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The separate section on "On-going Research Projects" has been eliminated from this issue. The Smithsonian Science Information Exchange (SSIE) ended its work October 1, 1981, and transfer of such efforts to the National Technical Information Service (NTIS) has not been completed. NASA plans to resume this section in an early issue of *STAR* Volume 20 (1982). Comments on this section and its usefulness are welcome and should be sent to the NASA Scientific and Technical Information Branch (NST-44), Washington, DC 20546.

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Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

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Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

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02 AERODYNAMICS

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For related information see also *34 Fluid Mechanics and Heat Transfer*.

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For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion*.

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For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.

For related information see also *Geosciences*.

88 SPACE SCIENCES (GENERAL) N.A.

89 ASTRONOMY 134

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS 135

Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION 135

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design, Testing and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

92 SOLAR PHYSICS 135

Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION 136

Includes cosmic radiation; and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

GENERAL

99 GENERAL 136

Note: N.A. means that no abstracts were assigned to this category for this issue.

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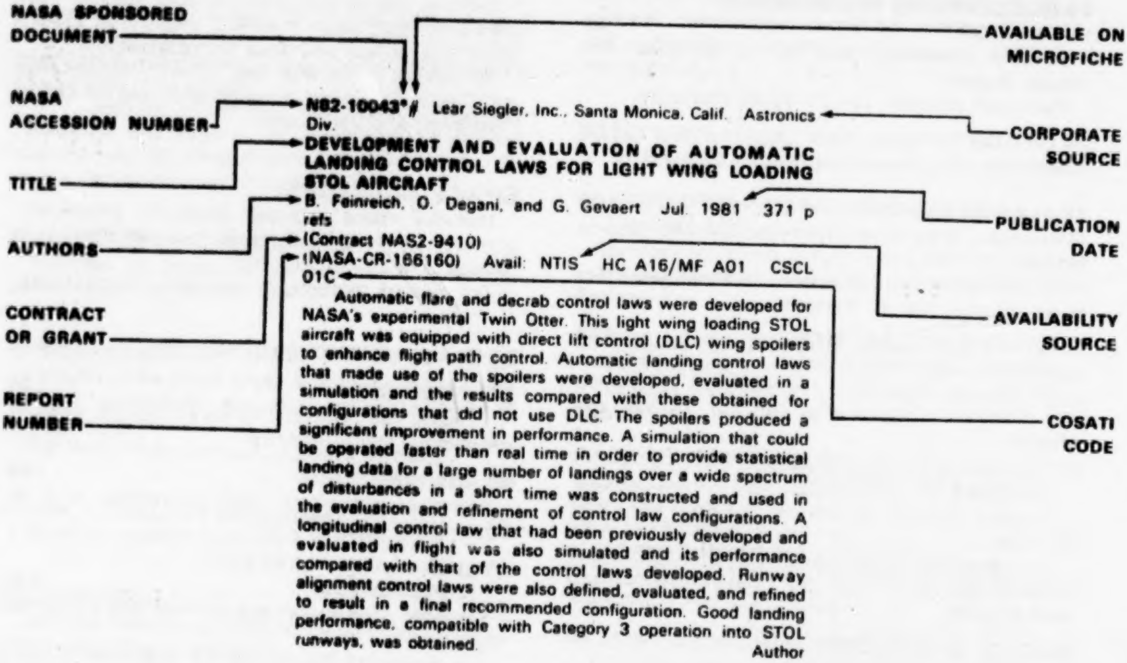
TYPICAL CITATION AND ABSTRACT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N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
(Contract NAS2-9410)
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained.
Author

VOLUME 20 NUMBER 1/JANUARY 8, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-10001*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
ANALYTIC STUDY OF ORBITER LANDING PROFILES
Harold J. Walker Sep. 1981 115 p refs
(NASA-TM-81365; H-1160) Avail: NTIS HC A06/MF A01 CSCL 01B

A broad survey of possible orbiter landing configurations was made with specific goals of defining boundaries for the landing task. The results suggest that the center of the corridors between marginal and routine represents a more or less optimal preflare condition for regular operations. Various constraints used to define the boundaries are based largely on qualitative judgements from earlier flight experience with the X-15 and lifting body research aircraft. The results should serve as useful background for expanding and validating landing simulation programs. The analytic approach offers a particular advantage in identifying trends due to the systematic variation of factors such as vehicle weight, load factor, approach speed, and aim point. Limitations such as a constant load factor during the flare and using a fixed gear deployment time interval, can be removed by increasing the flexibility of the computer program. This analytic definition of landing profiles of the orbiter may suggest additional studies, including more configurations or more comparisons of landing profiles within and beyond the corridor boundaries. J.M.S.

N82-10002# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Festigkeit.
MATHEMATICAL MODEL FOR THE MAINTENANCE PROGRAM OF MODERN JET AIRCRAFT
Rudolf Prinz, Hans-Christian Goetting, Karl-Heinz Galda (Deutsche Lufthansa A.G., Hamburg), and Juergen Kreth (Deutsche Lufthansa A.G., Hamburg) Oct. 1980 44 p refs In GERMAN; ENGLISH summary Report will also be announced as Translatation (ESA-TT-724)
(DFVLR-FB-81-14) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 10,40

Step-by-step escalation of structural inspection intervals based on long-term experience with a fleet of transport aircraft is described by a mathematical model. Fundamental to the model are statistical distributions of load and detectable crack length in a fatigue loaded component. Knowing realistic probabilities of failure enables the calculation of appropriate inspection intervals. Calculation procedure yields increasing intervals up to a maximum value and a decrease when approximating the mean value of detectable crack length. As to usual interval steps, the results show good agreement with practice. Restrictions and possible applications of the model are discussed. Author (ESA)

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-10003 Polytechnic Inst. of New York, Brooklyn.
THE SUPERSONIC FLOW IN CONICAL CORNERS Ph.D. Thesis
Frank Marconi 1981 74 p
Avail: Univ. Microfilms Order No. 8118884

A computational procedure was developed to predict the inviscid super hypersonic flow field of conical internal corners. The prediction of internal corner flow fields can be important in the design of supersonic box type inlets. The computational procedure utilizes a second order finite difference marching technique to asymptote to the conical corner flow solution of Euler's equations. These flow fields are dominated by complex shock interactions. All discontinuities, shocks and slip surfaces, are fitted with the appropriate jump conditions. The triple points (the interaction of three shocks and a slip surface) are also computed exactly. Computed results are compared with experimental data and the computational result of other investigations. In addition, the sensitivity of these flow fields to a number of geometric parameters is studied, and the impact of these flows on inlet performance is assessed. Dissert. Abstr.

N82-10004 Virginia Polytechnic Inst. and State Univ., Blacksburg.
ACOUSTIC PROPAGATION IN NONUNIFORM CIRCULAR DUCTS CARRYING NEAR SONIC MEAN FLOWS Ph.D. Thesis
Jeffrey Jennings Kelly 1981 150 p
Avail: Univ. Microfilms Order No. 8118699

A linear model based on the wave envelope technique is used to study the propagation of axisymmetric and spinning acoustic modes in hardwalled and lined nonuniform circular ducts carrying neat sonic mean flows. This method is valid for large as well as small axial variations, as long as the mean flow does not separate. A numerical procedure, which is stable for cases of strong interaction, for analysis of nonlinear acoustic propagation through nearly sonic mean flows is also developed. The numerical results show that an impedance condition can be satisfied at the duct exit and a corresponding solution obtained. The numerical results confirm that the nonlinearity intensifies the acoustic disturbance in the throat region, reduces in intensity of the fundamental frequency at the duct exit, and increases the reflections. This implies that the mode conversion properties of variable area ducts can reflect and focus the acoustic signal to the vicinity of the throat in high subsonic flows. Also the numerical results indicate that a shock develops if certain limits on the input parameters are exceeded. Dissert. Abstr.

N82-10005 West Virginia Univ., Morgantown.
AN INDOOR BLADE TEST FACILITY FOR DETERMINING THE BASIC AERODYNAMIC PROPERTIES OF DARRIEUS

WIND TURBINE AIRFOILS WITH TEST RESULTS FOR AN NACA 0015 AND A MODIFIED SECTION Ph.D. Thesis
Walter Paul Wolfe 1981 332 p
Avail: Univ. Microfilms Order No. 8118421

An indoor facility was developed for use in the aerodynamic testing of Darrieus wind turbine blades. A three component strain gage balance was used to reduce lift, drag, and moment coefficients of blades whose angle of attack, chord to radius ratio and Reynolds number could be systematically varied. A computer data acquisition system was developed to automatically record, reduce, and save the test data. It was learned that the unusual flow field of this test environment necessitates unique induced velocity corrections to the test data. Computer codes were developed to calculate the angles of attack induced at the blade by the trailing tip vortices. The results were then used to correct the test data. The effects of flow curvature on blade aerodynamics were experimentally verified. Both blades demonstrated virtual camber and incidence as evidenced by non-zero moment coefficients and angles of zero lift and minimum drag.
Dissert. Abstr.

N82-10006 George Washington Univ., Washington, D.C.
EFFECT OF DRIVEN WALL MOTION ON BOUNDARY LAYER FLOW Ph.D. Thesis
Leonard Murray Weinstein 1981 181 p
Avail: Univ. Microfilms Order No. 8117959

A low-speed experimental boundary layer study was conducted over a thin membrane surface model, driven by acoustic horns into a two dimensional standing wave. The influence of an unsteady wall boundary condition on the structure of a zero pressure gradient turbulent boundary layer was examined. Measured quantities included velocity profiles, total drag, turbulent and acoustic fluctuation quantities, Reynolds stress, and wall motion. A simplified theoretical analysis of the interaction of the mean flow with wall induced sound was used to explain some of the results obtained. The model was first examined under a laminar boundary layer. Data taken under this condition showed the effect of the driven wall on measured quantities without considering the effect of turbulence. The wall was then examined at several velocities under a turbulent boundary layer. This gave a combination of wall and flow disturbances. Data indicate the momentum thickness of the boundary layer and the total drag of the driven model did not change from the undriven values, even though the Reynolds stress showed both local and average changes.
Dissert. Abstr.

N82-10007 Colorado State Univ., Fort Collins.
ACTIVE MODELING OF TURBULENCE FOR WIND-TUNNEL STUDIES OF BRIDGE MODELS Ph.D. Thesis
Bogusz Bienkiewicz 1981 203 p
Avail: Univ. Microfilms Order No. 8119691

In a method, for turbulence generation, an additional energy is supplied to the mean flow by stirring air in an active manner. Two arrays of symmetric airfoils are placed in the mean flow and oscillate pseudorandomly driven by an appropriate servo-system and input driving signals. Vertical and horizontal velocity components are of main interest. It is possible to generate turbulence of prescribed characteristics for the two velocity components of interest provided that the experimental configuration of the generator is correctly selected. Measured velocity spectra are in good agreement with the target spectra, especially in the low-frequency range. The integral scales of turbulence are aproximately one order of magnitude larger than the scales of a typical grid turbulence generated in the same wind-tunnel conditions. The length and the ratio of the scales can be varied. The proposed active turbulence generator can be conveniently used in the wind tunnel studies to determine the effects of turbulence length scale upon the aerodynamic response of bridge section models.
Dissert. Abstr.

N82-10008 California Inst. of Tech., Pasadena.
A PETROV-GALERKIN FINITE ELEMENT FORMULATION FOR CONVECTION DOMINATED FLOWS Ph.D. Thesis
Alexander Nelson Brooks 1981 126 p
Avail: Univ. Microfilms Order No. 8118601

The basis of the formulation is the streamline upwind concept, which provides an accurate multidimensional generalization of optimal one dimensional upwind schemes. When implemented as a consistent Petrov-Galerkin weighted residual method, it is shown that the formulation is not subjected to the artificial diffusion criticisms associated with many classical upwind methods. The effectiveness of the streamline upwind/Petrov-Galerkin formulation for the linear advection diffusion equation is demonstrated with numerical examples. The formulation is extended to the treatment of the incompressible Navier-Stokes equations. An efficient implicit pressure/explicit velocity transient algorithm is developed which allows for several treatments of the incompressibility constraint and for multiple iterations within a time step. The algorithm is demonstrated on the problem of vortex shedding from a calculate cylinder at a Reynolds number of 100.
Dissert. Abstr.

N82-10009 California Inst. of Tech., Pasadena.
A MODEL FOR THE VON KARMAN VORTEX STREET Ph.D. Thesis
James Carl Schatzman 1981 118 p
Avail: Univ. Microfilms Order No. 8118980

In the wake of a two dimensional bluff body placed in a uniform stream, for sufficiently large but not too large flow velocity a distinctive pattern of vorticity is observed. The pattern consists of vortices of high vorticity surrounded by nearly irrotational fluid. These vortices are organized in two nearly parallel staggered rows of vortices of opposite direction of rotation. This pattern is called the von Karman vortex street. A model for the von Karman vortex street is analyzed. The model is inviscid, incompressible, two dimensional and consists of vortices of finite area and uniform voraticity. Calculations of steady solutions of the Euler equations and an analysis of the stability of steady solutions for two dimensional disturbances are described. The calculations indicate that the vortex wake can be stabilized by sufficiently large area of the vortices. Data are given which (to some approximation) will permit relating the street to the flow past a body.
Dissert. Abstr.

N82-10010*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A NEW SOLUTION-ADAPTIVE GRID GENERATION METHOD FOR TRANSONIC AIRFOIL FLOW CALCULATIONS
S. Nakamura (Ohio State Univ., Columbus) and T. L. Holst Oct. 1981 21 p refs
(Contract NCA2-OR565-901)
(NASA-TM-81330; A-8733) Avail: NTIS HC A02/MF A01 CSCL 01A

The clustering algorithm is controlled by a second-order, ordinary differential equation which uses the airfoil surface density gradient as a forcing function. The solution to this differential equation produces a surface grid distribution which is automatically clustered in regions with large gradients. The interior grid points are established from this surface distribution by using an interpolation scheme which is fast and retains the desirable properties of the original grid generated from the standard elliptic equation approach.
T.M.

N82-10011*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
OIL-FLOW SEPARATION PATTERNS ON AN OGIVE FOREBODY
Earl R. Keener Oct. 1981 32 p refs Presented at 14th AIAA Atmospheric Flight Mech. Conf., Danvers, Mass., 11-13 Aug. 1980
(NASA-TM-81314; A-8650) Avail: NTIS HC A03/MF A01 CSCL 01A

Oil flow patterns on a symmetric tangent ogive forebody having a fineness ratio of 3.5 are presented for angles of attack up to 88 deg at a transitional Reynolds number of 8 million (based on base diameter) and a Mach number of 0.25. Results show typical surface flow separation patterns, the magnitude of surface flow angles, and the extent of laminar and turbulent flow for symmetric, asymmetric, and wakelike flow regimes.
Author

N82-10012*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE STRUCTURE OF TRAILING VORTICES GENERATED BY MODEL ROTOR BLADES

C. Tung, S. L. Pucci, F. X. Caradonna, and H. A. Morse Aug. 1981 23 p refs Presented at Seventh European Rotorcraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany, 8-11 Sep. 1981 Prepared in cooperation with Army Aviation Research and Development Command, Moffett Field, Calif.
(NASA-TM-81316; A-8683; USAAVRADCOM-TR-81-A-25)
Avail: NTIS HC A02/MF A01 CSCL 01A

Hot-wire anemometry to analyze the structure and geometry of rotary wing trailing vortices is studied. Tests cover a range of aspect ratios and blade twist. For all configurations, measured vortex strength correlates well with maximum blade-bound circulation. Measurements of wake geometry are in agreement with classical data for high-aspect ratios. The detailed vortex structure is similar to that found for fixed wings and consists of four well defined regions--a viscous core, a turbulent mixing region, a merging region, and an inviscid outer region. A single set of empirical formulas for the entire set of test data is described. S.L.

N82-10013# Colorado Univ. at Boulder. Dept. of Aerospace Engineering Sciences.
APPLICATION OF A SHOCK-TURBULENT BOUNDARY LAYER INTERACTION THEORY IN TRANSONIC FLOW FIELD ANALYSIS
G. R. Inger 18 Feb. 1980 14 p refs Presented at Transonic Perspective: A Critique of Transonic Flow Res., Ames, Calif., 18-20 Feb. 1981
(Contract N00014-80-C-0470)
(AD-A103244) Avail: NTIS HC A02/MF A01 CSCL 20/4

This paper describes the application of non-asymptotic triple-deck theory of transonic shock-turbulent boundary layer interaction as a local modular element in the global calculation of supercritical airfoil flow fields. Author (GRA)

N82-10014# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge - Entwicklung.
CALCULATION OF THE VISCOUS FLOW ABOUT AN INFINITE STREAMLINED AIRFOIL WITH FLAPS, MAKING USE A PANEL METHOD BY WOODWARD AND DVORAK Thesis - Hochschule der Bundeswehr, Munich [DIE BERECHNUNG DER VISKOSEN STROEMUNG UM UNENDLICH GEPFEILTE TRAGFLUEGEL MIT KLAPPEN UNTER ZUHILFENAHME EINES PANELVERFAHRENS NACH WOODWARD UND DVORAK]
Ludwig Gilg 24 Sep. 1980 315 p refs In GERMAN
(MBB-FE-122/S/PUB/35) Avail: NTIS HC A14/MF A01

A computer program, based on an extant method by Woodward and Dvorak, for the calculation of incompressible flow about a multielement streamlined airfoil configuration with infinite wing span and dependent on viscous influences was eleborated. The airfoil configuration with a maximum of one slat and up to two flaps is described as panels. Using a two-dimensional vortex grid and potential formulation, frictionless flow and the resulting pressure distribution as well as the aerodynamic coefficients for lift and pitching moment are established. By iteration, between potential calculation and boundary layer calculation, there converges a stable solution while overall aerodynamic coefficients for lift, pitching moment, and drag can be derived as a function of Reynolds number. Author (ESA)

N82-10015# Stuttgart Univ. (West Germany). Inst. fuer Aerodynamik und Gasdynamik
THE EFFECT OF AIRFOIL CHARACTERISTICS ON FLAPPING AND ROTOR FORCES OF TWO-BLADE TURBINES WITH FLAPPING JOINTS AND FLAP-PITCH COUPLING, UNDER THE INFLUENCE OF GUST BONDING [DER EINFLUSS VON PROFILEIGENSCHAFTEN AUF SCHLAGBEWEGUNG UND ROTORKRAEFT VON ZWEIBLATTWINDTURBINEN MIT SCHLAGGELENKEN UND BLATTWINKELRUECKSTEUERUNG UNTER BOEENBELASTUNG]
Gervino A. Walter Aug. 1979 104 p refs In GERMAN; ENGLISH summary
(Contract BMFT-PLE-ET-4086-A)
(IAG-79-15) Avail: NTIS HC A06/MF A01

A problem fitted discretization using a supporting point calculation technique was chosen as a useful compromise between computational time and accuracy of the solutions. The effects of airfoil aerodynamics were investigated on a squall front with a gust factor of two, comparing the cases of the single-blade and the two-blade rotor, respectively with and without flap-pitch coupling. The effects of airfoil drag and gravitation are clearly seen in the flow behavior at the rotor blades, the useful torque, the rotor pitch, and yaw behavior, using blades without flap-pitch coupling. Various types of squall front or pulse gusts are discussed. Author (ESA)

N82-10016# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
STANDARD TESTS OF A RESEARCH MODEL ROTOR IN A WIND TUNNEL, INCLUDING MODEL SIMILARITY [STANDARD-ERPROBUNG DES FORSCHUNGS-MODELLROTORS IM WINDKANAL, EINSCHLIESSLICH MODELLVERGLEICHEN]
R. Stricker, V. Mikulla, and E. Allramseder Bonn Bundesministerium der Verteidigung 1979 93 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-79-16) Avail: NTIS HC A05/MF A01; Dokzentbw, Bonn DM 30

A wind tunnel test program was developed, as a basis the actual flight regime of the BO-105 helicopter. Operation of the test stand and calibration of measuring devices is described. The procedure for data reduction (digital programs) is given. Results include the parameters: mean and fluctuating components of rotor forces and moments; blade bending moments (flapping, lagging); and control forces. Control and static stability derivatives are also determined. The calculations done for comparison with measurements, using aerodynamic/aeroelastic/flight mechanic digital programs, show in almost all cases very good agreement with model test results. The correlation with flight test data of the BO-105 helicopter shows that model similarity according to the most important scaling laws is fulfilled to a high degree and that the results can be used for real comparison of various sizes of hingeless helicopter rotors. Author (ESA)

N82-10017# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Experimentelle Stroemungsmechanik.
EXPERIMENTAL INVESTIGATIONS OF THE SEPARATED FLOW AROUND A RECTANGULAR WING
Hans Bippes, Michael Turk, and Klaus Jacob Oct. 1980 56 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-81-12) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 10

For the aspect ratios lambda = 3.1 and 2.3, pressure distributions over the whole span were measured at angles of attack up to alpha approximately = 27 deg. For selected cases, oil flow patterns were produced and velocity profiles behind the wing along with shear stresses at the surface were measured. Most of the model and the experiments were carried out at Re approximately = 2,100,000 and M approximately = 0.17. The model and the experiments are described. The results are discussed and partly compared with results from a theoretical model. Author (ESA)

N82-10018# European Space Agency, Paris (France).
DRAG MEASUREMENTS OF CONICAL AFTERBODIES AT SUBSONIC AND TRANSONIC SPEEDS
Helmut Esch Apr. 1981 61 p refs Transl. into ENGLISH of "Widerstandsmessungen and Konischen Heckkoerpern in Unterschallu. Niedrigen Transschall" DFVLR Rept. FB-79-27 DFVLR, Goettingen, West Germany 22 May 1979 Original report in GERMAN previously announced as N80-25302
(ESA-TT-646; DFVLR-FB-79-27) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 10.40

The drag of open conical afterbodies of missile bodies was measured at angles of incidence up to 20 deg. The speeds were in the subsonic and lower transonic Mach range at Reynolds numbers, based on body diameter, between 500,000 and 1,300,000. At zero incidence, the results allow a drag optimization for constant afterbody lengths and for constant base diameters. Author (ESA)

N82-10019# European Space Agency, Paris (France).
THEORETICAL PREDICTION OF THE BASE PRESSURE FOR TWO-DIMENSIONAL TURBULENT BASE FLOWS AT SUPERSONIC VELOCITIES
Mauri Tanner Jul. 1981 92 p refs Transl. into ENGLISH of "Theoretische Bestimmung des Basisdruckes fuer zweidimensionale turbulente totwasserstroemungen bei ueberschallgeschwindigkeiten", DFVLR Rept. EB-80-19 DFVLR Goettingen, West Germany May 1980 Original report in GERMAN previously announced as N81-13926
(ESA-TT-674; DFVLR-FB-80-19) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 17,20

The essential physical foundation of the theory is the theory of Oswatitsch, which gives the connection between the drag of the body and entropy in the flow. In flow over a simple step, the base pressure calculated by the theory is in good agreement with experimental results. The influence of boundary layer thickness on the base pressure is realistically dealt with. The influence of boattail on base pressure can be determined, as can the influence of forebody drag. Application of the theory to symmetrical wedges indicates good agreement between theory and experiment. The influence of the angle of incidence on the base pressure can be calculated for thin profiles at small angles of incidence. The theoretical results for thin wedges show that the base pressure becomes smaller with increasing angle of incidence. Author (ESA)

N82-10020# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AIRCRAFT EXCRESCENCE DRAG
A. D. Young, J. H. Paterson, and J. Lloyd Jones, ed. Jul. 1981 172 p refs
(AGARD-AG-264; ISBN-92-835-1392-4) Avail: NTIS HC A08/MF A01

A review was undertaken of the available data on the subject of the drag of excrescences on aircraft surfaces. Information from this review is summarized and presented in a way that is readily usable for prediction and design purposes. The basic characteristics of boundary layers are discussed and, where possible, the drag of excrescences is related to those characteristics. In particular, because the size of many types of surface imperfection is small in comparison with boundary layer thicknesses, the drag of such imperfections can be correlated in terms of the properties of inner regions of the boundary layer. Several previously published analyses of this type are highlighted and, where possible, extensions to other data sources or other types of excrescence are presented. The practical problems of applying these data in the varying velocity gradients existing on aircraft surface are treated and one section is devoted to the drag of auxiliary air inlet and exit openings. Gaps in existing data which offer opportunities for research effort are pointed out. J.M.S.

N82-10981# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
FINITE DIFFERENCE COMPUTATION OF THE STEADY TRANSONIC POTENTIAL FLOW AROUND AIRPLANES
Luo Shijun, Zheng Yuwen, Qian Hong, and Wang Dieqian *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 5-30 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

N82-10982# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SECOND ORDER APPROXIMATION THEORY OF AN ARBITRARY AEROFOIL IN COMPRESSIBLE POTENTIAL FLOW
Lin Chaoqiang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 31-50 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

N82-10983# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AERODYNAMIC CALCULATIONS AND DESIGN OF SUBCRITICAL AEROFOILS
Lin Chaoqiang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 51-64 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report
David L. Kohlman, William G. Schweikhard, and Alan E. Albright Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

N82-10022# Committee on Science and Technology (U. S. House).
SPIN RECOVERY TRAINING
Washington GPO 1980 15 p Presented by the Subcomm. on Invest. and Oversight of the Comm. on Sci. and Technol., 96th Congr., 2nd Sess., Jul. 1980
(GPO-66-020) Avail: Subcommittee on Investigations and Oversight

The FAA policy of not requiring spin recovery training as a prerequisite for a private pilot license was examined in an effort to determine if such a requirement would result in a net savings of life. Only FAA remained adamant in defense of the no-spin training policy. All other witnesses, to varying degrees, expressed the need for spin and recovery training as a common sense safety requirement. It can be concluded without equivocation that experienced aviators overwhelmingly demand that aspiring pilots be trained to protect themselves and be able to recover from post stall gyrations, incipient spins, and spins. The subcommittee's recommendations that such training be required for licensing is discussed with emphasis on the development of a flight training manual and an implementation plan. A.R.H.

N82-10023# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
A PROPOSED FLIGHT SAFETY PROGRAM FOR THE KOREAN AIR FORCE M.S. Thesis
Chong Kwan Lee Mar. 1981 136 p refs
(AD-A102373) Avail: NTIS HC A07/MF A01 CSCL 05/1

Several methodologies relevant to the development of a safety program for the Korean Air Force were reviewed. Methodologies considered included: Control charts; System safety analysis; and Critical incident technique. Data collection methods applicable to accident analysis were proposed. Recommendations for the incorporation of these methods into a safety program for the K.A.F. were developed. The safety program described in this thesis possesses the potential for reducing overall operational costs and maximizing aircraft availability. The end result of such a program can only serve to increase operational readiness and thereby maximize overall efficiency and military capability of the K.A.F. GRA

N82-10024# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.

LIGHTNING EFFECTS ON AIRCRAFT AND COMPOSITES. LITERATURE STUDY ON LIGHTNING STRIKES AND PROTECTION [VERKAN AV BLIXT I FLYGPLAN OCH KOMPOSITER. LITTERATURSTUDIE OEVER SKADOR OCH SKYDD]

Anita Alm Nov. 1980 102 p refs In SWEDISH
(FOA-C-20388-F9) Avail: NTIS HC A06/MF A01

The frequency and different types of lightning strike on different parts of aircraft and several ways of protection against direct and indirect lightning effects were reviewed. Fiber composites, lightning damage and testing of lightning protection for modern aircraft material are studied by means of simulation techniques. Unshielded composite materials are damaged by lightning. With a correctly shaped lightning shield damage can be prevented. Author (ESA)

N82-10025# Societe Nationale Industrielle Aerospatiale, Paris (France).

COST REDUCTION IN AIR TRANSPORTATION

P. Leboúc 1980 21 p Presented at French Aerospace Week, Indonesia, 8-12 Dec. 1980
(SNIAS-811-150-101) Avail: NTIS HC A02/MF A01

Historical trends in costs are reviewed. By adopting fuel conservation policies, such as renewal of the jet fleet, adaptation of flight operation, and modification of air traffic control procedures, the airlines can limit the effect of expected fuel price increases. In parallel, productivity gains should keep at a constant level all the other costs of airline operations. Under the above conditions, growth of the industry seems to be certain even if fuel prices increase at a rate of 2 to 4% per year above inflation during the next 20 years. Author (ESA)

N82-10026# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bonn (West Germany). Inst. fuer Flugmedizin.

DEVELOPMENT AND CONSTRUCTION OF PILOT EJECTOR SEATS IN GERMANY FROM 1938-1945

Siegfried Ruff Feb. 1981 110 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-81-04) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 26

Pioneering research, leading to the development of an ejector seat for the Junkers Ju 88, is reviewed. Fundamentals in establishing human acceleration tolerances are discussed. The experimental simulation of shock induced acceleration is described, and human resistance is quantified. Exploitation and follow-up of accident related data are summarized, including investigations of the accelerations experienced with an aircraft out of control, e.g., shot down. The action of airspeed pressure on a person is considered, and experience gained with research aircraft is recounted. Measuring methods for technical and physiological parameters are indicated. The beginning of ejector seat development in England, Sweden, and the U.S. (1944-45) is also briefly reviewed in comparison. Author (ESA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N82-10027# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

THE STATISTICAL THEORY OF RADIO DIRECTION FINDING

R. L. Holland Jun. 1981 47 p refs
(Contract N00024-81-C-5301)
(AD-A104156; JHU/APL/TG-1330) Avail: NTIS HC A03/MF A01 CSCL 17/3

The statistical theory of radio direction finding as it applied to three-dimensional geometrics is presented in this report. This theory is an extension of the two-dimensional theory presented by R. G. Stansfield in 1947. The theory has application in situations where airborne targets are maneuvering in three dimensions at high speed, especially when the platforms with the direction finding equipment are also aircraft. Author (GRA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-10028*# Wyle Labs., Inc., Huntsville, Ala.

EXPERIMENTAL MODAL ANALYSIS OF THE FUSELAGE PANELS OF AN AERO COMMANDER AIRCRAFT Final Report

David Geisler Sep. 1981 164 p refs Prepared in cooperation with Structural Dynamics Res. Corp., Cincinnati, Ohio
(Contract NAS1-14693)
(NASA-CR-165750; Rept-10568) Avail: NTIS HC A08/MF A01 CSCL 01C

The reduction of interior noise in light aircraft was investigated with emphasis the thin fuselage sidewall. The approach used is theoretical and involves modeling of the sidewall panels and stiffeners. Experimental data obtained from tests investigating the effects of mass and stiffness treatments to the sidewalls are presented. The dynamic characteristics of treated panels are contrasted with the untreated sidewall panels using experimental modal analysis techniques. The results include the natural frequencies, modal dampling, and mode shapes of selected panels. Frequency response functions, data relating to the global fuselage response, and acoustic response are also presented. J.M.S.

N82-10029*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

V/STOL AIRCRAFT AND FLUID DYNAMICS

Leonard Roberts (Stanford Univ., Calif.) and Seth B. Anderson Oct. 1981 8 p refs
(NASA-TM-81328; A-8730) Avail: NTIS HC A02/MF A01 CSCL 01C

The impact of military applications on rotorcraft and V/STOL aircraft design is summarized with respect to fixed-wing aircraft. The influence of the mission needs on the configurational design of V/STOL aircraft, the implications regarding some problems in fluid dynamics relating to propulsive flows, and their interaction with the aircraft and the ground plane, are also considered. Additional research in fluid dynamics that can contribute to an improvement in performance of V/STOL aircraft is suggested. B.W.

N82-10030*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

AN INVESTIGATION OF A STOPPABLE HELICOPTER ROTOR WITH CIRCULATION CONTROL

John D. Ballard, John L. McCloud, III, and T. J. Forsyth Aug. 1980 372 p refs
(NASA-TM-81218; A-8278) Avail: NTIS HC A16/MF A01 CSCL 01C

A stoppable helicopter rotor with circulation control was investigated in the Ames 40 by 80 foot wind tunnel. The model was tested as a rotating wing, a fixed wing, and during transition start/stop sequences. The capability of the model's control system to maintain pitch and roll moment balance during the start/stop sequence, the ability of the blades to withstand the start/stop loads, the adequacy of the control system to maintain balance in the helicopter mode, and the control system capabilities in the fixed-wind mode were assessed. Time-history data of several start/stop sequences of the X-wing rotor, and the steady-state data relating to the model as both a rotor and as a fixed-wing aircraft are presented. In addition, stability data are presented which were acquired during open-loop and closed-loop tests of the hub moment feedback control system. J.M.S.

N82-10031*# National Aeronautics and Space Administration, Washington, D. C.
QUIET SHORT-HAUL RESEARCH AIRCRAFT FAMILIARIZATION DOCUMENT, REVISION 1
Joseph C. Eppel Sep. 1981 81 p refs
(NASA-TM-81298; A-8601) Avail: NTIS HC A05/MF A01 CSCL 01C

The design features and general characteristics of the Quiet Short Haul Research Aircraft are described. Aerodynamic characteristics and performance are discussed based on predictions and early flight test data. Principle airplane systems, including the airborne data acquisition system, are also described. The aircraft was designd and built to fulfill the need for a national research facility to explore the use of upper surface blowing, propulsive lift technology in providing short takeoff and landing capability, and perform advanced experiments in various technical disciplines such as aerodynamics, propulsion, stability and control, handling qualities, avionics and flight control systems, trailing vortex phenomena, acoustics, structure and loads, operating systems, human factors, and airworthiness/certification criteria. An unusually austere approach using experimental shop practices resulted in a low cost and high research capability. Author

N82-10032*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
COMPARATIVE STUDY OF FLARE CONTROL LAWS Final Report, 15 Dec. 1979 - 15 Oct. 1981
A. A. Nadkarni Oct. 1981 52 p refs
(Grant NsG-1480)
(NASA-CR-164903) Avail: NTIS HC A04/MF A01 CSCL 01C

The development of a digital, three dimensional, automatic control law designed to achieve an optimal transition of a B-737 aircraft between glide slope conditions and the desired final touchdown condition is presented. The digital control law is a time invariant, state estimate feedback law, and the design is capable of using the microwave landing system. Major emphasis is placed on the reduction of aircraft noise in communities surroundings airports, the reduction of fuel consumption, the reduction of the effects of adverse weather conditions on aircraft operations, and the efficient use of airspace in congested terminal areas. Attention is also given to the development of the capability to perform automatic flares from steep glide slopes to precise touchdown locations. B.W.

N82-10033# Aberdeen Univ. (Scotland). Dept. of Engineering.
APPLICATION OF NUMERICAL METHODS TO THE CALCULATION OF ELECTROSTATIC FIELDS IN AIRCRAFT FUEL TANKS Final Scientific Report, 1 Jul. 1980 - 30 Jun. 1981
J. R. Smith, P. Lees, and D. McAllister Aug. 1981 65 p refs
(Grant AF-AFOSR-0223-80; AF Proj. 2301; AF Proj. 3048)
(AD-A103270; EOARD-TR-81-9) Avail: NTIS HC A04/MF A01 CSCL 01/3

The solution of electrostatic field problems occurring during the refueling of aircraft fuel tanks containing explosion suppressant foams is discussed. A computational model of a fuel tank is set up, and the finite element method is used to calculate the electrostatic potential distribution within the tank. Author (GRA)

N82-10034# Boeing Military Airplane Development, Seattle, Wash.
LOW MAINTENANCE HYDRAULIC ACCUMULATOR Final Report, Aug. 1976 - Dec. 1980
E. C. Wagner and W. E. Willard Jun. 1981 65 p
(Contract F33615-76-C-2088; AF Proj. 3145)
(AD-A103947; AFWAL-TR-81-2031) Avail: NTIS HC A04/MF A01 CSCL 13/7

This report presents the results of a program to develop a low maintenance accumulator, compatible with current MS envelopes and competitive in cost with conventional accumulators. The purpose of the program was to select and develop a metal bellows configuration/concept to replace the conventional moving piston and seal of conventional accumulators. The selected bellows are of welded construction and welded in place to allow bellows movement identical to piston movement. The accumulator housing is of welded construction to eliminate all possible leak points. The program goal was to develop an accumulator to provide a ten year unserviced life. Test results indicate an accumulator design is possible to achieve a service life of 6 to 10 years based on installation on an F-16 aircraft. Author (GRA)

N82-10035# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
A CFRP TAILERON FOR THE TORNADO: CONSTRUCTION AND PRODUCTION [CFK-TAILERON FUER DEN TORNADO: KONSTRUKTION UND FERTIGUNG]
L. Lammer, W. Hartmann, and R. Guenther 1980 67 p In GERMAN Presented at Gastvortrag im KL 624, Mannheim, West Germany, 10-14 Nov. 1980
(MBB-FE-212/KFK/PUB/2) Avail: NTIS HC A04/MF A01

A CFRP lightweight structure, i.e., CFRP taileron, for the Tornado aircraft was developed. The CFRP taileron is interchangeable with the currently used metal horizontal stabilizer as far as geometry, function and durability are concerned while a 30% weight reduction is achieved with CFRP construction. The assembly of the CFRP taileron is detailed and results from static, dynamic, and vibration testing of the structure are presented. A series production method is then outlined, including inspection and certification procedures. Author (ESA)

N82-10036# European Space Agency, Paris (France).
THEORETICAL INVESTIGATION OF THE INFLUENCE OF SPOILER DYNAMICS ON THE HANDLING QUALITIES OF AN AIRCRAFT WITH DIRECT LIFT CONTROL
Dieter Schafranek Jul. 1981 66 p refs Transl. into ENGLISH of "Theoretische Untersuchung ueber den Einfluss der Spoilerdynamik auf die Fliegbarkeit eines Flugzeugs mit direkter auftriebssteuerung" Rept. DFVLR-FB-80-07 DFVLR, Brunswick, 1980 Original report in GERMAN previously announced as N81-13975
(ESA-TT-681; DFVLR-FB-80-07) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 14.70

Theoretical parameters describing the pilot's workload during aircraft control pitch tracking and flight path tracking tasks on a transport aircraft equipped with spoiler direct lift control (DLC) were studied. The determined parameters are the necessary phase compensation and gain adapation which the pilot must perform, and also the closed loop resonance. The influence of the DLC-gain factor, spoiler actuator rate, and spoiler deflection washout time constant on pilot workload is presented. Simulated time histories of pitch rate and normal acceleration response due to step type control inputs show the corresponding reactions of the various DLC-configurations which are essential for pitch control and flight path control. Direct lift control using spoilers is shown to be sensible for the aircraft in the test only if the pitching moment of the spoiler is completely compensated, the time constant for the spoiler deflection washout is not too small (greater than 5 seconds) and if the spoiler moves with more delay than the elevator. Author (ESA)

N82-10998# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
MATRIX ANALYSIS OF WINGS
Xu Yuan, Zhu Runziang, Jiang Jinqiag, and Cai Yiuliu *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS) T-0260-81-Pt-2) 28 Aug. 1981 p 76-111 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

No abstracts in this category.

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-10037*# Detroit Diesel Allison, Indianapolis, Ind.
PROPULSION STUDY FOR SMALL TRANSPORT AIRCRAFT TECHNOLOGY (STAT) Contractor Final Report
J. C. Gill, R. V. Earle, D. V. Staton, P. C. Stolp, D. S. Huelster, and B. A. Zolezzi 16 Dec. 1980 186 p refs
(Contract NAS3-21995)
(NASA-CR-165499; DDA-EDR-10470) Avail: NTIS HC A09/MF A01 CSCL 21E

Propulsion requirements were determined for 0.5 and 0.7 Mach aircraft. Sensitivity studies were conducted on both these aircraft to determine parametrically the influence of propulsion characteristics on aircraft size and direct operating cost (DOC). Candidate technology elements and design features were identified and parametric studies conducted to select the STAT advanced engine cycle. Trade off studies were conducted to determine those advanced technologies and design features that would offer a reduction in DOC for operation of the STAT engines. These features were incorporated in the two STAT engines. A benefit assessment was conducted comparing the STAT engines to current technology engines of the same power and to 1985 derivatives of the current technology engines. Research and development programs were recommended as part of an overall technology development plan to ensure that full commercial development of the STAT engines could be initiated in 1988. T.M.

N82-10038*# Detroit Diesel Allison, Indianapolis, Ind.
PROPULSION STUDY FOR SMALL TRANSPORT AIRCRAFT TECHNOLOGY (STAT), APPENDIX B Final Report
[1980] 11 p refs
(Contract NAS3-21995)
(NASA-CR-165499-App-B; DDA-EDR-10470-App-B) Avail: NTIS HC A02/MF A01 CSCL 21E

Data are tabulated for two conceptual engines designed for small transport aircraft. These are the 1790 W (2400 shp) class engine and the 3579 kW (4800 shp) class engine for the 0.5 M sub N and 0.7 M sub N airplanes, respectively. All data points required to perform the STAT missions are provided including take-off, climb, cruise, loiter, and fuel allowances. The weight, dimensions, price, and maintenance costs are given as well as the installation criteria and equations used for adjusting horsepower for gearbox loss, and converting horsepower to thrust. Scaling equations are included. A.R.H.

N82-10039*# United Technologies Research Center, East Hartford, Conn.
DEVELOPMENT OF LOW MODULUS MATERIAL FOR USE IN CERAMIC GAS PATH SEAL APPLICATIONS Final Report
H. E. Eaton and R. C. Novak Oct. 1981 83 p refs
(Contract NAS3-22134)
(NASA-CR-165469; R81-915188-13) Avail: NTIS HC A05/MF A01 CSCL 21E

Three candidate materials were examined: Brunsbond (R) Pad; plasma sprayed porous NiCrAlY; and plasma sprayed low modulus microcracked zirconia. Evaluation consisted of mechanical, thermophysical, and oxidation resistance testing along with optical microscopy and a feasibility demonstration of attaching the material to a suitable substrate. The goals of the program were the following: feasibility of fastening or depositing the low modulus system onto a broad range of substrate alloys; feasibility of depositing or forming the low modulus system to a thickness of 0.19 cm to 0.38 cm; potential to attain a modulus of elasticity in the range of 3.4 to 6.9 GPa (0.5 to 1.0 MSI), and an ultimate strength of 17.2 MPa (2.5 ksi); suitable thermal conductivity; and static oxidation life of at least 1000 hours at 1311 K. The results of the program indicate that all three systems offer attractive properties as a strain isolator material. T.M.

N82-10040*# General Electric Co., St. Petersburg, Fla.
THERMAL-BARRIER-COATED TURBINE BLADE STUDY Final Report
P. A. Siemers and W. B. Hillig Aug. 1981 134 p refs
(Contract NAS3-21727)
(NASA-CR-165351; SRD-81-083) Avail: NTIS HC A07/MF A01 CSCL 21E

The effects of coating TBC on a CF6-50 stage 2 high-pressure turbine blade were analyzed with respect to changes in the mean bulk temperature, cooling air requirements, and high-cycle fatigue. Localized spallation was found to have a possible deleterious effect on low-cycle fatigue life. New blade design concepts were developed to take optimum advantage of TBCs. Process and material development work and rig evaluations were undertaken which identified the most promising combination as ZrO2 containing 8 w/o Y2O3 applied by air plasma spray onto a Ni22Cr-10Al-1Y bond layer. The bond layer was applied by a low-pressure, high-velocity plasma spray process onto the base alloy. During the initial startup cycles the blades experienced localized leading edge spallation caused by foreign objects. T.M.

N82-10984# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AN AERODYNAMIC DESIGN METHOD FOR TRANSONIC AXIAL FLOW COMPRESSOR STAGE
Zhu Fangynan, Zhou Xinhai, Liu Songling, and Fan Feida *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 65-86 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

N82-11006# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INITIAL EXPERIMENTAL RESEARCH INTO THE RESPONSE OF TURBOJET ENGINE COMPRESSORS TO DISTORTION OF INTAKE PRESSURE
Chen Fu-qun, Tang Di-yi, Hu Zi-long, Id Wen-lan, Yu Jin-di, Wu Xin-yuan, Zhao Jue-liang, Lin Qi-xun, Wang Zong-yuan, Liu Si-hong et al *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 287-316 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

N82-11007# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A PRELIMINARY EXPERIMENTAL INVESTIGATION OF THE RESPONSE OF A TURBOJET ENGINE TO INLET PRESSURE DISTORTION
Chen Fu-qun, Tang Di-yi, Hu Zi-long, Id Wen-lan, Yu Jin-di, Wu Xin-yuan, Zhao Jue-liang, Lin Qi-xun, Wang Zong-yuan, and Liu Si-hong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 317-346 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

N82-11008# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

AN EXPERIMENTAL INVESTIGATION OF THE ROTATING STALL, SURGE AND WAKE BEHIND THE ROTOR FOR A SINGLE STAGE AXIAL COMPRESSOR
Zhang Weide, Zhang Changsheng, Liu Zhiwei, and Liu Jiafeng *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 347-370 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-10041*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DETERMINATION OF AIRPLANE MODEL STRUCTURE FROM FLIGHT DATA BY USING MODIFIED STEPWISE REGRESSION
Vladislav Klein (Joint Inst. for Advancement of Flight Sciences, Hampton, Va.), James G. Batterson, and Patrick C. Murphy Oct. 1981 48 p refs
(NASA-TP-1916; L-14613) Avail: NTIS HC A03/MF A01 CSCL 01C

The linear and stepwise regressions are briefly introduced, then the problem of determining airplane model structure is addressed. The MSR was constructed to force a linear model for the aerodynamic coefficient first, then add significant nonlinear terms and delete nonsignificant terms from the model. In addition to the statistical criteria in the stepwise regression, the prediction sum of squares (PRESS) criterion and the analysis of residuals were examined for the selection of an adequate model. The procedure is used in examples with simulated and real flight data. It is shown that the MSR performs better than the ordinary stepwise regression and that the technique can also be applied to the large amplitude maneuvers. T.M.

N82-10042*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ESTIMATION OF AIRPLANE STABILITY AND CONTROL DERIVATIVES FROM LARGE AMPLITUDE LONGITUDINAL MANEUVERS
James G. Batterson Oct. 1981 43 p refs
(NASA-TM-83185; L-14524) Avail: NTIS HC A03/MF A01 CSCL 01C

The application of a modified stepwise regression algorithm to both a complete data string and to that same data partitioned into bins as a function of angle of attack was demonstrated. Results from the large-scale maneuver agree well with results from 20 maneuvers in which small perturbation from trim at various angles of attack were induced. T.M.

N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
(Contract NAS2-9410)
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

N82-10044# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
ACTIVE CONTROL ELEMENTS ON THE TRANSONIC WING OF THE AIRBUS A-300 (ACTTA A). AIRBUS A-300 WITH REDUCED LONGITUDINAL STABILITY (ACTTA-C) [AKTIVE STEUERELEMENTE AM TRANSSONISCHEN FLUEGEL DES AIRBUS A300 (ACTTA A). AIRBUS A300 MIT REDUZIERTER LAENGSSTABILITAET (ACTTA-C)]
H. G. Klug 1980 34 p In GERMAN Presented at 2nd Bundesministerium fuer Forschung und Technologie Statusseminar Luftfahrtforsch. und Luftfahrttechnol., Garmisch-Partenkirchen, West Germany, 8-9 Oct. 1980
Avail: NTIS HC A03/MF A01

Two projects concerned with the development and design optimization of the Airbus A-300 are reviewed. Studies related to active control are discussed. Investigations specific to gust loading and maneuver induced loading of the A-300 structure are emphasized. Results influence design criteria, e.g., open or closed loop control, sensor selection, etc. Reduced longitudinal stability of the A-300 is then considered as a tradeoff in favor of weight reduction through the use of lightweight materials. Wind tunnel and other simulation tests are described. Author (ESA)

N82-10045# European Space Agency, Paris (France).
SYSTEM IDENTIFICATION OF THE LONGITUDINAL MOTION OF THE DFVLR HFB 320 RESEARCH AIRCRAFT WITH PARTICULAR CONSIDERATION OF CONTROL SURFACE EFFECTIVENESS
Ohad Rix Apr. 1981 55 p refs Transl. into ENGLISH of "Systemidentifizierung des DFVLR-Forschungsflugzeugs HFB 320 in der Laengsbewegung mit besonderer Beruecksichtigung der Steuerflaechenwirksamkeit" Rept. DFVLR-Mitt-79-66 DFVLR, Brunswick, Jul. 1979 Original report in GERMAN previously announced as N81-13971
(ESA-TT-666; DFVLR-Mitt-79-16) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 12

Analysis of the longitudinal motion of the DFVLR HFB-320 research aircraft by means of a maximum likelihood method is described. The control surface effectiveness of separately or simultaneously deflected DLC flaps and spoilers was determined. The flight test technique, and the influence of different mathematical models on the results obtained, are illustrated and discussed. Author (ESA)

N82-10046# European Space Agency, Paris (France).
A CONTRIBUTION TO THE STABILIZATION OF FLIGHT VEHICLE PARACHUTE SYSTEMS
Christos Saliaris and Dieter Muenscher Jun. 1981 30 p refs Transl. into ENGLISH of "Beitrag zur Stabilisierung von Flugkoerper-Fallschirm-Systemen" Rept. Mitt-80-05 DFVLR, Brunswick, Apr. 1980 Original report in GERMAN previously announced as N81-13926
(ESA-TT-679; DFVLR-Mitt-80-05) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 6.30

The dynamic behavior of a parachute-load system moving in a plane is analyzed. A mathematical model is adopted and a system of nonlinear equations of motion is produced, which are then solved without linearization using a digital computer. Calculations are carried out using a modified guide surface parachute in order to investigate the effects of parachute size, distance between attachment point and canopy, and distance between the attachment point and the center of gravity of the load on the oscillation of the missile. Parameters influencing the variation of the pitch angle of the load with time are also studied. Increasing the canopy and moving the attachment point behind the center of gravity of the load results in better stabilization. The damping increases, i.e. the pitch angle of the load becomes smaller and the period of oscillation decreases. If the distance between the attachment point on the load and the center of the canopy base is varied, there is scarcely any detectable change to the period of oscillation. However, the damping is influenced by a change in this distance; it has a maximum when the distance is approximately that which is customarily used. Author (ESA)

N82-10047# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Abteilung Elastomechanik und Aeroelastische Stabilitaet.

A METHOD FOR DETERMINATION OF THE AEROELASTIC BEHAVIOR OF AIRCRAFT WITH ACTIVE CONTROL SYSTEMS Ph.D. Thesis - Tech. Univ. Carolo-Wilhelmina

Raymond Freymann Feb. 1981 128 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-719)
(DFVLR-FB-81-05) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 26,30

An analytical method for the performance of dynamic calculations on servocontrolled aircraft, based on an extended formulation of the generalized aeroelastic equations is presented. The additional parameters introduced in the extended equations of motion are determined experimentally in a ground vibration test performed on a real aircraft structure as well as with help from an experimental-analytical method for determination of the transfer functions of the hydraulic actuators. The elaborated method is shown satisfactory by comparison of measured and calculated data resulting from investigations performed on a model wing structure with a rudder driven by a hydraulic actuator. Author (ESA)

N82-10048# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

MULTI-VARIABLE ANALYSIS AND DESIGN TECHNIQUES

Sep. 1981 168 p refs Presented at a Lecture Series held at Ankara, 28-29 Sep. 1981, Bolkesjo, Norway, 1-2 Oct. 1981, and Delft, The Netherlands, 5-6 Oct. 1981
(AGARD-LS-117) Avail: NTIS HC A08/MF A01

The basic theories and concepts involved in the design of advanced guidance and control systems employing state-space and multi-variable design methods are explained. The main topics reviewed include: (1) analysis and synthesis techniques; (2) application of observer and estimation principles; (3) computer-aided design and analysis methods; (4) system simulation techniques; and (5) tests evaluation and validation. For individual titles, see N82-10049 through N82-10058.

N82-10049# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

THE NEED FOR MULTIVARIABLE DESIGN AND ANALYSIS TECHNIQUES

Rhall E. Pope *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 10 p (For primary document see N82-10048 01-08)
Avail: NTIS HC A08/MF A01

Demand for higher accuracy, improved reliability/survivability, and more automation are placing increased emphasis on the control function for successful operation of aircraft weapon systems. Modifications to airframe designs directed at increased maneuverability and reduced weight are placing stringent on flight control systems. Fly-by-wire systems, particularly digital systems, provide the flexibility to not only accommodate but influence airframe design modifications and led to the control configured vehicle (CCV) concept. These advances in air, vehicle design and flight control system implementation are overwhelming traditional design and analysis techniques. Stability and control design specification are inadequate in dealing with statistically unstable vehicles, multiple control loops and high dynamic coupling. Better control system design and analysis techniques are needed which address the multi-input closely coupled dynamic nature of today's and tomorrows aircraft weapon systems. A.R.H.

N82-10050# Cambridge Univ. (England). Dept. of Engineering.

CHARACTERISTIC AND PRINCIPAL GAINS AND PHASES AND THEIR USE AS MULTIVARIABLE CONTROL DESIGN TOOLS

Alistair G. J. MacFarlane *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 34 p refs (For primary document see N82-10048 01-08)
Avail: NTIS HC A08/MF A01

The key to the generalization of classical frequency-response design techniques to the multivariable case lies in the development of ways of suitably extending the concepts of gain and phase. It is shown how algebraic function theory can be used to generalise Nyquist diagram and Root-Locus diagram techniques for use with systems having many inputs and outputs. This is done in such a way that the main structural features of such diagrams can be related to state-space model parameters. The shortcomings of characteristic gains and phases (used in a generalised Nyquist approach) are then noted. An alternative way of introducing amplitude and phase information, via the polar decomposition of an operator, leads to the introduction of principal gains and principal phases. Their properties are examined and, in particular, it is shown how they may be used to characterise robustness. The use of these techniques for design purposes is discussed. A.R.H.

N82-10051# Honeywell Systems and Research Center, Minneapolis, Minn.

MULTIVARIABLE DESIGN TECHNIQUES BASED ON SINGULAR VALUE GENERALIZATIONS OF CLASSICAL CONTROL

John C. Doyle *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 15 p refs (For primary document see N82-10048 01-08)
Avail: NTIS HC A08/MF A01

Singular value analysis was used to generalize the fundamental feedback ideas from classical single loop control theory to multiloop systems. The classical view of measuring the benefit of feedback in terms of desensitizing the system to plant variations and disturbances is discussed. Uncertainty is shown to play a critical role in determining the way in which feedback may be used. Certain singular value plots, called sigma-plots, are introduced as natural and effective generalizations of Bode gain plots and form the basic tools for analysis of multiloop feedback systems. These tools provide reliable means for assessing the stability margins, bandwidth, and desensitizing effects of multiloop feedback systems. Examples of a two input oscillator and control of the rotors of the CH-47 helicopter are given to illustrate the use of the sigma-plots and their interpretations. A.R.H.

N82-10052# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

LIMITATIONS ON ACHIEVABLE PERFORMANCE OF MULTIVARIABLE FEEDBACK SYSTEMS

John C. Doyle *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 9 p refs (For primary document see N82-10048 01-08)
Avail: NTIS HC A08/MF A01

The design tradeoffs that are the focus of classical single-loop theory were generalized to multiloop systems using singular value analysis techniques. The first tradeoff is algebraic between large loop gain for good sensitivity properties and small loop gain for stability margins. Another is the functional tradeoff improsed by the Bode gain/phase relations. These tradeoffs impose limitations on the achievable performance of any feedback design. The limitations caused by nonminimum phase zeros are also discussed. The problem of directionality in multiloop systems has no analog in single loop feedback systems is presented and analyzed. A.R.H.

N82-10053# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

LQG-BASED MULTIVARIABLE DESIGN: FREQUENCY DOMAIN INTERPRETATION

Gunter Stein *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 9 p refs (For primary document see N82-10048 01-08)
Avail: NTIS HC A08/MF A01

The use of the Linear-Quadratic-Gaussian (LQG) methodology in designing feedback compensators which meet multivarible performance, stability, and stability robustness requirements expressed as singular value conditions in the frequency domain is demonstrated. A.R.H.

N82-10054# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

LQG MULTIVARIABLE DESIGN TOOLS

Gunter Stein and Stephen Pratt *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 16 p refs (For primary document see N82-10048 01-08)
Avail: NTIS HC A08/MF A01

The basic design algorithms needed for frequency domain oriented Linear-Quadratic-Gaussian feedback design are described and experimental interactive computer aided design package through which these algorithms can be effectively acessed is introduced. The algorithms and design package are illustrated with several flight control design examples for highly maneuverable aircraft. A.R.H.

N82-10055# Groningen Rijksuniversiteit (Netherlands). Mathematics Inst.

DESIGN OF HIGH INTEGRITY MULTIVARIABLE CONTROL SYSTEMS

J. C. Williams *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 10 p refs (For primary document see N82-10048 01-08)
Avail: NTIS HC A08/MF A01

The notions of (almost) controlled and conditionally invariant subspaces of linear systems are explained and their application to the synthesis of feedback compensators for disturbance rejection and to robust controller is outlined. The disturbance rejection and the robust controller design problems are viewed as a procedure for designing a high integrity feedback control system. A.R.H.

N82-10056# Toronto Univ. (Ontario). Systems Control Group.

A GEOMETRIC APPROACH TO MULTIVARIABLE CONTROL SYSTEM SYNTHESIS

W. Murray Wonham *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 21 p refs (For primary document see N82-10048 01-08)
Avail: NTIS HC A08/MF A01

Multivariable control is discussed with emphasis on Multivariable Control: fundamentals, disturbance decoupling and output stabilization, controllability subspaces, noninteracting control, and regulation and tracking in linear systems and structurally stable nonlinear regulation with step inputs. A version of the internal model principle for controlled sequential machines is included. A.R.H.

N82-10057# McGill Univ., Montreal (Quebec). Dept. of Electrical Engineering.

MULTIVARIABLES DESIGN: THE OPTIMIZATION OF APPROXIMATE INVERSES

G. Zames *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 6 p refs (For primary document see N82-10048 01-08)
Avail: NTIS HC A08/MF A01

A mathematical framework for the analysis of sensitivity in multi-input-multi-output linear feedback systems is proposed, based on the concepts of a multiplicative seminorm and an approximate inverse. Many of the empirical results of classical control theory pertaining to the use of lead-lag networks can be deduced in this framework as solutions to well-posed mathematical optimization problems. Moreover, new classes of optimal filters for the reduction of sensitivity are introduced. A definition of optimal sensitivity to plant uncertainty is established. The multiplicative property of seminorms is used to obtain the following principle: for any specified aposteriori accuracy, there is a maximum of apriori plant uncertainty that can be tolerated, and a minimum of identification that is required. Author

N82-10058# McGill Univ., Montreal (Quebec). Dept. of Electrical Engineering.

FEEDBACK AND MINIMAX SENSITIVITY

George Zames and Bruce A. Francis (Waterloo Univ.) *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 8 p refs Sponsored in part by National Science and Engineering Research Council of Canada (For primary document see N82-10048 01-08) (Grant NSF ECS-80-12-565)
Avail: NTIS HC A08/MF A01

Feedbacks that minimize the sensitivity function of a linear, single variable feedback system represented by its frequency responses were considered. Sensitivity is measured in a weighted H (infinity) norm. The single variable cases are studied. The results are extended to unstable plants, and explicit formulas for the general situation of a finite number of RHP plant zeros or poles are provided. The Q or 'approximate-inverse' parameterization of feedbacks that maintain closed-loop stability is extended to the case of unstable plants. The H (infinity) and Wiener-Hopf approaches are compared. A.R.H.

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-10059*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

EVALUATION OF THE ACOUSTIC MEASUREMENT CAPABILITY OF THE NASA LANGLEY V/STOL WIND TUNNEL OPEN TEST SECTION WITH ACOUSTICALLY ABSORBENT CEILING AND FLOOR TREATMENTS Final Report

Mark A. Theobald May 1978 46 p refs
(Contract NAS1-14611)
(NASA-CR-165796; Rept-3820) Avail: NTIS HC A03/MF A01 CSCL 14B

The single source location used for helicopter model studies was utilized in a study to determine the distances and directions upstream of the model accurate at which measurements of the direct acoustic field could be obtained. The method used was to measure the decrease of sound pressure levels with distance from a noise source and thereby determine the Hall radius as a function of frequency and direction. Test arrangements and procedures are described. Graphs show the normalized sound pressure level versus distance curves for the glass fiber floor treatment and for the foam floor treatment. A.R.H.

N82-10060# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.

BEYOND THREE DECADES OF CONTINUOUS RESEARCH AT UTIAS ON SHOCK TUBES AND WAVES

I. I. Glass Jul. 1981 80 p refs Presented at the 13th Intern. Symp. on Shock Tubes and Waves, Niagara Falls, N.Y., 6-9 Jul. 1991
(UTIAS-45; CN-ISSN-0082-5247) Avail: NTIS HC A05/MF A01

Analytical and experimental research on nonstationary shock waves, rarefaction waves and contact surfaces is reviewed. Some unique facilities were used to study the properties of planar, cylindrical, and spherical shock waves and their interactions. Investigations were also performed on shock-wave structure and boundary layers in ionizing argon, water-vapor condensation in rarefaction waves, magnetogasdynamic flows, and the regions of regular and various types of Mach reflections of oblique shock waves. Explosively driven implosions were employed as drivers for projectile launchers and shock tubes, and as a means of producing industrial-type diamonds from graphite, and fusion plasmas in deuterium. The effects of sonic-boom on humans, animals, and structures formed an important part of the investigations. Shock waves in dusty gases, the viscous and vibrational structure of weak spherical blast waves in air, and oblique shock wave reflections were emphasized. J.M.S.

N82-10061*# Technology, Inc., Dayton, Ohio. Life Sciences Div.

OPERATIONS AND MAINTENANCE MANUAL FOR THE LINEAR ACCELERATOR (SLED)

10 Feb. 1981 70 p refs
(Contract NAS9-14880)
(NASA-CR-167425) Avail: NTIS HC A04/MF A01 CSCL 14B

The Linear Accelerator, a sliding chair which is pulled along a stationary platform in a horizontal axis is described. The driving force is a motor controlled by a velocity loop amplifier, and the mechanical link to the chair is a steel cable. The chair is moved in forward and reverse directions as indicated by the direction of motor rotation. The system operation is described with emphasis on the electronic control and monitoring functions. Line-by-line schematics and wire lists are included. J.M.S.

N82-10062# Committee on Science and Technology (U. S. House).
AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1981, PART 1
Washington GPO 1981 56 p Rept. to accompany H. R. 2643 Presented by the Comm. on Sci. and Technol. at the 97th Congr., 1st Sess., 19 Mar. 1981
(GPO-76-241-Pt-1) Avail: US Capitol, House Document Room

A bill authorizing appropriations to the FAA in the amount of $85,000,000 for air traffic control, navigation, aviation weather, aviation medicine, and ATC computer modernization for FY-1981-1982 is presented. The Committee directs that funds be reprogrammed to permit completion of the Flight Level 290 and to expedite development of the Doppler weather radar (Nexrad). The request for a trust fund to support $19.81 million of regulatory support research and development was denied. A.R.H.

N82-10063# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AIR-BREATHING ENGINE TEST FACILITIES REGISTER
Joachim H. Krengel, comp. Jul. 1981 122 p
(AGARD-AG-269) Avail: NTIS HC A06/MF A01

A register was compiled, aimed at comprising the test facilities relevant for research and development in NATO countries. Included are test facilities being in use or under construction at the various research organizations, industrial firms, and universities. Test facilities and their technical data are given as far as the response to a questionnaire was received or open literature was available. Test engineers will be able to find whether a test facility suiting their specific demands already exists or may be easily adapted to their purposes. T.M.

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-10064*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SIXTH ANNUAL FLIGHT MECHANICS/ESTIMATION THEORY SYMPOSIUM
Eugene Lefferts, ed. Oct. 1981 287 p refs Conf. held at Greenbelt, Md., 27-28 Oct. 1981
(NASA-CP-2205) Avail: NTIS HC A13/MF A01 CSCL 22A

Methods of orbital position estimation were reviewed. The problem of accuracy in orbital mechanics is discussed and various techniques in current use are presented along with suggested improvements. Of special interest is the compensation for bias in satelliteborne instruments due to attitude instabilities. Image processing and correctional techniques are reported for geodetic measurements and mapping. For individual titles, see N82-10065 through N82-10077.

N82-10065*# Computer Sciences Corp., Silver Spring, Md.
A COMPARATIVE STUDY OF THE HARRIS-PRIESTER, JACCHIA-ROBERTS, AND MSIS ATMOSPHERIC DENSITY MODELS IN THE CONTEXT OF SATELLITE ORBIT DETERMINATION c13
Robert E. Shanklin, Jr., Taesul Lee, M. K. Mallick, R. A. Kuseski, and J. O. Cappellari, Jr. *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 14 p refs (For primary document see N82-10064 01-12)
(Contract NAS5-24300)
Avail: NTIS HC A13/MF A01 CSCL 03B

The comparisons are summarized. The quantities compared include Bayesian weighted least squares differential correction statistics and orbit solution consistency and accuracy. T.M.

N82-10066*# Scientific Analysts and Consultants, Inc., Rockville, Md.
A GENERAL METHOD FOR COMPUTING THE TOTAL SOLAR RADIATION FORCE ON COMPLEX SPACECRAFT STRUCTURES c92
F. K. Chan *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 12 p refs (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 03B

The method circumvents many of the existing difficulties in computational logic presently encountered in the direct analytical or numerical evaluation of the appropriate surface integral. It may be applied to complex spacecraft structures for computing the total force arising from either specular or diffuse reflection or even from non-Lambertian reflection and re-radiation. T.M.

N82-10067*# Computer Sciences Corp., Silver Spring, Md.
SOLAR RADIATION FORCE MODELING FOR TDRS ORBIT DETERMINATION c92
Taesul Lee, Michael J. Lucas, and Robert E. Shanklin, Jr. *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 25 p refs (For primary document see N82-10064 01-12)
(Contract NAS5-24300)
Avail: NTIS HC A13/MF A01 CSCL 03B

The relative orbit determination accuracies resulting from several TDRS models are evaluated. These models include spherical, single-plate, and restricted two-plate models. The plate models can be adjusted in both area and reflectivity through differential correction. The restricted two-plate model has an Earth-pointing plate and a solar plate; the orientation of the solar plate is restricted to rotation about an axis perpendicular to the satellite's orbital plane. T.M.

N82-10068*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRECISION ORBIT COMPUTATIONS FOR AN OPERATIONAL ENVIRONMENT c13
C. E. Doll, David F. Eggert, and Richard L. Smith *In its* Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 36 p refs Prepared in cooperation with Computer Science Corp., Silver Spring, Md. (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 22C

Taking advantage of the improvements to the Earth's gravitation field and tracking station coordinates, an orbital computational consistency of the order of 5 meters was achieved for total position differences between orbital solutions for the Seasat and GEOS-3. The main source of error in these solutions was in the mathematical models that are required to generate these results, i.e., gravitation, atmospheric drag, etc. Different Earth gravitation fields and tracking coordinates were analyzed and evaluated in obtaining these computational results. Comparisons and evaluations of the Seasat results were obtained in terms of different solution types such as the Doppler only, Laser only, Doppler and Laser, etc. Other investigation using the Seasat data were made in order to determine their effect on the computational results at this particular level of consistency. T.M.

N82-10069*# Computer Sciences Corp., Silver Spring, Md.
TECHNIQUES FOR INCREASING THE EFFICIENCY OF EARTH GRAVITY CALCULATIONS FOR PRECISION ORBIT DETERMINATION c13
Richard L. Smith and Anatoly S. Lyubomirsky *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 28 p ref (For primary document see N82-10064 01-12)
(Contract NAS5-24300)
Avail: NTIS HC A13/MF A01 CSCL 22C

Two techniques were analyzed. The first is a representation using Chebyshev expansions in three-dimensional cells. The second technique employs a temporary file for storing the components of the nonspherical gravity force. Computer storage requirements and relative CPU time requirements are presented. The Chebyshev gravity representation can provide a significant reduction in CPU time in precision orbit calculations, but at the cost of a large amount of direct-access storage space, which is required for a global model. T.M.

N82-10070*# Phoenix Corp., McLean, Va.
AN ANALYSIS OF SIMULTANEOUS SATELLITE VISIBILITY TIME SPANS FOR TWO EARTH OBSERVATION STATIONS c15
F. K. Chan *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 33 p (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 22C

The analysis covers topics such as time average population, average population times and also the percentage visibility times for a given number of satellites. These results are useful for specific communications satellite applications. Numerical results are obtained for various configurations of a ground station and a ship. T.M.

N82-10071*# Scientific Analysts and Consultants, Inc., Rockville, Md.
DISTORTION-FREE MAPPING OF VISSR IMAGERY DATA FROM GEOSYNCHRONOUS SATELLITES c43
F. K. Chan *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct 1981 35 p ref (For primary document see N82-10064 01-12)
(Contracts NOAA-01-8-MO1-1864; NOAA-NA79-KA-C-00026)
Avail: NTIS HC A13/MF A01 CSCL 22A

The formulation is rigorous and includes all misalignment angles of the VISSR, the sun sensor and the instantaneous spin axis with the satellite's body axis. It also includes the effects due to the motion of the satellite's suborbital point. All the mapping equations for distortion removal were reduced to simplest forms, and all the algorithms were optimized as much as possible. An approach was then formulated for implementing these algorithms for in-line operational use. It is concluded that in-line distortion removal is possible in real-time processing of infra-red but not visible VISSR imagery data. T.M.

N82-10072*# General Electric Co., Lanham, Md. Space Div.
COMPUTATIONAL ASPECTS OF GEOMETRIC CORRECTION DATA GENERATION IN THE LANDSAT-D IMAGERY PROCESSING c43
I. Levine *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 16 p ref (For primary document see N82-10064 01-12)
(Contract NAS5-25300)
Avail: NTIS HC A13/MF A01 CSCL 05B

A method is presented for systematic and geodetic correction data calculation. It is based on presentation of image distortions as a sum of nominal distortions and linear effects caused by variation of the spacecraft position and attitude variables from their nominals. The method may be used for both MSS and TM image data and it is incorporated into the processing by means of mostly offline calculations. Modeling shows that the maximal of the method are of the order of 5m at the worst point in a frame; the standard deviations of the average errors less than .8m. Author

N82-10073*# General Electric Co., Lanham, Md. Space Div.
THE MSS CONTROL POINT LOCATION ERROR FILTER FOR LANDSAT-D c43
I. Levine *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 18 p refs (For primary document see N82-10064 01-12)
(Contract NAS5-25300)
Avail: NTIS HC A13/MF A01 CSCL 05B

The filter produces the maximum likelihood estimates for average values of the spacecraft position and attitude errors during a single scene. The quality of the filter performance is characterized by the maximal cross and along track residual errors for which probability distributions can be calculated analytically for a given pattern of control points. The filter with an automatic selection of the best set of estimates provides geodetic correction at 90% of pixels with residual errors less than 40 m for four or more control points and the mean squared measurement errors of the order of 20-25 m. The same accuracy can be preserved for eight or more control points and measurement errors of 30-35 m. T.M.

N82-10074*# Naval Electronic Systems Command, Washington, D. C. Electronic Special Warfare and Space Div.
SPIN-AXIS ATTITUDE ESTIMATION AND MAGNETOMETER BIAS DETERMINATION FOR THE AMPTE MISSION c43
R. H. Thompson, G. F. Neal, and M. D. Shuster *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 14 p refs Prepared in cooperation with Computer Sciences Corp., Silver Spring, Md. and Business and Technological Systems, Inc., Seabrook, Md. (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 08B

Algorithms were developed for magnetometer biases and spin axis attitude calculation. Numerical examples of the performance of the algorithm are given. T.M.

N82-10075*# Computer Sciences Corp., Silver Spring, Md.
A MATHEMATICAL MODEL OF LANDSAT-D ATTITUDE DYNAMICS WITH INTERNAL MOTION c15
S. D. Oh, G. W. Abshire, and J. M. Buckley *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 20 p refs (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 22A

An algorithm to model the effects of intenal motion by the solar array and the high gain antenna on the attitude of the LANDSAT-D spacecraft is presented. The relative torque and angular momenta arising from the internal motions are assumed to be attitude independent but are considered to be a source of attitude perturbations. The equation of motion for the three body problem is derived and then compared with the one body case. The effect of the internal motion on the control of the spacecraft is shown in a computer study of the problem. T.M.

N82-10076*# General Electric Co., Philadelphia, Pa. Control Systems Engineering Dept.
SPACECRAFT ATTITUDE POINTING PERFORMANCE DURING ORBIT ADJUST AS A FUNCTION OF COMPENSATOR ORDER c15
S. Basuthakur, R. Duelfer, A. Peckjian, and T. Stick *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 4 p (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 22A

A steady state compensator of specified order is proposed to estimate the required duty cycle needed to balance the distribution torque. The compensator was increased gradually to demonstrate the improvement in pointing accuracy. The basic mathematical model of the flexible spacecraft and sensor used to characterize the performance of the compensator are described. T.M.

N82-10077*# Business and Technological Systems, Inc., Seabrook, Md. Research and Development Div.
EFFICIENT ALGORITHMS FOR SINGLE-AXIS ATTITUDE ESTIMATION c13
M. D. Shuster *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 25 p refs (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 22A

The computationally efficient algorithms determine attitude from the measurement of art lengths and dihedral angles. The dependence of these algorithms on the solution of trigonometric equations was reduced. Both single time and batch estimators are presented along with the covariance analysis of each algorithm. T.M.

N82-10078*# Rockwell International Corp., Downey, Calif. Space Div.
SPAR 8 EXPERIMENT REPORT CONTAINERLESS PROCESSING OF GLASS EXPERIENT 74-42
R. A. Happe and K. S. Kim 24 Sep. 1981 37 p refs
(Contract NAS8-32023)
(NASA-CR-161872; SSD-81-0165) Avail: NTIS HC A03/MF A01 CSCL 22A

The flight experiment was designed to produce a single 0.64 cm (1/4 inch) diameter SPAR 8 silica modified gallia calcia glass (39.3 GA2O2: 35.7 CaO; 25.0 SiO2 in mol percent) containerless melted and cooled in a single axis acoustic levitator. Because the acoustic levitator suspended a sample of the same composition sample for only 27 seconds of the desired 240 seconds during SPAR 6, the sonic positioning time was increased for SPAR 8 to encompass the entire processing cycle. As a result of parachute malfunction, the SPAR 8 payload impacted the ground at a speed of approximately 300 ft/sec (about 200 MPH) and the experiment package suffered severe damage. The flight experiment sample is not yet recovered. The flight motion picture film, however, was recovered and successfully developed. The analysis of the motion picture showed that the experiment hardware functioned in most regards as planned, except the acoustic levitator, which suspended the sample for only 82 seconds of the desired 240 seconds. A.R.H.

N82-10079*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

MSFC EVALUATION OF THE SPACE FABRICATION DEMONSTRATION SYSTEM (BEAM BUILDER)

E. O. Adams and C. N. Irvine Sep. 1981 52 p ref
(Contract NAS8-32472)
(NASA-TM-82440) Avail: NTIS HC A04/MF A01 CSCL 22A

The beam builder, designed and manufactured as a ground demonstration model, is a precursor to a machine for use in the space environment, transportable by the space shuttle. The beam builder has the capability to automatically fabricate triangular truss beams in low Earth orbit with a highly reliable machine that requires a minimum of in-space maintenance and repair. A performance assessment of the beam builder, which was fabricated from commercial hardware is given. J.M.S.

N82-10080*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

MATERIALS PROCESSING IN SPACE PROGRAMS TASKS

E. Pentecost 1981 150 p refs
(NASA-TM-82443) Avail: NTIS HC A07/MF A01 CSCL 22A

Active research tasks as of the end of fiscal year 1981 of the materials processing in space program, NASA Office of Space and Terrestrial Applications are summarized to provide an overview of the program scope for managers and scientists in industry, university, and government communities. The program, its history, strategy, and overall goal are described the organizational structures and people involved are identified and a list of recent publications is given for each research task. Four categories: Crystal Growth; Solidification of Metals, Alloys, and Composites; Fluids, Transports, and Chemical Processes, and Ultrahigh Vacuum and Containerless Processing Technologies are used to group the tasks. Some tasks are placed in more than one category to insure complete coverage of each category. A.R.H.

N82-10081# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

THE SALYUT 6 SPACECRAFT DURING THE PERIOD 19 AUGUST 1979 TO 30 JUNE 1980 [RYMDSTATIONEN 'SALJUT-6' UNDER TIDEN 19 AUGUSTI 1979 - 30 JUNI 1980]

Astrid Rundkwist Nov. 1980 46 p refs In SWEDISH
(FOA-C-30206-F4) Avail: NTIS HC A03/MF A01

Unmanned orbits plus 185 days of manned flight are described. The scientific experiments are mentioned, including work with the small spectrograph, investigations to determine the influence of reduced gravity on production of interferon and tests with two furnaces for the production of crystals and alloys. Author (ESA)

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N82-10082# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.

APPLICATION OF THE EXTENDED KALMAN FILTER TO SEVERAL FORMULATIONS OF ORBIT DETERMINATION

Paul Chodas Aug. 1981 103 p refs Sponsored by the Communications Research Center
(UTIAS-TN-224; ISSN-0082-5263) Avail: NTIS HC A06/MF A01

Various sets of orbital elements are considered as state variables, and particular attention is given to two sets based on velocity space concepts. The properties of these sets are examined in detail and compared in the orbit determination context. Successful orbit determination is demonstrated using both of these sets, as well as the conventional set of position and velocity components. Although the velocity-space sets perform acceptably well, the conventional set is somewhat better in the cases studied. However, the conventional set is shown to be susceptible to an initial transient causing divergence. A simple technique is shown to alleviate the problem. Various sets of observables are applied to the determination of low Earth orbits, and, with typical amounts of measurement noise, the best set is shown to be azimuth, elevation, and range. Finally, the use of measurements from multiple sites is shown to significantly improve the orbit determination accuracy. J.M.S.

N82-10083# Engins Matra, Velizy (France).

ANALYSIS OF THE FREE MOTION OF SATELLITES UNDER THE EFFECT OF THE TERRESTRIAL GRAVITATIONAL POTENTIAL [ANALYSE DU MOUVEMENT LIBRE DES SATELLITES SOUS L'EFFET DU POTENTIAL DE GRAVITATION TERRESTRE]

S. Grodner and J. M. Pairot 26 Jun. 1980 54 p refs In FRENCH
Avail: NTIS HC A05/MF A01

The effect of one type of perturbation on the motion of the center of gravity of a satellite is studied, theoretically. The free motion, i.e., without trajectory correction, of a spacecraft, given its position and initial velocity, is determined by considering only the influence of the Earth's gravity. The gravitational potential created by a planet at a point in outer space is expressed. Lagrange perturbation formulas are introduced. The principal behind the approximations made in the analytical solution of the Lagrange perturbation system is explained. Implications of various terms used are considered. Author (ESA)

N82-10084# Engins Matra, Velizy (France).

SOLAR PERTURBATION FORCES: ESTIMATION AND COMPENSATION. ERROR CURVES FOR YAW AND FUEL CONSUMPTION [ESTIMATION ET COMPENSATION DES COUPLES PERTURBATEURS SOLAIRES ABAQUES D'ERREUR-LACET ET DE CONSUMMATION]

Roland Oskian and Jean Broquet 1980 67 p In FRENCH
Avail: NTIS HC A04/MF A01

Solar radiation pressure as a destabilizing force on a satellite in the operational mode is considered. Torque on the satellite due to this force is evaluated and its compensation is studied. In estimating the torque, the only data used, besides the satellite characteristics, are values for the transverse kinetic moment and, as a consequence, the instants of thruster impulses as well as their direction. Knowing the perturbation torque makes it possible to calculate, in conjunction with the error curves presented, yaw error along with satellite propellant consumption. Author (ESA)

N82-10085*# Computer Sciences Corp., Silver Spring, Md.

A COMPARATIVE STUDY OF THE HARRIS-PRIESTER, JACCHIA-ROBERTS, AND MSIS ATMOSPHERIC DENSITY MODELS IN THE CONTEXT OF SATELLITE ORBIT DETERMINATION

Robert E. Shanklin, Jr., Taesul Lee, M. K. Mallick, R. A. Kuseski, and J. O. Cappellari, Jr. *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 14 p refs (For primary document see N82-10064 01-12)
(Contract NAS5-24300)
Avail: NTIS HC A13/MF A01 CSCL 03B

N82-10086*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

PRECISION ORBIT COMPUTATIONS FOR AN OPERATIONAL ENVIRONMENT

C. E. Doll, David F. Eggert, and Richard L. Smith *In its* Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 36 p refs Prepared in cooperation with Computer Science Corp., Silver

Spring, Md. (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 22C

N82-10069*# Computer Sciences Corp., Silver Spring, Md.
TECHNIQUES FOR INCREASING THE EFFICIENCY OF EARTH GRAVITY CALCULATIONS FOR PRECISION ORBIT DETERMINATION
Richard L. Smith and Anatoly S. Lyubomirsky *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 28 p ref (For primary document see N82-10064 01-12)
(Contract NAS5-24300)
Avail: NTIS HC A13/MF A01 CSCL 22C

N82-10077*# Business and Technological Systems, Inc., Seabrook, Md. Research and Development Div.
EFFICIENT ALGORITHMS FOR SINGLE-AXIS ATTITUDE ESTIMATION
M. D. Shuster *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 25 p refs (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 22A

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N82-10085# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
RANGE INSTRUMENTATION: THE WHITE SANDS MISSILE RANGE DATA SYSTEMS MANUAL
L. R. Sugerman (New Mexico State Univ., Las Cruces) Aug. 1981 10 p
(AGARD-AR-168; ISBN-92-835-1395-9) Avail: NTIS HC A02/MF A01

The manual contains data on the telemetry systems, drone formation control system, optical instrumentation systems, and optical data reduction. Techniques of statistical analysis, least squares, and coordinate systems and map projections were reviewed. The radar systems, and the meterological and timing systems were examined. The data products were analyzed. T.M.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-10086* RCA Astro-Electronics Div., Princeton, N. J. Dynamics Explorer Program Office.
DYNAMICS EXPLORER: INTERFACE DEFINITION STUDY, VOLUME 2 Final Report
20 Oct. 1978 401 p refs 2 Vol.
(Contract NAS5-25020)
(NASA-CR-166625; AE-R-4270-Vol-2) Avail: NTIS CSCL 22B

Design and analysis tasks are identified for the attitude control subsystem, the structural design, and the command and data handling subsystem of the Dynamics Explorer Satellites. Mechanical drawings and reliablity predictions are included. J.M.S.

N82-10087*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
REPORT ON ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS
Robert W. Vostreys, ed. and Harriet H. Maitson, ed. Aug. 1981 310 p refs
(NASA-TM-84025; NSSDC/WDC-A-R&S-81-10) Avail: NTIS HC A14/MF A01 CSCL 22A

Active and planned spacecraft activity and experiments between June 1, 1980 and May 31, 1981 known to the National Space Science Data Center are described. The information covers a wide range of disciplines: astronomy, Earth sciences, meteorology, planetary sciences, aeronomy, particles and fields, solar physics, life sciences, and material sciences. Each spacecraft and experiment is described and its current status presented. Descriptions of navigational and communications satellites and of spacecraft that contain only continuous radio beacons used for ionospheric studies are specifically excluded. J.D.H.

N82-10088*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPACE PROCESSING APPLICATIONS ROCKET PROJECT (SPAR 6) Final Report
R. Chassay, comp. Oct. 1981 290 p refs
(Proj. SPAR)
(NASA-TM-82433) Avail: NTIS HC A13/MF A01 CSCL 22B

Experiments on the containerless processing of materials in space performed on the flight of the SPAR 6 sounding rocket are described. For individual titles, see N82-10089 through N82-10092.

N82-10089*# Rockwell International Corp., Thousand Oaks, Calif. Satellite Systems Div.
CONTAINERLESS PROCESSING OF GLASS Technical Report, 1 Mar. 1980
Ralph A. Happe *In* NASA. Marshal Space Flight Center Space Process. Appl. Rocket Proj. (SPAR) 6 Oct. 1981 54 p refs (For primary document see N82-10088 01-15)
(Contract NAS8-32023)
(SSD-80-0045) Avail: NTIS HC A13/MF A01 CSCL 22B

Ground-based research on the containerless melting of glass and experiments performed during a flight on the SPAR 6 are described. Experiments leading to selection of the flight sample composition, a silica-modified gallia/calcia glass, and the preparation of a one quarter inch diameter flight sample are described. During the flight experiment, a sample of the glass was containerless melted and cooled to a clear glass in a single axis acoustic positioning apparatus. The functioning of the flight experimental hardware was evaluated. The evaluation of the sample is presented. J.D.H.

N82-10090*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
EPITAXIAL GROWTH OF SINGLE CRYSTAL FILMS Final Report, 4 Oct. 1975 - 31 May 1980
M. D. Lind, R. L. Kroes, and A. A. Immorlica, Jr. *In its* Space Process. Appl. Rocket Proj. (SPAR) 6 Oct. 1981 41 p refs Prepared in cooperaion with Rockwell International Corp., Thousand Oaks, Calif. (For primary document see N82-10088 01-15)
(Contract NAS8-31738)
(ERC41001.30FR) Avail: NTIS HC A13/MF A01 CSCL 22B

An experiment in gallium arsenide liquid phase epitaxy (LPE) on a flight of the SPAR 6 is described. A general purpose LPE processor suitable for either SPAR or Space Transportation System flights was designed and built. The process was started before the launch, and only the final step, in which the epitaxial film is grown, was performed during the flight. The experiment achieved its objectives; epitaxial films of reasonably good quality and very nearly the thickness predicted for convection free diffusion limited growth were produced. The films were examined by conventional analytical techniques and compared with films grown in normal gravity. J.D.H.

N82-10091*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONTAINERLESS PROCESSING TECHNOLOGY EXPERIMENT REPORT Technical Report, May 1981
T. G. Wang, D. D. Elleman, N. Jacobi, and A. P Croonquist *In* NASA. Marshall Space Flight Center Space Process. Appl. Rocket Proj. (SPAR) 6 Oct. 1981 104 p refs (For primary document see N82-10088 01-15)

(Contract NAS7-100)
Avail: NTIS HC A13/MF A01 CSCL 22B

The stability and manipulability of liquid drops at zero gravity are investigated. The center of mass motion in an acoustic chamber, the rotation capability of the chamber, the natural resonant frequencies and damping mechanism of drop oscillation, and the drop shape change due to rotation were investigated. The apparatus used on the SPAR 6, and the theoretical background for the experiment are described. The data obtained from free and forced oscillation, from combined oscillation and rotation, during the relaxation of the drop, and as a rotating drop is spun up from rest are analyzed. The computer data translation program developed for the image processing and computerized simulations of the analysis of similar data are described. J.D.H.

N82-10092*# Grumman Aerospace Corp., Bethpage, N.Y.
DIRECTIONAL SOLIDIFICATION OF MAGNETIC COMPOSITES Technical Report, Jul. 1980
Ron G. Pirich and David J. Larson, Jr. *In* NASA. Marshall Space Flight Center Space Process. Appl. Rocket Proj. (SPAR) 6 Oct. 1981 61 p refs (For primary document see N82-10088 01-15)
(Contract NAS8-32219)
Avail: NTIS HC A13/MF A01 CSCL 22B

The directional solidification of three samples of eutectic Bi/MnBi during a low-g interval aboard the SPAR 6 flight is compared with solidification of comparison samples in a 1 g environment under identical furnace velocity and thermal conditions. Plane front directional solidification eutectic Bi/MnBi composites prepared at 1 g over a range of growth velocities, thermal gradients, and solidification orientations with respect to the gravity vector are compared with the samples prepared in space. Morphological analyses and the magnetic properties of the flight samples are compared with the samples obtained at 1 g. J.D.H.

N82-10093*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A STUDY OF THE LONGEVITY AND OPERATIONAL RELIABILITY OF GODDARD SPACECRAFT, 1960-1980
Edward F. Shockey Aug. 1981 50 p
(NASA-TM-82178) Avail: NTIS HC A03/MF A01 CSCL 22B

Compiled data regarding the design lives and lifetimes actually achieved by 104 orbiting satellites launched by the Goddard Spaceflight Center between the years 1960 and 1980 is analyzed. Historical trends over the entire 21 year period are reviewed, and the more recent data is subjected to an examination of several key parameters. An empirical reliability function is derived, and compared with various mathematical models. Data from related studies is also discussed. The results provide insight into the reliability history of Goddard spacecraft an guidance for estimating the reliability of future programs. Author

N82-10094*# RCA Astro-Electronics Div., Princeton, N. J. Dynamics Explorer Program Office.
DYNAMICS EXPLORER: INTERFACE DEFINITION STUDY, VOLUME 1 Final Report
20 Oct. 1978 419 p refs
(Contract NAS5-25020)
(NASA-CR-166742; AE-R-4270-Vol-1) Avail: NTIS HC A18/MF A01 CSCL 22B

Work done in response to the work statement wherein a specific deliverable was not identified but where design and analysis tasks were identified is reported. The summary and baseline change list is included along with design notes for the spacecraft system, thermal subsystem, power subsystem, communications subsystem, plasma wave instrument interface definition, and the structure. A.R.H.

N82-10095# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Reihe Flugtechnik.
POSITIONING MOTORS AND MOTIVE POWER SUPPLIES FOR THRUST RUDDERS ON GUIDED MISSILES [STELLMOTORE UND ENERGIEVERSORGUNG FUER RUDERANTRIEBE BEI FLUGKOERPERN]
F. Hofmann 21 May 1980 50 p refs In GERMAN
(MBB-UA-536/80-OE) Avail: NTIS HC A03/MF A01

The application of thrust rudders on guided missiles is considered. For specific configurations, performance criteria are determined and discussed. Examples of thrust rudder systems are illustrated, and schemes for optimizing their design are assessed. Propulsion systems commonly used with thrust rudders are also briefly reviewed. Author (ESA)

N82-10096# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
STABILITY MEASUREMENT AND FREE FLIGHT MOTION OF PROJECTILES WITH DIFFERENT BOATTAIL GEOMETRIES [STABILITETSMAETNING OCH SPRIDNINGSSKJUNTNING AV PROJEKTILER MED OLIKA PLACERING AV GOERDELN MALFOM 4.4831 ETAPP 5]
Sven Nordstroem Nov. 1980 62 p refs In SWEDISH; ENGLISH summary
(FOA-C-20379-D2) Avail: NTIS HC A04/MF A01

Tests on 7.5 cm projectiles with three different locations of the rotating bands were carried out. Stability measurements at four different velocities were performed as well as dispersion measurements for long-range firing at two velocities. The location of the rotating band affects neither the aeroballistic values nor the range/dispersion to any appreciable extent, except when firing at subsonic velocity, where the dynamic moment coefficients and the dynamic stability factor change considerably. At projectile velocities well above M = 1.0 a change of the position of the rotating band within the tested interval of 0.07 caliber to 0.87 caliber in front of the conical boattail does not affect the aeroballistic behavior of the projectile to any appreciable extent. Author (ESA)

N82-10097# Engins Matra, Velizy (France).
IN-FLIGHT THERMIC PROBLEMS ENCOUNTERED WITH A BALLISTIC MISSILE: GENERAL STUDY [PROBLEMES THERMIQUES RENCONTRES PAR UN MISSILE BALISTIQUE SUR SA TRAJECTOIRE ETUDE A CARACTERE GENERAL]
M. Lemonnier 14 Dec. 1979 100 p In FRENCH
(N-FIT-768) Avail: NTIS HC A05/MF A01

A calculation method that gives the temperature distribution within a body placed in a flow and following a trajectory, corresponding to the flight conditions of a missile, is defined. The method is to be incorporated in a minicomputer program. Heat transmission across the flow boundary layer, and then by conduction through a body composed of a succession of mediums whose thermic characteristics differ, was studied, supposing that the heat flow is monodimensional. Results are used to elaborate calculation schemes, and a program is established. An application of the program is recounted. Author (ESA)

N82-10098# British Aerospace Dynamics Group, Bristol (England).
STUDY OF NOISE FILTERING AND CONTROL OF POINTING SYSTEMS Final Report
Paris ESA Dec. 1980 452 p refs
(Contract ESTEC-3448/77/NL-AK(SC))
(ESS/SS-1023; ESA-CR(P)-1435) Avail: NTIS HC A20/MF A01

Baseline definitions and sensor characteristics are surveyed for optical inertial and RF sensors. Actuator and system dynamics are described taking into account necessary baseline definitions and sensor characteristics and then considered for a momentum biased system. Dynamic equations are derived and explained in order to present the theory behind the pointing characteristics of a fixed momentum wheel for a geostationary satellite with noise free sensors and actuators. The design of an attitude control system based on a third-order observed for the Inertial Scientific Mission (ISM) noise free situation is presented with results of assessment by digital simulation and analytic methods which verify design. The performance of an orbiter based pointing system modelled on the common attitude pointing system (CAPS) is analyzed, using the simulation results. ISM and CAPS are then considered in the presence of noise. Analysis is carried out, using the convariance analysis descriptive function technique method. Author (ESA)

N82-10099# European Space Agency, Paris (France).
POMS: POLAR ORBITING METEOROLOGICAL SATELLITE

J. Puls, P. Meischner, R. Naehle, M. Piening, A. Pietrass, B. Schmidt, H. P. Schmidt, and R. Stapf Jun. 1981 163 p refs
Transl. into ENGLISH of "POMS, Polarer Meteorologischer Satellite", Rept. DFVLR-FB-7937 DFVLR, Oberpfaffenhofen, West Germany, May 1979 Original report in GERMAN previously announced as N81-13984
(ESA-TT-671; DFVLR-FB-79-37) Avail: NTIS HC A08/MF A01; DFVLR, Cologne DM 26,60

A conceptual study for a climate research mission specially prepared for Earth radiation budget measurements was performed. The requisite daily global coverage is fulfilled by a system of three orbiting satellites. One of these is on a non-Sun synchronous drift orbit with an inclination of approximately 57 deg represented by the ESA satellite SEOCS. The other two are polar orbiting satellites, designated POMS. Appropriate near polar orbits are designed for these and concepts are investigated up to component level in order to demonstrate mission feasibility. Subsystem descriptions for thermal control energy supply, attitude stabilization, telecommunications and data processing are given. Cost estimates are provided. Author (ESA)

N82-10100# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Hochfrequenztechnik.

PROPOSAL FOR A GROUND STATION ANTENNA FOR GEOSTATIONARY SATELLITES WITH A SIMPLE CONCEPT OF BEAM STEERING

Peter Sliwinski and Hans-Juergen Steiner Nov. 1980 68 p refs Report will also be announced as translation (ESA-TT-717) In GERMAN; ENGLISH summary
(DFVLR-Mitt-81-05) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 14,40

A center fed Cassegrain system with a conical corrugated horn and doubly curved reflectors is proposed. The beam shaping has the purposes: reduction of interference with neighboring satellites and beam steering in one direction, e.g., azimuth direction. The beam steering is realized by lateral displacement of the subreflector. The effects of feed displacement are investigated by analytical methods. The radiation patterns at 11 GHz for focused and defocused antenna systems were calculated. Results show 50.5 dBi, half power beam width 0.30 deg and 0.92 deg; in this angle range the cross polarization is greater than 40 dB. Author (ESA)

N82-10070*# Phoenix Corp., McLean, Va.

AN ANALYSIS OF SIMULTANEOUS SATELLITE VISIBILITY TIME SPANS FOR TWO EARTH OBSERVATION STATIONS

F. K. Chan *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 33 p (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 22C

N82-10075*# Computer Sciences Corp., Silver Spring, Md.

A MATHEMATICAL MODEL OF LANDSAT-D ATTITUDE DYNAMICS WITH INTERNAL MOTION

S. D. Oh, G. W. Abshire, and J. M. Buckley *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 20 p refs (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 22A

N82-10076*# General Electric Co., Philadelphia, Pa. Control Systems Engineering Dept.

SPACECRAFT ATTITUDE POINTING PERFORMANCE DURING ORBIT ADJUST AS A FUNCTION OF COMPENSATOR ORDER

S. Basuthakur, R. Duelfer, A. Peckjian, and T. Stick *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 4 p (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 22A

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N82-10101*# General Electric Co., Philadelphia, Pa. Reentry Systems Div.

PARAMETER ANALYTICAL STUDIES FOR THE NONLINEAR DYNAMIC RESPONSE OF THE TILE/PAD SPACE SHUTTLE THERMAL PROTECTION SYSTEM

Harold Edighoffer 28 Oct. 1981 71 p refs
(Contract NAS1-16121)
(NASA-CR-165707) Avail: NTIS HC A04/MF A01 CSCL 22B

The studies examined for imposed sinusoidal and random motions of the shuttle skin and/or applied tile pressure. Studies are performed using the computer code DYNOTA which takes into account the highly nonlinear stiffening hysteresis and viscous behavior of the pad joining the tile to the shuttle skin. Where available, experimental data are used to confirm the validity of the analysis. Both analytical and experimental studies reveal that the system resonant frequency is very high for low amplitude oscillations but decreases rapidly to a minimum value with increasing amplitude. T.M.

N82-10102*# National Aeronautics and Space Administration, Washington, D. C.

MISSION OPERATION REPORT: OSTA-1

26 Oct. 1981 28 p
(NASA-TM-84053; S-420-81-01) Avail: NTIS HC A03/MF A01 CSCL 22B

The Office of Space and Terrestrial Applications (OSTA 1) payload was designed to demonstrate shuttle's capability as a space research platform and the potential application of techniques for future remote sensing. Because thermal tests planned for STS-2 flight require that the payload bay to be pointed towards Earth, the experiments selected for OSTA 1 emphasize terrestrial sciences and are concerned with remote sensing for Earth resources, environmental quality, ocean conditions, meteorological phenomena, and life sciences. Characteristics of the STS-2 flight, the major events timeline, geopgraphical areas coverage, pallet experiments ground coverages, and experiment operating modes are described. The OSTA-1 pallet configuration, payload interface, and the instruments comprising each of the experiments are described and illustrated. Mission support stations, and the payload team are listed. Mission cost data are included. A.R.H.

N82-10103*# National Aeronautics and Space Administration, Washington, D. C.

MISSION OPERATION REPORT: SPACE SHUTTLE PROGRAM, STS-2 LAUNCH

22 Oct. 1981 28 p
(NASA-TM-84054; M-989-81-02) Avail: NTIS HC A03/MF A01 CSCL 22A

The capability for routine prelaunch, launch, orbital, entry, approach, landing, and turnaround operations for the orbital flight test phase of the Space Shuttle program is discussed. The mission objectives as well as a detailed description of the STS-2 mission are given. B.W.

N82-10104# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Advanced Programs and Technology Dept.

FUTURE SPACE TRANSPORTATION SYSTEMS FOR EUROPE. VOLUME 1: SUMMARY STUDY REPORT

Paris ESA Oct. 1980 63 p
(Contract ESA-4268/80/F-DD(SC))
(MBB-URV-119/80-Vol-1; ESA-CR(P)-1441-Vol-1) Avail: NTIS HC A04/MF A01

Launch vehicle alternatives for Europe after Ariane 4 are defined based on expected mission and payload requirements for the period after 1990. The alternatives are : (1) a clustered vehicle with Ariane 4 components, (2) the expendable vehicle Ariane 5, (3) an Ariane with reusable second stage, (4) a (new) expendable cryogenic launch vehicle and (5) a fully reusable vehicle. All in the low Earth orbit payload range of 10 to 16 Mg. For geostationary communication satellites (2.5 to 4.5 Mg), a separate analysis of the possible transfer and injection system was made, including a cost and cost effectiveness analysis. The economics and programs analysis with comparison of U.S. and other launch capabilities in the 1990's indicate that only a fully reusable launch vehicle can fulfil all the mission and payload requirements. Author (ESA)

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N82-10105# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
STAR PATTERN RECOGNITION AND SPACECRAFT ATTITUDE DETERMINATION
Thomas E. Strikwerda and John L. Junkins Fort Belvoir, Va. Corps of Engineers May 1981 198 p refs
(Contract DAAK70-78-C-0038)
(AD-A103806; ETL-0260) Avail: NTIS HC A09/MF A01 CSCL 17/7

A method for real-time on-board spacecraft attitude determination is presented. The method is suitable for processing CCD or CID stellar camera and rate gyro output to determine orientation to better than five arc seconds. The system is self-calibrating; uncertain parameters such as interlock angles and gyro biases can be included in the estimation algorithms. The system is implemented in a microcomputer system which conclusively establishes that the system is compatible with on-board computation constraints. Author (GRA)

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-10106*# National Aeronautics and Space Administration. Pasadena Office, Calif.
RADIATIVE COOLER Patent Application
Stanley W. Petrick (JPL, California Inst. of Tech., Pasadena) and Ramon D. Garcia, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 17 Jul. 1981 13 p
(Contract NAS7-100)
(NASA-Case-NPO-15465-1; US-Patent-Appl-SN-284289) Avail: NTIS HC A02/MF A01 CSCL 22B

A device for use in passively cooling spaces, applicable to any level of thermal radiation in vacuum and to high-intensity thermal radiation in non-vacuum environments, is described. The device includes an enclosure nested in a multiplicity of thin, low-emittance, highly-reflective shields suspended in a casing in mutual angular relation and having V-shaped spaces for redirecting thermal radiation entering the sides of the shields. Successively reduced quantities of thermal radiation are reflected by the surfaces along substantially parallel paths extended through the V-shaped spaces to a common heat sink such as the cold thermal background of space. T.M.

N82-10107# European Space Agency, Paris (France).
FLIGHT TEST RESULTS OF THE MODEL SIMULATION CONTROLLER FOR THE HFB 320 FOR IN-FLIGHT SIMULATION OF THE A310 AIRBUS
Hans-Heinz Lange Apr. 1981 72 p refs Transl. into ENGLISH of 'Flugerprobung des modellfolgereglers fuer die HFB 320 zur Simulation des Airbus A 310 in Fluge" Rept. DFVLR-Mitt-79-13 DFVLR, Brunswick, 1979 Original report in GERMAN previously announced as N81-10078
(ESA-TT-660; DFVLR-Mitt-79-13) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 15.40

The onboard computer program which completes the model simulating control system is presented and its fundamental operations explained. The effect of nonlinearities is demonstrated by means of the results of ground simulation of the test aircraft, the control system and the simulated aircraft. The flight test results show the achieved quality of in-flight simulation of the modeled A310 aircraft. Examples of the ground simulation predictions of the overall aircraft and controller system behavior are cited. Author (ESA)

N82-10108# European Space Agency, Paris (France).
SYNTHESIS OF WORK CONCERNING EDDY CURRENT PENDULAR NUTATION DAMPER. APPLICATION TO THE RATING AND CHECKING OF A ROTATING SIMULATOR
J. Castro, J. J. Runavot, and L. Torres Jun. 1981 22 p refs Transl. into ENGLISH of 'Synthese des Travaux Effectues sur les Amortisseurs Pendulaires a Courants de Foucault. Application a la Qualification et Verification d'un Simulateur Tournant", Rept. CNES-78/CT/PRT/SST/SS, CNES, Toulouse, 12 Jul. 1978 Original report in FRENCH previously announced as N81-20165
(ESA-TT-695; CNES-78/CT/PRT/SST/SS/197) Avail: NTIS HC A02/MF A01

Eddy current nutation dampers for spin stabilized spacecraft are presented. The performance and the characteristic parameters of this pendular nutation damper are estimated and compared with the Mercury nutation damper developed for the Meteosat Project. A theoretical model of the motion damping is explained. Results lead to the design of an experiment which measures intrinsic damping parameters, given the design of the elastic suspension of the damper. The test was carried out on an air bearing simulator. Attainable precision demonstrated during this test indicates that the test rig is suitable for application in the certification of various satellite spin stabilization systems. Author (ESA)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-10109*# Aerojet Liquid Rocket Co., Sacramento, Calif.
DESIGN, FABRICATION, TEST, AND DELIVERY OF A HIGH-PRESSURE OXYGEN/RP-1 INJECTOR Final Report
L. Schoenman and R. S. Gross 30 Sep. 1981 100 p refs
(Contract NAS8-33651)
(NASA-CR-161877; Rept-33651F) Avail: NTIS HC A05/MF A01 CSCL 21H

A summary of the design analyses for a liquid rocket injector using oxygen and RP-1 propellants at high chamber pressures of 20,682 kPa (3000 psia) is presented. This analytical investigation includes combustion efficiency versus injector element type, combustion stability, and combustor cooling requirements. The design and fabrication of a subscale injector/acoustic resonantor assembly capable of providing a nominal thrust of 222K N (50,000 lbF) is presented. S.L.

N82-10110*# Thermacore, Inc., Lancaster, Pa.
HEAT PIPE HEAT REJECTION SYSTEM AND DEMONSTRATION MODEL FOR THE NUCLEAR ELECTRIC PROPULSION (NEP) SPACECRAFT Final Report
Donald M. Ernst Mar. 1981 139 p refs Prepared for JPL (Contracts NAS7-100; JPL-955100)
(NASA-CR-164878) Avail: NTIS HC A07/MF A01 CSCL 21F

The critical evaluation and subsequent redesign of the power conversion subsystem of the spacecraft are covered. As part of that evaluation and redesign, prototype heat pipe components for the heat rejection system were designed fabricated and tested. Based on the results of these tests in conjunction with changing mission requirements and changing energy conversion devices, new system designs were investigated. The initial evaluation and redesign was based on state-of-the-art fabrication and assembly techniques for high temperature liquid metal heat pipes and energy conversion devices. The hardware evaluation demonstrated the validity of several complicated heat pipe geometries and wick structures, including an annular-to-circular transition, bends in the heat pipe, long heat pipe condensers and arterial wicks. Additionally, a heat pipe computer model was developed which describes the end point temperature profile of long radiator heat pipes to within several degrees celsius. T.M.

N82-10111*# Hadron, Inc., Arlington, Va. Systems Management Support Div.
AYAME/PAM-D APOGEE KICK MOTOR NOZZLE FAILURE ANALYSIS
22 Jun. 1981 29 p
(Contract NAS5-26538)
(NASA-CR-166735) Avail: NTIS HC A03/MF A01 CSCL 21H

The failure of two communication satellites during firing sequence were examined. The correlation/comparison of the circumstances of the Ayame incidents and the failure of the STAR 48 (DM-2) motor are reviewed. The massive nozzle failure of the AKM to determine the impact on spacecraft performance is examined. It is recommended that a closer watch is kept on systems techniques. E.A.K.

N82-10112# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelningen foer Marinmateriel.
AGE CONTROL OF THE RB 52 ROCKET ENGINE [AADRINGSKONTROLL AV RAKETMOTORER FOER RB52]
Bert Anderson Sep. 1980 45 p In SWEDISH
(FOA-C-20366-D3) Avail: NTIS HC A03/MF A01

Reference testing of these rocket engines was done by test firing of robots starting in 1966. Ten of them were tested at normal temperature, 20 C, and five at -40 C. The starting stage pressure, driving stage pressure and driving force were recorded. All the firings show normal performance without disturbances. Author (ESA)

N82-10113# European Space Agency, Paris (France).
SYMPHONIE. NATURAL NUTATION DAMPING DUE TO THE ERGOLS OF THE HOT GAS PROPULSION SYSTEM. SYNTHESIS OF MV1 AND MV2 IN FLIGHT RESULTS
J. L. Marce Jun. 1981 9 p refs Transl. into ENGLISH of "SYMPHONIE. Amortissement Naturel de la Nutation du aux Ergols du Systeme Gaz Chaud. Synthese des Results en vol sur MV1 et MV2", Rept. CNES-79/CT/PRT/SST/SS/166, CNES, Toulouse, May 23, 1979 Original report in FRENCH previously announced as N81-20170
(ESA-TT-698; CNES-79/CT/PRT/SST/SS/166) Avail: NTIS HC A02/MF A01

In-flight measurements of nutation damping onboard SYMPHONIE satellites are interpreted, and a prediction model, which determines the time constant for nutation damping as a result of momentum energy being dissipated by liquid propellants in fuel tanks, is verified. Although model predictions disagree with in-flight measurements, they accurately portray the variation in damping time constant in function of tank fuel level. The radial motion of the satellite momentum wheel is evoked to explain the difference between computation and measurement. Author (ESA)

N82-10114# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany). Inst. fuer Technische Physik.
PHYSICAL RESULTS AND PROBLEMS OCCURRING DURING THE QUALIFICATION OF THE THRUSTER RIT-10 Ph.D. Thesis - Justus-Liebig Univ.
Eberhard Zeyfang Sep. 1980 131 p refs Report will also be announced as translation (ESA-TT-718) In GERMAN; ENGLISH summary
(DFVLR-FB-81-03) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 27,80

As a part of the qualification of the radiofrequency ion thruster RIT-10, a preliminary life test on three thrusters was carried out. During this test run in a special test facility, 8200 thrusting hours of continuous operation and, in a cycling mode, 2200 hours of thrust at 1100 cycles were achieved. The low increase of thruster input power and the decrease of optimal negative high voltage can be correlated to erosion of the extraction holes by ion impact. The life test data lead to a calculated lifetime limit for RIT-10 of more than 10,000 hours. Author (ESA)

N82-11011# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE ACOUSTIC INSTABILITY OF COMBUSTION IN SOLID PROPELLANT ROCKET MOTORS WITH TUBULAR GRAIN
Wu Xinping *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 412-413 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-10115 Louisiana State Univ. and A&M Coll., Baton Rouge.
METHANE PRODUCTION FROM ALKALINE FOOD WASTE Ph.D. Thesis
Wilson Thomas Gautreaux, Jr. 1981 222 p
Avail: Univ. Microfilms Order No. 8117624

Because of waste generated by potato processing contained significant quantities of carbohydrate degradation products and sodium carbonate anaerobic digestion was determined to be a reliable process for waste treatment and methane production. The high sodium levels did not inhibit anaerobic digestion at a substate concentration of 1.0 wt percent alkaline peel solids. In two-stage bench-scale studies at 37 C, methane production averaged 0.28 m cu/kg COD feed or 0.65 m cu/(m cu d) in a settled bacterial sludge methane fermenter with a 4 day retention time. A pilot-scale anaerobic digestion system with a 15.4 m cu fermenter demonstrated the feasibility of a proposed anaerobic pond system for a food processing plant. With a 1.0 wt percent alkaline solids feed and a 9-day retention time, methane production averaged 0.16 m cu/kg solids or 0.18 m cu/m cu d). A process for single cell protein production via the acid stage of anaerobic digestion was explored. Bacterial cell and protein yields of 0.18 and 0.09 kg/k glucose consumed were obtained at a retention time of four hours. Dissert. Abstr.

N82-10116# Department of Energy, Washington, D. C. Office of Basic Energy Sciences.
MATERIALS SCIENCES PROGRAMS
Sep. 1981 180 p
(DE81-030306; DOE/ER-0106) Avail: NTIS HC A09/MF A01

Laboratory and university research activities being performed under the auspices of DOE are listed under the following headings:

(1) metallurgy and ceramics; (2) solid state physics; and (3) materials chemistry, as an aid to administrators, managers, and scientists in coordinating research and in selecting new programs. The title of each of 467 projects and its description is given along with the names of the personnel involved, the funding level, budget activity number, and key words and phrases. Indexes show investigators, materials, techniques, phenomena, and environments. A.R.H.

N82-10117# Department of Energy, Washington, D. C. Div. of Chemical Sciences.
SUMMARIES OF FY 1981 RESEARCH IN THE CHEMICAL SCIENCES
Aug. 1981 273 p
(DE81-030000; DOE/ER-0105) Avail: NTIS HC A12/MF A01

Information useful to chemist, physicists, chemical engineers, and others who are considering the possibilities of proposing research for support by the DOE is presented. The information is intended to provided a rapid means of becoming aquainted with the chemical sciences program to members of the scientific and technological community. R.C.T.

N82-10118 Texas Univ. at Arlington.
SYNTHETIC ASPECTS OF CARBON MONOXIDE CHEMISTRY Ph.D. Thesis
Sun-Chueh Kao 1981 178 p
Avail: Univ. Microfilms Order No. 8119314

A general picture of the chemical properties of metalocarboxylic acids of transition metals was obtained by studying the decarboxylation of triphenybphoshino cyclopentadienyl carboxyiron carbonyl. The reducing capability of the metallocarboxylic acid of transition metal either as an isolated species in a stoichiometric system or as a reactive intermediate in a catalytic system as examined in the reduction of nitro compounds. It is believed that a study of the chemistry of the homogeneous analogues of proposed reactive intermediates of a revised mechanism for the Fischer-Tropsch reaction should shed some light on the homogeneous Fischer-Tropsch reaction. To investigate these possibilities a series of binuclear bridgin complexes of iron were synthesized and their chemistry studied through their photolytic, thermal, and oxidative reactions. These studies gave indications that the binuclear bridging complexes can serve as sources of hydrocarbons and that the bimetalocyclic complexes, though not isolated, might be involved in the reaction sequence which led to the hydrocarbon formation. Dissert. Abstr.

24 COMPOSITE MATERIALS

Includes laminates.

N82-10119 Drexel Univ., Philadelphia, Pa.
FRACTURE ANALYSIS OF (PLUS OR MINUS 25/90 SUB N) SUB S GRAPHITE-EPOXY COMPOSITE LAMINATES Ph.D. Thesis
George Ernest Law, Jr. 1981 158 p
Avail: Univ. Microfilms Order No 8118931

The mechanisms of transverse cracking, ply delamination, and their interactions were investigated in a series of graphite-epoxy composite laminates of the form (plus or minus 25/90 sub n) sub s. By varying the thickness of the 90 deg layer, (indicated by n) which is the single parameter separating the fracture events, several important and distinct fracture modes are identified. The energy release rate approach of classical fracture mechanics is applied to describe the fracture processes, including the crack initiation, growth, and growth stability. The cracking process is numerically simulated using a finite element procedure formulated within the framework of ply elasticity and on the assumption of a generalized plane strain state. The numerical procedure explicitly calculated the mode 1, mode 2, and mode 3 components of the energy release rate as a function of the crack length. The analytical model predicts the sequence of occurrence of the various fracture modes, the critical onset loads, the process of crack growth, and the growth stability. A good agreement was obtained between the theoretical and experimental results. Dissert. Abstr.

N82-10120*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MASS LOSS OF TEOS-COATED RCC SUBJECTED TO THE ENVIRONMENT AT THE SHUTTLE WING LEADING EDGE
C. W. Stroud and Donald R. Rummler Sep. 1981 59 p refs
(NASA-TM-83203) Avail: NTIS HC A04/MF A01 CSCL 11D

Coated, reinforced carbon-carbon (RCC) is used for the leading edges of the Space Shuttle. The mass loss characteristics of RCC specimens coated with tetra-ethyl-ortho-silicate (TEOS) were determined for conditions which simulated the entry environment expected at the stagnation area of the wing leading edge. Maximum specimen temperature was 1632 K. Specimens were exposed for up to 100 missions. Stress levels up to 8.274 MPa caused an average increase in oxidation of 6 percent over unstressed specimens. Experimentally determined mass losses were compared with those predicted by an existing empirical analysis. Author

N82-10121*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DEGRADATION MECHANISMS IN ALUMINUM MATRIX COMPOSITES: ALUMINA/ALUMINUM AND BORON/ALUMINUM Ph.D. Thesis - North Carolina State Univ. at Raleigh
George C. Olsen 1981 139 p refs
(NASA-TM-84055) Avail: NTIS HC A07/MF A01 CSCL 11D

The effects of fabrication and long term thermal exposure (up to 10,000 hours at 590 K) on two types of aluminum matrix composites were examined. An alumina/aluminum composite, was made of continuous alpha Al2O3 fibers in a matrix of commercially pure aluminum alloyed with 2.8% lithium. The mechanical properties of the material, the effect of isothermal exposure, cyclic thermal exposure, and fatigue are presented. Two degradation mechanisms are identified. One was caused by formation of a nonstoichiometric alumina during fabrication, the other by a loss of lithium to a surface reaction during long term thermal exposure. The other composite, boron/aluminum, made of boron fibers in an aluminum matrix, was investigated using five different aluminum alloys for the matrices. The mechanical properties of each material and the effect of isothermal and cyclic thermal exposure are presented. The effects of each alloy constituent on the degradation mechanisms are discussed. The effects of several reactions between alloy constituents and boron fibers on the composite properties are discussed. J.M.S.

N82-10122# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Metallurgy and Materials Science.
GENERALIZATION OF INTERNAL CENTRIFUGAL ZONE GROWTH OF METAL-CERAMIC COMPOSITES AND KINETICS, MORPHOLOGY AND THERMODYNAMICS OF THE SOLID-LIQUID TRANSITION OF NON-METALS Final Report, 1 Dec. 1973 - 31 May 1981
Robert F. Sekerka May 1981 12 p refs
(Contract DE-AS02-76ER-02407)
(DE81-027884; DOE/ER-02407/9) Avail: NTIS HC A02/MF A01

The fundamental instability phenomena that can occur during the induction heating and melting of ceramics was quantified and a model of the ICZG process that can serve to guide the crystal grower in process optimization and adaption to new materials was completed. A proof, independent of any statistical model, of the Onsager reciprocal relations for multicomponent diffusion and heat flow in fluids was obtained, the fundamental concepts inherent in the existence of constitutive relations were developed and the way was paved toward extension of these developments to solids and to solid-fluid interfaces. DOE

N82-10123# Colorado Univ., Boulder.
DIAGNOSTICS OF A GLOW DISCHARGE USED TO PRODUCE HYDROGENERATED AMORPHOUS SILICON FILMS Final Report, 15 Feb. 1980 - 14 Apr. 1981
A. Gallagher and J. Scott 1981 20 p Sponsored in part by Midwest Research Inst.
(Contract DE-AC02-77CH-00178)
(SERI/TR-9053-1-T3) Avail: NTIS HC A02/MF A01

The glow discharge deposition apparatus, with mass spectrometer sampling, was constructed and tested with Ar and SiH4 gas. It successfully achieved the desired high vacuum, gas flow rates, and mass spectrometer sensitivities. Ion and neutral species were measured from the end and side of a dc discharge in SiH4, finding major changes with sampling position, gas pressure, and discharge power. The ion species from a dc proximity discharge, and from the end and sides of an RF discharge in SiH4 were studied. Qualitative comparisons were made to the dc discharge results and to approximate models for the fields and charge distributions in RF discharges. Impurity concentrations were studied in the vacuum system and silane gasews, with sensitivities of < or = 1 ppM outside of mass region overlain by SiH4 ion spectra. The impurity levels attained in the apparatus appear to be entirely due to impurities in the SiH4 gas, and are typically at the 1 to 100 ppM level. DOE

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-10124 Pennsylvania Univ., Philadelphia.

THE EFFECT OF PORE STRUCTURE ON THE KINETICS OF FLUID-SOLID REACTIONS Ph.D. Thesis

Suresh Kumar Bhatia 1981 356 p

Avail: Univ. Microfilms Order No. 8117758

For fluid solid reactions a random pore model was developed which accounts for arbitrary pore size distributions as well as pore intersections in a reacting solid. The model is quite versatile and subsumes the prior grain models as special cases. It is found that a rate maximum may be expected for certain pore size distributions but not for others. In the initial stages of reaction the rate increases with conversion due to increase in the surface area as pore growth occurs, but this effect is overshadowed in later stages by pore intersections which reduce surface area. The model indicates that given the porosity and surface area, a solid possessing uniform size pores is intrinsically the least reactive. The model is formulated to include as well transport effects arising from boundary layer, intraparticle and product layer diffusion. It is found that the rate and surface area maxima predicted in the kinetic regime are shifted to lower conversions as intraparticle or product layer diffusional resistances increase. Dissert. Abstr.

N82-10125 Texas Univ. at Arlington.

DEGASSING PHENOMENA FROM LIQUID-GAS SOLUTIONS AFTER RAPID DECOMPRESSION Ph.D. Thesis

Ho-Young Kwak 1981 124 p

Avail: Univ. Microfilms Order No. 8119323

The basic experiments consist of a decomposition experiment where a water-methane solution, was decompressed to atmospheric pressure. The induction time for bubble formation was found depends on the pressure reduction time. In addition to the basic experiments, a series of experiments was conducted where an external disturbance was applied during the decompression process. External disturbances included were ultrasonic sound, an electric field, and a pure shear flow. Various solutions used were pure water, and water with surfactant. The ultrasonic and shear flow disturbances wre the most effective method of promoting homogeneous bubble formation. Dissert. Abstr.

N82-10126 California Inst. of Tech., Pasadena.

LABORATORY STUDIES OF SUBMICRON PARTICLE FORMATION IN PULVERIZED COAL COMBUSTION Ph.D. Thesis

Dean Dalton Taylor 1981 314 p

Avail: Univ. Microfilms Order No. 8119592

A laboratory furnace was constructed to study the mechanism of submicron particle formation in pulverized coal boilers. Simulation was achieved by matching characteristic kinetic times in laboratory and field units. This was done by matching volumetric heat extraction rates. Reynolds number and geometric scaling were not deemed essential for the simulation. Combustion-generated submicron aerosols from the laboratory furnace were characterized by size and composition distribution measurements using an electrical mobility analyzer and a low-pressure impactor. Elemental analysis of size-classified mass samples was done by alpha particle-induced X-ray emission spectrum analysis. The influence of macroscopic combustion parameters on the characteristics of fine particle emissions was investigated. Total submicron particle volume concentration was found to depend on burner type and to increase with temperature for each burner type tested. The particle volume concentration was found to increase with exhaust NO concentration. Dissert. Abstr.

N82-10127 Polytechnic Inst. of New York, Brooklyn.

LASER DIAGNOSTICS IN JETS AND FLAMES Ph.D. Thesis

Anthony Celentano 1981 165 p

Avail: Univ. Microfilms Order No. 8118863

An integrated four component pulsed vibration Raman scattering one dimensional laser Doppler velocimeter scattering measurement system is applied to nonreacting and reacting free jet flows. Simultaneous, instantaneous, nonintrusive, remote, and measurements of velocity, temperature and specie concentration are shown. In addition, specie concentration second and third order scalar cross correlation distributions are presented as a measure of specie mixing. It is found that many experimental parameters needed for theoretical flow modeling can be obtained by this measurement system. A highly implicit numerical code was written and applied to model the nonreacting turbulent jet flow. The code is extended to model a premixed methane-air reacting free jet flow using a one-step global 'laminar' Arrhenius rate chemical source term. It is found that agreement existed between the numerical solution and experimental measurements, but that refinements to the turbulent model and the use of a 'turbulent' chemical source term are required to obtain better agreement. Dissert. Abstr.

N82-10128 Clemson Univ., S.C.

APPLICATIONS OF CIBS THEORY Ph.D. Thesis

Lynn Elizabeth Lewis 1981 157 p

Avail: Univ. Microfilms Order No. 8117929

Applications of the differential equation formulation of 'corrections to an incomplete basis set' theory to systems of greater than two electrons are discussed. Results are reported for several basis sets of the He, Be, H2, LiH, Li2, and H2O systems. It is shown that the method is convergent and feasible for molecular systems. The method results in a significant improvement in energies and a relative reduction in computer time since iterative calculations are not required. Dissert. Abstr.

N82-10129 Polytechnic Inst. of New York, Brooklyn.

VIBRATIONAL RELAXATIONS IN A LARGE MOLECULAR SYSTEM BY RAMAN AND INFRARED SPECTROSCOPY Ph.D. Thesis

Ellen Veronica Miseo 1981 173 p

Avail: Univ. Microfilms Order No. 8118888

The vibrational correlation functions of the vibrations in the molecule 4-n-octyloxy 4 prime-cyanobiphenyl in the isotropic phase and in solution were examined. Their relaxation behavior was also determined. A comparison of the infrared and Raman data was also planned. The spectra of the solutions were collected using a Jobin Yvon Ramanor HG2 for the Raman spectra and a Digilab FTS-20C for the infrared spectra. The programs used to calculate the vibrational correlation functions along with other data handling routines were written in the lab. Dissert. Abstr.

N82-10130 California Univ., Davis.

STUDIES IN SINGLE-CRYSTAL X-RAY DIFFRACTOMETRY: TAILORING MEASUREMENT STRATEGY TO PROJECT NEEDS Ph.D. Thesis

Brenda Gail Nichols 1981 280 p

Avail: Univ. Microfilms Order No. 8117583

A Syntex P2 sub 1 diffractometer was used to collect low temperature data (140 K) for three structures by the scan techniques, allowing 1 sec for scan and 0.5 sec each for two background measurements for each reflection, yielding about 400 reflection/hour. The compounds studied were: (1) 1-5-dithiacyclooctane iodine adduct, C6H12S2I4; (2) 4,4'di-(2-methoxycarbonlyethyl)- -3, 3', 5, 5' - tetranmethylpyyromethene Hydrochloride, C21H29N2O4Cl:(3) (1-(acetylamino) ethylidenesulfamic acid, C4H8 N2O4S. Recognizable solutions were derived without difficulty from each data set. The results were compared with those obtained from conventional data (30 sec/scan, 15 sec each for two backgrounds). In general the fast data collection resulted in a 50% increase in positional e.s.d.'s. A Picker diffractometer was used to collect low-temperature (85 K) high-order data on pentaerythritol, C(CH-2OH)4. A total of 1939 reflections were collected. Full-matrix least-squares refinements yielded hydrogen positions which gave 0.96(3) A for the O-H bond. A program was written (RATIO) which calculates the average ratio of the observed/calculated structure factors for the reflection contained in a two theta rage. Dissert. Abstr.

N82-10131 Wisconsin Univ. - Madison.

MICROWAVE SPECTROSCOPY OF THE CARBON MONOXIDE ION AND THE FORMYL ION AND DEVELOPMENT OF RELATED COMPUTER PROGRAMS Ph.D. Thesis

Nancy Diane Piltch 1981 381 p

Avail: Univ. Microfilms Order No. 8116010

Computer programs were written for on line control of a microwave spectrometer and a quadrupole mass spectrometer. Both programs provide signal averaging and data storage capabilities. The microwave program is used with the phase locked spectrometer, and includes signal enhancement options via data smoothing, and for tone-burst modulation, baseline suppression. Another program was written to perform a least squares fit of the microwave data to a model lineshape appropriate to the tone burst modulation scheme. Dissert. Abstr.

N82-10132 California Univ., Irvine.

THE SIMULATION AND INTERPRETATION OF VIBRATIONAL ISOTOPE EFFECTS Ph.D. Thesis

Stephen Anthony Skaron 1981 192 p

Avail: Univ. Microfilms Order No. 8118490

The magnitude of the reduced partition function (s sub 2/s sub 2)f values and th isotopes effects on chemical equilibria which can be calculated from these quantities are investigated. In such an analysis, one does not need to consider normal mode vibrational frequencies, but considers the frequencies corresponding to non-interacting individual coordinates to (s sub 2/s sub 1)f values an to isotope effects on equilibrium constants are presented. The reduced isotopic partition function ratios (s sub 2/s sub1)f (C13/C12) are dissected by perturbation theory for a series of alkanes. It is shown that the major contribution of the P factors can be included with the c factors to form the c prime factors and that then very few well characterized P factors are necessary to approximate (s sub 2/s sub 1)f. Moreover, the C prime an P factors corresponding to given types of cordinates are similar so that it is suggested that all the alkane (s sub 2/s sub 1)f(C13/C12) values can be estimated from a table of average c prime and P factors. The H/Mu isotopic exchange reaction and oxygen, isotopic abundances in carbonaceous meteorites were also examined. Dissert. Abstr.

N82-10133 Wisconsin Univ. - Madison.

VACUUM ULTRAVIOLET PHOTOCHEMISTRY AND FOURIER TRANSFORM INFRARED SPECTROSCOPY OF SOFT X-RAY PHOTORESISTS Ph.D. Thesis

Paul William Bohn 1981 238 p

Avail: Univ. Microfilms Order No. 8116637

Synchrotron radiation was employed to study the vacuum ultraviolet absorption spectra of polymethylmethacrylate (PMMA) polybutene-l-sulfone (PBS), and a partially cyclized polycis-isoprene resist (K747). Quantitative spectral measurements of their linear absorption coefficients were made possible by the fabrication of 100 nm thick free standing SiO2 windows upon which 150-850 nm thick experimental polymer films were applied. A 3 x 3 array of 100 micrometers x 100 micrometers windows was anisotropically etched into (100) n type silicon with a 1:1 H2O:N2H4 mixture. Results showed mu sub (PMMA) = 1.4 - 1.8 x 10 to the 5th power/cm mu sub 1 (PRS) = 3.4 - 3.6 x 10 to the 4th power/cm and mu sub/ (K747) = 2.4 - 3.0 x 10 to the 4th power/cm from 17 to 32 nm. This ordering is in contrast with previous resist sensitivity data. Absorption, however, measures the amount of energy deposited in a film, whereas sensitivity gauges the effectiveness with which that energy causes chemical change. High precision calculated differences between the Fourier transform infrared spectra of irradiated and nonirradiated films were employed to identify major photofragments and to characterize the radiation dose dependence of the photochemical pathways. Dissert. Abstr.

N82-10134 Virginia Commonwealth Univ., Richmond.

HETEROGENEOUS ELECTRON TRANSFER KINETIC PARAMETERS OF HEMEPROTEINS AS STUDIED BY CHANNEL FLOW HYDRODYNAMIC VOLTAMMETRY Ph.D. Thesis

James Francis Castner 1981 129 p

Avail: Univ. Microfilms Order No. 8118962

The technique of channel flow hydrodynamic voltammetry was used to elucidate the heterogeneous electrochemical behavior of the hemeproteins myoglobin and cytochrome. Sperm whale myoglobin was principally studied due to its stability and availability even though physiologically this hemeprotein does not function as an electron transporting agent. A methyl viologen modified Au foil electrode was used in this investigation. The modified electrode surface facilitated the reversible reduction and oxidation of myoglobin as was demonstrated by the technique of spectroelectrochemistry. Channel flow hydrodynamic voltammetry provided rapid attainment of steady state reaction conditions which resulted in the acquisition of precise kinetic measurements. Dissert. Abstr.

N82-10135 Texas Univ. at Arlington.

PHOTOELECTROCHEMICAL REACTIONS OF PARTICULATE SEMICONDUCTOR SYSTEMS Ph.D. Thesis

Wendell Wayne Dunn 1981 192 p

Avail: Univ. Microfilms Order No. 8119283

The mechanism of the photoreaction at the suspended particle is considered with respect to the semiconductor properties of the mateials. The photodeposition of Pt and Pd on semiconductor powders from an aqueous solution containing the metal salt and acetate provides a technique for the preparation of supported catalysts. The physical properties of the catalysts are examined by scanning Auger and X-ray photoelectron spectroscopy and by X-ray diffraction techniques. Experiments are conducted to compare the photoprocesses at the powder are compared to the photoelectrochemical behavior of single crystal electrode materials. The photooxidation of oxalic acid at TiO2 and Pt/TiO2 under oxygen free and oxygen saturated conditions is examined. The oxidation process is analogous to the photocatalytic oxidation o acetate (the photon-Kolbe). Ti(3+) is produced by the irradiation of oxalate in suspensions of TiO2, thus suggesting that Ti(3+) is an intermediate environment of the photogenerated electron. Dissert. Abstr.

N82-10136 Colorado State Univ., Fort Collins.

EXPERIMENTAL MODELING OF AEROSOL PRODUCTION, TRANSPORT, AND VAPORIZATION FOR PLASMA SPECTROSCOPY Ph.D. Thesis

Stephen James Freeland 1981 230 p

Avail: Univ. Microfilms Order No. 8119702

The process of converting an aqueous sample into an atomic vapor within the optical path of an atomization source are delineated with repect to nebulization of the sample, transport and evaporation of the aqueous aerosol, and vaporization and motion of the dry analyte salt as well as diffusion of the analyte atoms within the flame or plasma. It is shown that small aerosol drops are desirable to avoid removal via inertial impaction, that at th po velocity is necessary to produce small aqueous aerosol drops while low overall gas flow is desirable in terms of atomic vapor dilution in the source, and that analyte spread in a flame is due to horizontal drag forces acting on analyte aerosol which enters the flame very near the slot watt. Analysis of scanning electron micrographs of dry aerosol particles confirms crustal formation for large particles (approximately 1 micro M). It is also shown that smaller dry particles are less dense than the larger ones providing support for the conclusion that crustal formation may also affect small droplets. Dissert. Abstr.

N82-10137 Emory Univ., Atlanta, Ga.
NMR STUDIES OF MOLECULAR STRUCTURE USING LYOTROPIC AND THERMOTROPIC LIQUID CRYSTAL SOLVENTS Ph.D. Thesis
William Eric Bechtold 1980 159 p
Avail: Univ. Microfilms Order No. 8119143

The hydrogen magnetic resonance spectrum of naphthalene was obtained in an orienting lyotropic liquid crystal solvent based on potassium laurate, and the results of the spectral analysis were used to calculate the proton geometry of the molecule. Vibrational corrections based on a full normal coordinate treatment were applied to the structure and the effect of different weighting schemes was investigated. The results are compared with those obtained in thermotropic media and by other structural methods. Dissert. Abstr.

N82-10138# Oakland Univ., Rochester, Mich. Dept. of Chemistry.
POTENTIAL ENERGY FUNCTIONS FOR THE SOLVATION OF ALKALI METAL CATIONS
P. P. Schmidt 1 Aug. 1981 38 p refs Submitted for publication
(Contract N00014-77-C-0293; NR Proj. 359-648)
(AD-A103994; TR-10) Avail: NTIS HC A03/MF A01 CSCL 07/2

The purpose of this paper is to explore the use of several model potential energy functions in order to try better to understand the nature of the ofrces which operate between simple monatomic cations and the molecules of solvent which surround them. This work builds upon and extends a recently reported initial treatment. In that report, the potential energy was modelled as the sum of an exponential (Born-type) repulsion and an ionic-dipolar attraction. In this paper we consider composite functions which consist variously of an exponential form of repulsion or an inverse R-12 repulsion, and attractions which are expressed in terms of the basic ionic-dipolar terms together with additional terms which depend upon the polarizabilities of the ion and the solvent. No more than two adjustable parameters are used. The force constants for the far infrared-active vibrations of the caged ions are known. With the use of the equilibrium condition for the cage of solvent, the values of the parameters can be determined. GRA

N82-10139# Oakland Univ., Rochester, Mich. Dept. of Chemistry.
THE ELECTROGENERATION OF SOLVATED METAL ATOMS. 2: ANALYSES OF THE STABILITIES OF SOLVATED CATIONS AND ATOMS Technical Progress Report, 31 Apr. 1980 - 31 Jul. 1981
P. P. Schmidt and B. S. Pons (Alberta Univ., Edmonton, Canada) 1 Aug. 1981 58 p refs Submitted for publication
(Contract N00014-77-C-0293; NR Proj. 359-648)
(AD-A103993; TR-11) Avail: NTIS HC A04/MF A01 CSCL 07/2

The purpose of this paper is to investigate mechanical models of ionic and atomic solvation in order to suggest a part of the mechanism of the electroreduction of metal ions. We use a Morse potential, the parameters for which are determined with the use of spectroscopic information, to try to predict the mechanical properties of a solvated atom. In particular, the solvated ionic and atomic systems are allowed to approach and interact with a metallic surface. Changes in the positions of the equilibria and changes in the calculated force constants are determined. We defined accurate adionic and adatomic states. In these states the ion or atom occupies an expanded cage which includes the solvent and the surface of the metal. The activation energies for the formation of adions may be much larger than the activation energies for the formation of the related adatoms. Thus, if a reduction should occur at the outer Helmholtz plane, a solvated atom can be formed. In the vicinity of the surface, such a solvated atom can desolvate much more readily than the ion. The strength with which solvent or ligand is associated with a zero-valent metallic species, we believe, influences strongly the character of the metallic deposit formed. GRA

N82-10140# Martin Marietta Labs., Baltimore, Md.
INTERFACE PROPERTIES AND SURFACE LEAKAGE OF (Hg,Cd)Te PHOTODIODES Final Report, 30 Aug. 1979 - 30 Apr. 1981
S. P. Buchner, G. D. Davis, W. A. Beck, and N. E. Byer Jul. 1981 75 p refs
(Contract DAAK70-79-C-0134)
(AD-A104014; MML-TR-81-39C) Avail: NTIS HC A04/MF A01 CSCL 09/1

The passivation of Hg(0.8)Cd(0.2)Te photodiode surfaces by an anodic oxide, ZnS, and a bilayer consisting of ZnS covering the anodic oxide was investigated using a combination of electrical and surface spectro-scopic techniques. This approach has allowed us to relate the electrical characteristics of the different passivants with the interface chemistry. The electrical properties of the passivants were revealed by capacitance-voltage measurements of MIS devices and by current-voltage and capacitance-voltage measurements of gate-controlled diodes. X-ray photoelectron spectroscopy together with argon sputtering has provided information both on the chemical species present in the vicinity of the interface and on their chemical states. Our results for the anodic oxide reveal an apparently very non-ideal interface with a substantial Hg depletion in the semiconductor near the interface, yet the density of interface states is quite small (<5 x 10 to the 11th power/sq cm /eV). However, the presence of a large positive charge in the oxide produces an inverted surface in the p-region of the diode which is detrimental to diode operation since it opens up a large channel for surface leakage current. GRA

N82-10141# Illinois Inst. of Tech., Chicago. Dept. of [illegible] Engineering.
SEPARATION OF PARTICLES FROM COAL DERIVED LIQUIDS VIA SURFACE CHARGE PROPERTIES Final Report, Aug. 1977 - May 1981
Dimitri Gidaspow and Darsh Wasan Jul. 1981 97 p refs
(Contract DE-AS02-77ET-10445)
(DE81-029088; DOE/ET-10445/1) Avail: NTIS HC A05/MF A01

An improved method of removal of fine particles suspended in nonaqueous media by the application of a high-voltage (1000 to 10,000 V/cm) electric field was developed. The technique is a modification of ordinary cross-flow filtration with a porous tube and of forced flow electrophoresis. The electrofilter was tested with a synthetic nonaqueous slurry as well as samples of diluted H-coal process liquids obtained from a coal liquefaction pilot plant at various electric field strengths, driving pressures, and feed rates. Models of clear boundary layers for flat and tubular cross-flow electrofilters were developed as a function of inlet Peclet number, electrophoretic velocity of particles, and rate of filtration. DOE

N82-10142# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
MODEL PATHWAYS IN LIGNIN THERMOLYSIS Ph.D. Thesis
Michael T. Klein and Preetinder S. Virk Feb. 1981 99 p refs
(Contract DE-AM01-76EI-02295)
(DE81-029767; MIT-EL-81-005) Avail: NTIS HC A05/MF A01

A total of 20 model compound pyrolysis substrates were selected to mimic the important reactive functional groups present in whole-lignin thermolysis. The more salient models were: phenethyl phenyl ether (PPE), which depicts the most prevalent lignin interunit linkage; guaiacol, model of the predominant aromatic methoxyl; and saligenol and cinnamyl alcohol, models of important propanoid side chains. Detailed pathway and kinetic analyses and determination of reaction Arrhenius parameters provided mechanistic insights into the model compound pyrolyses. Several pericyclic reaction mechanisms, hitherto not mentioned in the lignin pyrolysis literature, were suggested. DOE

N82-10143# State Univ. of New York, Binghamton. Dept. of Chemistry.
DESULFURIZATION WITH TRANSITION METAL CATALYSTS Quarterly Technical Progress Report, 28 Mar. - Jun. 1981
John J. Eisch 31 Jul. 1981 4 p
(Contract DE-AC22-79ET-14879)
(DE81-028935; DOE/ET-14879/T6) Avail: NTIS

HC A02/MF A01

The reactivity and the intermediates in the desulfurization of 2-methyl dibenzo thiophene and certain model sulfides and sulfones were examined. The ratio of bis-1.5-cyclo octadiene nickel, the desulfurizing activity of soluble organo cobalt complexes, and the activity of aluminum hydride combinations with nickel (11), cobalt(11), and molybdenum(0) or molybdenum (IV) salts were also studied. Experimental procedures for applying these techniques to coal derived liquids were also addressed. DOE

N82-10144# Worcester Polytechnic Inst., Mass.

KINETICS AND MECHANISMS OF CATALYTIC HYDROLIQUEFACTION AND HYDROGASIFICATION OF LIGNITE Quarterly Report, Apr. - Jun. 1981

Wilmer L. Kranich, Kamel Guruz, and Alvin H. Weiss 10 Aug. 1981 24 p refs

(Contracts DE-FG22-81PC-40770; DE-AC22-77ET-10618)

(DE81-023581; DOE/PC-40770/T2; QR-2) Avail: NTIS HC A02/MF A01

The variables involved in the hydroliquefaction and hydrogasification of lignite were studied. Emphasis was placed on the catalytic batch hydroliquefaction of a range of low rank coals including two subbituminous coals, four lignites, and leonardite, as well as cellulose. These were studied both as received and after partial demineralization by washing with hydrochloric acid. DOE

N82-10145# Texas A&M Univ., College Station. Dept. of Chemistry.

REACTIVATION OF AN AMINO BONDED PHASE LIQUID CHROMATOGRAPHIC COLUMN

D. Karlesky, Dennis C. Shelly, and Isiah M. Warner 1980 13 p refs

(Contract DE-AS05-80EV-10404)

(DE81-028459; DOE/EV-10404/2) Avail: NTIS HC A02/MF A01

The reactivation of an n-propyl amine bonded phase column after deactivation with acetone is described. Using reversed phase aqueous conditions the condensation product (Schiff's base) was hydrolyzed to original reactants. Column performance was evaluated before and after deactivation and after reactivation to monitor the effectiveness of the reactivation procedure. Results showed that column performance after reactivation compared to column performance before deactivation within experimental error. DOE

N82-10146# Texas A&M Univ., College Station. Dept. of Chemistry.

INVESTIGATION OF SEPARATION MECHANISMS IN THE NORMAL AND REVERSED PHASE CHROMATOGRAPHY OF POLYNUCLEAR AROMATIC HYDROCARBONS ON AN AMINO BONDED PHASE COLUMN

Dori Karlesky, Dennis C. Shelly, and Isiah M. Warner 1980 27 p refs Sponsored in part by the Robert A. Welch Foundation

(Contract DE-AS05-80EV-10404)

(DE81-028461; DOE/EV-10404/6) Avail: NTIS HC A03/MF A01

Experiments were run using an n-propyl amine polar bonded phase (Chromosorb LC-9) liquid chromatographic column in both the normal and reversed phase mode. Results indicate that the mechanism of separation in the normal phase is due mainly to a charge transfer interaction between the lone pair electrons on the stationary phase nitrogen and the (LC OMEGA) electron cloud of the solute PNAs. Elution order seems to depend upon a combination of (LC OMEGA) energy, electron affinity, and type of ring condensation of the solute. Comparing plots of log I versus number of aromatic carbons for catacondensed PNAs suggest that while the specific interaction is different than that seen in silica chromatography, the overall adsorption effect is comparable. In the reversed phase the separation mechanism is either a pure partitioning effect in highly polar mobile phases (methanol/water), or a mixture of liquid-solid adsorption and liquid-liquid partition in less polar solvent systems (acetonitrile/water). DOE

N82-10147# Texas A&M Univ., College Station. Dept. of Chemistry.

RECENT ADVANCES IN MULTICOMPONENT FLUORESCENCE ANALYSIS

Isiah M. Warner and Linda B. McGown (California State Univ., Long Beach) 1980 190 p refs

(Contract DE-AS05-80EV-10404)

(DE81-028337; DOE/EV-10404/T4) Avail: NTIS HC A09/MF A01

Examples of the recent advances in multicomponent fluorescence analysis are presented. This review is limited in scope to developments in instrumental methods although there is a brief review of multicomponent data reduction. DOE

N82-10148# Yale Univ., New Haven, Conn. School of Medicine.

DEVELOPMENT OF NEWER METHODS FOR THE ISOLATION AND IDENTIFICATION OF CERTAIN COMPONENTS FOUND IN COMPLEX MIXTURES DERIVED FROM ENERGY SOURCES AND THE DETERMINATION OF THEIR BIOLOGICAL ACTIVITY VIA BIOASSAY SYSTEMS Progress Report, Aug. 1980 - Jul. 1981

S. R. Lipsky Jul. 1981 29 p refs Prepared in cooperation with LASL, N. Mex.

(Contract DE-AS02-76EV-02958)

(DE81-028311; DOE/EV-02958/T1) Avail: NTIS HC A03/MF A01

A composite sample of Paraho crude oil was fractionated and the fractions chemically identified by multidimensional gas chromatography. The fractions were then bioassayed to determine their biological activity. DOE

N82-10149# University of Southern California, Los Angeles.

CHEMISTRY AND STRUCTURE OF COAL-DERIVED ASPHALTENES AND PREASPHALTENES Quarterly Progress Report, Jul. - Sep. 1980

T. F. Yen 1980 22 p refs

(Contracts DE-AC22-76ET-10626; EX-76-C-01-2051)

(DE81-025932; DOE/ET-10626/T1) Avail: NTIS HC A02/MF A01

In order to determine the role of oxygen in altering the microstructure of the residues and the differences in reaction paths during heat treatment, two asphaltenes, were pyrolyzed and the residues studied using Fourier transform infrared (FTIR) analysis. These were pyrolyzed under the standard conditions (N2 purge, 13 C/hr to 360 C, 5 C/hr to 500 C) and samples were taken at appropriate temperature intervals. The residues were fractionated into oil resin, asphaltenes, preasphaltene and mesophase and transformation curves obtained. Elemental analysis of the residue fractions was done for use in conjunction with FTIR analysis to get structural information. DOE

N82-10150# Energy and Environmental Research Corp., Santa Ana, Calif.

SOOT FORMATION IN SYNTHETIC FUEL DROPLETS Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981

G. England, J. Kramlich, Y. Kwan, and R. Payne Jul. 1981 36 p

(Contract DE-AC22-80PC-30298)

(DE81-028391; DOE/PC-30298/T3; QRPR-3) Avail: NTIS HC A03/MF A01

Fuel screening studies in the 70000 Btu/h tunnel furnace were extended to include SRC-11 middle and heavy distillate fuel oils. A total of eight fuels were investigated. Soot, particulates, and NOx emission levels were obtained under comparable firing conditions for both normal and staged combustion, and at various overall excess air levels. The combustion of single-droplet streams was investigated in a controlled flow reactor. The trajectory of every SRC-11 fuel droplet was observed to determinate in a microexplosion. High speed photography showed this to be an extremely rapid event resulting in the formation of a visible, luminous soot cloud. This behavior was not observed for a petroleum-derived No. 6 oil and appeared to be pronounced for a blended SRC-11 than for either the middle or heavy distillate fuels. Preliminary measurement were also made of local soot concentrations and of the temprature of the soot sheet in the reactor system. J.M.S.

N82-10151# Ohio State Univ., Columbus. Dept. of Chemistry.
ROTATING-DISK THIN-LAYER CHROMATOGRAPHY M.S. Thesis
Deborah Louise DuPont 1980 116 p refs
(Contract DE-AC02-80ER-10554)
(DE81-025878; DOE/ER-10554/8) Avail: NTIS HC A06/MF A01

A separations technique, rotating disk thin layer chromatography (RDTLC), is reported. Several packing methods, effects of silica activation on the reproducibility, and related efficiencies of the chromatographic systems are evaluated as well as the utility of the instrument with regard to the fractionation of complex mixtures. Reproducibility is found to be excellent if the adsorbent activity is controlled. The technique is most advantages when used for preparative separations. It is also shown to be useful in the clean up of complex natural products for subsequent analysis. DOE

N82-10152# Air Products and Chemicals, Inc., Allentown, Pa.
CRYOGENIC METHANE SEPARATION/CATALYTIC HYDROGASIFICATION PROCESS ANALYSIS Quarterly Report
J. Klosek Aug. 1981 42 p
(Contract DE-AC01-78ET-10325)
(DE81-029123; DOE/ET-10325/T11) Avail: NTIS HC A03/MF A01

Two commercial gasification processor were evaluated in terms of their relative effectiveness in separating methanes from the reaction products and some of the other synthesis gas products recycled. Cryogenic methane separation results from the process gas recovered by partial condensation and carbon absorption are reported. Preliminary plant designs for acid gas removal and cryogenic methane separation from the raw gas are also reported. R.C.T.

N82-10153# Brookhaven National Lab., Upton, N. Y.
FLAME-RETENTION HEAD BURNER EFFICIENCY TEST RESULTS AND ANALYSIS: SPACE-HEATING-EQUIPMENT TEST PROGRAM
R. J. McDonald and R. F. Krajewski Nov. 1980 26 p refs
(Contract DE-AC01-76CH-00016)
(DE81-030219; BNL-51321) Avail: NTIS HC A03/MF A01

Fuel oil savings resulting from the use of flame-retention head burners in residential oil-fired hydronic heating units are summarized. Results of laboratory and field tests are compared. The fuel savings varied between 5.1% and 22.0% for various systems. DOE

N82-10154# New Hampshire Univ., Durham.
LIQUEFACTION OF BITUMINOUS COALS USING DISPOSAL ORE CATALYSTS AND HYDROGEN Quarterly Progress Report, 7 May - 7 Aug. 1981
V. K. Mathur Aug. 1981 17 p
(Contract DE-AC22-81PC-41035)
(DE81-029134; DOE/PC-41035/1) Avail: NTIS HC A02/MF A01

Hydrogenation of coal-oil slurry by hydrogen using disposal ore catalysts (DOC) with special reference to maximizing liquefaction and minimizing viscosity of product oil was studied. A number of companies were contacted to collect samples of ores and ore concentrates containing cobalt, molybdenum, nickel and other metals considered to posses catalytic activity and a commercial Co-Mo catalyst (0402T) are reported. These data are to be used as a base for evaluating the catalytic effects of the ores and minerals collected. DOE

N82-10155# Physical Sciences, Inc., Woburn, Mass.
SYNTHETIC-FUEL COMBUSTION: POLLUTANT FORMATION. SOOT-INITIATION MECHANISMS IN BURNING AROMATICS Quarterly Report, 1 Apr. - 30 Jun. 1981
T. Tanzawa, S. P. Schertzer, and W. T. Rawlins 1981 21 p refs
(Contract DE-AC22-80PC-30292)
(DE81-029480; DOE/PC-30292/3; PSI-TR-284; QR-3) Avail: NTIS HC A02/MF A01

Toluene pyrolysis experiments were performed using He-Ne laser beam attenuation to monitor soot. The experimental results were consistent with those of previous investigators; however, the laser beam attenuation records showed an anomalously large absorption at the higher temperatures where soot formation should be minimal. This effect could be due to some light-absorbing gas-phase species such as PCAH and/or radicals of PCAH. Diagnostics employed show ambiguous late-time behavior of the pressure, density, and beam attenuation profiles. DOE

N82-10156# Argonne National Lab., Ill.
CYCLONE PERFORMANCE ESTIMATES FOR PRESSURIZED FLUIDIZED-BED COMBUSTION
R. F. Henry and W. F. Podolski Jul. 1981 33 p refs
(Contract W-31-109-eng-38)
(DE81-028504; ANL/CEN/FE-81-4) Avail: NTIS HC A03/MF A01

Hot pressurized flue gas from pressurized fluidized-bed combustion must be cleaned up prior to its expansion in a gas turbine as part of the combined-cycle electric power generation concept. The performance of conventional cyclones in experimental tests has been compared with theory, with reasonable agreement. Prediction of the performance of a larger cyclone system shows that three stages should provide the cleanup required on the basis of current estimates of turbine tolerance of particulate matter. Advances in hot gas cleanup - optimized cyclones, augmented cyclones, and alternative devices should provide future improvement in cycle efficiencies and costs, but simple cyclones are planned for first-generation PFB/CC pilot and demonstration plants. DOE

N82-10157# Spectron Development Labs., Inc., Costa Mesa, Calif.
PARTICULATE PROCESSES IN PULVERIZED-COAL FLAMES Quarterly Technical Progress Report, Jan. - Mar. 1981
Apr. 1981 65 p refs
(Contract DE-AC22-80PC-30300)
(DE81-025153; DOE/PC-30300/T3) Avail: NTIS HC A04/MF A01

The design of the entire apparatus for the dilute particle reaction experiment was completed. This includes two reactor heads, a fluidized bed feeder, the tube reactor, and the reactor traverse mechanism. Experimental observations of ignition and devolatilization of Pittsburgh Seam HVA bituminous coal were initiated. Observations using both front and back light pulsed laser holography and particle sizing interferometry were made. Preliminary analysis of the data indicate that high quality results can be obtained. DOE

N82-10158# Physical Sciences, Inc., Woburn, Mass.
PULVERIZED-FUEL COMBUSTION: MODELING AND SCALEUP METHODOLOGIES Quarterly Report, 1 Apr. - 30 Jun. 1981
Paul F. Lewis, Evan R. Pugh, Nelson H. Kemp, Alan Gelb, and Thomas Wolf Aug. 1981 30 p refs
(Contract DE-AC22-80PC-30294; QR-3)
(DE81-026546; DOE/PC-30294/3; PSI-TR-280) Avail: NTIS HC A03/MF A01

Effort this quarter has continued on model improvements, and the data analysis task has begun. Specific work reported includes: model of the heterogeneous reactions of coal chars, work on particle-particle collisions, improvements in the computer code to handle the stiff nature of the particle momentum and energy equations, and identification of a set of experiments with which to start the data analysis. Results of these efforts are: a model for heterogeneous carbon reactions including OH and O reactions, a model for collisional drag effects, improved numerical stability of the code, and beginning of data analysis. DOE

N82-10159# Brigham Young Univ., Provo, Utah. Combustion Lab.
BASIC COMBUSTION AND POLLUTANT-FORMATION PROCESSES FOR PULVERIZED FUELS Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
Geoffrey J. Germane and L. Douglas Smoot 15 Jul. 1981 46 p refs
(Contract DE-FG22-80PC-30306)
(DE81-027279; DOE/PC-30306/T3; QTPR-3) Avail: NTIS HC A03/MF A01

Characterization of coal-water mixtures (CWM) was initiated to identify handling factors which could affect the combustion and pollutant formation. Methods of CWM preparation and utilizatio have been studied to help define the approach to be used for this research. Careful design and utilization strategies can improve lab-scale similarity in certain areas with potential commercial-scale applications. The CWM reactor modifications embody design features for detailed space-resolved combustion studies and fabrication has begun. The reactor has been designed to handle up to 45 kilograms (100 pounds) per hour of CWM, with pecise control of the inside wall temperatures. Commercial and industrially produced chars were reviewed to determine their status and availability. Six chars were identified and requested. The literature survey was continued, determinin those variables and factors that influence char reactivity. Provisions have been made to conductor characterization tests that will enable the selection of two of the six chars for the laboratory-scale combustor tests. DOE

N82-10160# Oak Ridge National Lab., Tenn. Chemical Physics Section.
RESONANCE IONIZATION SPECTROSCOPY: COUNTING NOBLE-GAS ATOMS
G. S. Hurst, M. G. Payne, C. H. Chen, R. D. Willis, B. E. Lehmann, and S. D. Kramer Jun. 1981 9 p refs Presented at Fifth Intern. Conf. on Laser Spectry. (Vicols), Alberta, British Columbia, 29 Jun. - 3 Jul. Submitted for publication Sponsored in part by Scripps Inst. of Oceanography
(Contract W-7405-eng-26)
(DE81-024252; CONF-8106100-1) Avail: NTIS HC A02/MF A01

The counting of noble gas atoms, using lasers for the selective ionization and detectos for counting individual particles (electrons or positive ions) is reported. When positive ions are counted, various kinds of mass analyzers (magnetic, quadrupole, or time-of-flight) can be incorporated to proide A selectivity. It is shown that a variety of interesting and important applications can be made with atom-counting techniques which are both atomic number (Z) and mass number (A) selective. DOE

N82-10161# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
SOOT VOLUME-FRACTION PROFILES IN A FREE-COMBUSTING BOUNDARY LAYER
R. A. Beier and P. J. Pagni May 1981 10 p refs Presented at the ASME 20th Natl. Heat Transfer Conf., Milwaukee, 2-5 Aug. 1981
(Contracts W-7405-eng-48; NBS-80-NAGE-6839)
(DE81-760502; LBL-12767; CONF-810804-8) Avail: NTIS HC A02/MF A01

Carbon particulate volume fraction profiles and approximate particle size distributions were measured in a free laminar combusting boundary layer for five liquid hydrocarbon fuels and polymethylmethacrylate. A multiwavelength laser transmission technique determind the most probable particle radius and a total particle concentration, which are the two unknown parameters in an assumed Gauss size distribution. In the combustion boundary layer, a sooting region exists between the pyrolyzing fuel surface and the flame. The liquid fuel soot volume fractions range from f/ sub v/ approximately 10 7 for n heptane, a paraffin, to /sub v/ approximately 10 5 for toluene, an aromatic. The PMMA soot volume fractions, f/sub v/ approximately 10 7, are approximately the same as the values previously reported for pool fires. The soot volume fraction increase slightly with downstream distance, while the standoff distance of the maximum in the f sub v profile appears to approach the converging streamline. Convection of carbon particles broadens the soot region downstream. For all fuels tested, a most probable radius between 20 nm and 50 nm is obtained which varies only slightly with distance both downstream or normal to the fuel surface. DOE

N82-10162# Oak Ridge National Lab., Tenn. Chemical Technology Div.
REMOVAL OF FLUORIDE FROM AQUEOUS NITRIC ACID
D. J. Pruett, W. B. Howerton, and J. C. Mailen Jun. 1981 26 p refs
(Contract W-7405-eng-26)
(DE81-023853; ORNL/TM-7502) Avail: NTIS HC A03/MF A01

Several methods for removing fluoride from aqueous nitric acid were investigated and compared with the frequently used aluminum nitrate-calcium nitrate Ca(2+)-Al(3+) chemical trap-distillation system. Zirconium oxynitrate solutions were found to be superior in preventing volatilization of fluoride during distillation of the nitric acid, producing decontamination factors (DFs) on the order of 2 x 2,000 (vs approximately 500 for the Ca(2+)-Al(3+) system). Several other metal nitrate systems were tested, but they were less effective. Alumina and zirconia columns proved highly effective in removing HF from HF-HNO3 vapors distilled through the columns; fluoride DFs on the order of 10 to the 6th power and 10 to the 4th power, respectively, were obtained. A silica gel column was very effective in adsorbing HF from HF-HNO3 solutions, producing a fluoride DF of approximately 10 to the 4th power. DOE

N82-10163# Sandia Labs., Albuquerque, N. Mex.
SIMULTANEOUS DETERMINATION OF ANTIMONY AND CHLORINE IN SYNTHETIC RUBBERS BY 14-MeV NEUTRON-ACTIVATION ANALYSIS
Richard W. Bild 1981 14 p refs Presented at the 6th Intern. Conf. on Mod. Trends in Activation Anal., Toronto, 15 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023304; SAND-81-0156C; CONF-810682-1) Avail: NTIS HC A02/MF A01

A nondestructive method for the analysis of Sb and Cl in synthetic rubbers by 14 MeV neutron activation analysis was developed and evaluated by comparisons with microanalytical and thermal neutron activation analysis results. The method is most precise when a rubber with known amounts of Sb and Cl is used as a standard. Samples containing 0.07 to 2.5 wt percent Sb and 2.5 to 15.9 wt percent Cl were analyzed and precision for the method is 10 percent or better. Antimony and Cl detection limits are 0.02 and 0.5 wt percent respectively. Agreement among the three methods is excellent; the thermal activation analysis method is more precise and simpler to apply if only Sb needs to be determined in a sample. DOE

N82-10164# Sandia Labs., Albuquerque, N. Mex.
ELECTRICAL-TO-CHEMICAL CONNECTION
R. A. Graham 1981 5 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023172; SAND-81-1350C; CONF-810684-5) Avail: NTIS HC A02/MF A01

Data on shock-induced electrical polarization in polymers are presented for polysulfone, polystyrene, and polypyromellitimide. The polarization generated in polysulfone is the largest reported for any polymer. A strong correlation is observed between the number of benzene rings in the monomer repeat unit and the magnitude of the polarization. DOE

N82-10165 State Univ. of New York at Stony Brook.
LIGHT SCATTERING FROM POLYDISPERSE MACROMOLECULAR SOLUTIONS Ph.D. Thesis
Arthur Anthony DiNapoli 1981 230 p
Avail: Univ. Microfilms Order No. 8118952

The study of macromolecular solutions is often complicated by polydispersity, which is an inevitable consequence of all synthetic polymerization reactions and some biological processes. A polydisperse solution has a distribution of molecular weights, rather than a single, well defined value. The molecular weight distribution is related to a size distribution in chrmatographic techniques where the polymer is physically segregated by passage through a porous substrate or gel medium. Similar information to that available by chromatography was obtained through a combination of elastic and quasi-elastic light scattering. Dissert. Abstr.

N82-10166 Arizona State Univ., Tempe.
THEORETICAL MODELS FOR SOLID STATE PHASE TRANSITIONS Ph.D. Thesis
Maureen Barbara Langley 1981 192 p
Avail: Univ. Microfilms Order No. 8119962

Hysteresis in the pressure dependent solid state phase transition PrO sub 1.714-PrO sub 1.778 was modeled using a statistical thermodynamical formalism. The system was considered to be formed of a fixed number of domains, which were differentiated on the basis of size. In the case of interacting domains, particular attention was given to the clustering of domains of like phase as the transition progresses. The fraction variables representing the clustering behavior were calculated for the model system during the source of the phase transition. A statistical thermodynamical model was used to study the discontinuous ionic conductivity and heat capacity observed in stone solid electrolytes. The hysteresis which was observed in the ionic conductivity of some solid electrolytes is also investigated. A domain approach was invoked to modulate the width of the calculated hysteresis loop. The model was applied to hysteresis observed in the (Ag,Cu)2HgI4 eutectoid, YF3, and LuF3.

Dissert. Abstr.

N82-10167 California Univ., Irvine.

STUDIES OF LOW VOLATILITY COMPOUNDS BY ION CYCLOTRON RESONANCE MASS SPECTROMETRY Ph.D. Thesis

Michael James Locke 1981 394 p

Avail: Univ. Microfilms Order No. 8118479

The design and construction of an ion cyclotron resonance mass spectrometer is described which is capable of studying compounds with vapor pressure as low as 10 to the 10th power Torr. The gas phase acidities and basicities were determined for several classes of low volatility compounds including amino acids peptides, nuclear acid residues, porphyrins, and carbohydrates. The gas phase basicities for twenty common amino acids were determined by the pulsed is equilibrium technique relative to ammonia. The weakest base, glycine, is found to be 8.2 kcal/mol more basic than ammonia, while the strongest base histidine, was determined to be 28.5 kcal/mol more basic than ammonia. This range over 20 kcal/mol can be compared to aqueous solution where the basicities span a range of only 2.5 kcal/mol. These determinations allowed the enthalpies of solvation and of formation for the protonated molecular ions to be calculated. In addition, based upon substituent effects, the structure of the neutral amino acids in the gas phase has been shown to be nonionic form, rather than the zwitterionic from which predominates in solution.

Dissert. Abstr.

N82-10168 California Inst. of Tech., Pasadena.

OPTICAL DEPHASING AND ENERGY TRANSFER IN ORDERED AND DISORDERED SOLIDS: STUDIES BY LASER SPECTROSCOPY AND OPTICAL-MICROWAVE DOUBLE RESONANCE Ph.D. Thesis

Duane Donald Smith 1981 389 p

Avail: Univ. Microfilms Order No. 8118982

Electronic energy transfer and optical dephasing of ordered and disordered molecular crystals is studied theoretically and experimentally. Data on impurity band transport are presented which are consistent with the Anderson transition. The effect of dimensionality on trap-trap energy transfer thresholds is experimentally measured and modeled. Experiments focus on 1,4-dibromonaphthalene whose lowest triplet exciton is quasi-one-dimensional. Steady state and transient line narrowing laser spectroscopy provide the first unequivocal measurement of the inelastic scattering rate amongest the band states. The inelastic scattering rate (intraband exchange rate) is slow. It is significant that there is a six order of magnitude separation of time scales for the elasti and inelastic scattering, demonstrating that pure dephasing dominates the intraband exchange. For heavily trap-disordered DBN (up to 24 percent H6/D6) it is found that (1) excitation migration is step-wise incoherent, (2) energy transfer to deep traps is best fit with a t(-1/2) energy transfer rate, (3) there are no mobility edges in the trap inhomogeneous profile and (4) an upper limit for the trap homogeneous linewidth at 1.3 K is 9 GHz.

Dissert. Abstr.

N82-10169 Akron Univ., Ohio.

EVALUATION OF ERRORS IN PURITY DETERMINATIONS Ph.D. Thesis

Tuhfeh S. Habash 1981 231 p

Avail: Univ. Microfilms Order No. 8117712

The differential scanning calorimeter (DSC) produces thermograms that can be used for purity analyses of organic compounds and pharmaceuticals based on the van't Hoff equation. Because of the thermal resistance and response rate of the DSC the accuracy and precision of the method is dependent on the thermal resistance of the sample encapsulation package, sample size and heating rate. When all these variables are properly controlled an error still existed because the method not only assumes ideal solution in the liquid but also zero solid solubility. The most probable impurities are materials from which the product is made or its homologe. The chemical similarity suggests a probability of solid solubility at low concentration. An empirical correction method has been proposed for finding the temperature at which to begin integration of the peak. The solidus line for systems forming solid solutions can be determined by nuclear magnetic resonance.

Dissert. Abstr.

N82-10170 Virginia Polytechnic Inst. and State Univ., Blacksburg.

THE DEVELOPMENT OF ON-LINE LIQUID CHROMATOGRAPHY INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPECTROMETER FOR THE ANALYSIS OF TRACE ORGANICALLY BOUND METALS AND METALLOIDS IN COAL DERIVED PRODUCTS Ph.D. Thesis

Douglas William Hausler 1981 299 p

Avail: Univ. Microfilms Order No. 8118696

A series of fractions were collected from a preparative size exclusion separation of a CHCl3 soluble SRC on BioBeads S-X4. After removal of the solvent the samples were digested using H2SO4/H2O2. Plots of metal content versus elution volume provided metal specific detection. The development of the LC-ICP interface provided simultaneous online detection for metal species separated by effective molecular size. A spray chamber to facilitate the analysis in organic solvents of relatively high volatility was developed. It also served as the interface between the LC and the ICP. Detection limits in toluene are comparable to those found in aqueous off line operation of ICP-AES. Discussions are included concerning the requirements of computer based data output and examples of the output developed are presented. Demonstration of the LC-ICP interface is achieved by size separation of three synthetic mixtures. Two of the mixture are iron and silicon organometallic species with different ligands attacked; while, the third mixture consists of 20 different metals in essentially the same ligand environmental.

Dissert. Abstr.

N82-10171 Texas A&M Univ., College Station.

RADIOACTIVATION ANALYSIS WITH HEAVY ION BEAMS Ph.D. Thesis

Bennett David Lass 1981 106 p

Avail: Univ. Microfilms Order No. 8118277

Heavy ion activation analysis (HIAA) was evaluated for the determinaton of low Z elements Z < or = 8. The experimental effort focused on nuclear reactions yielding beta(+) emitting isotopes with half-lives of > or = 10 seconds. The sample depth probed was a fer mg/cu cm. Hence, HIAA is well suited for the determination of lowest Z species in thin layers. Four heavy ion beams, Li6, Be9, C12 and N14, were found to induce reactions which could be employed for the trace analysis. Percent interferences were calculated from experimental data. The trace detection capabilities of these reactions were tested. The use of autoradiography as a spatially resolved detection system for HIAA was also investigated.

Dissert. Abstr.

N82-10172 Rutgers - The State Univ., New Brunswick, N. J.

POSSIBLE MECHANISM OF RETENTION IN HIGH PERFORMANCE LIQUID CHROMATOGRAPHY STUDIES OF COBALT COMPLEXES Ph.D. Thesis

John Francis McCaffrey 1981 98 p

Avail: Univ. Microfilms Order No. 8119130

A possiule retention mechanism for the separation of several isomers of cobalt III complexes using reverse phase ion pair liquid chromatography is elucidated. The hydrophobic ion pairing reagent modifies the surface of the octadecylsilane stationary phase in such a way that the ionic portion of the ion pairing reagent protrudes out into the modile phase, while the hydrophobic portion is positioned toward the stationary phase. Due to this positioning of the ion pair reagent, a layer of counterions are preferentially concentrated along this surface; thus setting up a potential layer which will in turn bind the cationic cobalt complexes in a nonspecific way. Specific interactions between this aniomic layer and the cobalt complexes lead to a separation of the cis and trans isomers. By varying the length and type of ion pair reagent in a systematic way as well as the counterion used, recognizable trends are observed which substantiates the proposed retention mechanism. The factors which favor ion pair formation with modified stationary phase are also operative for ion pair formation in solution. However, there is an imperfect cancellation. Dissert. Abstr.

N82-10173 Indiana Univ., Indianapolis.
STUDY OF SEVERAL FUNDAMENTAL PROCESSES IN CHEMICAL ANALYSIS. 1: MEASUREMENT OF AEROSOL AND GAS VELOCITIES IN ANALYTICAL FLAMES. 2: DETERMINATION OF ATOMIC AND MOLECULAR FLUORESCENCE LIFETIMES USING A CROSS-CORRELATION APPROACH Ph.D. Thesis
Richard Eugene Russo 1981 308 p
Avail: Univ. Microfilms Order No. 8119076

The atomic distribution in flames has a direct relationship to sensitivity, precision, and working curve linearity in analytical flame spectrometry. This work examined two of the parameters responsible for the distribution of atoms in a flame: rise velocity of the flame gases and acceleration of sample droplets in the flame. For each study, sample was introduced into the flame as uniform, discrete droplets. The design and characterization of a new droplet generator for this sample introduction is presented. A new time-resolved measurement system was constructed, consisting of a synchronously pumped dye laser source annd opto-electronic cross-correlation detection network. The experimental system provided excellent time resolution, sensitivity, and accuracy compared to conventional methods. Background information on both the laser and detection system is included. Excited-state lifetimes of several molecular compounds in condensed phase were measured. Dissert. Abstr.

N82-10174 Texas A&M Univ., College Station.
HEAVY ION RUTHERFORD BACKSCATTERING SPECTROMETRY Ph.D. Thesis
Robert Timothy Sullins, III 1981 87 p
Avail: Univ. Microfilms Order No. 8118302

Theory predicts enhanced mass and depth resolution as well as greater sensitivity for RBS with heavy ions vs. protons or alphas. In this study the actual analytical capabilities of heavy ion RBS (HIRBS) were evaluated for several heavy ion beams. The optics of interest were: selectivity, i.e., the mass resolution, the profiling ability, i.e., depth resolution, and sensitivity, i.e., quantitative aspects. Dissert. Abstr.

N82-11009# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
EXPERIMENTAL INVESTIGATION OF A VAPORIZING COMBUSTION WITH DOUBLE COMBUSTION SPACES
In its Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 371-387 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

N82-11010# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A VAPORIZING COMBUSTOR WITH DOUBLE COMBUSTION SPACES
Tang Ming, Zhu Huiling, and Du Qinfang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 388-411 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-10175 Illinois Univ. at Urbana-Champaign.
THE PROPAGATION OF STRESS CORROSION CRACKS IN ALPHA-BRASSES Ph.D. Thesis
Dennis Vinton Beggs 1981 188 p
Avail: Univ. Microfilms Order No. 8119632

Observation of surface crack traces in commercial grade alpha-brasses tested in a tarnishing ammoniacal solution indicate that the transgranular cracks propagated discontinuously by the sudden appearance, in its entirety, of a fine crack extending several microns ahead of the previous crack tip. By periodically increasing the deflection, crack front markings were produced on the resulting fracture surfaces and these showed that the crack front at the free surface did not lag behind the overall crack front. This indicated that the discontinuous propagation of the crack trace was representative of the subsurface cracking. The intergranula crack trace appeared to propagate continuously at a relatively blunt crack tip. Load pulsing tests were also conducted to determine whether transgranular stress corrosion cracks propagated discontinuously and to compare values for the crack advance distance, and the time between advances, with those observed for the crack trace. Transgranular cracking is believed to occur by discontinuous mechanical fracture of an embrittled region around the crack tip. The specific mechanism of embrittlement is not understood. Intergranular cracking is believed to result from a different mechanism with cracking occurring via the film-rupture mechanism. Dissert. Abstr.

N82-10176 Carnegie-Mellon Univ., Pittsburgh, Pa.
COMPOSITION EFFECTS ON THE MICROSTRUCTURE AND CRACKING OF AUSTENITE STAINLESS STEEL WELDS Ph.D. Thesis
John Albert Brooks 1981 356 p
Avail: Univ. Microfilms Order No. 8118427

The solidification behavior, solid state transformations, phosphorus and sulfur impurity segregation are addressed as well as their relationship to weld hot cracking of austenitic stainless steel. The central experimental techniques used were transmission electron microscopy (TEM), light metallography (LM), and scanning transmission electron microscopy (STEM). Detailed STEM analysis was conducted on both primary-ferrite and primary-austenite solidified structures. The partitioning of both Cr and Ni and P and S impurities were studied for both solidification modes. Both TEM and STEM were used to study the nature of the solid state phase transformations which result in a wide range of ferrite morphologies. The degree of alloy partitioning during these transformations was of special interest since this point is central to microstructural interpretation. Dissert. Abstr.

N82-10177 Polytechnic Inst. of New York, Brooklyn.
AN INVESTIGATION OF DIFFUSION OF SILICON IN ALUMINUM AND DILUTE ALUMINUM ALLOY THIN FILMS Ph.D. Thesis
Narendra K. Garg 1981 222 p
Avail: Univ. Microfilms Order No. 8118870

Silicon was diffused along dc magnetron sputtered thin-film couples of aluminum and dilute aluminum alloys of induim, tin, bismuth and antimony at temperature of 400 C, 450 C, 500 C, 560 C, and the resulting concentrationpenetration profiles were analyzed by means of the electron microprobe analyzer. The solid solubility of silicon was found to agree with the reported value in the metallurgical literature for silicon in wrought aluminum. The silicon diffusivity was found to be substantially enhanced, however probably due to a high concentration of imperfections in the sputtered aluminum films. The values of the activation energies (Q) for diffusion of silicon in dilute aluminum alloys obtained were essentially the same as that of pure aluminum with the notable exception of the Al-0.013 at % In alloy. Thus the activation energies were more or less insentive to solute additions with the exception of indium. Transmission electron microscopic examination showed a large variation in grain size distribution. It was also found that sputtered films have a very coarse grain size. Dissert. Abstr.

N82-10178 Carnegie-Mellon Univ., Pittsburgh, Pa.
THE EFFECT OF SLIP CHARACTER ON LOW CYCLE FATIGUE BEHAVIOR Ta-Al ALLOYS Ph.D. Thesis
Hak-Min Kim 1981 234 p

Avail: Univ. Microfilms Order No. 8118437

The anisotropic nature of the hcp lattice and the presence of short range order of order precipitates are responsible for the different cyclic deformation behavio of Ti-Al alloys. Transmission electron microscopy studies of the cyclic deformation structures show that increasing aluminum contents and, in alloys containing more than approximately 10 at percent al, aging to produce coherent alpha sub 2 precipitates, causes not only the wavy to planar slip transition, but also the concentration of slip into fewer, more intense bands. Scanning electron microscopy studies of pre-polished surfaces and of the fatigue fracture surfaces show that different low cycle fatigue (LCF) performance in these Ti-Al alloys is mainly due to the different crack initiation sites which cause different fatigue crack initiation lives. That is, strain localization along the few slip bands in the high Al content alloys leads to earlier crack initiation along these slip bands and results in poorer LCF performance. This is in contrast to the non-localized alloys where crack initiation at grain boundaries is dominant.

Dissert. Abstr.

N82-10179 Case Western Reserve Univ., Cleveland, Ohio.

RADIATION DAMAGE IN ORDERED ALLOYS Ph.D. Thesis

Hsichang Liu 1981 163 p

Avail: Univ. Microfilms Order No. 8118628

Defect aggregation and order-disorder phenomena in gamma '-Ni3Al and beta -NiAl were investigated by high voltage electron irradiation at temperatures from 10 K to 810 K. Small defect clusters are created by irradiation even at 10 K, an the loop number density decreases but the size of loops increases with increasing irradiation temperature. With regard to order-disorder phenomena, the balance between radiation induced disordering and radiation enhanced ordering, which operate simultaneously during irradiation,determines the steady-state degree of order in an ordered alloy. NiAl, CoAl and NiGa still maintain a partially-ordered state even after irradiation at 10 K (150 K for NiGa) to 3 dpa. By contrast, FeAl and CoFe irradiation at 150 K to 1.2 dpa develop completely disordered states. This can be explained by the high ordering energies in NiAl, CoAl and NiGa, and the energetically favorable nature of correlated 'right' recombinations of radiation induced point defects. Dissert. Abstr.

N82-10180 Carnegie-Mellon Univ., Pittsburgh, Pa.

THE EFFECTS OF MICROSTRUCTURE AS AFFECTED BY HEAT TREATMENT AND PROCESSING ON THE FATIGUE CRACK GROWTH BEHAVIOR OF A METASTABLE BETA TITANIUM ALLOY Ph.D. Thesis

Gail Louise Mackiewicz Ludtka 1981 257 p

Avail: Univ. Microfilms Order No. 8118441

The relationship between microstructural and near-threshold fatigue crack growth for Beta III (Ti-11.5 Mo-6 Zr-4.5 Sn) titanium has been investigated for omega and alpha-aged conditions in both laboratory and inert environments. The microstructural versatility of such metastable beta titanium alloys permits the attainment of quite different microstructural conditions while simultaneously maintaining a comparable yield strength level. Three different processing conditions were chosen. Two of these were of the same nominal chemistry while the third processing condition had a higher oxygen content in order to study chemistry effects. Quantitative transmission electron microscopy and quantitative optical metallography were utilized to determine the volume fractions of the phases present. Extensive fractographic observations and mechanical property data analysis have fully characterized this material for the conditions evaluated.

Dissert. Abstr.

N82-10181 Polytechnic Inst. of New York, Brooklyn.

PLANE STRAIN FRACTURE TOUGHNESS AND FATIGUE PROPERTIES OF THERMOMECHANICALLY TREATED 7075 ALUMINUM ALLOY Ph.D. Thesis

Weera Phlawadana 1981 334 p

Avail: Univ. Microfilms Order No. 8118890

The effectiveness of a thermomechanical treatment (TMT) developed to improve the tensile properties and stress corrosion cracking susceptibility of commercial grade 7075 Al Alloy wrought products were investigated by studying the plane strain fracture toughness and plane bending fatigue properties of the thermomechanically treated 7075 Al alloy sheet and thin plate. Cycles of load were exercised on each toughness specimen to determine the pop-in and crack arresting characteristics of differently treated materials and the effective crack length data was recorded. It revealed that the TMT treatment did not adversely affect the 7075 Al alloy; instead an improvement in plane strain fracture toughness and fatigue strength in the longitudinal direction were found. Further studies on the fracture surfaces of fatigue and toughness specimens were carried out under optical, scanning electron, and transmission electron microscopes. The studies let to the clarification and explanation of the dependence of fatigue and toughness on the microstructure of 7075-TMT Al Alloy.

Dissert. Abstr.

N82-10182 Virginia Polytechnic Inst. and State Univ., Blacksburg.

EFFECT OF HYDROGEN ON THE DEFORMATION AND FRACTURE OF HIGH AND LOW STRENGTH STEELS Ph.D. Thesis

Jangannathan Murali 1980 296 p

Avail: Univ. Microfilms Order No. 8118703

The effects of hydrogen on the mechanical properties of high and low strength steels were determined with the aid of tensile, delayed failure, fatigue and fracture mechanics tests. Hydrogen diffusivity and solubility were determined by analysis of hydrogen outgassing and steady state permeation experiments to correlate embrittlement phenomena with the kinetics of hydrogen transport. The effect of traps on hydrogen solubility and diffusivity was also investigated. A unified mechanism that explains the seemingly contradictory experimental data is proposed. This mechanism explains hydrogen damage as due to a critical hydrogen concentration that causes hydrogen induced hardening which may result in further concentration increases and subsequent hydrogen induced decohesion. The relevancy of material and experimental variables in determining the necessary steps outlined in the unified mechanism for hydrogen embrittlement is discussed.

Dissert. Abstr.

N82-10183 Case Western Reserve Univ., Cleveland, Ohio.

MECHANISMS OF SHRINKAGE CAVITY FORMATION DURING SOLIDIFICATION OF DUCTILE IRON Ph.D. Thesis

Prasanna Kumar Samal 1981 113 p

Avail: Univ. Microfilms Order No. 8118634

Metal and mold factors affecting the shrinkage behavior of ductile iron were investigated. The main variables included: metal composition; stability of the mold or mold binder (green sand and resin bonded molds were used); pouring temperature; methods of inoculation; and the surface area to volume ratio of the casting. Factors that increase mold cavity enlargement also increase the size of the shrinkage cavity. Mold cavity enlargement was greater for castings produced in regular green sand molds than for those cast in stronger molds of no-bake, alkyd resin bonded sand. The surface area to volume ratios of the bosses also influence the shrinkage behavior, since the Volume 2/Surface Area 2 ratio determines the time of solidification. The composition, temperature and the degree of nucleation of the molten ductile iron also influence the amount of shrinkage, although come of these effects occur because of their influence on mold wall movement. The effect of pouring temperature was relatively small. Dissert. Abstr.

N82-10184 Texas Univ. at Arlington.

THE ELLIPSOMETRIC CHARACTERIZATION OF METAL SEMICONDUCTOR INTERFACES Ph.D. Thesis

Shiuh Chao 1981 110 p

Avail: Univ. Microfilms Order No. 8119271

An optical model for the Co/Si inerface reaction was formulated by means of ellipsometry. The formation of a glassy Si layer, followed by nucleation of Co2Si phase at the initial stage of Co deposition was postulated and observed through transport and transmission electron diffraction measurement. Multiple angle of incidence ellipsometry ws used here to study the Co/Si interface for varying Co deposition thickness. The refractive index of the surface layer increases as Co is first deposited, then decreases sharply in the vicinity of the Co deposition where discontinuity in the psi-Delta curve was well as a semiconducting-metallic electrical transition were observed. The increased refractive index is characteristic of an amorphoutized Si region. A phenomonological model of a local-delocal electronic phase transition is employed to account for the sharp decrease of refractive index that appears to immediately precede the semiconducting-metallic transition which triggers the subsequent Co2Si nucleation. Dissert. Abstr.

N82-10185 Carnegie-Mellon Univ., Pittsburgh, Pa.

MECHANISMS OF EROSIVE WEAR OF DUCTILE METALS DUE TO THE LOW VELOCITY, NORMAL INCIDENCE, IMPACT OF SPHERICAL PARTICLES Ph.D. Thesis

Paul Stoner Follansbee 1981 237 p
Avail: Univ. Microfilms Order No. 8118433

The normal incidence impact of spherical particles with a ductile target was investigated because of interest in coal conversion processes. A simple, cumulative damage model is proposed to describe erosive wear in these conditions. The penetration of a rigid, spherical body into an elasto-plastic substrate is analyzed using a finite element code, and from this analysis the location and magnitude of the plastic strain reversals occurring under multiple impacts is inferred. These plastic strain reversals are then used in conjunction with a Coffin-Manson law to furnish a prediction of relative erosion rates for different velocities and materials. An experimental simulation of erosion under these conditions is also presented with the erosion rates for Cu and Cu-Al alloys being measured in terms of weight loss for a range of low velocities. The surfaces, subsurface regions, and wear debris from eroded test specimens are characterized microscopically. Confirmation of the cumulative damage model is provided by the complimentary nature of the detailed stress/strain distributions determined analytically, and the experimental surface characterizations, and by the agreement, over a wide range, of predicted and measured relative, steady-state, erosion rates. Dissert. Abstr.

N82-10186 Wisconsin Univ. - Madison.

THE UPPER CRITICAL FIELD AND HIGH FIELD CRITICAL CURRENT DENSITY OF NIOBIUM-TITANIUM AND NIOBIUM-TITANIUM BASED ALLOYS Ph.D. Thesis

David George Hawksworth 1981 303 p
Avail: Univ. Microfilms Order No. 8115993

Investigations of the effect of ternary alloying additions of V, Ta, Sn, and Al on the upper critical field of Nb-Ti alloys between 2 K and the critical additions of the heavy elements Hf and Ta enhance the low temperature upper critical field, but additions of Al, Sn, and V reduce the upper critical field at all temperatures. The reasons for these differences in behavior were investigated through measurements of the critical temperature, the normal state resistivity, and the electronic specific heat coefficient. Significant enhancements found in the upper critical field of Nb-Ti-Ta alloys at 2 K are described. By carefully measuring the critical current density of four commercially available Nb-Ti multifilamentary composites, it is shown how the enhancements translate into improved high field performance of Nb-Ti at fields close to the upper critical field. The critical current density (12 Tesla, 2 K) value for a Nb 65a/oTi 10a/o Ta (Nb 43w oTi 25W/ o/Ta) alloy is predicted. Dissert. Abstr.

N82-10187 Virginia Univ., Charlottesville.

STRENGTH OF POLYCRYSTALLINE, CHROMIUM CONTAINING STEEL WHISKERS AFTER ANNEALING Ph.D. Thesis

Thomas Matthew Moore 1981 150 p
Avail: Univ. Microfilms Order No. 8117915

Because alloying iron polycrystalline whiskers with 2.5 percent chromium results in a retention of most of their original strength after brief heat treatments characteristics of the incorporation of these fibers into a metal matrix composite, chromium-alloyed whiskers were produced over the entire composition range, heat-treated in the range of 400 to 800 C, analyzed for composition, and tested for microhardness. The whiskers show a broad variation in chromium content within any production experiment due to the apparent lower decomposition temperature of chromium carbonyl and the retention of the original hardness is seen in whiskers of approximately 65 percent chromium. Whiskers of higher chromium content show a significant increase in hardness after heat-treatment. This high temperature strength is attributed to he sintering of a loosely bonded Cr2O3 structure. The presence of oxygen in the whiskers is associated with the deposition of chromium. Insights into the growth and microstructure of the whiskers were gained. Dissert. Abstr.

N82-10188 Utah Univ., Salt Lake City.

THERMOMECHANICAL TREATMENTS OF STEEL AND FATIGUE RESISTANCE Ph.D. Thesis

Po-We Kao 1981 154 p
Avail: Univ. Microfilms Order No. 8116770

The fatigue behavior of thermomechanically treated (TMT) pearlitic steels was studied with the fatigue initiation phase. The rapid annealing treatment was investigated by using scanning electron microscopy (SM), positron Doppler broadening, X-ray line broadening, and hardness. Fatigue initiation tests were carried out on eight selected microstructures, which included the following variables: interlamellar spacing, hardness, grain boundary proeutectoid ferrite network, ferrite crystallographic texture, and orientation of cementite lamellae and inclusions. Following fatigue-crack-initiation, fatigue-crack propagation was studied using single-edge-notched (SEN) specimens. Boron ion implantation was applied to further increase the already improved fatigue resistance of thermomechanically treated eutectoid steel. An approach to microhardness interpretation is advanced which is capable of quantifying the strengthening effect of hardened layers which may only be one to two microns thick. Correlation is established between total fatigue life and this microhardness analysis. Dissert. Abstr.

N82-10189 Wisconsin Univ. - Madison.

RADIATION INDUCED ORDER-DISORDER TRANSFORMATION Ph.D. Thesis

Ralph Hing-Chung Zee 1981 220 p
Avail: Univ. Microfilms Order No. 8116685

A model for ordered alloys is presented which describes the combined effects of radiation disordering and radiation enhanced-ordering. The model uses the assumptions of Bragg and Williams ordering in a kinetic form. Point defect concentrations are introduced into the kinetics so that the effect of radiation enhanced diffusion can be described. Both time dependent and steady state solutions are presented. CuPd ordered alloy of 52:48 atomic percent composition was irradiated using 14 MeV copper ions, 14.8 MeV neutrons and 1.8 MeV electrons. A post-irradiation annealing up to 310 C was conducted on two radiation disordered samples. This result indicates that the reordering process is heterogeneous in nature similar to classical recrystallization. Results of the 1.8 MeV electron irradiation at 80 K on an ordered CuPd sample gave a replacement to displacement ratio of 2.5. Annealing the irradiated sample at temperatures above 23 C resulted in recoveries of over 100 percent. Dissert. Abstr.

N82-10190 Texas Univ. at Arlington.

MECHANISMS OF GASEOUS ENVIRONMENTAL EMBRITTLEMENT DURING FATIQUE CRACK GROWTH IN ALUMINUM ALLOYS Ph.D. Thesis

Anna Krystyna Debogorska Zurek 1981 158 p
Avail: Univ. Microfilms Order No. 8119404

The diffusion and transport of deuterium and oxygen during fatigue crack growth of 2000 and 7000 series aluminum alloys were studied with SIMS and AES techniques for samples fatigued in vacuum, D2O,H2O, is O2-(18) and D2. Dry gases were found to have no influence on the crack propagation rates in aluminum alloys, while water vapor was found to enhance the crack propagation rates. Significant differences in penetration depth of deuterium was found between samples fatigued in dry gases to that fatigued in water vapor. The dependence of he deuterium diffusion on the presence of different trapping sites was studied using variety of deuterium ion implanted surfaces. The deuterium profiles of D2O vapor fatigue fractured specimens were closely duplicated in the deuterium ion implantation experiment. It is suggested that surface oxide serves as a strong trap and a barrier for the outdiffusing deuterium. Dissert. Abstr.

N82-10191 California Inst. of Tech., Pasadena.

THEORETICAL STUDIES OF HOMOGENEOUS CATALYSIS BY TRANSITION METAL COMPLEXES Ph.D. Thesis

Anthony Kay Rappe 1981 137 p
Avail: Univ. Microfilms Order No. 8118920

Extensive ab initio calculations (double zeta plus polarization function basis with correlated wavefunctions) on the oxidation of hydrocarbons by chromyl chloride are combined with standard thermochemical methods to predict the energetics for oxidation of alkanes, alcohols, and alkenes. Additional results are presented on the analogous oxidations by molybdyl chloride. A common feature of all these reactions is identified and explained. Calculations (double zeta plus polarization function basis with correlated wavefunctions) on the olefin metathesis reaction with high valent Mo and W catalysts are combined with standard thermochemical methods to predict the energetics of potential intermediates. The active catalyst is identified and explained together with several subsidiary features of the reaction manifold. A unifying generalized valence bond view of transition metal ligand bonding is presented as well as the energetics and structural characteristics of several ligand types. Additionally, the energetics for several ligand exchange reactions of potential synthetic utility are presented. Dissert. Abstr.

N82-10192 Pennsylvania Univ., Philadelphia.

REACTIONS OF ALKALINE EARTH METALS WITH VIBRATIONALLY EXCITED HYDROGEN HALIDES **Ph.D. Thesis**

Afranio Torres-Filho 1981 205 p

Avail: Univ. Microfilms Order No. 8117866

A double molecular beam chamber was designed and built to study reactive scattering processes. The reactions involved alkaline earth metals, M, (M = Ca, Sr, Ba) with vibrationally excited HF molecules. For the reactions of Ba + HF(v) yields BaF(v') + H, the mean product vibrational energy increases from 1.5 kcal to 5.4 kcal to 8.0 kcal for v = 0, 1, and 2, respectively, corresponding to 21%, 30% and 28% of the total energy content of the process. For the reaction of Sr + HF(v) yields SrF(v') + H, the total cross section is zero for reactions with v' = 0, and for reagents at v' = 2, the relative cross sections represent an average vibrational energy content of 3.7 kcal. In the case of Ca + HF(v = 2) no new states of CaF were formed although about 6 new vibrational levels were energetically accessible. Preliminary results on the reactions of Ca, Sr and Ba with vibrationally excited HCl,(v = 1,J = 3), are also presented. Dissert. Abstr.

N82-10193*# IIT Research Inst., Chicago, Ill. Materials Technology Div.

THERMAL FATIGUE AND OXIDATION DATA OF TAZ-8A AND M22 ALLOYS AND VARIATIONS **Technical Report, 1 Feb. - 30 Apr. 1980**

K. E. Hofer and V. E. Humphreys Sep. 1981 44 p refs

(Contract NAS3-17787)

(NASA-CR-165407; IITRI-M06001-89) Avail: NTIS HC A03/MF A01 CSCL 11F

Thermal fatigue and oxidation data were obtained on 36 specimens, representing 18 distinct variations (including the base systems) of TAZ-8A and M22 alloys. Double-edge wedge specimens for these systems were cycled between fluidized beds maintained at 1088 C and 316 C with a 180 s immersion in each bed. The systems included alloys TAZ-8A, M22, and 16 variations of these alloys. Each alloy variation consisted of a unique composition with an alternation in the percentage of carbon (C1 and C2), molydenum (M1 and M2), tungsten (W1 and W2), columbium (CB1, CB2, and CB3), tantalium (T1, T2, and T3), or boron (B1, B2, and B3) present. All of the alloys showed little weight change due to oxidation compared with other alloys previously tested in fluidized beds. Only both C1 alloy variation specimens survived 3500 cycles without cracking in the small radius, although substantial cracks were present, emanating from the end notches which were used for holding the specimens. Author

N82-10194*# Clemson Univ., S.C. Dept. of Mechanical and Materials Engineering.

FURTHER STUDY OF NEAR SOLIDUS INTERGRANULAR CRACKING IN INCONEL 718 **Final Report**

Raymond G. Thompson 17 Sep. 1981 30 p refs

(Contract NAS8-33805)

(NASA-CR-161878) Avail: NTIS HC A03/MF A01 CSCL 11F

A series of tests, performed to determine the strain necessary to initiate intergranular cracking in Inconel 718 as a function of temperature, contained enough scatter near the melting temperature that questions remained as to the best curve of curves to fit to the data. Fracture surface analysis showed that the scatter was due to incipient melting in the grain boundary region. The melting contributed to low fracture strain but had only a small on the incipient cracking strain. Gleeble tests, which could be interrupted by water quenching, were used to study the incipient intergranular melting of Inconel 718. This modified weld simulation test provided a sufficiently rapid quench to preserve the intergranular microstructure created during incipient melting. This structure was studied both microscopically and with energy dispensive X-ray analysis. The implications of incipient melting and low-strain incipient cracking on the development of microfissuring envelopes are discussed. A.R.H.

N82-10195*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio

CREEP SHEAR BEHAVIOR OF THE OXIDE DISPERSION STRENGTHENED SUPERALLOY MA 6000E

Thomas K. Glasgow 1981 19 p refs Presented at 110th Ann. Meeting of the Am. Inst. of Mining, Met. and Petroleum Engr., Chicago, 22-26 Feb. 1981

(NASA-TM-82704; E-985) Avail: NTIS HC A02/MF A01 CSCL 11F

The shear rupture life of the oxide dispersing strengthened (ODS) superalloy MA 6000E was determined at 650 and 760 C was 250 MPa. Comprisons were made at 760 C with the conventional cast superalloy B-1900+Hf, the ODS alloy MA 754, and the directionally solidified eutectic alloy gamma/gamma prime-delta was 170 MPa, and for B-1900+Hf was 360 MPa. The ODS alloy MA 6000E and gamma/gamma prime-delta failed with very little indication of ductile accommodation. Both MA 754 and B-1900+Hf showed some ductile tearing. Fracture surfaces of the ODS alloy MA 754 showed discontinuities similar size, shape, and roughness to its grain structure, but the fracture surfaces of MA 6000E were much smoother than its grain boundaries. Author

N82-10196# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.

LIQUID METAL AND HYDROGEN EMBRITTLEMENT OF NICKEL AND IRON-BASE AMORPHOUS ALLOYS **Technical Report, 15 Sep. 1980 - 1 Sep. 1981**

S. Ashok, T. Slavin, Norman S. Stoloff, and M. E. Glicksman 1 Sep. 1981 13 p refs

(Contract N00014-79-C-0583)

(AD-A103047; TR-2) Avail: NTIS HC A02/MF A01 CSCL 11/6

Tensile and bend properties of nickel and iron-base amorphous alloys have been studied at 200 C in the presence of liquid lithium and in air. Nickel base alloys show severe embrittlement, except for Metglas 2826MB. The results are discussed on the basis of proposed mechanisms of LME and it is concluded that the embrittlement of amorphous alloys takes place by an enhanced shear mechanism. Hydrogen embrittlement also seems to occur by a similar process. Author (GRA)

N82-10197# Oakland Univ., Rochester, Mich. Dept. of Chemistry.

THE ELECTROGENERATION OF SOLVATED METAL ATOMS. 1: THE FAR INFRARED SPECTRUM OF SOLVATED LITHIUM

P. P. Schmidt and B. S. Pons 1 Aug. 1981 29 p refs Submitted for publication Prepared in cooperation with Alberta Univ., Edmonton

(Contract N00014-77-C-0293; NR Proj. 359-648)

(AD-A103996; TR-9) Avail: NTIS HC A03/MF A01 CSCL 07/2

In some instances, the electrodeposition of metals onto electrodes may involve the prior generation of solvated metal atoms in the region of the outer Helmholtz plane. As a consequence, recently developed spectroscopic methods for detecting species in the interfacial region may be used to observe the solvated metal atoms. Therefore, with this paper we initiate an investigation of the nature of the possible states of solvation for these species in order to try to predict parameters which would be critical to their identification. In this paper we estimate the frequency at the band maximum for the far infrared-active vibrations which we predict to exist for the solvated lithium atom. We argue that the forces of repulsion may be nearly the same for the cation and atom. Thus, by means of a comparison to the Morse potential, we identify parameters for that potential.

We determine the magnitude of the force constant for the vibrations of the atom in its cage of solvent. GRA

N82-10198# Southwest Research Inst., San Antonio, Tex.
STUDY AND MODELING OF HIGH-TEMPERATURE-FATIGUE CRACK PROPAGATION IN AUSTENITIC STAINLESS STEEL Progress Report, 1981
D. L. Davidson 1 Aug. 1981 32 p refs
(Contract DE-AS05-79ER-10475)
(DE81-028941; DOE/ER-10475/2) Avail: NTIS HC A03/MF A01

Crack tip plasticity in stainless steels was examiner as a function of the variables: stress intensity factor, temperature, environment, frequency, and under creep and fatigue conditions. Interim results of crack tip plasticity determinations in 304 stainless steel with some of the variables are presented. DOE

N82-10199# International Nickel Co., Inc., Suffern, N. Y. Research and Development Center.
EVALUATION OF THE EFFECTS OF HEAT TREATMENT ON THE PASSIVE BEHAVIOR OF Ni-Cr-Fe ALLOYS IN HIGH TEMPERATURE WATER
P. E. Morris Jun. 1981 206 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. -1170-1)
(DE81-903816; EPRI-NP-1884) Avail: NTIS HC A10/MF A01

Five electrochemical test programs were completed to investigate the effects of thermal treatment, environmetal variations and stress on the corrosion resistance of INCONEL alloys 600 and 690 in PWR related dilute caustic environments in the temperature range between 260 to 3160 C. Several of the tested specimens were selected to characterize the corrosion product surface scales. The fundamental electrochemical corrosion behavior of these systems is described and a possible mechanism of surface scale formation is discussed. One test program was conducted to investigate the stress corrosion resistance of INCONEL alloys 600 and 690 in recirculated water containing 0.2 ppM oxygen at 2890 C. In addition to stress corrosion test results, the effects of dissolved oxygen on the corrosion potential are presented. DOE

N82-10200# Bendix Corp., Kansas City, Mo.
CVD TUNGSTEN-RHENIUM ALLOY CORROSION BEHAVIOR
D. E. Engelhaupt Aug. 1981 41 p refs
(Contract DE-AC04-76DP-00613)
(BDX-613-2477) Avail: NTIS HC A03/MF A01

The chemical and electrochemical corrosion behavior of chemical vapor deposited tungsten-rhenium alloy has been studied using nitric and sulfuric acid mixtures to remove the deposition substrate. The alloy corrosion rates as a function of acid compostion, aeration and temperature were established. Computer-aided analysis of polarization data showed that the tungsten-rhenium etched faster in dilute nitric acid solutions. The logarithmic etch rate was proportional to the reciprocal of the etchant temperature. Selective etching of the surface was more severe for alloys with an excess of eighteen weight percent rhenium. Protective coatings were studied and their respective merits are considered. DOE

N82-10201# Idaho National Engineering Lab., Idaho Falls.
CORROSION TESTING OF CARBON STEEL IN AEREATED GEOTHERMAL BRINE
D. F. Suciu and P. M. Wikoff Idaho Falls, Idaho Edgerton, Germeshausen and Grier, Inc. Feb. 1981 55 p refs
(Contract DE-AC07-76ID-01570)
(DE81-028653; EGG-GTH-5474) Avail: NTIS HC A04/MF A01

Two major problems are associated with the use of cooled geothermal water as coolant for the 5 MW(e) Pilot Power Plant and Raft River are: a scaling potential owing to the chemical species present in solution, and the corrosive nature of the geothermal water on carbon steels. A water treatment test program was established to reduce or eliminate these problems. Data show that scale can be prevented by a combination of dispersants and controlling the concentration of scaling species in the circulating water. Corrosion cannot be controlled without a pretreatment of tubing material. With the pretreatment, a protective gamma iron oxide film is laid down on the tube surface, that with proper corrosion inhibitor additives, significantly reduces both general and pitting corrosion. However, longer term testing is required to determine protection of pitting corrosion. DOE

N82-10202# Purdue Univ., Lafayette, Ind. School of Materials Engineering.
ZERO-FLUX PLANES AND FLUX REVERSALS IN MULTICOMPONENT DIFFUSION Progress Report, 1 Jan. - 31 Aug. 1981
M. A. Dayananda Aug. 1981 38 p
(Contract DE-AC02-81ER-10814)
(DE81-028526; DOE/ER-10814/1) Avail: NTIS HC A03/MF A01

The development and role of the zero-flux planes (ZFP) and flux reversals in both single phase and multiphase diffusion couples in the Cu-Ni-Zn and Fe-Ni-Cr ternary system was explored. Both single phase and multiphase diffusion couples were assembled with (alpha)(fcc) and/or (beta)(bcc) Cu-Ni-Zn alloys with similar thermodynamic activities of either Cu, Ni, or Zn and diffusion annealed at 775 C. The ZFP's where the interdiffusion flux of one of the components goes to zero were identified in several couples. The ZFP compositions were found to correspond through the terminal alloys on an isotherm. Similar studies of interdiffusion were done with (gamma)(fcc) Fe-Ni-Cr alloys at 1100 C for the determination of interdiffusion coefficients and diffusional interactions. In the third project, preliminary sandwich couples where two ZFP's move towards each other were set up with selected Cn-Ni-Zn alloys at 775 C for studies of possible ZFP interaction and regulation of interdiffusion fluxes. DOE

N82-10203# General Atomic Co., San Diego, Calif.
FATIGUE-LIFE PREDICTION FOR COPPER ALLOY DEGRADED BY MULTIPLE FLAWS
R. A. Sweig Jul. 1981 58 p refs Sponsored in part by Japan Atomic Energy Research Inst.
(Contract DE-AT03-80SF-11512)
(DE81-029949; GA-A-16144) Avail: NTIS HC A04/MF A01

Fatigue life prediction for alloy 155 copper degraded by multiple flaws was established. Twelve specimens with natural flaws were radiographically characterized and fatigue tested to failure in a manner which minimized data scatter. Disposition of defective alloy 155 copper plate stock and doublet 3 B-coil machined center post components was based on radiographically determined flaw size. Along with the macroscopic vertical internal flaws detected by radiography, undetectable microscopic alloy segregations wre present in the microstructure. Data scatter, including microscopic flaw distribution, was related to radiographically detectable flaw size, and the reliability of the radiographic method was evaluated. B-coil fatigue lives for various load conditions were predicted. B-coil life expended to date and useful life remaining are discussed. DOE

N82-10204# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
THERMAL AGING BEHAVIOR OF ERNiCr-3 ALLOY (WELD AND BASE METAL)
R. L. Klueh and J. F. King Aug. 1981 36 p refs
(Contract W-7405-eng-26)
(DE81-027047; ORNL-5783) Avail: NTIS HC A03/MF A01

The nickel-base filler metal alloy ERNiCr-3, containing nominally 67% Ni, 20% Cr, 3% Fe, 3% Mn, and 2.5% Nb, is used widely to make welds for elevated-temperature service. To determine the effect of elevated temperature on tensile and creep-rupture properties of ERNiCr-3, weld metal specimens were thermally aged to 10,000 h at 5100 C, to 15,000 h at 5660 C, and to 1000 h at 6700 C. Wrought ERNiCr-3 was also aged at 566 and 6770 C. The 0.2% yield strength of the ERNiCr-3 weld metal increased with thermal aging time at 510 and 5660 C. The ultimate tensile strength also increased continuously with aging time at 5660 C, whereas at 5100 C, it went through a maximum (the strength of the material aged 10,000 h was less than was that aged 5000 h). DOE

N82-10205# Oak Ridge Y-12 Plant, Tenn. Metals and Ceramics Dept.

HYDROGEN CONTENT AND STRAIN RATE EFFECTS ON THE TENSILE PROPERTIES OF A URANIUM-TITANIUM ALLOY

W. G. Northcutt, Jr., G. L. Powell, and T. C. Myhre 28 Apr. 1981 10 p refs Presented at the Conf. on High Density Penetration Materials, Charlottesville, Va., 28 Oct. 1980 Sponsored in part by Army ARRADCOM, Dover
(Contract W-7405-eng-26)
(DE81-024092; Y/DV-74; CONF-801061-8) Avail: NTIS HC A02/MF A01

Hydrogen embrittlement of U-0.74Ti alloy occurred below 1 H2 in specimens tested at 10 to the -4 power/s. At a higher strain rate of 1 S, however, the alloy experienced a much less embrittling effect out to approximately 8 wppm H2. Hydrogen content in the alloy did not affect properties other than elongation and reduction-in-area. Strength properties were increased by the higher strain rate. A second alloy of U-0.74Ti with increased iron content (from 20 to 50 wppM) was also tested at the high strain rate for the effect of hydrogen content on tensile properties. No differences in properties could be detected in the high strain rate results due to iron content. DOE

N82-10206# Oak Ridge Y-12 Plant, Tenn. Metals and Ceramics Dept.

EFFECT OF TITANIUM CONTENT AND AGING TEMPERATURE ON THE PROPERTIES OF URANIUM-TITANIUM ALLOYS

W. G. Northcutt, Jr. 28 Apr. 1981 16 p refs Presented at the Conf. on High Density Penetration Materials, Charlottesville, Va., 28 Oct. 1980 Sponsored in part by Army ARRADCOM, Dover
(Contract W-7405-eng-26)
(DE81-024091; Y/DV-73; CONF-801061-7) Avail: NTIS HC A02/MF A01

The mechanical properties and microstructures of four uranium-titanium alloys were examined as functions of titanium content and aging temperature. Titanium alloy content was varied from 0.41 to 0.79 weight percent. Aging temperatures from 350 to 460 C (all for six hours) were evaluated for each alloy in addition to tests in the unaged conditions. Titanium and aging temperature were both shown to be strong effects in determining alloy properties. It was determined that the uranium-0.41 weight percent titanium alloy underwent extensive age-hardening even though the alloy did not exhibit a martensitic microstructure characteristic of the alloys richer in titanium. DOE

N82-10207# Sandia Labs., Albuquerque, N. Mex.

THERMAL-VISCOUS MODEL FOR HETEROGENEOUS YIELDING IN ALUMINUM

D. B. Hayes and D. E. Grady 1981 10 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023748; SAND-81-0108C; CONF-810684-3) Avail: NTIS HC A02/MF A01

The finite rise times of high intensity shock waves in metals are commonly interpreted in terms of a bulk viscosity which is observed to vary inversely as the square root of the strain rate. To interpret this result, a two-temperature thermal model of a heterogeneously-yielding metal was constructed. The model assumes that the body is composed of thin shear bands in which irreversible energy is dissipated as heat and which are separated by the bulk of the material which undergoes isentropic compressive heating only. A condition of wave steadiness quantifies the irreversible energy dissipated during the passage of the shock. Two important results follow: first, the dependence of the apparent viscosity on the inverse square root of the strain rate stems from the microstructural, heterogeneous nature of the process, and is only expected for steady waves; second, when the model is used to interpret recent experiments, the viscosity calculated in the shear band itself is seen to be temperature independent. DOE

N82-10208# Argonne National Lab., Ill. Materials Science Div.

INTRODUCTION TO HYDROGEN IN ALLOYS

D. G. Westlake New York City Plenum Publishing Corp. 1980 33 p refs Presented at the Adv. Study Inst. on Metal Hydrides, Rhodes, Greece, 17-27 Jun. 1980
(Contract W-31-109-eng-38)
(CONF-8006130-3) Avail: NTIS HC A03/MF A01

Substitutional alloys, both those that form hydrides and those that do not, are discussed, with more emphasis on the former. Topics covered include: (1) the significant effects of substitutional solutes on the pressure-composition-temperature (PCT) equilibria of metal-hydrogen systems; (2) the changes in thermodynamic properties resulting from differences in atom size and from modifications of electronic structure; (3) attractive and repulsive interactions between H and solute atoms and the effects of such interactions on the pressure dependent solubility for H; (4) H trapping in alloys of Group V metals and its effect on the terminal solubility for H (TSH); (5) some other mechanisms invoked to explain the enhancement (due to alloying) of the (TSH) in Group V metals; and (6) H impurity complexes in alloys of the metals Ni, Co, and Fe. Some results showing that an enhanced TSH may ameliorate the resistance of a metal to hydrogen embrittlement are presented. DOE

N82-10209# Argonne National Lab., Ill. Materials Science Div.

OBSERVATIONS ON GRAIN-BOUNDARY STRUCTURES IN NICKEL OXIDE

K. Y. Liou and N. L. Peterson 1980 12 p refs Presented at the 7th LLR/MMRD Intern. Symp. of Interfaces in Glass Metal Systems, Berkeley, Calif., 28 Jul. 1980
(Contract W-31-109-eng-38)
(DE81-023125; CONF-800765-10) Avail: NTIS HC A02/MF A01

Transmission electron microscopic analysis of dislocation networks at low angle boundaries in nickel oxide annealed (1,500 C) to reach equilibrium is discussed as the structure of (001) twist boundaries near special coincidence angles in nickel oxide bicrystals prepared by a pressure sintering technique. DOE

N82-10210# Rockwell International Science Center, Thousand Oaks, Calif.

REMAINING FATIGUE LIFETIME PREDICTION FOR RETIREMENT-FOR-CAUSE IN ALUMINUM ALLOYS

W. L. Morris, M. R. James, and O. Buck (Ames Lab., Iowa) 1980 13 p refs Presented at the Symp. on NDE, Pittsburgh, 5-9 Oct. 1980
(Contract W-7405-eng-82)
(DE81-023756; IS-M-315; CONF-8010190-1) Avail: NTIS HC A02/MF A01

A methodology is evaluated for predicting the probability of specimen failure with subsequent fatigue, following detection of a short surface crack in an Al 2219-T851 alloy. Cracks are detected and tracked to failure using optical microscopy. Predictions of the distribution in remaining lifetimes, for comparison with measured values, are made with a Monte Carlo procedure in conjunction with crack growth laws that model the effect of grains of differing size, shape and crystallographic orientation on the propagation rate. A slower average rate of crack growth for cracks formed later during fatigue is observed and predicted. DOE

N82-10211# Oak Ridge National Lab., Tenn. Chemical Technology Div.

SORPTION OF IODINE ON LOW-CHROMIUM-ALLOY STEEL

M. F. Osborne, R. B. Briggs, and R. P. Wichner 1981 7 p refs Presented at the Ann. Meeting of the Am. Nucl. Soc., Miami Beach, Fla., 7-12 Jun. 1981
(Contract W-7405-eng-26)
(DE81-023271; CONF-810606-52) Avail: NTIS HC A02/MF A01

The sorption behavior of iodine on the surfaces of 1 1/4% Cr-1% Mo steel was investigated as a part of the high temperature gas cooled reactor (HTGR) chemistry program. In an effort to determine the equilibrium sorptive capacity of this alloy, which ccomprises most of the cooler regins of HTGR coolant circuit, under representative conditions. The data obtained are to be used to improve the capability for predicting, with computer programs, iodine deposition as functions of temperature and location in the primary circuit. DOE

N82-10212# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).

DESIGN RELEVANT MATERIAL DATA FOR SINTERED ALLOYS

C. M. Sonsino 1981 181 p refs In GERMAN; ENGLISH summary

(LBF-LB-158-1981) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 75

Mechanical fracture and fatigue tests were carried out with porous sintered alloys Fe Cu C and Fe Cu Ni. These tests show that conventional material data do not permit an aimed material selection and component design. Cyclic stress-strain curves, crack-propagation and fracture-toughness data as well as statistically evaluated S-N curves indicate, that pores with their effect as internal notches assure better fatigue properties than expected. Their scatter is not larger than for wrought steels. With constant alloy content the mean values depend significantly on the density. Author (ESA)

N82-10213*# National Bureau of Standards, Boulder, Colo. Thermophysical Properties Div.

LASER-INITIATED COMBUSTION STUDIES OF SELECTED ALUMINUM, COPPER, IRON, AND NICKEL ALLOYS

James W. Bransford and Alan F. Clark Apr. 1981 90 p (Contract NASA Order H-43201-B)

(PB81-215501; NBSIR-81-1647) Avail: NTIS HC A05/MF A01 CSCL 11F

The results of combustion studies at atmospheric pressure on ten metal alloys are presented. The alloys studied were aluminum alloys 1100, 2219, 6061, and tensile-50; 304, 347 and 21-6-9 stainless steel; inconel 600; beryllium copper and a bronze. It was found that once ignition was achieved all alloys would generally burn to completion. The overall combustion process appears to obey a first order rate process. Preliminary conclusions are presented along with recommendations for future work. GRA

N82-10214 Carnegie-Mellon Univ., Pittsburgh, Pa.

SMALL HOMONUCLEAR CLUSTERS OF BERYLLIUM AND BORON Ph.D. Thesis

Robert Alfred Whiteside 1981 118 p

Avail: Univ. Microfilms Order No. 8118449

The results of ab initio molecular orbital calculations on the structures and energies of small elemental clusters of beryllium and boron are described. Corrections are made for electron correlation using Moller-Plesset perturbation theory through fourth order in some cases. Included are beryllium clusters up to Be, and boron clusters up to B6 (excluding B5), and several structures are examined for each. Dissert. Abstr.

N82-10215 New Hampshire Univ., Durham.

THE KINETICS OF DISSOCIATION OF FIVE-COORDINATE TRANSITION METAL COMPLEXES IN NONAQUEOUS AND MIXED MEDIA Ph.D. Thesis

Nancy Lou Gottke 1980 84 p

Avail: Univ. Microfilms Order No. 8118541

Five-coordinate complexes of nickel (II), cobalt(II), and copper (II), were prepared from the quadridentate ligand tris-(2-dimenthylaminoethyl)amine, a ligand which forms high-spin trigonal bipyramidal complexes. Previous studies of the dissociation of these complexes in aqueous perchloric acid revealed a single step kinetic process. Dissociation of the cobalt(II) complex was undertaken in acetonitrile, in dimethyl sulfoxide, and in N,N-dimethylformamide, with monochloroacetic acid as the dissociating agent. Multi-step kinetic behavior was observed. The rate-determining step was considerably faster in dimethyl sulfoxide and in N,N-dimethylformamide than in acetonitrile and in water. Possible mechanisms for the dissociation reaction are described and discussed in terms of solvent properties and crystal field energies. Further studies were undertaken in mixed solvents such as dimethyl sulfoxide/water and N,N-dimethylformamide/water mixtures, to determine the effect of the presence of water on the mechanism of the dissociation reaction. Dissert. Abstr.

N82-10216 Case Western Reserve Univ., Cleveland, Ohio.

CORROSION AND PASSIVATION OF IRON AND FERROUS ALLOYS Ph.D. Thesis

Gholamabbas Nazri 1981 145 p

Avail: Univ. Microfilms Order No. 8118801

Both cyclic voltammetry and potential pulse techniques show that during passive film formation, the ferrous ions enter into the metal solution interface, which causes a formation of a deposited over-layer on the surface of the passive film. In-situ Raman spectroscopy was used to elucidate the structure of the passive film on iron. The Raman spectra of this film showed several peaks at low frequency (200-800 cm/1) which is not the same as any known stoichiometric iron oxides or oxy-hydroxides. In addition, Raman spectroscopy for air oxidized iron-chromium alloys were also used. Transmission electron microscopy of the passive film on iron showed that the passive film on iron has crystalline structure and also there are some epitaxial relationships between oxide and iron substrate. In addition, the thickness of passive films on each crystallographic plane is not the same. In this regard, a structural model for passive film on poly-crystalline iron is developed. The composition of passive film in this condition is believed to gamma-Fe2O3 with a compact mosaic type structure. Dissert. Abstr.

N82-10989# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SOLIDIFICATION CHARACTERISTICS OF SUPERALLOYS UNDER NONEQUILIBRIUM CONDITION

Fu Hengzhi *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 191-219 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xiam Shaanxi), 1979 (For primary document see N82-10980 01-99)

Avail: NTIS HC A17/MF A01

N82-10990# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE PLASTIC DEFORMATION, MICRO-CRACK INITIATION AND FATIGUE CRACK INITIATION LIFE OF 30CrMnSiNi2A HIGH STRENGTH MARTENSITE STEEL

Zheng Xiulin and Qiao Shengru *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 220-238 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)

Avail: NTIS HC A17/MF A01

N82-11000# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE ISLAND STRUCTURE OF (M-A) IN HARDENED LOW-ALLOY HIGH-STRENGTH STEELS

Kang Mokuang, Guan Dunhui, Guo Chengdao, and Zhu Jinrong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 137-173 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)

Avail: NTIS HC A18/MF A01

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-10217 Texas Univ. at Arlington.

THERMODYNAMIC CHARACTERIZATION OF MISCIBLE POLYMER BLENDS Ph.D. Thesis

Robert Sheppard Barnum 1981 270 p

Avail: Univ. Microfilms Order No. 8119255

The thermodynamics of a miscible polymer blend of poly (cyclohexanedimethanol terephthalate-co-isophthalate), Kodar, and polycarbonate were examined experimentally. Blend specific volumes were measured as functions of temperature and composition to determine volume changes on mixing and to provide data for analysis by a modified lattice model equation of state. These data showed that volume contractions on mixing on the order of 1.4 percent in the glassy state and 0.3 percent in the melt state occurred. These negative excess volumes are indicative of strong exothermic physical interactions between the blend components. Dissert. Abstr.

N82-10218 Virginia Polytechnic Inst. and State Univ., Blacksburg.
SYNTHESIS AND CHARACTERIZATION OF POLYCARBONATE-POLYDIMETHYSILOXANE BLOCK COPOLYMERS Ph.D. Thesis
Judy S. Riffle 1981 230 p
Avail: Univ. Microfilms Order No. 8118710

Two methods for the preparation of bispherol-A polycarbonate-polydimethyisiloxane multiblock or segmented copolymers were investigated. The first is a solution reaction which utlized the interaction of a performed alpha, omega, hydroxyl terminated polycarbonate. This synthesis produce perfectly alternating block copolymers wherein the block molecular weights are equal to the number average molecular weights of the respective well characterized oligomeric precursors. The second synthesis method investigated was a phase transfer catalyzed reaction which produced a more randomly coupled block copolymer. Preformed hydroxypropyl, hydroxybutyl, or carboxypropyl terminated siloxane oligomers were used whereas the polycarbonate blocks were produced in situ. Dissert. Abstr.

N82-10219 Missouri Univ. -Kansas City.
ACID CATALYZED HOMOPOLYMERIZATION OF CYCLIC GLYCYLGLYCINE AND COPOLYMERIZATION WITH CYCLIC LEUCYLLEUCINE TO LINEAR PEPTIDES Ph.D. Thesis
Franco Tak-On Lee 1981 215 p
Avail: Univ. Microfilms Order No. 8117657

The polymerizability of some cyclic dipeptides with sodium metal, HCl and H3PO4 catalysts is examined. The polymerization reactions of cyclic glycylglycine(I), c-dl-leucylleucine(II), c-dl-phenylalanylphenylalanine(III), and cyclic glycyl-l-leucine; and the copolymerizations of (I) with (II), and of (I) with (III), were investigated. The homo- and copolypeptides from acid catalyses are all white to yellow, and insoluble in conventional solvents. From infrared and X-ray data, the polyglycine obtained may possess polyglycine I or polyglycine II type confirmation, or both, depending on the catalytic system employed. Infrared spectroscopy of the polyleucylglycine shows features indicating a predominance of polyglycine II type conformaton. The leucylglycine copolymer obtained with HCl catalyst under varying conditions of temperature, time, and comonomer ratio, display identical infrared spectra. This suggests a rather constant polymer structure, probably related to the consistently low leu/gly incorporation ratio in the copolymer. Dual polymerization mechanisms are suggested for the acid catalyzed reactions. A competition probably exist between (1) a ring-opening mechanism, and (2) polycondensation after ring clevage by hydrolysis. Dissert. Abstr.

N82-10220 Polytechnic Inst. of New York, Brooklyn.
THERMAL DEGRADATION OF AROMATIC POLYAMIDES Ph.D. Thesis
Yash Pal Khanna 1981 135 p
Avail: Univ. Microfilms Order No. 8118880

Wholly aromatic polyamides like poly(1,3-phenylene isophthalamide) and poly(1,4-phenylene terephthalamide), also known as Nomex and Kevlar respectively, are commercially used in the fabrication of wide-bodied aircraft interiors. Therefore, improving the flammability behavior of these materials is of obvious importance. As a result of earlier studies which related the effect of substituents to char formation and flammability, the effect of a chlorine substituent on the degradation characteristics of the two polyamides was investigated. Dissert. Abstr.

N82-10221 Case Western Reserve Univ., Cleveland, Ohio.
STRUCTURE AND POLYMERIZATION STUDY OF NORBORNENE ENDCAPPED POLYIMIDES WITH FT-NMR SPECTROSCOPY Ph.D. Thesis
Andrew Chung-Lap Wong 1981 164 p
Avail: Univ. Microfilms Order No. 8118640

Due to the intractable, insoluble nature of the cured polymer, model compounds N-phenyl-5-Norbornene-2,3-dicarboximide (PN) and 2NE/MDA were synthesized and their polymerization mechanisms studied. Solution state carbon-13 and high field proton (270 MHz) NMR were used to investigate PN cured at various temperatures and column chromatography was used to separate the various reaction products of a partially cured sample. In cases of 2NE/MDA and PMR-10, characterization of the prepolymer and mildly cured imide samples were studied using solution state C-13 and H-1 NMR. The highly cured imide samples were insoluble in NMR solvents and were investigated utilizing C-13 solid state NMR. Research results show that during the polymerization process, the monomers (or prepolymers) undergo an endoxoisomerization in addition to the retro-Diels-Alder reaction at the norbornene endcap group. Dissert. Abstr.

N82-10222 Case Western Reserve Univ., Cleveland, Ohio.
SUSTAINED RELEASE OF BIOACTIVE AGENTS COVALENTLY BOUND TO POLYMERS Ph.D. Thesis
Mark Allen VanDress 1981 147 p
Avail: Univ. Microfilms Order No. 8118638

The synthesis of a polymeric pro-drug by covalently binding the drug to the polymer via a hydrolytically cleavable bond is described. As these bonds cleave, upon exposure to a hydrolyzing medium, the bioactive agent is slowly released. The hydrophilic/hydrophobic nature of the polymer in determining the release behavior of the bioactive agent is considered. In attempting to appreciate this aspect of release behavior, a herbicide system was synthesized and studied as a basis for comparison with a contraceptive system. Poly-L-glutamic acid was used as a biodegradable polymer to which 3-oximinonorethindrone was covalently linked via the hydrolytically labile oxime ester bond. The release behavior of both the contraceptive system and the herbicide system is described by pseudo-first order kinetics and the rate constants are seen to increase with increasing hydrophilic character of the polymer. Hydrolysis of the labile bond is seen to be the rate determining step for release. Dissert. Abstr.

N82-10223 Case Western Reserve Univ., Cleveland, Ohio.
CALCULATION OF THE ORGANIZATION OF CHAIN MOLECULES IN THE SOLID STATE Ph.D. Thesis
Sukant Kishore Tripathy 1981 131 p
Avail: Univ. Microfilms Order No. 8118637

Several types of molecular structure calculations relating to the organization and assembly of macromolecules were developed. A general method is presented to calculate and minimize the packing energy of a polymer crystal. Expressions are derived to compute the interaction energy of each unique row of atoms, treated as periodic force centers, with an atom not belonging to the lattice generated by the set of row atoms. The total energy is assumed to be the pair-wise additive sum of atomic interactions expressed in terms of the inverse powers of interaction distances using classical Lennard-Jones type dispersive/repulsive and coulomb types electrostatic potential functions. Mathematical tractability is obtained by expanding the series sum with the periodicity of the row lattice vectors. Rapid convergence of these series facilitates truncation to desired accuracy. The packing energy, defined to be the interaction energy of central conformational repeat unit interacting with a selectable number of surrounding polymer chains, is minimized with respect to the unit cell parameters for an assumed symmetry. Dissert. Abstr.

N82-10224 Akron Univ., Ohio.
STRUCTURE-PROPERTY RELATIONSHIPS OF PERFECTLY ALTERNATING
NE BLOCK COPOLYMERS Ph.D. Thesis
Solomon Hsing-Kuo Tang 1981 126 p
Avail: Univ. Microfilms Order No. 8117727

The relationships between the properties and microstructures of two series of perfectly alternating bisphenol-A polycarbonate-polydimethylsiloxane block copolymers were studied. In the first series the poly-carbonate (PC) block length was kept constant while the block length of polydimethylsiloxane (PDMS) was varied. The tensile properties of these block copolymers were found to be a function of composition. Dynamic mechanical properties measured as a function of temperature revealed the two-phase nature of these materials. Transmission electron micrographs showed that all samples had a sponge-like morphology independent of composition. The rheological properties as studied on the capillary meometer showed a maximum viscosity for the sample contining PC and PDMS blocks of equal molecular weight and extrudate swells increasing with PC content. In a second series of block copolymers the block molecular weights of both PC and PDMS were varied to keep the composition constant. The tensile strength of these samples was found to increase

with block molecular weights except for the sample having the highest block molecular weights. The lower tensile strength of this material was attributed to its lamellar type morphology.
Dissert. Abstr.

N82-10225 Detroit Univ., Mich.

POLYMERIC BUILDING BLOCKS FROM RENEWABLE RESOURCES: FRUCTOSE Ph.D. Thesis

Deenadayalu Chundury 1980 153 p
Avail: Univ. Microfilms Order No. 8116030

Five-Hydroxymethyl-furfuraldehyde (HMF) was prepared from high fructose corn syrup (HFCS) or crystalline D-fructose in high yields and purity. A 95 to 97% conversion of fructose to HMF was achieved using 25 mole per cent (based on fructose) boron trifluoride etherate catalyst in dimethyl sulfoxide, under a nitrogen atmosphere, a reaction temperature of 100 C, and a half hour reaction time. A 92 to 95% conversion of HFCS or crystalline D-fructose to 5-chloromethylfurfuraldehyde (CMF) was achieved using 300 mole % of conc. hydrochloric acid in chlorobenzene, under a nitrogen atmosphere, a reaction temperature of 75 C, and two or one hour reaction time, respectively. Polymeric building blocks were prepared from 5-hydroxymethyl- and 5-chloromethylfurguraldehyde. Dissert. Abstr.

N82-10226 Lehigh Univ., Bethlehem, Pa.

THE PREPARATION AND SURFACE CHARACTERIZATION OF POLYSTYRENE LATEXES AS MODEL COLLOIDS Ph.D. Thesis

Ahmed Abdel-Moneim Kamel 1981 230 p
Avail: Univ. Microfilms Order No. 8118838

Preparation of a model colloid with one type of surface group is described. Several conventional polystyrene latexes were prepared, cleaned by a mixed bed of anionic and cationic resins, and their surfaces characterized by conductometric titration. All latexes carried a strong-acid group; no weak-acids were detected. The electrophoretic mobility behavior of latex 520 (prime) was studied as a function of pH. All three forms of the latex displayed the same trends, showing no changes at intermediate pH ranges, while at lower pH the mobility decreased. In alkaline pH, the mobility first increased slightly before decreasing at higher pH. These trends were explained in terms of ion adsorption and acid-base interactions. At neutral pH, all three forms of the latex exhibited approximately the same zeta potential. Argon gas adsorption measurements gave surface areas that were in good agreement with those obtained from electron microscopy. The polymer surface was nonporous and mostly hydrophobic with only few polar sites. Dissert. Abstr.

N82-10227*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

METHOD OF NEUTRALIZING THE CORROSIVE SURFACE OF AMINE-CURED EPOXY RESINS Patent Application

Sheng Yen Lee, inventor (to NASA) Filed 14 Aug. 1981 9 p
(NASA-Case-GSC-12686-1; US-Patent-Appl-SN-293412) Avail: NTIS HC A02/MF A01 CSCL 11I

The corrosive alkaline surface layer of an epoxy resin product formed by the curing of the epoxy with an aliphatic amine is eliminated by first applying a non-solvent to remove most or all of the free unreacted amine and then applying a layer of a chemical reagent to neutralize the unused amine or amine functional groups by forming a substituted urea. The surface then may be rinsed with acetone and then with alcohol. The non-solvent may be an alcohol. The neutralizing chemical reagent is a monoisocyanate or a mono-isothiocyanate. Preferred is an aromatic mono-isocyanate such as phenyl isocyanate, nitrophenyl isocyanate or naplthyl isocyanate. NASA

N82-10228*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

HIGH TEMPERATURE GLASS THERMAL CONTROL STRUCTURE AND COATING Patent Application

David A. Stewart, Howard E. Goldstein, and Daniel B. Leiser, inventors (to NASA) (Stanford Univ., Calif.) Filed 2 Oct. 1981 18 p
(NASA-Case-ARC-11164-1; US-Patent-Appl-SN-308007) Avail: NTIS HC A02/MF A01 CSCL 11C

A high temperature stable and solar radiation stable thermal control coating either useful as such, applied directly to a member to be protected, or applied as a coating on a reusable surface insulation is discussed. The coating has a base coat layer and an overlay glass layer. The base coat layer has a high emittance, and the overlay layer is formed ffrom discrete, but sintered glass particles to give the overlay a high scattering coefficient. The resulting two-layer space and thermal control coating has an absorptivity-to-emissivity ratio of less than or equal to 0.4 at room temperature, with an emittance of 0.8 at 1200 F. It is capable of exposure to either solar radiation or temperatures as high as 2000 F without significant degradation. A reusable surface insulation structure in corporating the coating and having primary application as a space shuttle heat shield is also discussed. NASA

N82-10229# Bendix Corp., Kansas City, Mo.

PROCESS SCALE-UP FOR THERMALLY STABLE MOLDING COMPOUNDS Final Report

D. A. Young Aug. 1981 24 p
(Contract DE-AC04-76DP-00613)
(DE81-030201; BDX-613-2675) Avail: NTIS HC A02/MF A01

Trial runs were made at an independent research laboratory to demonstrate the scale-up from a batch to a continuous process for the preparation of silicone- and polyimide-based molding compounds. Coatings were applied in two stages to both a fiberglass cloth and mat. Molding tests on the product were used to substantiate the cure conditions needed for each coating. The knowledge obtained provided the information needed for planning a proposed production facility to prepare these molding compounds. DOE

N82-10230# British Gas Corp., Newcastle-upon-Tyne (England). Engineering Research Station.

POLYETHYLENE GAS PIPE SYSTEMS: AN APPRAISAL OF JOINT DESIGN AND CONSTRUCTION METHODS

L. Ewing and W. Richardson Nov. 1980 21 p refs Presented at Plastics and Rubber Inst. Yorkshire Section Conf. on Jointing and Fabric. of Thermoplastics Pipe and Struct., Bradford, England, 29 Oct. 1980 and at Am. Gas Assoc. 7th Plastic Pipe Symp., New Orleans, 12-14 Nov. 1980
(ERS-E-287) Avail: NTIS HC A02/MF A01

The properties of polyethylene pipes are compared with iron and steel, and likely modes of failure are considered. Developments in heated tool fusion jointing, fusion fittings with integral heating elements, and end-load resistant mechanical joints are reviewed. Quality control of field construction is also discussed. The provision of operator training aids and visual quality control procedures are described. The suitability of ultrasonics for the nondestructive examination of joints is evaluated. Author (ESA)

N82-10231# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Technologie und Warmfestigkeit.

THE DETERMINATION OF HIGH TEMPERATURE STRENGTH OF CERAMIC DISCUSSION OF TESTING TECHNIQUES: FLEXURAL AND TENSILE TESTS CREEP TESTS WITH FLEXURAL AND TENSILE LOADING

Werner Gebhard Jan. 1981 37 p refs Report will also be announced as translation (ESA-TT-716) In GERMAN; ENGLISH summary
(DFVLR-Mitt-81-03) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 8,90

High temperature strength of ceramic materials was determined within the service temperature range of an automobile gas turbine. For the use of ceramics as construction materials in gas turbine assemblies, results for flexural and tensile behavior are of varying consequence. In particular for turbine blades, centrifugal force at the blade root entrains forces that can cause large mechanical strain. Test apparatus is described, and test philosophy for the characterization of creep is discussed. The stress exponent n of secondary creep rate is specified from flexural and tensile creep tests, and the n data of different ceramic materials is presented. Author (ESA)

N82-10232# National Bureau of Standards, Washington, D.C.

POLYMER SCIENCE AND STANDARDS DIVISION Annual Report

Ronald K. Eby, Martin G. Broadhurst, James M. Cassel, Bruno

M. Fanconi, Isaac Sanchez, and Leslie E. Smith Apr. 1981 91 p refs
(PB81-215287; NBSIR-81-2263) Avail: NTIS HC A05/MF A01 CSCL 11I

Many separate investigations addressing dielectric plastics, polymer standards, migration phenomena, mechanical durability, and dental and medical materials are summarized. A listing of patents, publications, and seminars is also given. GRA

N82-10233# National Bureau of Standards, Washington, D.C. National Engineering Lab.
FLAMMABILITY MEASUREMENTS ON FOURTEEN DIFFERENT HYDRAULIC FLUIDS USING A TEMPERATURE-PRESSURE SPRAY IGNITION TEST
Joseph J. Loftus, Nilsa Jaarez, Adalberto Maldonado, and Jeffrey A. Simenauer Mar. 1981 29 p Sponsored in part by the Mine Safety and Health Administration, and the Bureau of Mines
(PB81-214173; NBSIR-81-2247) Avail: NTIS HC A03/MF A01 CSCL 11H

A spray ignition flammability test procedure to qualify hydraulic fluids for use in underground coal mines is described. The test procedure allows for quantitative measurement of heat and energy developed by fluids which may ignite in the test and provides for rank ordering of fluids according to their flammability. The testing program included currently used fluids such as invert emulsions, synthetics, and water glycols. Studies showed that the water glycol fluids were the only fluid type to resist ignition by spray testing. All other fluid types were ignited and in some cases produced considerable flaming. GRA

N82-10234 Akron Univ., Ohio.
TELECHELIC POLYMERS AND SEQUENTIAL COPOLYMERS BY BCl3 COINITIATED CATIONIC POLYMERIZATIONS Ph.D. Thesis
Robert Alan Smith 1981 179 p
Avail: Univ. Microfilms Order No. 8117725

Boron trichloride, used in conjunction with appropriate cationogens, polymerizes isobutylene with complete absence of chain transfer to monomer. The only chain breaking event is chlorination of the growing polyisobutylene chain by the counterion-leading to polyisobutylene containing a tertiary chlorine in the omega-position. From this understanding of the elementary reactions of the organic chloride/boron trichloride/isobutylene polymerization system, alpha-olefin, omega-chloropolyisobutylene was synthesized and characterized by GPC and by exposidation/titration. The telechelic polyisobutylene was utilized in synthesizing alpha-olefinpoly(isobutylene-b-alpha-methylstyrene), which has been characterized by GPC, NMR and osmometry. Dissert. Abstr.

N82-10235 Akron Univ., Ohio.
SYNTHESIS AND CHARACTERIZATION OF SEQUENTIAL COPOLYMERS FROM POLYCHLOROPRENE BY CARBOCATIONIC TECHNIQUES Ph.D. Thesis
Sebastian Sebastian Plamthottam 1981 109 p
Avail: Univ. Microfilms Order No. 8117719

Grafts comprising a polychloroprene backbone carrying poly(isobutyl vinyl ether), polyisobutylene, an poly(isobutylene-b-alpha-methylstyrene) were synthesized using select cationic coinitiators. The discovery that allylic chlorines in conjunction with silver hexafluorophosphate initiate isobutyl vinyl ether polymerization was exploited to synthesize poly(chloroprene-g-isobutyl vinyl ether). Selective solvent extraction of the graft coupled with H(1)NMR, DSC, and thermal dehydrochlornation indicate the presence of poly(isobutyl vinyl ether) branches. Thermal dehydrochlorination indicates the absence of active chlorine in the graft copolymer. Application of principles similar to those used for the synthesis of poly(chloroprene-g-isobutyl vinyl ether) was employed for the synthesis of grafts comprising a polychloroprene backbone carrying polyisobutylene branches with tertiary chlorine endgroups using the polychloroprene/BCl3/isobutylene system. This graft in conjunction with diethylaluminum-chloride was used to initiate alpha-methylstyrene polymerization and led to the synthesis of a new graft-block: poly [chloroprene-g-(isobutylene-b-alpha-methylstyrene)]. Dissert. Abstr.

N82-10236 Akron Univ., Ohio.
CHAIN MICROSTRUCTURE STUDIES OF POLY (VINYLFLUORIDE) BY HIGH RESOLUTION NMR SPECTROSCOPY Ph.D. Thesis
Fu-Mei Chen Lin 1981 253 p
Avail: Univ. Microfilms Order No. 8117717

The same sample of poly(vinylfluoride) (PVF) was carefully examined by 3 different types of high resolution NMR spectroscopy: F-19 at 282MHz, H-1 at 300MHz and C-13 at 20MHz. Chemical shifts, spectral line-intensities, spin-spin coupling constants, spin-lattice relaxation times and nuclear Overhauser effect values were measured, and wre used to assign the various MNR spectral peaks to particular polymer chain microstructures. The results of these studies by F-19 V-13 and H-1 NMR are in close agreement with each other, and reconfirm that the PVF molecular chains contain both backwards monomer addition and stereotactic irregularity. However, F-19 NMR spectra continue to provide the most detailed and quantitative information about the microstructure of PVF polymer chains. Dissert. Abstr.

N82-10237 Akron Univ., Ohio.
PROPERTIES OF CRYSTALLINE-RUBBERY POLYMER BLENDS AND BLOCKS WITH DIFFERING COMPATIBILITY AND CHAIN STIFFNESS Ph.D. Thesis
Ching-Chi Edward Kuo 1981 202 p
Avail: Univ. Microfilms Order No. 8117716

Blends of cis-polyisoprene and trans-polyisoprene are examined experimentally in terms of the melting point dependence, the crystallization behavior, and the changes in spherulite size. The segment interaction parameter is found to be zero. An increase in crystallinity with increasing content of cis-polyisoprene is found and is ascribed to an increase in the visocisty of the medium. The spherulite size decreases monotonically. Block copolymers of poly(butadiene-b-n-hexylisocyanate), PB-PHIC, are considered because of the large difference in chain polarity and chain stiffness between isocyanate and hydrocarbon groups. Both homopolymers of poly(n-hexylisocyanate) and block copolymers of polybut-co-n-hexylisocyanate were synthesized. A deviation from the GPC universal calibration curve is found for the block copolymer of polybutadiene-co-n-hexylisocyanate, while the high molecular weight homopolymer of poly(n-hexylisocyanate) can be fitted into the universal calibration. The crystal structure and crystal morphology of PHIC were also studied. Dissert. Abstr.

N82-10238 Akron Univ., Ohio.
CHARACTERIZATION OF THE FATTY ACIDS FROM GUAYULE RESIN AND THEIR DEGRADATIVE EFFECTS ON NATURAL RUBBER Ph.D. Thesis
Robert Walter Keller 1981 207 p
Avail: Univ. Microfilms Order No. 8117715

The fatty acids present in Guayule Resin were isolated and preliminary results indicated that these fatty acids are primarily responsible for the acceleration of natural rubber oxidative degradation. Analysis of the fatty acids revealed a relatively high unsaturated fatty acid content. It is concluded that the unsaturated fatty acids oxidized readily to form peroxy compounds which then function as initiators in the Bolland oxidation scheme as applied to natural rubber. Kinetic measurements were performed using molecular weight measurements and by studying the oxidation exotherms by differential scanning calorimetry of purified natural rubber containing various levels of the methyl esters of Guayule fatty acids. These kinetic studies indicated that the unsaturated fatty acids are acting as initiators of rubber oxidation verifying the concept that these fatty acids are primarily responsible for the ability of Guayule Resin to accelerate the oxidation degradation of natural rubber. Dissert. Abstr.

N82-10239 Akron Univ., Ohio.
DYNAMIC PROPERTIES OF SBS BLOCK COPOLYMERS IN THE DEFORMED STATE Ph.D. Thesis
Ruey-Ming Yang 1981 140 p
Avail: Univ. Microfilms Order No. 8117736

The infuence of morphology of a series of block copolymers upon their properties were investigated. The materials studied were linear styrene-butadiene block copolymers the center block molecular weight of which were similar; the molecular weights of their polystyrene end block varied over a wide range. The dynamic properties of these materials were studied as a function of a previously applied static strain. They were found to differ strongly from those observed on conventional well vulcanized elastomers. While the energy loss per cycle is not affected by moderate static deformations in the latter group of materials, that found for the block copolymers exhibited a strong peak at static strains around 0.1. At the same strains a strong stress softening effect can be observed in the static stress-strain curve. Dissert. Abstr.

N82-10240 Akron Univ., Ohio.
VOLUME DILATION OF FILLED SBR VULCANIZATES UNDER UNIAXIAL STRAIN Ph.D. Thesis
Nirmal Kumar Agarwal 1981 169 p
Avail: Univ. Microfilms Order No. 8117704

The effect of elastomer crosslink density on volume change due to applied unaxial stress on SBR vulcanizates filled with model polystyrene fillers was investigated. The spherical polymeric fillers were prepared by emulsion polymarization techniques in a range of average particle sizes from 80 nm to 550 nm. The size distributions were relatively narrow as indicated by the ratio of surface average to number average diameters close to unity. The dispersion of filler, 25 phr, was achieved by a latex blending technique. The densities were determined by hydrostatic weighing technique. The hysteresis of the vulcanizate was found to be inversely proportional to the strain dilation. The dependence of the hysteresis on reciprocal of strain dilation increased with increasing crosslink density. Scanning electron micrograph studies of fracture surfaces of the stretched vulcanizates containing large particle size polystyrene fillers (550 nm and 2000 nm) provided direct evidence of vacuole formation at the filler rubber interface in the direction of applied tension. Dissert. Abstr.

N82-10241 Akron Univ., Ohio.
BULK AND SOLUTION PROPERTIES OF STAR-BRANCHED POLYMERS Ph.D. Thesis
Barry Jay Bauer 1981 233 p
Avail: Univ. Microfilms Order No. 8117706

The difference in free energy of phase separation between linear diblocks and stars made from f of the diblocks is calculated from entropy changes that result when the arms are linked in the mixed and phase separated systems. The variation in chain end density in the phase separated system is accounted for. Stars are found to phase separate more readily than the diblock arms that they are made from. Monte Carlo calculations using the self-interacting chains of Mazur et al are used to find the volume of random flight chains based on a minimum surface area polyhedron that encloses all of the units. This volume is close to the hydrodynamic volume of a linear molecule. Corrections are made for the irregular shape of the chains. Dissert. Abstr.

N82-10242 California Univ., Irvine.
CONFIGURATIONAL STATISTICS OF POLYSACCHARIDES; MOLECULAR WEIGHT DISTRIBUTION OF PULLULAN Ph.D. Thesis
Bruce Anthony Burton 1981 307 p
Avail: Univ. Microfilms Order No. 8118463

Theoretical chain models for the D-glucans amylose, linear dextran, and pullulan were constructed on the basis of realistic molecular geometries for the skeletal segments and estimates of the conformational energy as a function of the backbone torsion angles. Reported chain dimensions take the form of characteristic ratios of the mean square unperturbed end-to-end distance and the persistence length. A measure of chain stiffness and extension is introduced which is a type of correlation function. Representative conformations of amylose, dextran, and pullulan chains are presented as projection drawings. Comparison of these drawings and the chain dimensions calculated for each chain discloses that the alpha-1,6-linkage is a source of substantial conformational freedom in D-glucan chains which incorporate this linkage. Refinement of the theoretical model for the alpha-1,6-linkage requires that experimental studies of the coil dimensions of pullulan and other polysaccharides containing this linkage be completed. Dissert. Abstr.

N82-10243 Akron Univ., Ohio.
SYNTHESES AND CHARACTERIZATION OF Si-H AND Si-Cl END-GROUP CONTAINING POLYMERS BY CARBOCATIONIC POLYMERIZATION AND DERIVATION Ph.D. Thesis
Victor Shiow Cherng Chang 1981 218 p
Avail: Univ. Microfilms Order No. 8117707

The synthetic possibilities offered by carbocationic polymerization techniques and the chemistries of the SiCl and Si-H bonds were combined. Two fundamentally different approaches were developed. (1) A series of novel silicon-functional carbocationic initiators were synthesized and used to induce cationic olefin polymerizations. In this manner, unique polymers carrying Si-Cl or Si-H head-groups were prepared. Extensive model experiments provided guidance for subsequent carbocationic polymerizations. Experimental conditions were worked out under which none of the electrophilic species that arise during polymerization would destroy the Si-H function. (2) Polyisobutylenes were carrying one (alpha) and two (alpha, omega) terinal 1-olefin function(s) were prepared by regioselective dehydrochlorination of alpha and alpha, omega di(tert.-chloro) polyisobutylenes. Subsequent hydrosilylation with HSi(CH3)2Cl yielded the Si-Cl function, which was in turn converted by LiAlH4 reduction to the Si-H terminus. Dissert. Abstr.

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-10244 Princeton Univ., N. J.
SOLID PROPELLANT RESPONSE FUNCTIONS DEDUCED BY FORCED LONGITUDINAL WAVES IN ROCKET MOTORS Ph.D. Thesis
Michael Matthew Micci 1981 131 p
Avail: Univ. Microfilms Order No. 8118341

Research with the Forced Longitudinal Wave (FLW) motor has demonstrated that pressure and velocity measurements inside a solid propellant rocket chamber can be utilized to deduce simultaneously the propellant pressure-coupled and velocity-coupled responses. The FLW motor represents the first attempt to measure propellant response functions within a rocket motor environment. A linear analysis of steady-state oscillations within rocket chambers has shown that oscillatory pressure measurements at the head and nozzle ends of a rocket chamber and a midchamber oscillatory velocity measurement provide sufficient information for the deduction of both real and imaginary parts of the propellant burning rate response functions. The midchamber velocity measurement was made by means of a magnetic flowmeter, a technique previously untried within solid propellant rocket chambers. Dissert. Abstr.

N82-10245*# Aerojet Liquid Rocket Co., Sacramento, Calif.
FUEL/OXIDIZER-RICH HIGH-PRESSURE PREBURNERS Final Report
L. Schoenman Oct. 1981 254 p refs
(Contract NAS3-21753)
(NASA-CR-165404) Avail: NTIS HC A12/MF A01 CSCL 21I

The analyses, designs, fabrication, and cold-flow acceptance testing of LOX/RP-1 preburner components required for a high-pressure staged-combustion rocket engine are discussed. Separate designs of injectors, combustion chambers, turbine simulators, and hot-gas mixing devices are provided for fuel-rich and oxidizer-rich operation. The fuel-rich design addresses the problem of non-equilibrium LOX/RP-1 combustion. The development and use of a pseudo-kinetic combustion model for predicting operaing efficiency, physical properties of the combustion products, and the potential for generating solid carbon is presented. The oxygen-rich design addresses the design criteria for the prevention of metal ignition. This is accomplished by the selection of materials and the generation of well-mixed gases. The combining of unique propellant injector element designs with secondary mixing devices is predicted to be the best approach. M.G.

N82-10246# Army Missile Command, Redstone Arsenal, Ala.
IMPROVED SPECIFICATIONS FOR COMPOSITE PRO-

PELLANT BINDERS FOR ARMY WEAPON SYSTEMS Final Report
James G. Carver Jun. 1981 43 p refs
(AD-A103086; DRSMI/RK-81-5-TR) Avail: NTIS
HC A03/MF A01 CSCL 21/9

A process has been developed that simultaneously can determine the molecular weight, molecular weight distribution, functionality, and functionality distribution of hydroxy-terminated polymers. The samples are analyzed on a high performance GPC permeation column and the detector responses sent directly to a computer. The molecular weight and molecular weight distribution are calculated using the universal calibration procedure. By reacting the polymer with a UV chromotograph, 3,5 dinitrobenzoyl chloride, the hydroxyl groups can be detected. By ratioing the UV response and the refractive index response, the hydroxyl groups per molecule can be determined. Detailed procedures for calibration derivitization and analysis are provided. A computer program for data reduction written in BASIC for a Hewlett-Packard Lab Automation System is also provided. This project has been accomplished as part of the US Army Materials Testing Technology Program, which has for its objective the timely establishment of testing techniques, procedures, or prototype equipment (in mechanical, chemical or nondestructive testing) to insure efficient inspection methods for materiel/material procured or maintained by DARCOM. Author (GRA)

N82-10247# Southwest Research Inst., San Antonio, Tex.
MULTICYLINDER DIESEL ENGINE TESTS WITH UNSTABILIZED WATER-IN-FUEL EMULSIONS Final Report, Sep. 1978 - Jul. 1980
C. W. Coon, Jr. Jun. 1981 155 p refs
(Grant DOT-TSC-1587)
(AD-A104090; TSC-USCG-80-7; USCG-D-27-70) Avail: NTIS
HC A08/MF A01 CSCL 13/10

Two diesel engines representative of the four-stroke cycle and two-stroke cycle main propulsion units installed in U.S. Coast Guard WPB class cutters were operated in a test environment in an attempt to demonstrate significant fuel savings associated with water-in-fuel emulsions. The engines were connected to a dynamometer in a laboratory test cell. A prototype fuel system was assembled that would supply unstabilized emulsions for which the water concentration could range form zero to 25 percent of the total volume of liquid supplied to the engine as fuel. An analysis of boat operation was performed in order to identify the most frequently used engine settings, and both engines were operated at test points representative of boat prop load performance. The test results for the four-stroke cycle engine indicated that an average diesel fuel saving of about 2.5 percent could be obtained at the most frequently encountered operating conditions using water concentrations of 15-25 percent. Statistical analysis procedures suggest a 90 percent confidence in the measured results. Significant reductions in exhaust smoke were also observed, although the exhaust stream opacity was low throughout the tests. For the two-stroke cycle engine, no statistically significant reduction in fuel consumption could be identified. GRA

N82-10248# Sandia Labs., Albuquerque, N. Mex.
SHOCK INDUCED HOT-SPOT FORMATION AND SUBSEQUENT DECOMPOSITION IN GRANULAR, POROUS HEXANITROSTILBENE EXPLOSIVE
D. B. Hayes 1981 89 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029130; SAND-81-0506C) Avail: NTIS
HC A05/MF A01

Experimental and theoretical studies on granular, porous hexanitrostilbene (HNS) explosives have yielded and increased understanding of microstructural processes occurring during initiation by shock loading. Experiments involved the planar impact of HNS specimens onto fused-silica targets. Chemical decomposition librerated gaseous products, causing the pressure in the HNS to rise. Velocity interferometry measured material velocity, hence, pressure at the fused silica/HNS interface. An analysis of this pressure excursion yields chemical decomposition history. The data are interpreted in terms of a quantitative two-temperature model which considers hot spots to be formed at pore sites as a result of the irreversible work accompanying the shock. Subsequently, decompostion completion is achieved by return fronts which propagate radially out from each hot spot at a velocity which can be determined from the bulk decomposition rate. Analysis of the experimental data in the context of the model yields several important resutls: the delay times corresponding to hot-spot decomposition are shorter than expected; model calculations show about the same inferred hot-spot temperature for different initial porosities and particle sizes in HNS, shock-loaded to equal pressures, which is consistent with experimental results. DOE

N82-10249# North Dakota Univ., Grand Forks.
CHEMISTRY OF LIGNITE LIQUEFACTION Quarterly Report, Apr. - Jun. 1981
R. J. Baltisberger, Virgil I. Stenberg, Kenneth J. Klabunde, and Neil F. Woolsey Jul. 1981 55 p refs
(Contract DE-AB18-78FC-02101)
(DE81-030178; DOE/FC-02101/18) Avail: NTIS
HC A04/MF A01

Progress reports are presented for structural studies of lignite derived asphaltene and preasphaltenes and ether cleavage studies. Reports of denitrogenation caused by CO and water reactions and of electron transfer catalysis studies are also presented. Results indicate that the major differences between asphaltenes and preasphaltenes is that the molecular weight maximizes near 1500 g/mol for the preasphaltenes compared to 400 g/mol for the asphaltenes. It is further indicated that asphaltenes have little or no aliphatic or aryl aliphatic ethers whereas preasphaltenes have significant amounts. Other significant results are reported. DOE

N82-10250# Department of Energy, Bartlesville, Okla. Energy Technology Center.
LIQUID FOSSIL FUEL TECHNOLOGY Quarterly Technical Progress Report, Oct. - Dec. 1980
May 1981 77 p refs
(DE81-029912; DOE/BETC/QPR-80/4) Avail: NTIS
HC A05/MF A01

Highlights of research activities at BETC during the past quarter are summarized. Major research areas include: liquid fossil fuel cycle, extraction (resource assessment and enhaned producton); processing (characterization, thermodynamics, and process technology); utilization; and product integration and technology transfer. DOE

N82-10251# Rockwell International Corp., Canoga Park, Calif. Energy Systems Group.
MOLTEN-SALT COAL-GASIFICATION PROCESS DEVELOPMENT UNIT, PHASE 2 Quarterly Technical Progress Report, Jan. - Mar. 1981
M. H. Slater 20 Apr. 1981 57 p refs
(Contract DE-AC21-77ET-10296)
(DE81-023585; DOE/ET-10296/T2; ESG-DOE-13363; QTPR-3) Avail: NTIS HC A04/MF A01

Run 7, the second run of the Phase 2 program, was completed. The gasification system was operated for a total of 169 h at pressures up to 90 psig. Average product gas HHV values of 81 Btu/scf were recorded during 90-psig operation, while gasifying coal at a rate of 735 lb/h. The run was terminated, as planned, after 7 full days of operation. Prior to Run 7, an 80% cobalt-20% chromium alloy metal melt withdrawal orifice was installed as a replacement for a high-purity alumina orifice which had cracked during Run 6; and thus, it is suspected, contributed to the overflow system plug which prematurely terminated the test. The new metal orifice survived the entire Run 7 campaign virtually intact. DOE

N82-10252# Northwestern Univ., Evanston, Ill.
MECHANISTIC STUDY OF CATALYTIC METHANOL SYNTHESIS Progress Report
Harold H. Kung 10 Aug. 1981 6 p
(Contract DE-FG22-80OC-30239)
(DE81-028915; DOE/PC-30239/T2) Avail: NTIS
HC A02/MF A01

Progress is reported on the elementary kinetics and mechanisms involved in the production of methanol by means of the hydrogenation of carbon monoxide. The relative rates of reaction were determined by means of the relaxation technique. Advancement in the understanding of mixed oxide catalysts was also made during the quarter. DOE

N82-10253# Westinghouse Electric Corp., Concordville, Pa.
BASELINE DATA ON UTILIZATION OF LOW-GRADE FUELS IN GAS TURBINE APPLICATIONS. VOLUME 2: HOT COMPONENT CORROSION EVALUATION Final Report
J. J. Vitello and S. T. Scheirer Jun. 1981 64 p Sponsored in part by Electric Power Research Inst.
(EPRI Proj. 1079-2)
(DE81-903760; EPRI-AP-1882-Vol-2) Avail: NTIS HC A04/MF A01

The corrosion of turbine parts when operated with residual oil versus distillate oil was compared. A metallographic evaluation of combustion turbine hot components, which showed partial residual versus total distillate fuel firing, revealed no discernable differences in component degradation (hot corrosion). Considering the time of operation, the degree of hot corrosion observed was somewhat greater than expected for oil-fired combustion turbines of similar designs and alloy selections. This abnormality was attributed to the ingestion of high levels of sodium contaminated mist from the adjacent cooling tower hrough the turbine compressor inlet. Corrosion due to vanadium compounds in the heavy fuel machines was practically nil, which indicates that residual fuel is satisfactory for use in combustion turbine plants. DOE

N82-10254# KVB, Inc., Irvine, Calif.
BASELINE DATA ON UTILIZATION OF LOW-GRADE FUELS IN GAS TURBINE APPLICATIONS. VOLUME 3: EMISSIONS EVALUATION Final Report
T. Sonnichsen Jun. 1981 108 p refs Sponsored in part by Electric Power Research Inst.
(EPRI Proj. 1079-3)
(DE81-903764; EPRI-AP-1882-Vol-3) Avail: NTIS HC A06/MF A01

A series of field tests was conducted on two residual-oil-fired gas turbine/heat recovery steam generators (HRSG) comprising a Westinghouse PACE 260-MW combined-cycle unit. Base load emission levels were determined. A series of tests was also made at reduced operating loads. Emission measurements included: (1) gaseous constituents measured by continuous monitoring instrumentation (O2, CO2, NO, NO sub x, and SO2) and by wet chemistry methods (SO3, aldehydes, and chlorides); and (2) particulate characteristics (mass loding, smoke spot number; submicron particle size, and particle morphology). Corrected NO sub x emissions at base load were 170 ppM and 200 ppM with and without HRSG afterburners in service, respectively. The NO sub x emissions decreased with water injection by 50% and were unchanged with the turbine wash. The NO sub x increased with load. DOE

N82-10255# Gulf Research and Development Co., Pittsburgh, Pa.
UNDERGROUND GASIFICATION OF STEEPLY DIPPING BEDS. PHASE 2 REPORT: RESULTS OF RAWLINS TEST NO. 1 Final Report, 1 Mar. 1978 - 1 Mar. 1980
Jul. 1981 271 p refs Prepared in cooperation with TRW Energy Systems Planning Div., McLean, Va.
(Contract DE-AC03-77ET-13108)
(DE81-028681; DOE/ET-13108/T14) Avail: NTIS HC A12/MF A01

A 23 ft thick coal bed dipping at 63 deg was used to test the feasibility of using underground coal gasification techniques to extract energy from steeply dipping coal beds (UCG-SDB). The coal was ignited at a vertical depth of 400 ft utilizing a directionally drilled process well pair. The heating value of the product gas during the 21 day air injection phase initially climbed to approximately 180 Btu/SCF and gradually declined to the 120 to 130 Btu/SCF range. Air injection rates of 1600 to 2000 SCFM were used, and wet product gas rates between 3000 and 4500 SCFM were obtained. A 5 day steam/oxygen injection test was also conducted which increased the product gas heating value to the 220 to 260 Btu/SCF range. The environmental studies concentrated on ground water quality, air quality, surface subsidence, and personnel industrial hygiene. DOE

N82-10256# California Univ., Berkeley. Lawrence Berkeley Lab.
DETONATION-PRODUCT BEHAVIOR AT LARGE EXPANSION: THE UNDERWATER DETONATION OF NITROMETHANE
F. H. Helm, Jr., E. S. Chambers, E. Lee, M. Finger, R. R. McGuire, J. P. Mahler, H. Cheung, and J. L. Cramer Dec. 1980 29 p refs
(Contract W-7405-eng-48)
(DE81-030468; UCRL-52903) Avail: NTIS HC A03/MF A01

An underwater test which was used to measure the shock-wave travel and gas bubble resulting from the detonation of 2 kg of nitromethane is described. The bubble expansion was photographically measured to a volume of about 80 times the initial volume of the shell. These experimental measurements compared well with those calculated by a one-dimensional hydrodynamic program, KOELAS. The program also provided data to assist in the calculation of the apparent position of the shell containing the explosive, using refractive index gradients and the bubble position as a function of time. A method for estimating optical ray paths penetrating the expanding shock front and a modification to a streaking camera that permits stable operation at low rotor speeds are described. The expansion exhibited a minimum pressure of 2 MPa (20 bars), an amount in the range of rock blasting applications, underwater explosions, and rock fracturing or cratering. DOE

N82-10257# Bell Aerospace Co., Buffalo, N. Y.
HIGH-MASS-FLUX COAL GASIFIER Final Report
A. J. Simpkin May 1981 102 p refs
(Contract DE-AC01-79ET-14674)
(DE81-029807; DOE/ET-14674/16) Avail: NTIS HC A06/MF A01

This report describes the design, analysis, construction, and test activities associated with bringing a short residence time, entrained flow gasifier process development unit (PDU) to operational status are described. The basic high mass flux (HMF) gasifier, incorporated in the PDU, operates at a coal through-put of twelve tons per day, a pressure of fifteen atmospheres and processes coal, oxygen and steam to produce a synthesis. When applied to the production of substitute natural gas, the option exists to add secondary coal to the basic HMF gasifier, for the purpose of enhancing the methane content of the product. A secondary coal feed system was developed and its injection capability demonstrated in a cold flow test facility. Operability and performance of the synthesis gas stage of the HMF gasifier were demonstrated with Pittsburgh seam coal and North Dakota Lignite. Curtailment of testing precluded the conduct of any gasification tests with secondary coal injection. Included in the main program was a task to evaluate the effects of slag fluxing additives upon viscosity/temperature relationships for Pittsburgh seal coal slags. DOE

N82-10258# California Univ., Livermore. Lawrence Livermore Lab.
MODEL TESTING OF A 10-kg HIGH EXPLOSIVE BLAST ATTENUATION MAZE
C. M. Bacigalupi and W. A. Burton 1 Jul. 1981 37 p
(Contract W-7405-eng-48)
(DE81-029297; UCRL-53160) Avail: NTIS HC A03/MF A01

The basement area of the proposed High Explosive Applications Facility (HEAF) at the Lawrence Livermore National Laboratory includes 10-kg HE assembly and process cells, and a 10-kg corridor for the transport of up to 10 kg of HE from the receiving dock to the cells and to the experimental firing tanks. A process cell-maze configuration that attenuated the effects of an accidental 10-kg detonation to acceptable levels (maximum of 10 to 11 psi reflected) was developed. Scale model tests were conducted to confirm the maze design and to determine the blast pressures in adjacent areas in the final HEAF building configuration. In addition, pressure/time information was obtained at selected points in the model expansion chamber to provide the architect-engineer with information for structural design. DOE

N82-10259# General Electric Co., St. Petersburg, Fla. Corporate Research and Development.
EXPERIMENTAL EVALUATION OF THE STEADY-STATE

AND DYNAMIC PERFORMANCE CHARACTERISTICS OF THE INTERACTIVE UNITS OF A COAL-GASIFICATION PROCESS **Quarterly Report, 28 Dec. 1980 - 29 Mar. 1981**

J. C. Corman Apr. 1981 75 p refs
(Contract DE-AC01-80ET-14928)
(DE81-028995; DOE/ET-14928/1) Avail: NTIS HC A04/MF A01

The technology base required to premit coal conversion systems to operate within the constraints imposed by end use applications was investigated. A series of unfired dynamic tests along with fired steady state tests were defined. Thermal decomposition of ammonia was investigated. High conversion rates were observed for binary NH3/H2 gas mixtures. Conversion was found to be thermodynamically limited when substantial H2 and N2 concentrations are present. The overall structure of the IGCC mathematical model has been developed and information flow requirements associated with each component in the model were defined. The computer model for the gasifier and the first water quench were completed. DOE

N82-10260# Hydrocarbon Research, Inc., Lawrenceville, N. J.

H-COAL PROCESS IMPROVEMENT STUDY. BENCH UNIT BASELINE RUN WITH PREHEATER/REACTOR

May 1981 56 p
(Contract DE-AC05-77ET-10152)
(DE81-026022; DOE/ET-10152/T6; FE-10152-65) Avail: NTIS HC A04/MF A01

The thermal dissolution of coal and its effects on the mechanism of coal liquefaction in an H-coal system is investigated. The two-stage coal liquefaction system consists of a coal slurry preheater which is essentially a short residence time reactor and a liquefaction reactor which can be regarded as a catalytic-hydrogenation-reactor. The preheater design and unit modifications are discussed. Results of the run to obtain baseline data with the preheater integrated in the bench unit system are compared with those of previous bench runs at similar operating conditions without a preheater, and also to previous PDU operations at similar conditions. These comparisons were made to determine what effect a preheater has on product yields and product quality. It is concluded that a preheater tends to increase heavy liquid yields with more residual oil and a higher proportion of heavy distillates in the distillate product. DOE

N82-10261# Catalytic, Inc., Wilsonville, Ala.

EVALUATION OF LIQUID-PHASE DRILLING AS A TECHNIQUE FOR SRC SOLIDIFICATION

H. E. Lewis Jun. 1981 27 p ref
(Contracts DE-AC05-76ET-10154; RP1234-1-2)
(DE81-025638; DOE/ET-10154/T9; FE-2270-80) Avail: NTIS HC A03/MF A01

A process for solidifying solvent refined coal (SRC) by injecting molten material into a column of water was developed. It was tested in a series of short, pilot-scale experiments using a column 78 mm (3 in.) in diameter and a maximum of 3.05 m (10 ft) high. The technical feasibility of the process concept was established within experimental limits. An engineering evaluation of the test results was conducted and a preliminary estimate of process costs for a drilling module sized to solidify 3400 tons of SRC per day developed. It was found that while the process advantages contemplated are probably valid, there are offsetting disadvantages which must be evaluated carefully before further effort is committed to process development. DOE

N82-10262# Aluminum Co. of America, Pittsburgh, Pa.

PULVERIZED-COAL FIRING OF ALUMINUM MELTING FURNACES **Quarterly Technical Progress Report, 1 Oct. - 31 Dec. 1979**

C. E. West Oct. 1980 56 p refs
(Contract DE-AC01-78CS-40037)
(DOE/CS-40037/T2) Avail: NTIS HC A04/MF A01

Progress is reported on the demonstration program of an efficient, environmentally acceptable coal firing process suitable for implementation on melting furnaces in the aluminum industry. Specific tasks reported on are: design of burner A, process equipment design and layout, purchase of process equipment, and fabrication of burner A. The status report on phase I data deliverable and a cost summary are presented. DOE

N82-10263# Midwest Research Inst., Golden, Colo. Solar Energy Information Data Bank.

ALCOHOL FUELS BIBLIOGRAPHY, 1901 - MARCH 1980

Apr. 1981 468 p
(Contract DE-AC02-77CH-00178)
(DE81-025482; SERI/SP-751-902) Avail: NTIS HC A20/MF A01

This annotated bibliography is subdivided by subjects, as follows: general; feedstocks-sugar; feedstocks-starch; feedstocks-cellulose crops and residues; productions; coproducts; economics; use as vehicle fuel; government policies; and environmental effects and safety. DOE

N82-10264# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

CHEMISTRY AND MORPHOLOGY OF COAL LIQUEFACTION **Quarterly Report, 1 Jan. - 30 Mar. 1981**

Heinz Heinemann Mar. 1981 20 p
(Contract W-7405-eng-48)
(DE81-028899; LBL-12933) Avail: NTIS HC A02/MF A01

A novel cobalt mediated, reversible cleavage of a vinyl-hydrogen bond was discovered. All products from the thermal decomposition of tetralin were identified. The stereochemistry of cis-1, 2 dihydrotetralin was determined. In the utilization of the water gas shift reaction as a reducing agent for model coal compounds it was found that tributylphosphine ligands increase the life of transition metal hydride catalysts. Rates of demetallation of high metal content gas oils over cobalt-molybdena-alumina catalysts were measured for vanadium and iron. It is clearly shown that pore plugging of the catalyst occurs early and results in deposition of the metals on the external catalyst surface. DOE

N82-10265# California Univ., Livermore. Lawrence Livermore Lab.

COMPARISON OF MOLECULAR-DYNAMICS CALCULATIONS WITH OBSERVED INITIATION PHENOMENA

F. E. Walker, A. M. Karo, and J. R. Hardy (Nebraska Univ.) 5 Jun. 1981 48 p refs Presented at the 7th Symp. on Detonation, Annapolis, Md., 16-19 Jun. 1981
(Contract W-7405-eng-48)
(DE81-024713; UCRL-85187; CONF-810602-28) Avail: NTIS HC A03/MF A01

Molecular dynamics calculations of the effects of the interaction of shock waves with condensed systems representing chemical explosives were completed and the microscopic effects of material characteristics known to cause changes in the sensitivity of explosives - voids and cracks, crystal defects, inclusions, initial temperature, and shock strength were explored. An instructive correlation with the macroscopic results was seen. In studies of voids in model two dimensional diatomic systems, such as face centered cubic nitric oxide and sulfur nitride lattices impacted by aluminum plates, the qualitative behavior was found to be much the same, whether the system is initially quiescent or thermal. Experimental evidence shows that chemical bonds can be broken by strictly mechanical forces to form free radicals, and the calculations indicate that a similar process can occur in condensed explosives within a shock front. This process is not in thermal equilibrium nor does it obey the rules of statistical mechanics. DOE

N82-10266# Mason and Hanger-Silas Mason Co., Inc., Amarillo, Tex.

STUDY FOR COMPACTING THE EXPLOSIVE LX-17

J. D. Harrell Jun. 1981 8 p refs
(Contract DE-AC04-76DP-00487)
(DE81-769469; MHSMP-81-28) Avail: NTIS HC A02/MF A01

The effects of compacting process variables on the pressed density of LX-17 were determined. The variables evaluated were pressure, number of compaction cycles, and dwell time. Density was influenced to the greatest degree by the number of compaction cycles. A maximum of five cycles was studied. Smaller but significant increases in densities were achieved in raising the pressure from 140 MPa to 196 MPa and increasing the dwell time from 15 minutes to 240 min. Two lots of Lx-17 containing different TATB particle size specification. Significant differences in pressed densities were observed between these two LX-17 lots. DOE

N82-10267# Argonne National Lab., Ill. Energy and Environmental Systems Div.

ENHANCEMENT OF METHANE GAS PRODUCTION USING AN INDUSTRIAL WASTE IN ANAEROBIC DIGESTION

L. Fradkin and F. Kremer (ESCOR, Inc.) 1980 10 p refs
Presented at the 3rd Miami Intern. Conf. on Alternative Energy Sources, Fla., 15-18 Dec. 1980
(Contract W-31-109-eng-38)
(DE81-023819; CONF-801210-26) Avail: NTIS HC A02/MF A01

Chrominum can block enzymatic systems or interfere with essential cellular metabolites of most oxidizing bacteria. In general, heavy metals coagulate and precipitate proteins, many of which are denatured by this action. The effects on anaerobic digestion of chromium shavings from leather tanning were examined. Leather chrome shavings (which contain proteins, nitrogen, and fats) were added to two of three digesters at various rates. The methane gas production of the experimental units improved significantly compared to the control. In addition, the presence of a toxic loading or change of feed had no harmful effect on the digester performance. DOE

N82-10268# Mound Lab., Miamisburg, Ohio.

PRICETOWN 1 UNDERGROUND COAL GASIFICATION FIELD TEST: OPERATIONS REPORT

A. K. Agarwal and R. E. Zielinski 1981 259 p refs
(Contract DE-AC04-76DP-00053)
(DE81-025162; MLM-MU-81-62-0007) Avail: NTIS HC A12/MF A01

An Underground Coal Gasification (UCG) field test in bituminous coal was successfully completed near Pricetown, West Virginia. The viability of the linked vertical well (LVW) technology to recover the 900 foot deep, 6 foot thick coal seam was determined. A methane rich product gas with an average heating value of approximately 250 Btu/SCF was produced at low air injection flow rates during the reverse combustion linkage phase. Heating value of the gas produced during linkage enhancement phase was 221 Btu/SCF with air injection. The high methane formation was attributed to the thermal and hydrocracking of tars and oils along with hydropyrolysis and hydrogasification of coal char. The high heating value of the gas was the combined effect of residence time, flow pattern, injection flow rate, injection pressure, and back pressure. During the gasification phase, a gas with an average heating value of 125 Btu/SCF was produced with only air injection, which resulted in an average energy production of 362 MBtu/day. DOE

N82-10269# Aerojet Energy Conservation Co., Sacramento, Calif.

STUDY OF GELLED LNG Final Technical Report

M. I. Rudnicki, J. A. Cabeal, L. C. Hoffman, R. A. Newton, R. K. Schaplowsky, and E. M. VanderWall May 1981 110 p
(Contract DE-AC03-80SF-10846)
(DE81-023259; DOE/TIC-11452) Avail: NTIS HC A06/MF A01

Progress is reported in the following areas: characterization of gelled LNG (GELNG) rheological properties, assessment of the relative leakage of GELNG vs LNG through a perforated wall, relative spread and vaporization rates of unconfined spills on water, and relative spread and vaporization rates of unconfined spills on land. Shear stress vs strain rate was determined for a range of gelant concentrations. The shear diagram was extended to cover shear rates in the range of 13 to 14,800 inverse seconds, expanding previous results at both low and high shear rates. Leakage tests of GELNG through a known geometry perforation were conducted along with comparative testing with LNG. Rapid cessation of flow through the perforated plate was observed for all tested concentrations of GELNG and at all driving pressures. Land spills were found to give inconclusive results due to difficulties in measuring transient weight changes during the spill. Gelatin increases total vaporization time significantly in water spills. DOE

N82-10270# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.

EXPLOSIVE MIXTURES OF HYDROCARBONS, ALUMINUM AND AIR [EXPLOSIVA BLANDNINGAR AV GASOL-ALUMINIUM-LUFT]

Stefan Lamnevik Nov. 1980 10 p refs In SWEDISH
(FOA-C-20389-D1) Avail: NTIS HC A02/MF A01

Optimal energy, deflagration velocities and pressures, explosion velocities and pressures occur in stoichiometric mixtures, e.g., 4.0% propane in air, 3.1% butane in air and with 338 g aluminum per cu meter. The maximum energy output for hydrocarbon fair is cu 10.4 mJ/normal cu m of fuel air mixture. Detonation data for five stoichiometric mixtures with different proportions of propane, aluminum and air were calculated by means of the state equations for ideal gases. Detonation velocities, 1.80 to 1.93 Km/sec, and detonation pressures of 1.9 to 2.7 M.Pa are obtained. Necessary priming energies for the deflagration vary from 0.3 mJ (propane-air) to multiples of 10 mJ (aluminum-air). For the priming of the detonating mixtures 1 to 100 g. of detonating material is required. Author (ESA)

N82-10271# Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Group.

SELECTIVITY IN FISCHER-TROPSCH SYNTHESIS: REVIEW AND RECOMMENDATIONS FOR FURTHER WORK

L. Caldwell Jun. 1980 42 p refs
(PB81-223596; CSIR-SR-CHNG-330) Avail: NTIS HC A03/MF A01 CSCL 21D

A broad product spectrum is obtained from the Fischer-Tropsch synthesis aimed at the production of gasoline and diesel fuels. This is a consequence of the carbon atom by carbon atom mechanism of chain growth. There is potential for narrowing the product spectrum by use of dual-function catalysts or transient process conditions. GRA

N82-10272# Battelle Pacific Northwest Labs., Richland, Wash.

KINETICS AND CATALYSIS OF PRODUCING SYNTHETIC GASES FROM BIOMASS Annual Report, 7 Dec. 1979 - 6 Dec. 1980

L. J. Sealock, Jr., D. C. Elliott, S. L. Weber, and R. J. Robertus Jan. 1981 129 p refs
(Contract GRI-5014-361-0242)
(PB81-217614; GRI-79-0100) Avail: NTIS HC A07/MF A01 CSCL 21D

The kinetics, reaction sequences, and pathways involved in pyrolysis and catalytic steam gasification of wood and wood components were investigated. An autoclave and a batch reactor were used to study gasification at low temperature and high temperature regimes. Kinetic studies of the carbon steam reaction relative to cellulose and lightning gasification were completed. Reaction rate constants and activation energies were determined for three catalyzed cases and for a noncatalyzed case. The formation of specific compounds during gasification in the presence and absence of catalyst was investigated in both reactor systems. Results of the experiments demonstrate dramatic effects on the kinetics and gas composition as a function of the various catalyst and catalyst concentrations tested. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-10273 Colorado State Univ., Fort Collins.

THE DYNAMICS OF WIND-INDUCED OSCILLATIONS OF BLUFF BODIES Ph.D. Thesis

Abraham Babatunde Adenigba 1981 80 p
Avail: Univ. Microfilms Order No. 8119685

The investigation of the dynamic capabilities of the Iwan-Blevins model prediction wake-vortex induced oscillation of bluff bodies using Hopf bifurcation theory is described. Bifurcation, stability, direction of bifurcation, periodic orbits and response diagrams were obtained and classified. Comparison was made with the experimental data of Feng. The experimentally observed double amplitude response for an elastically mounted cylinder vibrating in the transverse direction are predicted and explained. Prediction of the model and experimental results agree within the range of experimental data scatter. Dissert. Abstr.

N82-10274 Lehigh Univ., Bethlehem, Pa.

SEISMIC RESISTANCE CHARACTERISTICS OF REINFORCED CONCRETE BEAM SUPPORTED FLOOR SLABS

IN BUILDING STRUCTURES Ph.D. Thesis
Masayoshi Nakashima 1981 352 p
Avail: Univ. Microfilms Order No. 8118842

The in-plane seismic characterics of reinforced concrete floor slabs which function as diaphragms placed between lateral load resisting systems are described. The testing of representing a portion of the floor system in a building structure were tested under various loading and support conditions is described. A non-linear finite element model which predicts the ultimate strenght of the test slab panel subjected to monotonic in-plane loading duplicates the experimental load-deflection curves, reproduces the unloading stiffness of the test slab panels is described. The effects of geometry, reinforcement, loading and support conditions on the in-plane characteristics of floor slabs were investigated. In the dynamic response analysis, a seven story and six bay symmetrical building model was selected in order to examine the influence of in-plane characteristics of floor slabs on the building response. Dissert. Abstr.

N82-10275# Air Products and Chemicals, Inc., Trexlertown, Pa.
LOAD-CHANGE TESTING OF A LARGE COMMERCIAL OXYGEN PLANT Final Report
N. Chatterjee, J. C. Sorensen, and A. J. Patrylak Apr. 1981 46 p refs
(EPRI Proj. 2806-1)
(EPRI-NP-1824) Avail: NTIS HC A03/MF A01

A series of transient response tests were successfully conducted on one of three 1,000 T/D oxygen production plants operated under computer control. These tests involved a series of rapid rate changes in oxygen production specified to simulate the varying demand for oxygen of a coal gasifier in combined cycle power generation service. Since the ability of the oxygen plant itself to rapidly change its gaseous production rate is an important element in the design and operation of gasification combined cycle) plants, a series of load following tests was arranged. The actual oxygen plant rate changes easily exceeded the targeted response rate with minimal variation in product oxygen purity. Oxygen production rate changes of +- 10 to +- 13% of design in 1 to 2 min were readily accomplished. The production rate was also varied over the full range from 70% to 105% of design at a continuous ramp rate of approximately 2% of design production per minute. DOE

N82-10276# Mid-American Solar Energy Complex, Minneapolis, Minn.
QUARTERLY REPORT OF SOLAR FEDERAL BUILDINGS PROGRAM IN THE MASEC REGION
Jun. 1981 20 p
(Contract DE-AC02-79CS-30150)
(DE81-027968; MASEC-R-81-059/1) Avail: NTIS HC A02/MF A01

Solar Federal Buildings Program (SFBP) projects within the 12-state MASEC region are listed. The states involved are Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The SFBP agencies projects are briefly described. DOE

N82-10277# Minnesota Univ., St. Paul. Underground Space Center.
EARTH SHELTER 2. 1979-1980 USC SERIES
1980 236 p refs Presented at the Earth Sheltered Housing Conf. and Exhibition, Minneapolis, 9-11 Apr. 1980; sponsored by the Underground Space Center of the Minnesota Univ. and the Am. Underground Space Association, and Minnesota Soc. Am. Inst. of Architects, and Minnesota Soc. of Professional Eng. Sponsored by DOE
(CONF-800438) Avail: NTIS HC A11/MF A01

Abstracts are presented of 22 conference papers which discuss criteria for constructing earth-sheltered structures for residential and commercial purposes. Aesthetics and the manipulation of form, space, and natural light are examined as well as ionizing radiation levels; legal liabilities in design, construction, and ownership; and the impact of restrictive covenants. The locations and energy conservation efficiency of 80 earth-covered structures in Oklahoma are also examined. A.R.H.

N82-10278# Centre Technique des Industries Mecaniques, St. Etienne (France).
FORMING TECHNIQUES AND PROCEDURES Final Report [NOUVEAUX PROCEDES DE MISE EN FORME]
F. Ronde-Oustau Sep. 1980 40 p In FRENCH
(CETIM-1-3K-15-0) Avail: NTIS HC A03/MF A01

Innovative or little known procedures which may improve the competitiveness of forged parts are reviewed. Topics covered incude: (1) cooling of stamping or die forging tools by 'Caloduc' (an evaporative closed circuit cooling system); (2) continuous casting; (3) flangeless and closed metrix stamping; (4) rotaform orbital forging; and (5) plastic deformation of cast spheroidal graphite. Author (ESA)

N82-10279# Ruhrkohle A.G., Essen (West Germany).
SAFETY AND TECHNICAL OPTIMIZATION OF BELT TRANSFER POINTS WITH SPECIAL CONSIDERATION FOR THE SUPPRESSION OF NOXIOUS AND EXPLOSIVE DUSTS Final Report
Albert Schade Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 71 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-HA-80-048; ISSN-0171-7618) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,90

A dust suppression installation and a dust monitoring instrument were laboratory tested and installed at belt transfer points in a coal plant where noxious and explosive dust develops by air separation, leading to considerable increases of concentration in subsequent operational areas. Usage of enclosed segment chutes is shown to reduce the dust load by 40%. A digital scattered light photometer in connection with a signal-controlled sprinkler installation lead to further dust diminution along with a reduction of the spray water volume by 30 to 50%. Generalization of usage of the present installation is advocated. Author (ESA)

N82-10280# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
ELECTRONIC CONTROL AND PROTECTIVE SYSTEMS FROM THE SAFETY POINT OF VIEW [ELEKTRONISKA STYR- OCH SKYDDSSYSTEM UR ARBETARSKYDDSSYNPUNKT]
Mats Gunnerherd Nov. 1980 24 p refs In SWEDISH
(FOA-C-30205-E5) Avail: NTIS HC A02/MF A01

Results of a study to improve the type-classification of safety and driving systems for machine tools, related to electronic driving devices are presented. The change from electromechanics to electronics leads to many problems connected with labor safety. The possibilities of carrying through the safety recommendations given by a safety analysis must also be examined. Put to good use, electronics can give rise to labor safety. But there is a higher probability that dangerous drives or inadequate safety systems may appear on the market in spite of the checking, because electronic systems are difficult to analyze with regard to component errors and reliability. Author (ESA)

N82-10281# Acurex Corp., Mountain View, Calif. Energy and Environment Div.
INFRARED AND CATALYTIC BURNER TECHNOLOGY ASSESSMENT Final Report, 21 Feb. 1980 - 20 Feb. 1981
John P. Kesselring, W. V. Krill, and R. J. Schreiber Feb. 1981 163 p refs
(Contract GRI-5014-345-0283)
(PB81-222283; FR-80-72/EE; GRI-80-0019) Avail: NTIS HC A08/MF A01 CSCL 13A

A review of the state of the art in infrared and catalytic burner development shows that four basic types of IR burners are currently in use. Eight commercial and/or residential appliances were characterized to assess the applicability of these burners. The refractory monolith tile and the fiber matrix burners appear most applicable for appliance use. Conceptual designs for the eight appliances with IR burners were prepared to evaluate the technical feasibility. These appliances are shown to have significant fuel efficiency increase and NOx and CO emission reduction benefits. Four appliances -- the commercial rangetop, deep fat fryer, commercial water heater, and warm air furnance -- also appear economically competitive, and recommended approaches for further development are presented. Lists of IR burner literature and patents are also presented. GRA

N82-10282# Indian Lead Zinc Information Centre, New Delhi.
PROCEEDINGS OF SOLDER SEMINAR
Nov. 1980 215 p refs Conf. held at Bangalore, India, 5-6 Nov. 1979
(PB81-120297) Avail: NTIS HC A10/MF A01 CSCL 13H

Contents: Solder systems; Soldering fluxes and techniques; Quality and testing; Standardization and safety; Soldering in electronics industry; Soldering in other industries. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-10283 Polytechnic Inst. of New York, Brooklyn.
ASYMPTOTIC ANALYSIS OF PARABOLIC REFLECTOR ANTENNAS Ph.D. Thesis
Flavio Jose Vieira Hasselmann 1981 151 p
Avail: Univ. Microfilms Order No. 8118872

Dual mode horns employed commonly as feeds for parabolic reflector antennas generate a radiation pattern that can be well approximated by a Gaussian beam. Two procedures to determine the far field of the antenna which may contain multiple subreflectors, are reviewed and applied to a two-dimensional configuration comprising a parabolic reflector with offset beam feed centered and the focus. The scalar field results obtained from the two methods are shown to be equivalent. The complex-source-point method is adapted to the three-dimensional configuration and yields directly the depolarization and ellipticity of the reflected vector beam near or far from the reflector surface. Comparisons are made with results deduced elsewhere by a semiheuristic procedure, and with experimental data. The evanescent wave tracking analysis is extended to the vector fields encountered in the three-dimensional reflector configuration. The results here obtained are compared with those derived. Dissert. Abstr.

N82-10284 Polytechnic Inst. of New York, Brooklyn.
HIGH-FREQUENCY PROPAGATION IN ELEVATED TROPOSPHERIC DUCTS Ph.D. Thesis
Carlos Gustavo Migliora 1981 141 p
Avail: Univ. Microfilms Order No. 8118887

An analytical method combining a mixture of ray-optical fields and normal mode fields guided along the concave side of the duct boundary or between the duct boundary and the Earth's surface is described. The duct is modeled by two circular cylindrical boundaries representing, respectively, the Earth's surface and the interface separating the duct region (high refractive index) from the exterior. Excitation is from an electric current line source with time harmonic variation. After deriving the Green's function for the duct environment in an integral form, three different representations are obtained for the field; one involving only normal modes, one involving only geometric-optical rays and the hybrid ray-mode representation that includes rays, modes, and some remainder integrals that are shown to be negligible in most cases. Field values are then computed. The number of rays and modes included in the hybrid solution is determined. Dissert. Abstr.

N82-10285 Polish Academy of Sciences, Warsaw. Inst. Podstawowych Problemow Techniki.
PROCESSING AND DECODING THE SIGNAL IN SPEECH PERCEPTION
Piotra Lobacz 1981 96 p refs
(ISSN-0208-5658) Copyright. Avail: Issuing Activity

An attempt is made to summarize systematically present day knowledge of speech processing by man with a view to its inclusion in automatic systems in which word recognition is preceded by phoneme identification. It is suggested that the most interesting models are those which assume parallel processing in several blocks, interaction between bottom up and top down procedures, decoding phonemes on the basis of distinctive features, categorical character of perception at the segment level, and the acceptance of the lexeme as the basic element of recognition. Several theoretical approaches to the models are discussed and the following distinctions between the models are made: hierarchical vs. parallel and passive vs. active. T.M.

N82-10286*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SYNTHETIC APERTURE RADAR TARGET SIMULATOR Patent Application
Howard A. Zebker (JPL, California Inst. of Technology, Pasadena), Daniel N. Held (JPL, California Inst. of Technology, Pasadena), Richard M. Goldstein (JPL, California Inst. of Technology, Pasadena), and Thomas C. Bickler, inventors (to NASA) (JPL, California Inst. of Technology, Pasadena) Filed 17 Jul. 1981 15 p
(Contract NAS7-100)
(NASA-Case-NPO-15024-1; US-Patent-Appl-SN-284287) Avail: NTIS HC A02/MF A01 CSCL 17I

A simulator for simulating the radar return, or echo, from a target seen by a SAR antenna mounted on a platform moving with respect to the target is described. It includes a first-in first-out memory which has digital information clocked in at a rate related to the frequency of a transmitted radar signal and digital information clocked out with a fixed delay defining range between the SAR and the simulated target, and at a rate related to the frequency of the return signal. An RF input signal having a frequency similar to that utilized by a synthetic aperture array radar is mixed with a local oscillator signal to provide a first baseband signal to provide a first baseband signal having a frequency considerably lower than that of the RF input signal. T.M.

N82-10287*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FOCAL AXIS RESOLVER FOR OFFSET REFLECTOR ANTENNAS Patent Application
Richard F. Schmidt, inventor (to NASA) Filed 2 Oct. 1981 20 p
(NASA-Case-GSC-12630-1; US-Patent-Appl-SN-308009) Avail: NTIS HC A02/MF A01 CSCL 20N

A method and apparatus for determining the focal axis of an asymmetrical antenna (such as an offset paraboloid reflector) are described. A transmitting feed horn array is located at the known focal point of an offset reflector antenna and aligned with an estimated focal axis of the antenna. The array is coupled to an amplitude or phase comparison feed circuit which is adapted to provide sum and difference output fields. The feed horn array is rotated in discrete steps in at least one plane about an axis through the focal point of the antenna. At each step the far field radiation is received and detected in amplitude and the minimum value of the difference pattern at each step is noted. An indication of the true focal axis is provided by the extreme values of difference signal or the relative phase difference. M.G.

N82-10288*# Massachusetts Inst. of Tech., Cambridge.
PHASE-A COBE STUDY Final Report
Dec. 1978 57 p refs
(NASA-TM-84037) Avail: NTIS HC A04/MF A01 CSCL 20N

A scaled version of a conical apodizing horm similar to the one used in the Cosmic Background Explorer as the antenna for the far infrared absolute spectrometer (FIRAS) was tested to determine its diffraction patterns. The test transmitter used and results are described. Calculation of the tradeoff between noise and spectral resolution for the FIRAS are examined. Flexural transports, the optical properties of the Martin-Pupplet polarizing interferometer, and radiation absorption of thin bismuth films are also discussed. A.R.H.

N82-10289*# Computer Technology Associates, Inc., Seabrook, Md.
INTEGRATED COMMAND, CONTROL COMMUNICATION AND COMPUTATION SYSTEM STUDY Final Report

Aug. 1981 73 p refs
(Contract NAS5-26239)
(NASA-CR-166738) Avail: NTIS HC A04/MF A01 CSCL 17B

The study was conducted in three phases: a functional requirements phase; a functional architecture phase; and a design plan phase. The major emphasis was on the functional architecture phase and the approaches used for its functional hierarchy, operations concept, and interfaces. T.M.

N82-10290*# Computer Technology Associates, Inc., Seabrook, Md.

INTEGRATED COMMAND, CONTROL, COMMUNICATIONS AND COMPUTATION SYSTEM FUNCTIONAL ARCHITECTURE

C. G. Cooley and L. E. Gilbert 17 Aug. 1981 188 p refs
(Contract NAS5-26239)
(NASA-CR-166739) Avail: NTIS HC A09/MF A01 CSCL 17B

The functional architecture for an integrated command, control, communications, and computation system applicable to the command and control portion of the NASA End-to-End Data System is described including the downlink data processing and analysis functions required to support the uplink processes. The functional architecture is composed of four elements: (1) the functional hierarchy which provides the decomposition and allocation of the command and control functions to the system elements; (2) the key system features which summarize the major system capabilities; (3) the operational activity threads which illustrate the interrelationship between the system elements; and (4) the interfaces which illustrate those elements that originate or generate data and those elements that use the data. The interfaces also provide a description of the data and the data utilization and access techniques. R.J.F.

N82-10291# Committee on Science and Technology (U. S. House).

COMMUNICATIONS RESEARCH AND DEVELOPMENT

Washington GPO 1980 40 p Presented by the Subcomm. on Transportation, Aviation and Commun., and the Subcomm. on Sci., Res., and Technol. of the Comm. on Sci. and Technol., 96th Congr., 2nd Sess., Dec. 1980
(GPO-68-874) Avail: Subcommittee on Transportation, Aviation and Communications

The role of the FCC in the development and application of telecommunications technology is discussed. Trends in communications technology, FCC's role in assessing public interest developments and applications, mechanisms available to the FCC for implementing its role, and relationships between FCC and other organizations are considered. The merger of data processing and communications in terms of FCC's regulatory responsibility and the decision that with the exception of ATT and GTE there is no problem in this interface, and that this should not be a subject of FCC regulation is discussed. The regulatory role of the FCC is described. J.D.H.

N82-10292# Lincoln Lab., Mass. Inst. of Tech., Lexington.

RADAR PROPAGATION AT LOW ALTITUDES: A REVIEW AND BIBLIOGRAPHY

M. Littleton Meeks 31 Jul. 1981 140 p
(Contract F19628-80-C-0002; ARPA Order 3724)
(AD-A103773; TR-580; ESD-TR-81-98) Avail: NTIS HC A07/MF A01 CSCL 17/9

This report reviews the subject of electromagnetic wave propagation near the Earth's surface as it relates to the detection of low-flying aircraft by ground-based radars. Separate sections describe how current knowledge of the three fundamental physical phenomena - refraction, reflection, and diffraction - is applied to the problems of low-altitude propagation. Simple models incorporating these phenomena are discussed: (1) propagation over a plane with arbitrary reflection coefficient, (2) propagation over a knife-edge on a plane, and (3) propagation over a smooth, spherical earth. Computer programs for models (2) and (3) are given in the Appendices. We include a bibliography of the literature on which this report is based: books, journal articles, and technical reports. References are listed alphabetically by first author, and subject indices are given for major subject headings. Author (GRA)

N82-10293# Electronics Engineering Group (1842nd), Scott AFB, Ill.

SCINTILLATION EFFECTS, MITIGATIONS AND RECOMMENDATIONS FOR AFSATCOM AND OTHER SATELLITE COMMUNICATIONS SYSTEMS

Edwin H. Chapin Jun. 1981 44 p refs
(AD-A104149; Rept-1842-EEG/EETTW-TR-81-8) Avail: NTIS HC A03/MF A01 CSCL 20/14

Signal propagation disturbances, such as scintillations, seriously degrade or disrupt operational performance of AFSATCOM and other satellite communication links. The ionospheric irregularities which cause these disturbances may develop in either a natural or nuclear environment. Natural scintillations correlate with location, time of day, season and solar activity, and are particularly disruptive to airborne (SIOP) communications terminals. The disruptions are expected to peak in the early 1980's, near the crest of the 11 year solar activity cycle. Nuclear detonations can produce a combination of absorption and intense scintillation extending over a CONUS size region for several hours at UHF, and somewhat less at SHF. The report discusses both types of scintillation, noting the analogous equations governing density functions in the two regimes, outlines mitigation strategies, reviews Air Force involvement and offers recommendation for a coordinated and integrated AF effort. The AFCC/1842 EEG mission requirements, to perform system engineering, consultative assistance to MAJCOMs, and collaboration in research and development is reviewed and recommendations are made as to method to meet these requirements. Author (GRA)

N82-10294# Michigan State Univ., East Lansing. Div. of Engineering Research.

RADAR WAVEFORM SYNTHESIS FOR TARGET IDENTIFICATION Final Report, 5 May 1980 - 4 May 1981

Kun-Mu Chen 3 Jun. 1981 81 p refs
(Contract N00019-80-K-0382)
(AD-A103805) Avail: NTIS HC A05/MF A01 CSCL 17/9

A new scheme for radar detection and discrimination, the radar waveform synthesis method, is investigated. This scheme consists of synthesizing an aspect-independent waveform for the incident radar signal which excites an arbitrarily oriented target in such a way that the return radar signal from the target contains only a single natural resonance mode of the target in the late-time period. When the synthesized incident radar signal for exciting a particular natural mode of a known, preselected target is applied to a wrong target, the return radar signal will be significantly different from that of the expected natural mode, thus, the wrong target can be sensitively discriminated. The selection of an optimum pulse duration of the required incident signal for the purpose of shaping its waveform is also studied. Three kinds of targets, an arbitrarily oriented thin wire, a sphere and a normally oriented infinite cylinder, have been investigated. The cases of an arbitrarily oriented wire and a sphere have been completed and the results are reported in Parts 1 and 2. The case of infinite cylinder will be completed shortly and incomplete results of this case are outlined in Part 3. Author (GRA)

N82-10295# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

A BUSY-TONE-MULTIPLE-ACCESS-TYPE SCHEME FOR PACKET-RADIO NETWORKS

Moshe Sidi (Technion - Israel Inst. of Tech.) and Adrian Segall (Technion - Isrcel Inst. of Tech.) Jun. 1981 20 p refs Presented at Intern. Conf. on Performance of Data Commun. Systems and Their Appl., Paris, Sep. 1981 Submitted for publication
(Contract N00014-77-C-0532; NR Proj. 041-519)
(AD-A103825; LIDS-P-1103) Avail: NTIS HC A02/MF A01 CSCL 17/2

We consider a packet radio network whose stations share a communication channel and work with an algorithm similar to the busy-tone-multiple-access protocol of ALOHA systems. In this context, two problems are treated: distributed routing and bandwidth allocation. Author (GRA)

N82-10296# Texas Univ., Austin. Center for Particle Theory.

DIRAC'S NEW RELATIVISTIC WAVE EQUATION IN INTERACTION WITH AN ELECTROMAGNETIC FIELD

N. Mukunda, C. C. Chiang, and E. C. G. Sudarshan May 1981

11 p refs
(Contract DE-AC05-76ER-03992)
(DE81-028472; DOE/ER-03992/448) Avail: NTIS HC A02/MF A01

The Dirac equation of 1971 was made to provide wave equation for a spinless particle of finite mass capable of interacting with the electromagnetic field. The inconsistency of Dirac's equation was avoided by developing a more complex structure for the particle. DOE

N82-10297# New Mexico State Univ., Las Cruces. Physical Science Lab.
DEVELOPMENT OF LARGE CYLINDRICAL STRIPLINE ANTENNA ARRAYS Final Report, Feb. 1978 - Jan. 1981
Henry D. Weinschel and Al Waterman Hanscom AFB, Mass. AFGL Jun. 1981 65 p
(Contract F19628-78-C-0052; AF Proj. 7659)
(AD-A104190; PD-00990; AFGL-TR-8100181) Avail: NTIS HC A04/MF A01 CSCL 09/5

Studies included the development stripline telemetry antenna arrays for large diameter missiles, electrically small antennas at 550 MHz, and encapsulated S-Band antennas for small spherical satellites. Author (GRA)

N82-10298# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
HARMONIC RADAR LITERATURE [HARMONISK RADAR - EN LITTERATURSTUDIE]
Boerje Jansson Jul. 1980 35 p refs In SWEDISH
(FOA-C-30194-E1(E3)) Avail: NTIS HC A03/MF A01

A harmonic radar sends on a given frequency f sub o and receives on another frequency usually 3 f sub o. The overtone is generated on joints between the metal parts of the radar target. The generated high harmonic frequency is very weak, which is why this radar has an extremely low range of detection. Natural objects in the target area do not disturb the high frequency harmonics. The radar becomes clutter free. The principals of generating high frequency harmonics cover tunneling, semiconductor and microwave effects. Signal generation is most powerful when f sub o is between 100 and 1000 MHz. Author (ESA)

N82-10299# Research Inst. of National Defence, Linkoeping (Sweden). Huvudadvelning 3.
METHODS FOR AUTOMATIC TARGET TRACKING AND PLOT-TARGET ASSOCIATION. REVIEW OF THE LITERATURE [METODER FOER AUTOMATISK MAALUPPTAECKT OCH PLOTT-MAALASSOCIERUNG LITTERATURESTUDIE]
Rune Thors Aug. 1980 187 p refs In SWEDISH
(FOA-C-30199-E1) Avail: NTIS HC A09/MF A01

Methods for checking the performance of alternatives to given tracking method in different environments are considered. Alternatives to the track split method are described, especially target tracking of aircraft flying in group formations. Tracking filters proposed for use in very dense environments are examined. Simulation performances and calculation requirements are discussed. Author (ESA)

N82-10300# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
BROADBAND RADAR: PRINCIPLES AND METHODS OF JAMMING [BREDBANDSRADAR: PRINCIPER OCH STOERMOEJLIGHETER]
Per Hyberg Dec. 1980 234 p refs In SWEDISH
(FOA-A-30023-E4) Avail: NTIS HC A11/MF A01

Different jamming methods are discussed. A chart shows how to choose the most appropriate jammer according to the type of broadband radar required. Author (ESA)

N82-10301# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 1.
EXPERIENCE WITH THE TELECONFERENCE SYSTEM KOM [ERFARENHETER AV ANVAENDNING AV TELEKONFERENSSYSTEMET KOM]
Jacob Palme, Lillemor Adrianson, Martin Nilsson, Tommy Nilsson, Anders Sandberg, Torgny Tholerus, and Mats Wallin Dec. 1980 131 p In SWEDISH
(FOA-C-10166-M6(H9)) Avail: NTIS HC A07/MF A01

The frequency and object of use of KOM are described. Users opinions are reported. Cost is compared with other communications systems. Author (ESA)

N82-10302# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
WEIGHTED LINEAR DISPERSIVE RETARDATION LINES: CALCULATIONS FOR THE OUT-SIGNAL TIME FUNCTION WHERE THE IN-SIGNAL IS AN ALMOST MATCHING LINEAR FREQUENT SINE-SIGNAL [VIKTADE LINJAERT DISPERSIVA FOERDROEJNINGSLEDNINGAR: BERAEKNINGAR AV UTSIGNALENS TIDSFUNKTION NAER INSIGNALEN AER EN NAESTEN MATCHANDE LINJAERT FREKVENSSVEPT SINUSSIGNAL]
Rickard Wallden Nov. 1980 30 p In SWEDISH
(FOA-C-30202-E4) Avail: NTIS HC A03/MF A01

Calculation of the out-signal from a linear dispersive retardation line with two different types of small nonmatching sloped in-signal is discussed. On the one hand, an example of an in-signal of which the frequency/time characteristics deviate somewhat from the characteristics suited to the line, on the other hand a pulsed in-signal, not filling-up the line are considered. The background for these calculations is briefly indicated. Results are given as time-diagrams, with explanations. Author (ESA)

N82-10303# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
CONSTRUCTION OF AN AM DEMODULATOR FOR BROADBAND MODULATION SIGNALS [BREDBANDIG AM-LAENK]
Anders Kaelldahl Dec. 1980 64 p refs In SWEDISH
(FOA-C-30209-E4) Avail: NTIS HC A04/MF A01

The construction of an AM demodulator for broadband modulation signals is described. Design of an automatic gain control device is detailed. Low cost components and construction methods were used. Entry dynamics of 45 dB with a signal to noise ratio over 20 dB, regardless of the position on the dynamics curve was achieved. Author (ESA)

N82-10304# Engins Matra, Velizy (France).
SPECTRAL ANALYSIS USING THE FAST FOURIER TRANSFORMATION [L'ANALYSE SPECTRALE PAR LA TRANSFORMATION DE FOURIER RAPIDE]
Thierry Moreira 24 Apr. 1981 115 p refs In FRENCH
(Rept-100-81) Avail: NTIS HC A06/MF A01

The Fourier transformation was studied, emphasizing applications in signal analysis. A diminution in run time when calculating the power spectrum of a signal was sought. The utilization of the method is only valid for finding the general nature of spectral oscillations, to the exclusion of any quantitative measure. As a general rule, the calculation method based on the autocorrelation function remains the most effective. As a corollary result, a computer calculation program for the fast Fourier transformation is presented. Author (ESA)

N82-10305# Technical Research Centre of Finland, Espoo. Telecommunications Lab.
INTRODUCTION TO PROGRAM DEVELOPMENT RULES [JOHDATUS OHJELMIEN KEHITYSSAEAENTOEIHIN]
Vaeinoe Maksimainen and Jorma Hirvensalo May 1981 29 p refs In FINNISH; ENGLISH summary
(VTT-48; ISBN-951-38-1195-6; ISSN-0355-368X) Avail: NTIS HC A03/MF A01

Rules for constructing mini and microcomputer programs for switching systems were developed. Specification, design, implementation, and installation and operation are covered. Specification includes definition of the system requirements, and rules for defining the software under development. The design phase consists of guidelines for data structuring, modularizing, and refining of outlines into detailed design documents. The implementation rules indicate how to code, tests, and debug the program. The installation and operation phase transfers the program into the target system. Guidelines for implementing quality control and documentation are given. Author (ESA)

N82-10306# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ELECTROMAGNETIC COMPATIBILITY

Aug. 1981 131 p refs Lecture held in Bolkesjo, Norway, 31 Aug. - 1 Sep. 1981, in Munich, 3-4 Sep. 1981, and in Rome, 7-8 Sep. 1981
(AGARD-LS-116; ISBN-92-835-1396-7) Avail: NTIS HC A07/MF A01

Various aspects of electromagnetic compatibility (EMC) are presented. The major focus is on impact of the increasing complexity and density of avionics systems on the special demands of those responsible for achieving EMC within host weapon platforms. For individual titles, see N82-10307 through N82-10313.

N82-10307# Rome Air Development Center, Griffiss AFB, N.Y.
THE EMC CONCEPT FOR WEAPON SYSTEMS
John F. Spina *In* AGARD Electromagnetic Compatibility Aug. 1981 9 p refs (For primary document see N82-10306 01-32)
Avail: NTIS HC A07/MF A01

Electromagnetic compability (EMC) is discussed as it pertains to various weapon systems. The focus is on those weapon systems where the density of electronics is such that EMC must be reconed. Several weapon system EMC solution methods are also discussed. The status of computer aided EMC analysis techniques is given. R.C.T.

N82-10308# Syracuse Univ., N. Y. Dept. of Electrical and Computer Engineering.
EMC ANALYSIS AT THE SYSTEM LEVEL
Donald D. Weiner *In* AGARD Electromagnetic Compatibility Aug. 1981 22 p (For primary document see N82-10306 01-32)
Avail: NTIS HC A07/MF A01

A computer program is described which determines whether signals entering a receptor port from one or more emitters may cause interference. The characterization of emitter ports in terms of power spectral densities is discussed and narrowband and broadband components of the spectrum are defined. System compatibility is described in terms of electromagnetic interference margins. R.C.T.

N82-10309# Kentucky Univ., Lexington. Dept. of Electrical Engineering.
EMC ANALYSIS AT THE EQUIPMENT LEVEL
Clayton R. Paul *In* AGARD Electromagnetic Compatibility Aug. 1981 23 p refs (For primary document see N82-10306 01-32)
Avail: NTIS HC A07/MF A01

A summary of the techniques and problems involved in the assessment of the vulnerability of components of an electronic system is provided. Modeling emitters and receptors of electromagnetic energy are discussed as well as the predominant coupling paths (wire to wire, field to wire, and antenna to antenna). Various computer aided methods for evaluating the coupling are considered. R.C.T.

N82-10310# Rome Air Development Center, Griffiss AFB, N.Y.
AN INTRASYSTEM EMC ANALYSIS PROGRAM
Gerald T. Capraro *In* AGARD Electromagnetic Compatibility Aug. 1981 22 p refs (For primary document see N82-10306 01-32)
Avail: NTIS HC A07/MF A01

Various aspects of the intrasystem electromagnetic compatibility analysis program (IEMCAP) are discussed. Emphasis is placed on the input data requirements and coupling models contained in IEMCAP. The computer aspects and size constraints are given with helpful hints for the user on how to apply IEMCAP to systems whose size violates these constraints. Data are also provided showing the relative accuracy of IEMCAP's major coupling modes. Various modifications to IEMCAP are also presented. R.C.T.

N82-10311# Concordia Univ., Loyola Campus, Montreal (Quebec). Dept. of Electrical Engineering.
COMPUTER GRAPHIC AIDS TO WEAPON SYSTEMS EMC ANALYSIS
Stanley J. Kubina *In* AGARD Electromagnetic Compatibility Aug. 1981 13 p refs Sponsored in part by the Canadian Dept. of National Defense (For primary document see N82-10306 01-32)
Avail: NTIS HC A07/MF A01

The full potential of interactive computer graphics for the achievement of an unprecedented level of appreciation of the electromagnetic interference interaction elements are illustrated Examples are taken from the computer code called advanced antenna to antenna coupling plus graphics. It is shown that the input modelling data used in the large, powerful electromagnetic compatibility codes can be presented as comprehensive images of the aircraft or the system port characteristics. It is further shown that the results can be presented in a format which makes visible the constituent components that produce the images. R.C.T

N82-10312# Royal Aircraft Establishment, Farnborough (England).
THE EMC TESTING OF AIRCRAFT EQUIPMENT
N. J. Carter *In* AGARD Electromagnetic Compatibility Aug 1981 20 p refs (For primary document see N82-10306 01-32
Avail: NTIS HC A07/MF A01

The repeatability and usefulness of the electronics in fligh critical equipment were measured in terms of their effectiveness in aiding aircraft clearance. Specific emphasis was placed on the electromagnetic compatibility requirements of military aircraft. R.C.T

N82-10313# Aeritalia S.p.A., Caselle Torinese (Italy). Gruppo Equipaggiamenti.
A NEW APPROACH TO EMC SYSTEM TESTING
B. Audone *In* AGARD Electromagnetic Compatibility Aug 1981 8 p refs (For primary document see N82-10306 01-32
Avail: NTIS HC A07/MF A01

An approach is described which encompasses the quantitative measurement of electromagnetic compatibility of aircraft equipment. The general testing philosophy is explained and a series of generally applicable test methods are described. R.C.T

N82-10314 Air Force Inst. of Tech., Wright-Patterson AFB Ohio.
THE FINITE ELEMENT METHOD APPLIED TO THE SYSTEM GENERATED ELECTROMAGNETIC PULSE BOUNDARY LAYER Ph.D. Thesis
John Alfred Gaudet 1981 145 p
Avail: Univ. Microfilms Order No. 8119137

Use of the finite element method to solve the nonlinear electron plasma equations for the system-generated electromagnetic pulse boundary layer in one spatial dimension is described These equations were solved in distance velocity phase space using a rectangular finite element mesh. Linear approximation were used for both the trial and weight functions for each element. The advection terms in the Vlasov plasma equation were treated with the Heinrich upwinding technique. The time integration was performed using an explicit two-step Lax-Wendroff procedure. The system of algebraic equations was solved with a fully-packed Gauss-Seidel iteration scheme. A value of 2/3 for the upwinding parameter was found to provide the best compromise between dispersion of the pulse and computer storage requirements. The savings in computer memory results in increased execution speed for the algorithm. Also, it is shown that the numerical scheme does not permit spurious pulse reflections from the edges of the mesh. Results for several test cases are presented. Dissert. Abst

N82-10987# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A SYNTHESIS TECHNIQUE FOR ARRAY ANTENNAS OF HIGH DIRECTIVITY AND LOW SIDELOBE
Wan Wei, Huang Jingxi, and Hu Shiming *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1 20 Aug. 1981 p 132-155 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N82-10315 Southern Methodist Univ., Dallas, Tex.
STATISTICAL CHARACTERIZATION OF LOGIC CIRCUIT TIMING PARAMETERS Ph.D. Thesis
Harold Dean Camp 1981 214 p
Avail: Univ. Microfilms Order No. 8119136

Several methods of characterizing logic timing parameters are investigated. Device characterization studies are inspected and it is seen that propagation delays for the TTL logic family follow Gaussian distributions. A method of timing analysis is developed which uses the Gaussian timing delays and the central limit theorem to approximate the propagation delays for a logic circuit composed of several levels of gate delays. This method relies on accurate timing distributions for each gate type in the circuit as an input to the procedure. In an attempt to obtain accurate timing distributions for gate and logic circuits, a method of computer analysis of digital circuits is developed. It is shown that the resultant timing parameter distributions have Gaussian characteristics for all four logic families investigated. The central limit theorem is shown to apply to both the TTL and ECL logic families. Dissert. Abstr.

N82-10316 California Inst. of Tech., Pasadena.
TOPICS IN THE ANALYSIS, MEASUREMENT, AND DESIGN OF HIGH-PERFORMANCE SWITCHING REGULATORS Ph.D. Thesis
Arthur Raymond Brown 1981 236 p
Avail: Univ. Microfilms Order No. 8119587

The high frequency capabilities of two switching regulator modeling techniques, state space averaging, and discrete modeling, are compared, using the subharmonic instability in current programmed regulators as a test. As a result of this comparison, a small signal, linear, time invariant modeling technique, called sampled-data modeling, was developed. This method retains the continuous form of state space averaging but also possesses the accuracy of discrete modeling, and thus it combines features of the two techniques. The sampled data modeling technique was applied to the question of the interpretation of loop gain measurements in high performance switching regulators. Dissert. Abstr.

N82-10317 Carnegie-Mellon Univ., Pittsburgh, Pa.
ITERATIVE ELECTRO-OPTIC MATRIX PROCESSOR Ph.D. Thesis
Mark Joseph Carlotto 1981 196 p
Avail: Univ. Microfilms Order No. 8118788

An electro-optic vector matrix processor with electronic feedback is described. The iterative optical processor (IOP) is designed for the rapid solution of linear algebraic equations. The IOP and the iterative algorithm it realizes are analyzed and simulated. A version of the system was fabricated using advanced solid state light sources and detectors plus fiber optic technology, and its performance is evaluated. An extension of the system using wavelength multiplexing is developed and the basic system concepts demonstrated. Its use in the restoration of degraded images or signals (deconvolution) and the computation of matrix eigenvectors and eigenvalues and matrix inversion are demonstrated. The two major case studies pursued are: adaptive phased array radar processing and optimal control. In the former case, the system is used to compute the adaptive antenna weights for a radar system. In the latter case, the IOP solves the linear quadratic regular and algebraic Ricatti equations of modern control theory. Dissert. Abstr.

N82-10318 Polytechnic Inst. of New York, Brooklyn.
A DYNAMIC ROUTING SCHEME IN PACKET SWITCHING NETWORKS Ph.D. Thesis
Paul Hua-Nien Chu 1981 166 p
Avail: Univ. Microfilms Order No. 8118867

The nodal as well as the network delay performance were analyzed and simulated. A nodal model under the dynamic routing scheme was constructed. This is diffferent from most other existing models where each link at a node is modeled separately. Results show that, given adequate traffic and traffic utilization at a node, the nodal delay performance under the routing strategy is better than that of a fixed routing strategy. The ratio of the delay performances approaches 1/n as the traffic load approaches unity. This result is insensitive to the service disciplines employed at the node. Dissert. Abstr.

N82-10319 Carnegie-Mellon Univ., Pittsburgh, Pa.
SYNTHETIC FILTERS FOR MULTICLASS PATTERN RECOGNITION Ph.D. Thesis
Charles Franklin Hester 1981 239 p
Avail: Univ. Microfilms Order No. 8118790

The recognition of an object from infrared imagery independent of the aspect viewing angle using one or only a few matched spatial filters is considered. A formulation of matched spatial filters as discriminant surfaces in hyperspace and consideration of multi-channel hyperplane filering are advanced. Selection and formation of synthetic discriminants that decorrelate input training set data by Fourier-Kernel, Gram-Schmidt, and Karhunen-Loeve decomposition are described. Bandpass filtering and preprocessing techniques such as non-unitary transforms for data decorrelation and maximum common information transformations are advanced to provide increased discrimination and improved system performance. Dissert. Abstr.

N82-10320 Texas Univ. at Arlington.
ANALYSIS AND SYNTHESIS OF LINEAR SHIFT-VARIANT DIGITAL FILTERS Ph.D. Thesis
Nian-Chyi Huang 1981 109 p
Avail: Univ. Microfilms Order No. 8119306

A framework for the analysis and synthesis of linear shift-variant (LSV) digital filters in both time and frequency domains is developed. The interrelationships among the impulse response, the shift-variant difference equation and the generalized transfer function of an LSV digital filter were investigated. The necessary and sufficient conditions for realizing an impulse response and a rational generalized transfer function as recursive shift-variant difference equations are derived. An LSV digital filter is applied to modify the short-time spectrum of a nonstationary sequence. It is shown that the shift-variant hort-time spectral modification can be implemented using a nonrecursive LSV digital filter, providing a frequency-domain interpretation of shift-variant filtering process. Problems associated with the synthesis and implementation of recursive LSV digital filters are investigated. Dissert. Abstr.

N82-10321 Arizona Univ., Tucson.
AUTOMATED DESIGN OF TWO-ZERO RATIONAL CHEBYCHEV FILTERS Ph.D. Thesis
Kha Hien Le 1981 111 p
Avail: Univ. Microfilms Order No. 8118451

The Rational Chebychev function is used to design elliptic-characteristic filters. The filter has N/2 ripples in the passband but only one ripple in the stopband for all orders. As N increases from three, the result is a substantial saving in number of capacitors in the passive ladder realization of the above function as compared to that of traditional elliptic filters of the same order N. The ladder's element values can be expressed as explicit involving only the coefficients of the transfer function. These expressions can also be used for other types of filters. Numerically, the design can be carried out by a FORTRAN program of a set of programs on a programmable calculator. The user needs only to give the three specifications: the filter order N, the stopband zeros Z, and the passband ripple amount R sub p. The program automatically selects the starting point for the given case and proceeds. The numerical results of the above programs over a range of specifications relate the above specifications to the minimum stopband attenuation. Dissert. Abstr.

N82-10322 Case Western Reserve Univ., Cleveland, Ohio.
IMPLANTABLE INTRACRANIAL PRESSURE TELEMETER USING CUSTOM INTEGRATED CIRCUITS Ph.D. Thesis
Albert May Pun Leung 1981 234 p
Avail: Univ. Microfilms Order No. 8118626

The design, fabrication, and evaluation of an implantable intracranial pressure (ICP) telemetry transmitter is described. Data transmission is accomplished by means of a radio frequency (RF) link. A silicon piezoresistive pressure transducer is used. Electrostatic bonding of this transducer onto a tubular glass support provides long-term stability, stress isolation and a hermetic package. Pressure baseline stability of better than 2 mm Hg/month has been achieved. Pulse code modulation is employed in the pressure channel to assure accurate data transmission. Low duty cycle pulse powering technique lowers the power consumption of the telemeter to only 0.3 mW. The complexity of the electronics is reduced by the use of a custom integrated circuit (PM2) which is a 40-pin bipolar device measuring 150 mil x 150 mil. It contains 75 NPN transistors, 26 PNP transistors, 45 base resistors (480 K total) and 16 pinch resistors (560 K total). The operating characteristics of the telemeter are described.
Dissert. Abstr.

N82-10323 Polytechnic Inst. of New York, Brooklyn.
CCD/MOS SAMPLED ANALOG LMS ADAPTIVE SIGNAL PROCESSOR Ph.D. Thesis
Subinoy Mazumdar 1981 138 p
Avail: Univ. Microfilms Order No. 8118886

An all analog adaptive signal processor applying the least mean square error algorithm is described. This processor is primarily a transversal filter. A simple MOSFET multiplier is developed in conjunction with a bidirectional charge integrator, providing advantages in speed, cost, power consumption, and weight over digital and hybrid adaptive processors. A feasibility study of different analog multipliers for use in an analog adaptive processor, an analysis of the errors introduced by the various devices are presented. The effects of these errors on the processor performance are considered. The processor compensates for the errors introduced by most of the components except for any offset error introduced by the tap weight charge integrator and, by the comparator that detects the difference between the reference signal and the processor output. Applications for the processor are outlined.
Dissert. Abstr.

N82-10324*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TUNED ANALOG NETWORK Patent Application
Everett John Pyle, Jr., inventor (to NASA) Filed 10 Sep. 1981 14 p
(NASA-Case-GSC-12650-1; US-Patent-Appl-SN-301077) Avail: NTIS HC A02/MF A01 CSCL 09C

A non-inverting, direct current amplifier stage is cascaded into an integrator stage to form a two stage tuned network having a single input junction common to both stages. The network provides independent adjustment of center frequency, bandwidth and voltage gain. The insertion of a positive feedback loop between the stages provides a very narrow bandwidth network. The addition of back-to-back Zener diodes between the common input node and ground converts the network into an oscillator.
NASA

N82-10325*# Fairchild Weston Systems, Inc., Archbald, Pa.
MODIFICATIONS TO CTVS TV CAMERAS FOR SPACE SHUTTLE COMPATIBILITY AND EVALUATION Final Report
K. Hoagland Aug. 1981 36 p
(Contract NAS9-16228)
(NASA-CR-161087; ED-AX-225) Avail: NTIS HC A03/MF A01 CSCL 09A

Five all solid state cockpit television system (CTVS) cameras, built to USAF requirements for high performance type F-16 aircraft, were modified and tested for possible use in the closed circuit television system on the space shuttle orbiter. The 400 HZ power supply in the electronics unit assembly was replaced with two DC/DC converters to enable operation from 28VDC spacecraft-type power sources. Nonessential circuit functions were deleted to minimize input power requirements. The normal 31 mm focal length lense assemblies were replaced with wider field-of-view 19 mm focal length lenses. Base plates for and housings were redesigned to facilitate mounting and heat-sinking of the camera in the space environment and short length (14') adapter cables were designed, fabricated, and tested to meet requirements for cameras configured to mount on the astronauts helmet/visor assembly. Technical requirements, design implementation, environmental tests, Modifications prodedures, and reliability/quality efforts are discussed. Schematics are included. A.R.H.

N82-10326# Boeing Military Airplane Development, Seattle, Wash. Mechanical/Electrical Systems Technology Dept.
ADVANCED AIRCRAFT ELECTRICAL SYSTEM CONTROL TECHNOLOGY DEMONSTRATOR. PHASE 1: REQUIREMENTS ANALYSIS AND CONCEPTUAL DESIGN Interim Technical Report, 1 Sep. 1980 - 28 Feb. 1981
G. L. Dunn, P. J. Leong, and I. S. Mehdi Jul. 1981 103 p refs
(Contract F33615-80-C-2004; AF Proj. 3145)
(AD-A103922; D180-25927-2; AFWAL-TR-81-2058) Avail: NTIS HC A06/MF A01 CSCL 09/3

In Task 1, the requirements for the electrical power system and the integrated power system control were defined. In Task 2, three conceptual designs for the electrical power system were prepared. Each design incorporated a different data bus architecture, integrated, hierarchical, and non-integrated dedicated. The three designs were evaluated for application to a two engine tactical aircraft. Processor and data bus loading were examined for each architecture. Based on the evaluation, the conceptual design based on the integrated architecture is recommended for preliminary design in Task 3, phase I.
Author (GRA)

N82-10327# Stanford Univ., Calif. Electronics Labs.
A FAST TURN-AROUND FACILITY FOR VERY LARGE SCALE INTEGRATION (VLSI) Semiannual Technical Status Report, 1 Jul. - 31 Dec. 1980
James D. Meindl, James D. Plummer, Robert W. Dutton, R. Fabian Pease, and J. Beaudouin Fort Monmouth, N.J. Army Electronics Reseach and Development Command Jul. 1981 63 p refs
(Contract MDA903-80-C-0432; DARPA Order 4012)
(AD-A104000; DELET-TR-80-0432-1; SATSR-1) Avail: NTIS HC A04/MF A01 CSCL 09/5

In order to appreciate the critical hardware and software problems associated with the definition and design of very large scale integrated circuits or integrated systems including 1000 - 1,000,000 transistors in a single silicon chip, incisive experiments conducted with actual operating chips are indispensible. The objective of this project is to establish within a university research environment, a facility for the rapid execution of mask generation, wafer fabrication, and functional testing of user-generated custom I. C. designs.
Author (GRA)

N82-10328# Stanford Univ., Calif. Electronics Labs.
A FAST TURN-AROUND FACILITY FOR VERY LARGE SCALE INTEGRATION (VLSI) Semiannual Technical Status Report, 1 Jan. - 30 Jun. 1980
James D. Meindl Fort Monmouth, N.J. Army Electronics Research and Development Command Jul. 1981 48 p refs
(Contract MDA903-80-C-0432; DARPA Order 4012)
(AD-A104001; DELET-TR-80-0432-2; SATSR-2) Avail: NTIS HC A03/MF A01 CSCL 09/5

Efforts were made to provide fast turn-around fabrication of silicon integrated circuits for the local VLSI design community. Many of the practical aspects of producing small numbers of custom designed integrated circuits with a short turn around time were persued. The major focus was focus on many of the facilities, equipment, and fabrication issues which affect our ability to fabricate and test these custom designed chips.
R.C.T.

N82-10329# Ohio State Univ., Columbus. Dept. of Electrical Engineering.
FEASIBILITY STUDY OF THE USE OF AN ENVIRONMENTAL CHAMBER FOR THE EXAMINATION OF TRANSMISSION-LINE ELECTRIC FIELD AND CORONA EFFECTS Final Report
S. A. Sebo, R. V. DeVore, and D. G. Kasten Jul. 1981 48 p refs Sponsored by EPRI
(EPRI Proj. 68-6)
(DE81-903933; EPRI-EL-1953) Avail: NTIS HC A03/MF A01

The feasibility of tests in a 5m x 5m x 6m (length) environmental chamber related to ground level electric field strength, corona starting voltage, conductor surface conditions, corona mechanisms, corona losses, ozone emission, audible noise, radio noise, and DC corona phenomena for changes in energizing voltages, geometry, conductor types and materials, and atmospheric conditions was reviewed. Environmental chamber design considerations and preliminary specifications are also outlined with a review of supply requirements and guidelines for instrumentation. DOE

N82-10330# Westinghouse Electric Corp., Pittsburgh, Pa.
LIGHT-FIRED THYRISTOR DEVELOPMENT Interim Report
E. S. Schlegel, E. C. Strycula, and L. R. Lowry Jul. 1981 96 p Sponsored by Electric Power Research Inst.
(EPRI Proj. 567-1)
(DE81-903932; EPRI-EL-1916) Avail: NTIS HC A05/MF A01

A light-fired thyristor switch was demonstrated in one phase of a static volts-amperes-reactive generator and is presently under extended testing. The building of this 13.8-kV, bidirectional, 1200-A rms, solid-state switch required the development of the thyristor element and its special package, a light system consisting of laser diodes and a light distribution harness, and a special monitoring and protecting control circuit to protect the switch against various conditions under which it might not function safely. The switch is entirely self-contained and replaces the electrically gated version with no need for changes in the circuit to which it is connected. The report gives details on the development of each of the novel parts of the system; on the testing of each part of the system; and on the building, installation, and early evaluation of the switch. DOE

N82-10331# University of Southern California, Los Angeles. Dept. of Electrical Engineering.
CONTAMINATION FLASHOVER OF HVDC INSULATORS Final Report
T. C. Cheng, C. T. Wu, and A. Rodriquez-Penz Aug. 1981 162 p refs Sponsored in part by EPRI
(EPRI Proj. 848-1)
(DE81-904213; EPRI-EL-2016) Avail: NTIS HC A08/MF A01

An integrated field and laboratory study was conducted to investigate the mechanism of flashover of contaminated insulators under high voltage, direct current conditions. Salient factors identified in the field studies were reproduced under simulated conditions in the laboratory for in-depth studies. The effects of each factor were studied. Newly discovered phenomena which occur during the flashover process, such as formation of clean zones and the deleterious effect of nitrates on insulating materials, were observed. Theories were formulated to explain the mechanisms involved in these pemomena. Electrochemical properties of contaminants and their effects on flashover process were examined. The relationship between single-component salts and multi-component salts as investigated. Voltage distribution along a string of insulators was studied. Insulator designs using capacitive grading were proposed and their advantages exploited. The new designs showed promising results in both computer analysis and initial laboratory studies. DOE

N82-10332# Los Alamos Scientific Lab., N. Mex.
BLUMLEIN LINE GENERATION OF LONG-PULSE, PRECISELY REGULATED WAVESHAPES FOR NONLINEAR RESISTIVE LOADS
W. A. Reass 1981 4 p Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1-3 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025380; LA-UR-81-1670; CONF-810659-14) Avail: NTIS HC A02/MF A01

Criteria utilized in the design of a long-pulse, offset-tuned Blumlein line is characterized as capable of generating extremely high power, high voltage pulses with outstanding fidelity over a wide range of voltage driving a nonlinear resistive load. R.C.T.

N82-10333# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DESCRIPTION OF BATTERY STATE-OF-CHARGE CONTROLLER
R. N. Cadieux May 1981 11 p refs
(Contract DE-AC02-77ET-20279)
(DE81-026294; DOE/ET-20279/T8; COO-4094-82) Avail: NTIS HC A02/MF A01

A controller was designed to meet the requirements of an off-peak, stand-alone solar photovoltaic power system. Design requirements, physical description, circuit description, theory of operation and operation procedures are presented. DOE

N82-10334# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
INTEGRATION OF DECENTRALIZED GENERATORS WITH THE ELECTRIC POWER GRID
Susan Finger Apr. 1981 193 p refs
(Contract DE-AM01-76EI-02295)
(DE81-029731; MIT-EL-81-011) Avail: NTIS HC A09/MF A01

The economic interactions of customer-owned electrical generators with the central electric power grid was studied. The reciprocal effects of the operation and expansion plans of the utility, and the resulting price of electricity, and the demand patterns and expansion plans of customers are discussed. The system is modeled in an open-loop feedback mode that allows both the utility and the customers to update their plans and expectations for the next time period based on the other's actions in the current time period and based on any new information such as the current time period and based on any new information such as the current price of oil. The utility and the customers solve similar operation and expansion problems, except that each has control over different variables. DOE

N82-10335# Los Alamos Scientific Lab., N. Mex.
PULSE POWER APPLICATIONS OF FLUX COMPRESSION GENERATORS
C. M. Fowler, R. S. Caird, D. J. Erickson, and B. L. Freeman 1981 9 p refs Presented at the IEEE Pulse Power Conf., Albuquerque, N. Mex., 1-3 Jun. 1981
(Contract W-7405-eng-36)
(LA-UR-81-1601; CONF-810659-5) Avail: NTIS HC A02/MF A01

Characteristics are presented for two different types of explosive driven flux compression generators and a megavolt pulse transformer. Status reports are given for rail gun and plasma focus programs for which the generators serve as power sources. DOE

N82-10336# Montana State Univ., Bozeman. Dept. of Physics.
ELECTRICAL PROPERTIES OF LANTHANUM CHROMITE BASED CERAMICS IN HYDROGEN AND OXIDIZING ATMOSPHERES AT HIGH TEMPERATURES Final Report, 1 Apr. 1979 - 31 Mar. 1980
V. H. Schmidt Jun. 1981 63 p refs
(Contract DE-AS05-79ET-15415)
(DE81-028306; DOE/ET-15415/1) Avail: NTIS HC A04/MF A01

Several results regarding the effect of hydrogen on lanthanum chromite were determined. Thermally-activated diffusion of hydrogen through La(Mg)CrO3 was found with a high activation energy. It was found that its electrical conductivity drops drastically, especially at low temperature, after exposure to hydrogen at high temperature. Also, the curvature of most of the conductivity plots, as well as the inability to observe the Hall effect, lends support to the proposal by Karim and Aldred that the small-polaron model which predicts thermally activated mobility is applicable to doped lanthanum chromite. From differential thermal analysis, an apparent absorption of hydrogen near 3000 C was noticed. Upon cooling the lanthanum chromite in hydrogen and subsequently reheating it in air, desorption occurred near 1700 C. The immediate purpose of this study was to determine whether hydrogen has a deleterious effect on lanthanum chromite in solid oxide fuel cells. DOE

N82-10337# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavedlning 3.
MICROWAVE TUBES. REVIEW OF THE LITERATURE. NUMBER 1: AUGUST 1978 TO DECEMBER 1979 [MIKROVAAGSROER. LITTERATUROEVERSIKT NR 1. OMFATTANDE PERIODEN AUGUSTI 1978 - DECEMBER 1979]
Herbert Steyskal Oct. 1980 102 p refs In SWEDISH
(FOA-C-30200-E) Avail: NTIS HC A06/MF A01

Development trends are analyzed. Greatest activity with regard to conventional microwave tubes is noted for travelling wave tube technology. Importance is attached to generating and amplification methods which promise good results. Frequencies up to the infrared are reported. With the exception of the gyrotron, these projects are in the research stage. Author (ESA)

N82-10338# AEG-Telefunken, Heilbronn (West Germany). Geschaeftsbereich Halbleiter.

DEVELOPMENT OF A TECHNIQUE FOR THE AUTOMATIC WIRELESS MOUNTING OF INTEGRATED CIRCUITS Final Report

Alfons Schmitt Bonn Bundesministerium fuer Forschung und Technologie Oct. 1980 63 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-80-085; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,30

This technique is also applicable to power circuits because the heat can be easily removed. It is suitable either for highly reliable circuits or for devices for consumer applications. It is an economical technique, able to compete with cheap labor countries. Author (ESA)

N82-10339# AEG-Telefunken, Heilbronn (West Germany). Geschaeftsbereich Halbleiter.

LARGE SCALE PRODUCTION METHODS FOR OPTOELECTRONIC COMPONENTS Final Report

Werner Schoebol Bonn Bundesministerium fuer Forschung und Technologie Nov. 1980 80 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-80-088; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16,80

Light parameters were measured at the wafer probe station for light emitting diode (LED) wafers, infrared diode-wafers and photodetector wafers. The dicing of 3-5 wafers by: (1) diamond scribing and breaking; (2) laser scribing and breaking; and (3) sawing of wafers were compared. The encapsulation of optoelectronic components by injection molding with polycarbonates (development of injection molding tools for production), and the development of measurement techniques for final testing of optoelectronic components are discussed. A scheme for the automatic final measurement of LED's with the possibility of separating them into groups with different luminous intensities and spectral distribution, is presented as well as the development of a testing method for seven segment numerical displays). Author (ESA)

N82-10340# Stuttgart Univ. (West Germany). Inst. [illegible] Netzwerk und Systemtheorie.

HYBRIDE MICROCIRCUITS IN TANTALUM THIN-FILM TECHNOLOGY Final Report

Ernst Lueder, Traugott Kallfass, Holm Baeger, Bernd Kaiser, Juergen Mutschler, Hans W. Renz, Reinhard Riekeles, and Hans-Juergen Tilch Bonn Bundesministerium fuer Forschung und Technologie Nov. 1980 228 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-80-120; ISSN-0340-7608) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 39,30

The design and manufacture of linear circuits, especially RC active filters in tantalum thin film technology are presented. The R and C components are made from a single sputtered film out of Ta oxinitride, with a temperature compensated time constant RC. An economical manufacturing process requires only one high vacuum step. Building blocks and tuning algorithms for filters with a low (<20) and a high (>120) pole-Q are described. Circuits with RC thin film lines require a small substrate area. Examples of circuits are pulse code modulation low passes and a telephone touchtone system. Author (ESA)

N82-10341# Valvo G.m.b.H., Hamburg (West Germany). Roehren und Halbleiterwerke.

APPLICATION OF ION IMPLANTATION IN THE MANUFACTURING OF MONOLITHIC BIPOLAR ANALOGUE INTEGRATED CIRCUITS Final Report

Wolfgang Dietsch, Andreas Gakis, Norbert Hofmann, Wolfgang Nolde, and Uwe Suckow Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 110 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-80-147; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,10

The main items were: high frequency transistors; bases; resistors (especially those with a high resistance); passivation methods; and components. The existing doping methods were replaced by more controllable ion implantation and processes are developed which can only be realized by means of ion implantation. In both cases, processes were developed with technological as well as economical advantages with respect to standard technologies. The results are partly introduced into large-scale production. Author (ESA)

N82-10342# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

METHODS OF GENERATION AND AMPLIFICATION OF MICRO- AND MILLIMETER WAVES IN VACUUM TUBES

Herbert Steyskal Jan. 1981 104 p refs In SWEDISH; ENGLISH summary

(FOA-C-30210-E) Avail: NTIS HC A06/MF A01

The principles underlying electron tubes, such as gyrotrons, peniotrons, free electron lasers, orotrons, and gyrocons are described. These generators for very high frequency and very high power generators are considerably different from conventional microwave tubes. They are at present in the research and development stage but may soon become important for fusion and radar technology. Author (ESA)

N82-10343# British Gas Corp., Newcastle-upon-Tyne (England). Engineering Research Station.

MICROELECTRONICS SERVING ENGINEERING

T. M. Sporton and W. L. Mercer Nov. 1980 29 p refs Presented at 46th Inst. of Gas Eng. Autumn Meeting, London, Nov. 1980

(ERS-E-273) Avail: NTIS HC A03/MF A01

The development of electronics technology over the past 20 years was reviewed. Microelectronics is shown to be the product of a long evolution rather than a revolution. The mode of operation of digital electronic circuits, from simple units to the microcomputer, is described. Potential applications of these techniques within the gas industry are explored. The need for gas engineers to become familiar with the capabilities of microelectronics, and to take the initiative in defining worthwhile applications within their own areas of expertise, is noted. Predictions of future developments are made. Author (ESA)

N82-10344# Filtronic Components Ltd., Leeds (England).

MICROWAVE DEVICES WITH ASYMMETRIC FREQUENCY CHARACTERISTICS AND CASCADE DECOMPOSITION STUDY Final Report

J. D. Rhodes Paris ESA 1981 60 p

(Contract ESTEC-3968/79/NL-DG(SG))

(ESA-CR(P)-1439) Avail: NTIS HC A04/MF A01

A compact diplexer that produces an overall asymmetric or symmetric response was built and tested. A grounded strip was placed between resonators to overcome the problem of undesirable length due to the low internal values of coupling capacitance. The theory bemind this configuration is presented with the theory for the coupling between two rods separated by a grounded rod, as used in the design. Channels are of 43 MHz bandwidth to meet loss requirements and sixth degree to meet selectivity requirements. Measured performance meets all out of band attenuation criteria, but because of the unplated structure in-band loss is high under IdB. Author (ESA)

N82-10345# National Bureau of Standards, Washington, D.C. Electrosystems Div.

OPTICAL MEASUREMENTS FOR INTERFACIAL CONDUCTION AND BREAKDOWN (1980) Annual Report

R. E. Hebner, E. F. Kelley, J. E. Thompson (South Carolina Univ.), T. S. Sudarshan (South Carolina Univ.), and T. B. Jones (Colorado State Univ.) May 1981 90 p refs Sponsored in part by DOE, Washington, D.C.

(PB81-216343; NBSIR-81-2275) Avail: NTIS HC A05/MF A01 CSCL 09A

Techniques were developed to measure the fields in transformer oil using Kerr effect and to measure the surface charge at a gas-solid interface using the Pockels effects. Measurements are supplemented by calculations of the distortion produced by selected interfacial charge distributions. The relatively pure transformer oil used showed little space charge distortion of the electric field. There also was no statistically significant preference for breakdown in the vicinity of the interface. At vacuum-solid interfaces, however, interfacial breakdown was observed and surface charging was measured. As gas is introduced into the system, the surface charge is removed so that no effect of surface charging was detected at atmospheric pressure. At pressures above atmospheric, there is evidence that surface charging may again become important. GRA

N82-10346# National Bureau of Standards, Washington, D.C. Electrosystems Div.

DEVELOPMENT OF POWER SYSTEM MEASUREMENTS Quarterly Report, 1 Jan. - 31 Mar. 1981

R. E. Hebner Apr. 1981 20 p refs Prepared for DOE, Washington, D.C.
(PB81-220261; NBSIR-81-2283) Avail: NTIS HC A02/MF A01 CSCL 09A

The errors associated with measurements of the vertical current density in an electrical environmental consisting of a dc field with space charge are considered. The measurement of RF attenuation in distribution cables, the onset characteristics of positive and negative corona in compressed SF6 gas, and the measurement of the space charge density in transformer oil subjected to 60-Hz excitation are also examined. GRA

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

N82-10347 Polytechnic Inst. of New York, Brooklyn.

A THEORETICAL AND EXPERIMENTAL INVESTIGATION OF THE HYPERSONIC VISCOUS SHOCK LAYER FOR LARGE RATES OF INJECTION Ph.D. Thesis

Peter Plostins 1981 151 p
Avail: Univ. Microfilms Order No. 8118891

The conservation form, axisymmetric, full shock layer equations are solved in the stagnation region for large rates of air injection. The transverse momentum and continuity equations are solved by an unconditionally stable, coupled, block tri-diagonal algorithm. The energy equation is integrated uncoupled from the rest of the system. A variable grid is prescribed in order to insure that high resolution is obtained in the vicinity of the injection interface. Solutions are obtained for a wide range of Mach numbers and Reynolds numbers. A numerical method is proposed to solve the conservation form of the full shock layer equations on a slender sphere cone for small angles of incidence. An experimental study of thin film cooling conducted on a 10 deg half angle sphere cone at angle of attack is described. Dissert. Abstr.

N82-10348 Pennsylvania Univ., Philadelphia.

EFFECTS OF NON-UNIFORM HEATING AND INTERNAL BAFFLES ON NATURAL CONVECTION IN INCLINED RECTANGULAR ENCLOSURES Ph.D. Thesis

Paul Kuo-Bing Chao 1981 376 p
Avail: Univ. Microfilms Order No. 8117767

Finite difference calculations for providing three dimensional solutions for natural convection in a 2 x 1 x 1 inclined rectangular closure are presented. Two forms of non-uniform heating were investigated. In the first form of nonuniform heating, sawtooth temperature distributions with different amplitudes orientations were imposed on the lower (2 x 1) surface to simulate the effect of a cooling coil or water jacket on the collector plate of a flat solar heater. In the second form of non-uniform heating, a uniform temperature was imposed on one 1 x 1 segment of the lower surface while the other 1 x 1 segment and the four side walls were insulated. A lower uniform temperature was imposed on the upper surface. The effect of inclining both the long and short dimensions was investigated. The effect of thin baffles of various sizes, locations and conductivities was investigated theoretically and experimentally for a rectangular enclosure with a uniform higher temperature on the lower surface and a uniform lower temperature upper surface. Dissert. Abstr.

N82-10349 Notre Dame Univ., Ind.

DIFFUSE MASS TRANSPORT IN A POROUS MEDIUM Ph.D. Thesis

Fun Gau Ho 1981 144 p
Avail: Univ. Microfilms Order No. 8118571

Variational methods are used to investigate the problems of diffusive mass transport in a porous medium. Calculations of the effective diffusivities are performed for a model pore structure generated by randomly placed, freely overlapping solid spheres all of the same radius. Effects of the tortuosity of the diffusion paths are considered. Numerical evaluations are used to test some approximate engineering models. For gaseous transition region diffusion the mean free path kinetic theory is used to derive a variational upper bound on the effective transition region diffusivity. For the simultaneous liquid or gas phase Fickian bulk diffusion in the void and Fickian surface diffusion on the pore wall surface, an analytical expression for effective diffusion coefficient is obtained and compared with the usual engineering model of parallel surface and void diffusion. The simultaneous gaseous transition region diffusion in the void and the Fickian surface diffusion on the pore wall surface are examined numerically. Dissert. Abstr.

N82-10350 Carnegie-Mellon Univ., Pittsburgh, Pa.

DYNAMIC SIMULATION WITH AN EQUATION BASED FLOWSHEETING SYSTEM Ph.D. Thesis

Selahattin Kuru 1981 232 p
Avail: Univ. Microfilms Order No. 8118439

The ASCENT-II dynamic simulation system is described. Differential equations, integral equations and retarded equations are treated by universal mathematical units which can be used to form the unit modules. The equation solving method employed permits the degrees of freedom in a flowsheet to be changed almost arbitrarily, allowing simulation and design to be done simultaneously. Decision variables specified as trajectories are handled cleanly and neatly. The tear variable concepts is introduced in order to reduce computation time in the numerical integration of differential-algebraic systems. A method is developed to treat the integration step-size as a variable to be calculated such that the integration error criteria is automatically satisfied at each step of numerical integration. The spline collocation method is studied within the context of flowsheeting and is found to be a suitable global approximation method. Dissert. Abstr.

N82-10351 Notre Dame Univ., Ind.

ANALYTICAL INVESTIGATION OF HEAT TRANSFER OF TURBULENT FLOW IN PIPES NEAR THE THERMODYNAMIC CRITICAL POINT Ph.D. Thesis

Marco Antonio Egoavil 1981 212 p
Avail: Univ. Microfilms Order No. 8118566

An analytical investigation is carried out near supercritical turbulent forced convection in pipes. A unified theoretical model together with available experimental data, to identify and determine the physical mechanisms involved in the heat transfer deterioration anomaly of the near supercritical phenomena. A finite difference scheme is used to solve the boundary layer-parabolic type of hydrodynamic and energy equations. A rate equation for determining the turbulent viscosity is added to the governing equations, which takes into account the effects of turbulence convection, turbulence diffusion, and turbulence generation and decay due to mean shear, small eddy dissipation, buoyancy, and pressure straining. Logarithmic-law equations for the wall region of the pipe are utilized as the forcing function of boundary conditions for the mean and turbulent field calculations. The theory procedures, and computer program are successfully tested in several limiting cases such as the thermal laminar flow in the entrance region in a tube, the turbulent flow in the entrance region in a pipe, and in fully developed turbulent flow with heat transfer in tubes. Dissert. Abstr.

N82-10352 Illinois Inst. of Tech., Chicago.
ALGORITHMIC ASPECT OF THE SOLUTION OF TRANSIENT HEAT TRANSFER IN STRUCTURES Ph.D. Thesis
Mohammad Hassan Kadivar 1980 147 p
Avail: Univ. Microfilms Order No. 8112421

The analysis and design of high speed reentry vehicles requires the solution of the transient heat transfer equations in the structure. The application of the finite element method to such a problem results in a system of stiff ordinary differential equations. Variable step, of such systems of explicit algorithms for the solution of such systems of differential equations are investigated. An efficient solution algorithm with an efficient storage strategy for the ill-conditioned large set of algebraic equations which arises from the use of implicit algorithms applied to the system of differential equations is developed. The performance of the algorithm is compared to other algorithms for the solution of two and three dimensional transient heat transfer problems in structures. Dissert. Abstr.

N82-10353 Pennsylvania Univ., Philadelphia.
HEAT TRANSFER AND FLOW DISTRIBUTION WITHIN RADIANT-CONVECTIVE FINNED-TUBE MANIFOLD ASSEMBLIES Ph.D. Thesis
Gerard Francis Jones 1981 375 p
Avail: Univ. Microfilms Order No. 8117797

A theoretical investigation of heat transfer and the distribution of flow within an inclined finned-tube manifold assembly having radiative and convective boundary conditions is presented. Nonuniform flow distribution among the riser tubes and flow development and buoyancy effects within them, as well as other phenomena which are normally neglected in state of the art models (such as the Hottel-Whillier-Bliss model) are included in the analysis. A mathematical method for solving a class of conjugated heat transfer problems which include the finned-tube manifold assembly is developed. The finned-tube manifold assembly problem is divided into three subproblems: (1) riser tube fluid dynamics and heat transfer, (2) radiant convective finned-tube heat transfer, (3) dual-manifold system hydrodynamics. Both integrated and local results are presented. These are obtained for upper and lower thermal performance bounding cases, for both parallel and reverse flow. The effects due to simultaneous flow development and buoyancy within the riser tube flows are analyzed. Dissert. Abstr.

N82-10354 Case Western Reserve Univ., Cleveland, Ohio.
DILUTION JETS IN ACCELERATED CROSS FLOWS Ph.D. Thesis
Abraham Lipshitz 1981 161 p
Avail: Univ. Microfilms Order No. 8118627

Results of flow visualization experiments and measurements of the temperature field produced by a single jet and a row of dilution jets issued into a reverse flow combustor are presented. The flow visualization experiments were designed to examine the separate effects of longitudinal and transverse acceleration on the jet trajectory and spreading rate. A model describing a dense single jet in a lighter accelerating cross flow is developed. The model is based on integral conservation equations, including the pressure terms appropriate to accelerating flows. It uses a modified entrainment correlation obtained from previous experiments of a jet in a cross stream. Comparison between combustor experimental results and model calculations shows poor agreement due to the drifting effect which is not taken into consideration in the model calculations. Results are shown in the form of consecutive normalized temperature profiles. The confinement parameters appears to become increasingly important with decreasing spacing ratio, in particular when its effect is enhanced by the drifting phenomena and associated pressure field. Dissert. Abstr.

N82-10355 Notre Dame Univ., Ind.
FINITE DIFFERENCE ANALYSIS OF RADIATION CONVECTION INTERACTIONS IN TWO-DIMENSIONAL ENCLOSURES Ph.D. Thesis
Lien-Chang Chang 1981 317 p
Avail: Univ. Microfilms Order No. 8118561

The gas radiation-surface radiation-natural convection interaction in a two dimensional partitioned enclosure in the laminar flow regime was investigated. An upward finite difference scheme was used to solve the governing equations for a fully compressible buoyancy driven flow. Temperature, velocity components, pressure and density at steady state were obtained from numerical solutions. The average total Nusselt number was derived from the convective and radiative heat fluxes at the side walls. Dissert. Abstr.

N82-10356# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
PSEUDO-STATIONARY OBLIQUE SHOCK-WAVE REFLECTION IN CARBON DIOXIDE: DOMAINS AND BOUNDARIES
Samon Ando Apr. 1981 131 p refs Sponsored in part by the Natural Science and Engineering Research Council of Canada and the ARO
(Grant AF-AFOSR-3303-77)
(UTIAS-TN-231; ISSN-0082-5263) Avail: NTIS HC A07/MF A01

The transition boundaries for a triatomic gas between various types of shock-wave reflection configurations exhibited by a plane shock impinging on a compressive corner in a shock tube were studied experimentally using CO2 as the test gas. The shock Mach numbers ranged from 1.8 to 10.2, and the initial pressure from 3.5 to 80 torr at room temperature. The regions corresponding to the four types of reflection were obtained in terms of the shock Mach number M sub s and the wedge angle theta sub w. The resultant transition map in the M sub s minus theta sub w plane is presented. The transition boundaries are determined. The density contours of the flow fields were obtained by means of infinite-fringe interferograms. Shock-polar diagrams are analyzed. It is concluded that a perfect-gas model with an appropriate constant gamma should be used in determining the transition angles between various types of shock reflection for shock Mach numbers at least up to 10. J.D.H.

N82-10357# Toronto Univ., Downsview (Ontario). Inst. of Aerospace Studies.
AN EXPERIMENTAL INVESTIGATION OF RISE TIMES OF VERY WEAK SHOCK WAVES
Ole Holst-Jensen Mar. 1981 86 p refs Sponsored in part by the Canadian Ministry of Transport
(Grant AF-AFOSR-3303-77)
(UTIAS-TN-229; CN-ISSN-0082-5263) Avail: NTIS HC A05/MF A01

The technique of using exploding wires to generate N waves is developed and described. The discrepancy between the shock rise times predicted by the weak shock theory and the 100 to 1000 times greater rise times measured for sonic booms is investigated. Consideration is given to N waves generated by sparks in the UTIAS Traveling Wave Sonic Boom Simulator, and from supersonic aircraft. The experimental equipment is described. J.D.H.

N82-10358*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COOLING BY CONVERSION OF PARA TO ORTHO-HYDROGEN Patent Application
Allan Sherman, inventor (to NASA) Filed 10 Sep. 1981 14 p
(NASA-Case-GSC-12770-1; US-Patent-Appl-SN-301075) Avail: NTIS HC A02/MF A01 CSCL 20D

The cooling capacity of a solid hydrogen cooling system is significantly increased by exposing vapor created during evaporation of a solid hydrogen mass to a catalyst and thereby accelerating the endothermic para-to-ortho transition of the vapor to equilibrium hydrogen. Catalysts such as nickel, copper, iron or metal hydride gels of films of nickel, copper or iron or hydride gels of nickel, copper or iron in a low pressure drop catalytic reactor are suitable for accelerating the endothermic para-to-ortho conversion. NASA

N82-10359*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
GAS LEVITATOR AND METHOD FOR CONTAINERLESS PROCESSING Patent Application
Leroy H. Berge, William A. Oran, and John M. Theiss, inventors (to NASA) Filed 28 Aug. 1981 17 p

(NASA-Case-MFS-25509-1; US-Patent-Appl-SN-297486) Avail: NTIS HC A02/MF A01 CSCL 20D

An elongated levitation tube having a contoured interior in the form of a convergent section, and a constriction and divergent section, wherein the levitation node is created, is described. Gas flow control means control flow to prevent separation of flow from the interior walls in the region of specimen. An apparatus provides for levitating and heating the specimen simultaneously by combustion of a suitable gas mixture combined with an inert gas. T.M.

N82-10360*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

IMPROVED CONSTANT-OUTPUT ATOMIZER Patent Application

Jack Y. Dea, inventor (to NASA) (Desert Research Inst.) Filed 2 Oct. 1981 12 p Sponsored by NASA

(NASA-Case-MFS-25631-1; US-Patent-Appl-SN-308203) Avail: NTIS HC A02/MF A01 CSCL 20D

A constant-output atomizer is described which includes a generally frustoconical expansion nozzle for producing an air jet. A liquid feed line supplies liquid to be atomized by the air jet, and the body includes a groove which opens into the diffuser section of the nozzle downstream of the throat for conducting liquid from the feed line to the nozzle. The groove extends in a direction perpendicular radially to the axis of the nozzle, and it has a depth approximately equal to half the axial length of the nozzle. Liquid, conducted by capillary action in the groove to the nozzle, is atomized into a fine mist by the air jet in the nozzle; and the groove eliminates fluctuations in spray order. NASA

N82-10361*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

A COMPILATION OF UNSTEADY TURBULENT BOUNDARY-LAYER EXPERIMENTAL DATA

Lawrence W. Carr Sep. 1981 55 p refs Prepared in cooperation with Army Aviation Research and Development Command, St. Louis

(NASA-TM-81317; A-8581; USAVRADCOM-TR-81-A-26) Avail: NTIS HC A04/MF A01 CSCL 20D

An extensive literature search was conducted and those experiments related to unsteady boundary layer behavior were cataloged. In addition, an international survey of industrial, university, and governmental research laboratories was made in which new and ongoing experimental programs associated with unsteady turbulent boundary layer research were identified. Pertinent references were reviewed and classified based on the technical emphasis of the various experiments. Experiments that include instantaneous or ensemble averaged profiles of boundary layer variables are stressed. The experimental apparatus and flow conditions are described and summaries of acquired data and significant conclusions are summarized. Measurements obtained from the experiments which exist in digital form were stored on magnetic tape. Instructions are given for accessing these data sets for further analysis. Author

N82-10362*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

A DOCUMENTATION OF A THREE-DIMENSIONAL SHOCK SEPARATED TURBULENT BOUNDARY LAYER

M. I. Kussoy and C. C. Horstman Sep. 1981 119 p refs

(NASA-TM-81327; A-8713) Avail: NTIS HC A06/MF A01 CSCL 20D

A detailed investigation of a flow in which a three dimensional shock wave separates a two dimensional turbulent boundary layer is presented. The resulting flow field is highly three dimensional with a significant portion of flow separation on the surface at the phi = 0 deg (windward) plane as well as a large zone of secondary surface flow off this plane. Tests were performed at a nominal Mach number of 2.3 for a range of Re/m of 11.7 x 1 million 105.8 x 1 million. At the lower Reynolds number, mean and fluctuating experimental measurements, including yaw angles, static pressure, turbulent shear stress, and turbulent kinetic energy, were obtained throughout the entire flow field. Pressures, flow angles, and shear stress were measured on the surface for all Reynolds numbers. These data which define the complete flow field, including the upstream undisturbed flow region, are presented in graphical and tabular form. Author

N82-10363# Wisconsin Univ. - Madison. Mathematics Research Center.

THE KORTEWEG-de VRIES EQUATION, POSED IN A QUARTER PLANE Technical Summary Report

Jerry Bona (Chicago Univ.) and Ragnar Winther Aug. 1981 84 p refs

(Contract DAAG29-80-C-0041; Grant NSF MCS-80-02327)

(AD-A103861; MRC-TSR-2258) Avail: NTIS HC A05/MF A01 CSCL 12/1

An initial and boundary value problem for the Korteweg-de-Vries equation is shown to be well posed. The considered problem may serve as a model for unidirectional propagation of plane waves generated by a wavemaker in a uniform medium. Such models apply in regimes in which nonlinear and dispersive effects are of comparable small order. Author (GRA)

N82-10364# Wisconsin Univ. - Madison. Mathematics Research Center.

THE INITIAL BOUNDARY VALUE PROBLEM FOR THE EQUATIONS OF MOTION OF COMPRESSIBLE VISCOUS AND HEAT-CONDUCTIVE FLUID Technical Summary Report

Akitaka Matsummura (Kyoto Univ.) and Takaaki Nitshida (Kyoto Univ.) Jul. 1981 27 p refs

(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)

(AD-A103866; MRC-TSR-2237) Avail: NTIS HC A03/MF A01 CSCL 20/4

We prove the global existence and uniqueness of solutions to the equations of motion for compressible, viscous and heat-conductive Newtonian fluid in a bounded domain, with small initial data and external force, and boundary conditions of zero velocity and constant temperature. We also show that the solution decays exponentially to a unique equilibrium state. The proof uses an energy method similar to the one used in our previous results on the pure initial value problem plus some new techniques for estimates near the boundary. Author (GRA)

N82-10365# Maine Univ., Orono.

PERTURBATION THEORY FOR POLAR FLUIDS Final Report

Jayendran C. Rasaiah Jul. 1981 29 p refs

(Contract N00014-78-C-0724)

(AD-A103963) Avail: NTIS HC A03/MF A01 CSCL 20/10

Work completed under this grant on polar fluids includes an extension of perturbation theory to polar molecules with point octopoles and hexadecapoles as well as a preliminary investigation of molecules with non-spherical cores. In addition, the ordering of dipolar molecules near a flat electrified wall has been investigated in the linearized hypernetted chain (LHNC) and quadratic hypernetted chain (QHNC) approximations. This has led to a new study of electrostriction and non-linear effects in the polarization density of dipolar fluids. Author (GRA)

N82-10366# Brown Univ., Providence, R. I. Div. of Engineering.

FLOW IN GEOTHERMAL WELLS. PART 4: TRANSITION CRITERIA FOR TWO-PHASE FLOW PATTERNS

Z. Bilicki and J. Kestin Dec. 1980 22 p refs

(Contract DE-AC02-79ET-27225)

(DE81-028312; DOE/ET-27225/9) Avail: NTIS HC A02/MF A01

Detailed considerations justifying the criteria for transitions between flow patterns are presented. The following are covered: transition from bubble to plug (or slug) flow, transition from plug flow to froth flow, transition from froth to annular mist flow, and model comparisons. DOE

N82-10367# Bettis Atomic Power Lab., West Mifflin, Pa.

COMPARISONS OF TURBULENT-FLOW CALCULATIONS WITH EXPERIMENT

M. Goldsmith, ed. Aug. 1981 110 p

(Contract DE-AC11-76PN-00014)

(DE81-031930; WAPD-TM-1473) Avail: NTIS HC A06/MF A01

Predictions of the (k, epsilon) turbulence model are compared with experiment for a number of standard cases: fully developed flows in ducts and pipes, developing pipe flow, flows through axisymmetric and rectangular sudden expansions, flows over steps, and axisymmetric swirling flows. In a general way, it appears that the (k, epsilon) model gives good predictions of velocity profiles and good enough estimates of pressure drops to be useful for many engineering applications. Estimates of turbulence intensities and stresses are much less reliable and range from excellent for fully developed flows to unsatisfactory for strongly swirling flows. DOE

N82-10368# Allied Chemical Corp., Morristown, N.J.

ORGANIC ABSORPTION GAS-FIRED RESIDENTIAL HEAT PUMP

Kevin P. Murphy 1981 5 p Presented at the DOE Heat Pump Contractor's Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Prepared for ORNL
(Contract W-7405-eng-26)
(DE81-024131; CONF-810672-19) Avail: NTIS HC A02/MF A01

The development program of a system utilizing a new absorption pair, R133a (CF3CH2Cl) as the refrigerant, and ETFE (ethyletra-hydrofurfury lether) as the absorber fluid, is described. A diagram of the basic configuration is shown. The cooling mode and the heating mode are discussed. Six units of an early hardware design were constructed and tested. Two of these units were placed in home heating service during the 1980-81 season. A market evaluation of the business potential of the absorption system was made, identifying location and size of the likely market for such a system. A performance simulation analysis was performed for seven cities in the US. From these, general characteristics of the areas having the greatest performance benefits were established. DOE

N82-10369# Los Alamos Scientific Lab., N. Mex.

HEAT-PIPE DEVELOPMENT FOR THE SPAR SPACE-POWER SYSTEM

W. A. Ranken 1981 15 p refs Presented at the 4th Intern. Heat Pipe Conf., London, 7-9 Sep. 1981
(Contract W-7405-eng-36)
(LA-UR-81-1025; CONF-810902-2) Avail: NTIS HC A02/MF A01

The use of alkali metal heat pipes to provide redundant, reliable, and low loss heat transfer at high temperatures is described. Three sets of heat pipes are used in the system. These include sodium/molybdenum heat pipes to transfer heat from the reactor core to the conversion system, potassium/niobium heat pipes to couple the conversion system to the radiator in a redundant manner, and potassium/titanium heat pipes to distribute rejected heat throughout the radiator surface. The designs of these units are discussed and fabrication methods and testing results are described. DOE

N82-10370# Oak Ridge National Lab., Tenn. Energy Div.

ANALYTICAL MODEL OF THE ROUND BUOYANT JET

D. W. Lee 1981 29 p refs Presented at the Symp. on Fluid Mech. of Combustion Systems, Boulder, Colo., 22 Jun. 1981
(Contract W-7405-eng-26)
(DE81-023940; CONF-810621-5) Avail: NTIS HC A03/MF A01

An analytical model for a round turbulent buoyant jet which is discharged vertically into a stagnant ambient is presented. The buoyant jet is considered to have three separate zone models which are matched to form a complete solution. The velocity field is determined for the entire jet and plume regions by the use of an eddy viscosity which varies along the axis of the jet. The centerline decay of buoyancy is determined throughout and the results are compared to existing numerical codes. The model is applied to the disposal of carbon dioxide enriched seawater. The results can be used to provide design information for minimizing or maximizing the dilution of a discharge by the receiving environment. DOE

N82-10371# Sandia Labs., Albuquerque, N. Mex.

SHOCK COMPRESSION TEMPERATURE RISE DETERMINED FROM RESISTIVITY OF EMBEDDED METAL FOILS

D. D. Bloomquist and S. A. Sheffield 1980 10 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024083; SAND-80-2836C; CONF-810684-11) Avail: NTIS HC A02/MF A01

The temperature rise of polymethyl methacrylate (PMMA) was determined from measurements of the electrical resistivity of embedded copper foils. The temperature of the copper was determined from the observed foil resistance and known values of the change in copper resistivity with temperature and shock compression. Temperature values obtained over a stress range from 0.9 to 6.0 GPa are in good agreement with thermocouple measurements reported previously. DOE

N82-10372# Argonne National Lab., Ill.

STUDY OF TURBULENT NATURAL-CIRCULATION FLOW AND LOW-PRANDTL-NUMBER FORCED-CONVECTION FLOW

K. S. Chung and D. H. Thompson 1980 9 p refs Presented at the Natl. Heat Transfer Conf., Orlando, Fla., 29-30 Jul. 1980
(Contract W-31-109-eng-38)
(DE81-023531; CONF-800723-27) Avail: NTIS HC A02/MF A01

Calculation methods and results are discussed for the coupled energy and momentum equations of turbulent natural circulation flow and low Prandtl number forced convection flow in an effort to study of the thermal hydraulic behavior of coolant flowing in a liquid metal fast breeder reactor channel under natural circulation conditions. The two equation turbulence model is used to evaluate the turbulent momentum transport property. Because the analogy between momentum transfer and heat transfer does not generally hold for low Prandtl number fluid and natural circulation flow conditions, the turbulent thermal conductivity is calculated independently using equations similar to the two-equation turbulence model. The numerical technique used in the calculation is the finite element method. DOE

N82-10373# Argonne National Lab., Ill.

CALCULATIONAL METHOD FOR COMBINED NATURAL CIRCULATION AND FORCED-CONVECTION FLOW IN A CHANNEL

K. S. Chung and D. H. Thompson 1980 8 p refs Presented at the 19th Natl. Heat Transfer Conf., Orlando, Fla., 27-30 Jul. 1980
(Contract W-31-109-eng-38)
(DE81-023542; CONF-800723-26) Avail: NTIS HC A02/MF A01

A finite element solution is presented for combined natural circulation and forced convection flow in a channel. Because the buoyancy force plays an important role in a mixed convection flow, an iteraction scheme was used in solving the coupled energy momentum equations. The momentum equations and the pressure equation are solved to calculate velocity profiles instead of solving the momentum equations with the continuity equation. Though the pressure equation is obtained by using the continuity equation, the continuity principle is reinforced into the momentum equations and the pressure equation at each iteraction. Calculations are performed for the combined natural circulation and forced convection case and the forced convection only case. DOE

N82-10374# Technische Physische Dienst TNO-TH, Delft (Netherlands).

BOUNDARY LAYER MEASUREMENTS ON A SHIP MODEL USING A LASER DOPPLER VELOCIMETER [GRENSLAAGMETINGEN AAN EEN SCHEEPSMODEL MET BEHULP VAN EEN LASER DOPPLER SNELHEIDSMETER]

A. H. vanKrieken and J. Oldengarm 18 Oct. 1979 15 p refs
(RVO-TNO-A76/KM/016; TDCK-73106; TD-905.106) Avail: NTIS HC A02/MF A01

Boundary layer velocity profiles were measured on a moving ship model in a water tank, using a backscatter laser Doppler velocimeter system (LDS). The LDS has previously given good results when applied to a stationary uniform flow field. Its applicability when measuring the flow around a moving model is assessed. In particular, the performance of the LDS frequency evaluator and photon correlator are considered. Measurement results are shown and compared with theoretical calculations of boundary layer flow past a randomly oriented ship model. Author (ESA)

N82-10375# Technical Research Centre of Finland, Espoo. Lab. of Heating and Ventilating.
THERMAL CONDUCTANCE OF WALL STRUCTURES
Seppo Ahvenainen, Erkki Kokko, and Antero Aittomaeki Dec. 1980 72 p refs
(VTT-54; ISBN-951-38-1120-4; ISSN-0357-7031) Avail: NTIS HC A04/MF A01

Five test walls of differing structural properties or direction, but all parts of existing buildings, were subjected to measurements during winter, spring, and summer. The measured time dependent values of the inside surface temperature, and the heat flux through the inside surface, were analyzed by computer, according to a theoretical model. Compatibility of results was poor. Only the nearly steady state periods in sandwich type test walls gave adequate results, nonsteady state behavior being different from that expected in an ideal multilayer wall.
Author (ESA)

N82-10376# Technical Research Centre of Finland, Espoo. Metals Lab.
TUBE TESTING BY INSIDE EDDY-CURRENT PROBE [PUTKIEN TARKASTUS SISAEPUOLISELLA PYOERREVIRTAKALLA]
Matti Sarkimo 1981 15 p refs In FINNISH; ENGLISH summary
(VTT-81; ISBN-951-38-1153-0; ISSN-0355-6395) Avail: NTIS HC A02/MF A01

The principles of eddy current testing, methods and equipment are reviewed. Use of the inside eddy current probe for detecting corrosion and erosion defects inside heat exchanger tubes is described. The defective areas are easy to locate in the longitudinal direction of the tubes. By indication analysis, defects inside and outside the tubes can usually be separated and also the defect depths can be estimated with sufficient accuracy. Results of typical inspections are shown. Author (ESA)

N82-10377# Imperial Coll. of Science and Technology, London (England). Dept. of Mechanical Engineering.
EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THREE DIMENSIONAL TURBULENT MIXING IN JETS AND DUCTS Ph.D. Thesis - London Univ.
George W. Carroll Nov. 1980 279 p refs
(HTS/80/6) Avail: NTIS HC A13/MF A01

Only parabolic flows are considered. The model was derived from a two dimensional model, based on a turbulent viscosity concept and the supposition that turbulence can be adequately described by the kinetic energy of turbulence and the dissipation rate of turbulent kinetic energy. Predictions are made for two laboratory model flows with complex-shaped shear layers. A computer program is developed that predicts the flow in an exhaust duct of a fan jet engine equipped with a lobe mixer. The important features of the flow are predicted accurately, even in the region where the shear layers completely fill the flow field where discrepancies are usually quite large. Author (ESA)

N82-10378# Imperial Coll. of Science and Technology, London (England). Dept. of Mechanical Engineering.
APPLICATIONS OF A LOW REYNOLDS NUMBER TURBULENCE MODEL AND WALL FUNCTIONS FOR STEADY AND UNSTEADY HEAT-TRANSFER COMPUTATIONS Ph.D. Thesis - London Univ.
Mohamed Abdel-Meguid Elhadidy Jan. 1980 243 p refs
(HTS/80/7) Avail: NTIS HC A11/MF A01

A composite model and a wall function method for computing turbulent flow and heat transfer close to walls are described. The Reynolds stress is calculated from the kinetic energy of turbulence and its dissipation rate, by means of differential transport equations. Semi-analytical solutions are employed and a solution applicable for the whole range of laminar Prandtl number fluids is developed, considering the variation of effective thermal laminar sublayer thickness with Reynolds and laminar Prandtl numbers. Applications to the computation of steady hydrodynamic, steady, and unsteady heat transfer in pipes are presented. Conjugate heat transfer analysis of the effects of streamwise diffusion of heat inside a solid wall and in the flow fields, and effects of solid to fluid conductivity ratio, are given. Comparison with experimental data shows good agreement. Data from investigations on an unsteady heat transfer conjugate problem support the validity of the composite model. Author (ESA)

N82-10379 California Inst. of Tech., Pasadena.
STUDIES OF THE NONLINEAR SCHROEDINGER EQUATION AND ITS APPLICATION TO WATER WAVES Ph.D. Thesis
David Uhl Martin 1981 135 p
Avail: Univ. Microfilms Order No. 8118919

Various properties of the nonlinear Schroedinger equation and special solutions thereof are investigated, with emphasis on applications to water waves. The spreading of model energy for initial conditions corresponding to unstable perturbations of a uniform wave is investigated numerically and analytically. Stability results for plane-wave envelopes on a two dimensional surface are calculated and verified numerically with the nonlinear Schroedinger equation. For standing wave disturbances, instability is found for both odd and even modes; as the period of the unperturbed solution increases, the instability associated with the odd modes remains, but that associated with the even modes disappears. Bifurcation techniques are used to obtain a new class of small amplitude water waves of permanent form. Two types of new solutions are found, one symmetric with respect to the carrier wave propagation direction, and one asymmetric. Finally, the nonliner Schroedinger equation is used to study the interaction of deep-water gravity waves with currents.
Dissert. Abstr.

N82-10985# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF PERFORMANCE OF SUPERSONIC EJECTOR NOZZLE
Shen Huili and Chen Zhongqing *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 87-109 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

N82-11001# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A STUDY ON INSULATED RISERS
Zhoe Yaohe, Zhang Yanwei, Qu Weitao, Lin Zaiue, Mao Zhiying, Wang Youxu, Niu Jingxin, and Zhang Qixn *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 174-196 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-10380 Polytechnic Inst. of New York, Brooklyn.
INVESTIGATIONS OF ELECTRICALLY EXPLODING THIN SHELLED METALLIC TUBES Ph.D. Thesis
Charles David Hechtman 1981 104 p
Avail: Univ. Microfilms Order No. 8118873

An instability was identified experimentally on the tube prior to vaporization. A theoretical analysis was developed that predicts the instability. The metallic shells were exploded via a capacitor bank. The tube is observed with a modified shadowgraph technique and a long wavelength instability was observed to dominate at the onset. Theoretical treatment of the problem was derived in part from the Z pinch instability method of Kruskal and Tuck and the mechanical stress analysis was occupied mainly from the techniques of Onat on thin shelled tubes. These methods are integrated to form a theoretical basis for the instability analysis.

The experimental observation and the results of the theoretical analysis compare favorably. Dissert. Abstr.

N82-10381*# Princeton Univ., N. J. Dept. of Astrophysical Sciences.

SEC SENSOR PARAMETRIC TEST AND EVALUATION SYSTEM Final Report, 29 Apr. 1976 - 29 Jan. 1977

7 Mar. 1978 175 p refs
(Contract NAS5-23386)
(NASA-CR-166737) Avail: NTIS HC A08/MF A01 CSCL 14B

This system provides the necessary automated hardware required to carry out, in conjunction with the existing 70 mm SEC television camera, the sensor evaluation tests which are described in detail. The Parametric Test Set (PTS) was completed and is used in a semiautomatic data acquisition and control mode to test the development of the 70 mm SEC sensor, WX 32193. Data analysis of raw data is performed on the Princeton IBM 360-91 computer. T.M.

N82-10382# Michigan Univ., Ann Arbor.

PRECISION POSITRON POLARIMETRY: A NEW TECHNIQUE IN WEAK-INTERACTION STUDIES Final Report, 1 Jul. 1979 - 1 Jul. 1981

D. E. Newman and A. Rich Jun. 1981 13 p refs
(DE81-027435; DOE/ER-10451/2) Avail: NTIS HC A02/MF A01

The development of the positron polarization comparator is described. It consists of a magnetic (ALPHA)-ray spectrometer coupled to a positron polarimeter. This device is capable of comparing the polarization of positrons from two different nuclei to an accuracy which we estimate to ultimately reach 2 x 10(+4), thus enabling investigations of weak interaction features previously inaccessible to experiment. The current comparator system, including the results of studies of the systematic effects to be anticipated in such devices, is described. DOE

N82-10383# Sandia Labs., Albuquerque, N. Mex.

TRANSIENT TEMPERATURE RESPONSE OF STRAIN GAGES

P. H. Adams 1981 14 p refs Presented at the BSSM-SEASA Intern. Conf., Edinburgh, 31 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-767387; SAND-80-2689C; CONF-810807-1) Avail: NTIS HC A02/MF A01

When an electrical resistance strain gage bonded to a material is subjected to a temperature change, the resistance of the strain gage changes even though the material is free of stress. This temperature-induced resistance change is generally expressed in strain units and is commonly called apparent strain or thermal output. The thermal expansion coefficients and the temperature coefficient of resistance are temperature dependent quantities and not necessarily linearly related to temperature. For transient temperature conditions, the two temperatures are different. The magnitude and effect of the temperature difference on apparent strain is studied. DOE

N82-10384# Los Alamos Scientific Lab., N. Mex.

DESIGN AND FABRICATION OF A HIGH-DAMAGE THRESHOLD INFRARED SMARTT INTERFEROMETER

R. B. Hammond and A. J. Gibbs 1981 4 p refs Presented at the Conf. on Optics, Santa Fe, N. Mex., 7-10 Apr. 1981
(Contract W-7405-eng-36)
(LA-UR-81-1395; CONF-810429-27) Avail: NTIS HC A02/MF A01

A Smartt interferometer was investigated in terms of its use as a very precise alignment tool for infrared lasers. Particular emphasis was placed on its application to high power, fast pulse laser systems such as Helios and Antares. Results indicate that fabrication of structure with the unique optical characteristics of the Smartt interferometer combined with a very high optical damage threshold is necessary. DOE

N82-10385# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).

PHASE A STUDY FOR THE SPACELAB EXPERIMENT: CONICAL SCAN RADIOMETER Final Report

Helmut Klostermann, Franz Pittermann, Wolfgang Ruehe, and Walter Schrieder Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 98 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-80-013; ISSN-0170-1339) Avail: NTIS HC A05/MF A01; Fachinformatinszentrum, Karlsruhe, West Germany DM 20,60

In order to map the total global radiation budget it is necessary to develop an instrument with an extremely broad spectral range (from 0.2 to 76 microns) and complete coverage of each ground path with as few orbits as possible. The number of measured radiation angles has to be maximum and the measuring principle should be independent of slow spacecraft yaw-motions. With respect to these requirements, different system concepts were investigated by means of efficiency analysis. The resulting most feasible concept is described in more detail and can be used as a baseline for a system definition study. Author (ESA)

N82-10386# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

DESCRIPTION OF A RADIOMETER FOR 94 GHz [BESKRIVNING AV RADIOMETER FOER 94 GHz]

Rolf Krook (Chalmers Univ. of Technology), Erik Kollberg (Chalmers Univ. of Technology), Lars-David Wernlund, and Gunnar Stenstroem Dec. 1980 47 p Partly in SWEDISH and ENGLISH
(FOA-C-30208-E1) Avail: NTIS HC A03/MF A01

The design and construction of a radiometer for 94 GHz is described. The radiometer is Dicke receiver and its temperature can be measured up to 876 K by double sideband techniques. R.C.T.

N82-10387# British Gas Corp., Newcastle-upon-Tyne (England). Engineering Research Station.

EFFECT OF TEMPERATURE ON VIBRATING WIRE STRAIN GAUGES

J. K. Marshall and P. Hunter Jan. 1980 12 p Submitted for publication
(ERS-E-240) Avail: NTIS HC A02/MF A01

Two methods of assessing true pipe strain values from indicated strain readings are outlined: a graphical analysis which tends to be intuitive, and a theoretical analysis which derives a solution from first principles. True strain in buried pipes is influenced by thermal effects due to changes in ground temperature and mechanical effects due to the constraints placed on the pipe by the surrounding soil. Both analyses consider the thermal and mechanical components of true strain, while the theoretical analysis enables these individual components to be determined from the indicated strain readings. Author (ESA)

N82-10388# Leeds and Northrup Co., North Wales, Pa.

MODIFICATION OF OPTICAL INSTRUMENTS FOR IN-STACK MONITORING OF PARTICLE SIZE Final Report, Sep. 1979 - Aug. 1980

A. L. Wertheimer Jun. 1981 46 p refs
(Contract EPA-68-02-3253)
(PB81-213373; EPA-600/2-81-096) Avail: NTIS HC A03/MF A01 CSCL 14B

A light scattering instrument for in-situ measurements of particles in the 0.2 to 20 micrometer diameter size range is described, and field test results are presented. The instrument is a modified version of an earlier prototype. The upper limit of the size response was extended from 10 to 20 micrometers, and several component and packaging changes were incorporated to make the unit more suited to stack particulate emission survey applications. The completed instrument was tested at a coal-fired electric power generating facility. A cascade impactor was used as a referee device and both instruments were run side by side in the outlet duct of the electrostatic precipitator. Results show an excellent correlation between the two instruments with regard to the identification of a 1 micrometers diameter peak in the particle size distribution. A second peak around 20 micrometers, defined by the optical instrument, could not conclusively be confirmed through the impactor data. GRA

N82-10389# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

AN OPTIMUM DESIGN PROCEDURE OF TOTAL-

TEMPERATURE THERMOCOUPLE PROBE
Liu Cihong and Zhao Jue-liang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 110-131 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

N82-10991# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE COMPUTATION OF INTEGRAL TYPE FLEXURE HINGE ASSEMBLY OF DYNAMICALLY TUNED GYROSCOPES
Mei Shuo-ji *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 239-270 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-10389 California Inst. of Tech., Pasadena.
ULTRA-HIGH FREQUENCY DYNAMICS OF SEMICONDUCTOR INJECTOR LASERS Ph.D. Thesis
Kam-Yin Lau 1981 195 p
Avail: Univ. Microfilms Order No. 8118917

The basic analog modulation and transient characteristics of injection lasers with various structures are studied and compared. The basic limitations on ultrahigh frequency (> 5 GHz) modulation of lasers are considered. Self-pulsations in injection lasers are studied and their interaction with external cavities are clarified. These studies lead to the quenching of self-pulsation and ultra-short short pulse generation in laser diodes by coupling to an external cavity. A novel external fiber resonator is introducad for this purpose. Pattern effects in pulse code modulation of injection lasers are studied and a bipolar pulsing scheme devoid of the above effect is described. The transverse mode shift in a transverse junction laser under ultra-shot electrical pulse excitation is investigated. Finally, the frequency response of superluminescent lasers (lasers without mirrors) is analysed. Dissert. Abstr.

N82-10390*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ACTIVE LAMP PULSE DRIVER CIRCUIT Patent Application
K. Edward Logan, inventor (to NASA) (International Laser Systems, Inc.) Filed 24 Jun. 1981 24 p
(NASA-Case-GSC-12566-1; US-Patent-Appl-SN-276748) Avail: NTIS HC A02/MF A01 CSCL 20E

A flashlamp drive circuit is described in detail. The device uses an unsaturated transistor as a current mode switch to periodically subject a partially ionized gaseous laser excitation flash-lamp to a stable, rectangular pulse of current from an incomplete discharge of an energy storage capacitor. A monostable multivibrator sets the pulse interval, initiating the pulse in response to a flash command by providing a reference voltage to a non-inverting terminal of a base drive amplifiers. A tap on an emitter resistor provides a feedback signal sensitive to the current amplitude to an inventory terminal of the amplifier, thereby controlling the pulse amplitude. The circuit drives the flashlamp to provide a square-wave current flashlamp discharge. NASA

N82-10391# Schafer (W. J.) Associates, Inc., Wakefield, Mass.
LOW VOLTAGE FREE ELECTRON LASER. VOLUME 2: THEORY Final Report, 30 Apr. 1980 - 29 Apr. 1981
S. A. Mani and C. S. Chang 29 Jun. 1981 49 p refs
(Contract N00014-80-C-0515)
(AD-A103049; WJSA-FTR-81-168) Avail: NTIS HC A03/MF A01 CSCL 20/5

The theory of the low voltage free electron laser has been surveyed. The physics of trapping and high extraction are discussed. The technical issues connected with the two stage FEL optics are discussed. Author (GRA)

N82-10392# Illinois Univ., Urbana. Dept. of Electrical Engineering.
INVESTIGATION ON NON-GLASS LASER FUSION TARGETS: THEIR FABRICATION, CHARACTERIZATION, AND TRANSPORT Progress Report, 1 Jun. 1980 - 31 Jan. 1981
Kyekoon Kim 1981 86 p refs Prepared for Calif. Univ., Lawrence Livermore Lab., Calif.
(Contract W-7405-eng-48)
(DE81-026566; UCRL-15357; CPRLR-2-81) Avail: NTIS HC A05/MF A01

The development of techniques for fabricating, characterizing, and transporting laser fusion targets on a continuous basis was investigated. The target fabrication techniques are intended mainly for nonglass spherical shell targets, both cryogenic and noncryogenic. The following categories were investigated: (1) Liquid hydrogen behavior inside a spherical laser fusion target; (2) development of automated target characterization scheme; (3) cryogenic target fabrication scheme utilizing cold gas levitation and electric field positioning; (4) development of a cryogenic target fabrication system based on target free fall method; (5) generation of hydrogen powder using electrohydrodynamic spraying; (6) study of target charging techniques for application to contactless cryogenic target fabrication; and (7) development of hollow metal sphere production technique. DOE

N82-10393# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemistry.
LOW-PRESSURE APPROACH TO THE FORMATION AND STUDY OF EXCIPLEX SYSTEMS Final Report
George Sanzone Jun. 1981 59 p refs
(Contracts DE-AS02-76DP-40071; EY-76-S-02-2810)
(DE81-028316; DOE/DP-40071/T1) Avail: NTIS HC A04/MF A01

Development and construction of an experimental system for the study of the kinetics of excimers, and the validity of the low pressure approach to such studies was demonstrated. The apparatus consists of the following: (1) cluster molecular-beam souce of van der Waals dimers and higher oligomers; (2) modulated beam mass spectrometer; (3) low energy electron beam for the production of excimers; (4) vacuum ultraviolet to visible detection and photon counting system to monitor excimer emission; (5) flash excited tunable laser for studies of resonant self absorptions. The formation of Ar2 in its van der Waals ground state the productional $Ar2^*$ by electron bombardment of Ar2 and fluorescence and photon absorption of $Ar2^*$ are discussed. DOE

N82-10394# Sandia Labs., Albuquerque, N. Mex.
IMPROVED DATA-REDUCTION METHODS FOR LASER-PULSE-DIFFUSIVITY DETERMINATION WITH THE USE OF MINICOMPUTERS
J. A. Koski 1981 27 p refs Presented at the Intern. Joint Conf. on Thermophys. Properties, Gaithersburg, Md., 15 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024070; SAND-80-2602C; CONF-810683-2) Avail: NTIS HC A03/MF A01

A generalized approach for obtaining simultaneous laser pulse time and radiative heat loss corrections for an arbitrary laser pulse shape is developed. A large scale computer is used to calculate convolution integral solutions and generate correction factors. The results are then put into a form convenient for minicomputers. A parameter estimation theory approach to data reduction presented as an alternative to the methods of Cowan, or Clark and Taylor, involves fitting an analytical solution to experimental data by minimizing the mean square error between the two. Thermal diffusivity and radiative loss factor are determined simultaneously from a solution form which includes laser pulse time corrections. The use of nonrecursive linear digital noise filters based on finite Fourier transform techniques is also discussed as a method for smoothing of data on minicomputers. Some results obtained for pulse diffusivity data with the use of a filter with hanning window characteristics are presented. DOE

N82-10395# Oak Ridge National Lab., Tenn. Analytical Chemistry Div.
SIMPLE OPTOACOUSTIC ENERGY METER FOR PULSED LASERS

Robert W. Shaw 1981 8 p refs Presented at the 2nd Intern. Photoacoustic Spectry. Conf., Berkeley, Calif., 22 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024122; CONF-810630-6) Avail: NTIS HC A02/MF A01

The instrument's sensitivity is 0.24 microjoule noise equivalent energy and its accuracy is + or - 5% over 3.5 decades. The design of the instrument is described along with cost estimates for production. T.M.

N82-10396# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
TESTS WITH LASER BATHYMETRY [FOERSOEK MED LASERBATYMETRI]
Goeran Bolander, Haakan Klevebrant, Joergen Lexander, Ove Steinvall, Anders Widen, and Tryggve Ramquist Jul. 1980 40 p refs In SWEDISH
(FOA-C-30196-E1) Avail: NTIS HC A03/MF A01

Tests with an airborne laser were carried out in order to check this method for maritime close-watch and reconnaissance missions as well as for seabottom charting. The obtained depth-range was limited, owing to certain electric disturbances, to about 12 m from an altitude of 100 m, which in this case corresponds to about six attenuation-lengths. Extrapolation of the obtained data and also a theoretical analysis indicate that it is quite possible to reach 15 to 20 attenuation-lengths, which for typical Baltic Sea water corresponds to a depth of up to 40 m. With regard to the Baltic Sea, the best transmission occurs for wavelengths of 540 to 560 nm. Author (ESA)

N82-10397# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abteilung Forschungsanlagen.
THEORY AND CONSTRUCTION OF A TWO-COMPONENT LASER VELOCIMETER
Jens-Carten Petersen Feb. 1981 31 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-81-06) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 6,40

The principle of a crossbeam laser anemometer is described in simplified form. The theory is based on DISA two-color optics and is conceived for the simultaneous determination of two velocity components. Exact optical adjustment is supposed for training the DISA optics. This is of particular importance to the derived interference line interval and the Bragg cell orientation. The electronics necessary for signal conditioning are also described, and the construction of a complete measuring system is discussed, including software, relative to an already existing laser velocimeter for one component. Author (ESA)

N82-10398# Quantronix Corp., Smithtown, N.Y.
DUAL WAVELENGTH LASER THERMAL PROCESSING OF SEMICONDUCTORS Final Report
Martin G. Cohen, Kuo-Ching Liu, and Robert A. Kaplan Jun. 1980 46 p refs
(Grant NSF DAR-79-17090)
(PB81-218000; NSF/RA-800540) Avail: NTIS HC A03/MF A01 CSCL 13H

The annealing of ion implantation damage in semiconductors by laser irradiation is optimized by employing a dual wavelength laser source and tailoring the time delay between pulses at the two wavelengths. The strong temperature dependence of the absorption coefficient for the initially less strongly absorbed wavelength is neutralized. A solid state laser emitting high intensity was used in conjunction with an optical fiber delay line to study the annealing characteristics of an arsenic implanted silicon solar cell wafer. The results are in agreement with a theoretical model based on melting and liquid phase epitaxial regrowth. GRA

N82-10399 California Inst. of Tech., Pasadena.
(AlGa)As SEMICONDUCTOR LASERS AND INTEGRATED OPTOELECTRONICS Ph.D. Thesis
Daniel Paul Wilt 1981 146 p
Avail: Univ. Microfilms Order No. 8119583

The design, fabrication, and testing of the first monolithic integrated optical repeater is described. The use of ion implantation as a technique to fabricate both lasers and field effect transistors is discussed. A theoretical model of the double heterostructure laser is given which treats the p-n junction in the device correctly by using fundamental semiconductor relationships and reasonable assumptions about the device heterointerfaces. The effect of lateral carrier diffusion upon the modulation characteristics of the semiconductor laser is discussed. An approach to effective permittivity formalism is presented which clarifies and extends the use of this technique particularly in the treatment of waveguiding in the semiconductor laser. Dissert. Abstr.

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-10400 Polish Academy of Sciences, Warsaw. Inst. Podstawowych Problemow Techniki.
EVALUATION OF MECHANICAL RATCHETING USING ENDOCHRONIC THEORY Ph.D. Thesis
Tetsuo Nashiro 1981 93 p refs
(ISSN-0208-5658) Copyright. Avail: Issuing Activity

A material deformation phenomenon (ratcheting) is described which results from a condition of steady stress with superposed cyclic high stress. A nonlinear endochronic theory was constructed to describe the nonlinear dependence of ratchet strain on the steady stress. The stress-strain curves at each cycle are also incorporated in the model, and cyclic hardening and softening are discussed. Finally, the effectiveness of endochronic theory applied to the multiaxial loading case is determined. M.G.

N82-10401*# Cleveland State Univ., Ohio. Dept. of Mechanical Engineering.
A MULTI-PURPOSE METHOD FOR ANALYSIS OF SPUR GEAR TOOTH LOADING Final Report
R. Kasuba, J. W. Evans, R. August, and J. L. Frater Oct. 1981 106 p refs
(Contract NAS3-18547)
(NASA-CR-165163) Avail: NTIS HC A06/MF A01 CSCL 13I

A large digitized approach was developed for the static and dynamic load analysis of spur gearing. An iterative procedure was used to calculate directly the 'variable-variable' gear mesh stiffness as a function of transmitted load, gear tooth profile errors, gear tooth deflections and gear hub torsional deformation, and position of contacting profile points. The developed approach can be used to analyze the loads, Hertz stresses, and PV for the normal and high contrast ratio gearing, presently the modeling is limited to the condition that for a given gear all teeth have identical spacing and profiles (with or without surface imperfections). Certain types of simulated sinusoidal profile errors and pitting can cause interruptions of the gear mesh stiffness function and, thus, increase the dynamic loads in spur gearing. In addition, a finite element stress and mesh subprogram was developed for future introduction into the main program for calculating the gear tooth bending stresses under dynamic loads. A.R.H.

N82-10402*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
MODULAR ANTENNA DESIGN STUDY Final Report
John W. Ribble Sep. 1981 202 p refs
(Contract NAS1-14887)
(NASA-CR-3316; LMSC-D714622) Avail: NTIS HC A10/MF A01 CSCL 13I

The mechanical design of a modular antenna concept was developed sufficiently to allow manufacture of a working demonstration model of a module, to predict mass properties, and to make performance estimates for antenna reflectors composed of these modules. The primary features of this concept are: (1) each module is an autonomous structural element which can be attached to adjacent modules through a three point connection; (2) the upper surface is a folding hexagonal truss plate mechanism which serves as the supporting structure for a reflective surface; and (3) the entire truss and surface can be folded into a cylindrical envelope in which all truss elements are essentially parallel. The kinematic studies and engineering demonstration model fully verified the deployment kinematics, stowing philosophy, and deployment sequencing for large antenna modules. It was established that such modules can be stowed in packages as small as 25 cm in diameter, using 1.27 cm diameter structural tubes. The development activity indicates that this deployable modular approach towards building large structures in space will support erection of 450 m apertures for operation up to 3 GHz with a single space shuttle flight. A.R.H.

N82-10403# Encotech, Inc., Schenectady, N.Y.

COMBUSTION TURBINE COMBINED-CYCLE R AND D PROJECT PRIORITY ANALYSIS Final Report

K. S. Deligiannis and J. Patmore, (Systems Control, Inc., Palo Alto, Calif.) Jul. 1981 237 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 990-4)
(DE81-904206; EPRI-AP-1943) Avail: NTIS HC A11/MF A01

The development of a Computerized priority methodology for combustion Turbine R nd D projects was studied. The development of reliable and cost effective combustion turbine combined cycle systems is discussed. Time and funds to meet this development goal are limited, a method to prioritize potential R and D projects is highly desirable. The methodology includes a combined cycle plant simulation model (CCPSM) and a prioritization algorithm that ranks alternatives based on their benefit/cost effectiveness. DOE

N82-10404# Westinghouse Electric Corp., Tampa, Fla. Nuclear Equipment Div.

DEVELOPMENT OF AUTOMATED WELDING PROCESS FOR FIELD FABRICATION OF THICK WALLED PRESSURE VESSELS

R. A. Schneider 1981 13 p
(Contract DE-AC05-78ET-13511)
(DE81-028914; DOE/ET-13511/T8) Avail: NTIS HC A02/MF A01

Four tasks are reported on: (1) review of welding processes; (2) adaptation of the GTAW-HW narrow groove process to vertical and horizontal welds; (3) 8-inch thick field demonstration/qualification welds; and (4) welding procedure handbook. DOE

N82-10405# Westinghouse Electric Corp., Concordville, Pa. Combustion Turbine Systems Div.

ADVANCED COOLING FULL-SCALE ENGINE DEMONSTRATION PROGRAM Final Report

Jul. 1981 240 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1319-2)
(DE81-904240; EPRI-AP-1933) Avail: NTIS HC A11/MF A01

A cooling technology for vanes, blades and associated hot section components of a combustion turbine was developed. Three advanced cooling concepts were investigated for application over a maximum metal temperature range of 1100 to 15000 F: Lamilloy Spar, Shell/Spar and Hybrid. The susceptibility of transpiration cooled vanes to plugging in a residual oil combustion environment was determined. The engine modifications were defined. The Shell/Spar concept at 1500 F maximum metal temperature was selected for detailed design and fabrication. Temperature selection is based on performance and corrosion considerations. A design criteria for fabricating the Shell/Spar blades and vanes is developed. DOE

N82-10406# General Electric Co., St. Petersburg, Fla. Gas Turbine Div.

WATER-COOLED GAS TURBINE DEVELOPMENT PROGRAM Final Report

Jun. 1981 249 p Sponsored in part by Electric Power Research Inst. 2 Vol.
(EPRI Proj. 234-3)
(DE81-904245; EPRI-AP-1889-Vol-1) Avail: NTIS HC A11/MF A01

Work on the EPRI water cooled gas turbine development program, RP234 is summarized. The viability of water cooling to achieve higher firing temperatures and increased fuels flexibility in utility gas turbines was established. It is found that water cooling is a viable concept and that it results in considerable improvements in gas turbine combined cycle efficiency at increased firing temperatures. DOE

N82-10407# General Electric Co., St. Petersburg, Fla. Gas Turbine Div.

WATER-COOLED GAS TURBINE DEVELOPMENT PROGRAM Final Report

Jul. 1981 651 p , refs Sponsored in part by Electric Power Research Inst. 2 Vol.
(EPRI Proj. 234-3)
(DE81-904229; EPRI-AP-1889-Vol-2) Avail: NTIS HC A99/MF A01

Descriptions of the test rigs, experimental procedures, and data acquired during the testing of the water cooled gas turbine are presented. Areas of turbine design that required further information and detailed data of a complete gas turbine are identified. These areas include: water heat transfer in rotating buckets; transfer of cooling water to the turbine rotor; distribution of the water to individual cooling passages in the buckets; collection of unvaporized water from the bucket tips; the influence of water on rotor and bucket vibration; water purity requirements to limit deposition in cooling passages; water erosion of turbine materials; and the establishment of proper blading surface temperatures to minimize hot corrosion and ash deposition from contaminated fuels. DOE

N82-10408# Centre Technique des Industries Mecaniques, St. Etienne (France).

EVALUATION OF LUBRICANTS FOR AIR COMPRESSORS Final Report [EVALUATION DES LUBRIFIANTS POUR COMPRESSEURS D'AIR]

N. Ollier and J. G. Schamelhout Sep. 1979 321 p refs In FRENCH
(CETIM-12-E-12-0) Avail: NTIS HC A14/MF A01

Given the lubricant requirements specific to the domain of application (reciprocating air compressors; centrifugal or turbo air compressors) methods of evaluation and tests are proposed. These methods were applied in the laboratory to products considered representative of the principal families of lubricants commonly in use. Lubricating performance of these products is disclosed. Author (ESA)

N82-10409# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Berlin (West Germany). Abt. Turbulenzforschung, Berlin.

NOISE REDUCTION IN CENTRIFUGAL FANS BY USE OF RESONATORS

Wolfgang Neise and Gary H. Koopmann (Houston Univ.) Mar. 1981 53 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-723)
(DFVLR-FB-81-09) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 9.20

The significant reduction of aerodynamically generated blade passage noise at the source by mounting a lambda/4 resonator at the cut-off lip on centrifugal fans is considered. While preserving the original cut-off lip geometry, the perforated mouth of the resonator now forms the lip. The resonator can be tuned to various frequencies, e.g., the blade passage frequency, via a moveable end plug, enabling reductions in tone intensity of up to 29 dB. Attenuation of a somewhat lesser degree occurs within a frequency band about the resonance frequency. The bandwidth of the resonator response is influenced by the porosity of the resonator mouth. Author (ESA)

N82-10992# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A THEORETICAL ANALYSIS OF INVOLUTE HARMONIC GEARING

Shen Yunwen *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 271-314 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

N82-11002# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE STUDY ON TECHNOLOGICAL FUNDAMENTALS OF PULSED SPRAY TRANSFER ARC WELDING (IV). OBSERVATIONS ON ARC PHENOMENA IN THE CASE OF STABLE WELDING CONDITION
Duan Liyu, Cheng Gongshou, Feng Jijiang, Wang Xuxi, and Lu Xuezhen *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 197-236 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
(Rept-1) Avail: NTIS HC A18/MF A01

N82-11003# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A FAST FOURIER TRANSFORM HARDWARE PROCESSOR
Kang Ji-Chang and Xu Naiping *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-PT-2) 28 Aug. 1981 p 237-252 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-10410 Drexel Univ., Philadelphia, Pa.
THE UTILIZATION OF SIGNAL PROCESSING AND PATTERN RECOGNITION FOR THE ADVANCEMENT OF ULTRASONIC NONDESTRUCTIVE TESTING Ph.D. Thesis
Michael Joseph Avioli, Jr. 1981 155 p
Avail: Univ. Microfilms Order No. 8118925

Different technologies that utilize signal processing and pattern recognition to use these desciplines to advance the state of the art in flaw and material classification in ultrasonic inspection are presented. The availability of suitable tools for analysis, and two sample problems that can be handled with this integrated technology are described. The two problems are related to weld inspection, the first on welded plates, and the second for K joint damage analysis in an offshore structure. The development of a system software package the Generalized Approach to New Problems in Ultrasonic Inspection (GANPUI) is described.
Dissert. Abstr.

N82-10411# Westinghouse Electric Corp., Mercury, Nev. Advanced Energy Systems Div.
QUALITY-ASSURANCE PROGRAM PLAN
R. A. Kettell May 1981 74 p
(Contract DE-AC08-80NV-10061)
(DE81-028257; DOE/NV-10061/7) Avail: NTIS HC A04/MF A01

The quality assurance program which is applied to radioactive waste management activities conducted at the Nevada test site is presented. The systematic and administrative controls to assure quality, safety, reliability, and maintainability during design, procurement, fabrication, inspection, shipments, tests, and storage are described.
DOE

N82-10412# Engins Matra, Velizy (France).
MILITARY COMPONENTS POLICY. GENERAL REFLECTIONS ON THE DEFINITION OF PROCEDURES FOR TROUBLESHOOTING MILITARY EQUIPMENT [POLITIQUE COMPOSANTS MILITAIRES. REFLEXION GENERALE POUR LA DEFINITION DE PROCEDURES DE DEVERMINAGE D'EQUIPEMENTS MILITAIRES]
J. Ringler 22 Aug. 1980 18 p In FRENCH
Avail: NTIS HC A02/MF A01

Debugging profiles which represent a compromise between cost and effectiveness, specific to military equipment developed by MATRA, are proposed. Principally, electronic equipment (computers, automatic pilots, power supply circuits, etc.) is considered. The objectives of troubleshooting are defined, and a mathematical model of test procedure effectiveness is given. After reviewing those factors which favor effective debugging, MATRA equipment test programs were drawn up, and a scheme for determining their validity is suggested.
Author (ESA)

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N82-10413 California Univ., Davis.
THE INFLUENCE OF END FRICTION AND LENGTH-TO-DIAMETER RATIO ON THE BEHAVIOR OF CONCRETE CYLINDERS Ph.D. Thesis
Islam Ahmed Basunbul 1981 216 p refs
Avail: Univ. Microfilms Order No. 8117558

Separate experiments were performed to evaluate the friction coefficients of steel heads with five different controlled surface textures and on Teflon pads. Three different sizes of concrete cylinders were loaded to failure. Axial and lateral deformations and failure patterns were studied. Incremental finite element analyses with nonlinear modeling of the concrete materials were performed taking into consideration the size and the different friction constraints at the ends of the test specimen. Results indicate that for concrete cylinders with a length to diameter ratio of 2 or more, friction is not significant in compression. However, as the L/D ratio decreases, the influence of friction rapidly becomes very significant.
Dissert. Abstr.

N82-10414 Pennsylvania Univ., Philadelphia.
THE STATISTICS OF THE OCEAN WAVE-CURRENT FORCE WITH APPLICATION TO OFFSHORE STRUCTURES Ph.D. Thesis
Haym Benaroya 1981 213 p
Avail: Univ. Microfilms Order No. 8117756

A nonlinear, statistical model for the loadings on offshore structures due to ocean waves and currents is developed. System parameters are treated as random variables, and the responses of specific structures to this model are determined. The areas considered are: the wave force, the wave-current force, the effect of a nonrigid structure on fluid-structure interaction; vortex shedding forces; and the application of the force model to representative structures.
Dissert. Abstr.

N82-10415 Virginia Univ., Charlottesville.
VIBRATIONS OF LOCALLY MODIFIED MECHANICAL AND STRUCTURAL SYSTEMS Ph.D. Thesis
Alan Brian Palazzolo 1981 308 p
Avail: Univ. Microfilms Order No. 8117919

Several approximate reanalysis procedures for solving the free and harmonically forced response problems of damped, unsymmetric systems are developed. By fully exploiting the sparsity of the modifications to these systems, the procedures are computationally efficient. The modified systems are condensed by employing generalized receptance matrix elements. An improved hybrid spectral - property matrix receptance formalism is derived. This formalism is applicable to the general, unsymmetric, quadratic eigenvalue problem. Also, algorithms for eigensolution component synthesis, eigenvalue design, and forced harmonic response design are developed. The design methods should be useful tools to designers of active or passive vibration control devices. These algorithms may also be directly applied to system parameter identification schemes. The results demonstrate that by applying the reanalysis and design schemes to the search for an optimized structural design, the computational efficiency may be substantially increased over standard exact solution techniques.
Dissert. Abstr.

N82-10416 Virginia Polytechnic Inst. and State Univ., Blacksburg.
A MODELING TECHNIQUE FOR SUBSONIC STALL FLUTTER IN CASCADES Ph.D. Thesis

John Francis Sparks 1981 123 p
Avail: Univ. Microfilms Order No. 8118715

By combining a dynamic stall model with the equations of motion for a two-dimensional cascade of blades, a model was created which simulated torsional self-excited vibration of the cascaded blades. The lift and moment coefficients were correlated in Fourier magnitude and phase form with the reduced frequency, mean incidence angle, and the magnitude of the incidence angle change during the airfoil oscillation at a given Mach number. By calculating the inverse transform, it was then possible to closely reproduce the values of the lift and moment coefficients for the blade at any time during its oscillation. The motion of each blade in the cascade was determined by simultaneously integrating the equation of motion of every blade in the cascade. Values of lift and moment from the dynamic stall segment of the model were used to determine the external moment on the blades. These values were constantly updated at each time step as the blades responded. A uniform upstream flow was assumed and the effects of the blade movement on the flow in the blade passage were transmitted through a blade coupling term which was dependent upon the relative rate of oscillation of the adjacent blades. A rotating test rig was used to verify the model.
Dissert. Abstr.

N82-10417 Pennsylvania Univ., Philadelphia.
CYCLIC DEFORMATION AND STRAIN LOCALIZATION IN AL-4WT PERCENT CU ALLOY CONTAINING THETA DOUBLE PRIME PRECIPITATES Ph.D. Thesis
Jia-Kuen Jerry Lee 1981 283 p
Avail: Univ. Microfilms Order No. 8117806

The cyclic deformation of single crystals and polycrystals was explored in strain controlled tests for plastic resolved shear strains. The mechanism of cyclic softening is discussed. The cyclic stress strain curves (CSS curves) of the monocrystalline and polycrystalline material are similar. Both show plateau behavior; at strains both higher and lower than the plateau the cyclic flow stress increases with strain amplitude. The slip step heights produced by the quarter cycles were replicated to measure the strain localized in the persistent slip bands (PSB's) measured by interferometry and correlated with the applied plastic strain. It was thus found: that (1) after the peak, essentially all the plastic strain is carried by the PSB's; (2) they are segmented into micro PSB's; (3) their volume fraction is very low throughout the plateau; and (4) the localized strain varies between 0.3 and 0.6, two orders of magnitude higher than in copper. This results in crack nucleation within the PSB's and, the fatigue life is very low. However, just like in copper single crystal, the life is described by the Coffin-Manson law. Dissert. Abstr.

N82-10418 Texas Univ. at Arlington.
A FINITE ELEMENT ANALYSIS FOR PROBLEMS OF LARGE STRAIN AND LARGE DISPLACEMENT Ph.D. Thesis
Amin Saleh Aly 1981 139 p
Avail: Univ. Microfilms Order No. 8119252

The principle of virtual work, set in a Lagrangian frame of reference, is used for a finite element formulation of nonlinear boundary value problems for hyperelastic materials at large strains. The formulation is applicable to a general isotropic form of the strain energy function, and uses the Newton Raphson technique for incremental iterative analysis. In the discrete problem, two models are considered to simulate the behavior of rubber-like materials. The first model is a displacement model that has the displacement as the only variable. The second model is a mixed model that has both the displacement and hydrostatic pressure as variables. The performances of the eight-node serendipity element and the nine-node Lagrangian element are discussed. The formulation of the finite element scheme is completely consistent with the virtual work equations. This consistency leads to a good accuracy and rapid convergence of the computations.
Dissert. Abstr.

N82-10419 Louisiana State Univ. and A&M Coll., Baton Rouge.
AN EXPERIMENTAL EVALUATION OF NEUBER'S CYCLIC RELATION AT ROOM AND ELEVATED TEMPERATURE Ph.D. Thesis
Michael Wade Guillot 1981 152 p
Avail: Univ. Microfilms Order No. 8117628

The four quantities incorporated in Neuber's cyclic relation were measured so that a direct evaluation of the relation could be made. Three of the parameters were measured during tests lasting a thousand cycles on notched specimens run under completely reversed load control. These three were the stress and strain in the specimen far removed from the notch and the strain at the edge of the notch. The latter value was obtained using a novel laser based interferometric technique. The fourth parameter, stress at the notch, was inferred from load data taken on a small, smooth specimen which was subjected to the strains measured at the notch. These measurements were conducted on specimens manufactured from three different materials, with two notch geometries, and run at both room and elevated temperatures. After having recorded this data, Neuber's rule was used to compute a value for numerous cycles of each test which was then compared to the theoretical stress concentration factor. Results showed that Neuber's parameter was generally less than the stress concentration factor regardless of material, notch geometry, or temperature and is, therefore, a conservative design criterion.
Dissert. Abstr.

N82-10420 Louisiana State Univ. and A&M Coll., Baton Rouge.
SOME PROBLEMS IN ONE AND TWO-DIMENSIONAL COUPLED THERMOELASTICITY Ph.D. Thesis
Abdel Hassan Ghosn 1981 124 p
Avail: Univ. Microfilms Order No. 8117625

The one-dimensional, cylindrical, quasi-static, coupled thermoelastic problem is considered. The temperature and displacement fields in an infinitely long solid cylinder, and an infinite medium with a cylindrical hole whose boundaries are subjected to a time dependent function, are presented. These results, under the appropriate assumptions and loadings, are identical to published results. Also presented is the general solution in the transform domain for the two-dimensional cartesian plane strain coupled thermoelastic problem. As an application, the Lamb plane problem is treated under two loading conditions. The method used in both cases is the so-called direct approach, that is Laplace transform without resorting to the commonly used thermoelastic potential function.
Dissert. Abstr.

N82-10421# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 9
Judith Nagle-Eshleman, ed. Sep. 1981 123 p refs
(AD-A105062) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375: $15.00/set CSCL 20/11

Structural dynamic problems inherent to design, analysis, and operation of rotating machinery were investigated. The following Space Shuttle related problems are discussed: analytical and experimental loads, and dynamics efforts; development of data systems and environmental testing programs; Space Shuttle thermal protection system and the Space Shuttle main engine; structural dynamics, dynamic testing, and vibration control. For individual titles, see N82-10422 through N82-10424.

N82-10422# Polish Academy of Sciences, Warsaw.
LINEAR DYNAMIC THERMOELASTICITY: A SURVEY
J. Ignaczak *In* Shock and Vibration Information Center (Defense) The Shock and Vibration Dig., Vol. 13, No. 9 Sep. 1981 p 3-8 refs (For primary document see N82-10421 01-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375: $15.00/set CSCL 20/11

The historical development of linear dynamic thermoelasticity was surveyed. A linear theory of nonsteady heat conduction is combined with elastodynamics to describe thermomechanical processes in a solid body. Problems concerning periodic thermoelastic disturbances were solved. The periodicity hypothesis allows reduction of governing equations to classical Helmholtz equations with complex valued wave numbers and application of the classical elastodynamics to solve actual problems. Descriptions of fundamental results and of a basic system of field equations for dynamic thermoelasticity with relaxation times are surveyed.
E.A.K.

N82-10423# Ohio State Univ., Columbus.
PLATE VIBRATION RESEARCH, 1976 - 1980: CLASSICAL THEORY
A. W. Leissa *In* Shock and Vibration Information Center (Defense)

The Shock and Vibration Dig., Vol. 13, No. 9 Sep. 1981 p 11-22 refs (For primary document see N82-10421 01-39)
Avail: NTIS Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

The free transverse vibrations of plates was investigated. The following problems governed by the classical theory of plates are described: homogeneous, isotropic, thin, constant thickness, no inplane initial forces, small transverse displacements, vibrating in a vacuum. E.A.K.

N82-10424# Texas Technological Univ., Lubbock. Dept. of Mechanical Engineering.

PARAMETRIC VIBRATION. PART 6: STOCHASTIC PROBLEMS (2)

R. A. Ibrahim *In* Shock and Vibration Information Center (Defense) The Shock and Vibration Dig., Vol. 13, No. Sep. 1981 p 23-35 refs (For primary document see N82-10421 01-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Developments in the mathematical theory of stochastic differential equations and of random processes in the study of dynamic systems driven by random parametric excitation are discussed. Progress was made in the analysis of stochastic stability of linear and nonlinear systems. New closure techniques to truncate the infinite hierarchy moments equations are established. The probability of the first passage time, the interaction between self excited and random parametric vibrations, and identification of oscillating and vibroimpact systems are reviewed. E.A.K.

N82-10425 Materials Research Labs., Melbourne (Australia).

USE OF WEIGHT FUNCTIONS TO DETERMINE THE STRESS INTENSITY FOR A CRACKED THICK-WALLED CYLINDER

Graham Clark May 1981 19 p refs
(MRL-R-814; AR-002-413) Copyright. Avail: Issuing Activity

The use of weight functions to determine stress intensities for cracked specimens is demonstrated. While the initial derivation of a suitable weight function for some specimen geometries may be complex, the technique offers substantial benefits. In particular, stress intensities may be estimated for any initial stress distribution, and variations in stress intensity which result from the introduction of residual stress fields may be handled without the need to perform a full re-analysis for each case. The stress intensity at the tip of a crack which grows through a known stress field is estimated using a weight function technique. The geometry considered is a thick-walled cylinder (Ro/Ri = 1.8) containing a longitudinal crack along the bore surface, and stress distributions corresponding to a variety of loading arrangements are used as examples. J.M.S.

N82-10426 Princeton Univ., N. J.

HIGH FIELD GRADIENT PHENOMENA IN NONLOCAL MEDIA Ph.D. Thesis

Nasit Cevat Ari 1981 143 p
Avail: Univ. Microfilms Order No. 8118344

The application of nonlocal theories to high field gradient phenomena was investigated. Formulation of nonlocal mixed boundary value problems is discussed. Crack problems provide high field gradient phenomena where nonlocal approach can be very useful. The solution of the nonlocal Griffith problem is given. It is found that the maximum stress is finite and away from the crack tip. The nonlocal solution to the propagating crack problem is utilized in Eringen's fracture criterion to dynamic rupture phenomena. Dissert. Abstr.

N82-10427 Virginia Polytechnic Inst. and State Univ., Blacksburg.

RESPONSE OF SELF-EXCITED MULTIDEGREES-OF-FREEDOM SYSTEMS TO MULTIFREQUENCY EXCITATIONS Ph.D. Thesis

Khaled Rafiq Asfar 1981 184 p
Avail: Univ. Microfilms Order No. 8118685

The response of self excited multidegrees of freedom systems of the van der Pol type to multifrequency excitations was analyzed. A first order uniformly valid approximate solution is sought using the perturbation method of multiple scales. It is shown that the total response of such systems is composed of two parts: a free oscillation part with an amplitude and a phase that are functions of the excitations, and a forced response part. The first part can be quenched under certain conditions. A steady state response of the system is not periodic unless the frequencies of the resonant excitations are commensurable. It is also shown that the frequency response curves can be multivalued, indicating several possible solutions for the free-oscillation part, and that the multivaluedness increases for more degrees of freedom. Dissert. Abstr.

N82-10428 Texas Univ. at Arlington.

THE COMPUTATION OF BENDING SINGULARITIES IN ELASTIC PLATES USING BOUNDARY INTEGRAL TECHNIQUES Ph.D. Thesis

Jin-Woo Kim 1980 115 p
Avail: Univ. Microfilms Order No. 8119318

Boundary integral equations governing thin elastic plate flexure with singularities such as might occur at cracks or corners are formulated. The list of variables includes the singularity intensity parameters as well as displacement, normal slope, bending moment and equivalent shear on the plate boundary. The reciprocal work identity on which these equations are based is developed and extended to include boundary singularities. Two problems are treated in detail; the elastic plate with a through crack, and a simply supported rectangular reentrant corner. The kernel functions appropriate to these two cases are derived. A discretization scheme for solving the resulting system of coupled singular boundary integral equations and boundary conditions is proposed, and some numerical results are presented for the model problem of bending of a centrally cracked square plate. Dissert. Abstr.

N82-10429 Lehigh Univ., Bethlehem, Pa.

CIRCUMFERENTIAL CRACKS IN THICK-WALLED CYLINDERS: A GENERAL SOLUTION Ph.D. Thesis

Herman Frederick Nied 1981 126 p
Avail: Univ. Microfilms Order No. 8118845

A long hollow circular cylinder with a circumferential crack subjected to various symmetric and nonsymmetric external loads was investigated. The crack is circular or ring shaped and may be either an edge crack or a crack completely embedded in the cylinder wall. The three dimensional problem is based on the theory of elasticity and the techniques of integral transforms. It is shown that external edge cracks in hollow cylinders have greater stress intensity factors than inner radius edge cracks of the same length in both axial loading and in pure bending. It is demonstrated that for hollow cylinders with large radii to wall thickness ratios, results are obtained by using the two dimensional cracked strip solution. Dissert. Abstr.

N82-10430*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

CORNERING CHARACTERISTICS OF THE NOSE-GEAR TIRE OF THE SPACE SHUTTLE ORBITER

William A. Vogler (Kentron International, Inc., Hampton, Va.) and John A. Tanner Oct. 1981 29 p refs
(NASA-TP-1917; L-14681) Avail: NTIS HC A03/MF A01 CSCL 20K

An experimental investigation was conducted to evaluate cornering characteristics of the 32 x 8.8 nose gear tire of the space shuttle orbiter. Data were obtained on a dry concrete runway at nominal ground speeds ranging from 50 to 100 knots and over a range of tire vertical loads and yaw angles which span the expected envelope of loads and yaw angles to be encountered during space shuttle landing operations. The cornering characteristics investigated included side and drag forces and friction coefficients, aligning and overturning torques, friction force moment arm, and the lateral center of pressure shift. Results of this investigation indicate that the cornering characteristics of the space shuttle nose gear tire are insensitive to variations in ground speed over the range tested. The effects on cornering characteristics of variations in the tire vertical load and yaw angle are as expected. Trends observed are consistent with trends observed during previous cornering tests involving other tire sizes. Author

N82-10431# Denver Research Inst., Colo.

DESIGN AND FABRICATION OF AN X-RAY STRESS ANALYZER Final Report

C. Barrett, D. A. Steffen, R. E. Sturn, E. D. Wardzala, and K. C. Wasmundt Jun. 1981 92 p refs Sponsored by Electric

Power Research Inst.
(EPRI Proj. 823-1)
(DE81-903772; EPRI-NP-1873) Avail: NTIS HC A05/MF A01

To investigate feasibility of fabricating an X-ray stress analyzer for measuring residual stress in austenitic stainless steel pipe, stainless steel coupons were tested first, using a laboratory breadboard set up. Successful tests, as compared to electrical resistance strain gauges were followed by tests on sample specimens of ten-inch stainless steel BWR pipes which had been seam-welded. An X-ray stress analyzer for use with four-inch stainless steel BWR pipes was designed and partially assembled. Software was developed for automatic determination of the change in Debye ring diameter, including data smoothing and averaging calculations. DOE

N82-10432# Rochester Univ., N. Y. Dept. of Mechanical Engineering.
MATERIALS AND MECHANICS OF RATE EFFECTS IN FRACTURE Final Report, 1 Feb. 1974 - 14 Feb. 1981
S. J. Burns Jul. 1981 16 p refs
(Contract DE-AS02-76ER-02422)
(DE81-028489; DOE/ER-02422/29) Avail: NTIS HC A02/MF A01

Brittle fracture mechanics were studied. The following topics are discussed: dynamic analysis of rapidly wedged double cantilevered beam specimens; experimental measurements of stress intensity factors for a propagating brittle crack in steel at selected temperatures; elastic, nonlinear fracture analysis in a thermodynamic formalism using energy balances; mechanical fracture stability for either constant load or constant displacement specimens; measuring J/sub IC/ by recording the load versus the loadpoint displacement for two specimens with a finite difference in crack area; creep cracking and determination of the activation enthalpy for the rate controlling process in steady state crack propagation; experimental determination of the athermal component of the crack driving force establishing its temperature independence; and, elastic solutions for a single dislocation and arrays of dislocations at a sharp crack tip, proving crack tip dislocation shielding concept. DOE

N82-10433# Argonne National Lab., Ill. Applied Mathematics Div.
SECONDARY STATES OF VIBRATING PLATES
Bernard J. Matkowsky (Northwestern Univ.), Leonard J. Patrick (Siena Coll., Loudonville, N.Y.), and Edward L. Reiss (Northwestern Univ.) Aug. 1981 25 p refs
(Contract W-31-109-eng-38)
(DE81-029961; ANL-81-49) Avail: NTIS HC A02/MF A01

A previously developed perturbation method is used to obtain a class of periodic motions for the nonlinear vibrations of rectangular, elastic plates. The dynamic von Karman plate theory is used in the analysis. The solutions arise by secondary bifurcation from the periodic solutions that bifurcate from the natural frequencies of free vibrations of the linearized plate theory. The motions are a linear combination of two modes of the linearized theory. DOE

N82-10434# Sandia Labs., Albuquerque, N. Mex.
RESIDUAL STRESSES IN DARRIEUS VERTICAL AXIS WIND TURBINE BLADES
P. Veers Apr. 1981 63 p
(Contract DE-AC04-76DP-00789)
(DE81-1026144; SAND-81-0923) Avail: NTIS HC A04/MF A01

A numerical package called RESID was essential to calculate the residual stresses in VAWT blades induced during cold forming. Using a strength of materials - elementary beam theory approach, RESID models the material response with a bilinear stress-strain curve, and the cross sectional geometry with an array of area increments. Through an iterative solution procedure residual stresses are predicted for a specified final radius of curvature or applied bending moment. Results are compared to theoretical solutions for simple geometries and with MARC Finite element results for VAWT blade geometries. Calculating residual stress levels, determining acceptable residual stress levels, and a method of reducing residual stresses are discussed. A complete listing and sample run are inclined in the appendexes. DOE

N82-10435# Electric Power Research Inst., Palo Alto, Calif. Nuclear Power Div.
STRUCTURAL MECHANICS PROGRAM: PROGRESS IN 1980 Progress Report
R. E. Nickell, D. M. Norris, S. W. Tagart, Jr., and T. U. Marston Aug. 1981 138 p
(DE81-904244; EPRI-NP-1969-SR) Avail: NTIS HC A07/MF A01

The EPRI Structural Mechanics Program, to improve nuclear plant reliability and availability is discussed. The program includes characterization of materials, evaluation and analysis of flaws, and application and technology transfer. The largest efforts are: the development of statistically valid radiation embrittlement data base for evaluating the fracture toughness of irradiated pressure vessel steels and for evaluating damage annealing processes for embrittlement materials; the development of weld repair procedures for reactor pressure vessels as alternatives to the half bead repair method; the development of simplified design methodology for the prediction of crack initiation, stable crack growth, and instability of ductile material in the presence of flaws; and the development of methodology for predicting the growth and stability of stress corrosion cracks in large diameter stainless steel piping. DOE

N82-10436# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
INDENTATION AND EROSION OF BRITTLE MATERIALS Ph.D. Thesis
Moshen Ashrafi Khatibloo Jun. 1981 163 p refs
(Contract W-7405-eng-48)
(DE81-030351; LBL-11883) Avail: NTIS HC A08/MF A01

Indentation and erosion of brittle materials were studied. The mechanical behavior of brittle materials was studied and their various responses to loading were classified. Plasticity occurs whenever sharp or very small indenters are used. A model shows that cracks referred to as median vent, radial and multiple cone cracks initiate and propagate along paths close to the principal stress trajectories in the uncracked solid. However, this model gives only the initiation locations of lateral cracks. DOE

N82-10437# California Univ., Livermore. Lawrence Livermore Lab.
THEORETICAL STUDIES OF SHOCK DYNAMICS IN TWO-DIMENSIONAL STRUCTURES, 5: MICROSCOPIC CONSTRAINTS ON SHOCK-INDUCED SIGNALS
A. M. Karo, F. E. Walker, W. G. Cunningham, and J. R. Hardy (Nebraska Univ.) 18 Jun. 1981 14 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract W-7405-eng-48)
(DE81-024194; UCRL-85288; CONF-810684-17) Avail: NTIS HC A02/MF A01 .

Molecular dynamics calculations are presented that address the extent of microscopic detail that can be deduced from macroscopic gauge measurements of shock propagation in condensed systems. Large asymmetrically shock-loaded lattices were simulated, varying the initial temperature and the strength of shock loading. Randomly-placed mass defects were introduced into the lattice, and the degradation of the shock front with the subsequent development of fracture and chunky spall were studied and compared with the coherent microscopic spall found for perfect lattices. DOE

N82-10438# Sandia Labs., Albuquerque, N. Mex.
CRITERION FOR THERMO-PLASTIC SHEAR INSTABILITY
T. J. Burns, D. E. Grady, and L. S. Costin 1981 8 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023178; SAND-81-0041C; CONF-810684-8) Avail: NTIS HC A02/MF A01

Dynamic torsional Kolsky bar experiments on thin walled tubes of 1018 cold rolled and 1020 hot rolled steel were modeled. A deformation plasticity theory which imcorporates a specific constitutive model for the shear stress in terms of strain strain rate, and temperature into a system of differential equations is applied. Stability diagrams of strain rate vs. strain are constructed for the two types of steel using the criterion. It is found that the Kolsky bar data are consistent with the analysis. DOE

N82-10439# Sandia Labs., Albuquerque, N. Mex.

STRAIN-RATE EFFECTS IN BERYLLIUM UNDER SHOCK COMPRESSION

J. R. Asay, L. C. Chabildas, and J. L. Wise 1980 5 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024080; SAND-80-2847C; CONF-810684-13) Avail: NTIS HC A02/MF A01

Shock wave experiments were conducted on beryllium over the range of 6 to 25 GPa. A steady wave analysis of the shock front was used to estimate effective viscosities during the loading process. The process varied approximately as the inverse square root of strain rate for strain rates greater than about 3 microns. DOE

N82-10440# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

PROGRESS IN UNDERSTANDING THE MECHANICAL BEHAVIOR OF PRESSURE VESSEL MATERIALS AT ELEVATED TEMPERATURES

R. W. Swindemann and C. R. Brinkmen 1981 19 p refs Presented at the ASME PVP Conf., Denver, 21 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024128; CONF-810625-18) Avail: NTIS HC A02/MF A01

High temperature mechanical properties data for pressure vessel materials were reviewed. Satisfying new data requirements to implement advances in high temperature inelastic design methods was investigated. Servocontrolled testing machines and high resolution extensometry were developed to gain more information on the essential behavioral features of high temperature alloys. The similarities and differences in the mechanical response of various pressure vessel materials were identified. DOE

N82-10441# General Atomic Co., San Diego, Calif.

EFFECT OF COUPLE-STRESS ON THE PURE BENDING OF A PRISMATIC BAR

F. Tzung, B. Kao, F. Ho, and P. Tang Feb. 1981 10 p refs Presented at the 6th Intern. Conf. on Struct. Mech. in Reactor Technol., Paris, 17 Aug. 1981
(Contract DE-AT03-76ET-35300)
(GA-A-16001; CONF-810801-34) Avail: NTIS HC A02/MF A01

An evaluation of the applicability of the couple-stress theory to the stress analysis of graphite structures is performed by solving a pure bending problem. The differences between solutions from the couple-stress theory and from the classical theory of elasticity are compared. It is found that the differences are sufficient to account for the inconsistencies which have often been observed between the classical elasticity theory and actual behavior of graphite under bend and tensile loadings. An experimental procedure to measure the material constants in the couple-stress theory is also suggested. The linear couple-stress theory, the origins of which go back to the turn of the last century, adds linear relations between couple-stress and rotation gradients to the classical stress-strain law. By adopting the classical assumption that the plane cross section remains plane after deformation, the pure-bending problem is reduced to a plane couple-stress problem with traction-free boundary conditions. Dissert. Abstr.

N82-10442# Sandia Labs., Albuquerque, N. Mex.

RESULTS OF FULL-SCALE TURBINE MISSILE CONCRETE IMPACT EXPERIMENTS

Ronald L. Woodfin and George E. Sliter (Electric Power Research Inst., Palo Alto, Calif.) 1981 9 p refs Presented at the 6th Intern. Conf. on Structural Mech. in Reactor Technol., Paris, 17 Aug. 1981
(Contract DE-AC04-76DP-00789)
(SAND-81-0353C; CONF-810801-12) Avail: NTIS HC A02/MF A01

Four full scale experiments were conducted to obtain data on the response of reinforced concrete containment walls to impact and penetration by turbine-produced missiles. Missile velocity was varied from 90 to 132 m/s; missile mass, from 1476 to 2100 kg; missile attitude, to the two extremes of piercing and blunt; and panel linear thickness, from 0 (no liner) to 9.5 mm thickness. Penetration depths into the 1.37 m thick panels ranged from 33 cm for the blunt impact of the 1476 kg missile at 92 m/s to 65 cm for the piercing impact of the 2100 kg missile at 115 m/s. The strongest correlation for penetration was with kinetic energy. With the linear absent much superficial cracking was present on the rear face, while the liner seemed to inhibit such cracking. Impact with a sharp missile attitude caused more severe backface cracking than with the blunt attitude. Intensity of shear plug cracking correlated strongly with missile momentum for the same missile attitude. Rear face kinematic quantities showed displacements in excess of 6 cm and velocities in excess of 7 m/s. DOE

N82-10443# Sandia Labs., Albuquerque, N. Mex.

NUMERICAL MODELING OF OBLIQUE HYPERVELOCITY IMPACT USING TWO DIMENSIONAL PLANE STRAIN MODELS

William T. Brown 1981 5 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024077; SAND-80-2865C; CONF-810684-12) Avail: NTIS HC A02/MF A01

A numerical procedure was developed to obtain information on the hypervelocity impact of a sphere onto a plate by considering the corresponding plane strain problem. A rod is presented as a superposition of an infinite chain of spheres and the information about a single sphere is numerically unfolded. The technique is used to calculate the peak pressure distribution when the impact is normal to the plate surface. DOE

N82-10444# Washington State Univ., Pullman. Dept. of Physics.

FRACTO-EMISSION ACCOMPANYING ADHESIVE FAILURE

J. T. Dickinson, M. K. Park, E. E. Donaldson, and L. C. Jensen Sep. 1981 24 p refs Submitted for publication
(Contract N00014-80-C-0213; NR Proj. 092-358)
(AD-A104050; TR-2) Avail: NTIS HC A02/MF A01 CSCL 20/11

For a wide range of materials, emission of electrons (EE), positive ions (PIE), and photons (phE) is observed accompanying fracture. Here we report on work concerning emission from adhesive failure. The systems studied include interfacial failure between epoxy--brittle materials, polybutadiene-glass, and pressure sensitive adhesives--polymers. When interfacial failure occurs, it produces highly excited surfaces with intense charge separation. De-excitation in the presence of surface charge produces intense, long lasting (several minutes) emission. Energy distribution curves for both EE and PIE decrease monotonically with a tail extending out to several hundred eV. For a few systems we compare EE and phE which show different decay characteristics. Author (GRA)

N82-10445# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.

TESTING PLASTER SHEET WALLS ON A STEEL PLATE FRAMEWORK UNDER THE EFFECT OF SHOCK WAVES IN THE AIR [FOERSOEK MED LUFTSTOETVAAGSBELASTADE GIPSSKIVEVAAGGAR PAA STAALREGELSTOMME]

Jan-Erik Jonasson Oct. 1980 195 p refs In SWEDISH
(FOA-C-20372-D4(A3)) Avail: NTIS HC A09/MF A01

Walls were built up with one or two 13 mm thick plaster sheets on each side of a 1200 x 2300 mm framework. During the 16 tests pressure in front and behind the wall; the bending of the construction and cracks in the plaster, and other permanent distortions were recorded. An analog method is proposed, giving the effects of an explosion wave by means of static tests with hydraulically regulated loads. In addition, real explosions with eight kg explosives were carried out on the ground and above the ground, at distances of five to eleven m from the wall. The transfer of the load to the framework can be improved by crossrods or by gluing a glass fiber fabric onto the plaster sheets. The

agreement between theory and practice is satisfactory.
Author (ESA)

N82-10446# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
DEFORMATION, SPEED AND ACCELERATION OF PLASTIC SYSTEMS EXPOSED TO SHOCK WAVE LOADS IN THE AIR [DEFORMATION, HASTIGHET OCH ACCELERATION FOER PLASTISKA SYSTEM UTSATTA FOER LUFTSTOETV-AAGSBELASTNING]
Jan-Erik Jonasson Oct. 1980 48 p refs In SWEDISH
(FOA-C-20373-D4(A3)) Avail: NTIS HC A03/MF A01

Complete analytical expressions are presented for a system with one degree of freedom whose inner resistance is assumed to be constant during the distortion. A base for a dynamic calculation of the first distortion process, with the aid of a minicomputer is given. Arbitrarily chosen load data can be translated into a simplified load-time-scheme which includes the case of a pure impulse load and long lasting pressure effects. A calculation of the maxima deformation for different load functions, in size and time is reported for the case of the plate simply fastened along two opposite sides, and for the case of a plate fastened along the four sides. In this analysis, the real system is translated to an equivalent one degree of freedom system.
Author (ESA)

N82-10447# Karlsruhe Univ. (West Germany). Inst. fuer Werkstoffkunde 2.
HIGH TEMPERATURE PROPERTIES OF Si3N4. CREEP OF REACTION BONDED SILICON NITRIDE Final Report
Georg Grathwohl, Franz Porz, and Fritz Thuemmler Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 38 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-128; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,60

The correlation between microstructure and creep behavior was investigated. Internal oxidation during creep testing in air plays an important role. Materials were developed with a narrow pore size distribution and hence a very limited amount of internal oxidation with creep rates below .000001/hr (at 1300 C and loaded with 70 to 100 MN/sqm). Activation energies between 540 and 700 kJ/mol and stress exponents of 1-2< n<2-3 are found.
Author (ESA)

N82-10448# Danish Research Center for Applied Electronics, Hoersholm. Dept. for Mechanical Testing.
APPLICATIONS OF MECHANICAL SHOCK SPECTRA. APPLICATION OF SHOCK SPECTRA IN SHOCK-TESTING AND MECHANICAL DESIGN OF ELECTRONIC EQUIPMENT AS WELL AS DESCRIPTION OF ENVIRONMENTS
Bjoern Barueel Petersen Jan. 1981 68 p refs Sponsored by Danish Council of Technology
(ECR-106) Avail: NTIS HC A04/MF A01

The relationship between shock environment, shock test specification, and shock design of equipment is treated in terms of shock spectra. Those shock characteristics which are important in causing damage to structures are emphasized. Shock testing by classical (half sine) shock impulses is compared with vibrator testing with shock-spectrum-specified oscillating shock transients. Potentials and limitations of shock spectra are discussed and environmental shock measurements are presented together with their computed spectra.
Author (ESA)

N82-10449# British Gas Corp., Newcastle-upon-Tyne (England). Engineering Research Station.
MAGNETIC CRACK DETECTION OFFSHORE: THE WAY TO GO IN THE FUTURE
M. J. King (Star Offshore Services Ltd.) and R. F. Lumb Apr. 1980 19 p ref Submitted for publication
(ERS-E-246) Avail: NTIS HC A02/MF A01

The basic requirements for magnetic flux in magnetic crack detection are explained. A system for obtaining the magnetic flux from electrical conductors placed on, but insulated from, a structure is described and its application to complex welds, such as nodes, in offshore structures, is discussed. Its technical advantages, compared with permanent magnets, and current flow from prods, are explained. Diving time is reduced and the test can be done by one technician/diver instead of two. The sanctioning of lower flux levels is proposed. The development of equipment for optimizing the performance of the parallel conductor and encirclement coil system for use underwater is described. Experience in applying the technology offshore is detailed.
Author (ESA)

N82-10450# British Gas Corp., Newcastle-upon-Tyne (England). Engineering Research Station.
TOUGHNESS SPECIFICATION FOR SHEAR FRACTURE ARREST IN PIPELINES
G. D. Fearnehough and D. G. Jones Jun. 1980 21 p refs Presented at Intern. Conf. on Fracture Mech., Rome, 24-27 Jun. 1980
(ERS-E-262) Avail: NTIS HC A02/MF A01

Up-to-date information from a wide range of full scale shear fracture propagation tests on linepipe was reviewed and statistically analyzed, showing that it is consistent with a previously published theory. Effects on recently studied materials (materials showing separations, high toughness steels, and thick walled pipe), not previously accounted for by this theory, are considered, and a method for incorporating them into the theory is shown. A nomograph is presented which gives Charpy predictions for fracture arrest.
Author (ESA)

N82-10451# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).
THE INFLUENCE OF COMPONENT SIZE, TYPE OF LOADING SEQUENCE AND LOAD LEVEL ON THE FATIGUE IMPROVEMENT BY COLD WORKING OF HOLES
H. Lowak 1981 127 p refs In GERMAN; ENGLISH summary
(LBF-FB-157-1981) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 95

Fatigue tests were carried out, using open hole specimens (Kt = 2.5) with and without stress coining. The compressive residual stresses in the holes were induced by mandrelizing. Two materials, four specimen sizes, three types of loading sequences (constant amplitude, miniTWIST and a Gaussian random sequence) and two load levels were investigated. For each specimen the fatigue life to crack initiation as well as to total fracture was recorded. The residual stresses induced by the loading sequence and by the cold working process were experimentally and theoretically determined.
Author (ESA)

N82-10452# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Aeroelastic.
CALCULATION OF NATURAL MODES OF VIBRATION FOR ROTOR BLADES BY THE FINITE ELEMENT METHOD
Fritz Kiessling and Dieter Ludwig Jan. 1981 66 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-81-07) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 14,20

The mass and stiffness matrices for a rotating blade are established by the finite element method. The formulation is based on the Lagrange function presented for combined flapwise bending, chordwise bending, and torsion of twisted nonuniform rotor blades. The element matrices were created by the nonnumeric computer program REDUCE by which it is possible to evaluate the formulas by symbolic manipulation. An ordering scheme was introduced to demonstrate which terms were simplified or neglected. As examples, eigenanalyses are performed for a nonrotating homogeneous beam and for the rotor blade of a wind energy converter.
Author (ESA)

N82-10453# European Space Agency, Paris (France).
EXPERIMENTS WITH THIN-WALLED, ISOTROPIC CONES SUBJECTED TO AXIAL LOAD, AXIAL LOAD COMBINED WITH CONSTANT INTERNAL PRESSURE AND EXTERNAL HYDROSTATIC PRESSURE
Ulrich Heidmann Apr. 1981 33 p refs Transl. into ENGLISH of "Versuche mit duennwandigen isotropen Kegelstuempfen unter Axiallast, konstantem Innendruck mit Axiallast u. unter allseitigem Aussendruck" Rept. DFVLR-Mitt-80-02 DFVLR, Brunswick, Dec. 1979 Original report in GERMAN. previously announced as N81-14348

(ESA-TT-670; DFVLR-Mitt-80-02) Avail: NTIS HC A03/MF A01

The buckling and post-buckling loads of thin-walled (Mylar film), isotropic cones were determined theoretically and experimentally. The experimental results are compared with calculated buckling loads for an ideal cone with the boundary conditions employed in the test. Author (ESA)

N82-10454# Dow Chemical Co., Midland, Mich. Highway and Concrete Products Research and Development.

DEVELOPMENT AND EVALUATION OF POLYMER MODIFIED PORTLAND CEMENT CONCRETE LAGGING FOR MINE OPENINGS Final Open File Report, 17 Jun. 1976 - 31 Dec. 1978

R. Douglas Eash and Henry W. Kirchner 1 Oct. 1980 127 p
(Contract DI-BM-H0262046)
(PB81-223331; BM-OFR-93-81) Avail: NTIS HC A07/MF A01 CSCL 08I

A Saran latex modified portland cement concrete lagging, to be used as a replacement for wood lagging in underground mining was investigated. Two hundred and twenty latex modified concrete lagging were produced for installation in mine at the 17th level. The lagging concept replaces wood systems by using reinforced latex concrete which outperforms and outlives wood systems. It is more cost effective, and is completely nonflammable. GRA

N82-10455# Massachusetts Inst. of Tech., Cambridge. Sea Grant College Program.

GEOTECHNICAL RELIABILITY OF OFFSHORE GRAVITY PLATFORMS

Gregory B. Baecher, Mark Chan, Thomas S. Ingra, Thomas Lee, and Louis R. Nucci Dec. 1980 298 p refs
(Grant NOAA-04-7-158-44079)
(PB81-224438; MITSG-80-20; NOAA-81042708) Avail: NTIS HC A13/MF A01 CSCL 13J

The sources of geotechnical uncertainty in offshore structures, and formal methods in geotechnical reliability analysis are presented. The basic uncertain variables, dealing with environmental loads and load effects, and site characterization and parameter estimates are examined. The problem of modeling foundation performance are discussed. The aggregation of these uncertainties into overall estimates of risk and reliability are considered. GRA

N82-10456# National Bureau of Standards, Washington, D.C. Electron Devices Div.

MICROELECTRONIC TEST PATTERNS NBS-12 AND NBS-24

G. P. Carver, R. L. Mattis, and M. G. Buehler May 1981 41 p refs
(PB81-214892; NBSIR-81-2234) Avail: NTIS HC A03/MF A01 CSCL 14B

Microelectronic test patterns NBS-12 and NBS-24 which are modular developmental patterns for experimentally evaluation improved designs of certain test structures were examined. The NBS-12 addresses geometric design considerations for the cross bridge sheet resistor test structure. NBS-24 contains a variety of preliminary designs for the integrated gated-diode electrometer and a series of variations on the design of the MOSFET dc profiler. Both patterns include assorted process parameter test structures. Tables of design parameters, functional descriptions of the test structures in each pattern, and computer composed outline drawings showing all of the test structures are included. GRA

N82-10457# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

NON-LINEAR AEROELASTIC ANALYSES AND TESTING

Jul. 1981 43 p refs Partly in ENGLISH; partly in FRENCH Meeting held in Cesme, Turkey, 5-10 Apr. 1981
(AGARD-R-698) Avail: NTIS HC A03/MF A01

The ground vibration testing of aircraft with active control systems is discussed and a method of performing and interpreting dynamic tests on non-linear systems, such as control surface actuators is presented. For individual titles, see N82-10458 through N82-10459.

N82-10458# Office National d'Etudes et de Recherches Aeronautiques, Paris (France).

IDENTIFICATION OF THE EIGEN MODES OF A STRUCTURE FROM THE RESPONSES TO A NON-APPROPRIATED EXCITATION

Rolland Dat and Philippe Dunoyer *In* AGARD Non-linear Aeroelastic Analyses and Testing Jul. 1981 18 p refs In FRENCH; ENGLISH summary (For primary document see N82-10457 01-39)
Avail: NTIS HC A03/MF A01

The two methods are presented which use the harmonic responses, at a large number of points on the structure, in order to determine the eigen modes, without necessitating an appropriation of the excitation forces. The first one of the methods, which is more synthetic, determines the set of modal characteristics through the resolution of a set of algebraic equations; the second one, which is more analytic, proceeds to a separation of each mode by combining the harmonic responses of the different points of the structure. The results show that the two methods give a satisfactory modelisation of the structure through the modal representation. Author

N82-10459# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. of Aeroelasticity.

NONLINEAR AEROELASTIC ANALYSES TAKING INTO ACCOUNT ACTIVE CONTROL SYSTEMS

R. Freymann *In* AGARD Non-linear Aeroelastic Analyses and Testing Jul. 1981 19 p refs (For primary document see N82-10457 01-39)
Avail: NTIS HC A03/MF A01

Analytical investigations on aircraft with active control systems can be performed on the basis of an extended formulation of the generalized aeroelastic equations. The structural modal parameters needed for the investigation can be determined in a ground vibration test on the real aircraft structure. A method is presented for determining the transfer functions of the different elements of the control loops in a ground vibration test on the real aircraft and in special tests on the aircraft hydraulic actuation systems. To demonstrate the validity of the procedure, dynamic response calculations based upon the proposed extended formulation of the aeroelastic equations, which take into account both the results of the ground vibration test as well as of the actuator tests, are performed on a model wing structure with a hydraulically driven rudder. Results of the analysis are compared to measured data on the same model structure. A.R.H.

N82-10993# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A METHOD OF EVALUATION OF THE TORSIONAL RIGIDITY AND THE THIRD STRESS INTENSITY FACTOR OF PRISMATICAL BAR OF RECTANGULAR CROSS SECTION WITH CRACKS

Chen Yizhou *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 315-337 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

N82-10995# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

STRUCTURAL ANALYSIS OF FUSELAGES WITH CUTOUTS BY FINITE ELEMENT METHOD

G. Shoulian, Sun Can, Tang Xuunchun, and Ye Tiangi *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 359-378 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

N82-10997# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

DUAL PROPERTIES OF ELASTIC STRUCTURES

Chen Baiping *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 1-75 refs Transl. into ENGLISH from Recent Selected Papers of NW

Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

N82-10999# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON A METHOD FOR THE DETERMINATION OF PLANE STRESS FRACTURE TOUGHNESS K SUB c OF 30 CrMnSiNi2A STEEL AND SOME RELATED PROBLEMS
Cui Zhenyuan, Zheng Changqing, Shi Jize et al *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 112-136 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

42 GEOSCIENCES (GENERAL)

N82-10460# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
MAGNETOSPHERIC AND GEOMAGNETIC ACTIVITY DURING THE FIRST YEAR (1979) OF THE SCATHA (P78-2) SATELLITE OPERATION Final Report, 1 Oct. 1979 - 30 Sep. 1980
Ching-I. Meng Dec. 1980 397 p
(Contract MIPR-FY7121-80-00009; AF Proj. 7661)
(AD-A104109; AFGL-TR-81-0104) Avail: NTIS HC A17/MF A01 CSCL 08/14

This report consists of two parts. The first is a comprehensive analysis of the geomagnetic field variations observed by several networks of ground-based stations to monitor the magnetospheric conditions during the first year of the SCATHA satellite operation in 1979, together with the determination of the most disturbed and quietest days during the 1979 period. The second part is a summary of the scientific results in the investigation of polar region electron precipitations based on USAF DMSP observations. The daily graphs and listing of 1.0 minute auroral electrojet activity index (AE) constructed from three networks of the magnetic field observations over the Northern American Continent are illustrated as Appendices 2 and 3, respectively.
Author (GRA)

N82-10461# National Oceanic and Atmospheric Administration, Seattle, Wash.
CTD/02 MEASUREMENTS DURING THE EQUATORIAL PACIFIC OCEAN CLIMATE STUDY (EPOCS) IN 1979
L. J. Mangum, N. N. Soreide, B. D. Davies, B. D. Spell, and S. P. Hayes Oct. 1980 641 p refs
(PB81-211203; NOAA-DR-ERL-PMEL-1; NOAA-81041501)
Avail: NTIS HC A99/MF A01 CSCL 08I

Neil Brown instrument System (NBIS) CTD/02 measurements recorded on five cruises are summarized. A description of the acquisition and processing systems and calibration techniques are presented. These data were collected along longitudes of 105 W and 110 W between 15 N and 5 S. Additional casts in the vicinity of 0 degrees, 153 W also presented. Station locations, meteorological conditions, and profiles of temperature, salinity, sigma T, and oxygen are shown for each cast. GRA

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N82-10462 Clark Univ., Worcester, Mass.
MOVEMENT OF BED MATERIAL IN A SMALL REACH OF A PERENNIAL STREAM Ph.D. Thesis
Abraham Zahavi 1981 181 p
Avail: Univ. Microfilms Order No. 8118828

The relations between a particle's physical properties, its movement and stream channel macro and micro morphology were established and the spatial aspect of bedload movement was studied. Bedload discharge calculations were developed based on the movement of individual particles. Mutual relations between bed material and bedload movement were explored. It was found that different flow magnitudes, in relation to bedload movement, likely explain the polimodal bed-material size distribution. The fall and winter flows, which are of a higher magnitude create the modal class in the coarse fractions. The late spring and summer flows which are of a lower magnitude, transport only fine bed-material and create the modal class in finer fractions. It was also found that where large boulders are not an integral part of the bed-material, bedload grain size distribution coarsens as a function of time during the fall and winter flow events. This sequential coarsening of bedload is explained by removal of finer material by early season flows.
Dissert. Abstr.

N82-10463 Idaho Univ., Moscow.
FORECASTING SUBSURFACE WATER FLOW AND STORAGE ON FORESTED SLOPES USING A FINITE ELEMENT MODEL Ph.D. Thesis
Mohsen Mohsenisaravi 1981 176 p
Avail: Univ. Microfilms Order No. 8119892

Subsurface flow in a three soil layer vertical cross section of the Pine Creek watersheds in the Idaho Batholith of central Idaho was simulated using the finite element model, UNSAT2, under uncut, clearcut, and wildlife conditions. The model was based on a two-dimensional transient saturated-unsaturated analysis of the subsurface flow at the field site. The sensitivity of subsurface outflow to various input parameters indicates that subsurface outflow is most sensitive to the magnitude of saturated hydraulic conductivity. The simulations show that different snowmelt events require different saturated hydraulic conductivity to simulate subsurface outflow adequately. Nomographs were made showing the changes of saturated hydraulic conductivities on control and treated watersheds under harvesting and burning situations. Dissert. Abstr.

N82-10464 Duke Univ., Durham, N. C.
STRATIFICATION AND MIXING IN SHALLOW TROPICAL AFRICAN LAKES Ph.D. Thesis
Sally MacIntyre 1981 356 p
Avail: Univ. Microfilms Order No. 8119639

Measurements of current speeds and temperature profiles were used to characterize daily mixing events in three shallow African lakes of differing morphology and exposure to wind. Reasons for the persistence of chemical stratification were explored in a sheltered crater lake. Flow measurements under the aquatic fern Salvinia molesta were the first to confirm that flow within weed beds is not turbulent. Measurements within meromictic Lake Sonachi indicated that monimolimmia are not stagnant. The current measurements were made on spatial and temporal scales appropriate for documenting vertical mixing events on scales relevant to phytoplankton. In Lake Nakuru the upper mixed layer was shallow in the morning but deepened each afternoon despite the strong thermal stratification at its base. Deep mixing events during the day were typical in Lake Sonachi despite the high eddy transfer coefficients for a lake of its small size and high thermal stability. At night wind speeds tended to be low, and deep mixing was infrequent despite the presence of an unstable temperature gradient. Dissert. Abstr.

N82-10465 Utah Univ., Salt Lake City.
MORPHOSTRUCTURAL ANALYSES OF SPACE IMAGERY IN THE CENTRAL COLORADO PLATEAU Ph.D. Thesis
Abdelrahman Mohammad Shafik Masrouf 1981 130 p
Avail: Univ. Microfilms Order No. 8118146

Coincidences of increase or decrease in frequency of most of the lineament trends common to both Skylab and Landsat photos and images of the Colorado Plateau suggest that the peaks or troughs are not artificially introduced by sampling bias, and there are actual preferred orientations represented by peak or trough coincidences. Interpretation of lineaments from Skylab and Landsat data, along with study of magnetic and gravity maps, suggest strong correlation between lineaments and faults in the Precambrian basement. It is shown that the basement faults influenced the present surface drainage and structures through a sedimentary cover of more than 6 km. The faults were formed during the middle Precambrian, and were rejuvenated later in varying degrees and at various times. Dissert. Abstr.

N82-10466* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

MATE VAN: MOBILE ANALYSIS AND TRAINING EXTENSION

[1981] 7 p

(NASA-TM-84056) Avail: NASA Scientific and Technical Information Facility, P. O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 05B

A modified 30-foot motor coach was equipped with modern data processing equipment in order to train personnel and demonstrate useful techniques and capabilities for analyzing and applying LANDSAT imagery in the western regional area. A block diagram of the interactive digital image manipulation system is presented and its processing features itemized. Specifications for the van and the equipment are listed. False color composites used to interpret and identify many LANDSAT technological applications are included. A.R.H.

N82-10467 Danish Meteorological Inst., Copenhagen.

THE ICE-CONDITIONS IN THE GREENLAND WATERS, 1965. COASTAL MAPS

1980 66 p refs

(ISBN-87-7478-183-9) Avail: NTIS HC A04/MF A01

Maps indicating the size, distribution, and character of Greenland's coastal ice formations are presented. Data is derived from visual flight observations and supplemented by aerial radar reconnaissance and ship observations. Narrative evaluations of ice conditions for several coastal locations are presented. R.J.F.

N82-10468*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MAGSAT: VECTOR MAGNETOMETER ABSOLUTE SENSOR ALIGNMENT DETERMINATION

M. H. Acuna Sep. 1981 39 p refs

(NASA-TM-79648) Avail: NTIS HC A03/MF A01 CSCL 14B

A procedure is described for accurately determining the absolute alignment of the magnetic axes of a triaxial magnetometer sensor with respect to an external, fixed, reference coordinate system. The method does not require that the magnetic field vector orientation, as generated by a triaxial calibration coil system, be known to better than a few degrees from its true position, and minimizes the number of positions through which a sensor assembly must be rotated to obtain a solution. Computer simulations show that accuracies of better than 0.4 seconds of arc can be achieved under typical test conditions associated with existing magnetic test facilities. The basic approach is similar in nature to that presented by McPherron and Snare (1978) except that only three sensor positions are required and the system of equations to be solved is considerably simplified. Applications of the method to the case of the MAGSAT Vector Magnetometer are presented and the problems encountered discussed. A.R.H.

N82-10469*# Martin Marietta Corp., Denver, Colo.

ONBOARD UTILIZATION OF GROUND CONTROL POINTS FOR IMAGE CORRECTION. VOLUME 1: EXECUTIVE SUMMARY Final Report

May 1981 30 p refs 4 Vol.

(Contract NAS5-26094)

(NASA-CR-166731; MCR-81-576-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 05B

Operation of a navigation system, centered around image correction, was simulated and the system performance was analyzed. Onboard utilization of ground control points for image correction is summarized. Simulation results, and recommendations for future mission requirements are presented. E.A.K.

N82-10470*# Martin Marietta Corp., Denver, Colo.

ONBOARD UTILIZATION OF GROUND CONTROL POINTS FOR IMAGE CORRECTION. VOLUME 2: ANALYSIS AND SIMULATION RESULTS Final Report

May 1981 183 p refs 4 Vol.

(Contract NAS5-26094)

(NASA-CR-166732; MCR-81-576-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 05B

An approach to remote sensing that meets future mission requirements was investigated. The deterministic acquisition of data and the rapid correction of data for radiometric effects and image distortions are the most critical limitations of remote sensing. The following topics are discussed: onboard image correction systems, GCP navigation system simulation, GCP analysis, and image correction analysis measurement. E.A.K.

N82-10471*# Martin Marietta Corp., Denver, Colo.

ONBOARD UTILIZATION OF GROUND CONTROL POINTS FOR IMAGE CORRECTION. VOLUME 3: GROUND CONTROL POINT SIMULATION SOFTWARE DESIGN Final Report

May 1981 409 p refs 4 Vol.

(Contract NAS5-26094)

(NASA-CR-166733; MCR-81-576-Vol-3) Avail: NTIS HC A18/MF A01 CSCL 05B

The software developed to simulate the ground control point navigation system is described. The Ground Control Point Simulation Program (GCPSIM) is designed as an analysis tool to predict the performance of the navigation system. The system consists of two star trackers, a global positioning system receiver, a gyro package, and a landmark tracker. E.A.K.

N82-10472*# Martin Marietta Corp., Denver, Colo.

ONBOARD UTILIZATION OF GROUND CONTROL POINTS FOR IMAGE CORRECTION. VOLUME 4: CORRELATION ANALYSIS SOFTWARE DESIGN Final Report

May 1981 86 p refs 4 Vol.

(Contract NAS5-26094)

(NASA-CR-166734; MCR-81-576-Vol-4) Avail: NTIS HC A05/MF A01 CSCL 05B

The software utilized for image correction accuracy measurement is described. The correlation analysis program is written to allow the user various tools to analyze different correlation algorithms. The algorithms were tested using LANDSAT imagery in two different spectral bands. Three classification algorithms are implemented. E.A.K.

N82-10473# Nova Univ., Dania, Fla.

SEASAT ALTIMETRY ADJUSTMENT MODEL INCLUDING TIDAL AND OTHER SEA SURFACE EFFECTS

Georges Blaha Hanscom AFB, Mass. AFGL Mar. 1981 113 p refs

(Contract F19628-78-C-0013; AF Proj. 2309)

(AD-A104188; SR-3; AFGL-TR-81-0152) Avail: NTIS HC A06/MF A01 CSCL 22/2

This study is a part of the on-going effort aimed at improved determinations of the Earth's gravity field through the adjustment of satellite altimeter data in the short-arc mode. Until recently the key role in such adjustments has been played by GEOS-3 altimeter data. However, Seasat altimetry is envisioned as providing a more accurate means for addressing this task. In view of the improved quality of altimeter data and of the corresponding more stringent requirements for the data reduction, several improvements in the existing altimetry model have been designed and are described herein. For example, the criteria have been established specifying the maximum and the minimum allowable lengths of Seasat arcs. An important improvement in the economy has been achieved through a reduction in the number of spherical-harmonic potential coefficients entering the orbital integrator, without a noticeable compromise in the excellent quality of the Seasat observational system. GR

N82-10474# Department of Energy, Washington, D. C. Energy Information Administration.

VENEZUELA, TRINIDAD AND TOBAGO: CRUDE OIL POTENTIAL FROM KNOWN DEPOSITS

William D. Dietzman, Naim R. Rafidi, and Arthur J. Warner Jul. 1981 127 p refs

(DE81-027023; DOE/EIA-0297) Avail: NTIS HC A07/MF A01

Estimates of original oil in place: ultimate recovery: remaining reserves; and projected supply patterns are presented. A discussion of the methodology for projecting supply patterns is also presented. The Republic of Venezuela ranked 7th in 1979 in production among the oil producers of the world and is one of the leading exporters of crude oil. About 1/3 of the country's exports are received by the United States, and it was the 5th and 3rd largest supplier of crude oil and refined products to the United States in 1978 and 1979, respectively. DOE

N82-10475# Nevada Univ., Reno.
LOW-TO-MODERATE TEMPERATURE GEOTHERMAL RESOURCE ASSESSMENT FOR NEVADA, AREA SPECIFIC STUDIES Final Report, 1 Jun. 1980 - 30 Aug. 1981
D. T. Trexler, B. A. Koenig, T. Flynn, J. L. Bruce, and G. Ghusn, Jr. 1981 223 p refs
(Contract DE-AC08-79NV-10039)
(DE81-030487; DOE/NV-10039/3) Avail: NTIS HC A10/MF A01

The Hawthorne study area encompasses approximately 310 sq km. The energy needs of the military and the local population are substantial. The techniques employed in the resource assessment are described. Geological and geophysical methods were used and the results are reported. T.M.

N82-10476# Bendix Field Engineering Corp., Grand Junction, Colo.
STATISTICAL TECHNIQUES APPLIED TO AERIAL RADIOMETRIC SURVEYS (STAARS): SERIES INTRODUCTION AND THE PRINCIPAL-COMPONENTS-ANALYSIS METHOD
Fredric L. Pirkle Apr. 1981 62 p refs
(Contract DE-AC13-76GJ-01664)
(DE81-029177; GJBX-114(81)) Avail: NTIS HC A05/MF A01

A series of open-file reports established to provide the latest interpretation techniques to those using aerial radiometric data is announced. Geological applications of the technique are emphasized in case histories. A bibliography is provided which defines the detailed theory and statistics of the technique to assist researchers in ascertaining the statistical validity and merit of the technique. The use of multivariate statistical analysis in delineating regions favorable to uranium deposition in the Lubbock and Plainview quadrangles of Texas, and along the Texas Gulf coast is demonstrated in this issue. GRA

N82-10477# Texas Univ., Austin. Dept. of Petroleum Engineering.
TERTIARY OIL RECOVERY PROCESSES RESEARCH AT THE UNIVERSITY OF TEXAS Final Report, Oct. 1979 - Sep. 1980
R. S. Schechter and W. H. Wade Jun. 1981 135 p refs
(Contract DE-AC19-78BC-20001)
(DE81-025222; DOE/BC-20001/10) Avail: NTIS HC A07/MF A01

Surfactant adsorption, phase behavior, interfacial tension, and solubilization were examined. Focus is on solubilization, I.F.T., and phase behavior with the emphasis on the influence of branching for anionics and molecular weight for nonionics. Phase behavior is related to emulsion stability, polymeric surfactants, and salinity tolerant surfactants were evaluated. DOE

N82-10478# Oak Ridge National Lab., Tenn.
ION EXCHANGE CHARACTERISTICS OF ENHANCED OIL RECOVERY SYSTEMS (MISCIBILITY STUDIES) Semiannual Report, 1 Apr. 1979 - 30 Sep. 1980
P. C. Ho, K. A. Kraus, T. M. Bender, and S. B. Ogden Jul. 1981 59 p refs
(Contract W-7405-eng-26)
(DE81-769734; DOE/BETC/OR-19) Avail: NTIS HC A04/MF A01

During the report period: (1) studies of the hydrotropic properties of organic alkylbenzenesulfonates and particularly of alkylbenzenecarboxylates were extended; (2) the effects of several different alcohols on miscibility between aqueous protosurfactant solutions and aliphatic and aromatic alkanes were investigated; (3) hydrotropic properties of an alicylic carboxylate were determined; (4) the equivalent weight of the organic salts studied was extended into the surfactant range; (5) colubilities of protosurfactants and surfactants in salt solution were measured; and (6) investigations of the adsorption of protosurfactants on minerals as a function of salinity were started. Measurements include establishment of the phase behavior in the limiting three-component systems, the effect of protosurfactant concentration in the four-component systems, and determination of the compositions in a limited number of cases of the coexisting phases. DOE

N82-10479# Argonne National Lab., Ill. Land Reclamation Program.
FRACTURE FLOW OF GROUNDWATER IN COAL-BEARING STRATA
Jeffrey P. Schubert 1980 15 p refs Presented at 1980 Symp. on Surface Mining Hydro., Sedimentology and Reclamation, Lexington, Ky., 1-5 Dec. 1980
(Contract W-31-109-eng-38)
(DE81-023810; CONF-801263-1) Avail: NTIS HC A02/MF A01

Laboratory tests on core samples of sandstones, siltstones, shales, and claystones indicate extremely low intergranular hydraulic conductivities. Various aquifer tests, using wells in the same locations, invariably showed hydraulic conductivities to be much greater than those estimated by laboratory techniques. In addition the hydraulic conductivity of highly fractured rock can be 100 to 1,000 times greater than slightly fractured rock. The greatest concentration of fractures usually occurs in faulted areas and in narrow fracture zones less than 100 m below ground surface. The majority of large inflows through rock into surface and underground mines occur at the faults and fracture zones. By studying and understanding more about the structural control of fractures in coal basins, the larger inflows possibly could be avoided. DOE

N82-10480# Los Alamos Scientific Lab., N. Mex.
DEVELOPMENT OF MAN-MADE GEOTHERMAL RESERVOIRS
Roland A. Pettitt 1981 9 p Presented at the Energy in the Man-Built Environment: The Next Decade Specialty Conf., Vail, Colo., 2-6 Aug. 1981
(Contract W-7405-eng-36)
(LA-UR-81-852) Avail: NTIS HC A02/MF A01

The technology used to create and extract heat from a geothermal reservoir in low porosity, granitic basement rock in at the Fenton Hill site in northern New Mexico is described. Topics covered include drilling boreholes, injecting potable water as the working fluid, hydraulic fracture to provide the large surface area need for heat exchange, the mechanics of reservoir growth, make-up water requirements, geofluid chemistry, electrical generation, operational constraints, and effects on the environment. A.R.H.

N82-10481# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
USE OF RADAR AND MICROWAVE RADIOMETRY FOR RECONNAISSANCE SATELLITES [ANVAENDNING AV RADAR OCH MIKROVAAGSRADIOMETRIE VID SPANINGSSATELLITER]
Hans Lok Oct. 1980 28 p refs In SWEDISH
(FOA-C-30204-E1) Avail: NTIS HC A03/MF A01

The advantages and disadvantages of side-looking radar and microwave radiometers for observations of Earth by satellite are discussed. Each system is examined with regards to field of view and instrument sensitivity. Microwave attenuation is also discussed. A.R.H.

N82-10482# Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover (West Germany).
DEVELOPMENT OF ORGANIC GEOCHEMICAL AND ISOTOPE TECHNIQUES FOR HYDROCARBON EXPLORATION Final Report
Eckhard Faber, Heinz Hufnagel, Helmut Jacob, Joachim Kock, Wolfgang Stahl, Manfred Teschener, and Hermann Wehner Bonn Bundesministerium fuer Forschung und Technologie Oct. 1980 55 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-076; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,55

Sedimentary organic matters was characterized by correlating microscopic and chemical data. Techniques for oil-oil and

oil-source rock correlations were developed using the distribution of polycyclic aromatic hydrocarbons. It is shown that the carbon isotopic composition of oils, extracts and kerogens. The C12/C13 ratios of methane from different natural gases were correllated with the maturity of their source rocks. The C13/C12 ratios of methane from cuttings were also determined. Results show that pyrolysis chromatograms reflect the type of organic matter. Fluorescence of dinoflagellates is directly related to maturity. Bitumens are classified by fluorescence microscopy. Correlation of crude oils is performed using chromatograms of the aromatic fraction of crudes. Gas-source rock correlation is feasible by a systematic correlation of delta values of methane and the maturity of the source organic matter. Isotope analyses of head-space gases are developed for active exploration.
Author (ESA)

N82-10483# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
GEOGRAPHICAL DATA PROCESSING IN WEST GERMANY [GEOGRAFISK DATABEHANDLING I VAESTTYSKLAND]
Anders Wellving Feb. 1981 34 p refs In SWEDISH
(FOA-C-20397-D8(F8)) Avail: NTIS HC A03/MF A01

The use of computer processing of geographic data is described. Important investments were made in equipment and programming for the automatic production of topographic maps, civil and military. A problem is the lack of training facilities for young topographers and geographers who wish to specialize in data processing. Author (ESA)

N82-10484# Kiruna Geophysical Inst. (Sweden).
A SWEDISH PROPOSAL FOR AN EISCAT/GEOS-2 EXPERIMENT
Svante Westerlund, Georg Gustafsson, Aake Steen, John Murdin, Gudmund Wannberg, Rolf Bostroem (Uppsala Ionospheric Obs., Sweden), Aake Hedberg (Uppsala Ionospheric Obs., Sweden), Hermann Opgenoorth (Uppsala Ionospheric Obs., Sweden), Erling Nielsen (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), Carl-Gunne Faelthammar (Royal Inst. of Technol., Stockholm) et al Mar. 1981 28 p refs
(KGI-175; ISSN-0347-6405) Avail: NTIS HC A03/MF A01

An experiment that uses GEOS to measure in the equatorial plane at the same time as EISCAT and other ground based instrumentation are monitoring the ionosphere is described. The generation, acceleration and loss of auroral particles are studied. Signatures of particle precipitation in the ionosphere and properties of the plasma and electric field in the equatorial plane are correlated. The position of the conjugate point of GEOS is determined during various conditions. Such data in conjunction with magnetic field models, make it feasible to identify and estimate the various effects that contribute to the field during disturbances, i.e., to improve geomagnetic field models.
Author (ESA)

N82-10485# Technical Research Centre of Finland, Espoo. Maankaeytoen Lab.
SMALL-SCALE TERRAIN MAPPING BASED ON NUMERICAL INTERPRETATION OF LANDSAT IMAGERY [LANDSAT-KUVIEN NUMEERISEEN TULIKINTAAN PERUSTUVA PIENKAAVAINEN MAASTOKARTOITUS]
Esa Franssila 1981 75 p refs In FINNISH; ENGLISH summary Original contains color illustrations
(VTT-40; ISBN-951-38-1180-8; ISSN-0355-3477) Avail: NTIS HC A04/MF A01

The usability of digital LANDSAT imagery for producing terrain data, the general map of Finland (1: 400,000) and other small-scale terrain maps was investigated. The image processing was based on numerical processing of: image correction to map projection; image interpretation; data generalization; and graphic output along with statistical summary data. In order to achieve an automated cartographic generalization, the scale caused details were effaced by applying alternative rules. Compared with the conventional generalization, the result is defective. Figure lines for cartographic presentation were produced. Author (ESA)

N82-10486# Science Research Council, Slough (England).
STUDY ON SATELLITE RADAR ALTIMETRY IN CLIMATOLOGICAL AND OCEANOGRAPHIC RESEARCH, VOLUME 1
Final Report
Paris ESA Dec. 1980 450 p refs Prepared in cooperation with Natural Environment Research Council, Godalming, England 2 Vol.
(Contract ESA-4355/80/F-FC(SC))
(SP/153/06/01/FR(80)-Vol-1; ESA-CR(P)-1437-Vol-1) Avail: NTIS HC A19/MF A01

The contribution of satellite radar altimetry to climate, oceanographic and glaciological research is analyzed. The current position, the need for improved data and the relevance of existing altimeter data to climate, oceanographic and glaciological studies are discussed. Experience gained from previous missions is reviewed and the corrections which need to be made to the basic altimeter data are considered, along with the requirements for supporting measurements needed to aid in interpretation of this data. Sampling requirements in relation to particular aspects of oceanography and glaciology are treated. The role of circulation models in satellite altimetry, and those features of instrument design relating to scientific requirements, are examined. Supporting and complementary instruments are reviewed. The value of multi-satellite missions and possible future developments are discussed. Author (ESA)

N82-10487# Science Research Council, Slough (England).
STUDY ON SATELLITE RADAR ALTIMETRY IN CLIMATOLOGICAL AND OCEANOGRAPHIC RESEARCH, VOLUME 2
Final Report
Paris ESA Dec. 1980 47 p Prepared in cooperation with Natural Environment Research Council, Godalming, England 2 Vol.
(Contract ESA-4355/80/F-FC(SC))
(SP/153/06/01FR(80)-Vol-2; ESA-CR(P)-1437-Vol-2) Avail: NTIS HC A03/MF A01

The potential contribution of satellite radar altimetry to climatology, oceanography, and glaciology is discussed. The altimetry requirements for future programs are considered. Tradeoffs between spatial and temporal coverage, sampling rate and error budget, involved in defining an optimum mission are examined. Accuracy of + or - 10 cm, pulse lengths of 1.5 nsec and integration times of 3 sec are recommended. Orbital inclination should be between 60 and 65 deg. Author (ESA)

N82-10488# University Coll., Dublin (Ireland). Dept. of Physics.
STUDY ON CALIBRATION METHODS FOR EARTH OBSERVATION OPTICAL IMAGING INSTRUMENTS Final Report
E. O. Mongain Paris ESA Nov. 1980 230 p refs
(Contract ESA-4237/80/NL-PP(SC))
(UCD-207/1/80; ESA-CR(P)-1443) Avail: NTIS HC A11/MF A01

The properties and calibration of lamps diffusors, and detectors are considered. Measurements of solar irradiance from ground level are illustrated and the NASA solar spectral irradiance experiments are discussed with respect to the possibility of image striping as an inherent property of imaging arrays. Author (ESA)

N82-10489# Intermountain Forest and Range Experiment Station, Ogden, Utah.
LARGE-SCALE COLOR AERIAL PHOTOGRAPHY AS A TOOL IN SAMPLING FOR MORTALITY RATES
David A. Hamilton, Jr. Jan. 1981 14 p refs Sponsored by USDA Forest Service
(PB81-214777; FSRP/INT-269) Avail: NTIS HC A02/MF A01 CSCL 02F

Mortality rates specify the proportion of trees with a given set of characteristics that are expected to die in a fixed time interval. Results indicate that 1 year mortality trees can be dated and species can be assigned to green trees and to 1 year mortality trees with acceptable accuracy on 70 mm color photography at scales of 1:1600 and 1:2400. GRA

N82-10071*# Scientific Analysts and Consultants, Inc., Rockville, Md.
DISTORTION-FREE MAPPING OF VISSR IMAGERY DATA FROM GEOSYNCHRONOUS SATELLITES
F. K. Chan *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 35 p ref (For primary document see N82-10064 01-12)

(Contracts NOAA-01-8-MO1-1864; NOAA-NA79-KA-C-00026)
Avail: NTIS HC A13/MF A01 CSCL 22A

N82-10072*# General Electric Co., Lanham, Md. Space Div.
COMPUTATIONAL ASPECTS OF GEOMETRIC CORRECTION DATA GENERATION IN THE LANDSAT-D IMAGERY PROCESSING
I. Levine *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 16 p ref (For primary document see N82-10064 01-12)
(Contract NAS5-25300)
Avail: NTIS HC A13/MF A01 CSCL 05B

N82-10073*# General Electric Co., Lanham, Md. Space Div.
THE MSS CONTROL POINT LOCATION ERROR FILTER FOR LANDSAT-D
I. Levine *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 18 p refs (For primary document see N82-10064 01-12)
(Contract NAS5-25300)
Avail: NTIS HC A13/MF A01 CSCL 05B

N82-10074*# Naval Electronic Systems Command, Washington, D. C. Electronic Special Warfare and Space Div.
SPIN-AXIS ATTITUDE ESTIMATION AND MAGNETOMETER BIAS DETERMINATION FOR THE AMPTE MISSION
R. H. Thompson, G. F. Neal, and M. D. Shuster *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 14 p refs Prepared in cooperation with Computer Sciences Corp., Silver Spring, Md. and Business and Technological Systems, Inc., Seabrook, Md. (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 08B

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *85 Urban Technology and Transportation.*

N82-10490 Southern Methodist Univ., Dallas, Tex.
THIN-FILM POLYCRYSTALLINE CADMIUM TELLURIDE SOLAR CELLS AND LARGE-AREA POLYCRYSTALLINE SILICON SOLAR CELLS Ph.D. Thesis
Roshdy Abolazayem Abderrassoul 1981 139 p
Avail: Univ. Microfilms Order No. 8117862

Device quality polycrystalline films were deposited on a tungsten-coated graphite substrate by chemical vapor deposition. An in-situ indium layer was deposited prior to CdTe deposition to reduce the back resistance. Indium and iodine were used for n-type doping, and arsenic and phosphorus were used for p-type doping. The structural and electronic properties of the films were evaluated. Post-deposition heat treatment in a cadmium overpressure reduced the electrical resistivity by a factor of 2-3. Large-area purified metallurgical silicon substrates on graphite were prepared by unidirectional solidification. The moving-coil zone-melting technique was used. The pulverized metallurgicalsilicon was acid-treated and phosphoruspentoxide gettered prior to recrystallization, in order to reduce the content of harmful metallic impurities, especially Al and Fe. A spectrophotometric technique was used to determine the iron content in the acid-treated silicon. Dissert. Abstr.

N82-10491 Southern Methodist Univ., Dallas, Tex.
THIN FILM PHOTOVOLTAIC DEVICES Ph.D. Thesis
Ching-Long Lin 1981 117 p
Avail: Univ. Microfilms Order No. 8117881

The deposition of a silicon film containing a p-n junction on a metallurgical silicon substrate was used for the preparation of thin-film silicon solar cells. The substrate was prepared by the unidirectional solidification of the purified metallurgical silicon on a graphite plate, and the silicon film was deposited by the thermal reduction of trichlorosilane with hydrogen containing appropriate dopants. Indium phosphide films were deposited on foreign substrates by the reaction of indium, hydrogen chloride, and phosphine. Their structural and electrical properties were studied. Schottky barriers prepared from indium phosphide films were found to have low rectification ratios, high dark currents, and poor photovoltaic response due to grain boundary effects. The effects of grain boundaries were partially reduced by thermal oxidation, ruthenium (III) treatment, and nitridation, thus improving the photovoltaic characteristics of thin-film indium phosphide solar cells. Dissert. Abstr.

N82-10492 Texas A&M Univ., College Station.
A COMPUTER MODEL OF A STIRLING ENGINE USING A TWO-PHASE TWO-COMPONENT WORKING FLUID Ph.D. Thesis
David Allen Renfroe 1981 193 p
Avail: Univ. Microfilms Order No. 8118295

Stirling engines are potentially the most efficient converters of thermal energy to mechanical work that are manufacturable. In addition to its high efficiency capability, it also operates relatively cleanly, quietly, and with multiple fuel capability. Its one deficiency is the low specific power (power output/engine size.) A method of increasing specific power is described. This is by utilizing a two-phase two-component (TPTC) working fluid or one having a carrier gas and a component which changes phase during the cycle, such as a mixture of water and air. In order to study the effect of adding water to the working fluid of a Stirling engine on its operation, a computer model of the system was developed. The TPTC model is an extension of a Stirling engine with an ideal gas working fluid and includes provisions for accounting for differences in heat transfer and flow losses for a TPTC working fluid. Dissert. Abstr.

N82-10493 Virginia Univ., Charlottesville.
FUNDAMENTAL INVESTIGATIONS ON FUEL CELLS FOR TRANSPORTATION APPLICATIONS Ph.D. Thesis
Earl Jennings Taylor 1981 268 p
Avail: Univ. Microfilms Order No. 8117914

Three areas concerning fuel cells for transportation applications were investigated. The areas are: (1) a comparison of oxygen reduction in phosphoric acid and in trifluoromethanesulfonic acid, (TFMSA); (2) testing of three types of fuel cells under simulated vehicular operating conditions; and (3) the design, fabrication, and testing of a 1/2-kilowatt alkaline fuel cell module. Additions of TFMSA to phosphoric acid enhance the oxygen reduction in phosphoric acid. It is shown that the single cell has no adverse effect on fuel cell performance in simulated automobile power requirements. It is demonstrated that the single cells can be scaled-up without loss of performance. Author

N82-10494 Princeton Univ., N. J.
THE PLASMADYNAMICS AND IONIZATION KINETICS OF THERMIONIC ENERGY CONVERSION Ph.D. Thesis
John Langie Lawless, Jr. 1981 198 p
Avail: Univ. Microfilms Order No. 8118339

Radiation by a Cesium recombination laser operating in a different thermionic converter as an energy efficient process is discussed. To reduce the plasma arc drop, thermionic energy conversion was studied. It is predicted that it is possible to generate the required laser light from a thermionic-type Cesium plasma. A numerical method is developed to solve the thermionic plasma dynamics. The effects of the complete system of electron atom inelastic collisions on the ionization recombination problem are reduced to a simple system one quantum approximation. A Cesium recombination laser is predicted and the magnitudes for the population inversion and the laser efficiency are derived. Thermionic converter performance using laser radiation is considered. It is found that laser radiation impinging on a thermionic plasma enhances the ionization process thereby raising the plasma density and reducing the plasma arc drop. Dissert. Abstr.

N82-10495*# Gilbert/Commonwealth, Reading, Pa.
MAGNETOHYDRODYNAMICS MHD ENGINEERING TEST

FACILITY ETF 200 MWE POWER PLANT. CONCEPTUAL DESIGN ENGINEERING REPORT CDER. VOLUME 3: COSTS AND SCHEDULES Final Report

Sep. 1981 61 p 5 Vol.
(Contracts DEN3-224; DE-AI01-77ET-10769)
(NASA-CR-165452-Vol-3; DOE/NASA/0224-1-Vol-3) Avail: NTIS HC A04/MF A01 CSCL 10B

The extimated plant capital cost for a coal fired 200 MWE electric generating plant with open cycle magnetohydrodynamics is divided into principal accounts based on Federal Energy Regulatory Commision account structure. Each principal account is defined and its estimated cost subdivided into identifiable and major equipment systems. The cost data sources for compiling the estimates, cost parameters, allotments, assumptions, and contingencies, are discussed. Uncertainties associated with developing the costs are quantified to show the confidence level acquired. Guidelines established in preparing the estimated costs are included. Based on an overall milestone schedule related to conventional power plant scheduling experience and starting procurement of MHD components during the preliminary design phase there is a 6 1/2-year construction period. The duration of the project from start to commercial operation is 79 months. The engineering phase of the project is 4 1/2 years; the construction duration following the start of the man power block is 37 months. A.R.H.

N82-10496*# National Aeronautics and Space Administration. Pasadena Office, Calif.

SOLAR ENERGY MODULATOR Patent Application

Allan R. McDougal (JPL, California Inst. of Tech., Pasadena) and Robert R. Hale, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 17 Jul. 1981 14 p
(Contract NAS7-100)
(NASA-Case-NPO-15388-1; US-Patent-Appl-SN-284286) Avail: NTIS HC A02/MF A01 CSCL 10A

A module is described with a receiver having a solar energy acceptance opening and supported by a mounting ring along the optic axis of a parabolic mirror in coaxial alignment for receiving solar energy from the mirror, and a solar flux modulator plate for varying the quantity of solar energy flux received by the acceptance opening of the module. The modulator plate is characterized by an annular, plate-like body, the internal diameter of which is equal to or slightly greater than the diameter of the solar energy acceptance opening of the receiver. Slave cylinders are connected to the modulator plate for supporting the plate for axial displacement along the axis of the mirror thereby shading the opening with respect to solar energy flux reflected from the surface of the mirror to the solar energy acceptance opening. T.M.

N82-10497*# Mobil Tyco Solar Energy Corp., Waltham, Mass.

LARGE AREA SILICON SHEET BY EFG Quarterly Report, 1 Apr. - 30 Jun. 1981

11 Sep. 1981 50 p ref Sponsored by NASA and DOE Prepared for JPL, Pasadena
(Contract JPL-954355)
(NASA-CR-164881; DOE/JPL-954355-81/18; JPL-9950-591) Avail: NTIS HC A03/MF A01 CSCL 10A

The influence of parameters such as CO2 concentration, gas flow patterns, quartz in the bulk melt, melt doping level and growth speed on ribbon properties was examined for 10 cm wide ribbon. Ribbon quality is optimized for ambient CO2 in argon concentrations in the range from 1000 to 5000 ppm. Cell performance degrades at CO2 concentrations above 5000 ppm and IR interstitial oxygen levels decrease. These experiments were done primarily at a growth speed of 3.5 cm/minute. Cartridge parameters influencing the ribbon thickness were studied and thickness uniformity at 200 micrometers (8 mils) has been improved. Growth stability at the target speed of 4.0 cm/minute was improved significantly. T.M.

N82-10498*# California Inst. of Tech., Pasadena.

DEVELOPMENT AND FABRICATION OF A SOLAR CELL JUNCTION PROCESSING SYSTEM Quarterly Progress Report

Robert Giesling Jul. 1981 30 p ref Sponsored in part by DOE Prepared for JPL, Pasadena
(Contracts NAS7-100; JPL-955640)
(NASA-CR-163768; DOE/JPL-955640-81/6; JPL-9950-585; QPR-6) Avail: NTIS HC A03/MF A01 CSCL 10A

Modifications to the ground plane, to insure a good electrical return path during the pulse discharge, were made using a ring of beryllium copper finger stock attached to the underside of the aluminum ground plate. Experiments on annealing of wafers with ion implantation damage continued. The entire surface of 100 mm diameter wafers were annealed by one pulse for the standard implant (10 keV, phosphorus, 2x10 to the 15th power ions/sq cm). While samples are being fabricated into solar cells for electrical characterization, work is continuing on improvement of the electron beam uniformity and the optimization of the diode parameters. The engineering design was completed and the manufacturing detail drawings were released for fabrication. Assembly of the subcomponents for the exit and entrance locks is almost complete. These components include the cassettes, the indexing mechanisms, main doors, and wafer carrier transfer modules. The 'Y' track and three phase transition track sections are under final assembly and test. J.M.S.

N82-10499*# Ross (Bernd) Associates, San Diego, Calif.

DEVELOPMENT OF AN ALL-METAL THICK FILM COST EFFECTIVE METALLIZATION SYSTEM FOR SOLAR CELLS Quarterly Report, May - Jul. 1980

Bernd Ross Aug. 1980 35 p refs Sponsored in part by DOE Prepared for JPL
(Contract JPL-955688)
(NASA-CR-164779; DOE/JPL-955688-80/1; JPL-9950-598; QR-1) Avail: NTIS HC A03/MF A01 CSCL 10A

Materials including copper powders, silver-fluoride, and silicon wafers were procured and copper pastes were prepared. Electrodes made with copper pastes were analyzed and compared with the raw materials. A needle-like structure was observed on the electroded solar cells, and was identified as eutectic copper-silicon by electron probe X-ray spectroscopy. The existence of this phase was thought to benefit electrical and metallurgical properties of the contact. Subsequently electrodes made from new material were also shown to contain this phase while simultaneously having poor adhesion. J.M.S.

N82-10500*# Optical Coating Lab., Inc., City of Industry, Calif. Photoelectronics Div.

SILICON SOLAR CELL PROCESS DEVELOPMENT, FABRICATION AND ANALYSIS Annual Report, 1 Jul. 1980 - 30 Jun. 1981

H. I. Yoo, P. A. Iles, and D. C. Leung 31 Jun. 1981 100 p refs Sponsored in part by DOE
(Contract JPL-955089)
(NASA-CR-163787; DOE/JPL-955089-81/12; JPL-9950-597) Avail: NTIS HC A05/MF A01 CSCL 10A

Solar cells were fabricated from EFG ribbons dendritic webs, cast ingots by heat exchanger method, and cast ingots by ubiquitous crystallization process. Baseline and other process variations were applied to fabricate solar cells. EFG ribbons grown in a carbon-containing gas atmosphere showed significant improvement in silicon quality. Baseline solar cells from dendritic webs of various runs indicated that the quality of the webs under investigation was not as good as the conventional CZ silicon, showing an average minority carrier diffusion length of about 60 um versus 120 um of CZ wafers. Detail evaluation of large cast ingots by HEM showed ingot reproducibility problems from run to run and uniformity problems of sheet quality within an ingot. Initial evaluation of the wafers prepared from the cast polycrystalline ingots by UCP suggested that the quality of the wafers from this process is considerably lower than the conventional CZ wafers. Overall performance was relatively uniform, except for a few cells which showed shunting problems caused by inclusions. T.M.

N82-10501*# Wyle Labs., Inc., Huntsville, Ala.

AN ANALYTICAL COMPARISON OF THE EFFICIENCY OF SOLAR THERMAL COLLECTOR ARRAYS WITH AND WITHOUT EXTERNAL MANIFOLDS Final Report

Sep. 1981 30 p
(Contract DEN8-000006)
(NASA-CR-161852) Avail: NTIS HC A03/MF A01 CSCL 10A

An analytical comparison of the efficiency of solar thermal collector arrays with and without external manifolds is reported. A FORTRAN computer program was written for the computation of the thermal performance of solar thermal collector arrays with and without external manifolds. Arrays constructed from two example solar thermal collectors are computated. Typical external manifold sizes and thermal insulations are presented graphically and are compared with the thermal performance of the collector alone. E.A.K.

N82-10502*# Wyle Labs., Inc., Huntsville, Ala.
PERFORMANCE EVALUATION OF THE SOLAR KINETICS T-700 LINE CONCENTRATING SOLAR COLLECTOR Final Report
Sep. 1981 49 p
(Contract DEN8-000006)
(NASA-CR-161856) Avail: NTIS HC A03/MF A01 CSCL 10A

A performance evaluation of the solar kinetics T-700 line concentrating solar collector is reported. Collector descriptions, summary, test conditions, test equipment, test requirements and procedures, and an analysis of the various tests performed are described. E.A.K.

N82-10503*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF POSITIVE PULSE CHARGE WAVEFORMS ON THE ENERGY EFFICIENCY OF LEAD-ACID TRACTION CELLS Final Report
John J. Smithrick Sep. 1981 11 p refs
(Contract DE-AI01-77CS-51044)
(NASA-TM-82709; E-991; DOE/NASA/51044-22) Avail: NTIS HC A02/MF A01 CSCL 10A

The effects of four different charge methods on the energy conversion efficiency of 300 ampere hour lead acid traction cells were investigated. Three of the methods were positive pulse charge waveforms; the fourth, a constant current method, was used as a baseline of comparison. The positive pulse charge waveforms were: 120 Hz full wave rectified sinusoidal; 120 Hz silicon controlled rectified; and 1 kHz square wave. The constant current charger was set at the time average pulse current of each pulse waveform, which was 150 amps. The energy efficiency does not include charger losses. The lead acid traction cells were charged to 70 percent of rated ampere hour capacity in each case. The results of charging the cells using the three different pulse charge waveforms indicate there was no significant difference in energy conversion efficiency when compared to constant current charging at the time average pulse current value. Author

N82-10504*# Wyle Labs., Inc., Huntsville, Ala.
EVALUATION OF ALL-DAY-EFFICIENCY FOR SELECTED FLAT PLATE AND EVACUATED TUBE COLLECTORS Final Contractor Report
Sep. 1981 158 p
(Contract DEN8-000006)
(NASA-CR-161866) Avail: NTIS HC A08/MF A01 CSCL 10A

An evaluation of all day efficiency for selected flat plate and evacuated tube collectors is presented. Computations are based on a modified version of the NBSIR 78-1305A procedure for all day efficiency. The ASHMET and NOAA data bases for solar insolation are discussed. Details of the algorithm used to convert total (global) horizontal radiation to the collector tilt plane of the selected sites are given along with tables and graphs which show the results of the tests performed during this evaluation. J.M.S.

N82-10505*# Stirling Thermal Motors, Inc., Ann Arbor, Mich.
EVALUATION OF THE POTENTIAL OF THE STIRLING ENGINE FOR HEAVY DUTY APPLICATION Final Report
R. J. Meijer and B. Ziph Oct. 1981 62 p refs
(Contract NAS3-22226)
(NASA-CR-165473) Avail: NTIS HC A04/MF A01 CSCL 10B

A 150 hp four cylinder heavy duty Stirling engine was evaluated. The engine uses a variable stroke power control system, swashplate drive and ceramic insulation. The sensitivity of the design to engine size and heater temperature is investigated. Optimization shows that, with porous ceramics, indicated efficiencies as high as 52% can be achieved. It is shown that the gain in engine efficiency becomes insignificant when the heater temperature is raised above 200 degrees F. E.A.K.

N82-10506*# DHR, Inc., Washington, D.C.
MARKET ASSESSMENT OF PHOTOVOLTAIC POWER SYSTEMS FOR AGRICULTURAL APPLICATIONS IN MEXICO
William Steigelmann and Itil Asmon (ARD, Inc.) Jul. 1981 135 p refs
(Contracts DEN3-180; DE-AI01-79ET-20485)
(NASA-CR-165441; DOE/NASA/0180-3) Avail: NTIS HC A07/MF A01 CSCL 10A

The first year of cost-competitiveness, the market potential, and the environment in which PV systems would be marketed and employed were examined. Market elements specific to Mexico addressed include: (1) useful applications and estimates of the potential market for PV systems; (2) power requirements and load profiles for applications compatible with PV usage; (3) operating and cost characteristics of power systems that compete against PV; (4) national development goals in rural electrification and rural services, technology programs and government policies that influence the demand for PV in Mexico; (5) financing mechanisms and capital available for PV acquisition; (6) channels for distribution, installation and maintenance of PV systems; and (7) appropriate methods for conducting business in Mexico. A.R.H.

N82-10507# Harvard Univ., Cambridge, Mass.
OPTIMIZATION OF TRANSPARENT ELECTRODE FOR SOLAR CELLS Technical Progress Report, 15 Dec. 1980 - 15 Jun. 1981
Roy G. Gordon 1981 5 p Prepared for Midwest Research Inst., Golden, Colo.
(Contract DE-AC02-77CH-00178)
(DE81-023359; SERI/PR-9318-1-T2) Avail: NTIS HC A02/MF A01

Fluorine-doped tin oxide films prepared from highly purified tetramethyl tin (TMT) were compared with films prepared under identical conditions using less pure TMT. No effects due to impurities were found. The use of thermocouples to measure the temperature of glass surfaces is unsatisfactory. The use of an infrared emission thermometer is recommended. DOE

N82-10508# California Univ., Livermore. Lawrence Livermore Lab.
MECHANICAL ENERGY STORAGE TECHNOLOGY PROJECT Annual Report, 1980
T. M. Barlow, W. T. Crothers, T. T. Chiao, D. N. Frank, D. M. King, and S. V. Kulkarni 1 May 1981 203 p refs
(Contract W-7405-eng-48)
(DE81-029753; UCRL-50056-80) Avail: NTIS HC A10/MF A01

Progress during 1980 in the development and evaluation of the energy-saving potential of flywheel energy storage systems for vehicles and for fixed-base power systems is reported. Activities related to transportation applications, fixed-base applications, fiber-composite materials technology, flywheel rotor and containment technology, advanced component technology, and project management are described. DOE

N82-10509# Boeing Co., Seattle, Wash.
SOLAR PROJECT DESCRIPTION FOR PUBLIC SERVICE COMPANY OF NEW MEXICO (LOT 7) SINGLE FAMILY RESIDENCE, RIO RANCHO, NEW MEXICO
6 Aug. 1981 58 p
(Contracts DE-AB01-76CS-31020; HUD-H-2372)
(DE81-027853; SOLAR/1084-81/50) Avail: NTIS HC A04/MF A01

A solar space heating/domestic hot water system employing 150 square feet air flat plate collectors and 20,000 pounds of rock for storage is described. The collector, storage, energy to load, and auxiliary heat subsystems and five modes of operation are described. Auxiliary space heating is provided by an electric strip heater in the air ducts. The hot water system consists of an 80 gallon solar preheating tank which supplies a 40 gallon conventional tank. An electric heating element provides auxiliary heating in the preheat tank. DOE

N82-10510# Boeing Co., Seattle, Wash.
SOLAR PROJECT DESCRIPTION FOR COLORADO SUNWORKS: SINGLE FAMILY
1981 74 p
(Contracts DE-AB01-76CS-31020; HUD-H-2372)
(DE81-028054; SOLAR/1051-81/50) Avail: NTIS
HC A04/MF A01

A passive solar energy system for both space heating and domestic hot water preheating is described. The passive space heating system consists of a drum wall and direct gain system. Heat losses are reduced by a Beadwall movable insulation. The vertically stacked drums near the south wall form a drumwell chimney where heated air rises through ceiling vents above the drums into an open plenum area between the roof and the ceiling of the rooms. Additional vents from this plenum on the north side of the house provide a path for the warm air into the room. Earth berms on the north, east, and west sides of the house, a one foot covering of earth on the roof, and an entry vestibule are used. Cooling is enhanced by night ventilation. The hot water system consists of two 30 gallon tanks painted black and positioned next to the south wall. Original cost estimates for provisioning and installation of the solar system are given. DOE

N82-10511# Department of Housing and Urban Development, Washington, D. C.
SOLAR PROJECT DESCRIPTION FOR LIVING SYSTEMS SINGLE FAMILY RESIDENCE, DAVIS, CALIFORNIA
Oak Ridge, Tenn. DOE 31 Aug. 1981 75 p Prepared in cooperation with Boeing Co., Seattle
(Contract DE-AB01-76CS-31020)
(DE81-029743; SOLAR/1046-81/50) Avail: NTIS
HC A04/MF A01

Two independent systems are described - a direct gain passive solar space heating system and an active domestic hot water preheating system. Large south-facing windows and a clerestory skylight permit direct winter Sun to enter the house. Solar energy thermal storage is provided by both water filled tubes and the concrete slab floor. Movable shutters and insulating curtains provide capability to reduce night heat losses. Summer overheat protection is provided by roof overhangs and by natural ventilation. The collector, storage, heating load, and auxiliary loads subsystems and modes of operation are described for both systems. The house is instrumented for thermal performance evaluation. Original cost estimates for provisioning and installation of the solar system are given. DOE

N82-10512# Midwest Research Inst., Kansas City, Mo. Solar Energy Research Inst.
ENERGY END-USE REQUIREMENTS IN MANUFACTURING, VOLUME 1
Dilip R. Limaye (Synergic Resources Corp.), Steven Isser (Synergic Resources Corp.), Roy Beatty (Synergic Resources Corp.), Glenn Colville (Synergic Resources Corp.), Karen Lang (Synergic Resources Corp.), and Frank Krawiec Jul. 1981 233 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-028975; SERI/TR-733-790R-Vol-1) Avail: NTIS
HC A11/MF A01

A review and evaluation of existing industrial energy data bases were undertaken to assess their potential for supporting SERI research to analyze technical and economic feasibility of solar technologies, and to establish multilayer R and D programs for: solar thermal industrial electric power systems and solar IPH systems. In the review of existing industrial energy data bases, the level of detail, disaggregation, and primary sources of information were examined. The focus was on fuels and electric energy used for heat and power purchased by the manufacturing subsector and listed by 2-, 3-, and 4-digit SIC, primary fuel, and end use. DOE

N82-10513# Sandia Labs., Albuquerque, N. Mex.
FREQUENCY RESPONSE ANALYSIS OF FLUID CONTROL SYSTEMS FOR PARABOLIC-TROUGH SOLAR COLLECTORS
R. Schindwolf Jul. 1981 29 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029293; SAND-80-0385) Avail: NTIS
HC A03/MF A01

A linearized steady-state frequency response is derived for parabolic-trough collectors and for connecting piping that can be used in standard gain-phase analyses to evaluate system stability and closed-loop frequency response. The frequency-response characteristics of a typical collector string and piping are used in a gain-phase analysis to get some insight into the effect on system stability of various system parameters such as controller gain, sensor and controller-time constants, and sensor location. DOE

N82-10514# Massachusetts Inst. of Tech., Cambridge.
OESYS: A SIMULATION TOOL FOR NONCONVENTIONAL ENERGY APPLICATIONS ANALYSIS. THEORETICAL AND OPERATIONAL DESCRIPTION WITH USER DOCUMENTATION
Thomas L. Dinwoodie Aug. 1980 190 p refs
(Contract DE-AM01-78EI-02295)
(DE81-029701; MIT-EL-80-022) Avail: NTIS
HC A09/MF A01

A method is developed for assessing both the operational and economic performance of variable mixes of energy conversion technologies within their specific service environments. This method is incorporated into OESYS (Optional Energy Systems Simulator), a computer model with the specific capability to assess conditions of economic viability and service reliability for energy project evaluation. The OESYS program is especially well suited to handle stochastic (weather dependent) generation technologies, and simultaneously handles the generation, transfer, and demand of multiple energy quality levels (electricity, high/low grade thermal, liquid/gaseous fuels, etc.). The model can be applied to most use sectors, including residential, commercial, industrial, and institutional, or combinations of use sectors. A model summary description is given. A theoretical description of the types of energy applications handled by OESYS, an operational description of the model, user documentation, and three sample studies are included. DOE

N82-10515# Science Applications, Inc., McLean, Va. Electro-Optics Technology Div.
TECHNICAL AND ECONOMIC ASSESSMENT OF SOLAR THERMOPHOTOVOLTAIC CONVERSION Final Report, Jul. 1981
W. Koechner, H. R. Verdun, and N. C. Wyeth Jul. 1981 190 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1415-1)
(DE81-803762; EPRI-AP-1940) Avail: NTIS
HC A09/MF A01

The solar thermophotovoltaic (STPV) conversion concept is aimed at large-scale electric utility applications. After consideration of several options, a conceptual system arrangement was chosen an analyzed to provide calculations for STPV system configuration, size, performance, and cost. Baseline designs were selected fo the optical and converter subsystems, and a detailed analysis of the performance of these subsystems was made using mathematical models an computer codes. The various subsystems operating parameters were related to overall sytem performance and cost, and a minimum cost/power output point was found for the conceptual system. DOE

N82-10516# Veda, Inc., Camarillo, Calif.
ECONOMIC ANALYSIS OF THE UNIFIED HELIOSTAT ARRAY
7 Nov. 1980 395 p refs
(Contract DE-AC03-80SF-10802)
(DE81-026698; DOE/SF-10802/T4;
VEDA-43905-80U/P0069) Avail: NTIS HC A17/MF A01

The array (UHA) is comprised of conventional two-axis heliostats mounted on a terraced south-facing wall of a single structure. The arrangement of heliostats on the array is chosen to eliminate or control the degree of inter-heliostat shading and blocking. The UHA was investigated as to cost and optical performance. Two heliostats, the Veda Industrial Heliostat (VIH) and the Repowering Helistat were investigated in conjunction with the UHA. The UHA is found to be a viable candidate for solar thermal central receiver applications. The UHA-VIH combination was shown to provide very high flux densities and to be suitable for high temperature applications in the 1000 K to 2000 K range. These temperatures were shown to be achieve even with very small (1 MWt) collector fields. DOE

N82-10517# Atlanta Univ., Ga. Dept. of Chemistry.
COOPERATIVE PROGRAM OF APPLIED ENERGY RESEARCH TECHNOLOGY DEVELOPMENT Final Technical Report, 1 Oct. 1979 - 31 Dec. 1980
1980 140 p refs Prepared in cooperation with Georgia Inst. of Technology, Atlanta
(Contract DE-FG05-79ET-60058)
(DE81-028916; DOE/ET-60058/T1) Avail: NTIS
HC A07/MF A01

Studies conducted by groups at Atlanta University and the Georgia Institute of Technology Engineering Experiment Station are described. These efforts were proposed as exploratory studies in the area of alternative energy technologies as preliminary work leading to a multi-year program of specific developmental efforts. Topics chosen were supportive of on-going research programs at the two institutions. Work proposed included pertinent literature search, computer modeling, initial choices of systems, and preliminary parametric studies. DOE

N82-10518# Wayne State Univ., Detroit, Mich. Dept. of Chemistry.
CUPROUS OXIDE PHOTOVOLTAIC CELLS Final Report, 9 Apr. 1979 - 31 Jan. 1981
D. Trivich 1981 116 p refs
(Contract DE-AC02-79ET-23010)
(DE81-028927; DOE/ET-23010/T10) Avail: NTIS
HC A06/MF A01

Research is described which deals with heterojunctions on Cu2O, MIS structures, effect of impurities in Cu2O, new etching procedures, junction formation by reduction of Cu2O to Cu through hydrogen ion bombardment, theoretical analysis of the hydrogen-reduced cells, a new method of measuring diffusion length in Cu2O, and measurement of the absorption coefficient of Cu2O. The factor most improved was the open circuit voltage, V/sub oc/, which was increased from 0.35 V to 0.7 V. DOE

N82-10519# Lincoln Lab., Mass. Inst. of Tech., Lexington.
PERFORMANCE OF TERRESTRIAL PHOTOVOLTAIC MODULES AT MIT LINCOLN LABORATORY EXPERIMENTAL PHOTOVOLTAIC SYSTEMS
S. E. Forman 30 Apr. 1981 19 p refs
(Contract DE-AC02-76ET-20279)
(DE81-029995; DOE/ET-20279/140) Avail: NTIS
HC A02/MF A01

Through a program of periodic surveillance, measurements and inspections, over 250 electrically failed modules were located, removed and analyzed during a four-year period. The principal causes of failure were: cells cracked due to weathering or internal module stresses; failed solder joints; interconnects not soldered to rear sides of cells at assembly; cells or interconnects electrically shorted to metallic substrates; and broken or split interconnects. Details and photographs of many of the different typs of failures are presented. In addition, some of the analysis techniques used to locate the failures are described. DOE

N82-10520# Cornell Univ., Ithaca, N. Y.
STUDIES OF PHOTOSYNTHETIC ENERGY CONVERSION
R. K. Clayton Jul. 1981 20 p refs
(Contract DE-AS02-76ER-03162)
(DE81-028313; DOE/ER-03162/T1) Avail: NTIS
HC A02/MF A01

Spectroscopic studies are reported on the major pigmented components of bacterial photosynthetic membranes: antenna complexes and photochemical reaction centers of Rhodopseudomonas sphaeroides and related species. Through optical studies with polarized light, combining the techniques of linear dichroism and photoselection, the relative orientations were determined of pigment molecules in reaction centers and antenna complexes and in relation to the photosynthetic membrane. Fairly complete angular coordinates were obtained of bacterio-chlorophyll (bchl) and bacteriopheophytin in the reaction centers, and less detailed information about antenna pigments (bchl and carotenoids) and bound cytochromes. DOE

N82-10521# Chicago Univ., Ill. Enrico Fermi Inst.
INTEGRATED FUNCTION NONIMAGING CONCENTRATING COLLECTOR TUBES FOR SOLAR THERMAL ENERGY Technical Progress Report
Roland Winston and Joseph J. OGallagher 25 Aug. 1981 21 p refs
(Contract DE-AC02-80ER-10558)
(DE81-029677; DOE/ER-10558/2) Avail: NTIS
HC A02/MF A01

A substantial improvement in optical efficiency over contemporary external reflector evacuated tube collectors was achieved by integrating the reflector surface into the outer glass envelope. The design, fabrication and preliminary test results are described for a prototype collector based on this concept. Efficiencies above 40% up to nearly 300 C may be achieved. DOE

N82-10522# Battelle Pacific Northwest Labs., Richland, Wash.
OPERATIONAL CHARACTERISTICS OF ANAEROBIC DIGESTERS AT SELECTED WASTEWATER-TREATMENT FACILITIES IN THE UNITED STATES
Jul. 1981 46 p refs
(Contract DE-AC01-76CS-20300)
(DE81-030144; DOE/CS-20300/2) Avail: NTIS
HC A03/MF A01

The effectiveness of powered activated carbon in improving volatile solids destruction and gas production in anaerobic digesters that are operating at less than normally expected levels of efficiency was studied. Digester operating characteristics were surveyed and the number of stressed digesters estimated. It is shown that although median values of the operating parameters conformed with those of a well operated digester, 30 percent of the digesters surveyed were stressed with regard to at least one important parameter. Digester gas production and usage are examined to determine the importance of methane off gas as an energy source. Onsite uses include heating digesters and buildings, incinerating sludge, operating equipment, and generating electricity. DOE

N82-10523# Exide Management and Technology Co., Yardley, Pa.
HANDBOOK OF SECONDARY STORAGE BATTERIES AND CHARGE REGULATORS IN PHOTOVOLTAIC SYSTEMS Final Report
Albuquerque, N. Mex. Sandia National Labs. Aug. 1981 189 p refs Prepared in cooperation with Motorola, Inc., Scottsdale, Ariz., Sandia National Labs., Albuquerque, N. Mex., Exide Corp., Horsham, Pa., and Exide Corp., Raleigh, N.C.
(Contract DE-AC04-76DP-00789)
(DE81-029464; SAND-81-7135) Avail: NTIS
HC A09/MF A01

Solar photovoltaic systems often require battery subsystems to store reserve electrical energy for times of zero insulation. This handbook is designed to help the system designer make optimum choices of battery type, battery size and charge control circuits. Typical battery performance characteristics are summarized for four types of lead-acid batteries: pure lead, lead-calcium and lead-antimony pasted flat plate and lead-antimony tubular positive types. Similar data is also provided for pocket plate nickel cadmium batteries. Economics plays a significant role in battery selection. Relative cost of each battery type are summarized under a variety of operating regimes expected for solar PV installations. DOE

N82-10524# Little (Arthur D.), Inc., Cambridge, Mass.
LARGE WIND TURBINE GENERATOR PERFORMANCE ASSESSMENT, TECHNOLOGY STATUS REPORT NO. 3 Interim Report
W. A. Vachon Jul. 1981 136 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1348-1)
(DE81-903763; EPRI-AP-1959) Avail: NTIS
HC A07/MF A01

Detailed summaries of test results are presented for the US Department of Energy's 200-kW MOD-OA horizontal-axis WTs that were interconnected with electric utilities at various locations around the United States. A description of the progress and experiences with both the MOD-1 1.5-MW WT and the cluster of three MOD-2 2.5-MW WTs is also presented, along with a summary of plans for the DOE vertical-axis wind turbine program. A brief summary of Danish large WT programs is also provided. DOE

N82-10525# Hibbing Public Utilities Commission, Minn.
FEASIBILITY OF A SMALL SCALE PUMPED STORAGE DEMONSTRATION PROJECT, HIBBING, MINNESOTA
1981 229 p refs Prepared in cooperation with Hansen (James) and Associates, Springfield, Vt.
(Contract DE-AC07-76ID-01570)
(DE81-028678; DOE/TIC-1028678; IDO-10097) Avail: NTIS HC A11/MF A01

The economic and technical feasibility of developing a 5 to 15 MW pumped storage power plant was examined. The substitution of power from a pumped storage facility for the purchased peak power is advantageous because: (1) the coal fired cogeneration plant operates with an improved heat rate; (2) numerous open pits from abandoned iron ore mines are available as reservoirs for pumped storage; and (3) the peaking power generated does not depend on petroleum fuel. It is suggested that: eight mine sites are suitable for pumped storage; oil fired peak power units should be avoided to improve the efficiency of the existing cogeneration; this is a nonpolluting form of power generation; and the development of small scale reversible pump/turbine units for commercial operation is desirable. DOE

N82-10526# Oregon State Univ., Corvallis. Dept. of Mechanical Engineering.
HEAT PUMPS FOR SEASONAL THERMAL ENERGY STORAGE: OPERATION AND DESIGN
Gordon M. Reistad and William R. McMahon Nov. 1980 80 p refs
(Contracts DE-AT06-79RL-10121; DE-AM06-76RL-02227)
(DE81-025592; DOE/RL-10121/T1) Avail: NTIS HC A05/MF A01

A survey of commercial groundwater heat pump installations, and an analysis of residential-scale water-source heat pumps and their potential application to seasonal thermal energy storage in aquifers are presented. Through the survey, the operational experiences of large heat pumps using groundwater, with or without reinjection, were evaluated. A model of the residential-scale heat pump and aquifer system was made and evaluated for energy performance over a range of parameters for the heat pump, the aquifer and the heating load being met from the heat pump. DOE

N82-10527# Acres American, Inc., Buffalo, N.Y.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 1: EXECUTIVE SUMMARY Final Report
May 1981 111 p Sponsored in part by Electric Power Research Inst. Prepared for Potomac Electric Power Company, Washington, D.C.
(Contract DE-AC02-77ET-28013; EPRI Proj. 1081-1)
(DE81-029440; EPRI-EM-1589-Vol-1; DOE/ET-5047/1) Avail: NTIS HC A06/MF A01

A preliminary design study of water compensated Compressed Air Energy Storage (CAES) and Underground Pumped Hydroelectric (UPH) plants for siting in geological conditions suitable for hard rock excavations was performed. The study was divided into five primary tasks as follows: establishment of design criteria and analysis of impact on power system; selection of site and establishment of site characteristics; formulation of design approaches; assessment of environmental and safety aspects; and preparation of preliminary design of plant. The salient aspects considered and the conclusions reached during the consideration of the five primary tasks for both CAES and UPH are presented. DOE

N82-10528# Acres American, Inc., Buffalo, N.Y.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 2: PROJECT DESIGN CRITERIA: UPH Final Report
May 1981 185 p refs Sponsored in part by Electric Power Research Inst. Prepared for Potomac Electric Power Co., Washington, D.C.
(Contract DE-AC02-77ET-28013; EPRI Proj. 1081-1)
(DE81-028107; EPRI-EM-1589-Vol-2; DOE/ET-5047/2) Avail: NTIS HC A09/MF A01

The design criteria for an underground pumped hydroelectric (UPH) storage facility having a maximum generating capacity of 2000 MW and a storage capacity of 20,000 MWh at a nominal head of 5000 ft are documented. The UPH facility is a two step configuration with single stage reversible pump turbines, each step consisting of a 1000 MW plant at a nominal head of 2500 ft. Overall design criteria including operating requirements, civil/structural criteria, geotechnical criteria, mechanical criteria and electrical criteria are detailed. Specific requirements are given for the upper reservoir, intake/outlet structure, penstock and draft tubes, powerhouses, transformer galleries, intermediate reservoir, lower reservoir, shafts and hoists, switchyard and surface buildings. The requirements for the power plant electrical and mechanical equipment, including pump turbine and motor generator units, are referred to. Electrical design criteria are given to meet the requirements of two power houses located underground at different depths, but these criteria may not necessarily reflect PEPCO's current engineering practice. The criteria refer to a specific site and take into account the site investigation results. The design criteria given were used as the basis for the plant design. DOE

N82-10529# Acres American, Inc., Buffalo, N.Y.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 5: SITE SELECTION Final Report
Apr. 1981 148 p refs Sponsored in part by Electric Power Research Inst. Prepared for Potomac Electric Power Co., Washington, D.C.
(Contract DE-AC02-77ET-28013; EPRI Proj. 1081-1)
(DE81-028199; EPRI-EM-1589-Vol-5; DOE/ET-5047/5) Avail: NTIS HC A07/MF A01

A six-step site selection process undertaken to identify and subsequently rank potential sites suitable for either an underground pumped hydroelectric (UPH) facility, or a water-compensated hard-rock cavern compressed air energy storage (CAES) facility is described. The region of study was confined to the service area of the Potomac Electric Power Company (PEPCO) and contiguous areas. Overriding considerations related to geology, environmental impact and transmission-line routing were studies within the context of minimizing plant costs. The selection process led to the identification of several sites suitable for the development of either a CAES or an UPH facility. Design development and site exploration at the selected site are described. DOE

N82-10530# Acres American, Inc., Columbia, Md.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 9: DESIGN APPROACHES, CAES. APPENDIX D: MECHANICAL SYSTEMS Final Report
Apr. 1981 104 p Sponsored in part by Electric Power Research Inst. Prepared for Potomac Electric Power Company, Washington, D.C.
(Contract DE-AC02-77ET-28013; EPRI Proj. 1081-1)
(DE81-028200; EPRI-EM-1589-Vol-9-App-D;
DOE/ET-5047/9D) Avail: NTIS HC A06/MF A01

The development of the design approach taken for the mechanical systems included in a compressed air energy storage (CAES) facility were documented. Design approaches developed the fuel oil system, water supply system, waste treatment system, fire protection and safety system, and miscellaneous plant services are based on similar designs for conventional utility plants because the operating characteristics, design parameters, and equipment capabilities for CAES plant mechanical systems are similar to standard utility systems. The design approach for each of these systems develops several alternatives for achieving the CAES plant requirements in each area. The preferred alternative is then expanded into a preliminary system description. DOE

N82-10531# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

MATERIALS AND MOLECULAR RESEARCH DIVISION REPORT, 1980 Annual Report
Jun. 1981 562 p refs
(Contract W-7405-eng-48)
(DE81-027828; LBL-12000) Avail: NTIS HC A24/MF A01

Progress made in the following research areas is reported: materials sciences (metallurgy and ceramics, solid state physics, materials chemistry); chemical sciences (fundamental interactions, processes and techniques); nuclear sciences; and fossil energy. Advanced isotope separation technology, energy storage, magnetic fusion energy, and nuclear waste management are also discussed. DOE

N82-10532# GeoTrans, Inc., Herndon, Va.
REVIEW OF SIMULATION TECHNIQUES FOR AQUIFER THERMAL ENERGY STORAGE (ATES)
James W. Mercer, Charles R. Faust, William J. Miller, and F. J. Pearson, Jr. Mar. 1981 225 p refs Prepared in cooperation with INTERA, Environmental Consultants, Inc., Houston, Texas Prepared for Pacific Northwest Lab., Richland, Washington
(Contract DE-AC06-76RL-01830)
(DE81-029943; PNL-3769) Avail: NTIS HC A10/MF A01

The analysis of aquifer thermal energy storage (ATES) systems rely on the results from mathematical and geochemical models. Therefore, the state-of-the-art models relevant to ATES were reviewed and evaluated. These models describe important processes active in ATES including ground-water flow, heat transport (heat flow), solute transport (movement of contaminants), and geochemical reactions. In general, available models of the saturated ground-water environment are adequate to address most concerns associated with ATES; that is, design, operation, and environmental assessment. In those cases where models are not adequate, development should be preceded by efforts to identify significant physical phenomena and relate model parameters to measurable quantities. DOE

N82-10533# California Univ., Livermore. Lawrence Livermore Lab. Transportation Systems Research.
PRELIMINARY DESIGN AND ANALYSIS OF ALUMINUM-AIR CELLS PROVIDING FOR CONTINUOUS FEED AND FULL UTILIZATION OF ANODES
John F. Cooper 16 Aug. 1981 9 p refs
(Contract W-7405-eng-48)
(DE81-030479; UCID-19178) Avail: NTIS HC A02/MF A01

The advantages, disadvantages, and engineering problem areas of the wedge shaped cells in anodes utilization are reviewed. The importance of solution side current collection to the practicality of this approach when used with alkaline electrolytes is identified. The relationship between cell height and total anode mass is derived for this and corresponding cells of the M1 design. It is concluded that the M1-CF design may provide the basis for an automotive battery of greater simplicity, reliability, and economy than earlier designs. DOE

N82-10534# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
STANDARDS APPLICATION AND DEVELOPMENT PLAN FOR SOLAR THERMAL TECHNOLOGIES
H. R. W. Cobb Jul. 1981 218 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-030310; SERI/TR-742-885) Avail: NTIS HC A10/MF A01

Functional and standards matrices, developed from input from ST users and from the industry that will be continually reviewed and updated as commercial aspects develop are presented. The matrices highlight codes, standards, test methods, functions and definitions that need to be developed. They will be submitted through ANSI for development by national consensus bodies. A contingency action is proposed for standards development if specific input is lacking at the committee level or if early development of a standard would hasten commercialization or gain needed jurisdictional acceptance. T.M.

N82-10535# Brobeck (William M.) and Associates, Berkeley, Calif.
DYNAMIC STABILITY OF STACKED DISK TYPE FLYWHEELS
F. C. Younger Apr. 1981 47 p refs Prepared for California Univ., Lawrence Livermore Lab.
(Contract W-7405-eng-48)
(DE81-030008; UCRL-15372) Avail: NTIS HC A03/MF A01

A flywheel assembly formed from adhesively bonded stacked fiber composite disks was analyzed. The stiffness and rigidity of the assembly required to prevent unconrolled growth in the deformations due to centrifugal force was determined. It is shown that stacked disk type flywheels become unstable when the speed exceeds a critical value. This critical value of speed depends upon the stiffness of the bonded attachments between the disks. It is found that elastomeric bonds do not provide adequate stiffness to insure dynamic stability for high speed stacked disk type flywheels. DOE

N82-10536# Tata Energy Research Inst., Bombay (India). Documentation Center.
WATER-PUMPING-WINDMILL DESIGNS: A HANDBOOK
Tarangini Rastogi, comp. and Narsing R. Rao, comp. Jun. 1981 162 p refs
(DE81-904016; NP-1904016) Avail: NTIS HC A08/MF A01

Windmills are becoming an attractive proposition for water pumping in the rural areas. Information on designs of water pumping windmills which could be constructed with inexpensive and locally available materials and skills is presented. This handbook covers about 23 indigeneous windmill designs and information such as name of the designer, institutional affiliation, type of windmill, specific applications and suitability, design features, and operating data wherever available. Most of these designs tested and were successfully used in different parts of the world. Commercially obtainable windmills listed along with complete address of the manufacturers and relevant technical specifications. T.M.

N82-10537# Los Alamos Scientific Lab., N. Mex.
STATE OF THE ART IN PASSIVE SOLAR HEATING
J. Douglas Balcomb 1981 4 p Presented at the Passive and Hybrid Solar Energy Program Update Meeting, Washington, D.C., 9-12 Aug. 1981
(Contract W-7405-eng-36)
(LA-UR-81-2185; CONF-810832-1) Avail: NTIS HC A02/MF A01

The state of the art is outlined according to four major categories: passive, solar practice, evaluation, design, and products and materials. Needed future research activities and point industry/government activities are listed. DOE

N82-10538# Los Alamos Scientific Lab., N. Mex.
LOS ALAMOS NATIONAL LABORATORY PASSIVE SOLAR PROGRAM
Donald A. Neeper 1981 12 p refs Presented at the Passive and Hybrid Solar Energy Program Update Meeting, Washington, D.C., 9-12 Aug. 1981
(Contract W-7405-eng-36)
(DE81-028778; LA-UR-81-2162; CONF-810832-2) Avail: NTIS HC A02/MF A01

Progress in passive solar tasks performed for FY-81 is documented. Twenty-eight configurations of sunspaces were studied using the solar load ratio method of predicting performance, the configuration showing best performance is discussed. The minimum level of insulation needed to generate convective flow in the thermosphon test rig is noted and measured. Information is also included on test room performance, off speak auxiliary electric heating for a passive home, free convection experiment, monitored building, and technical support to the US Department of Energy. DOE

N82-10539# Midwest Research Inst., Kansas City, Mo. Solar Energy Research Inst.
INVESTIGATION OF PHOTOVOLTAIC MECHANISMS IN POLYCRYSTALLINE THIN-FILM SOLAR CELLS Quarterly Report, 1 Aug. - 31 Oct. 1980
T. A. Temofonte 3 Apr. 1981 18 p refs
(Contract DE-AC02-77CH-00178)
(DE81-027272; SERI/PR-9233-1-T1; QR-1) Avail: NTIS HC A02/MF A01

Initial efforts focused on exploring the role of atomic hydrogen on silicon surfaces. The atomic hydrogen was generated using an inductively coupled plasma. Comparisons using Auger sputter profiling were made of hydrogenated silicon surfaces, deliberately oxidized silicon surfaces and silicon surfaces having a native oxide. The auger spectrum of a hydrogenated silicon surface is initially qualitatively similar to that for an oxidized surface. Distinct differences emerge as a function of sputtering depth. ziv., the ratio of free silicon to bonded silicon decreases first before finally decreasing. This implies a significantly different surface composition for hydrogenated silicon compared to oxidized silicon. DOE

N82-10540# Mitre Corp., McLean, Va. Metrek Div.
STATUS OF THE DOE BATTERY AND ELECTROCHEMICAL TECHNOLOGY PROGRAM 2
R. Roberts Dec. 1980 279 p refs Presented at Dept. of Energy Battery and Electrochem. Contractor's Conf., 10-12 Dec. 1979
(Contract DE-AC01-79ET-25407)
(DE81-029879; DOE/ET-25407/1) Avail: NTIS HC A13/MF A01

The status of electrochemical storage systems is reviewed. Secondary batteries were recommended, however, selected mechanically rechargeable batteries and aspects of energy conservation in industrial electrochemistry were included. Batteries included are: lead acid, nickel/iron, nickel/zinc; advanced: lithium/metal sulfide, sodium/sulfur, zinc/chlorine; and research and development: metal/air, hydrogen/chlorine, zinc/bromine, redox, organic electrolytes, solid state. Electrode reactions, cell performance modeling, new battery materials are examined. Energy conservation and alternative processes in electrochemical industry are reviewed. The potential contributions of the battery program to the various missions supported such as electric vehicles, photovoltaic systems, distributed electrical energy systems, and energy conservation in industry are discussed. DOE

N82-10541# Sandia Labs., Albuquerque, N. Mex.
SOLAR ENERGY SYSTEM DESIGN: A SIMPLE METHOD FOR SIZING THE COLLECTOR FIELD AND THERMAL STORAGE
Ralph R. Peters Jul. 1981 81 p refs
(Contract DE-AC04-76DP-00789)
(DE81-028652; SAND-81-1541) Avail: NTIS HC A05/MF A01

The Zero Marginal Cost (ZMC) technique to enable quick, accurate designs of parabolic trough solar energy systems was developed. The ZMC technique is discussed and it is shown that systems designed with this technique compare quite favorably with those designed using expensive computer codes. DOE

N82-10542# SRI International Corp., Menlo Park, Calif.
CONCEPTUAL DESIGN OF A GLASS-REINFORCED CONCRETE SOLAR COLLECTOR
Arthur J. Slemmons, Dale W. Ploeger, and Ron Lundgren (Sandia Labs., Albuquerque, N. Mex.) Jul. 1981 51 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029280; SAND-81-7011) Avail: NTIS HC A04/MF A01

An investigation of the properties and characteristics of glassfiber-reinforced concrete (GRC) was made to determine its suitability as a reflector substrate and structure for heliostats and solar collectors. The material properties and characteristics of GRC were established by tests on small flat panels. A conceptual design of a 2-m x 6-m parabolic trough solar collector module and a preliminary production-cost analysis were also completed. DOE

N82-10543# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC-SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 1: FOR LOVINGTON SQUARE SHOPPING CENTER SITE, LOVINGTON, NEW MEXICO
Jul. 1981 18 p Prepared for Sandia Labs., Albuquerque, N. Mex.
(Contract DE-AC04-76DP-00789)
(DE81-028071; SAND-81-7085/1) Avail: NTIS HC A02/MF A01

A 100 kwp photovoltaic flat panel system is planned for application in a shopping center to assess problems associated with utility tie-in and to provide utility experience with a photovoltaic system. The project is briefly outlined, and the participants are listed. Relevant weather data and reference operating conditions are given and four operational modes are described. System specifications are given and the solar array, control, protection, and data acquisition and instrumentation subsystems are described. DOE

N82-10544# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
ENERGY END-USE REQUIREMENTS IN MANUFACTURING, VOLUME 3
F. Krawiec, Dilip R. Limaye (Synergic Resources Corp.), Steve Isser (Synergic Resources Corp.), Roy Beatty (Synergic Resources Corp.), Glenn Colville (Synergic Resources Corp.), and Karen Lang (Synergic Resources Corp.) Jul. 1981 624 p
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-027976; SERI/TR-733-790R-Vol-3) Avail: NTIS HC A99/MF A01

Data on the US and state manufacturing subsectors' energy end use requirements disaggregated by 2 and 4 digit SIC and temperature level in 1990 are presented. DOE

N82-10545# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
DEVELOPMENT OF HIGH-EFFICIENCY-CASCADE SOLAR CELLS
Jul. 1981 5 p
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-028145; SERI/PR-8136-1-T4) Avail: NTIS HC A02/MF A01

A comparative analysis of Mg and Be diffused GaAsSb junctions is described. It is found that Mg may be more suitable as the bottom cell dopant since it is less affected during subsequent layer growth. Increasing the number of grading layers with the composition of the bottom cell from one to six, the open circuit voltage increased from 0.3 to over 0.5 V. Results of the OM-CVD growth of GaAsSb are reported. Photoluminescence in the layers is mentioned. DOE

N82-10546# Potomac Electric Power Co., Washington, D.C.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 3: PROJECT DESIGN CRITERIA: CAES Final Report
Apr. 1981 218 p Prepared in cooperation with Acres American, Inc., Columbia, Md.
(Contract DE-AC02-77ET-28013; EPRI Proj. 1081-1)
(DE81-028197; EPRI-EM-1589-Vol-3) Avail: NTIS HC A10/MF A01

The design criteria presented provided the basis for development of the design approaches and preliminary plant design. These design criteria are based, where possible, upon related facilities and experiences and are representative of normal utility practices. They cover the major plant equipment, systems, and facilities and the plant characteristics which depend upon or have an impact on plant surroundings. Project team studies and outside development contracts concentrated on those areas where current technology or practice does not provide adequate information to support plant design activities or economic analyses. DOE

N82-10547# Mid-American Solar Energy Complex, Minneapolis, Minn.
SUMMARY OF PASSIVE-SOLAR-RETROFIT WORKSHOPS
Jun. 1981 12 p
(Contract DE-AC02-79CS-30150)
(DE81-028146; MASEC-CF-81-028) Avail: NTIS HC A02/MF A01

Efforts are described to provide training in the latest passive solar retrofit techniques to a wide sector of residential design and construction professionals. Three 20-hour passive solar single-family retrofit workshops were attended by 116 residential construction-related participants. Each of the three workshops is described. The workshop topics and workbook were evaluated by 65 participants, and suggestions were made for improvement. DOE

N82-10548# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

RAPID CHARGING OF LEAD-ACID BATTERIES FOR ELECTRIC-VEHICLE PROPULSION AND SOLAR-ELECTRIC STORAGE

P. Longrigg Jun. 1981 44 p refs
(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178)
(DE81-028084; SERI/RR-742-1068) Avail: NTIS
HC A03/MF A01

A survey of the various charging techniques that are available and that have been used extensively for lead acid batteries is presented. Descriptions of newer techniques involving gas evolution controlled charging are also included. An evaluation of fast charge approaches, with an analysis of battery state equations, is presented. DOE

N82-10549# Oak Ridge Y-12 Plant, Tenn. Fabrications Systems Dept.

COMPOSITE FLYWHEEL BALANCE EXPERIENCE

R. S. Steele 6 Apr. 1981 9 p refs Presented at the IECEC Conf., Atlanta, 9-14 Aug. 1981
(Contract W-7405-eng-26)
(DE81-769341; Y/DX-290; CONF-810812-2) Avail: NTIS
HC A02/MF A01

The high performance composite flywheels which have properties useful in reducing the total energy requirements for automobiles were examined. This requires high rotational speeds and solution to the accompanying problems of fatigue and vibration control through balancing of the rotor. Demonstrated that composite flywheels, require significant balancing and expenses to meet the minimum balance requirements practiced in industry. Flywheels experience balance changes with speed changes. DOE

N82-10550# Burke, Davoud and Associates, Richmond, Va.

CANNON SHREDDING OF MUNICIPAL SOLID WASTE FOR THE PREPARATION OF BIOLOGICAL FEEDSTOCK Final Report

Jerry Burke Idaho Falls, Idaho Edgerton, Germeshausen and Grier, Inc. Apr. 1981 44 p
(Contract DE-FG01-79CS-20099)
(DE81-025850; DOE/CE-20088/01) Avail: NTIS
HC A03/MF A01

Explosive decompression as a method of size reduction of materials found in municipal solid waste (MSW) was studied and preliminary data related to the handling and wet separation of exploded material was gathered. Steam was emphasized as the source of pressure. Municipal refuse was placed in an 8-ft long, 10.75-in. ID steel cannon which was sealed and pressurized. After an appropriate time, the cannon muzzle closure was opened and the test material expelled from the cannon through a constrictive orifice, resulting in explosive decompression. Flash evaporation of pressurized saturated water, expansion of steam, and the strong turbulence at the cannon muzzle accomplished size reduction. Hydraulic processing is shown to be an effective technique for separating heavy and light fractions. DOE

N82-10551# Science Applications, Inc., La Jolla, Calif.

PROGRAMMER'S MANUAL FOR THE DOEHPE (DOE HEAT PUMP EFFICIENCY) PROGRAM

23 Oct. 1980 76 p refs
(Contract DE-AC03-79CS-10757)
(DE81-769452; SAI-444-80-533-LJ) Avail: NTIS
HC A05/MF A01

The computer code DOEHPE, which is used to calculate air source heat pump seasonal and annual performance factors and energy consumption is described. The program computes heating season performance factors, seasonal energy efficiency ratios, representative regional annual performance factors, representative regional annual energy consumption and national energy consumption from the standard measurements of heat pump capacity and power input and heat pump descriptive information as input data. The calculation for single and dual speed compressor heat pumps and single speed compressor heating only heat pumps are described. Representative regional performance factors are computed for each of six major climatic regions shown, for the US, and for each of the standard design heating requirements shown. DOE

N82-10552# Oak Ridge National Lab., Tenn. Energy Div.

ANNUAL CYCLE ENERGY SYSTEM

Robert E. Minturn 1981 6 p refs Presented at the Heat Pump Contractors' Program Integration Meeting, Washington, D.C., 2-4 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024911; CONF-810672-16) Avail: NTIS
HC A02/MF A01

The annual cycle energy system (ACES) program which incorporates in a practical system the outstanding energy conservation potential that exists when the unidirectional heat pump and the interseasonal storage of energy are combined to provide heating, cooling, and domestic hot water to buildings is described. Information on the system, its applicability to different geographic areas, and the methodology for designing and building systems are enumerated. It is shown that the system is rugged, reliable, and appreciably more conservative of purchased energy than all practical alternatives. An ACES residential design methodology was also developed. It is concluded that the system is constant in efficiency and capacity during winter operation, independent of extremes in weather, contributes to the reduction of peak demand and increases in daily and seasonal load factors. DOE

N82-10553# Argonne National Lab., Ill.

LIQUID-METAL MHD FOR SOLAR AND COAL

E. S. Pierson, D. Cohen, and S. J. Grammel 1980 10 p refs Presented at the 7th Intern. Conf on MHD Elect. Power Generation, Cambridge, Mass., 16-20 Jun. 1980
(Contract W-31-109-eng-38)
(DE81-023545; CONF-800617-8) Avail: NTIS
HC A02/MF A01

The two phase generator, liquid metal magnetohydrodynamic energy conversion system has an inherently thermodynamic efficiency for the same heat source and sink temperatures and is better suited for cogeneration than other conversion systems. For solar applications, attractive efficiencies in comparison with alternative systems are calculated, and cogeneration advantages are indicated. For coal applications, recent coal combustion gas copper reaction results show that the copper can be used to control SO2 emissions. DOE

N82-10554# Argonne National Lab., Ill. Chemistry Div.

SUBSTANTIVE IMPROVEMENT OF THE THERMAL EFFICIENCY OF THE MERCURY-IODINE THERMOCHEMICAL CYCLE ANL-4

E. H. Appleman, B. M. Abraham, L. J. Basile, R. R. Richards, and F. Schreimer 1980 9 p refs Presented at the 3rd World Hydrogen Energy Conf., Tokyo, 23-26 Jun. 1980
(Contract W-31-109-eng-38)
(DE81-023573; CONF-800616-10) Avail: NTIS
HC A02/MF A01

The mercury iodine thermochemical cycle ANL-4 was improved by the use of pure water instead of aqueous isopropanol as the solvent for the low temperature, water binding step, H2O + NH3 + CO2 + KI yields KHCO3 + NH4I. The modification reduces the amount of energy required to isolate the NH4I formed in this reaction and increases the overall thermal efficiency of the cycle to about 31%, based on delta G of formation of liquid water. DOE

N82-10555# Argonne National Lab., Ill. Chemical Engineering Div.

PHASE RELATIONSHIPS IN POSITIVE ELECTRODES OF HIGH-TEMPERATURE LITHIUM ALUMINUM/IRON SULFIDE CELLS

Z. Tomczuk, M. F. Roche, and D. R. Vissers 1980 14 p refs Presented at the Lithium Sulfide Symp. Electrochem. Soc., Hollywood, Fla., 5-10 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023816; CONF-8010159-11) Avail: NTIS
HC A02/MF A01

The phases present in FeS and FeS2 positive electrodes of lithium aluminum/iron sulfide cells were detemined by X-ray diffraction and by metallographic examinations. The phases found in FeS electrodes were FeS, J(= LiK6Fe24S26Cl), Li2FeS2, Li2S, and Fe. The phases found in FeS2 electrodes were FeS2 KFeS2, Li3Fe2S4, Y phase (similar Li7,Fe2S8), Fe/sub 1-x/S, J, Li2S, and Fe. In the absence of potassium-containing phases, the electrode phases are in accord with the Li-Fe-S phase diagram. DOE

N82-10556# Argonne National Lab., Ill.
NEAR-TERM BATTERIES FOR ELECTRIC VEHICLES
C. C. Christianson, N. P. Yao, and F. Hornstra 1981 9 p refs
Presented at the 8th Energy Technol. Conf. and Expo, Washington, D.C., 9-11 Mar. 1981
(Contract W-31-109-eng-38)
(DE81-023543; CONF-810315-13) Avail: NTIS HC A02/MF A01

Major progress achieved in the lead-acid, nickel/iron and nickel/zinc battery technology development since the initiation of the Near-Term eV Battery Project in 1978 is reported. Against the specific energy goal of 56 wh/kg the demonstrated specific energies are 41 wh/kg for the improved lead-acid batteries, 48 wh/kg for the improved nickel/iron batteries, and 68 wh/kg for the improved nickel/zinc batteries. These specific energy values would allow an ETV-1 vehicle to have an urban range of 80 miles in the case of the improved lead-acid batteries, 96 miles for the improved nickel/zinc batteries, and 138 miles for the improved lead-acid batteries. All represent a significant improvement over the state-of-the-art lead-acid battery capability of about 30 wh/kg with approximately a 51 mile urban range for the ETV-1 vehicle. DOE

N82-10557# Argonne National Lab., Ill. Chemical Engineering Div.
RECENT PROGRESS IN LITHIUM/IRON SULFIDE BATTERY DEVELOPMENT
D. L. Barney, R. K. Steunenberg, and A. A. Chilenskas 1980 28 p refs Presented at the 15th Intersoc. Energy Conversion Eng. Conf., Seattle, 18-22 Aug. 1980
(Contract W-31-109-eng-38)
(DE81-023127; CONF-800806-46) Avail: NTIS HC A03/MF A01

The development of high temperature lithium/iron sulfide batteries for electric vehicle propulsion and stationary energy storage is described. In the Mark 2 program, various improvements are made in the cells and battery hardware to eliminate the potential failure mechanisms. In the cell development effort, multiplate cells with three positive and four negative electrodes were fabricated. A charger equilizer concept is developed, in which the major portion of the charge is added to the battery as a whole and then the individual cells are charged to a predetermined cutoff voltage. DOE

N82-10558# Lincoln Lab., Mass. Inst. of Tech., Lexington.
TESTING AND EVALUATION OF A SOLAR PHOTOVOLTAIC FLYWHEEL ENERGY STORAGE SYSTEM
Philip O. Jarvinen, Bronwyn L. Prench, R. Duncan Hay, and Neil F. Rasmussen (American Power Conversion, Burlington, Mass.) 1981 6 p Presented at the IECEC Conf., Atlanta, 9-14 Aug. 1981
(Contract DE-AC02-76ET-20279)
(DOE/ET-20279/130; CONF-810812-4) Avail: NTIS HC A02/MF A01

Measurements made on a 1/10 scale, magnetically levitated, residential solar photovoltaic (PV) flywheel energy storage system which acts as a complete interface between a solar PV array and an ac load are reported. The overall in/out electrical storage efficiency of the flywheel unit was measured along with the power transfer efficiencies of individual components and the system spin down tar losses. An overall storage efficiency of 82 percent was measured for the flywheel storage system when operated in a utility interactive mode. DOE

N82-10559# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
FABRICATION, TESTING, AND MODELING PLANS FOR A 125-KW COUNTER-ROTATING-TURBINE WAVE ENERGY CONVERTER
J. Miles and T. Penney Jun. 1981 12 p refs Presented at the 8th Ocean Energy Conf., Washington, D.C., 7-11 Jun. 1981
(Contract EG-77-C-01-4042)
(DE81-023946; SERI/TP-634/1215; CONF-810622-4) Avail: NTIS HC A02/MF A01

An air turbine accepting bi-directional flow and featuring counter-rotating turbine wheels is described. The turbine is for use with an oscillating water column and an air chamber to form a wave energy converter. Plans are presented for testing the turbine in a steady-state manner so as to obtain output torque and mass flow as functions of operational parameters. Concurrent modeling studies are described which will lead to the design of an optimized airchamber. DOE

N82-10560# Los Alamos Scientific Lab., N. Mex.
HOT DRY ROCK GEOTHERMAL ENERGY DEVELOPMENT PROGRAM Progress Report
Paul R. Franke 1981 17 p refs Presented at the IECEC Conf., Atlanta, 19 Aug. 1981
(Contract W-7405-eng-36)
(LA-UR-81-1265; CONF-810812-11) Avail: NTIS HC A02/MF A01

A hot dry rock geothermal system was developed from a reservoir created by hydraulic fracturing. A reservoir of sufficient size and capacity was confirmed and two extraction runs were made. The thermal drawdown data indicate that the effective heat area is increased. The reservoir enlargement is confirmed by gradual thermal drawdown, and the effective heat transfer area of the reservoir is increased. E.A.K.

N82-10561# Oak Ridge National Lab., Tenn. Energy Div.
WATER-RELATED CONSTRAINTS TO THE DEVELOPMENT OF GEOTHERMAL ELECTRIC GENERATING STATIONS
R. C. Robertson, Alf D. Shepherd, Carey S. Rosemarin, and Michael W. Mayfield Jun 1981 160 p refs
(Contract W-7405-eng-26)
(DE81-025138; ORNL/TM-7718) Avail: NTIS HC A08/MF A01

The water related constraints concerning geothermal energy are discussed. Three different constraints are: (1) water requirements of geothermal power stations; (2) resource characteristics of the most promising hydrothermal areas and regional and local water supply situations; and (3) legal issues confronting potential users of water at geothermal power plants in the states in which the resource areas are located. A total of 25 geothermal resource areas were studied. It is found that each had a hydrothermal resource temperature in excess of 150 C and an estimated 30 year potential of greater than 100-MW(e) capacity. DOE

N82-10562# Montana Dept. of Natural Resources and Conservation, Helena.
MONTANA GEOTHERMAL HANDBOOK: A GUIDE TO AGENCIES, REGULATIONS, PERMITS AND FINANCIAL AIDS FOR GEOTHERMAL DEVELOPMENT
Steven Perlmutter and Jeff Birkby 1980 52 p
(Contract DE-FC07-79ID-12014)
(DE81-024315; DOE/ID-12014/T1) Avail: NTIS HC A04/MF A01

The handbook is divided into three parts: a list of the permits required for various thermal projects, and an estimate of time needed to obtain them; a brief discussion of the statutes and regulations referred to; and a description of the state and federal grant and loan funding available to a prospective geothermal developer. DOE

N82-10563# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
APPLICATION OF SOLAR THERMAL ENERGY TO BUILDINGS AND INDUSTRY
Charles F. Kutscher May 1981 32 p refs Presented at the Energy and the Man-Built Environment Conf., Vail, Colo., 3-5 Aug. 1981; sponsored by Am. Soc. of Civil Eng.
(Contract DE-AC02-77CH-00178)
(SERI/TP-641-1222; CONF-810808-6) Avail: NTIS HC A03/MF A01

Flat plate collectors and evacuated tube collectors are described, as are parabolic troughs, Fesnel lenses, and compound parabolic concentrators. Use of solar energy for domestic hot water and for space heating and cooling are discussed. Some useful references and methods of system design and sizing are given. This includes mention of the importance of economic analysis. The suitability of solar energy for industrial use is discussed, and solar ponds, point-focus receivers and central receivers are briefly described. The use of solar energy for process hot water, drying and dehydration, and process steam was examined, industrial process heat field tests by the Department of Energy are discussed, and a solar total energy system in Shenandoah, GA is briefly described. DOE

N82-10564# Little (Arthur D.), Inc., Cambridge, Mass.
SOLAR HEATING AND COOLING (SHAC) SIMULATION PROGRAMS: ASSESSMENT AND EVALUATION. VOLUME 2: DETAILED FINDINGS Final Report
R. L. Merriam May 1981 247 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1269-1)
(EPRI-EM-1866-Vol-2) Avail: NTIS HC A15/MF A01

Solar heating and cooling system simulation programs available to use by electric utilities were identified, analyzed, tested and evaluated. The strengths and weaknesses of the more promising programs are highlighted. A comprehensive reference manual describing the characteristics of computer programs and manual methods was developed. The programs are described and ranked by application. Four programs are tested for three building types (residential, light commercial, heavy commercial) and three heating and cooling system classes (conventional, active solar, passive solar). The results are compared and related to the program's analytical bases. The user experience is highlighted and user related factors for the four programs are compared. The applicability of the programs to utilities is explored. DOE

N82-10565# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
MEASURED PERFORMANCE OF FALLING-JET FLASH EVAPORATORS
H. J. Green, D. A. Olson, D. Bharathan, and D. H. Johnson Jun. 1981 9 p refs Presented at the 8th Ocean Energy Conf., Washington, D.C., 7 Jun. 1981
(Contract EG-77-C-01-4042)
(DE81-024355; SERI/TP-631-1270; CONF-810622-3) Avail: NTIS HC A02/MF A01

The rates of heat transfer and approach to thermal equilibrium of flash evaporators operating at pressures of 2 to 4 kPa were investigated. Heat and mass transfer rates from falling jet evaporators operating in the temperature range of 18 to 30 C are measured. The initial experimental results are given and the apparatus is described. DOE

N82-10566# Paulling (J. Randolph), Inc., Orinda, Calif.
THEORY AND USER MANUAL FOR OTEC CW PIPE PROGRAMS ROTECF AND SEGPIP
J. Randolph Paulling Jul. 1980 193 p refs
(Contracts DE-AI01-79CS-20396; N00024-78-C-5384)
(DE81-023736; DOE/NOAA-OTEC-35) Avail: NTIS HC A09/MF A01

A quasi linear frequency domain analysis of the coupled OTEC CW pipe and platform system was developed. A finite element model of pipe structural dynamics is employed and the platform is modelled by contemporary ship or stable platform motion theory. Nonlinear fluid forces are included by the equivalent linearization method. An alternative procedure is presented for a pipe consisting of a number of rigid cylindrical segments linked together end to end. In both cases, the motions of nodes or joints and the internal stresses or joint forces are computed. DOE

N82-10567# Oak Ridge National Lab., Tenn.
DIRECT-CONTACT HEAT EXCHANGERS FOR OTEC: SOME ADVANTAGES AND DISADVANTAGES
R. N. Lyon 1981 6 p refs Presented at the 8th Ocean Energy Conf., Washington, D.C., 7-11 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024253; CONF-810622-5) Avail: NTIS HC A02/MF A01

A direct contact evaporator for ocean thermal energy conversion was considered. Several advantages were enumerated: (1) removing the corrosion and fouling problems associated with closed heat exchangers: (2) permitting the plant to operate at above atmospheric pressure in comparison with an open Claude system; and (3) reducing capital costs. The potential loss of working fluid in the effluent seawater, for which there appears to be no state of the art recovery process that does not require serious consumption of otherwise net power is addressed. Potential loss of working fluid in the condenser off gases require stringent deaeration of the seawater. DOE

N82-10568# Institute of Gas Technology, Chicago, Ill.
ELECTROCHEMICAL PHOTOVOLTAIC CELLS Quarterly Technical Progress Report, 1 Nov. 1980 - 31 Jan. 1981
Peter G. P. Ang, Anthony J. Tiller, Anthony A. Rossignuolo, and Anthony F. Sammells Apr. 1981 24 p ref Sponsored in cooperation with Midwest Research Inst.
(Contract EG-77-C-01-4042)
(DE81-769704; SERI/PR-9175-1-T3) Avail: NTIS HC A02/MF A01

The photoelectrochemical properties of p-Si, p-InP, p-MoS2, and n-CdSe semiconductors are presented. A number of redox storage systems are discussed. Characteristics of single crystal systems and of surface treatments are investigated. Long term testing was performed with polycrystalline CdSe and with p-InP single crystal in electrochemical cells. The quality and long term stability of various electrodes, electrolytes, and separator materials are studied. DOE

N82-10569# Pennsylvania State Univ., University Park. Materials Research Lab.
CONTROLLED CADMIUM TELLURIDE THIN FILMS FOR SOLAR-CELL APPLICATIONS Quarterly Report, 1 Dec. 1980 - 1 Feb. 1981
M. B. Das and S. W. Krishnaswamy 15 May 1981 14 p refs
(Contract DE-AC02-77CH-00178)
(DE81-023275; SERI/PR-9131-1-T3; QR-3) Avail: NTIS HC A02/MF A01

Indium doped CdTe films cadmium vacancies occur which cause the presence of deep level acceptor states in the material are discussed. By sputtering at a cadmium overpressure, it was possible to compensate for these vacancies and improve the device quality. Extensive temperature dependent measurements of dark and illuminated I/V characteristics of gold metalized Schottky barrier diodes based on these improved and reproducible films were made. Characteristics showing I/sub sc/ and V/sub oc/ at different temperatures and different illumination level are presented. DOE

N82-10570# Sandia Labs., Albuquerque, N. Mex. Photovoltaic Projects Div.
SOLAR PHOTOVOLTAIC SYSTEM ENGINEERING PERSPECTIVES
Gary J. Jones 1981 7 p refs Presented at the Energy in Man-Built Environ.: The Next Decade Spec. Conf., Vail, Colo., 3 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023179; SAND-81-1164C; CONF-810808-7) Avail: NTIS HC A02/MF A01

The activities of the national photovoltaic program which aid the photovoltaic system background information are presented and major issues are highlighted. DOE

N82-10571# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
TECHNOLOGICAL ACTIVITIES FOR HIGH PERFORMANCE RECEIVERS Final Report
Guenther Schmidt, Erich Kirner, and Helmut Zewen Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 86 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-133; MBB-UR-39979-79; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,05

Preliminary studies were carried out on the optimization of the energy transfer efficiency from the incident solar radiation into the heat transfer medium of solar thermal plants by designing high performance receivers. The transfer efficiency has a direct impact on the overall plant efficiency and the size of the cost effective collector field. Two main lines were followed, closed Rankine cycles with organic heat transfer media at temperatures between 350 and 400 C; and gas turbine cycles at temperatures from 800 to 900 C. A test receiver cooled by organic media was built and its thermal and mechanical resistance as well as the behavior of different heat transfer media with respect to thermal efficiency and stability were analyzed. Industrial application appears feasible. Author (ESA)

N82-10572# KA-Planungs G.m.b.H., Heidelberg (West Germany).
PRELIMINARY INVESTIGATION ON A PRIMARY ENERGY SAVING HEAT SUPPLY SYSTEM FOR THE RESIDENTIAL DISTRICT 'MARIA LINDENHOF' IN DORSTEN, WEST GERMANY Final Report
Alfred Bechtel, Klaus Berlinghoff, Hans Grossmann, Helmut Kaschube, and Friedrich Reinmuth Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 126 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-157; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 26,50

Ways and means to operate a heating station by gas motor-driven heat pumps, using river water as heat source are investigated. The economic viability of the scheme is considered. A comparison with conventional technologies clearly shows the feasibility and effectiveness of this application, and at the same time supplies guidelines for design and dimensioning. Because of possible energy saving, the present investigation supports the realization of the project. Author (ESA)

N82-10573# Renault Vehicles Industriels (France). Direction des Etudes et Recherches.
ENERGY CONSUMPTION AND HEAVY-DUTY VEHICLES [LA CONSOMMATION D'ENERGIE ET LES POIDS LOURDS]
Yves Bonnetain 1980 18 p In FRENCH Presented at S.I.A. Journees Poids Lourds, Paris, 8-9 Oct. 1980
Avail: NTIS HC A02/MF A01

Research and analysis which leads to energy conservation in the operation of tractor-trailers (semis) was reviewed. Two approaches are emphasized: design improvements on the vehicle itself, and policies or dashboard instrumentation which result in a more efficient use of the vehicle. Evidence is presented to show that immediate and significant reductions in fuel consumption are possible merely by instigating more efficient driving practices, e.g., speed laws, governors on engines, etc. Author (ESA)

N82-10574# Acres American, Inc., Columbia, Md.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 12: PLANT DESIGN, CAES Final Report
Apr. 1981 285 p Sponsored in part by Electric Power Research Inst. Prepared for Potomac Electric Power Company, Washington, D.C.
(Contract DE-AC02-77ET-20013; EPRI Proj. 1081-1)
(DE81-028110; EPRI-EM-1589-Vol-12; DOE/ET-5047/12)
Avail: NTIS HC A13/MF A01

Detailed designs were developed for the major components and systems of the CAES plant. These designs were based upon the preliminary economic and technical evaluations and alternative designs developed in Task 3C. The detailed project design drawings for the major plant systems and structures are presented. The site development report, updated cost estimate, cost/schedule risk study, reliability/availability, analysis, and recommendations for additional research and development are included. DOE

N82-10575# National Bureau of Standards, Washington, D.C. Electron Devices Div.
LASER SCANNING MEASUREMENTS ON SOLAR CELL TEST PATTERN NBS-22 Final Report, 1 Jun. 1980 - 30 Nov. 1981
W. F. Lankford, P. Kowalski, and H. A. Schafft May 1981 53 p refs Sponsored in part by Solar Energy Research Inst., Golden, Colo.
(Contract EG-77-C-01-4042)
(PB81-214157; NBSIR-81-2260) Avail: NTIS HC A04/MF A01 CSCL 10B

The NBS laser scanner was used to make measurements on the solar cell test pattern, NBS-22, to verify theoretical calculations. The photovoltaic response from cells with controlled sheet resistance step changes and breaks in the metallization contact to the cell was measured and compared to the theoretical predictions. Laser scanner limits of resolution were identified and proposed improvements were discussed. Preliminary measurements indicate that it is possible to measure the sheet resistance of the emitter layer of solar cells with an accuracy of several percent, using the laser scanner. GRA

N82-10576# Indian Lead Zinc Information Centre, New Delhi.
BATTERY
Nov. 1980 31 p refs
(PB81-120263; Rept-10) Avail: NTIS HC A03/MF A01 CSCL 10C

Contents: Outlook for lead, zinc and cadmium in India; Future for lead production and recycling - a British view; AKERLOW lead recovery plant; Expanded lead battery grids; Resume of first solder seminar in India; Automatic paste soldering adds sparks to zinc-carbon batteries; 122-ton lead battery used for testing BEST facility; Press release on Pb 80; Research and development; Second International Symposium on Industrial and Oriented Basic Electrochemistry; Industry news; Book review and new publications; Battery abstracts. GRA

N82-10577# Department of Agriculture, Washington, D.C.
THE YOUNG SOLAR COLLECTOR: AN EVALUATION OF ITS MULTIPLE FARM USES
Walter G. Heid, Jr. May 1981 21 p ref
(PB81-214132; AER-466) Avail: NTIS HC A02/MF A01 CSCL 13A

The features of the Young collector and reports on its physical and economic performance were studied. The collector is portable and tiltable, with a flexible airflow system. It is found that it satisfactorily dries grain, provides home heating, and saves energy. The homemade, low cost Young flat plate solar collector for multiple uses on the farm was designed by a farm couple and the small farm energy project. GRA

N82-10578 Texas Univ. at Dallas.
DESIGN, SIMULATION, FABRICATION, AND TESTING OF MEDIUM TEMPERATURE, LINEAR FRESNEL REFLECTOR COLLECTORS Ph.D. Thesis
Howard Newton McCalla 1981 184 p
Avail: Univ. Microfilms Order No. 8118225

Linear Fresnel reflectors were investigated with respect to performance in a solar collection system for the production of process heat or for use with absorption chillers. Computer models were developed for both north-south and east-west tracking linear concentrators composed of from 6 to 16 segments. The results were used to select parameters for two experimental arrays and to develop design criteria. Good correlation between the model and the experimental arrays is demonstrated over a limited range of tests. The model is used to make comparisons of north-south and east-west arrays for a range of parameters including array length, tilt angle, and the segment width/spacing ratio for periods up to one year. Arrays were designed and built with common materials, common sizes, and low cost technology. System economics were evaluated. Dissert. Abstr.

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-10579 Oklahoma Univ., Norman.
DEVELOPMENT OF A NATIONAL HAZARDOUS WASTE MANAGEMENT SYSTEM MODEL Ph.D. Thesis
Daniel Thomas Boatright 1981 318 p
Avail: Univ. Microfilms Order No. 8115346

The technical feasibility of an alternative system of hazardous waste management which would address the generation, storage, transportation, and disposal of the most tenacious hazardous wastes which cannot be treated by available technology is discussed. The essence of the model system is centered on wastes of the nature described being transported to regional staging areas, and once a pre-determined volume of waste is accumulated, the waste would then be forwarded to a national hazardous waste ultimate disposal site located in a highly isolated and secure portion of the United States where the land to be used is owned by the Government and is dedicated in perpetuity to nonpublic and nonprivate uses. Once the model system was developed, the model was applied to radioactive wastes generated by a once through fuel cycle nuclear power plant serving a hypothetical population of 500,000 persons. It was determined that the model system was technically feasible and on an economic par with other hazardous waste option currently practiced and/or under consideration. Dissert Abstr.

N82-10580 Texas Univ. at Dallas.
RELEASE OF NITROGEN COMPOUNDS FROM DREDGED SEDIMENT Ph.D. Thesis
Pinaki Bandyopadhyay 1981 259 p
Avail: Univ. Microfilms Order No. 8118223

Dredged material disposal from hopper and mechanical barge type dredges were monitored to determine the significance of nitrate, organic nitrogen and especially, ammonia release on water quality at the disposal site. The usefulness of elutriate tests in estimating nitrogen compound release from dredged sediment was also evaluated. Measurable ammonium concentrations were recorded in turbid plumes following disposal operations from hopper and mechanical type dredges. However, these elevated concentrations persisted at any specific point for only a few minutes. High ammonium concentrations observed near pipeline discharge points showed rapid dilution at short distances away. The elutriate test and plop test results provided a conservative estimate of ammonium release at hopper and mechanically dredged disposal sites. The general order of magnitude of ammonium release at pipeline discharge sites was predicted by the elutriate test. At pipeline disposal sites tidal influences and continuous discharge over a long period of time could potentially cause toxic and excessive growth problems. Dissert. Abstr.

N82-10581 Drexel Univ., Philadelphia, Pa.
PHYSICAL-CHEMICAL MECHANISMS OF THE REACTION OF OZONE WITH AQUATIC HUMIC SUBSTANCES Ph.D. Thesis
Paul C. Chrostowski 1981 308 p
Avail: Univ. Microfilms Order No. 8118926

The validity and use of ozone in water treatment for humics removal definition of concepts and terms used in ozonation practice, control of the process, the importance of mass transfer, and the chemical properties of the humics were investigated. The approach was to follow changes in different parameters as a function of time of ozonation in a heterogeneous reaction matrix. The results indicate that classical rate laws could be used to describe the reactions. All the reactions could be separated into three mechanisms: slow, reaction rate limited; slow mass transfer limited; and fast mass transfer limited. The importance of ozone decomposition, presence of inhibitors, and voltilization was also demonstrated. Rate curves were used to differentiate between oxidative coupling and degradative mechanisms. The information derived was utilized as input to a protocol for design of water treatment facilities utilizing ozone for organics control. The conditions of ozonation were defined such that control over the process and reproductability of results could be ensured. Dissert. Abstr.

N82-10582 University of Western Michigan, Kalamazoo.
STORM-SEWER INPUT OF HEAVY METALS INTO AN URBAN LAKE ENVIRONMENT Ph.D. Thesis
George Alexander Duba 1981 131 p
Avail: Univ. Microfilms Order No. 8117698

The concentration of lead, cadmium, zinc and copper in runoff entering an urban lake ecosystem and the distribution of these metals in selected tropic levels of the lakes were measured. Samples were collected on the basis of proximity to a storm sewer contaminated portion of the lake. It is suggested that: (1) metals not show highest concentrations at highest tropic levels; (2) lead, zinc and copper are detected in stormwater; (3) although some substrate was highly contaminated, the other tropic levels do not show similar contamination; (4) the benthic organisms. do not elevated concentrations along the food chain; (5) the two processes of analysis, PIXE and AA, give similar values; and (6) the fish of Fish Lake present little toxic danger of metal contamination. Dissert. Abstr.

N82-10583 Texas Univ. at Dallas.
OIL AND GAS INDUSTRY AND ENVIRONMENTAL POLLUTION: APPLICATION OF SYSTEMS RELIABILITY ANALYSIS FOR THE EVALUATION OF THE STATUS OF ENVIRONMENTAL POLLUTION CONTROL IN THE NIGERIAN PETROLEUM INDUSTRY Ph.D. Thesis
Azhinoto Ozodio Ikpah 1981 377 p
Avail: Univ. Microfilms Order No. 8118224

Current environmental pollution control policies, regulations, oil field management practices and programs for detection, inventory, prevention and control of oil spills/pollution in Nigeria were examined. The status of pollution control in the Nigerian petroleum industry was evaluated. Spill event data which were analyzed, based on shore, category, systems, cause/effect relationip, clean-up method, violation and other parameters pertinent to pollution control in the oil industry. Spill data indicated that frequency of spill events is high; dispersant is indiscriminately used; more spills occur onshore; water disposal method is poor; and equipment failure, operators' maintenance error and third party account for a large number of spills. Pipes, valves and gaskets are spill vulnerable components, and the product spilled is generally crude oil. Few spill events were considered violations of federal laws. Standard engineering designs and criteria are employed in production of oil in Nigeria, but the level of investments on strictly pollution control equipments and personnel is minimal. It is concluded that legal and institutional arrangement for pollution control in the Nigerian petroleum industry need modification and updating. Dissert. Abstr.

N82-10584# Laboratorio de Acustica e Sonica, Sao Paulo (Brazil). Inst. de Engenharia.
THE INDUSTRIAL NOISE PROBLEM AND ITS EFFECTS AND SOCIAL IMPLICATIONS
L. X. Nepomuceno 24 Apr. 1979 41 p refs In PORTUGUESE; ENGLISH summary
Avail: NTIS HC A03/MF A01

Codes for reducing noise exposure to workers are examined and compared with the actual situation in Brazil. The degree of enforcement of existing regulations in that country is criticized. Economic factors associated with the loss of time from work, and the number of hearing disabilities among the working population indicate that a 90 dBA level that is obeyed is better than a ficticious 85 dBA level that is not followed in the majority of industries. A.R.H.

N82-10585# Oak Ridge National Lab., Tenn. Fossil Energy Information Center.
ENVIRONMENTAL COMPLIANCE PROGRAM HANDBOOK
Aug. 1981 332 p
(Contract W-7405-eng-26)
(DE81-030226; ORNL/EIS-171) Avail: NTIS HC A15/MF A01

Only by demonstrating that energy technologies can be built and operated without adverse environmental impact can these technologies be considered as proven and ready for commercialization by the private sector. This handbook is one of a series covering federal laws and regulations and the laws and regulations of selected states that pertain to air quality, water quality, and the identification and disposal of solid and hazardous wastes. The data summary sheets are part of a computer file. This handbook identifies and provides abstracts to those pertinent laws and regulations which were in force in the State of Ohio in early 1980. The permit forms are those in use during that time frame. T.M.

N82-10586# Michigan Univ., Ann Arbor. Dept. of Aerospace Engineering.
STUDY OF THE FORMATION OF SUBMICRON PARTICULATES GENERATED BY COAL COMBUSTION Quarterly Progress Report, 1 Apr. - 30 Jun. 1981
P. M. Sherman and D. R. Glass Jul. 1981 28 p refs
(Contract DE-FG22-80PC-30305)
(DE81-027447; DOE/PC-30305/T3; QPR-3) Avail: NTIS HC A03/MF A01

The formation of the very small particles was investigated so that combustion and heat transfer conditions which will prevent their formulation can be identified. Emphasis was largely on perfecting techniques for obtaining electron microscope data which can be correlated with variations in heat transfer and combustion parameters. Improvements include better sealing of the furnace tube: provision for measurement of the entire flow field downstream of the flame; better control of the exhaust stream; better control of the coal dust feeder; and better control of the temperature of the secondary air. Program focus on particles in the 50 A to 0.1 micron range. These were largely overlooked in the past because they are difficult to detect. T.M.

N82-10587# International Research and Technology Corp., McLean, Va.

PROCEEDINGS: WORKSHOP ON CYCLING AND EFFECTS OF TOXIC SUBSTANCES

Douglas Britt Aug. 1981 117 p refs Workshop held in Carmel, Calif., 26-29 Oct. 1980 Sponsored by Electric Power Research Inst.
(EPRI Proj. 1822-1)
(DE81-904201; EPRI-EA-1988) Avail: NTIS HC A06/MF A01

The purpose of the workshop was to suggest a research program responsive to the needs of the electric utility industry. The workshop participants recommended a broad, conceptual framework for the development of a toxic substances subprogram within the ecological studies program. Futhermore, several guiding principals were suggested for the proposed subprogram, and a variety of specific research areas was identified and ranked for future implementation by EPRI. DOE

N82-10588# California Univ., Berkeley. Lawrence Berkeley Lab.

ASSESSMENT OF OPTIMUM AQUATIC MICROCOSM DESIGN FOR POLLUTION IMPACT STUDIES Final Report

J. Harte, D. Levy, J. Rees, and E. Saegebarth Aug. 1981 179 p refs Sponsored in part by Electric Power Research Inst.
(Contract W-7405-eng-48; EPRI Proj. 1224-1)
(DE81-030674; EPRI-EA-1989) Avail: NTIS HC A09/MF A01

A number of different pelagic microcosm configurations were studied, including the size of the microcosm containers, the method of algal surfacegrowth prevention, and the degree of water mixing and aeration. In addition, the microcosm-lake comparisons were carried out in various seasons of the years to determine the influence of natural seasonal factors on the chemical and biological differences between the lakes and microcosms. In all but the smallest microcosms, surface-growth prevention removed size dependence. Chemical nutrients tracked well except during periods when nutrient inputs to the lake from the surrounding watershed were high. Good tracking of phytoplankton succession patterns was observed only when the physical conditions of the lake matched well with those in the laboratory system. In the decomposition studies, additions of dead organic matter to the lake microcosms were made, and the subsequent response of mineralization activity was measured. It was concluded that appropriate applications of pelagic microcosms are limited, and those applications that are most appropriate are delineated. DOE

N82-10589# National Oceanic and Atmospheric Administration, Oak Ridge, Tenn. Atmospheric Turbulences and Diffusion Lab.

HANDBOOK ON ATMOSPHERIC DIFFUSION MODELS

S. R. Hanna 5 Mar. 1981 72 p refs Sponsored by DOE
(DE81-030474; ATDL-81/5) Avail: NTIS HC A04/MF A01

Models that are widely used for regulatory purposes were reviewed. It is found that the Gaussian plume model is most often used in western countries, while the gradient-transport (K) model is most often used in eastern countries. The most important parameters predicted by the models are the magnitude and location of maximum round level concentrations. The models are compared theoretically and empirically using observations, with the conclusion that maximum concentrations predicted by the two models can differ by an order of magnitude, with the sign of the difference depending on the specific application. DOE

N82-10590# Argonne National Lab., Ill.

STUDIES OF THE REGENERATION OF ACTIVATED BAUXITE USED AS GRANULAR SORBENT FOR THE CONTROL OF ALKALI VAPORS FROM HOT FLUE GAS OF COAL COMBUSTION

S. H. D. Lee, S. D. Smith, W. M. Swift, and Irving Johnson May 1981 51 p refs
(Contract W-31-109-eng-38)
(DE81-030192; ANL/CEN/FE-81-1) Avail: NTIS HC A04/MF A01

Regeneration of activated bauxite by water leaching and thermal swing method was studied. It was found that granular activated bauxite was very effective when used as a filter medium in granular bed filters to remove gaseous alkali metal compounds from simulated hot flue gas of PFBC. Activated bauxite that captured alkali chloride vapors easily and effectively regenerated for reuse by a simple water leaching method. Data were obtained on: (1) the leaching rate of the absorbed NaCl: (2) effects on the leaching rate of absorbed NaCl loading, leaching temperature, and the amount of water; and (3) water retention in activated bauxite after leaching. Physical changes and particle attrition of activated bauxite resulting from regeneration are discussed. The sorption mechanisms of activated bauxite toward alkali chloride vapors are interpreted. DOE

N82-10591# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

INEL GOETHERMAL ENVIRONMENTAL PROGRAM Annual Report, 1980

L. S. Cahn, T. L. Thurow, and J. A. Martinez Apr. 1981 73 p refs
(Contract DE-AC07-76ID-01570)
(DE81-025671; EGG-2113) Avail: NTIS HC A04/MF A01

An overview of continuing environmental research and monitoring programs conducted at the Raft River Geothermal Site is provided. The monitoring programs are designed to collect data on the physical, biological and human environments of the development area. Primary research during 1980 emphasized completing baseline studies on terrestrial fauna, establishing an air quality monitoring network, investigating potential sources of fluoride in the Raft River valley, and studying water level changes in the shallow monitor wells in response to development of the geothermal resource. DOE

N82-10592# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.

EFFECTS OF ATMOSPHERIC VARIABILITY ON ENERGY UTILIZATION AND CONSERVATION Progress Report, 1 Jan. - 30 Jun. 1981

Elmar R. Reiter, C. C. Burns, H. Cochrane, G. R. Johnson, H. Leong, and J. D. Sheaffer Jul. 1981 99 p refs
(Contract DE-AS02-76EV-01340)
(DE81-026308; DOE/EV-01340/1) Avail: NTIS HC A05/MF A01

The research was focused on four major tasks: planetary wave variability and climate fluctuations; regional energy demand modelling; energy demand modelling for air conditioning; and economic factors in climate-sensitive space-conditioning systems design. Efforts in each of these areas are outlined and described in detail. Predicting the impact of climate variability on energy utilization involves understanding both the mechanisms underlying atmospheric variability and the response of energy demand systems to atmospheric variations. Summary descriptions of significant progress in both areas are presented. DOE

N82-10593# Florida Univ., Gainesville. Center for Wetlands.

MODELS OF CARBON FLOW IN TROPICAL ECOSYSTEMS WITH EMPHASIS ON THEIR ROLES IN THE GLOBAL CARBON CYCLE Final Report, 15 Sep. 1978 - 14 Sep. 1980

Sandra Brown, ed. and Ariel E. Lugo, ed. 1980 123 p refs
(Contract DE-AS05-78EV-06047)
(DE81-027999; DOE/EV-06047/1) Avail: NTIS HC A06/MF A01

The role of tropical forests in the carbon balance of the world was studied. Four different approaches were proceded: (1) to quantify the area of tropical forests and the changes in forest cover: (2) to calculate the storage and production of organic carbon in tropical forests; (3) the modelling of land use changes in tropical countries using computer simulation models; and

(4) the synthesis of information from may sources into conceptual schemes using life zone and energy use concepts. DOE

N82-10594# Hart (Fred C.) Associates, Inc., New York, N.Y.
METHODOLOGY FOR DETERMINING THE IMPACT OF ENVIRONMENTAL REGULATORY PROGRAMS Final Report
B. T. Delaney, D. D. Roderique, and T. S. Sekulic May 1981 165 p refs Sponsored by Electric Power Research Inst.
(DE81-903429; EPRI-CS-1834; TPS-79-743) Avail: NTIS HC A08/MF A01

Major federal environmental legislation and regulatory programs affecting the management of air, water, land and solid waste were reviewed. Existing and future environmental regulatory programs and their potential impact on the development and commercialization of advanced, coal-based energy conversion systems are examined. It is determined that the analysis and interpretation of technical information and data collected can be directed towards the development of a methodology by which environmental impacts are systematically reviewed and problem areas identified. DOE

N82-10595# Wisconsin Univ., Milwaukee. Dept. of Physics.
COMPOUND IDENTIFICATION OF ATMOSPHERIC PARTICLES Final Report
D. Lichtman Oct. 1980 35 p
(EPRI Proj. 1310)
(EPRI-EA-1595) Avail: NTIS HC A03/MF A01

The usefulness of several modern surface analytic techniques for compound identification of atmospheric particles with emphasis on sulfur species was tested. Morphology and bulk elemental composition measurements of individual particles were obtained. Electron spectroscopy for chemical analysis was used to obtain sulfur peaks for all the compounds used in the auger electron spectroscopy calibration, enabling the correlation of information with that obtained with the high spatial resolution scanning Auger system. It is indicated that a combination of techniques can be used successfully for compound identification of individual particles. DOE

N82-10596# California Energy Commission, Sacramento.
PROPOSED RESIDENTIAL BUILDING STANDARDS: DRAFT ENVIRONMENTAL IMPACT REPORT
Mar. 1981 231 p refs
(P-700-80-013) Avail: NTIS HC A11/MF A01

The Warren-Alquist Act of 1974 requires the California Energy Commission to adopt and periodically update energy-conservation standards for new residential buildings. The Act also requires the CEC to adopt performance standards for new buildings. With increased energy costs, the CEC staff proposed to update the current energy-conservation standards and they are a hybrid of performance and prescriptive requirements. The proposed standards do not cover hotels, motels, or buildings over 3 stories high. The purpose of an environmental impact report (EIR) is to provide public agencies and the public in general with detailed information about the effects a proposed project is likely to have on the environment, to list ways in which the significant effects of such a project might be minimized, and to indicate alternatives to the project. DOE

N82-10597# California Univ., Livermore. Lawrence Livermore Lab.
ELECTROSTATIC AIR FILTERS GENERATED BY ELECTRIC FIELDS
W. Bergman, A. H. Biermann, H. D. Hebard, B. Y. Lum, and W. D. Kuhl 27 Jan. 1981 38 p refs Presented at the Ann. Meeting of the Fine Particle Soc., Washington, D.C., 16-18 Sep. 1980
(Contract W-7405-eng-48)
(DE81-023658; UCRL-84878; CONF-800953-2) Avail: NTIS HC A03/MF A01

Fibrous filters converted to electrostatic operation by a nonionizing electric field were investigated. It was shown that static filter has a higher efficiency and a longer, more useful life. The filter's increased efficiency is attributed to a time independent attraction between polarized fibers and charged, polarized particles and a time dependent attraction between charged fibers and charged, polarized particles. It is concluded that the charge on the fibers results from a dynamic process of charge accumulation due to the particle deposits and a charge dissipation due to the fiber conductivity. DOE

N82-10598# Argonne National Lab., Ill.
ECONOMIC AND ENVIRONMENTAL TRADEOFFS IN COAL CONVERSION
C. D. Livengood, H. S. Huang, and P. S. Farber 1980 20 p refs Presented at the Ann. Meeting of the Air Pollution Control Assoc., Montreal, 22-27 Jun. 1980
(Contract W-31-109-eng-38)
(CONF-800608-8) Avail: NTIS HC A02/MF A01

The costs of environmental control systems and the difficulties of solid waste disposal are discussed. Unless significant cost breakthroughs are achieved, SRC-1 does not appear economically competitive for new large power plants. The use of SRC is favored in plants converting from oil. The recent increased interest in reducing emissions from existing coal fired plants as a control measure for acid rain could open up a significant new market for highly processed coal such as SRC-1. DOE

N82-10599# ECP, Inc., El Segundo, Calif.
CRYSTALLIZED FLY-ASH FEASIBILITY STUDY Final Report
May 1981 78 p refs Sponsored in part by Electric Power Research Inst.
(EPRI Proj. 1210-1)
(EPRI-EL-1836) Avail: NTIS HC A05/MF A01

A study to determine the feasibility for production and use of crystallized fly ash is presented. The raw materials (fly ash, fluxing, nucleating and crystallizing agents), molten state and crystallization analysis and characterization of crystallized fly ash are discussed in detail. The development of the process along with the structural and insulation characteristics of the crystallized fly ash as a mechanical support element for electrical conductors are also described in detail. DOE

N82-10600# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
DEVELOPMENT AND APPLICATION OF TERRESTRIAL FOOD CHAIN MODELS TO ASSESS HEALTH RISKS TO MAN AND RELEASES OF POLLUTANTS TO THE ENVIRONMENT
Stephen V. Kaye, F. Owen Hoffman, Laura M. McDowell-Boyer, and C. Fred Baes 1981 39 p refs Presented at the Intern. Symp. on Health Impacts of Different Sources of Energy, Nashville, Tenn., 22 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024127; IAEA-SM-254/63; CONF-810652-4) Avail: NTIS HC A03/MF A01

The application of mathematical models to predict the terrestrial food chain transport of pollutants of potential importance to human health are discussed. The strengths and weaknesses of these models are related to the needs of the model user, the availability of relevant data for parameter quantification, and the feasibility for model validation. The optimum level of simplification, however, is determined by model validation results and the use of model implementation. Most examples are derived from models used to assess the terrestrial food chain transport of radionuclides. It is concluded that current limitations in parameter quantification and model validation will restrict most assessment applications of terrestrial food chain models to a type of screening calculation. DOE

N82-10601# Harvard Univ., Cambridge, Mass. School of Government.
RELAXING ENVIRONMENTAL STANDARDS DURING OIL-SUPPLY DISRUPTIONS: PAST, PRESENT AND FUTURE M.A. Thesis
Thomas Hansen Birdsall 13 Apr. 1981 132 p refs
(Contract DE-AC01-80PE-70278)
(DE81-024250; DOE/PE-70278/T15) Avail: NTIS HC A01/MF A01

Relaxation of environmental standards during oil supply disruptions were examined. The following two policy questions are addressed: (1) should environmental standards such as sulfur emissions limitations be relaxed during oil supply disruptions; and (2) if relaxing a particular standard appears desirable, when, where and how should it be relaxed. It is argued that disruptions could suddenly result in marginal pollution abatement costs much greater than the benefits from, or demand for, the marginal improvement in air quality from such abatement, justifying temporary variances. A set of criteria for evaluating variance policies are developed on the basis of both the theoretical rationale for variances and institutional or implementation considerations. Present federal variance policy are described and the criteria are used to evaluate current policy. DOE

N82-10602# Research Inst. of National Defence, Umea (Sweden). Huvudavdelning 4.
AEROSOLS AND RELATIVE HUMIDITY. STATE OF THE ART REPORT [AEROSOLER OCH RELATIV LUFTFUKTIGHET]
Mats S. Ahlberg and Jan Bylund Dec. 1980 12 p In SWEDISH
(Grant Dnr-79/137)
(FOA-C-40127-H2) Avail: NTIS HC A02/MF A01

A system for producing humid air is described along with a circulation drier, to dry the humid air. The system was tested on a welding smoke aerosol. A modification of shape of the welding smoke particles, from a chain connection to a sphere-shaped agglomerate, as a consequence of humidifying them followed by drying is reported with the aid of a transmission electron microscope. Author (ESA)

N82-10603# Technical Research Centre of Finland, Helsinki. Nuclear Engineering Lab.
ARANO: A COMPUTER PROGRAM FOR THE ASSESSMENT OF RADIOLOGICAL CONSEQUENCES OF ATMOSPHERIC RADIOACTIVE RELEASES
Ikka Savolainen and Serpo Vuori Sep. 1980 59 p refs
(VTT-53; ISBN-951-38-1061-5; ISSN-0355-3698) Avail: NTIS HC A04/MF A01

Results include individual doses for different organs at given distances from the release point, collective doses, numbers of casualties, area polluted by deposited activity, and loss of investment or production due to radioactive contamination. Cases of a single release and atmospheric dispersion, and of a group of radioactive releases and dispersion with discrete probability distributions, can be considered. If these releases of dispersion conditions are expressed by probability distributions, the magnitudes of specified effects, and their expectation values and cumulative probability distributions, can be assessed. Author (ESA)

N82-10604# Transportation Research Board, Washington, D.C.
ENVIRONMENTAL ISSUES IN TRANSPORTATION: ANALYSIS, NOISE, AND AIR QUALITY
Louis F. Cohn, Gerardo G. Clemena, Kenneth R. Agent, Jerry A. Reagan, Glenda J. Sisson, William Bowlby, Louis F. Cohn, Leonard W. Casson, David I. Cook, Andrew N. Barrass et al 1981 63 p refs
(PB81-215261; TRB/TRR-789; ISBN-0-309-03203-2; ISSN-0361-1981; LC-81-9592) Avail: NTIS HC A04/MF A01 CSCL 13F

The following areas were examined: evolution of environmental analysis at the state transportation department level; empirical relationship between mesoscale carbon monoxide concentrations and areal vehicular emission rates; evaluation of the federal highway administration procedure for highway traffic noise prediction; comparison of Leq(h) and Ldn as descriptors of highway traffic noise; role of plant materials in traffic noise control; noise abatement and public policy decisions: a case study -1-440 in Nashville; and inventory and priority rating of potential type II noise-abatement sites in Georgia. A simplified traffic-noise-prediction model for transportation and land use planning is presented. GRA

N82-10605# Harvard Univ., Cambridge, Mass. School of Government.
CASE STUDIES IN THE APPLICATION OF AIR QUALITY MODELLING IN ENVIRONMENTAL DECISION MAKING: SUMMARY AND RECOMMENDATIONS
Catherine G. Miller May 1981 92 p refs
(Grant EPA-R-805558-01)
(PB81-213233; EPA-600/4-01-034) Avail: NTIS HC A05/MF A01 CSCL 13B

The application of air quality models to examine the problems encountered when trying to use these models in makin environmental policy decisions was undertaken. It is shown that technical and political constraints exist but that unresolved policy issues, the management of the decision process and conflicting institutional and organizational interests also cause problems. Reommendations are made on how to improve the technical planning and management of the decision process so that the air quality models can become a better policy tool within the state of the art, political and organizational constraints. GRA

N82-10606# Moulton Niguel Water District, Laguna Niguel, Calif.
WASTEWATER TREATMENT BY ROOTED AQUATIC PLANTS IN SAND AND GRAVEL TRENCHES Final Report, Aug. 1977 - Aug. 1979
Pamela R. Pope Jun. 1981 31 p
(Grant EPA-R-805279)
(PB81-213241; EPA-600/2-81-091) Avail: NTIS HC A03/MF A01 CSCL 13B

A process for the treatment of industrial wastes, an energy efficient method for the treatment of municipal wastewater was evaluated. This biological treatment process uses a minimal amount of mechanical equipment and does not require a great amount of manpower for normal operation. It is demonstrated that raw screened wastewater applied to the trench system at a rate not exceeding 95 cu m/d can be treated to secondary effluent quality. Spatial requirements were the same as for a septic tank system. GRA

N82-10607# FMC Corp., Englewood, Colo.
FEASIBILITY STUDY OF OPEN TANK OXYGEN-ACTIVATED SLUDGE WASTEWATER TREATMENT Final Report, May 1973 - Oct. 1974
Kerwin R. Rakness Jun. 1981 65 p refs
(Grant EPA-S-801790)
(PB81-213274; EPA-600/2-81-095) Avail: NTIS HC A04/MF A01 CSCL 13B

A pilot plant consisting of one oxygenation basin and two clarifiers treated primary clarifier effluent from the Englewood, Colorado, treatment facility. The influent flow rate was adjusted to attain average aeration reactor detention times ranging from 0.94 to 3.3 hr. The pilot plant operation was conducted in two phases. Treatment performance during both phases was excellent. Final effluent BOD5 concentration and secondary BOD5 removals averaged less than 20 mg/l and greater than 90 percent, respectively. Analysis of pilot plant operations indicated that somewhat less sludge was produced with the oxygen system when compared to literature-cited, typical air sludge production. This decreased sludge production occurred and became more pronounced at higher organic loadings. GRA

N82-10608# Geological Survey, Champaign, Ill.
COAL FLY ASH: A REVIEW OF THE LITERATURE AND PROPOSED CLASSIFICATION SYSTEM WITH EMPHASIS ON ENVIRONMENTAL IMPACTS
William R. Roy, Richard G. Thiery (Illinois State Natural History Survey), Rudolph M. Schuller, and John J. Suloway (Illinois State Natural History Survey) Apr. 1981 75 p refs
(PB81-215014; IL/SGS/EGN-96) Avail: NTIS HC A04/MF A01 CSCL 13B

The scientific literature on fly ash generated by coal burning power plants cites is reported. General conclusions are formulated, on the basis of data compiled from this review, on the physiochemical characteristics of the solid waste and the possible environmental impacts of its disposal. GRA

N82-10609# Environmental Protection Systems, Inc., Jackson, Miss.
FACULTATIVE LAGOON EFFLUENT POLISHING USING PHASE ISOLATION PONDS Final Report, Sep. 1977 - Sep. 1980
E. Corbin McGriff, Jr. May 1981 168 p refs
(Grant EPA-R-805296)
(PB81-205965; EPA-600/2-81-084) Avail: NTIS HC A08/MF A01 CSCL 13B

An investigation into the performance of phase isolation was conducted using 2 facultative lagoons arranged in series followed by 2 isolation ponds used alternately for final polishing. The isolation ponds were operated on a fill and draw basis with isolation periods varying from 20-44 days. GRA

N82-10610 State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
THE DISTRIBUTION OF HEAVY METALS AND PETROLEUM RESIDUES IN THE SOIL FROM URBAN SURFACE RUNOFF Ph.D. Thesis
Manfred Owe 1981 193 p
Avail: Univ. Microfilms Order No. 8118121

The profiles of two common soils, a sandy, porous Arkport and a dense, clayey Dunkirk, were reconstructed in 14 cm by 80 cm columns in the laboratory. The design was intended to simulate a collection basin, one fourth the surface area of the test basin. Surface runoff was sampled and collected from a heavily used shopping center parking lot. The profiles were subsequently analyzed at predetermined increments for zinc, lead, cadmium, copper and petroleum residues. An overall increase in total cation and petroleum concentration was noticed with an increase in treatment concentration. A positive relationship between contaminant concentration in the soil and treatment level, exchange capacity, final soil pH and percent organic matter was realized. A negative correlation was noticed between contaminant concentration and bulk density. Treatment level and final soil pH experienced a strong negative correlation. Dissert. Abstr.

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N82-10611 Indiana Univ., Indianapolis.
SAND ENCROACHMENT BY WIND IN AL-HASA OF SAUDI ARABIA Ph.D. Thesis
Yahya Mohammed Sheikh Abolkhair 1981 214 p
Avail: Univ. Microfilms Order No. 8118015

Sand drift and sand dune movement rates in the study area are controlled by several major factors. These factors in descending order of importance are: wind characteristics (velocity, duration, and direction), mean sand grain size, dune size, sand volume available for transport, moisture content of the sand and density of vegetal cover. The objective of this study was to determine the rate of sand drift and sand dune movement as it is related to wind characteristics and mean sand grain size. Equipment to record wind characteristics was installed in the al-Hasa dune field during the period between February and June of 1980. Sand traps to measure the volume of sand moved and the direction from which it moved during this period were also installed at the project site. Sand caught in the various traps was analyzed and its statistical parameters such as the mean, sorting, skewness and kurtosis were determined. Rates of sand dune movement were determined. Dissert. Abstr.

N82-10612 Texas Univ. at Dallas.
A CRUSTAL SECTION OF NORTHERN CENTRAL AMERICA AS INFERRED FROM WIDE ANGLE REFLECTIONS FROM SHALLOW EARTHQUAKES Ph.D. Thesis
Jung Joon Kim 1981 111 p
Avail: Univ. Microfilms Order No. 8118228

A three-layered crustal structure for a portion of northern Central America is derived using both travel time and amplitude data from seismograms recorded at Tegucigalpa, Honduras. The sources are shallow earthquakes that occurred along the Motagua fault in Guatemala 200 to 450 km (25-50 seconds in terms of S-P time) from the station. Since ray paths are almost parallel to the axis of the Middle America trench, approximately 250 km away, a homogeneous, horizontally layered crust may be reasonably assumed. At this distance range, which is far beyond critical distance for reflections from within the crust, shallow sources always generate a small first arrival followed by several large later arrivals. The first arrival is interpreted as Pn (the head wave from the Mohorovicic discontinuity) and the later arrivals are interpreted as wide angle (over-critical) reflections from layer boundaries. Three wide angle reflections (PmP, PiP, and PgP) are identified. Dissert. Abstr.

N82-10613 State Univ. of New York at Stony Brook.
AN APPLICATION OF THE TWO EDDY HYPOTHESIS TO THE GENERAL CIRCULATION OF THE ATMOSPHERE Ph.D. Thesis
Babu R. Bangaru 1980 85 p
Avail: Univ. Microfilms Order No. 8119629

A statistical dynamical model to the problem of general circulation of the Earth's atmosphere is developed using vorticity as a transferable flow property instead of momentum. Two types of eddies are used to explain the overall up-gradient transfer of vorticity at certain latitudes and down-gradient at others. By the use of Proudman-Taylor theorem generalized to rotating baroclinic quasi-geostrophic fluid the model is greatly simplified. To examine the validity of the two eddy hypothesis and that of vorticity as a transferable flow property a simplified version of the model is solved numerically for a zonally symmetric atmosphere. The distributions of wind, temperature, heat flux, and angular momentum flux are in tolerable agreement with the observed data in spite of the simplifications used. Dissert. Abstr.

N82-10614 Massachusetts Univ., Boston.
STRATIGRAPHY, STRUCTURAL GEOLOGY, AND PETROLOGY OF BEDROCK ALONG THE ADIRONDACK HIGHLANDS. NORTHWEST LOWLANDS BOUNDARY HARRISVILLE, NEW YORK Ph.D. Thesis
Richard Witt Wiener 1981 144 p
Avail: Univ. Microfilms Order No. 8118052

Detailed geologic mapping and analysis of minor structural features in the eastern portion of the Harrisville and western portion of the Fine 7 1/2' quadrangles reveals that the boundary between the Adirondack Highlands and Northwest Lowlands is a multiply folded intrusive contact between metamorphosed sedimentary rocks of the Lowlands and metamorphosed intrusive rocks of the Diana Complex in the Highlands. Furthermore, protomylonitic foliation in quartz syenite gneiss of the Diana Complex is an axial plane foliation formed by isoclinal folding of dry quartz syenite at granulite facies metamorphic grade. The lack of major post-intrusive fault displacement along the Diana Complex-Northwest Lowlands Boundary is demonstrated by correlation of xenoliths in the Diana Complex with immediately adjacent metamorphosed sedimentary rock units of the Northwest Lowlands. Dissert. Abstr.

N82-10615 Wisconsin Univ. - Madison.
PALEOGEOGRAPHY, DEPOSITIONAL HISTORY AND CONODONT PALEOECOLOGY OF THE LOWER TRIASSIC THAYNES FORMATION IN THE CORDILLERAN MIOGEOSYNCLINE Ph.D. Thesis
Timothy Robert Carr 1981 227 p
Avail: Univ. Microfilms Order No. 8116641

The Lower Triassic Thaynes Formation was studied at ten localities in Utah, eastern Nevada, southeastern Idaho, western Wyoming, and southwestern Montana. The Thaynes Formation records the final episode of marine sedimentation in the Cordilleran miogeosyncline. The strata display a depositional and structural pattern persistent from the late Paleozoic and possibly the late Precambrian. A basin-wide conodont zonation is proposed and is based on the stratigraphic distribution of 34 form elements referable to 17 single element species. The improved conodont based time-stratigraphic correlations permit recognition of facies patterns for restricted time-rock units and subsequent discrimination of persistent paleographic and paleotectonic features. Association and similarity analysis are used to cluster Smithian conodont elements into eight entities, reflecting both biologic association (multielement apparatuses) and ecologic association (biofacies). Examination of contingency tables and discriminant analysis reveal the presence of three distinctive conodont biotopes arranged along a generalized depth-related environmental gradient. Dissert. Abstr.

N82-10616 Virginia Polytechnic Inst. and State Univ., Blacksburg.
EROSIONAL HISTORY OF THE NEW RIVER, SOUTHERN

APPALACHIANS, VIRGINIA Ph.D. Thesis

Brenda Houser 1980 309 p
Avail: Univ. Microfilms Order No. 8118697

The data derived from mapping the surficial geology (particularly alluvial deposits), in conjunction with other field observations and with heavy-mineral analyses, are interpreted in terms of provenance, depositional environment (or accumulation), and preservation of the surficial deposits. In addition, these data are applied to an interpretation of the evolution of the New River drainage in the Valley and Ridge Province during the latter half of the Neogene. The areal distribution of the surficial materials indicates that in a humid, temperature climate deposits of surficial materials tend to be preserved if they overlie carbonate bedrock which weathers chemically but tend to be eroded from shale and sandstone bedrock which weathers mechanically. In carbonate terrains where surface runoff is minimal, surficial materials are let down in place by solution and have been accumulating in a piecemeal fashion over a time period which in some areas may include all Cenozoic time. The areal distribution and lithology of alluvial deposits provide evidence which can be used to reconstruct the late Cenozoic evolution of part of the New River drainage system within the Valley and Ridge Province. Dissert. Abstr.

N82-10617 Massachusetts Univ., Boston.

BRITTLE FRACTURE HISTORY OF THE NARRAGANSETT PIER GRANITE, RHODE ISLAND Ph.D. Thesis

Michael Jacob Hozik 1981 321 p
Avail: Univ. Microfilms Order No. 8118007

The Narragansett Pier Granite, which underlies the southern coast of Rhode Island, was studied for its brittle fracture. It is suggested that the pluton does not extend far offshore to the east or south and that the remaining onshore body of granite is only a few kilometers thick. Foliation data in the granite and surrounding rocks, in conjunction with metamorphic isograds in the Narragansett Basin suggests that the granite intruded parallel to the generally east west foliation in the surrounding rocks, probably at moderate to shallow depths. The stresses induced by the change in spreading direction is in agreement with the stress inferred from an east west set of late dip slip faults in the narragansett domain, and with a set of younger stresses. The youngest features in the Narragansett Pier Granite are common joints, microjoints, and zones of microjoints. It is noted that most of these elements formed under a different stress system from the faults. It is suggested that the development of rift and grain represents the result of an additional process or event not recorded by other fracture elements. Dissert. Abstr.

N82-10618 Idaho Univ., Moscow.

GEOLOGY AND LINEARS OF LIBYA Ph.D. Thesis

Milud Abdulkrim Mansur 1981 276 p
Avail: Univ. Microfilms Order No. 8119882

The geology of Libya is described in detail with some reference to economic resources. An analysis of LANDSAT space photographs revealed about 2,000 linears, unequally distributed in the different parts of the country, and characterized by considerable variations in their length, strike, and density. Some of them coincide with known structural features including fault scarps, topographic features, dikes, alignments of igneous bodies, and straight drainage systems. Dissert. Abstr.

N82-10619 Colorado State Univ., Fort Collins.

JURASSIC DEPOSITIONAL HISTORY AND VANADIUM-URANIUM DEPOSITS, SLICK ROCK DISTRICT, COLORADO PLATEAU Ph.D. Thesis

Noel Tyler 1981 285 p
Avail: Univ. Microfilms Order No. 8119737

The Jurassic interval studied in the Slick Rock vanadium-uranium district consists of the upper units of the San Rafael group (the Summerville formation and the Junction Creek sandstone) and the Tidwell and Salt Wash members of the Morrison formation. The dominantly argillaceous Summerville formation is interpreted as a lacustrine deposit. A salt cast-bearing seven meter thick arenite sequence in the central portions of the Summerville assemblage is inferred to have been deposited in the nearshore and evaporative foreshore setting during a major lacustrine regression. As the Summerville lake dried up, sand dunes migrated across the lacustrine plain. These are now preserved as the eolian Junction Creek sandstone in the southern part of the study area. Dissert. Abstr.

N82-10620 Emory Univ., Atlanta, Ga.

LABORATORY MEASUREMENTS OF RATE CONSTANTS OF SELECTED BROMINE REACTIONS OF STRATOSPHERIC INTEREST Ph.D. Thesis

Jessica Dee Posey 1980 123 p
Avail: Univ. Microfilms Order No. 8119154

Some bromine reactions of stratospheric interest were examined. The kinetics of several bromine reactions were studied at 298 K using a fast flow reactor coupled to a molecular beam mass spectrometer. Selected chlorine analogs of several of the bromine reactions were also examined to check the method of experimentation. Dissert. Abstr.

N82-10621 Institut d'Aeronomie Spatiale de Belgique, Brussels.

FLUCTUATIONS, SOLAR PERIODICITIES, AND CLIMATIC TRANSITIONS

C. Nicolis 1980 26 p refs Presented at CNES Intern. Conf. on Sun and Climate, Toulouse, 30 Sep. - 3 Oct. 1980
(Aeronomica-Acta-A-225-1980) Avail: Issuing Activity

The time dependent properties of a zero dimensional climatic model, showing-bistable behavior and subject both to internal fluctuations and to an external periodic forcing, are analyzed. Conditions under which the deterministic response of the system is amplified are found analytically. The results are illustrated by numerical simulations. R.C.T.

N82-10622 Institut d'Aeronomie Spatiale de Belgique, Brussels.

CHEMICAL RESPONSE OF THE MIDDLE ATMOSPHERE TO SOLAR VARIATIONS

P. DeBaets, G. Brasseur, and P. C. Simon 1980 14 p refs Presented at 14th ESLAB Symp. on Physics of Solar Variations, Scheveningen, Netherlands, 16-19 Sep. 1980 Submitted for publication
(Aeronomica-Acta-A-224-1980) Avail: Issuing Activity

The possible variation of the trace species concentration in the middle atmosphere, related to long-term solar irradiance variability, is estimated by means of a one dimensional numerical model. The spectral variation of the solar irradiance over the 11 year cycle is discussed. The ratio of irradiance at high and low solar activity conditions is on the order of 2.8 at Lyman alpha (121.6 nm) and decreases with wavelength to reach about 1.2 at 185 nm. The one dimensional model extends from the ground to an altitude of 100 km. A standard chemical scheme, including the odd oxygen, hydrogen, nitrogen, and chlorine species, is used, but no temperature feedback is considered. Calculation results assume constant thermal and dynamic, averaged conditions. It is suggested that the introduction of temperature and transport feedback could considerably modify the values presented. Author (ESA)

N82-10623*# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.

BASIC RESEARCH FOR THE EARTH DYNAMICS PROGRAM Semiannual Status Report, 1 Apr. - 30 Sep. 1981

Oct. 1981 105 p refs
(Contract NAS5-25888)
(NASA-CR-164902; SASR-7; SASR-4) Avail: NTIS HC A06/MF A01 CSCL 08G

The technique of range differencing with Lageos ranges to obtain more accurate estimates of baseline lengths and polar motion variation was studied. Differencing quasi simultaneous range observations eliminate a great deal of orbital biases. Progress is reported on the definition and maintenance of a conventional terrestrial reference system. E.A.K.

N82-10624*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

OZONE TREND DETECTABILITY

Janet W. Campbell, ed. Jul. 1981 108 p refs Proc. o
Symp. held at Boulder, Colo., 28-29 Jul. 1977
(NASA-CP-2189; L-14654) Avail: NTIS HC A06/MF A01 CSCL 04A

The detection of anthropogenic disturbances in the Earth' ozone layer was studied. Two topics were addressed: (1) th level at which a trend in total ozoning is detected by existin data sources; and (2) empirical evidence in the prediction of the depletion in total ozone. Error sources are identified. The predictability of climatological series, whether empirical models can be trusted, and how errors in the Dobson total ozone data impact trend detectability, are discussed. For individual titles, see N82-10625 through N82-10628.

N82-10625*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE NATURE OF THE DATA
In its Ozone Trend Detectability Jul. 1981 p 8-94 (For primary document see N82-10624 01-46)
Avail: NTIS HC A06/MF A01 CSCL 04A

The locations of total ozone stations and of stratospheric ozone samplings were presented. The samplings are concentrated in three areas: Japan, Europe, and India. Approximately 75% of the total ozone measurements are made with Dobson instruments which offer the best international measurements. When well calibrated their accuracy is on the order of a few percent. It is found that although the total ozone percent is similar in both hemispheres, the Northern Hemisphere has 3 to 10% more ozone than the southern hemisphere. The close association between total ozone distribution and pressure distribution in the atmosphere is noted. E.A.K.

N82-10626*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ESTIMATION OF TRENDS
In its Ozone Trend Detectability Jul. 1981 p 35-66 (For primary document see N82-10624 01-46)
Avail: NTIS HC A06/MF A01 CSCL 04A

The application of statistical methods to recorded ozone measurements. The effects of a long term depletion of ozone at magnitudes predicted by the NAS is harmful to most forms of life. Empirical prewhitening filters the derivation of which is independent of the underlying physical mechanisms were analyzed. Statistical analysis performs a checks and balances effort. Time series filters variations into systematic and random parts, errors are uncorrelated, and significant phase lag dependencies are identified. The use of time series modeling to enhance the capability of detecting trends is discussed. E.A.K.

N82-10627*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FORUM FOR DISCUSSION AND DEBATE
In its Ozone Trend Detectability Jul. 1981 p 67-91 refs (For primary document see N82-10624 01-46)
Avail: NTIS HC A06/MF A01 CSCL 04A

The application of statistical methods to meteorological data for which there are long, compatible series, and where known trend changes took place were suggested. The effects of optical wedge deterioration, atmospheric aerosol variation, solar irradiance variations, etc., are evaluated. It is recommended that coupled satellite ground based observational system is required to determine global long term trends. E.A.K.

N82-10628*# Control Data Corp., Minneapolis, Minn.
TOTAL OZONE TREND SIGNIFICANCE FROM SPACE TIME VARIABILITY OF DAILY DOBSON DATA
Robert W. Wilcox *In* NASA. Langley Research Center Ozone Trend Detection Jul. 1981 p 93-104 refs (For primary document see N82-10624 01-46)
Avail: NTIS HC A06/MF A01 CSCL 04A

Estimates of standard errors of total ozone time and area means, as derived from ozone's natural temporal and spatial variability and autocorrelation in middle latitudes determined from daily Dobson data are presented. Assessing the significance of apparent total ozone trends is equivalent to assessing the standard error of the means. Standard errors of time averages depend on the temporal variability and correlation of the averaged parameter. Trend detectability is discussed, both for the present network and for satellite measurements. E.A.K.

N82-10629*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A MULTILAYER MODEL OF TIME DEPENDENT DEFORMATION FOLLOWING AN EARTHQUAKE ON A STRIKE-SLIP FAULT
Steven C. Cohen Aug. 1981 33 p refs Submitted for publication
(NASA-TM-82174) Avail: NTIS HC A03/MF A01 CSCL 08K

A multilayer model of the Earth to calculate finite element of time dependent deformation and stress following an earthquake on a strike slip fault is discussed. The model involves shear properties of an elastic upper lithosphere, a standard viscoelastic linear solid lower lithosphere, a Maxwell viscoelastic asthenosphere and an elastic mesosphere. Systematic variations of fault and layer depths and comparisons with simpler elastic lithosphere over viscoelastic asthenosphere calculations are analyzed. Both the creep of the lower lithosphere and astenosphere contribute to the postseismic deformation. The magnitude of the deformation is enhanced by a short distance between the bottom of the fault (slip zone) and the top of the creep region but is less sensitive to the thickness of the creeping layer. Postseismic restressing is increased as the lower lithosphere becomes more viscoelastic, but the tendency for the width of the restressed zone to growth with time is retarded. E.A.K.

N82-10630# Honeywell, Inc., Clearwater, Fla.
GEO-SPIN/IPS-2 IMPROVEMENTS FOR PRECISION GRAVITY MEASUREMENT
Gary W. Adams and Michael J. Hadfield 5 Jun. 1981 19 p refs Sponsored by Army
(AD-A103407; ETL-R025) Avail: NTIS HC A02/MF A01 CSCL 17/7

Improved accuracies must be maintained with the system operated along any trajectory in a ground vehicle or helicopter. The most important performance parameter is deflection of the vertical. This paper reports the results of the gravity improvement study. It addresses hardware, software and operational procedure aspects. Supporting data are provided for the assessment of current performance. On-line and off-line data reduction and analysis are considered. The rather interesting application of both Kalman filtering (using data up to a current point) and Kalman smoothing (total traverse data processing) is covered and its effectiveness evaluated with supporting computer simulations for the gravity measurement problem. Use of both ZUPT and control point data is considered in the smoothing process. By-products of gravity measurement accuracy improvement are better positioning performance and operational flexibility. These topics are also touched upon in this paper. Hence, it should be of widespread interest to the surveying and geodesy communities. GRA

N82-10631# Lowell Univ., Mass. Center for Atmospheric Research.
DIGITAL IONOSPHERIC SOUNDING IN THE ARCTIC Final Report, 1 Mar. 1978 - 25 Mar. 1980
B. Reinisch and K. Bibl Hanscom AFB, Mass. AFGL Jan. 1981 134 p refs
(Contract F19628-78-C-0085; AF Proj. 4643)
(AD-A104163; ULRF-412/CAR; AFGL-TR-81-0022) Avail: NTIS HC A07/MF A01 CSCL 04/1

New ionogram observation techniques were applied at the Goose Bay Ionospheric Observatory (GBIO) in Newfoundland, Canada, and aboard AFGL's Airborne Ionospheric Observatory (AIO), using the Digisonde 128PS system. A receiving array of four crossed-loop antennas at GBIO enabled incidence angle and polarization measurements within the ionogram in addition to the Doppler observations. The Doppler information in the propagation ionograms between the GBIO Digisonde and the moving AIO sounder facilitates the interpreting of different modes of propagation. Software for the AFGL CDC 6600 computer and for a microcomputer was developed for the processing of the digital ionograms. The identification of ordinary and extraordinary echoes in the Goose Bay ionograms greatly simplify the automatic processing of ionograms. Indeed, it became clear that for automatic ionogram trace identification the O and X tagging is a prerequisite. In support of the ESD 414L project an ionogram communicator (ICOM) was added to the GBIO Digisonde providing - via telephone lines - realtime ionogram printouts at the Over-The-Horizon Backscatter Experimental Radar System in Maine. Another Digisonde station was equipped and brought to operation in Keflavik, Iceland, to provide environmental data for the OTH radar operation. Author (GRA)

N82-10632# California Univ., Berkeley. Lawrence Berkeley Lab.
SUMMARY OF THE LLNL ONE-DIMENSIONAL TRANSPORT-KINETICS MODEL OF THE TROPOSPHERE AND STRATOSPERE, 1981
D. J. Wuebbles Sep. 1981 29 p refs
(Contract W-7405-eng-48)
(DE81-030400; UCID-19185) Avail: NTIS HC A03/MF A01

The model currently extends from the ground to 56.25 km. The vertical grid structure is variable, but usually has a 0.5 km thick layer at the surface, 1 km thick layers extending from 0.5 to 34.5 km, a 1.75 km thick layer between 34.5 and 36.25, and 2.5 km thick layers extending to 56.25 km. The treatment of all species by the model is described. The transport parameterization is discussed in detail. T.M.

N82-10633# Radiation Research Associates, Inc., Fort Worth, Tex.
STUDY OF THE DISTRIBUTION OF RADON IN THE ATMOSPHERE TO A HEIGHT OF 457 METERS Final Report
C. E. Clifford, R. M. Rubin, and M. B. Wells May 1981 53 p refs
(Contract DE-AC13-76GJ-01664)
(DE81-030293; GJBX-280-81; RRA-T8002) Avail: NTIS HC A04/MF A01

An extensive set of measurements were obtained using alpha-particle detectors of the Track Etch type. These detectors were exposed for periods of approximately three months on four television towers. Radon measurements were also made as a function of ground depth. A statistical F-test analysis of the readings from the exposed Track Etch detectors on the towers leads to the conclusion that the radon concentration in air at each of the tower sites does not vary with height above ground for heights to 457 meters. DOE

N82-10634# Tufts Univ., Medford, Mass. Dept. of Physics.
RADIATION REACTION FORCE AND UNIFICATION OF ELECTROMAGNETIC AND GRAVITATIONAL FIELDS
C. Y. Lo, Gary R. Goldstein, and A. Napier Apr. 1981 26 p refs
(Contract DE-AC02-76ER-03023)
(DE81-029086; DOE/ER-03023/T1) Avail: NTIS HC A03/MF A01

A unified theory of electromagnetic and gravitational fields should modify classical electrodynamics such that the radiation reaction force is accounted for. The analysis leads to a five-dimensional unified theory of five variables. The theory is supported by showing that, for the case of a charged particle moving in a constant magnetic field, the radiation reaction force is indeed included. Moreover, this example shows explicitly that physical changes are associated with the fifth variable. Thus, the notion of a physical five-dimensional space should be taken into consideration. DOE

N82-10635# California Univ., Livermore. Lawrence Livermore Lab.
BLOCK-ADAPTIVE FILTERING AND ITS APPLICATION TO SEISMIC-EVENT DETECTION Ph.D. Thesis
Gregory Alan Clark Apr. 1981 209 p refs
(Contract W-7405-eng-48)
(DE81-028361; UCRL-53147) Avail: NTIS HC A10/MF A01

Block digital filtering involves the calculation of a block or finite set block processing arises from computational advantages of the technique. Block filters take good advantage of parallel processing architectures, which are becoming more and more attractive with the advent of very large scale integrated (VLSI) circuits. The block technique was extended to Wiener and adaptive filters, both of which are statistical filters. The key to this extension is the definition of a new performance index, block mean square error (BMSE), which combines the well known sum square error (SSE) and mean square error. DOE

N82-10636# Kiruna Geophysical Inst. (Sweden).
QUIET TIME CONVECTION ELECTRIC FIELD PROPERTIES DERIVED FROM keV ELECTRON MEASUREMENTS AT THE INNER EDGE OF THE PLASMA SHEET BY MEANS OF GEOS-2
B. Hultqvist, H. Borg, L.-A. Holmgren, H. Reme (Toulouse Univ.), A. Bahnsen (Danish Space Research Inst.), M. Jespersen (Danish Space Research Inst.), and G. Kremser (Max-Planck-Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany) Apr. 1981 54 p refs Submitted for publication
(KGI-Preprint-052; ISSN-0349-2656) Avail: NTIS HC A04/MF A01

An electric field model, with the dusk singular point of the forbidden region boundary at 1500 instead of at 1800 MLT, is in quite good agreement with the observations. Effects due to shielding by the hot plasma of the inner magnetosphere from the convection electric field are quite strong in situations of low disturbance level. The quiet time convection electric field strength at 2100 MLT in the geostationary orbit obtained from this analysis varies in the range 0.15 to 0.3 keV/Re. Six hours earlier or later in the satellite orbit the convection field is four times stronger. Also when the convection field varies, information about its magnitude can be obtained from the keV electron measurements. Author (ESA)

N82-10637 Texas Univ. at Dallas.
ELECTROMAGNETIC SOUNDINGS IN CALIFORNIA, NEW MEXICO AND WISCONSIN Ph.D. Thesis
Victor Julio Lopez Correa 1981 228 p
Avail: Univ. Microfilms Order No. 8118230

Frequency dependent transfer functions and inductive responses derived from the recorded geomagnetic fluctuations in California and New Mexico permitted the location of lateral inhomogeneities in the electrical conductivity distribution of the crust and upper mantle that help to understand the thermo-tectonic setting in these regions. The lateral inhomogeneties are interpreted as near surface and deep seated highly two dimensional (greater than 60 percent) conductive zones that strike normal to the directions of the inductive response vectors. Dissert. Abstr.

N82-10638 Texas Univ. at Dallas.
SEISMIC VELOCITY MODELING FROM AN ENSEMBLE OF EARTHQUAKES Ph.D. Thesis
Hong-Bing Liaw 1981 155 p
Avail: Univ. Microfilms Order No. 8118229

An algorithm for solving non linear inverse problems is developed. As test of this algorithm is made for simultaneous determination of hypocentral and velocity parameters using hypothetical P wave travel-time data. The algorithm is applied to travel-time data from earthquakes observed in northern Costa Rica. The derived velocity model and relocated earthquakes are tested against other known geophysical data in this region. Some tectonic implications discussed on the basis of focal mechanisms, the relocated earthquakes, and the seismic velocity distribution. Dissert. Abstr.

N82-10639 California Inst. of Tech., Pasadena.
SEISMIC SOURCE PROCESSES AND TECTONICS: OBSERVATIONS OF FOUR INTRACONTINENTAL EARTHQUAKES Ph.D. Thesis
John Joseph Cipar 1981 156 p
Avail: Univ. Microfilms Order No. 8118974

The source processes of four shallow earthquakes and their relation to regional tectonics are presented. Long-period teleseismic P and S waves from the Haicheng, China earthquake of February 4, 1975 are compared directly to time domain synthetic seismograms to infer source parameters. The P wave focal mechanism indicates that faulting was dominantly left-lateral strike-slip along a northwest striking nodal plane. A detailed examination of seismograms recorded by the 1976 Friuli, Italy earthquake (May 6, 1976, Ms = 6.5) and two major aftershocks (both on September 15, 1976 at 03h 15m, Ms = 6.0 and 09h 21m, Ms = 5.9) is presented. Teleseismic long period body waves and surface waves radiated by the mainshock and 09h 21m aftershock are studied to determine source characteristics. Focal mechanisms along with geological evidence suggest that both events represent underthrusting of the Friuli Plain beneath the Southern Alps. The depths of both earthquakes, estimated by matching synthetic body wave seismograms to observations, are found to lie between 6 and 10 km. Dissert. Abstr.

N82-10640 California Univ., Davis.
CHEMICAL AND MINERALOGICAL COMPOSITION AND

BEHAVIOR OF THE MANCOS SHALE AS A DIFFUSE SOURCE OF SALTS IN THE UPPER COLORADO RIVER BASIN Ph.D. Thesis
Vasilios Petros Evangelou 1981 210 p
Avail: Univ. Microfilms Order No. 8117567

A automated kinetic dissolution method for analysis of calcite and dolomite was developed. Calcite dolomite contribute relatively small but significant quantities of soluble ions to waters permeating Mancos Shale. Following emergence of the Mancos formation and recession of waters of the Cretaceous sea environment, the remaining waters of the sedimentary formation evaporated. As waters evaporated, soluble calcium concentration was maintained at a low level relative to sodium and magnesium through precipitation of calcite and gypsum. Surficially exposed Mancos Shale weathers rapidly to produce a permeable, unconsolidated surface veneer in which the gypsum is more intimately mixed with other components of the shale. Waters draining from the weathered Mancos Shale contain the calcium exchanged sodium and magnesium together with calcium and sulfate from gypsum and with lesser quantities of calcium, magnesium and bicarbonates dissolved from carbonates in the shale. Dissert. Abstr.

N82-10641 Indiana Univ., Indianapolis.
THE MINERALOGY AND PETROLOGY OF THE WILLIMANTIC DOME, EASTERN CONNECTICUT Ph.D. Thesis
James Scott Fout 1981 256 p
Avail: Univ. Microfilms Order No. 8119051

The Willimantic dome is a shallow amplitude gneiss dome. Because it is isolated tectonically from the other antiformal belts and gneiss dome sequences in New England, the Willimantic dome was examined structurally and petrologically to determine its relationship to the other major structures in eastern Connecticut. Field work indicates that the Willimantic dome consists of a core gneiss of oligoclase-quartz-monzonite, designated the Willimantic Gneiss, surrounded by a plagioclase-biotite-hornblende gneiss designated the Plagioclase Gneiss and the Tatnic Hill Formation, a complicated series of pelitic schists. Compositional layering and intercalated sediments indicate that the Willimantic dome represents a relict stratigraphic pile. Regional deformation occurred along the Willimantic Thrust Fault located at the contact between the Plagioclase Gneiss and the Tatnic Hill Formation. Dissert. Abstr.

N82-10642 California Univ., Berkeley.
THE COLIMA VOLCANIC COMPLEX, MEXICO. 1: POST-CALDERA ANDESITES FROM VOLCAN COLIMA. 2: LATE-QUATERNARY CINDER CONES Ph.D. Thesis
James Francis Luhr 1980 221 p
Avail: Univ. Microfilms Order No. 8113116

Major and trace element analyses of whole rock samples and all constituent phases for a suite of nine postcaldera hornblende and olivine andesites are presented. Samples from Colima's four major eruptions since 1869, spanning the last two eruptive cycles are included. Colima's postcaldera andesites are poor in K and other incompatible elements characteristic of near trench andesites. From the 1913 ashflow eruption through the fourth cycle andesites, increases occurred in whole rock abundances. The most pronounced Mg rich rims occur in the olivine andesites and reflect preeruptive magma mixing. The post 1961, fourth cycle andesites display features which distinguish them from earlier postcaldera hornblende andesites of similar bulk composition. It is suggested that the fourth cycle andesites were less hydrous prior to eruption. The slight Mg rich pyroxene rims in pre 1961 hornblende andesites record late stage preeruptive increases in magmatic water content. The fourth cycle andesites did not experience a strong, preeruptive influx of water, resulting in lower magmatic water content and normally zoned pyroxenes. Dissert. Abstr.

N82-10643 Massachusetts Univ., Boston.
THE BEDROCK GEOLOGY OF THE COLRAIN QUADRANGLE MASSACHUSETTS-VERMONT 1980 Ph.D. Thesis
Jeffrey William Pferd 1981 367 p
Avail: Univ. Microfilms Order No. 8118035

The Colrain quadrangle of west-central Massachusetts lies within the Connecticut Valley-Gaspe Synclinorium and contains a Vermont-type structural dome. The quadrangle is underlain by Paleozoic metamorphic and intrusive rocks that are unconformably overlain in a small area on the southeast by Triassic continental sedimentary rocks. The Paleozoic rocks are of the Vermont sequence and consist from oldest to youngest of Goshen Formation (Northfield in Vermont), Waits River Formation, Standing Pond Volcanics and Gile Mountain Formation. The Goshen formation consists of graphitic, quartz-mica schist, quartz granulites and rare, but laterally extensive, calcareous granulities. Two members are recognized and are believed to be facies equivalents of one another. The Waits River Formation is comprised of two subdivisions; the lower Thin-bedded Carbonate Member and the upper Thick-bedded Carbonate Member. Both consist of rusty-weathering mica schists and punky brown-weathering calcareous granulites. Dissert. Abstr.

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-10644 West Virginia Univ., Morgantown.
RAINFALL CATCH ERRORS ASSOCIATED WITH CIRCUMAMBIENT OBSTRUCTIONS Ph.D. Thesis
Edward William Repa 1981 182 p
Avail: Univ. Microfilms Order No. 8118414

The effects of circumambient obstructions of rainfall catch were determined. Procedures included: (1) construction of tractable obstruction models for field testing that conform to boundary conditions inherent in natural sites; (2) observe rainfall catch, wind speed, and rainfall intensity for individual rain storms under a variety of air mass conditions; (3) develop a deterministic model based on physical theory to predict the effects of circumambient obstructions on rainfall catch; and (4) compare actual rainfall catch to the theoretical catch. Results showed that gage catch was a function of screening angle, where the average maximum catch occurred at an angle of 26.57 deg. Rainfall catch decreased sharply as screening angles increased from 26.57 deg and decreased slightly as screening angle decreased. Increased wind speeds, and decreased rainfall intensities, resulted in larger rainfall catch deficits especially for larger screening angles. Theoretical catch was found to accurately predict actual catch except for very high intensities. Dissert. Abstr.

N82-10645 Colorado State Univ., Fort Collins.
TROPICAL CYCLONE STRUCTURE AND INTENSITY CHANGE Ph.D. Thesis
Edwin Nunez 1981 298 p
Avail: Univ. Microfilms Order No. 8119720

Utilizing the compositing approach, fourteen years (1961-1974) of northwest Atlantic rawinsonde soundings are analyzed to obtain the basic thermodynamic and wind fields of the hurricane. A comparison is undertaken of the basic structure of the composited west Atlantic hurricane and the west Pacific typhoon. Similarities and difference are discussed. In order to investigate differences which lead to tropical cyclone genesis and intensification, eighteen Atlantic and Pacific data sets were composited and divided into two groups: deepening, and filling/steady systems. Deepening systems are found to have supergradient winds in the lower troposphere and less subgradient winds in the upper levels than filling/steady disturbances. The thermal wind equation indicates that an imbalance exists such that deepening systems have larger vertical tangential wind shear (WS) than baroclinicity. The opposite is true of filling systems. Dissert. Abstr.

N82-10646 Colorado State Univ., Fort Collins.
CLOUD TRACKING FROM SATELLITE PICTURES Ph.D. Thesis
Uwe Ludwig Haass 1981 128 p
Avail: Univ. Microfilms Order No. 8119704

Several methods of motion analysis are introduced based on different signal characterizations and various degrees of image abstraction. Using the discrete luminance information (half-tone picture), the maximum of the inner product surface of two consecutive images serves as a lateral displacement estimator.

The maximum peak detectability can be improved by prefiltering with a non-causal planar least-squares inverse filter. Although this filter is derived from theoretical considerations, the resulting high-pass frequency characteristic commends its use for another reason: since most of the cloud information, such as edges and texture, is embedded in the high-frequency parts of the image, the subsequent inner product operation takes only the homogeneous displacement of these features into account. For clouds that have undergone severe shape changes, a gradual shift to less restrictive frequency characteristics is suggested.
Dissert. Abstr.

N82-10647 Colorado State Univ., Fort Collins.
THE STRUCTURE AND LIFE-CYCLE OF MIDLATITUDE MESOSCALE CONVECTIVE COMPLEXES Ph.D. Thesis
Robert Alan Maddox 1981 331 p
Avail: Univ. Microfilms Order No. 8119716

Enhanced infrared satellite imagery was used to document the existence and frequent occurrence, over middle latitudes of the United States, of large, convectively driven weather systems. These systems, named Mesoscale Convective Complexes (MCCs), frequently produce a variety of severe convective weather phenomena (such as tornadoes, hailstorms and flash floods) that significantly impact human activities. A preliminary climatology of MCCs, based on satellite data from two warm seasons, indicates tha these systems frequently affect United States agricultural regions and it is hypothesized that MCCs produce a highly significant portion of the growing season precipitation over these areas.
Dissert. Abstr.

N82-10648 Colorado State Univ., Fort Collins.
A CLIMATE INDEX DERIVED FROM SATELLITE MEASURED SPECTRAL INFRARED RADIATION Ph.D. Thesis
Michael David Abel 1981 157 p
Avail: Univ. Microfilms Order No. 8119684

It is assumed that clouds and climate are closely related and a change in one will result in a change in the other. Because the index developed is a function of the cloud, temperature, and moisture distributions, it may be used as a climate index. The advantage is that the index is more accurately retrieved from satellite data than cloudiness per se. The VIRES index (vertical infrared radiative emitting structure), is based upon the shape and relative magnitude of the broadband weighting function of the infrared radiative transfer equation. The broadband weighting curves were retrieved from simulated satellite infrared sounder data (spectral radiances). The retrieval procedure is described and error sensitivities of this method were investigated. Index measuring options and possible applications of the VIRES index are proposed.
Dissert. Abstr.

N82-10649 Colorado State Univ., Fort Collins.
WAVE-MEAN FLOW INTERACTIONS AND SOLAR-WEATHER EFFECTS Ph.D. Thesis
Alison Frances Colvill Bridger 1981 149 p
Avail: Univ. Microfilms Order No. 8119693

A time-dependent, hemispheric, primitive-equation numerical model is constructed to test Hines' hypothesis that solar variations induce changes in the distributions of basic state variables at high levels in the atmosphere, and thus induce changes in planetary-scale wave structure at lower atmospheric levels. The induced changes of the basic state zonal wind field are of primary concern. Sensitivity studies reveal that planetary-scale wave structure is sensitive to the assumed initial basic state zonal wind distribution. The stratospheric sudden warming, which is driven by the interaction of such a large-scale wave with the zonally averaged flow, is therefore also sensitive to the initial basic state fields. The distributions of the latitudinal gradient of basic state potential vorticity, and the fields of wave energy flux at selected times, prove to be useful tools in diagnosing the atmosphere's response to forcing by a wave. Lower atmospheric wave structure is found to be insensitive to solar-induced changes in the upper atmosphere. Such changes as do occur are limited to within about 30 kilometers below the level of maximum heating, and are also quite short-lived.
Dissert. Abstr.

N82-10650*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
VECTOR WIND PROFILE GUST MODEL
S. I. Adelfang (Computer Sciences Corp., Huntsville, Ala.) and O. E. Smith Aug. 1981 38 p refs
(NASA-TM-82441) Avail: NTIS HC A03/MF A01 CSCL 04B

The development of a vector wind gust model that is suitable for orbital flight test operations and trade studies was studied. Verification of the hypothesis that gust component variables are gamma distributed, gust modulus is approximately Weibull distributed, and zonal and meridional gust components are bivariate gamma distributed is emphasized. A method of testing for bivariate gamma distributed variables, and two distributions for gust modulus are described. The results of extensive hypothesis testing of one of the distributions are presented, and the validity of the gamma distribution for representation of gust component variables is established.
E.A.K.

N82-10651*# Kentucky Univ., Lexington. Dept. of Chemical Engineering.
AN ALGORITHM TO GENERATE INPUT DATA FROM METEOROLOGICAL AND SPACE SHUTTLE OBSERVATIONS TO VALIDATE A CH4-CO MODEL Final Report, 1 Feb. 1978 - 31 Oct. 1980
Leonard K. Peters and John Yamanis 15 Oct. 1981 109 p refs
(Grant NsG-1501)
(NASA-CR-164899) Avail: NTIS HC A06/MF A01 CSCL 04B

Objective procedures to analyze data from meteorological and space shuttle observations to validate a three dimensional model were investigated. The transport and chemistry of carbon monoxide and methane in the troposphere were studied. Four aspects were examined: (1) detailed evaluation of the variational calculus procedure, with the equation of continuity as a strong constraint, for adjustment of global tropospheric wind fields; (2) reduction of the National Meteorological Center (NMC) data tapes for data input to the OSTA-1/MAPS Experiment; (3) interpolation of the NMC Data for input to the CH4-CO model; and (4) temporal and spatial interpolation procedures of the CO measurements from the OSTA-1/MAPS Experiment to generate usable contours of the data.
B.W.

N82-10652*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EQUATORIAL SUPERROTATION IN A THERMALLY DRIVEN ZONALLY SYMMETRIC CIRCULATION
H. G. Mayr and I. Harris Sep. 1981 61 p refs Presented at AGU Meeting, 1981 and IAGA Sci. Assembly, Edinburg, 1981 Submitted for publication
(NASA-TM-83832) Avail: NTIS HC A04/MF A01 CSCL 04B

Near the equator where the Coriolis force vanishes, the momentum balance for the axially symmetric circulation is established between horizontal and vertical diffusion, which, a priori, does not impose constraints on the direction or magnitude of the zonal winds. Solar radiation absorbed at low latitudes is a major force in driving large scale motions with air rising near the equator and falling at higher latitudes. In the upper leg of the meridional cell, angular momentum is redistributed so that the atmosphere tends to subrotate (or corotate) at low latitudes and superrotate at high latitudes. In the lower leg, however, the process is reversed and produces a tendency for the equatorial region to superrotate. The outcome depends on the energy budget which is closely coupled to the momentum budget through the thermal wind equation; a pressure (temperature) maximum is required to sustain equatorial superrotation. Such a condition arises in regions which are convectively unstable and the temperature lapse rate is superadiabatic. It should arise in the tropospheres of Jupiter and Saturn; planetary energy from the interior is carried to higher altitudes where radiation to space becomes important. Upward equatorial motions in the direct and indirect circulations (Ferrel-Thomson type) imposed by insolation can then trap dynamic energy for equatorial heating which can sustain the superrotation of the equatorial region.
Author

N82-10653# University of Central Florida, Orlando. Dept. of Mathematics and Statistics.
SOME MODELS FOR VISIBILITY FOR GERMAN STATIONS Scientific Report, 1 Sep. 1979 - 14 Apr. 1981

Paul N. Somerville Hanscom AFB, Mass. AFGL 15 Apr. 1981 40 p refs
(Contract F19628-80-C-0004; AF Proj. 6670)
(AD-A104167; AFGL-TR-81-0144; SR-4) Avail: NTIS HC A03/MF A01 CSCL 04/2

A goal of the Air Weather Service is to be able to expeditiously give the probability that a weather element will have a value above a specified threshold for any location and any time. In previous reports, the present investigators have shown how probability models can be constructed for such weather elements as visibility, ceiling, sky cover, precipitation and windspeed for stations where records exist, so that the required probabilities can be easily calculated. More recently studies have been made to develop models for visibility where data does not exist. The pilot study was made using data from Germany. Models for visibility were developed for thirty German stations for different months and times of day using the Weibull distribution. Regression runs were made to obtain expressions for parameter estimates as functions of variables such as elevation, relative elevation, proximity to water, direction of terrain at the station, etc. These expressions are then usable to obtain Weibull model parameter estimates for arbitrary locations. The present report gives the Weibull parameter estimates for the thirty German stations for each month of the year and eight times of day. Measures of model accuracies for the different stations are also given. The data used to develop the models was extracted from the 'Revised Uniform Summary of Weather Observations' (RUSSWO's) prepared by the Data Processing Division of the Air Weather Service. Author (GRA)

N82-10654# Maryland Univ., College Park. Dept. of Meteorology.
CLIMATOLOGICAL RELATIONSHIPS BETWEEN MONTHLY MEAN SURFACE TEMPERATURE AND MID-TROPOSPHERIC HEIGHTS Progress Report, 1 Nov. 1980 - 30 Jun. 1981
William H. Klein 1981 36 p refs
(Contract DE-AS05-81EV-10539)
(DE81-029841; DOE/EV-10539/T1) Avail: NTIS HC A03/MF A01

The screening process to improve the accuracy of monthly mean temperature forecasts in the contiguous United States is reported. Rederation of the statistical equations now used to specify mean temperature anomalies from mean height anomalies are examined. It is decided to compute all future correlation fields from anomalies, rather than absolute values of temperature and height. DOE

N82-10655# Pacific Northwest Lab., Richland, Wash. Atmospheric Sciences Dept.
ANALYSIS OF DATA FROM THE US DEPARTMENT OF ENERGY'S METEOROLOGICAL VALIDATION PROGRAM
William F. Sandusky and John W. Buck Jun. 1981 19 p refs Presented at the Pacific Div., Am. Assoc. for the Advan. of Sci. Ann. Meeting, Richland, Wash., 15-18 Jun. 1981
(Contract DE-AC06-76RL-01830)
(DE81-030100; PNL-SA-9411; CONF-8106152-1) Avail: NTIS HC A02/MF A01

The history of the meteorological validation program (MVP) and its unique features of the summarized data for candidate sites are described. Available wind power for each site and the projected power for a MOD-2 turbine at each site is provided. Wind power data are compared to data from the resource assessment program to locate areas of high wind energy potential in the contiguous United States, Alaska and Puerto Rico. The effect of data recording techniques and averaging period of the data on Weibull distribution parameters are included. DOE

N82-10656# Technical Research Centre of Finland, Espoo. Lab. of Structural Engineering.
GENERAL CONDITIONS IN ARCTIC AREAS [ARKTISTEN ALUEITTEN YLEISET OLOSUH TEET]
Juhani Karri May 1981 63 p refs In FINNISH; ENGLISH summary
(VTT-12; ISBN-951-38-1189-1; ISSN-0357-7031) Avail: NTIS HC A04/MF A01

General climatological conditions in arctic areas are described. Average and minimum values of temperatures are presented. From other climatological factors, precipitation, snow conditions, visibility, cloudiness and wind conditions are dealt with. The extent of permafrost and its influence on construction are briefly described. The seismically active areas are presented. The extent of sea ice and its forms of appearance are clarified in the arctic areas generally, and more precisely in the Eurasian arctic seas. Author (ESA)

N82-10657# European Space Agency, Paris (France).
RADIATION BUDGET OF THE TROPICAL ATMOSPHERE: RESULTS FROM MEASUREMENTS OF THE HEMISPHERICAL RADIANT FLUX DENSITIES IN THE VISIBLE SPECTRAL RANGE DURING THE '1969 ATLANTIC EXPEDITION'
Heinz Queck Mar. 1981 92 p refs Transl. into ENGLISH of "Ergebnisse zum Strahlungsumsatz in der tropischen Atmosphaere aus Messungen der hemisphaerischen Strahlungsflussdichten in sichtbaren Spektralbereich waehrend der Atlantischen Expedition 1969" Rept. DFVLR-EB-79-36 DFVLR, Oberpfaffenhofen, West Germany, 1979 93 p Original report in GERMAN previously announced as N81-10623
(ESA-TT-658; DFVLR-FB-79-36) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 16,20

Some 67 radio probes measuring the radiant flux densities from the upper and lower hemispheres in the visible spectral range were launched from aboard the German research vessels Meteor, Planet and the American research vessel Discoverer. The receivers of the probes had their optical centers at 550 and 684 nm. The radiant flux densities from both hemispheres are given as a function of height with the frequency distributions. The components of the radiation budget, spectral absorbed, reflected and transmitted portions, are given. The resulting spectral heating rates are presented. Author (ESA)

N82-10658# Illinois State Water Survey, Urbana.
ILLINOIS THIRD CONSECUTIVE SEVERE WINTER: FOR 1978-1979
Stanley A. Changnon, David Changnon, and Phyllis Stone 1980 42 p refs Sponsored by State of Illinois
(PB81-218240; ISWS/RI-94/80) Avail: NTIS HC A03/MF A01 CSCL 04B

Seventeen major winter storms, the state's record coldest January-February, and record snow depths gave the winter of 1978-1979 a rank as the second worst statewide for Illinois, exceeded only by the prior winter of 1977-1978. In the northern fourth of Illinois, the 1978-1979 winter was the worst on record. Average snowfall for the state was 42.8 inches, or 23.3 inches above normal. The 1978-1979 winter had a myriad of socioeconomic impacts, the most serious ones in the Chicago metropolitan area. Ten deaths and at least 60 serious injuries were attributed to the storms. GRA

N82-10659# National Severe Storms Lab., Norman, Okla.
SUMMARY OF AEC-ERDA-NRC SUPPORTED RESEARCH AT NSSL 1973-1979
J. T. Lee, ed., Dusan S. Zrnic, Robert P. Davies-Jones, and Joseph H. Golden Mar. 1981 110 p refs Sponsored by the National Oceanic and Atmospheric Administration
(PB81-220162; NOAA-TM-ERL-NSSL-90; NOAA-81043004) Avail: NTIS HC A06/MF A01 CSCL 04B

In 1973, the mutual interest in tornado wind and pressure structure witnessed the formation of a cooperative research program between the National Oceanic and Atmospheric Administration's (NOAA) National Severe Storms Laboratory at Norman, Oklahoma and the Atomic Energy Commission (AEC) with its successor organization the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission (NRC). An overview of the research and results generated through the coordinated effort is presented. This research proceeded along several lines - direct observations such as radar and photographic, indirect observations such as damage inferred wind flows, and modeling. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-10660 Texas Univ. at Arlington.
A GLOBAL ATLAS OF GEOS-3 SIGNIFICANT WAVEHEIGHT

AND COMPARISON OF THE DATA WITH NATIONAL BUOY DATA Ph.D. Thesis
James Douglas McMillan 1981 147 p
Avail: Univ. Microfilms Order No. 8119337

The GEOS-3 significant waveheight estimation algorithm is derived by analyzing the return waveform characteristics of the altimeter. It is shown that the difference between the waveform expected from a flat surface and the actual waveform observed returning from a nonflat sea surface can be analyzed to determine the magnitude of the significant waveheight. This technique employs a curve fitting procedure utilizing least squares estimation. The rationale for a smoothing technique is presented and the convergence characteristics of the smoothed estimate are discussed. Then, a statistically representative sampling of GEOS-3 data is selected for comparison with buoy measurements and the accuracy of the GEOS-3 significant waveheight estimates is deduced, through statistical analysis, to be 50 cm. The GEOS-3 significant waveheight estimates gathered during the entire mission of the spacecraft are assembled in the form of a global atlas of contour maps. Both high and low sea state contour maps are presented, and the data are displayed both by seasons and for the entire duration of the GEOS-3 mission. The contour maps are then compared with contour maps compiled by the U.S. Navy and significant differences are found. Dissert. Abstr.

N82-10661*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CHESAPEAKE BAY PLUME STUDY: SUPERFLUX 1980
Janet W. Campbell, ed. and James P. Thomas, ed. (National Marine Fisheries Service, Highland, N.J.) Oct. 1981 504 p refs Symp. held at Williamsburg, Va., 21-23 Jan. 1981; sponsored in part by National Marine Fisheries Service, NOAA, and Dept. of Commerce
(NASA-CP-2188; L-14680;
NOAA/NEMP-111-81-ABCDFG-0042) Avail: NTIS HC A22/MF A01 CSCL 08C

The results of the Chesapeake Bay plume study are reported. The role of remote sensing in monitoring and assessing the effects of pollution of marine resources is delineated. For individual titles, see N82-10662 through N82-10695.

N82-10662*# Virginia Inst. of Marine Science, Gloucester Point.
A BENCHMARK-MULTI-DISCIPLINARY STUDY OF THE INTERACTION BETWEEN THE CHESAPEAKE BAY AND ADJACENT WATERS OF THE VIRGINIAN SEA
William J. Hargis, Jr. *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 1-4 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

The social and economic importance of estuaries are discussed. Major focus is on the Chesapeake Bay and its interaction with the adjacent waters of the Virginia Sea. Associated multiple use development and management problems as well as their internal physical, geological, chemical, and biological complexities are described. R.C.T.

N82-10663*# National Marine Fisheries Service, Highlands, N.J. Div. of Environmental Assessment.
A MARINE ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM
John B. Pearce *In* NASA. Langley Research Center Cheasapeake Bay Plume Study Oct. 1981 p 15-28 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

The need for the use of modern, extremely sensitive techniques to aid in rapidly and synoptically assessing the relative health and production of coastal waters and estuaries is reported. Major emphasis is placed on establishing a solid foundation for the use of remote sensing in basic oceanographic studies and the management of human wastes. R.C.T.

N82-10664*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SUPERFLUX I, II, AND III EXPERIMENT DESIGN: REMOTE SENSING ASPECTS
Janet W. Campbell, Wayne E. Esaias, and Warren D. Hypes *In its* Chesapeake Bay Plume Study Oct. 1981 p 29-42 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

The Chesapeake Bay plume study called Superflux is described. The study was initiated to incorporate the disciplines of both resources management and remote sensing in accomplishing the following objectives: (1) process oriented research to understand the impact of estuarine outflows on continental shelf ecosystems; (2) monitoring and assessment to delineate the role of remote sensing in future monitoring and assessment programs; and (3) remote sensing research: to advance the state of the art in remote sensing systems as applied to sensing of the marine environment, thereby hastening the day when remote sensing can be used operationally for monitoring and assessment and for process oriented research. R.C.T.

N82-10665*# National Marine Fisheries Service, Highlands, N.J. Northeast Fisheries Center.
SUPERFLUX I, II, AND III EXPERIMENT DESIGNS: WATER SAMPLING AND ANALYSES
James P. Thomas *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 43-60 (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Both airborne remote sensors and seagoing research vessels were used to study the effects of man's continual use of the Chesapeake Bay offshore environments. The major focus of the study was to: (1) advance the development and transfer of improved remote sensing systems and techniques for monitoring environmental quality and effects on living marine resources; (2) increase understanding of the influence of estuarine outwellings (plumes) on contiguous shelf ecosystems; and (3) provide a synoptic, integrated and timely data base for application to problems of marine resources and environmental quality. R.C.T.

N82-10666*# Johns Hopkins Univ., Baltimore, Md.
CIRCULATION IN THE CHESAPEAKE BAY ENTRANCE REGION: ESTUARY-SHELF INTERACTION
W. C. Boicourt *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 61-78 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Current meters and temperature-salinity recorders confirm the assumption that the upper layers of the continental shelf waters off Chesapeake Bay can be banded in summer, such that the coastal boundary layer (consisting of the Bay outflow) and the outer shelf flow southward while the inner shelf flows to the north, driven by the prevailing southerly winds. These measurements show that the estuary itself may also be banded in its lower reaches such that the inflow is confined primarily to the deep channel, while the upper layer outflow is split into two flow maxima on either side of this channel. R.C.T.

N82-10667*# College of William and Mary, Gloucester Point, Va. Remote Sensing Center.
CHESAPEAKE BAY PLUME DYNAMICS FROM LANDSAT
John C. Munday, Jr. and Michael S. Fedosh *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 79-92 refs (For primary document see N82-10661 01-48) (Grant NA80FA-C-00051)
Avail: NTIS HC A22/MF A01 CSCL 08C

LANDSAT images with enhancement and density slicing show that the Chesapeake Bay plume usually frequents the Virginia coast south of the Bay mouth. Southwestern (compared to northern) winds spread the plume easterly over a large area. Ebb tide images (compared to flood tide images) show a more dispersed plume. Flooding waters produce high turbidity levels over the shallow northern portion of the Bay mouth. R.C.T.

N82-10668*# Research Triangle Inst., Research Triangle Park, N. C.
MONITORING THE CHESAPEAKE BAY USING SATELLITE DATA FOR SUPERFLUX III
Fred M. Vukovich and Bobby W. Crissman *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 93-110 (For primary document see N82-10661 01-48) (Grant NA81FA-C-00002)
Avail: NTIS HC A22/MF A01 CSCL 08C

The TIROS-N and NOAA-6, and GOES visible infrared satellite data were used to identify and locate surface oceanographic thermal fronts for the purpose of issuing daily and premission advisory briefings in support of the Superflux 3 in situ and remote sensing experiment in the Chesapeake Bay region. Satellite data were collected for the period 1 - 22 October 1980. A summary of that data is presented. R.C.T.

N82-10669*# Virginia Inst. of Marine Science, Gloucester Point.
TEMPORAL AND SPATIAL VARIATIONS OF THE CHESAPEAKE BAY PLUME
Evon P. Ruzecki *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 111-130 refs (For primary document see N82-10661 01-48)
(Grants NA80FE-A0015; NA31FA-C-0005)
Avail: NTIS HC A22/MF A01 CSCL 08C

Historical records and data obtained during the Superflux experiments are used to describe the temporal and spatial variations of the effluent waters of Chesapeake Bay. The alongshore extent of the plume resulting from variations of freshwater discharge into the Bay and the effects of wind are illustrated. Variations of the cross sectional configuration of the plume over portions of a tidal cycle and results of a rapid underway water sampling system are discussed. R.C.T.

N82-10670*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
REMOTE SENSING OF THE CHESAPEAKE BAY PLUME SALINITY VIA MICROWAVE RADIOMETRY
Bruche M. Kendall *In its* Chesapeake Bay Plume Study Oct. 1981 p 131-140 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

The NASA-Langley-developed L-Band microwave radiometer was used to remotely measure sea surface salinity during the Chesapeake Bay plume studies. Obtained measurements of microwave brightness temperatures of the sea surface were combined with measurements of sea surface temperature obtained with an infrared radiometer and inverted to produce corresponding values of sea surface salinity. Results from the plume measurements, which indicate the southward extent of the plume along the Virginia-North Carolina coast, are presented and discussed. Additional measurements obtained for the Delaware Bay Mouth flight, and the James River-Shelf flight are also discussed. R.C.T.

N82-10671*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
MAPPING WATERMASS BOUNDARIES USING FLUOROSENSING LIDAR
Charles C. Sarabun, Jr. *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 141-158 refs (For primary document see N82-10661 01-48)
(Contract N00024-81-C-5301)
Avail: NTIS HC A22/MF A01 CSCL 08C

An initial application of multispectral LIDAR data from the NASA airborne oceanographic lidar (AOL) to the mapping of watermass boundaries is presented. The approach uses the multispectral lidar data from the fluorosensing mode in a cluster analysis to define water types. Individual data points are classified as to parent water type(s) and then plotted in plan view to show the watermass boundaries and mixing regions. The methodology was applied to the AOL data from the SUPERFLUX overflights. The results are compared to salinity-mapping radar results from the same region. R.C.T.

N82-10672*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRELIMINARY ANALYSIS OF OCEAN COLOR SCANNER DATA FROM SUPERFLUX III
Craig W. Ohlhorst *In its* Chesapeake Bay Plume Study Oct. 1981 p 159-174 (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

The ocean color scanner collected data Superflux III Experiment Single channel gray scale data products generated 5 minutes after the scanner data were collected showed details of the Chesapeake Plume structure, suggesting that this quick-look capability could have potential use to experimenters in real time. The Chesapeake Bay Plume extended offshore between 5 and 7 nautical miles on two occasions. The scanner data also show many other water features within the lower bay itself. R.C.T.

N82-10673*# Old Dominion Univ., Norfolk, Va.
LAGRANGIAN CIRCULATION STUDY NEAR CAPE HENRY, VIRGINIA
Ronald E. Johnson *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 175-198 (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

A study of the circulation near Cape Henry, Virginia, was made using surface and seabed drifters and radar tracked surface buoys coupled to subsurface drag plates. Drifter releases were conducted on a line normal to the beach just south of Cape Henry. Surface drifter recoveries were few; wind effects were strongly noted. Seabed drifter recoveries all exhibited onshore motion into Chesapeake Bay. Strong winds also affected seabed recoveries, tending to move them farther before recovery. Buoy trajectories in the vicinity of Cape Henry appeared to be of an irrotational nature, showing a clockwise rotary tide motion. Nearest the cape, the buoy motion elongated to almost parallel depth contours around the cape. Buoy motion under the action of strong winds showed that currents to at least the depth of the drag plates substantially are altered from those of low wind conditions near the Bay mouth. Only partial evidence could be found to support the presence of a clockwise nontidal eddy at Virginia Beach, south of Cape Henry. R.C.T.

N82-10674*# Old Dominion Univ., Norfolk, Va.
SUSPENDED PARTICULATE MATTER IN THE CHESAPEAKE BAY ENTRANCE AND ADJACENT SHELF WATERS
Kathryn J. Gingerich and George F. Oertel *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 199-222 ref (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Approximately 400 samples were collected from the mouth of the Chesapeake Bay for various analyses, including 138 for suspended solids. Characteristics of suspended solids that were analyzed included: total suspended matter; total suspended inorganics, total suspended organics; percent organics; particle size distribution; and presence or absence of 11 of the most prominent particle types. R.C.T.

N82-10675*# Old Dominion Univ., Norfolk, Va.
PARTICLE SIZE DISTRIBUTION OF SUSPENDED SOLIDS IN THE CHESAPEAKE BAY ENTRANCE AND ADJACENT SHELF WATERS
Mark R. Byrnes and George F. Oertel *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 223-236 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Characteristics of suspended solids, including total suspended matter, total suspended inorganics, total suspended organics, particle size distribution, and the presence of the ten most prominent particle types were determined. Four research vessels simultaneously collected samples along four transects. Samples were collected within a 2-hour period that coincided with the maximum ebb penetration of Chesapeake Bay outwelling. The distribution of primary and secondary particle size modes indicate the presence of a surface or near-surface plume, possibly associated with three sources: (1) runoff, (2) resuspension of material within the Bay, and/or (3) resuspension of material in the area of shoals at the Bay mouth. Additional supportive evidence for this conclusion is illustrated with ocean color scanner data. M.G.

N82-10676*# Old Dominion Univ., Norfolk, Va.
CONCENTRATION OF HYDROCARBONS ASSOCIATED WITH PARTICLES IN THE SHELF WATERS ADJACENT TO THE ENTRANCE OF CHESAPEAKE BAY
Terry L. Wade and George F. Oertel *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 237-242 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Particulate hydrocarbon concentrations were measured in 94 water samples. The concentrations ranged from below the detection limit (> 0.7 micro-G/L) to 32 micro-g/l. The mean for all samples was 5.6 micro-g/l. Particulate hydrocarbon concentrations are higher in the Bay mouth and lower in the shelf waters adjacent to the entrance of Chesapeake Bay. No coherent particulate hydrocarbon distribution is seen with depth in the water column. The Bay is postulated as one of the possible chronic sources of particulate hydrocarbons for the adjacent shelf waters. M.G.

N82-10677*# Old Dominion Univ., Norfolk, Va.

COPROSTANOL AS A POTENTIAL TRACER OF PARTICULATE SEWAGE EFFLUENT TO SHELF WATERS ADJACENT TO THE CHESAPEAKE BAY

Robert C. Brown and Terry L. Wade *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 243-250 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Samples were collected in the Chesapeake Bay entrance and contiguous shelf waters and were subsequently analyzed for particulate coprostanol and cholesterol concentrations. Surface coprostanol concentrations were fairly uniform, with a slight increase with depth. This increase with depth may be due to sewage-associated particulates settling as they leave the Bay, or the resuspension of contaminated sediment. Preliminary findings indicate sewage-associated materials are being transported from the Chesapeake Bay to shelf waters, where they may have a detrimental affect on living marine resources. Author

N82-10678*# Old Dominion Univ., Norfolk, Va.

CHARACTERISTICS OF TOTAL SUSPENDED MATTER AND ASSOCIATED HYDROCARBON CONCENTRATION ADJACENT TO THE CHESAPEAKE BAY ENTRANCE

George F. Oertel and Terry L. Wade *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 251-280 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Methodologies used to determine concentrations of hydrocarbons and associated suspended particulates at stations in and adjacent to the entrance to the Chesapeake Bay are described and the results are presented. Passive and active remote sensing data were acquired in conjunction with sea truth data collection. M.G.

N82-10679*# Old Dominion Univ., Norfolk, Va. Dept. of Oceanography.

NUTRIENTS IN WATERS ON THE INNER SHELF BETWEEN CAPE CHARLES AND CAPE HATTERAS

George T. F. Wong and James F. Todd *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 251-282 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

The distribution of nutrients in the shelf waters of the southern tip of the Middle Atlantic Bight was investigated. It is concluded that the outflow of freshwater from the Chesapeake Bay is a potential source of nutrients to the adjacent shelf waters. However, a quantitative estimation of its importance cannot yet be made because (1) there are other sources of nutrients to the study area and these sources cannot yet be quantified and (2) the concentrations of nutrients in the outflow from Chesapeake Bay exhibit significant short-term and long-term temporal variabilities. M.G.

N82-10680*# Delaware Univ., Newark. College of Marine Studies.

REMOTE SENSING OF OPTICALLY SHALLOW, VERTICALLY INHOMOGENEOUS WATERS: A MATHEMATICAL MODEL

W. D. Philpot and S. G. Ackleson *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 283-300 refs (For primary document see N82-10661 01-48)
(Contract NOAA-NA80-AA-D-00106)
Avail: NTIS HC A22/MF A01 CSCL 08C

A multiple-layer radiative transfer model of a vertically inhomogeneous, optically shallow water mass is briefly described. This model is directed toward use in remote sensing properties. Some preliminary results and qualitative predictions are presented. Author

N82-10681*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

REAL-TIME TEST OF MOCS ALGORITHM DURING SUPERFLUX 1980

Gary W. Grew *In its* Chesapeake Bay Plume Study Oct. 1981 p 301-322 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

A remote sensing experiment was conducted in which success depended upon the real-time use of an algorithm, generated from MOCS (multichannel ocean color sensor) data onboard the NASA P-3 aircraft, to direct the NOAA ship Kelez to oceanic stations where vitally needed sea truth could be collected. Remote data sets collected on two consecutive days of the mission were consistent with the sea truth for low concentrations of chlorophyll a. Two oceanic regions of special interest were located. The algorithm and the collected data are described. M.G.

N82-10682*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ANALYSIS OF TESTBED AIRBORNE MULTISPECTRAL SCANNER DATA FROM SUPERFLUX II

David E. Bowker, Charles A. Hardesty, Daniel J. Jobson, and Gilbert S. Bahn (Kentron International, Inc.) *In its* Chesapeake Bay Plume Study Oct. 1981 p 323-338 (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

A test bed aircraft multispectral scanner (TBAMS) was flown during the James Shelf, Plume Scan, and Chesapeake Bay missions as part of the Superflux 2 experiment. Excellent correlations were obtained between water sample measurements of chlorophyll and sediment and TBAMS radiance data. The three-band algorithms used were insensitive to aircraft altitude and varying atmospheric conditions. This was particularly fortunate due to the hazy conditions during most of the experiments. A contour map of sediment, and also chlorophyll, was derived for the Chesapeake Bay plume along the southern Virginia-Carolina coastline. A sediment maximum occurs about 5 nautical miles off the Virginia Beach coast with a chlorophyll maximum slightly shoreward of this. During the James Shelf mission, a thermal anomaly (or front) was encountered about 50 miles from the coast. There was a minor variation in chlorophyll and sediment across the boundary. During the Chesapeake Bay mission, the Sun elevation increased from 50 degrees to over 70 degrees, interfering with the generation of data products. M.G.

N82-10683*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

LASER REMOTE SENSING OF MARINE SEDIMENT LOAD AND ALGAL PIGMENTS: LABORATORY EXPERIMENTS

R. J. Exton and W. M. Houghton *In its* Chesapeake Bay Plume Study Oct. 1981 p 339-348 (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

The fluorescence emission spectra for estuarine water samples excited by an argon laser at 514.5 nm were analyzed. The features of interest were: (1) scattering at the laser wavelength by particulates (Mie); (2) fluorescence from the pigments chlorophyl a and phycoerythrin; (3) Raman scattering by water; and (4) fluorescence by dissolved organic matter. It is shown that these intensities increase with the concentration of the corresponding material and decrease with attenuation. Since the concentration of water is constant the Raman intensity provides a direct measure of attenuation. M.G.

N82-10684*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

APPLICATION OF THE NASA AIRBORNE OCEANOGRAPHIC LIDAR TO THE MAPPING OF CHLOROPHYLL AND OTHER ORGANIC PIGMENTS

F. E. Hoge and R. N. Swift (EG&G Washington Analytical Services Center, Inc.) *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 349-374 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Laser fluorosensing techniques used for the airborne measurement of chlorophyll a and other naturally occurring waterborne pigments are reviewed. Previous experiments demonstrating the utility of the airborne oceanographic lidar (AOL) for assessment of various marine parameters are briefly discussed. The configuration of the AOL during the NOAA/NASA Superflux experiments is described. The participation of the AOL in these experiments is presented and the preliminary results are discussed. The importance of multispectral receiving capability in a laser fluorosensing system for providing reproducible measurements over wide areas having spatial variations in water column transmittance properties is addressed. This capability minimizes the number of truthing points required and is usable even in shallow estuarine areas where resuspension of bottom sediment is common. Finally, problems encountered on the Superflux missions and the resulting limitations on the AOL data sets are addressed and feasible solutions to these problems are provided. M.G.

N82-10685*# National Marine Fisheries Service, Highlands, N.J.

TOTAL PLANKTON RESPIRATION IN THE CHESAPEAKE BAY PLUME

Craig N. Robertson and James P. Thomas *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 375-390 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Total plankton respiration (TPR) was measured at 17 stations within the Chesapeake Bay plume off the Virginia coast during March, June, and October 1980. Elevated rates of TPR, as well as higher concentrations of chlorophyll a and phaeopigment a, were found to be associated with the Bay plume during each survey. The TPR rates within the Bay plume were close to those found associated with the Hudson River plume for comparable times of the year. The data examined indicate that the Chesapeake Bay plume stimulates biological activity and is a source of organic loading to the contiguous shelf ecosystem. M.G.

N82-10686*# College of William and Mary, Williamsburg, Va. Dept. of Microbiology-Pathology.

BACTERIAL BIOMASS AND HETEROTROPHIC POTENTIAL IN THE WATERS OF THE CHESAPEAKE BAY PLUME AND CONTIGUOUS CONTINENTAL SHELF

Howard I. Kator and Paul L. Zubkoff *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 391-404 refs (For primary document see N82-10661 01-48)
(Contract NOAA-NA80-FA-C-00035)
Avail: NTIS HC A22/MF A01 CSCL 08C

Seasonal baseline data on bacterial biomass and heterotrophic uptake in the Chesapeake Bay plume and contiguous Atlantic Ocean shelf waters are discussed. Viable count bacterial numbers in surface water samples collected during June 1980 ranged from a maximum of 190,000 MPN (most probable number)/ml at the Bay mouth to a minimum of 7900 MPN/ml offshore. Similarly, direct count densities ranged from 1,800,000 BU (bacterial units)/ml to 24,000 BU/ml. Heterotrophic potential (V max) was largest at the Bay mouth and lowest offshore. Biomass and V max values usually decreased with depth although subsurface maxima were occasionally observed at inshore stations. Correlation of biomass and heterotrophic potential data with selected hydrographic variables was determind with a nonparametric statistic. Results indicate viable counts are positively and significantly correlated with total chlorophyll, temperature, direct count and V max during June 1980; significant negative correlations are obtained with salinity and depth. Calculations of bacterial standing crop are discussed. M.G.

N82-10687*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ANALYSIS OF ALOPE DATA FROM SUPERFLUX

Olin Jarrett, Jr., Wayne E. Esaias, Clarence A. Brown, Jr., and E. Brian Pritchard *In its* Chesapeake Bay Plume Study Oct. 1981 p 405-416 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01

Remote sensing data collected with the airborne lidar oceanographic probing experiment (ALOPE) laser fluorosensor during the Superflux 1 and Superflux 2 experiments were analyzed using two techniques. A qualitative technique which requires no supplementary data provided a near-real-time estimate of relative abundance of the golden-brown and green phytoplankton color groups. Contour plots developed for the later mission are used to demonstrate the utility of this technique. A quantitative technique which requires supplementary data to define the attenuation coefficient provides chlorophyll a concentration by color group. The sum of the golden-brown and green chlorophyll a data yields total chlorophyll a values which may be compared with in situ data. As expected, the golden-brown population was dominant in the Chesapeake Bay and the Bay plume whereas the green population was dominant in shelf waters. M.G.

N82-10688*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AN ALGORITHM FOR COMPUTING CHLOROPHYLL-A CONCENTRATIONS USING A DUAL-FREQUENCY FLUOROSENSOR

Janet W. Campbell *In its* Chesapeake Bay Plume Study Oct. 1981 p 417-428 (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

An algorithm to be used on data from a dual-frequency fluorosensor (i.e. one using two wavelengths for excitation of chlorophyll-a fluorescence) to compute total chlorophyll-a concentration and to partition that chlorophyll between two color groups present in a mixed phytoplankton population is described. The algorithm is based on laboratory and field-testing experience gained with the airborne lidar oceanographic probing experiment fluorosensor. M.G.

N82-10689*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

INTERPRETATION OF AN INDEX OF PHYTOPLANKTON POPULATION COMPOSITION CALCULATED FROM REMOTE AIRBORNE FLUORSENSOR (RAF) DATA

Franklin H. Farmer *In its* Chesapeake Bay Plume Study Oct. 1981 p 429-438 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

The calculation of indices of phytoplankton population composition from chlorophyll a fluorescence at 685 nm excited by narrow band light at 454 and 539 nm is discussed. The ratio of the fluorescence excited by light of these two wavelengths is a function of the distribution of the phytoplankton between two color groups, designated the golden-brown and the green. The golden-brown group consists of those species which have the highly photosynthetically active carotenoid-chlorophyll-a-protein complexes, i.e. members of the classes Bacillariophyceae, diatoms Dinophyceae, dinoflagellates, and some members of the class Prymnesiophyceae. The green color group consists those species of phytoplankton which apparently lack those complexes, i.e. members of the classes Chlorophyceae, Euglenophyceae, Prasinophyceae, Eustigmatophyceae, Xanthophyceae, and a few members of the Prymnesiophyceae. A few species of phytoplankton appear to have intermediate characteristics, and would apparently belong to neither group. Most of these species are members of the class Cryptophyceae. The composition index for this class is examined in detail. M.G.

N82-10690*# Old Dominion Univ., Norfolk, Va. Dept. of Biological Sciences.

PHYTOPLANKTON ASSEMBLAGES WITHIN THE CHESAPEAKE BAY PLUME AND ADJACENT WATERS OF THE CONTINENTAL SHELF

Harold G. Marshall *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 439-468 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

The Chesapeake Bay plume was identified and plotted in relation to the presence and high concentrations of phytoplankton assemblages. Seasonal differences occurred within the plume during the collection period, with Skeletonema costatum and an ultraplankton component the dominant forms. Patchiness was found along the transects, with variations in composition and concentrations common on consecutive day sampling within the plume in its movement along the shelf. The presence of 236 species is noted, with their presence indicated for plume and shelf stations during the March, June, and October 1980 collections. Author

N82-10691*# Old Dominion Univ., Norfolk, Va. Dept. of Biological Sciences.

USE OF ORDINATION AND CLASSIFICATION PROCEDURES TO EVALUATE PHYTOPLANKTON COMMUNITIES DURING SUPERFLUX II

Charles K. Rutledge and Harold G. Marshall *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 469-490 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Cluster analysis and an ordination procedure were performed on two data matrices to investigate real and environmental spatial relationships. Multiple regression analysis was used to relate the measured environmental variables to the phytoplankton community changes. Qualitative type phytoplankton data proved to be less structured in both of these spaces, relative to the biomass data. The salinity gradients of the northern transects covaried significantly with the phytoplankton association changes. In the southern transects the light variable was most important in explaining the variance in the ordination axes. These data suggest the close relationships between phytoplankton community changes and the physical hydrology of the area. M.G.

N82-10692*# Old Dominion Univ., Norfolk, Va. Dept. of Biological Sciences.

SUPERFLUX CHLOROPHYLL-A ANALYSIS: AN ASSESSMENT OF VARIABILITY IN RESULTS INTRODUCED PRIOR TO FLUOROMETRIC ANALYSIS

S. J. Cibik, Charles K. Rutledge, and C. N. Robertson (National Marine Fisheries Service, Highlands, N.J.) *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 491-494 ref (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Several experiments were undertaken to identify variability in results that came from procedural differences in the processing of chlorophyll samples prior to fluorometric analysis. T-tests on group means indicated that significant differences (alpha = 0.05) in phaeopigment a concentrations did result in samples not initially screened, but not in the chlorophyll a concentrations. Highly significant differences (alpha = 0.001) in group means were found in samples which were held in acetone after filtering as compared to unfiltered seawater samples held for the same period. No difference in results was found between the 24-hour extraction and samples which were processed immediately. M.G.

N82-10693*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ASSESSMENT OF SUPERFLUX RELATIVE TO MARINE SCIENCE AND OCEANOGRAPHY

Wayne E. Esaias *In its* Chesapeake Bay Plume Study Oct. 1981 p 495-500 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

A general assessment of the Superflux project is made in relation to marine science and oceanography. It is commented that the program clearly demonstrated the effectiveness of state-of-the-art technology required to study highly dynamic estuarine plumes, and the necessity of a broadly interdisciplinary, interactive remote sensing and shipboard program required to significantly advance the understanding of transport processes and impacts of estuarine outflows. M.G.

N82-10694*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ASSESSMENT OF SUPERFLUX RELATIVE TO REMOTE SENSING

Janet W. Campbell *In its* Chesapeake Bay Plume Study Oct. 1981 p 501-502 (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

The state-of-the-art advancements in remote sensor technology due to the Superflux program are examined. Three major individual sensor technologies benefitted from the program: laser fluorosensors, optical-range scanners, and passive microwave sensors. Under Superflux, convincing evidence was obtained that the airborne oceanographic lidar fluorosensor can map chlorophyll, i.e., is linear, over a wide range from less than 0.5 to 5.0 mg/cu m. The lidar oceanographic probe dual-excitation concept for addressing phytoplankton color group composition was also demonstrated convincingly. Algorithm development, real time capabilities, and multisensor integration are also addressed. M.G.

N82-10695*# National Marine Fisheries Service, Highlands, N.J.

ASSESSMENT OF SUPERFLUX RELATIVE TO FISHERIES RESEARCH AND MONITORING

James P. Thomas *In* NASA. Langley Research Center Chesapeake Bay Plume Study Oct. 1981 p 503-515 refs (For primary document see N82-10661 01-48)
Avail: NTIS HC A22/MF A01 CSCL 08C

Some of the findings of the Superflux program relative to fishery research and monitoring are reviewed. The actual and potential influences of the plume on the shelf ecosystem contiguous to the mouth of Chesapeake Bay are described and insights derived from the combined use of in situ and remotely sensed data are presented. M.G.

N82-10696# Naval Postgraduate School, Monterey, Calif. Dept. of Oceanography.

SEA LEVEL VARIATIONS IN GULF OF THAILAND

M.S. Thesis

Vichai Punpuk Mar. 1981 150 p refs
(AD-A103004) Avail: NTIS HC A07/MF A01 CSCL 08/3

From a study of low-pass filtered hourly sea levels for Sattahip and Ko-Lak in the northern Gulf of Thailand during the period 1960 through 1966, the sea level variations due to meteorological effects are found. The mean annual variation of the filtered sea level, which averages 0.5 meters, is consistent with the climatological mean annual wind variations. This sea level change appears to be a response to the Ekman transport which would be expected from the seasonal monsoon wind regimes. Sea level response to atmospheric pressure is negligible compared with response to wind. Analyses performed to find relations between the filtered sea level and the gulf-wide geostrophic wind and local surface wind show that the sea level slopes upward across the gulf in the same direction as the local wind blows, the response being coherent in the frequency band 0.083-0.117 cycles per day (period 8 to 12 days). This wind set-up effect is clearly secondary to the Ekman transport in inducing the seasonal sea level variations observed in the gulf. GRA

N82-10697# Naval Oceanographic Office, Bay St. Louis, Miss.

ICAPS OCEANOGRAPHIC DATA FOR THE PACIFIC OCEAN

Final Report

Dec. 1980 174 p
(AD-A103439; NOO-RP-32B) Avail: NTIS HC A08/MF A01 CSCL 08/10

The Integrated Command ASW Prediction System (ICAPS) oceanographic data files for the Pacific Ocean are presented. These graphic displays provide an illustration of the historical data stored within the ICAPS data base. Depth, temperature, and salinity values are shown on a split-depth scale providing a detailed depiction of the near-surface structure and a less detailed picture of the slowly varying deeper structure. The corresponding oceanographic data for the Atlantic Ocean and Mediterranean Sea and Indian Ocean are presented in companion publications. Author (GRA)

N82-10698# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Environmental Simulation Branch.

A SUMMARY OF PAPERS RELATED TO MESOSCALE AND LARGE-SCALE OCEAN MODELING, VOLUME 1

Harley E. Hurlburt Jun. 1981 93 p refs
(AD-A103540; NORDA-TN-109-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 08/10

This technical note contains summaries of the important ideas and results from 13 papers related to mesoscale and large scale ocean modeling. Most of the papers represent major contributions to our understanding of the dynamics and energetics of mesoscale eddies and their interaction with ocean currents and with each other. Understanding the nature of flow instabilities associated with the generation and evolution of the eddies is an important aspect of the problem which receives much attention in these papers. Most of the numerical simulations utilized simple two-layer, eddy-resolving, quasi-geostrophic models; a small number used primitive equation models. Author (GRA)

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-10699*# BioTechnology, Inc., Falls Church, Va.
USSR SPACE LIFE SCIENCES DIGEST, VOLUME 1, NO. 3 Quarterly Review
Patricia M. Wallace Sep. 1980 41 p refs
(Contract NASw-3223)
(NASA-CR-164780) Avail: NTIS HC A03/MF A01 CSCL 06D

An overview of the developments and direction of the USSR Space Life Sciences Program is given. Highlights of launches, program development, and mission planning are given. Results of ground-based research and space flight studies are summarized. Topics covered include: space medicine and physiology; space biology; and life sciences technology. J.M.S.

N82-10700*# BioTechnology, Inc., Falls Church, Va.
USSR SPACE LIFE SCIENCES DIGEST, VOLUME 1, NO. 4 Quarterly Review
Lyn D. Paulson Dec. 1980 65 p refs
(Contract NASw-3223)
(NASA-CR-164781) Avail: NTIS HC A04/MF A01 CSCL 06D

An overview of the developments and direction of the USSR Space Life Sciences Program is given. Highlights of launches, program development, and mission planning are given. Results of ground-based research and space flight studies are summarized. Topics covered include: space medicine and physiology; space biology, and life sciences and technology. J.M.S.

N82-10701*# BioTechnology, Inc., Falls Church, Va.
USSR SPACE LIFE SCIENCES DIGEST, VOLUME 2, NO.1 Quarterly Review
Lyn D. Paulson Mar. 1981 50 p refs
(Contract NASw-3223)
(NASA-CR-164782) Avail: NTIS HC A03/MF A01 CSCL 06D

An overview of the developments and direction of the USSR Space Life Sciences Program is given. Highlights of launches, program development, and mission planning are given. Results of ground-based research and space flight studies are summarized. Topics covered include: space medicine and physiology; space biology; and life sciences technology. J.M.S.

N82-10702*# BioTechnology, Inc., Falls Church, Va.
USSR SPACE LIFE SCIENCES DIGEST, VOLUME 2, NO. 2 Quarterly Review
Lyn D. Paulson Jun. 1981 48 p refs
(Contract NASw-3223)
(NASA-CR-164783) Avail: NTIS HC A03/MF A01 CSCL 06D

An overview of the developments and direction of the USSR Space Life Sciences Program is given. Highlights of launches, program development, and mission planning are given. Results of ground-based research and space flight studies are summarized. Topics covered include: space medicine and physiology; space biology; and life sciences and technology. J.M.S.

N82-10703# Woods Hole Oceanographic Institution, Mass. Dept. of Chemistry.
THE TRACE ELEMENT GEOCHEMISTRY OF MARINE BIOGENIC PARTICULATE MATTER Ph.D. Thesis
Robert William Collier Feb. 1981 304 p refs
(Contract N00014-80-C-0273; Grant NSF DES-75-03826)
(AD-A095300; WHOI-81-10) Avail: NTIS HC A14/MF A01 CSCL 08/1

Plankton samples were investigated for physical and chemical leaching decomposition to identify the major and trace element composition of particulate carrier phases. The identification of trace element/major element ratios in the biogenic materials was emphasized. The majority of the trace elements in the samples were directly associated with the nonskeletal organic phases of the plankton. Calcium carbonate and opal were not significant carriers for any of the trace elements studied. A refractory phase containing Al and Fe in terrigenous ratios was present in all samples, even from the more remote marine locations. E.A.K.

N82-10704# Columbia Univ., New York. Radiological Research Lab.
RADIATION PHYSICS, BIOPHYSICS AND RADIATION BIOLOGY Progress Report, 1 Oct. 1980 - 30 Sep. 1981
Jul. 1981 302 p refs
(Contracts DE-AC02-78EV-04733; EP-78-S-02-4733)
(DE81-025259; DOE/EV-04733/T1; COO-4733-4) Avail: NTIS HC A14/MF A01

Separate abstracts were prepared for the 29 papers in this progress report which deal with radiobiological physics, the biological effects of ionizing radiations, and the modification of these effects by chemical and pharmacological agents. DOE

N82-10705# Roscoe B. Jackson Memorial Lab., Bar Harbor, Maine.
INBORN ANEMIAS IN MICE Progress Report, 1 Aug. 1980 - 1 Jun. 1981
Seldon E. Bernstein, Jane E. Barker, and Elizabeth S. Russell Jun. 1981 36 p
(Contract DE-AC02-76EV-03264)
(DE81-029128; DOE/EV-03264/20) Avail: NTIS HC A03/MF A01

Four macrocytic anemias, five hemolytic anemias, nonhemolytic microcytic anemia, transitory siderocytic anemia, sex-linked iron-transport anemia, and a target-cell anemia were studied. Each of these blood dyscrasias is caused by the action of a unique mutant gene, which determines the structure of different intracellular molecules, and thus controls a different metabolic process. Each anemia was studied through: characterization of peripheral blood values, determinations of radiosensitivity under a variety of conditions, measurements of iron metabolism and heme synthesis, histological and biochemical study of blood-forming tissue, functional tests of the stem cell component, examination of responses to erythroid stimuli, and transplantation of tissue between individuals of differently affected genotypes. DOE

N82-10706# Argonne National Lab., Ill. Chemistry Div.
MODEL SYSTEMS IN PHOTOSYNTHESIS RESEARCH
Joseph J. Katz and J. C. Hindman 1980 12 p refs Presented at the 5th Intern. Photosyn. Congr., Halkidiki, Greece, 7-13 Sep. 1980 Submitted for publication
(Contract W-31-109-eng-38)
(DE81-023889; CONF-800963-7) Avail: NTIS HC A02/MF A01

Recently developed models in photosynthesis are described. The Mg-tris(pyrochlorophyllide)1,1,1-tris(hydroxymethyl) ethane triester in its folded configuration is a rudimentary antenna photoreaction center model. Self assembled chlorophyll systems that contain a mixture of monomeric, oligomeric and special pair chlorophyll are shown to have fluorescence emission characteristics. It is suggested that energy transfer between different chlorophyll species in these systems is more complex than previously suspected. DOE

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-10707 Tulane Univ., New Orleans, La.
A HOMEOMORPHIC FINITE ELEMENT MODEL OF IMPACT HEAD INJURY Ph.D. Thesis
Ronald Richard Hosey 1981 235 p
Avail: Univ. Microfilms Order No. 8118368

A finite element model of the human head and neck, as a system, is presented which incorporates the brain and skull models of previous investigators and a model of the cervical spine into a single model. The exact geometry of the cerebrospinal fluid (CSF) space is included, and morphological continuity of the CSF space and brain material in the region of the head/spine connection is maintained in order that the proper flow of material between the head and spinal cavity may take place during a

simulated head impact or whiplash. The 3-dimensional geometry of the brain, spinal cord, CSF space, cervical vertebrae, and the intervertebral disks is defined by means of eight-node, isoparametric brick elements.
Dissert. Abstr.

N82-10708 Loyola Univ., Chicago, Ill.
THE ROLE OF SKIN TEMPERATURE IN THE CONTROL OF SWEATING IN MAN Ph.D. Thesis
Thomas Vincent McCaffrey 1981 126 p
Avail: Univ. Microfilms Order No. 8119982

The role of cutaneous thermal receptors in the control of thermoregulatory sweating in men and particularly the specialized role of the head skin temperature in thermoregulatory sweating was investigated. It is suggested that tympanic membrane temperature, and oral temperature, may be affected by thermal exchange occurring between the arteries and veins in the cervical and cephalic regions. Sweating rate increases when head skin temperature increases and when the tympanic membrane and oral temperatures begin to rise. When head skin temperature decreases tympanic membrane and oral temperatures decreases and sweating rate followed the changes in skin temperature as well as the changes in tympanic membrane and oral temperatures. It is shown that head skin temperature is important in determining thermal comfort and sweating rate when compared to other body regions. It is suggested that this sensitivity is in part due to a thermal counter-current exchange between venous blood draining the head and arterial blood ascending to intracranial thermal receptors.
Dissert. Abstr.

N82-10709* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY (SUPPLEMENT 223)
Sep. 1981 42 p
(NASA-SP-7011(223)) Avail: NTIS HC A03 CSCL 06E

This bibliography lists 92 reports, articles, and other documents introduced into the NASA scientific and technical information system in August 1981.
Author

N82-10710# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
A COMPUTATIONAL THEORY OF VISUAL SURFACE INTERPOLATION
W. E. L. Grimson Jun. 1981 77 p refs
(Contract N00014-80-C-0505; Grant NSF MCS-77-07569)
(AD-A103921; AI-M-613) Avail: NTIS HC A05/MF A01 CSCL 06/4

A computational theory of the interpolation of surfaces from visual information is presented. However, the surface must agree with the information from stereo or motion correspondence, and not vary radically between these points. Using the image irradiance equation, an explicit form of this surface consistency constraints is derived and a functional from the space of functions to the real numbers is required. Conditions on the form of the functional are derived. It is concluded that if the functional is a complete seminorm which satisfies the parallelogram law, or the space function is a semi-Hilbert space and the functional is a semiinner product, then there is a unique surface which is most consistent with the visual information.
E.A.K.

N82-10711# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
COLOR VISION AND IMAGE INTENSITIES: WHEN ARE CHANGES MATERIAL?
John M. Rubin and W. A. Richards May 1981 34 p refs
(Contract N00014-80-C-0505; Grant NSF MCS-79-23110)
(AD-A103926; AI-M-631) Avail: NTIS HC A03/MF A01 CSCL 05/1

A preliminary goal for color vision to determine where changes of material occur in a scene, using only spectral information was analyzed. It is posted that the effects of many processes are confounded with the effects of material changes in the available image intensities and material changes are essentially arbitrary. A unique condition, the spectral crosspoint, allows rejection of hypothesis that measured image intensities arise from one of the confounding processes. Image intensities are measured from regions on opposite sides of an edge. The biological visual system interprets spectral crosspoints across edges as material changes. A circularly symmetric operator is designed to detect crosspoints which resemble the double opponent cell which is commonplace in biological color vision systems.
E.A.K.

N82-10712# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
EVIDENCE RELATING SUBJECTIVE CONTOURS AND INTERPRETATIONS INVOLVING OCCLUSION
Kent A. Stevens Jun. 1981 14 p refs
(Contract N00014-80-C-0505; Grant NSF MCS-79-23110)
(AD-A103925; AI-M-637) Avail: NTIS HC A02/MF A01 CSCL 06/16

Subjective contours, according to one theory, outline surfaces that are apparently interposed between the viewer and background (because of the disruption of background figures, sudden termination of lines, and other occlusion 'cues') but are not explicitly outlined by intensity discontinuities. This theory predicts that if occlusion cues are not interpreted as evidence of occlusion, no intervening surface need be postulated, hence no subjective contours would be seen. This prediction, however, is difficult to test because observers normally interpret the cues as occlusion evidence and normally see the subjective contours. This article describes a patient with visual agnosia who is both unable to make the usual occlusion interpretations and is unable to see subjective contours. He has, however, normal ability to interpret standard visual illusions, stereograms, and in particular, stereogram versions of the standard subjective contour figures, which elicit to him strong subjective edges in depth (corresponding to the subjective contours viewed in the monocular versions of the figures).
Author (GRA)

N82-10713# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
EQUATION COUNTING AND THE INTERPRETATION OF SENSORY DATA
W. A. Richards, J. M. Rubin, and D. D. Hoffman 6 Jun. 1981 27 p refs
(Contract N00014-80-C-0505; Grant NSF MCS-79-23110)
(AD-A103924; AI-M-614) Avail: NTIS HC A03/MF A01 CSCL 06/16

Many problems in biological information processing require the solution to a complex system of equations in many unknown variables. An equation-counting procedure is described for determining whether such a system of equations will indeed have a unique solution, and under what conditions the solution should be interpreted as correct. Three examples of the procedure are given for illustration, one for auditory signal processing and two from vision.
Author (GRA)

N82-10714# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 5.
A HUMAN BEING IN THE SEA. PART 2: DEVELOPMENT TRENDS IN SUBMARINE TECHNOLOGY [MAANNISKAN I HAVET 2. UTVECKLINGSTENDENSER INOM UNDERVATTENSOMRAADET]
Bo Cassel Sep. 1980 37 p In SWEDISH
(FOA-C-58008-H3-Pt-2) Avail: NTIS HC A03/MF A01

Methods and techniques are reviewed for diving applicances including: diving suits for divers exposed to pressure; selfcontained diving apparatus; rigid diving apparatus and diving bells; rescue techniques, especially for long term stays in case of emergency; submarines with crew or without crew; tools; and technical development of the resources of the sea bottom. Description of easily transportable deep underwater diving apparatuses in standard containers is given. Methods to evacuate divers under pressure to pressure-chambers on land are discussed.
Author (ESA)

N82-10715# Research Inst. of National Defence, Umea (Sweden). Huvudavdelning 4.
CADMIUM ANALYSIS IN VIVO [KADMIUM-ANALYS IN VIVO]
Ronny Bergman Dec 1980 25 p refs In SWEDISH
(FOA-C-40126-W4(C3)) Avail: NTIS HC A02/MF A01

A method for quick selective analysis of the cadmium content in organs like kidneys and the liver with the use of neutron activation was developed. The method is based on the measurement of prompt gamma radiation emitted by the neutron absorption in the Cd 113 isotope. The sensitivity of the analysis is high. With neutrons in the intermediate energy interval, 1 to 100 KeV, organs at different distances in the body are selectively analyzed. The amount of cadmium in the kidneys of normal people are analyzed with sufficient accuracy so that the dose in the most exposed tissues does not exceed 40 mrad, of which more than half are from gamma rays. With cadmium amounts higher than the normal in the kidney tissues, the doses decrease proportionnaly. Author (ESA)

N82-10716# Medical Physics Inst. Utrecht (Netherlands).
[MEDICAL RESEARCH ACTIVITIES IN THE NETHERLANDS] Progress Report
B. vanEijnsbergen, ed. and F. H. LopesdaSilva, ed. Dec. 1980 154 p refs
(TNO-MFI-PR-7) Avail: NTIS HC A08/MF A01

Several aspects of medical physics are reported. Topics include: the brain (work on epileptiform transients; recording of responses via implanted electrodes; EEG monitoring during open heart surgery; and models related to the generation of propagated alpha rythmic activity); and the heart and lungs (computerized and microcomputerized) monitoring of parameters. Author (ESA)

N82-10717# Department of Agriculture, Washington, D.C. National Economics Div.
ENERGY EXPENDITURE AND DIETARY CHANGE
Larry G. Traub and Thomas A. Stucker May 1981 27 p refs
(PB81-218471; AGESS-810512) Avail: NTIS HC A03/MF A01 CSCL 10A

Comparative expenditures for food and costs of energy in the food system under alternative diets was studied. The types of diet analyzed are: the current average diet consumed; and a diet consistent with specifications of the dietary guidelines. It is shown that the greatest savings under a diet altered to conform with the dietary guidelines is in electrical generation, and the least energy savings in refined petroleum use. GRA

N82-10718 Ohio State Univ., Columbus.
CARDIORESPIRATORY RESPONSES AND HANDGRIP ISOMETRIC COMPONENT FOR VARIOUS WHEELCHAIR PROPULSION SYSTEMS Ph.D. Thesis
Douglas Peter Beal 1981 182 p
Avail: Univ. Microfilms Order No. 8115083

Three types of wheelchair propulsion systems for cardiorespiratory responses normal synchronous (sync) handrim propulsion, an asynchronous (async) system of application of force to the handrims, and an arm crank system of propulsion were studied. The static exercise component of the handgrip muscles for these three methods of wheelchair propulsion were compared and a test protocol which measures these variables under equivalent conditions at submaximal and maximal power output (PO) levels, on both able bodied (AB) and wheelchair dependent (WD) subjects was employed. It is found that the static component directly related to the relative intensity of each exercise mode. Similar static components were found for sync and async handrim propulsion, whereas a higher static component was found for arm cracking. It is indicated that the sync propulsion method is slightly more stressful than the async method, and that the arm crank propulsion system significantly reduces the stresses associated with wheelchair locomotion. Dissert. Abstr.

N82-10719 Florida State Univ., Tallahassee.
THE EFFECTS OF COLD- AND EXERCISE-INDUCED ALTERATIONS IN SKIN AND CORE TEMPERATURE ON SUBSTRATE MOBILIZATION AND UTILIZATION Ph.D. Thesis
Bernard F. Hurley 1981 134 p
Avail: Univ. Microfilms Order No. 8117944

The effects of altering skin and core temperature by cold exposure and exercise on substrate mobilization and utilization were examined. The significance of the effects of skin and core temperatures on the variables of interest was determined. It is indicated that free fatty acid, glucose, lactate, hemoglobin, and hematocrit concentrations significantly increase during rest when both mean skin temperature and rectal temperature are induced. It is concluded that reductions in both skin temperature and rectal temperature are necessary during cold exposure to produce increases in substrates, hemoconcentration, lactate, and oxygen consumption. Fat mobilization and utilization occurs during exercise in the cold only if reductions in both skin and rectal temperature are produced. Dissert. Abstr.

N82-10720# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
PHYSIOPATHOLOGY AND PATHOLOGY OF SPINAL AILMENTS IN AEROSPACE MEDICINE [PHYSIOPATHOLOGIE AT PATHOLOGIE DES AFFECTION DUR RACHIS EN MEDECINE AEROSPATIALE]
R. P. Delahaye, R. Auffret, P. Doury, C. Kleitz, A. Leger, G. Leguay, P. J. Metges, J. L. Poirier, B. Vettes, and H. Viellefond Apr. 1981 336 p refs In FRENCH
(AGARD-AG-250-FR; ISBN-92-835-2108-0) Avail: NTIS HC A15/MF A01

Spinal problems in aerospace medicine are reviewed. Opinions are expressed in the areas of etiology, diagnosis and prognosis for lesions in the spinal column, injuries which are activated by piloting rotary wing aircrafts, conventional airplanes, gliders, or by parachute jumping. It is concluded that this information is helpful in aerospace medicine, the medical physiology of flying personnel, and also in the enforcment of flight safety. Transl. by E.A.K.

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

No abstracts in this category.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-10721# Virginia Polytechnic Inst. and State Univ., Blacksburg. Computer Science, Industrial Engineering/Operations Research.
A MONTE-CARLO SIMULATION INVESTIGATING MEANS OF HUMAN-COMPUTER COMMUNICATION FOR DYNAMIC TASK ALLOCATION
Mark E. Revesman Aug. 1981 39 p refs Presented at the IEEE Intern. Conf. on Cybernetics and Soc., Atlanta, Oct. 1981 Submitted for publication
(Contract N00014-81-K-0143)
(AD-A103890; CSIE-81-1) Avail: NTIS HC A03/MF A01 CSCL 05/8

This paper investigates human-computer communication in multitask decision making situations. It is proposed that tasks in these systems be allocated in a dynamic manner. Communication between human and computer is essential for dynamic allocation to enhance system performance. Simulation experiments investigate two modes of communication: implicit, in which the human's planned actions are relayed to the computer by the use of model of the human's decision strategy , and explicit, in which the human overtly describes his decisions to the computer. Results indicate that implicit communication can significantly enhance system performance if the computer uses a method of decision making which complements that of the human. Explicit communication can greatly enhance system performance, but there is an inherent cost in the time it takes the human to transmit his decisions to the computer. It is concluded that the costs of both methods can be traded off so that either implicit or explicit communication may be useful in different situations. Further research is suggested for defining complementary strategies using human models and for investigating trade-offs between implicit and explicit communication. Author (GRA)

N82-10722# Research Inst. of National Defence, Umea (Sweden). Huvudavdelning 4.
THE INFLUENCE OF BEARD, BEARD-STUBBLE AND AGE WRINKLES ON THE ADJUSTMENT OF PROTECTIVE MASKS [INVERKAN AV SKAEGG, SKAEGGSTUBB OCH AALDERSRYNKOR PAA SKYDDSMASKTILLPASSNING]
Per-Gunnar Joensson Nov. 1980 32 p refs In SWEDISH
(FOA-A-40034-C2/A2/ B2) Avail: NTIS HC A03/MF A01

Tests were conducted with eight different types of respirators on 31 men, newly shaven and then after 8, 24, 48 and 96 hours of beard growth. Two types of safety devices covering nose and mouth, i.e., four complete gas masks and two with pressurized air, were investigated. With three of these masks a notable worsening in the adjustment is noticeable after only eight hours beard growth. The same eight protective devices were also tested on 20 full-bearded men. No satisfactory protection is recorded. Wrinkled skin can also lead to a less favorable performance. The influence of this factor was tested on 56 retired men and women with two safety devices covering nose and mouth and four different gas masks. The adjustment is significantly less tight than on younger persons. Author (ESA)

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N82-10723*# Bendix Corp., Teterboro, N. J. Flight Systems Div.
MEASUREMENT OF FAULT LATENCY IN A DIGITAL AVIONIC MINIPROCESSOR Progress Report
John G. McGough and Fred L. Swern Oct. 1981 206 p refs
(Contract NAS1-15946)
(NASA-CR-3462) Avail: NTIS HC A10/MF A01 CSCL 12A

The results of fault injection experiments utilizing a gate-level emulation of the central processor unit of the Bendix BDX-930 digital computer are presented. The failure detection coverage of comparison-monitoring and a typical avionics CPU self-test program was determined. The specific tasks and experiments included: (1) inject randomly selected gate-level and pin-level faults and emulate six software programs using comparison-monitoring to detect the faults; (2) based upon the derived empirical data develop and validate a model of fault latency that will forecast a software program's detecting ability; (3) given a typical avionics self-test program, inject randomly selected faults at both the gate-level and pin-level and determine the proportion of faults detected; (4) determine why faults were undetected; (5) recommend how the emulation can be extended to multiprocessor systems such as SIFT; and (6) determine the proportion of faults detected by a uniprocessor BIT (built-in-test) irrespective of self-test. J.M.S.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N82-10724 Texas Univ. at Arlington.
A COMPUTER ARCHITECTURE WITH HARDWARE OPERATING SYSTEM FEATURES FOR COMMUNICATIONS PROCESSING Ph.D. Thesis
Gene Charles Barton 1981 224 p
Avail: Univ. Microfilms Order No. 8119256

Computer and operating system design features are examined and evaluated with respect to their utility in a communications environment. Then, an architecture which fulfills these requirements is presented. The proposed architecture includes hardware operating system features which largely eliminate the multiprogramming difficulties normally encountered in communications applications. In particular, scheduling context switching and protection are implemented in such a way that no overhead is imposed. The protection concept of a sentry is introduced and implemented in a way that is fault tolerant and fail safe. Dissert. Abstr.

N82-10725 New Mexico State Univ., Las Cruces.
ON-LINE FAULT DIAGNOSTICS OF MULTIPLE MICROPROCESSOR SYSTEMS Ph.D. Thesis
Hsin Chia Fu 1981 128 p
Avail: Univ. Microfilms Order No. 8117751

An on-line fault diagnostic architecture is introduced that utilizes a built-in-test microprocessor to monitor the operating behavior of an array of microprocessors in a multiprocessor system. The multiprocessor architecture consists of a host computer, a bus processor, a built-in-test-processor (BITP), and an array of slave processors interconnected by communication units. Having access to the internal bus of all slave processors, the BITP can record and analyze the activity on any slave processors's bus for possible errors. An analytical fault diagnostic net (FDN) model is formulated to characterize the relationships between the recorded activity and the type of faults to be diagnosed. Algorithms and theorems are derived for a functional FDN (an FDN that is completely diagnosable) of a microprocessor system. A complete description of a prototype built-in-test system that utilizes the FDN model is presented. A discussion is given to describe a generalized application of the FDN concept for different microprocessor systems. Dissert. Abstr.

N82-10726 Pennsylvania Univ., Philadelphia.
INFORMATION PRESENTATION THROUGH DEFAULT DISPLAYS Ph.D. Thesis
Sakunthala Gnanamgari 1981 118 p
Avail: Univ. Microfilms Order No. 8117783

Graphic presentation of tabular data is considered. An intelligent system which helps users in the graphical display of data by performing the task of a graphic artist is developed. The gap between the way a user and the machine is considered. The automatic selection of graphic display formats is developed, based on the formally characterizable properties of the data to be displayed, the user's particular objectives, principles of graphic design, and the results of studies in the area of human factors and effective displays. Dissert. Abstr.

N82-10727 University of Central Florida, Orlando.
AN ASSOCIATIVE BACKEND MACHINE FOR DATA BASE MANAGEMENT Ph.D. Thesis
Alireza Hurson 1980 393 p
Avail: Univ. Microfilms Order No. 8118424

A backend machine architecture ASLM (Associative Search Language) was developed. The language is directly executed by the backend machine using built-in hardware algorithms for query processing and associative hardware for name-space resolution. The language ASL is a high level data base language using associative principles for basic operations and defined by the relational data model. The ASLM is designed based on cellular organization. In the design of ASLM, the processing units (cells) are moved into the backend machine. The general strategy in ASLM is based on the pre-search through the data file and then the execution of the operation on the explicit subfiles which are stored in the associative memory. The ASLM is microprogrammable. The separation of the cells in the ASLM from the secondary storage results in a cost effective system in comparison to the other machines and eliminates any restriction on the secondary devices. Dissert. Abstr.

N82-10728 Texas Univ. at Arlington.
A COMPUTER ARCHITECTURE FOR LOGIC SIMULATION Ph.D. Thesis
Rondey Lange Barto 1980 125 p
Avail: Univ. Microfilms Order No. 8119405

A computer architecture optimized for logic simulation was designed and validated, and examples of its operation given. The computer has its memory system and data paths designed around the data structures of a logic simulator, and incorporates dedicated processors to perform the required simulator functions. A possible hardware implementation using commercially available components was presented, and its cost and performance estimated. These were shown to compare favorably to the cost and performance of a programmed logic simulator.
Dissert. Abstr.

N82-10729 Case Western Reserve Univ., Cleveland, Ohio.
THEORETICAL BASIS FOR REDUCTION OF CROSS-TALK IN ASSOCIATIVE MEMORY RECOGNITION OF PATTERNS: WITH RESULTING DECREASE IN PROCESSING TIME AND COMPUTER STORAGE REQUIREMENTS Ph.D. Thesis
Gert Paul Hartoch 1981 117 p
Avail: Univ. Microfilms Order No. 8118798

An information storage and retrieval procedure capable of efficiently storing away a large number of individual facts and later retieving these facts in a very rapid manner, was developed. A large training set of reference patterns is clustered via an automatic, self-adaptive clustering algorithm to generate a multi-tiered, multi-branched hierarchical tree structure. The reference patterns at the nodes of the hierarchical tree structure were encoded into associative memories using Walsh function encoding techniques. An algorithm to minimize the associative memory noise was developed. The procedure is easily adaptable to a large variety of classes of data. It presents a very rapid and storage efficient pattern recognition tool when test patterns are to be identified by a similarity measure. Dissert. Abstr.

N82-10730# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
RESEARCH PROGRAM IN FULLY DISTRIBUTED PROCESSING SYSTEMS Quarterly Progress Report, 1 Mar. - 31 May 1981
Jun. 1981 15 p refs
(Contracts N00014-79-C-0873; F30602-78-C-0120;
DAAG29-79-C-0155; DAAK70-79-D-0087; Grant NSF
MCS-79-24370)
(AD-A103009; QPR-7) Avail: NTIS HC A02/MF A01 CSCL 09/2

A comprehensive data processing system, in which both physical and logical components are loosely coupled while operating with a high degree of control autonomy at the component level, is described. The definition of the specific class of multiple computer systems is investigated. The operational characteristics of the systems is to advance the state-of-the-art which delivers a high proportion of the benefits claimed by distributed processing systems. Formal modeling and theoretical studies to empirical examinations of prototype systems and simulation models are presented. E.A.K.

N82-10731# Bunker-Ramo Corp., Arlington, Va.
MICROPROCESSOR FRONT-END TERMINAL STUDY Final Technical Report, May 1980 - Mar. 1981
Raymond Arnold and Ward Neely Griffiss AFB, N.Y. RADC Jun. 1981 158 p refs
(Contract F30602-80-C-0182; AF Proj. 5581)
(AD-A104171; RADC-TR-81-149) Avail: NTIS HC A08/MF A01 CSCL 09/2

The objective of this effort was the definition and description of a modular intelligent display terminal for the TACS system which incorporates a programmable microprocessor as a front-end to handle communication and teleprocessing interfaces and protocols. The unit should be able to function as a stand-alone terminal, as a terminal to a processing facility or as an independent mode on a network of data processing systems. The main emphasis of the system analysis was JINTACCS messages at the Wing Level although other messages and levels are also included.
Author (GRA)

N82-10732# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
QUERY PROCESSING IN DISTRIBUTED DATA BASES
Victor O. K. Li (Southern California Univ.) Jul. 1981 23 p refs
(Contract N00014-77-C-0532; NR Proj. 041-519)
(AD-A103826; LIDS-P-1107) Avail: NTIS HC A02/MF A01 CSCL 09/2

This paper describes two new distributed query processing algorithms. The MST Algorithm minimizes the total communication costs associated with a query while the MDT Algorithm minimizes the response time. These two algorithms are easy to analyze and to implement, since they are based on the minimum spanning tree and the shortest path problems, for which numerous algorithms exist. In addition, these two algorithms can be implemented using distributed computation, i.e., each node using only information available from adjacent nodes. We also develop the 'artificial file node' technique to extend existing query processing algorithms which are designed for non-redundant databases to that for general, redundant databases. The two algorithms are illustrated by simple examples. Author (GRA)

N82-10733# Siemens A.G., Munich (West Germany). Hauptbereich Anwendungstechnik.
DEVELOPMENT OF HARDWARE CONCEPTS FOR INTERACTIVE VIDEOTEX Final Report
Wilhelm Bosselmann, Ladislav Bunata, Reinhard Fischer, Heinrich Kammerhofer, Wolfgang Kampczyk, and Erik Langer Bonn Bundesministerium fuer Forschung und Technologie Nov. 1980 106 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-118; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22,30

The execution of system comparisons for interactive and broadcast videotex shows that, with respect to the existing requirements on system performance, the hardware for the decoders in television receivers has to be different. The compatibility of the hardware can either be obtained by canceling the character row and television line, or by degradation of the interactive videotex system. With respect to the modem, the greatest difficulties arise from dc feeding by the telephone line. The necessary filters can be integrated; their power consumption has a great influence on the concept. Author (ESA)

N82-10734# Danish Research Center for Applied Electronics, Hoersholm.
PRACTICES AND TECHNIQUES FOR EFFICIENT SOFTWARE DEVELOPMENT FOR MICROCOMPUTERS. PROGRAMMING LANGUAGES, SOFTWARE DEVELOPMENT TOOLS AND SYSTEMS AS DEVELOPED AND USED BY 12 ELECTRONICS COMPANIES AND UNIVERSITIES IN THE UNITED STATES
Christen Monberg and Stig Skelboe Dec. 1980 37 p refs
Sponsored by Danish Council of Technology
(ECR-105) Avail: NTIS HC A03/MF A01

Information on currently used techniques and trends in software development was collected. Visits were made to 12 companies and universities in the United States. The main areas of interest explored were: programming language (assembly language, high level languages and domain specific languages); development systems; software management, planning, and testing; software environment and tools; and operating systems.
Author (ESA)

N82-10735# British Gas Corp., Newcastle-upon-Tyne (England). Engineering Research Station.
MICROPROCESSOR APPLICATIONS FOR THE MONITORING AND CONTROL OF GAS SUPPLIES
R. S. Davidson and T. M. Sporton Nov. 1980 11 p Presented at IMEKO/IFAC Symp. on Appl. of Microprocessors in Devices for Instrumentation and Automatic Control, London, 17-20 Nov. 1980
(ERS-E-276) Avail: NTIS HC A02/MF A01

The potential of the microprocessor to replace many established electromechanical and pneumatic systems and to solve problems which could be tackled previously only by main-frame computers is discussed. Applications already in use and ideas under development are detailed. These include telemetry systems used for controlling and monitoring gas supplies, controlling the monitoring of a reversible liquid natural gas process for meeting peak demand on a seasonal basis, a system incorporating a microprocessor for gas holder monitoring and control, and a prototype microprocessor control system for gas distribution governors. Author (ESA)

N82-10736# Engins Matra, Velizy (France).
COMPARISON OF 16 BIT MICROPROCESSORS: MOTOROLA MC 68000 AND INTEL 8086 [COMPARISON DES MICROPROCESSEURS 16 BITS: MOTOROLA MC 68000 ET INTEL 8086]
Claude Abin 13 Apr. 1981 32 p In FRENCH
(DEL/CA/337) Avail: NTIS HC A03/MF A01

The most significant characteristics of the two devices are compared. These include packaging, address space, internal architecture, mode of address, instruction sets, interruptions, performance, and peripherals. Comparison shows advantages for the 68000 over the 8086 as to internal architecture. On the other hand, the 8086 with the 8087 coprocessor is considerably more powerful. The two families of peripheral circuitry offer more or less similar functions, although under different forms, with performance being on the same order of magnitude. Author (ESA)

N82-10737# Federal Compiler Testing Center, Falls Church, Va. Software Development Office.
DATA GENERAL CORPORATION AOS COBOL REVISION 3.10
15 Jun. 1981 50 p
(PB81-219206; CCVS74-VSR775) Avail: NTIS HC A03/MF A01 CSCL 09B

The validation summary report for the Data General AOS COBOL compiler version 3.10 (AOS version 3.39) is presented. A summary of the results obtained from the validation of the subject compiler against the 1974 COBOL standard is given. GRA

N82-10738# Federal Compiler Testing Center, Falls Church, Va. Automated Data and Telecommunications Service.
COMPUTER SCIENCES CORPORATION CSTS 74 COBOL, VERSION COB230
15 Jun. 1981 68 p
(PB81-219214; CCVS74-VSR790) Avail: NTIS HC A04/MF A01 CSCL 09B

The Computer Sciences Corporation CSTS 74 COBOL compiler version COB230 (CSTS Version SYS200) was evaluated. A consolidated summary of the results obtained from the validation of the compiler against the 1974 COBOL standard is given. GRA

N82-10739# Federal Compiler Testing Center, Falls Church, Va. Software Development Office.
NCR CORPORATION NCR IRX COBOL, RELEASE 4.0
15 Jun. 1981 49 p refs
(PB81-219222; CCVS74-VSR785) Avail: NTIS HC A03/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the NCR Corporation IRX COBOL Compiler Compiler Version 4.0 (NCR IRX Version 4.0) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The complier was validated at the Low-Intermediate level of DIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies between level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-10740# Federal Compiler Testing Center, Falls Church, Va. Software Development Office.
NCR CORPORATION NCR IRX COBOL, RELEASE 4.0 INDEXED 1-0 MODULE, LEVEL 1
15 Jun. 1981 10 p
(PB81-219230; FCTC/TR-81/18) Avail: NTIS HC A02/MF A01 CSCL 09B

This FCTC Technical Report for the indexed I-O Module of the NCR Corporation IRX COBOL Compiler Version 4.0 (NCR IRX Version 4.0) provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed I-O Module of the 174 COBOL Standard (X323-1974/FIPS PUB 21-1). This technical report is made up of several sections showing the discrepancies found. A companion report (Validation Summary Report CCVS740VSR785) provides information regarding the validation of the Compiler at the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

N82-10741# Federal Compiler Testing Center, Falls Church, Va. Automated Data and Telecommunications Service.
COBOL COMPILER VALIDATION SYSTEM 1974. VERSION 4.1 USER'S GUIDE (IMPLEMENTATION DOCUMENT)
Jun. 1981 254 p refs
(PB81-219040; FCTC/CCVS74UG-81/17; GSA/DF-80/001B) Avail: NTIS HC A12/MF A01 CSCL 09B

The information necessary to implement version 4.1 of the 1974 COBOL compiler validation system (CCVS) is documented. The 1974 CCVS consists of audit routines, their related data, and an executive routine (VP-routine) which prepares the audit routines for compilation. Each audit routine is a COBOL program which includes many tests and supporting procedures indicating the result of the tests. GRA

N82-10742# Federal Compiler Testing Center, Falls Church, Va. Automated Data and Telecommunications Service.
COBOL COMPILER VALIDATION SYSTEM 1974. VERSION 4: EVALUATION GUIDE
Jun. 1981 149 p refs
(PB81-219057; FCTC/CCVS74EG-81/16; GSA/DF-80/001C) Avail: NTIS HC A07/MF A01 CSCL 09B

A consolidation of checklists, guides, and supporting documents which aid the user of the 1974 COBOL compiler validation system when evaluating the results from testing a COBOL compiler for adherence to Federal standard is presented. GRA

N82-10743# Federal Compiler Testing Center, Falls Church, Va. Automated Data and Telecommunications Service.
CONTROL DATA CORPORATION COBOL 5.3 LEVEL 540 CYBER 73, NOS/BE 1.4 LEVEL 530 Validation Summary Report
3 Jun. 1981 66 p refs
(PB81-213837; CCVS74-VSR766) Avail: NTIS HC A04/MF A01 CSCL 09B

The validation summary report for the CDC NOS/BE COBOL Compiler 5.3 Level 540 (NOS/BE 1.4 level 530) is presented. A consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL standard is given. GRA

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-10744 Texas Univ. at Arlington.
A MODELING SYSTEM FOR MATHEMATICAL PROGRAMMING Ph.D. Thesis
Wilhelm Franz Burger 1981 179 p
Avail: Univ. Microfilms Order No. 8119266

The model formulation process and the data management aspects of the model data are examined for the case of linear programming (LP) models. A modeling system is presented which uses a unified language for expressing data definition, data manipulation, and model formulation constructs. A module mechanism is introduced in order to break the modeling task into sub-tasks that can be handled separately. In particular, model formulation and model data management are treated independently. An interactive environment is provided in order to support the design process of a model, and to allow the user to experiment with alternative problem solutions. A command language is defined with which different modes of man-machine interaction can be initiated. Of importance is the browsing mode in which data definition and data manipulation facilities are available interactively. The browsing mode can be used to change or create data for different solutions, or it may be simply used to learn more about the data at hand. Dissert. Abstr.

N82-10745 Wisconsin Univ. - Madison.
ANALYSIS OF SPEEDUP IN DISTRIBUTED ALGORITHMS Ph.D. Thesis
John Philip Fishburn 1981 186 p
Avail: Univ. Microfilms Order No. 8116649

Several practical parallel algorithms for multicomputers were analyzed. Two distributed algorithms for implementing alpha beta search on a tree of processors are presented. For each algorithm, a theoretical model is developed that predicts speedup with arbitrary many processors. Iterative methods give rise to natural multicomputer algorithms. The numerical solution of elliptic partial differential equations are considered. The running time of the grid and the tree algorithms with respect to permessage overhead, perpoint communication time and perpoint computation time are derived. It is concluded that the larger the problem, the closer the algorithms approach optimal speedup. The application of the tree algorithms to nonuniform regions is shown. Dissert. Abstr.

N82-10746 Illinois Univ. at Urbana.
PERFORMANCE ANALYSIS OF UPDATE SYNCHRONIZATION ALGORITHMS FOR DISTRIBUTED DATABASES Ph.D. Thesis
Wing Kai Cheng 1981 248 p
Avail: Univ. Microfilms Order No. 8119634

Several update synchronization algorithms are modelled and analyzed. Algorithms investigated include a resilient centralized locking algorithm, some distributed algorithms using timestamps, and some algorithms using clock messages in addition to timestamps. Results from the analysis allow one to pinpoint inefficiency and suggest some algorithms. Dissert. Abstr.

N82-10747 Massachusetts Univ., Amherst.
USING COMPUTER GRAPHICS AS AN AID TO UNDERSTANDING SIMULATION DATA Ph.D. Thesis
Alan Charles Morse 1981 266 p
Avail: Univ. Microfilms Order No. 8118028

The design of a computer graphics system for more effective display computer simulation data is developed. The human factors of graphical data representation are analyzed. Possible coding schemes are described. The structure of modelling is analyzed and appropriate display coding methods and principles are determined and applied to a subclass of models, namely, those that involve neural simulations. A system for data display is outlined. The results of using such a system are described. Dissert. Abstr.

N82-10748 Massachusetts Univ., Amherst.
COMPUTER INTERPRETATION OF A DYNAMIC IMAGE FROM A VEHICLE Ph.D. Thesis
Thomas Dell Williams 1981 293 p
Avail: Univ. Microfilms Order No. 8118055

The design and implementation of a computer program that constructs an interpretation of images of a natural scene, in particular, one imaged while the camera is in a moving automobile, are discussed. The succession of images is interpreted in terms of sufaces and objects in three-dimensional space. The agreement between image dynamics and an internal surface model of the environment is measured by comparing a pair of temporally disparate images (two movie frames). Using the model, an image taken at one location can be transformed into a synthetic image of the scene as it would be viewed from another location. This synthesis accounts for point displacements and occlusion effects as predicted by the internal model. Differences between the real and the synthetic images are then used as an error measure in a search that refines the model. Once the model is refined, unresolved errors are used to correct the initial surface model by resegmenting the image into a better approximation of the surfaces in the environment. This surface model refinement is followed by an object identification phase. Size and color attributes measured from the derived internal model are compared with stored attributes for objects. Dissert. Abstr.

N82-10749 California Univ., Irvine.
A DATAFLOW ARCHITECTURE WITH IMPROVED ASYMPTOTIC PERFORMANCE Ph.D. Thesis
Robert Eugene Thomas 1981 90 p
Avail: Univ. Microfilms Order No. 8118403

The design of a computer comprising large numbers of small, inexpensive processors and based on the asynchronous and functional semantics of dataflow is presented. Processors within the machine are interconnected by a packet switched binary n cube although a limited number of other networks may be substituted with predictable asymptotic effects on performance. Improved performance of the proposed machine over a previously reported dataflow architecture is predicted in terms of the computational time complexity of several example programs: matrix multiply, quicksort, and iterative solutions to partial differential equations. Although the example programs are numerical in nature, the machine is intended for general purpose computation since programs are written in the high level dataflow language Id without knowledge of the number of processors or interconnections. Storage management and data communication methods are also presented which are necessary to obtain the improved performance. Experimental results from a simulated machine incorporating some of these methods are given to corroborate analytic results. Dissert. Abstr.

N82-10750 Texas A&M Univ., College Station.
MODEL ORDER AND PARAMETER IDENTIFICATION FROM LAYERED MEDIA RESPONSE DATA Ph.D. Thesis
Joel Nelson Holyoak 1981 198 p
Avail: Univ. Microfilms Order No. 8118270

The generation of a maximum likelihood estimation algorithm for the simultaneous solution of the order and the reflection coefficients of a reverberative, non-absorptive, horizontally stratified, layered media is discussed. The approach taken involves utilizing response data from both the input excitation as well as the response data from the layered media to form estimates of a composite model which includes the excitation model and the layered media model. This particular approach allows for simplifications that reduce the required computations in the maximum likelihood algorithm. A parallel processing scheme is presented which is based on the interlayer spacing of the reflecting layers. Interlayer spacing is used to form a class of models on which order determination procedures can be performed. The nature of the models is such that all lower-order model reflection layers are also reflection layers in all higher-order models. Two methods are developed for the solution of the maximum number of determinable reflection layers. Numerous examples are given to demonstrate estimation quality. Dissert. Abstr.

N82-10751 Polytechnic Inst. of New York, Brooklyn.
PARTITION STATISTICS IN IMAGE PROCESSING Ph.D. Thesis
Basil Palte Rabinowitz 1981 132 p
Avail: Univ. Microfilms Order No. 8118894

Extensions of partition statistics for problems in image processing are developed. The broad class of images that are represented by a discrete array of pixels is considered. The statistics presented find application in a wide variety of fields such as underwater sounding, radar, sonar and satellite photography. The extension of the Two Sample Linear m-Interval Partition Test and the Two Sample Quadratic m-Interval Partition Test to their bivariate counterparts is considered in detail. In particular, the application of the bivariate tests to edge detection in image processing is presented, showing the power of these tests. These tests are shown to effectively increase the signal-to-noise ratio by as much as a factor of 1.4. A general integral representation of a broad class of nonparametric bivariate statistics is developed. An important factor to be considered is that of estimating the optimum scores for these tests when the underlying distributions function is unknown. The Robbins-Monro stochastic approximation algorithm is used to develop techniques for estimating the optimum scores when the underlying distribution function is unknown. In the mixture type distribution where the system is subject to burst noise intermittently, these estimators may fail to converge, or will converge very slowly as a result of the high variance noise terms. To overcome this, a robustized RMSA algorithm using a nonlinear pre-processor is introduced. Dissert. Abstr.

N82-10752*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

NASA LARC RAFTOR DOCUMENTATION VERSION 1.0

H. J. Dunn Sep. 1981 21 p ref
(NASA-TM-83173) Avail: NTIS HC A02/MF A01 CSCL 09B

The use of a preprocessor of the LaRC computer center that converts RAFTOR source into FORTRAN source code is described. The purpose of RAFTOR is to make FORTRAN a better programming language for both writing and structuring programs. It is concluded that RAFTOR can generate a well structured program with a source code that is easy to follow. E.A.K.

N82-10753*# Mississippi State Univ., Mississippi State. Dept. of Electrical Engineering.

A STUDY OF HIGH DENSITY BIT TRANSITION REQUIREMENTS VERSUS THE EFFECTS ON BCH ERROR CORRECTING CODING Interim Final Report, 1 Jul. 1980 - 30 Sep. 1981

Frank Ingels and William O. Schoggen 30 Sep. 1981 99 p refs
(Contract NAS8-33887)
(NASA-CR-161881) Avail: NTIS HC A05/MF A01 CSCL 09B

Several methods for increasing bit transition densities in a data stream are summarized, discussed in detail, and compared against constraints imposed by the 2 MHz data link of the space shuttle high rate multiplexer unit. These methods include use of alternate pulse code modulation waveforms, data stream modification by insertion, alternate bit inversion, differential encoding, error encoding, and use of bit scramblers. The psuedo-random cover sequence generator was chosen for application to the 2 MHz data link of the space shuttle high rate multiplexer unit. This method is fully analyzed and a design implementation proposed. J.M.S.

N82-10754*# Martin Marietta Corp., Bethesda, Md.

USER'S MANUAL: THERMAL RADIATION ANALYSIS SYSTEM TRASYS 2

Carl L. Jensen Jun. 1981 471 p refs Revised
(Contract NAS9-15832)
(NASA-CR-161077; MCR-73-105-Rev-3) Avail: NTIS HC A20/MF A01 CSCL 09B

A digital computer software system with generalized capability to solve the radiation related aspects of thermal analysis problems is presented. When used in conjunction with a generalized thermal analysis program such as the systems improved numerical differencing analyzer program, any thermal problem that can be expressed in terms of a lumped parameter R-C thermal network can be solved. The function of TRASYS is twofold. It provides: (a) Internode radiation interchange data; and (b) Incident and absorbed heat rate data from environmental radiant heat sources. Data of both types is provided in a format directly usable by the thermal analyzer programs. The system allows the user to write his own executive or driver program which organizes and directs the program library routines toward solution of each specific problem in the most expeditious manner. The user also may write his own output routines, thus the system data output can directly interface with any thermal analyzer using the R-C network concept. A.R.H.

N82-10755# University of Central Florida, Orlando. Dept. of Mathematics and Statistics.

A FORTRAN PROGRAM FOR ESTIMATING PARAMETERS IN A CUMULATIVE DISTRIBUTION FUNCTION

Steven J. Bean, Mark Heuser, and Paul N. Somerville Hanscom AFB, Mass. AFGL 31 Mar. 1981 18 p
(Contract F19628-80-C-0004; AF Proj. 6670)
(AD-A104165; SCIENTIFIC-3; AFGL-TR-81-0120) Avail: NTIS HC A02/MF A01 CSCL 12/1

The report documents and gives a listing for a FORTRAN program written to estimate the parameters of a cumulative distribution function which best fits an empirical cumulative distribution function in a least squares sense. Nonlinear regression techniques are used. The program as listed uses the Weibull distribution for the fit, but with the replacement of certain modules the program may be used to fit many different distributions. Author (GRA)

N82-10756# Bedford Research Associates, Mass.

USER GUIDE FOR INTERACTIVE APPLICATION PROGRAM (IAP)

E. Cronin, D. Dechichio, and P. Meehan 1 Jan. 1981 26 p
(Contract F19628-80-C-0124; AF Proj. 9993)
(AD-A104085; SCIENTIFIC-1; AFGL-TR-80-0370) Avail: NTIS HC A03/MF A01 CSCL 09/2

The Interactive Application Program, which will be referred to by IAP, has been designed to generate a BATCH job (consisting of a control card record and data input record) reporting on the DMSP data base and/or in copying part of the data base. The BATCH job is necessary because the data base is on several tapes which cannot be hung interactively. The respective reporting and copying modules are described herein. Author (GRA)

N82-10757# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

MARR'S APPROACH TO VISION

Tomaso Poggio Aug. 1981 8 p
(Contract N00014-80-C-0505; Grant NSF MCS-79-23110)
(AD-A104198; AI-M-645) Avail: NTIS HC A02/MF A01 CSCL 09/2

In the last seven years a new computational approach has led to promising advances in the understanding of biological visual perception. The foundations of the approach are largely due to the work of a single man, David Marr at M.I.T. Now, after his death in Boston on November 17th, 1980, research in vision will not be the same for the growing number of those who are following his lead. Author (GRA)

N82-10758# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

THE IMAGE IRRADIANCE EQUATION: ITS SOLUTION AND APPLICATION

Anna R. Bruss Jun. 1981 110 p refs
(Contracts N00014-80-C-0505; N00014-77-C-0389)
(AD-A104043; AI-TR-623) Avail: NTIS HC A06/MF A01 CSCL 12/1

How much information about the shape of an object can be inferred from its image? In particular, can the shape of an object be reconstructed by measuring the light it reflects from points on its surface? These questions were raised by Horn (HO70) who formulated a set of conditions such that the image formation can be described in terms of a first order partial differential equation, the image irradiance equation. In general, an image irradiance equation has infinitely many solutions. Thus constraints necessary to find a unique solution need to be identified. First we study the continuous image irradiance equation. It is demonstrated when and how the knowledge of the position of edges on a surface can be used to reconstruct the surface. Furthermore we show how much about the shape of a surface can be deduced from so called singular points. At these points the surface orientation is uniquely determined by the measured brightness. Then we investigate images in which certain types of silhouettes, which we call b-silhouettes, can be detected. In particular we answer the following question in the affirmative: Is there a set of constraints which assure that if an image irradiance equation has a solution, it is unique? To this end we postulate three constraints upon the image irradiance equation and prove that they are sufficient to uniquely reconstruct the surface from its image. GRA

N82-10759# Los Alamos Scientific Lab., N. Mex. Health Div.

ILLUSTRATOR'S VIEW OF MORE-EFFECTIVE TECHNICAL COMMUNICATION THROUGH COMPUTER GRAPHICS

Kathleen D. DeGasperi 1981 12 p Presented at SIGGRAPH: The 8th Ann. Conf. on Computer Graphics and Interactive Tech., Dallas, 3-7 Aug. 1981
(Contract W-7405-eng-36)
(DE81-769507; LA-UR-80-3457) Avail: NTIS HC A02/MF A01

Computer graphics as an art media tool for the illustrator often surpasses other available media. After the speed of the computer, its capability to produce an incredible range of complex color schemes makes it such an invaluable aid. However, this medium is frequently not used to its fullest capacity in the field of technical communication. This is because of the lack of well-designed visual presentations. In particular, this situation is often caused by the improper use of color, the lack of contrast, and visual continuity. Improving the state-of-the-art in the area of visual presentations by including graphic design techniques, a common-reference language, and by improving versatility in graphics programs and software packages is discussed. DOE

N82-10760# Los Alamos Scientific Lab., N. Mex.
METAFILE FOR EFFICIENT SEQUENTIAL AND RANDOM DISPLAY OF GRAPHICS
Theodore Niles Reed 1981 12 p refs Presented at SIGGRAPH Conf., Dallas, 3-7 Aug. 1981
(Contract W-7405-eng-36)
(LA-UR-80-3642; CONF-810805-1) Avail: NTIS HC A02/MF A01

Objectives and applications of the common graphics system (CGS) metafile are given. Details of the format and the random access techniques incorporated in the CGS Metafile are described. DOE

N82-10761# Los Alamos Scientific Lab., N. Mex.
SATELLITE GRAPHICS OUTPUT STATION
Richard Wolf 1981 18 p refs Presented at the SIGGRAPH Conf., Dallas, 3-7 Aug. 1981
(Contract W-7405-eng-36)
(DE81-769454; LA-UR-80-3716; CONF-810805-2) Avail: NTIS HC A02/MF A01

A satellite graphics output station is described. This station serves to directly accept user requests for output via a large computer network. The system orders these requests and schedules output on one of several devices consistently with the user's request and the overall job turnaround requirements of the laboratory. The system translate a standard Metafile into a device-specific format and efficiently generates the requested output. At this same time, the print and graphics express station provides some graphics processing. The system provides current information on queues, jobs being processed, and the devices. An effective quality control program is an integral part of the system design. DOE

N82-10762# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
RECONCILING DATA FLOW MACHINES AND CONVENTIONAL LANGUAGES
Arthur H. Veen Sep. 1980 18 p refs Submitted for publication
(MC-IW-146/80) Avail: NTIS HC A02/MF A01; Stitching Mathematisch Centrum, Amsterdam FL 3

A project aimed at developing a compiler for an existing high level language for string processing is considered. The compiler is intended to accept the full language without changing its semantics in any respect. The implementation of a sizeable subset of the language is described, and solutions to the remaining problems are suggested. The results indicate that the gap between data flow machines and conventional languages is easier to bridge than previously assumed. Author (ESA)

N82-10763# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 1.
USES OF THE SIMULA PROCESS CONCEPT
Jacob Palme Feb. 1981 13 p refs
(FOA-C-10172-M6) Avail: NTIS HC A02/MF A01

Examples from existing programs as to how the process aspect of the class concept can be used to structure programs are described. All the examples are taken from real production programs in heavy usage, but they are simplified to illustrate the main idea. Examples considered are: the splitting of a data stream (a sequential file of records); the evaluation of Boolean expressions; the debugging of part of a program while simulating parts not yet written; and a menu structured user interface. Author (ESA)

N82-10764# Royal Inst. of Tech., Stockholm (Sweden). Dept. for Numerical Analysis and Computing Science.
INTEGRAL: A PROPOSAL FOR A RESEARCH LABORATORY OF THE DEPARTMENT FOR NUMERICAL ANALYSIS AND COMPUTING SCIENCE
Oerjan Ekeberg, Jan Olof Eklundh, Kerstin Frencker, Anders Hillbo, Lars Kjelldahl, Anders Lansner, Lennart Pettersson, Bjoern Ringh, Staffan Romberger, Yngve Sundblad et al 1981 49 p refs
(TRITA-NA-8103) Avail: NTIS HC A03/MF A01

The design of a laboratory destined to develop knowledge, methods and tools for computer aided structuring, interpretation, editing and presentation of text and picture information with high quality in readability and intelligibility is discussed. Techniques from computer graphics, text processing, (digitized) image processing, computer vision and pattern analysis, are integrated to establish an openly available basis of knowledge and to support education. Author (ESA)

N82-10765# National Bureau of Standards, Washington, D.C. Center for Programming Science and Technology.
SPECIFICATIONS AND TEST METHODS FOR NUMERIC ACCURACY IN PROGRAMMING LANGUAGE STANDARDS Final Report
John V. Cugini Jun. 1981 42 p refs
(PB81-219305; NBS-SP-500-77; LC-81-600056) Avail: NTIS HC A03/MF A01 CSCL 09B

Language-independent and machine-independent criteria for assessing the quality of floating-point arithmetic operations and functions are formulated. The criteria require that results be within the limits generated by perturbing the arguments or operands by a specified amount, and thus allow for the mathematical instability of some functions at certain arguments and also for the granularity of numeric representation inherent in digital machines. Automatic test methods derive naturally from the accuracy requirements. Model algorithms for testing are included. GRA

N82-10766# National Bureau of Standards, Washington, D.C. Center for Programming Science and Technology.
NBS PROGRAMMING ENVIRONMENT WORKSHOP REPORT Final Report
Martha A. Branstad, ed. and W. Richards Adrion, ed. Jun. 1981 109 p refs Conf. held at Rancho Sante Fe, Calif., 29 Apr. - May 1980
(PB81-223430; NBS-SP-500-78; LC-81-600068) Avail: NTIS HC A06/MF A01 CSCL 09B

The state-of-the-art in programming environment technology and the key questions and issues that must be addressed to use these techniques to improve software quality and productivity within the Federal Government are addressed. GRA

N82-10994# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE AUTOMATIC MATRIX FORCE METHOD AND TECHNIQUES FOR HANDLING MORE COMPLEX COMPUTATIONS WITH GIVEN COMPUTER CAPACITY
Yang Qingxiong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 338-358 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

62 COMPUTER SYSTEMS

Includes computer networks.

N82-10767*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
REMOTELY PILOTED VEHICLE: APPLICATION OF THE GRASP ANALYSIS METHOD
William L. Andre and J. Bradley Morris Sep. 1981 60 p Prepared in cooperation with Army Research and Technology Labs., Moffett Field, Calif.
(NASA-TM-81261; A-8456; USAAVRADCOM-TR-81-A-22)
Avail: NTIS HC A04/MF A01 CSCL 09B

The application of General Reliability Analysis Simulation Program (GRASP) to the remotely piloted vehicle (RPV) system is discussed. The model simulates the field operation of the RPV system. By using individual component reliabilities, the overall reliability of the RPV system is determined. The results of the simulations are given in operational days. The model represented is only a basis from which more detailed work could progress. The RPV system in this model is based on preliminary specifications and estimated values. The use of GRASP from basic system definition, to model input, and to model verification is demonstrated. S.L.

N82-10768# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
CHAOSNET
David A. Moon Jun. 1981 63 p refs
(Contract N00014-80-C-0505)
(AD-A104024; AI-M-628) Avail: NTIS HC A04/MF A01 CSCL 09/2

Chaosnet is a local network, that is, a system for communication among a group of computers located within about 1000 meters of each other. Originally developed by the Artificial Intelligence Laboratory as the internal communications medium of the Lisp Machine system, it has since come to be used to link a variety of machines around MIT and elsewhere. This memo describes both the hardware and software protocols. It is intended to be the definitive documentation for Chaosnet. Author (GRA)

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

N82-10769 North Carolina State Univ. at Raleigh.
OPTIMAL CONTROL OF ARRIVALS TO AN ACYCLIC QUEUEING NETWORK OF TWO EXPONENTIAL SERVERS Ph.D. Thesis
Hussein Atta Ghoneim 1980 108 p
Avail: Univ. Microfilms Order No. 8111004

An acyclic queueing network of two exponential servers is discussed. The input to such a network can be controlled by accepting or rejecting arriving customers. It is assumed that customers arrive from a Poisson process. The arrivals are of two types: those that join server (1) then go to server (2) or those that join server (2) directly. Conditions under which a monotonic control policy is optimal are determined. Optimal decision rules for customers seeking self and social optimization are examined and, that the usual result that individual optimization tends to over congest the servie system is not necessarily true for type (1) customers. These results are established for finite and infinite horizons. Dissert. Abstr.

N82-10770 Polytechnic Inst. of New York, Brooklyn.
APPROXIMATION METHODS FOR ANALYSIS OF QUEUES WITH APPLICATION TO PROBLEMS IN COMPUTER COMMUNICATION NETWORKS Ph.D. Thesis
Hsiao-Mei Jean Hu 1981 114 p
Avail: Univ. Microfilms Order No. 8118874

Methodologies as well as numerical examples for all the approximation methods are presented. Two different methods of approximation, the diffusion approximation and the method of stages, are studied. Two distinct ways of approximation are presented: Prony's method and the rational function method. The rational function method approximates the moment generating function of pertinent distributions by rational functions which can then be transformed back generating approximate p.d.f's in the form of weighted sums of hyperexponential or Erlangian distribution. Dissert. Abstr.

N82-10771 Carnegie-Mellon Univ., Pittsburgh, Pa.
PARTITIONED QUEUEING NETWORK MODELING AND PERFORMANCE ANALYSIS OF MULTI-PROCESSORS Ph.D. Thesis
William Robert Paulsen 1981 143 p
Avail: Univ. Microfilms Order No. 8118444

A closed queueing network approximation analysis technique that is shown to be particularlysuited to a certain class of memory access level multiprocessor performance models is presented. This class has the property that subnetworks of queues can be found such that customers associated with a particular subnetwork traverse queues only within that subnetwork, or they traverse any of a set of shared queues. The approximation technique is described by several algorithms, which are symbolically evaluated for simple networks and numerically evaluated for larger networks. Errors introduced by the approximation, with respect to exact evaluation results, are discussed. The approximation technique is thoroughly examined to the extent that one may estimate, or predict, the error that will be incurred in using the approximation method before it is applied to the analysis of a given network. Several examples of multiprocessor analyses are given that indicate the error is often small, yet a computationally feasible solution is provided. Dissert. Abstr.

N82-10772 Massachusetts Univ., Amherst.
STABLE ADAPTIVE CONTROL FOR MULTIVARIABLE SYSTEMS Ph.D. Thesis
Velliyiur Nott Subbarao 1981 112 p
Avail: Univ. Microfilms Order No. 8118048

Stable adaptive controllers are designed for multivariable systems, when only the input and output signals are accessible and not the entire state vector. The desired dynamic behavior is characterized by a reference model. The control inputs are synthesized along with the associated adaptive parameters of the plant so that the plant outputs track the model outputs asymptotically. In these design schemes feedback and feedforward gains are adjusted to compensate for unknown plant parameters. Lyapunov's direct method forms the basis of the algorithm for adaptive laws for the multivariate system. The global asymptotic stability of the adaptive controller can be implemented as a differentiator-free dynamical system. In the case of single-input single-output plants, globally stable controllers are designed using simpler auxiliary inputs. Variable adaptation gain algorithms, which can be used to improve the transient response of the plant, are developed. Furthermore the property of global asymptotic stability of the adaptive algorithm is preserved in the variable adaptation gain schemes. Dissert. Abstr.

N82-10773# Research Inst. of National Defence, Stockholm (Sweden).
INTRODUCTION TO NONLINEAR CONTROL TECHNIQUES [INTRODUKTION TILL OLINJAER REGLERTEKNIK]
Lennart Brandqvist Jul. 1980 60 p In SWEDISH
(FOA-C-20363-E3) Avail: NTIS HC A05/MF A01

Transfer functions for nonlinear chains are classified. Descriptive functions, single sine and double sine are considered. A method to convert nonlinear chains to linear ones is presented. Intentional introduction of nonlinearities in control systems is also covered. Ordinary analytical methods for analysis for nonlinear systems are mentioned. Author (ESA)

N82-10774# European Space Agency, Paris (France).
PERFORMANCE EVALUATION OF UNCONSTRAINED OPTIMIZATION TECHNIQUES
Dieter Kraft and Gerhard Kreisselmeier Apr. 1981 43 p refs
Transl. into ENGLISH of "Vergleich von Verfahren zur unbeschraenkten Optimierung von Funktionen mehrerer Variabler" Rept. DFVLR-Mitt-79-21 DFVLR, Oberfpaffenhofen, West Germany, Sep. 1979 Original report in GERMAN previously announced as N81-14992
(ESA-TT-669; DFVLR-Mitt-79-21) Avail: NTIS HC A03/MF A01; DVFLR, Cologne DM 12,80

Algorithms for unconstrained optimization of functions of several variables are described. Their performance as implemented FORTRAN programs is evaluated by comparing results of test examples. Unconstrained optimization is not only important by itself for unconstrained problems, but also plays a significant role as core algorithm in constrained optimization (penalty and multiplier methods). Methods requiring a gradient calculation (quasi-Newton methods) and methods not requiring a gradient calculation are included. The general method of iteration, Quasi-Newton formulas and step-length algorithms are described. None of the program variants can provide a solution to every example without modification to the starting values, i.e., the programs cannot be utilized in all cases, without any further consideration, like a black box; they require some degree of experience on the part of the user. Author (ESA)

N82-10988# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

MODEL METHOD OF STATE ESTIMATION

Dai Guanzhong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 156-190 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-10775 Mississippi Univ., University.

ON THE SOLUTIONS OF MIXED BOUNDARY VALUE PROBLEMS VIA VARIATIONAL TECHNIQUES AND INTEGRAL EQUATIONS Ph.D. Thesis

Sam Sohrab Gordji 1981 104 p
Avail: Univ. Microfilms Order No. 8117284

Several methods of solving mixed boundary value problems which arise in engineering applications, particularly in solid mechanics are discussed. The classical method of solving dual integral equations by conversion into singular integral equations is applied to the determination of stresses in a folded plate structure which is weakened by a crack. The least square technique is applied to an example of a mixed boundary value problem in potential theory governed by dual trigonometric series. In order to solve the infinite number of unknown constants, certain integral functions are examined. The minimization of this function leads to a system of linear algebraic equations for the determination of the unknown constants. The method is extended in the context of mixed boundary value problems of linear elasticity in a rectangular domain. The problem is formulated in terms of complex valued eigenfunctions which posses modified and complicated orthogonality properties. This renders the construction of the integral function nonunique. Dissert. Abstr.

N82-10776 Notre Dame Univ., Ind.

DEFINING FUNCTIONS OF BOUNDED GROWTH FOR ANALYTIC SUBSETS OF ALGEBRAIC VARIETIES Ph.D. Thesis

James Emmett Curry 1981 151 p
Avail: Univ. Microfilms Order No. 8118564

Let A be an analytic subset of pure dimension P of an affine algebraic variety V of dimension m > p embedded into a complex projective space W (doublebar) of dimension k. A complex projective space S of dimension (k-m-1) is given embedded into the hyperplane at infinity, W(double bar)-W. An affine subspace Y of dimension m in the affine space W is given so that the projection centered at S of V onto Y is proper, subjective, and holomorphic. It is shown that for small perturbations of S, corresponding central projections remain proper, subjective, and holomorphic. In this way, a family of projections parameterized by a Grassmannian G sub s(W) is obtained. By Remmert's Proper Mapping Theorem, the image of A under a proper holomorphic map is again an analytic set of pure dimension p in Y. Because Y is a vector space, well known results of Skoda allow the construction of defining functions of bounded growth on Y. An induction technique allows the choice of (m + 1) of these functions which pulled back to V by the appropriate projections, form a family of defining functions for A in V. Estimates are included to show that these functions again have appropriately bounded growth properties. Dissert. Abstr.

N82-10777 California Univ., Riverside.

RIDGE REGRESSION: CONSTRAINED OPTIMIZATION WITH APPLICATIONS IN DESIGN OF EXPERIMENTS Ph.D. Thesis

Kent Douglas Smith 1981 145 p
Avail: Univ. Microfilms Order No. 8119579

The constraint required to derive ridge regression estimates is contrasted with those used in classical design of experiments estimation; the required constraint is shown to be related to the ridge parameter. The application of ridge regression estimates to the general linear model was furthered by developing testing procedures based upon a constrained likelihood ratio technique. The resulting distributions were derived and techniques for conducting tests of hypotheses based upon ridge regression estimates were developed. Finally, ridge regression estimation procedures were developed for design of experiment models. Such models are ideally suited for ridge regression techniques since the matrix is almost always singular. Parameter estimates are readily obtained since the design matrix has such a well defined pattern to its structure. Dissert. Abstr.

N82-10778*# Stanford Univ., Calif. Inst. for Plasma Research.

EXAMINATION OF TIME SERIES THROUGH RANDOMLY BROKEN WINDOWS

P. A. Sturrock and E. C. Shoub Jul. 1981 23 p refs
(Grant NGL-05-020-272; Contract N00014-75-C-0673)
(NASA-CR-164901; SU-SUIPR-824R) Avail: NTIS HC A02/MF A01 CSCL 12A

In order to determine the Fourier transform of a quasi-periodic time series (linear problem), or the power spectrum of a stationary random time series (quadratic problem), data should be recorded without interruption over a long time interval. The effect of regular interruption such as the day/night cycle is well known. The effect of irregular interruption of data collection (the 'breaking' of the window function) with the simplifying assumption that there is a uniform probability p that each interval of length tau, of the total interval of length T = N sub tau, yields no data, is investigated. For the linear case it is found that the noise-to-signal ratio will have a (one-sigma) value less than epsilon if N exceeds p(-1)(1-p)epsilon(-2). For the quadratic case, the same requirement is met by the less restrictive requirement that N exceed p(-1)(1-p)epsilon(-1). Author

N82-10779# Oakland Univ., Rochester, Mich. Dept. of Physics.

THE USE OF FOURIER TRANSFORM METHODS FOR THE EVALUATION OF COEFFICIENTS IN A TAYLOR SERIES TO ARBITRARY ORDER

J. M. McKinley and P. P. Schmidt 1 Aug. 1981 26 p refs
Submitted for publication
(Contract N00014-77-C-0293; NR Proj. 359-648)
(AD-A103997; TR-6) Avail: NTIS HC A03/MF A01 CSCL 12/1

We present a new formulation of the Taylor series for a class of functions which can be expressed as the product of a purely angular and purely radial part, viz., G(R sub T) = Y sub (lambda mu)(r)f(r) in which Y sub (lambda mu) (R) is the spherical harmonic function. The formulation is based upon the use of the Fourier transform of the function to be expanded. The general expression for the Taylor series which we obtain is similar in form to the Laplace expansion for the Coulomb potential. Thus, Taylor series can be developed for aribtrary functions along lines which are similar to the multipolar expansions in the electromagnetic theory. Such expansions are easily adapted to the symmetry of a collection of sources. Author (GRA)

N82-10780# Maryland Univ., College Park. Inst. for Physical Science and Technology.

A-POSTERIORI ERROR ESTIMATES AND ADAPTIVE TECHNIQUES FOR THE FINITE ELEMENT METHOD

I. Babuska and A. Miller Jun. 1981 108 p refs
(Contract N00014-77-C-0623)
(AD-A104003; BN-968) Avail: NTIS HC A06/MF A01 CSCL 12/1

The theory of the computable a-posteriori error estimate for a finite element method is developed. Among other things, it is shown that the error estimate is very reliable and the ratio (called effectivity index) between the estimator and the true error approaches one. Numerical examples computed by program FEARS (Finite Element Adaptive Research Solver) of the University of Maryland, illustrate the effectivity and reliability of the estimators. Author (GRA)

N82-10781# Oak Ridge Y-12 Plant, Tenn. Fabrications Systems Dept.
INTERPOLATION ALGORITHMS FOR MACHINE TOOLS
R. R. Burleson Aug. 1981 20 p refs
(Contract W-7405-eng-26)
(DE81-029463; Y-2223) Avail: NTIS HC A02/MF A01

Three types of interpolation algorithms used in most numerical control systems (digital differential analyzer, pulse-rate multiplier, and binary-rate multiplier) are described. A method for higher order interpolation is also discussed. The trends point toward the use of high-speed microprocessors to perform these interpolation algorithms. DOE

N82-10782# Argonne National Lab., Ill. Applied Mathematics Div.
IMPROVING THE ACCURACY OF COMPUTED EIGENVALUES AND EIGENVECTORS
J. J. Dongarra, C. D. Moler (New Mexico Univ.), and J. H. Wilkinson (Stanford Univ.) Jul. 1981 31 p refs
(Contract W-31-109-eng-38; Grants NSF MCS-76-03297; AF-AFOSR-0094-79)
(DE81-028480; ANL-81-43) Avail: NTIS HC A03/MF A01

A computational method for improving the accuracy of a given eigenvalue and its associated eigenvectors is described. The method is analogous to iterative improvement for the solution of linear systems. An iterative algorithm using working precision arithmetic is applied to increase the accuracy of the eigenpair. The only extended precision computation is the residual calculation. The method is related to inverse iteration and to Newton's method applied to the eigenvalue problem. DOE

N82-10783# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
INTRODUCTION OF EVENT TREE ANALYSIS INTO THE EFFICIENCY CALCULATIONS FOR AIRBORNE TARGETS [INFOERAANDE AV HAENDELSETRAEDSANALYS I VERKANSBERAEKNINGAR FOER LUFTMAAL]
Per-Olof Fjellstroem, Lars Eriksson, and Peter Verstaendig Oct. 1980 35 p refs In SWEDISH
(FOA-C-20374-D8) Avail: NTIS HC A03/MF A01

An algorithm which can be applied to relatively complex event trees is treated. Its use in the calculation of the effects of fighting components in airborne targets is described. A special operator, called KOMPTAB, is used to estimate the consequences of the damage caused by firing and to evaluate the possibilities that the target can survive and fulfill its assignment. Author (ESA)

N82-10784# Oxford Univ. (England). Engineering Lab.
MULTIVARIABLE SECTORS AND NONLINEAR STABILITY. PART 2: A GENERALIZATION OF THE CIRCLE CRITERION
B. Kouvaritakis and R. Husband 1981 30 p refs 2 Vol.
(OUEL-1355/81-Pt-2) Avail: NTIS HC A03/MF A01

The use of appropriate sector conditions in conjuction with the decomposition of a linear operator into two linear operators, phi and G-phi, where phi has a normal transfer function matrix, leads to a useful stability criterion for a class of multivariable nonlinear feedback systems. This sector approach is adopted and the decomposition of the linear operator is used order to define frequency dependent sectors, which leads to a natural extension of the circle criterion to the multivariable case. The result has a simple graphical interpretation and lends itself to a computer implementation which can be shown to be numerically stable. Author (ESA)

N82-10785# Oxford Univ. (England). Engineering Lab.
MULTIVARIABLE SECTORS AND NONLINEAR STABILITY. PART 1: THE USE OF SECTORS IN THE DERIVATION OF STABILITY CRITERIA FOR NONLINEAR MULTIVARIABLE SYSTEMS
R. Husband and B. Kouvaritakis 1981 25 p refs 2 Vol.
(OUEL-1359/81-Pt-1) Avail: NTIS HC A02/MF A01

The definition and properties of the sector of scalar systems are extended to systems with many-inputs and many-outputs. On the basis of these definitions it is possible to state a simple stability criterion for a class of nonlinear multivariable systems. A suitable decomposition of the linear element G of the nonlinear feedback system, enables the derivation of a generalization of the circle criterion. This involves the frequency response of the eigenvalues of a normal matrix and an expanded version of the classical on-axis circle. The expansion of the circle is due to the deviation of the transfer function matrix of G from normality which is measured by appropriate sector conditions o the error operator G-phi. Author (ESA)

N82-10786 Carnegie-Mellon Univ., Pittsburgh, Pa.
ON NUMERICAL SOLUTIONS TO INTEGRAL EQUATIONS Ph.D. Thesis
Harold Edward Donley, Jr. 1981 85 p
Avail: Univ. Microfilms Order No. 8118431

Numerical solutions to three problems formulated in terms of Fredholm integral equations are discussed. The first problem is in an abstract setting. A first kind operator equation is solved on Hilbert spaces using the method of regularization and least squares approximations. In a Sobolev space setting with finite element subspaces it is shown that for an apropriate choice of the regularization parameter, optimal error bounds are attained. The second integral equation is a first kind weakly singular Fredholm equation arising from potential theory via Fichera's method. Existence and stability results are obtained for piece-wise constant collocation approximations for the integral equations associated with Laplace's equation on a circle. Experimental error estimates are also included. Finally, some results of numerical experiments for some two- and three-dimensional linear elastic fracture mechanics problems are discussed. Dissert. Abstr.

N82-11005# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON THE UNIQUENESS OF THE SOLUTION TO THE VELOCITY POTENTIAL INTEGRAL EQUATION ESTABLISHED BY USING GREEN'S THEOREM
Liu Qiangang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 273-286 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-10787 Case Western Reserve Univ., Cleveland, Ohio.
A COMPARISON OF FISHER'S LINEAR DISCRIMINANT AND THE LOGISTIC CONDITIONAL MAXIMUM LIKELIHOOD CLASSIFICATION TECHNIQUES Ph.D. Thesis
Linda Jane Dohanich Goldsmith 1981 144 p
Aval: Univ. Microfilms Order No. 8118621

Fisher's linear discriminant and the logistic conditional maximum likelihood method, two currently applied linear classification methods are compared in the two-group case for small- to moderate-sized samples. The comparisons are based on results of a Monte Carlo simulation computer program which summarizes estimates of the expected error rates, relative efficiencies, expected linear classifier coefficients, and other performance measurements. Distribution types (and sample sizes) for the population pairs considered include: (1) multivariate normal with identical unknown variance-covariance matrices (N = 20, 50, 100); (2) multivariate binary (N = 100, 200); and (3) independent mixes of 1 and 2 (N = 100, 200). Both methods performed well in terms of expected error rates and other measurements on all the population pairs in which the optimal method (the method of choice when the population parameters are known) is a linear classifier. When the optimal method is not a linear classifier, both methods perform poorly. Data from some multinomial distributions originally coded as multivariate binary can be recoded to yield linear models on which the two methods perform well. Dissert. Abstr.

N82-10788 Princeton Univ., N. J.
MODELING DATA AS A FRACTIONAL GAUSSIAN NOISE Ph.D. Thesis

Donna Lesh Mohr 1981 156 p
Avail: Univ. Microfilms Order No. 8119125

Time series in which distant records are strongly correlated are addressed. Specifically, a family of processes called fractional gaussian noise are discussed which have a covariance function which asymptotically is proportional to < or = < 1. A method for estimating the mean when H is known is given. This should provide guidance for a method when H is unknown. Confidence intervals for H using R/S Analysis and using a function of the periodogram are presented. The periodgram yields more dependable estimates. Approximate confidence intervals for the mean of the marginal distribution are given using the sample mean and standard deviation. The calculation of these intervals uses an estimates of the unknown nuisance parameter H. The effect of this substitution depends on the length of the series.
Dissert. Abstr.

N82-10789 Pennsylvania Univ., Philadelphia.

STABILITY OF WEIGHTS AND COEFFICIENTS PRODUCED BY CANONICAL CORRELATION AND REDUNDANCY ANALYSIS: A SAMPLING STUDY OF A REAL DATA BASE Ph.D. Thesis

John Algimantas Meskauskas 1981 143 p
Avail: Univ. Microfilms Order No. 8117814

A simulation technique, comparing results found in multiple samples to those for an entire population, was employed. Thirty samples were drawn at each of four different sizes (30, 60, 120, 360) from a population of 7782. Variables were grouped into three covariance structures with six variables each in the X and Y subsets. Structure 1 contained variables with population intercorrelations of 0.29 to 0.61, Structure 2 of 0.13 to 0.35; structure 3 contained a combination of Structure 1 and 2 variables. Canonical correlations and redundancy analyses were run on each of the 120 samples, for each of the three structures, thus resulting in 720 runs. Bias was assessed by comparing the mean result for a set of samples to the corresponding population parameter. Standard error was defined as the standard deviation of sample estimates. Both sample and covariance structure affect the bias of the canonical correlations.
Dissert. Abstr.

N82-10790 Virginia Polytechnic Inst. and State Univ., Blacksburg.

THE ANALYSIS OF VARIANCE WITH UNBALANCED AND INCOMPLETE DATA Ph.D. Thesis

Leigh Whitton Murray 1980 173 p
Avail: Univ. Microfilms Order No. 8116798

The algorithms used by several statistical computer packages to obtain analyses of unbalanced data are discussed. Methods of determining algebraic expressions for the hypotheses tested in such analyses are developed, and some examples of hypotheses tested by various statistical packages are given. Consideration is also given to the extension of these methods of analysis to situations of missing cells and to methods of determining the hypotheses tested in such cases. Finally, a definition of connectedness applied to the cell means model is developed in conjunction with a criteria for determining whether a model is connected.
Dissert. Abstr.

N82-10791 Carnegie-Mellon Univ., Pittsburgh, Pa.

STOCHASTIC MODELS FOR THE DISCOVERY OF OBJECTS IN DISCRETE TIME Ph.D. Thesis

Mark Alan Ciancutti 1981 51 p
Avail: Univ. Microfilms Order No. 8118428

Some stochastic models for the discovery of objects in discrete time periods are presented. Objects are distributed among cells in a variety of ways and at discrete time periods inspections of the cells are conducted to discover the objects. Provisions were made for the movement of undiscovered objects among the cells between inspection periods. Patterns of search for the models which are optimal for various criteria are presented.
Dissert. Abstr.

N82-10792 Texas A&M Univ., College Station.

METHODS FOR ANALYZING UNTRANSFORMED DATA FROM THE NEGATIVE MULTINOMIAL DISTRIBUTION Ph.D. Thesis

Robert Joseph Case, Jr. 1981 94 p
Avail: Univ. Microfilms Order No. 8118246

Several methods for analyzing untransformed data from negative multinomial distributions are presented with examples. These include a test of fit, a comparison of mean values, and an analysis of linear models. The techniques are generalizations of existing univariate methods used to analyze data from generalized Poisson distributions such as the negative binomial. Constrained minimum chi square estimators are derived separately for the marker parameter and the proportions for each variate in the negative multinomial distribution. The statistics required for performing these tests are based on sample factorial cumulants and sample zero frequencies for each variate in each distribution under consideration. The goodness of fit test is free of disadvantages associated with the Pearson chi square test and is more easily computed through weighted least squares. The advantages of analyzing mean values and linear models on untransformed data are discussed along with a history of the negative multinomial distribution.
Dissert. Abstr.

N82-10793 Loyola Univ., Chicago, Ill.

ROBUSTNESS OF THREE METHODS FOR ASSESSING SECOND ORDER INTERACTION IN MULTIDIMENSIONAL CONTINGENCY TABLES WITH SMALL SAMPLES BY A MONTE CARLO TECHNIQUE Ph.D. Thesis

Joseph William Fidler 1981 318 p
Avail: Univ. Microfilms Order No. 8119974

A Monte Carlo technique generated 3 x 3 x 3, 2 x 2 x 3 and 2 x 2 x 2 contingency tables for the following sample sizes: 20, 40, 60, 80, 100. In addition, four multinomial distributions for each dimension were used as underlying sampling distributions. Each sampling distribution was used to generate 1,825 contingency tables for each sample size. Consequently 109,500 contingency tables were generated for the 60 combinations of dimension (3), sample size (5), and sampling distribution (4). Each table was tested for second order interaction by means of four methods: Bartlett, Iterative Proportional Fitting (IPF), Goodman 1, and Goodman 2. For Goodman 1, a 1/2 was added to each empty cell and for Goodman 2, a 1/2 was added to every cell before the table was tested for second order interaction by the Goodman method.
Dissert. Abstr.

N82-10794 Texas Univ. at Arlington.

THE H-FUNCTION AND PROBABILITY DENSITY FUNCTIONS OF CERTAIN ALGEBRAIC COMBINATIONS OF INDEPENDENT RANDOM VARIABLES WITH H-FUNCTION PROBABILITY DISTRIBUTIONS Ph.D. Thesis

Ivy Dewey Cook, Jr. 1981 239 p
Avail: Univ. Microfilms Order No. 8119277

The exact probability density function and cumulative distribution function of a sum of any number of terms involving any combination of products, quotients, and powers of independent random variables with H-function distributions was determined. Background material, including history on H-functions and the algebra of random variables, definitions and properties of integral transforms, theorems on transformations of random variables, and definition, properties and special cases of the H-function are provided. Evaluation guidelines are established and applied to the known special cases, the Laplace transform, and the derivatives of the H-function. An improved formulation for evaluation of an H-function by summing residues is derived. This formulation is combined with a Laplace transform numerical inversion method to give a second new formulations. The definition, special cases, and transformation theorems for the H-function distribution are presented.
Dissert. Abstr.

N82-10795 Virginia Polytechnic Inst. and State Univ., Blacksburg.

COMPARISON OF REGRESSION MODELS BY THE USE OF STANDARDIZED TOTAL MEAN SQUARED ERROR Ph.D. Thesis

Yuk-Miu Lam 1981 237 p
Avail: Univ. Microfilms Order No. 8118701

The distributions of linear combinations and quadratic forms of indepndent t-variates and their approximations are discussed. The objective of using the C sub p statistic is to find a model which gives the smallest standardized total mean squared error (STMSE) among other candidate regression models. Models with smaller C sub p and C sup close to p are considered. Comparisons of regressions models by the use of their STMSE are performed via hypothesis testing. The test is extended to the simultaneous comparison of a p-term model with all its possible submodels. Multiple comparisons of all possible models are studied. Stein's two stage sampling procedure is applied to linear regression. The regression model is transformed into a reduced model with errors being Student-t distributed and completely independent of the unknown variance. The development of statistical analysis and model comparisons follows the same path as that for the homogeneous model. Dissert. Abstr.

N82-10796 Claremont Graduate School, Calif.

ERROR REDUCTION TECHNIQUES FOR MONTE CARLO NEUTRON TRANSPORT CALCULATIONS Ph.D. Thesis

Jean Ho-Ming Wang Ju 1981 152 p
Avail: Univ. Microfilms Order No. 8119942

An importance sampling theory for general weighted analog (GWAN) estimators is developed. The optimal choice of the weighting measure v sub 2 (= analog measure), which is identical to that used for unbiased importance sampling, is shown to give rise to a zero-error estimator. A theory for combining possibly biased estimators is developed. A path length importance measure is derived in terms of the terminal importance measure, a general theoem is developed to obtain an importance measure for an estimator satisfying certain conditions of integrability and absolute continuity. With this importance measure, zero-error estimation may be achieved. The error reduction techniques developed in this work are applied to model problems. Modified path length estimation based on the path length importance measure leads to excellent error reduction in all model problems examined. Dissert. Abstr.

N82-10797 Claremont Graduate School, Calif.

CONTRIBUTIONS TO THE THEORY OF ERROR REDUCTION OF QUASI-MONTE CARLO METHODS Ph.D. Thesis

Earl Howard Maize 1981 162 p
Avail: Univ. Microfilms Order No. 8119943

Deterministic error bounds for a variance reducing technique known as weighted importance sampling are developed. The estimates are of a form where g and h are appropriately chosen adjunct functions. In the case g = h = 1, these error bounds reduce to the Koksma-Hlawka Inequality. If added restrictions are placed on the integrand, in particular periodicity and a certain amount of regularity, convergence rates better than O((log N)(s)/N) may be obtained. The only known infinite sequences of sample points which yield this improved convergences rate depend upon taking the fractional parts of irrational numbers, which, because of the necessary truncation in computer implementatin, may lead to unexpected results. A class of infinite dyadic sequences which are easily and exactly implemented on a computer are introduced. These sequences are intimately related to the theory of good lattice points and also result in an improved convergence rate. The use of weighted importance sampling to transform a sufficiently regular integrand into a periodic integrand in order to take advantage of this improved convergence rate is demonstrated. Dissert. Abstr.

N82-10798# Rome Air Development Center, Griffiss AFB, N.Y.

AN ERROR ANALYSIS TECHNIQUE FOR STATISTICAL HYPOTHESIS TESTING. GENERATION OF JOINTLY DISTRIBUTED RANDOM VARIATES

John F. Lennon and Robert J. Papa Mar. 1981 39 p refs
(AF Proj. 2305)
(AD-A103956; RADC-TR-81-81) Avail: NTIS HC A03/MF A01 CSCL 12/1

As a part of the study of electromagnetic scattering from rough terrain, various geographical sites were characterized by applying statistical analysis techniques to digitized terrain data bases. One aspect was the use of decision theory formulation to assign an appropriate distribution function to the surface height variations in the regions. This report discusses the decision processes used and the errors to be expected. There are two main themes: assessment of statistical hypothesis testing and application of a numerical technique to determine the errors inherent in the decisions. There are a number of assumptions and constraints that affect the form of the hypothesis test developed for the terrain study and these will be considered. The numerical technique consists in generating jointly distributed random variates in a Monte Carlo type computer procedure. Its application to the specification of decision errors will be described. The formulation allows extension of standard analytic error analysis techniques to cases where the analysis would be intractable. Results are presented and the agreement with analysis for various cases is shown. Author (GRA)

N82-10799# Tennessee Univ., Knoxville. Dept. of Psychology.

AN ALTERNATIVE ESTIMATOR FOR THE MAXIMUM LIKELIHOOD ESTIMATOR FOR THE TWO EXTREME RESPONSE PATTERNS

Fumiko Samejima 29 Jun. 1981 113 p refs
(Contract N00014-77-C-0360; RR0420401)
(AD-A104088; RR-81-1) Avail: NTIS HC A06/MF A01 CSCL 12/1

In the methods and approaches we have developed for estimating the operating characteristics of the discrete item responses, the maximum likelihood estimate of the examinee based upon the 'Old Test' has an important role. When Old Test does not provide us with a sufficient amount of test information for the upper and lower part of the ability interval, however, it is likely that we obtain response patterns which are either all lowest item scores or all highest item scores, and the resultant maximum likelihood estimates are negative or positive infinity. Although such a test is undesirable for us to use as the Old Test, to a certain extent we can salvage the situation by providing some alternative estimator for these two extreme response patterns. Following RR-80-3, 'Is Bayesian Estimation Proper for Estimating the Individual's Ability', in the present paper, such an estimator is proposed and discussed. Author (GRA)

N82-10800# Texas Univ., Austin. Inst. for Fusion Studies.

TURBULENT RESPONSE IN A STOCHASTIC REGIME

K. Molvig (MIT, Cambridge), J. P. Freidburg (MIT, Cambridge), R. Potok (MIT, Cambridge), S. P. Hirshman (Oak Ridge National Lab.), J. C. Whitson (Oak Ridge National Lab.), and T. Tajima Jun. 1981 28 p refs
(Contract DE-FG05-80ET-53088)
(DE81-029768; DOE/ET-53088/30; IFSR-30) Avail: NTIS HC A03/MF A01

The theory for the non-linear, turbulent response in a system with intrinsic stochasticity is considered. It is argued that perturbative Eulerian theories, such as the direct interaction approximation (DIA), are inherently unsuited to describe such system. The exponentiation property that characterizes stochasticity appears in the Lagrangian picture and cannot even be defined in the Eulerian representation. An approximation for stochastic systems - the normal stochastic approximation - is developed and states that the perturbed orbit functions (Lagrangian fluctuations) behave as normally distributed random variables. This is independent of the Eulerian statistics and, in fact, the Eulerian fluctuations are treated as fixed. A simple model problem (appropriate for the electron response in the drrift wave) is subjected to a series of computer experiments. To within numerical noise the results are in agreement with the normal stochastic numerical noise the results are in agreement with the normal stochastic approximation. The predictions of the DIA for this mode show substantial qualitative and quantitative departures from the observations. DOE

N82-10801 Massachusetts Univ., Boston.

CONSTRUCTING THE TENSOR PRODUCT OF GENERALIZED SAMPLE SPACES Ph.D. Thesis

Robin Howard Lock 1981 164 p
Avail: Univ. Microfilms Order No. 8118016

Techniques for constructing the tensor product of a pair of generalized sample spaces as defined in the empirical logic formalism of Randall and Foulis are investigated. One reason for studying this problem is to sufficiently explain the structure underlying these products in order to apply the stochastic theory and inference procedures of operational statistics to the combination of systems or observers. The deterministic probability models on the generalized sample spaces are used to create a duality theory on which most of the constructions are based. Row and column shifts are introduced as a means to generate tensor operations in a procedure to verify these constructions. A reasonable candidate is obtained for the tensor product of generalized sample space which admit a unital set of dispersion free weights by using the duality alone or by combining it with

the theory of interpretation manuals. How these concepts can be applied in explicitly finding the tensor product of any dacification manual is shown. It is proved that the logic of the tensor produce of locally finite manuals depends only on the logic of the factors and define a tensor product of general operational logics.
Dissert. Abstr.

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-10802# Engins Matra, Velizy (France).
ANALYSIS OF TECHNIQUES FOR THE REDUCTION OF MODELS. NONLINEAR FILTERING [ANALYSE DES TECHNIQUES DE REDUCTION DE MODELES: FILTRAGE NON-LINEAIRE]
Christian Guedon and Bernard Govin 1980 96 p refs In FRENCH
Avail: NTIS HC A05/MF A01

Diverse techniques which can be applied to particular systems, the equations of which were well adapted to the description of large satellite structures, are critically reviewed. These include aggregation, participation in optimal control, the modal gains technique, impulsion responses, and tests for observability and commandability. The effect of spillover on calculations is also considered. The technique that seems the most promising is the one which depends on modal contributions to impulsion responses, because it comprehends a physical interpretation of truncation phenomena and it is well adapted to an algorithmic treatment.
Author (ESA)

N82-10803# Engins Matra, Velizy (France).
TECHNIQUES FOR THE ANALYSIS OF MULTIVARIABLE LINEAR SYSTEMS BY STATE REQUIREMENTS [TECHNIQUE D'ANALYSE DE SYSTEMES LINEAIRES MULTIVARIABLES PAR LA REPRESENTATION D'ETAT]
Magli Serre, Laurent Bourgeade, and P. E. Bourg 1980 191 p refs In FRENCH
Avail: NTIS HC A09/MF A01

As an alternative to the direct representation of physical systems, i.e., input-output modeled by a function or transfer matrix, an internal representation, which parameterizes the relation between input and output (perhaps multidimensional) by particular intermediary variables that assure the uniqueness of the response and the decoupling of past and future, is proposed. Computer programs, programming, and theoretical verifications are presented as an aid to this analysis. Obtainment of the state representation from a linear differential system with constant coefficients is considered. Extraction of observable and commandable parts of the system is treated.
Author (ESA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-10804 Notre Dame Univ., Ind.
THE CURVATURE PROPERTIES OF LEFT INVARIANT METRICS ON LIE GROUPS Ph.D. Thesis
Frank Barnet 1981 56 p
Avail: Univ. Microfilms Order No. 8118553

Let G be a Lie group with Lie algebra g. It is shown that x is in the center of g if every tangential plane containing x has nonnegative sectional curvature for all left invariant Riemannian metrics on g. If g is a Lie group containing no compact nonabelian subgroups, it is shown that the scalar curvature of g is nonpositive for all left variant Riemannian metrics on g. It is proved that, if g is any nonabelian Lie group, g admits a left invariant Lorentz metric of positive scalar curvature; and if dim g does not equal 3, g admits a left invariant Lorentz metric of negative scalar curvature. It is then shown exactly which 3 dimensional Lie groups admit left invariant Lorentz metrics of negative scalar curvature.
Dissert. Abstr.

N82-10805 Polytechnic Inst. of New York, Brooklyn.
BRANCHED AFFINE (OR PROJECTIVE) STRUCTURES ON RIEMANN STRUCTURES Ph.D. Thesis
John Thomas Masterson 1981 173 p
Avail: Univ. Microfilms Order No. 8118885

Projective structures on an arbitrary compact Riemann surface of genius g = 1 are considered using the theory of elliptic functions. A correspondence is established between certain possible projective structures on such a surface and a class of linear ordinary differential equations whose coefficients are elliptic functions prescribed by the structure. Utilizing a knowledge of the possible branch, locus divisors of affine structures, a partial answer to the question of when the structure is projective but is not affine is given. Branched affine structures on a compact Riemann surface of genus g > or = 1 are investigated. Using the theory of divisors on a Riemann surface, the existence of branched affine structures with branch locus divisors of degree satisfying a new higher bound is shown. Finally, the question of uniqueness of affine structures is examined and a uniqueness result for such structures is obtained.
Dissert. Abstr.

N82-10806# Oakland Univ., Rochester, Mich. Dept. of Physics.
TAYLOR-LAPLACE EXPANSIONS OF THE YUKAWA AND RELATED POTENTIAL ENERGY FUNCTIONS
J. M. McKinley and P. P. Schmidt 1 Aug. 1981 28 p refs
Submitted for publication
(Contract N00014-77-C-0293; NR Proj. 359-648)
(AD-A103998; TR-7) Avail: NTIS HC A03/MF A01 CSCL 12/1

In this paper we apply that form of the Taylor series to the Yukawa potential, and to several potential functions which can be derived from it. In particular, we examine the expansion of the Yukawa potential itself. In the limit as the exponent a vanishes, the Yukawa potential transforms into the Coulomb potential. We show that the limiting process applied to the Taylor series for the Yukawa potential yields the familiar form of the Laplace expansion of the Coulomb potential. Differentiation of the Yukawa potential with respect to the exponent a yields the exponential function. Hence, we develop a Taylor-Laplace power series representation of the Morse potential.
GRA

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-10807 Florida Inst. of Tech., Melbourne.
TIME-RESOLVED SPECTRAL EMISSION STUDIES OF A PULSED, HIGH-PRESSURE XENON GAS DISCHARGE Ph.D. Thesis
Manuel Figueroa 1981 461 p
Avail: Univ. Microfilms Order No. 8115521

The physical processes taking place during a high-current discharge in a high-pressure xenon plasma were investigated, with the goal of enhancing the spectral match so as to improve the overall efficiency of solid-state lasers. The dominant mechanism for the production of optical emission from the high-current, high-pressure radiating xenon plasma is that of bound-bound transitions whose characteristic emission lines are broadened to the extent of at least ten angstroms by pressure (collision) broadening and Stark broadening processes. A limited degree of control over the shape of the broad emission spectrum can be exterted by a careful time-tailing of the discharge current pulse, and by proper choice of the flashtube voltage. However, an improved understanding of the time evolution of the plasma electron and ion temperatures and concentrations during the current pulse is necessary in order to more effectively control the optical emission spectrum of the flashtube through adjustment of the available electrical input parameters.
Dissert. Abstr.

N82-10808# Maryland Univ., College Park. Dept. of Chemistry.
DIELECTRIC CONSTANT OF UNDERCOOLED WATER
B. K. Das, G. F. Kraus, J. T. Siewick, and S. C. Greer Sep. 1981 22 p refs Submitted for publication

(Contract N00014-79-C-0008; NR Proj. 051-701)
(AD-A104086; TR-2) Avail: NTIS HC A02/MF A01 CSCL 07/4

Recent work has shown that liquid water has anomalous thermodynamic properties in its metastable undercooled state, below 0 C. We have investigated the static dielectric constant and conductivity of undercooled water by measuring the capacitance (within 0.05%) and conductance (within 0.2%) of water-filled glass capillary capacitance cells between +20 C and -17 C. We find that the capacitance and conductance data over the entire temperature range can be represented by analytic functions. Our measurements show no evidence of anomalous behavior in the dielectric constant or conductivity of undercooled water. Author (GRA)

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution.*

N82-10809 Polish Academy of Sciences, Warsaw. Inst. Podstawowxch Problemow Techniki.

PHYSICAL FOUNDATIONS OF ULTRASONICS RESEARCH TRENDS AND ITS APPLICATION IN POLAND

Ignacy Malecki and Jerzy Ranachowski 1981 31 p refs
(ISSN-0208-5658) Copyright. Avail: Issuing Activity

Research trends in the acoustics of solids, of liquids and polymers, in quantum acoustics, ultrasonic nondestructive testing, bioacoustics, and optoacoustics are described. Underwater acoustics efforts are not considered. J.D.H.

N82-10810 Catholic Univ. of America, Washington, D.C.

RESPONSE OF MULTIPLE COUPLED DYNAMIC SYSTEMS Ph.D. Thesis

Lawrence J. Maga 1981 155 p
Avail: Univ. Microfilms Order No. 8118985

The impulse response function of multiple generally coupled, one dimensional, wave bearing dynamic systems in terms of the reflection and transmission coefficients at the boundaries of each system was determined. The description handles a complex dynamic system. The systems reduce properly to fit specific models of simplified complexes. The impulse response function derived is employed to generate an energy analysis (EA) of multiple generally coupled dynamic systems. The approximations and assumptions are examined and assessed. The energy analysis is derived from the impulse response function. The elements of the statistical energy analysis (SEA) are discussed. Dissert. Abstr.

N82-10811 Indiana Univ., Indianapolis.

INVERSION OF THE FIRST-ORDER EQUATIONS GOVERNING THE PROPAGATION OF SOUND WAVES IN A LAYERED ACOUSTIC MEDIUM Ph.D. Thesis

Michael Steven Howard 1981 103 p
Avail: Univ. Microfilms Order No. 8110028

The inverse scattering problem for a layered acoustic medium is considered from the first order differential equations of motion, resulting in a vector formulation and using a vector form of the inverse scattering methods for Schroedinger's equation of Quantum Mechanics, which is a vector Marchenko equation. The lowest order approximation which accounts for multiple reflections is obtained and compared using synthetic data. The exact inversion method is like the final step in removing the twice differentiable constraint imposed on the impedance profile by the wave equation method. The effects of missing high frequencies, missing low frequencies and noise in the data are compared. The left and right going component vector of the one dimensional case is generalized to two dimensions to allow the velocity and density profiles to be resolved separately as functions of depth from nonnormal incidence data. This involves a nonlinear equation to relate the apparent travel times to depth. Dissert. Abstr.

N82-10812# Hope Associates, Inc., Washington, D.C.

A COMPREHENSIVE BIBLIOGRAPHY OF LITERATURE ON HELICOPTER NOISE TECHNOLOGY Final Report

A. M. Carter, Jr. Jun. 1981 116 p
(Contract DTFA01-80-Y-10597)
(AD-A103331; FAA-EE-81-4) Avail: NTIS HC A06/MF A01 CSCL 20/1

This bibliography, covering the period 1975 through calendar 1980 also provides abstracts on literature that appear to make a significant contribution to the field of helicopter noise technology. The helicopter is recognized as a complex noise generator, with significant contributions from the rotors, the engine and the gearbox. Progress continues to be made in the noise areas of: (a) Formulations, math models and analytical procedures; (b) Noise prediction methodology; (c) Noise reduction techniques; and (d) Subjective response to helicopter noise. The body of information, data and knowledge has use in many applications, including the reduction of helicopter noise in a cost effective manner and in minimizing annoyance to the civil populace. GRA

N82-10813# Utah Univ., Salt Lake City. Dept. of Mathematics.

TRANSIENT ACOUSTIC WAVE PROPAGATION IN STRATIFIED FLUIDS Technical Summary Report

Calvin H. Wilcox Jul. 1981 49 p refs
(Contract N00014-76-C-0276; NR Proj. 041-370)
(AD-A104187; TSR-42) Avail: NTIS HC A03/MF A01 CSCL 20/1

Transient acoustic wave propagation is analyzed for the case of plane-stratified fluids having density rho(y) and sound speed c(y) at depth y. For infinite fluids it is assumed that the (in general discontinuous) functions rho(y), c(y) are uniformly positive and bounded and satisfy abs.val (rho(y) rho(at infinity)) < or = C(+ or - y) to the - alpha power, abs. val. (c(y) - c(at infinity)) < or = C(+ or - y) to the - alpha power for + or - y > 0, where alpha > 3/2. Semi-infinite and finite layers are also treated. The acoustic potential is a solution of the wave equation del-squared u/del t-squared c-squared(y) rho(y) del dot (1/rho(y) grad(u)) = f(t,x,y) where x = (x1,x2) are horizontal coordinates and f(t,x,y) characterizes the wave sources. The principal results of the analysis show that u is the sum of a free component, which behaves like a diverging spherical wave for large t, and a guided component which is approximately localized in regions abs. val. (y - y sub j) < h sub j where c(y) has minima and propagates outward in horizontal planes like a diverging cylindrical wave. Author (GRA)

N82-10814# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

VIRTUAL HYDROPHONE FOR DETECTING NARROWBAND NOISE FROM A SHIP [VIRTUELL HYDROFON FOER DETEKTERING AV SMALBANDIGT BULLER FRAAN FARTYG]

Lars Goetherstroem Jun. 1980 12 p In SWEDISH
(FOA-C-30193-E1) Avail: NTIS HC A02/MF A01

Virtual hydrophone measurements were carried out. Measuring was done recording moving targets as incoming signals at periodically repeated intervals. These points in the route are given by the virtual hydrophone. Phase stability in the outgoing, narrowband noise signal is required. The signal to noise ratio must be high for each measurement point in order to allow signal addition. The conditions for detection are discussed, showing that the use of this method is particularly limited. Author (ESA)

N82-10815# Research Inst. of National Defence, Umea (Sweden). Huvudavdelning 4.

AN EMITTER-CELL FOR MEASURING GAS CONCENTRATION BY MEANS OF ULTRASONICS [MAETGIVARE FOER GASKONCENTRATION MED ULTRALJUD]

Goeran Olofsson and Lars Hedlund Oct. 1980 21 p In SWEDISH
(FOA-C-40124-C2(B2)) Avail: NTIS HC A02/MF A01

Measurements of the velocity of sound in mixtures of halon (CBrF3) were made. The factors which influence its applicability are the physical properties of the gas, such as its density and the kinetic state of the molecules, and the required sensitivity. It is desirable to be able to control pressure and temperature in measurements. Author (ESA)

N82-10816 Texas Univ. at Arlington.

COVARIANCE FUNCTIONS AND RELATED STATISTICAL

PROPERTIES OF ACOUSTIC BACKSCATTERING FROM A RANDOMLY ROUGH AIR-WATER INTERFACE Ph.D. Thesis
Gary Ray Wilson 1981 290 p
Avail: Univ. Microfilms Order No. 8119399

The study was limited to backscattered sound (reverberation) from a pulsed sound source. The experimental study employed nine vertically separated receivers and four horizontally separated receivers in order to examine the spatial and temporal covariance of the backscattered sound for both orientations simultaneously. Approximately 1000 narrowband reverberation returns were generated by repetitively projecting a 100 CW pulse centered at 80 kHz at the wind-roughened surface of a freshwater lake at a 10.5 degree grazing angle. The returns were sampled digitally for a 10 ms interval during which surface reverberation was predominant, and were formed into ensembles at each sample time. Various univariate moments and the time-difference component of the covariance were computed experimentally utilizing ensemble averages. The statistical validity of the ensembles was determined by testing each ensemble for randomness and homogeneity. Dissert. Abstr.

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-10817 Wisconsin Univ. - Madison.
THE EFFECT OF MICROSTRUCTURE ON THE SPATIAL DISTRIBUTION OF THE DAMAGE PRODUCED BY IONS IN SOLIDS Ph.D. Thesis
Hosny M. Attaya 1981 214 p
Avail: Univ. Microfilms Order No. 8115976

A three dimensional Monte Carlo model, HERAD, is described The model developed to study the ranges and the damage of ions in materials, incorporates the options to use a large number of nuclear and electronic stopping models. The results of the HERAD model were compared to the other current computational models, and the effect of cavities on the range as well as the distribution of damage was studied. The HERAD code yields a close agreement between experiments and theory than other computational models. The code is also shown to be less expensive to run and more versatile than present Monte Carlo codes for radiation damage calculations. A reduction of more than 80% of the LSS electronic cross section was found to produce better agreement between theory and experiment. Dissert. Abstr.

N82-10818 Polish Academy of Sciences. Warsaw. Inst. Podstawowych Problemow Techniki.
THE THEORY OF ORIENTED NUCLEATION WITH ASYMMETRIC SINGLE ELEMENTS. 1: EQUILIBRIUM ORIENTATION DISTRIBUTION
Andrzej Ziabicki and Leszek Jarecki 1981 36 p refs
(ISSN-0208-5658) Copyright. Avail: Issuing Activity

It is shown that the classical theory of nucleation can not be used to discuss phase transitions in preoriented systems of asymmetric particles, and a revised theory of nucleation is proposed. The proposed theory converges qualitatively to the classical one for the isotropic systems of asymmetric particles, providing an explansion for the apparent validity of the classical approach for such systems. T.M.

N82-10819 Texas Univ. at Arlington.
QUANTUM FIELD THEORY AND QUANTIZED DETECTORS IN STATIONARY COORDINATE SYSTEMS Ph.D. Thesis
John Robert Letaw 1981 176 p
Avail: Univ. Microfilms Order No. 8119326

Quantization of the massive scalar field in the stationary coordinate systems of flat spacetime was performed with the aim of determining whether a reasonable particle interpretation and definition of the vacuum can be made in these systems. Canonical quantization proceeds along standard lines. It is found that there are only two distinct vacua in flat spacetime, the usual vacuum of Minkowski coordinates and the vacuum found by Fulling in Rindler coordinates. The Fulling vacuum is always associated with coordinate systems having event horizons and the Minkowski vacuum with those which do not. The proposition that the vacuum state is a coordinate system is that state of the field in which an Unruh box on a coordinate line is unexcited is examined. By explicit calculations of the excitation spectra on the stationary world lines it is shown that a detector is excited in the canonical vacuum if the system is not static. In addition to not defining the vacuum, these detectors cannot even be considered to be particle detectors because they are excited without the presence of canonical particles. Dissert. Abstr.

N82-10820 Texas Univ. at Dallas.
PHOTOLYTIC SPECTROSCOPY OF CsKr EXCIMERS AT VISIBLE WAVELENGTHS Ph.D. Thesis
Hossein Golnabi 1981 155 p
Avail: Univ. Microfilms Order No. 8118235

Two dye lasers were aligned so that the first laser pulse excited the parent Cs-Kr molecules, and the second pulse, delayed about 3 nsec, was used to excite dissociated products to Cs Rydberg states which could readily be ionized and result in positive ions. The detection of ions was accomplished through the inclusion of a space charge limited diode in an absorption cell. Relative cross sections for the selective photolysis of Cs-Kr molecules into the 6 2 P and 5 2 D states of Cs atoms over the 6600 A wavelength region were obtained. The observed spectrum seems to be concentrated in three bands correlating with the red, yellow, and blue bands. Except for the red bands near wavelength 6330 A and the small bond near 4537 A, the similarity between the photolysis bands of Cs2 and Cs-Kr molecules was considerable. Interpretation of the results required the consideration of the photolysis of both the CsKr excimers and Cs2Kr molecules in the photolysis spectra. Analysis of the spectra indicated that the small red satellite 6d sigma and the blue satellite 5d sigma were the result of the photolysis of CsKr excimers and the other bands could be the result of the photolysis of the Cs2Kr along the Cs-Cs band. Dissert. Abstr.

N82-10821 Indiana Univ., Indianapolis.
EXCHANGE CURRENT CONTRIBUTIONS TO QUASI-ELASTIC ELECTRON SCATTERING Ph.D. Thesis
Joe S. Conte, Jr. 1981 125 p
Avail: Univ. Microfilms Order No. 8119044

The effects of exchange currents in an anomalous region of large electron energy loss were calculated using the standard Feynman graph rules. All important long range exchange currents (pair, pionic, and isobar exchange currents) were included. The resulting multidimensional integrals were done using Monte Carlo techniques. All exchange currents which were investigated were found to be appreciable in the anomalous region, and also important in the quasi-free peak region. Dissert. Abstr.

N82-10822 Texas A&M Univ., College Station.
PARTIAL WAVE ANALYSIS OF INELASTIC TWO-NUCLEON COLLISIONS Ph.D. Thesis
James Henry Gruben 1981 125 p
Avail: Univ. Microfilms Order No. 8118264

The fraction of the incoming flux which is scattered inelastically in a nucleon-nucleon reaction below 800 MeV is determined by a theoretical approach. The scattering amplitude for the NNpi final state, the dominant channel, is presented in an angular momentum basis. This partial wave helicity amplitude projects the angular momentum states from a plane wave amplitude derived elsewhere. A computer program was written to evaluate the partial wave amplitudes, from which the cross sections of certain initial angular momenta are calculated. Finally, the inelasticities of an initial NN reaction proceeding from isospin 0 and isospin 1 states are found. The computed inelasticities are generally consistent with existing phase shift analyses. Due to the dominance of the delta intermediate state, all of the isospin 1 results are significant. The only important isospin 0 yields, which proceed through the nucleon intermediate state, are those for (3)S1, (3)D1, and (1)P1 partial waves. At high angular momenta, the one-pion-exchange mechanism dominates the process, and the nucleons may be considered as pointlike particles. Dissert. Abstr.

N82-10823 Texas Univ. at Arlington.
QUANTUM ERGODICITY IN MODEL MOLECULAR SYSTEMS: A STUDY OF THE WIGNER DISTRIBUTION Ph.D. Thesis
John Steven Hutchinson 1981 182 p
Avail: Univ. Microfilms Order No. 8119308

Quantum mechanical wave functions of model molecular systems were analyzed for the statistical mechanical property of ergodicity. Quantum ergodicity was analyzed by calculating the Wigner phase space distribution for each wave function. Three variations of the model Henon-Heils system which models the vibrations in a linear triatomic molecule were studied. Both stationary and non-stationary wave functions of this system were calculated as expansions over a harmonic oscillator product basis set. A technique was developed for calculating the Wigner distributions for such wave functions. These were analyzed for uniformity as an indication of quantum ergodicity. A close correspondence was developed between the concepts of classical and quantum ergodicity. The classical features of KAM behavior and trajectory instability were shown to have relevance to quantum mechanical systems. Implications of the classical quantum correspondence and comparisons of this study to previous quantum ergodic studies are discussed. Dissert. Abstr.

N82-10824 Indiana Univ., Indianapolis.
CONFIGURATION INTERACTION APPROACH TO THE STUDY OF DIATOMIC MOLECULES Ph.D. Thesis
Fernando Rei Ornellas 1981 146 p
Avail: Univ. Microfilms Order 8119071

A series of computer programs for very accurate calculations of energies and wavefunctions for diatomic molcules were designed and implemented on the CDC 6600 computer. The problem of calculating the energy and wavefunction is approached by the configuration interaction method using a very large set of Slater type functions. When possible, advantage is taken of the symmetry of the problem to make the calculation less time consuming. Worthy of note in the programs are the very efficient routines developed for the calculation of two electron integrals; they are out-of-core charge distribution oriented and allow for the calculation of very large blocks of integrals. Aiming also at the accuracy of the calculation, a procedure for constructing an optimum set of functions to be used in the wave function expansion was developed. This set is optimum in the sense that a significant energy improvement is obtained for a relatively short wavefunction expansion. Results for the ground state of the lithium hydride molecule are presented together with a discussion of the different levels of approximation. Dissert. Abstr.

N82-10825# Oakland Univ., Rochester, Mich. Dept. of Physics.
ANALYSES FOR MECHANICAL STABILITY FOR SYSTEMS OF IONS AND ATOMS ASSOCIATED WITH RINGS, CAGES, AND CRYPTS Technical Progress Report
J. M. McKinley and P. P. Schmidt 2 Aug. 1981 33 p refs
Submitted for publication
(Contract N00014-77-C-0293; NR Proj. 359-648)
(AD-A103995; TR-8) Avail: NTIS HC A03/MF A01 CSCL 07/2

There exist examples of systems in which small, simple metallic cations are associated with ring-like molecules (e.g., aromatic radical anions), with aggregates of molecules which encage the ion (e.g., solvation and coordination), or special molecules which trap ions within the molecular structure (crypts). For each of these examples, the harmonic oscillations of the ion in the presence of the molecular structure can be observed. Moreover, in many instances, the stability of the ionic motions in the presence of the molecular structure is important in considering some form of transport process which is associated with the ion. In this paper we present an analysis of the mechanics of the motion of an ion under the influence of various molecular structures. For our analyses, we use a form of symmetry-adapted Taylor series which we recently developed. We determine the positions of equilibrium for the ion in the presence of a continuous ring, a polygon and a polyhedron of sourses for the pair-wise forces. We also determine the states of stability for the positions of equilibrium through an examination of the second order terms in the Taylor series. GRA

N82-10826# Massachusetts Inst. of Tech., Cambridge.
LOWEST ENERGY ELECTRONIC STATES OF RARE EARTH MONOXIDES Final Scientific Report, 1 Jan. 1977 - 15 Aug. 1980
Robert W. Field Hanscom AFB, Mass. AFGL 1 Sep. 1980 102 p refs
(Contract F19628-77-C-0061; AF Proj. 2303)
(AD-A104039; AFGL-TR-80-0328) Avail: NTIS HC A06/MF A01 CSCL 07/4

The electronic spectra of the rare earth monoxides have been nearly intractable for two reasons: There is a tremendous number of molecular electronic states (typically more than 100) expected to occur below 3eV, these states all have nearly identical rotational and vibrational constants (to within 2%) and are, therefore, not readily distinguishable from each other. It has been necessary to develop laser spectroscopic methods which are capable of resolving and dealing unambiguously with complex spectra, recognizing individual electronic states and organizing them into partial energy level diagrams, and linking partial level diagrams for groups of states which, because of selection-rule restrictions, involve mostly disjoint groups of electronic states. In order to provide information of value to either thermochemists or theoreticians, it is important to know that all of the lowest energy electronic states have been found. To this end, a crystal field model, which relates the molecular energy levels to those of the free m+2 ion, has been developed and tested for the 4f6s configuration of CeO. GRA

N82-10827# Los Alamos Scientific Lab., N. Mex.
POSITIVE-PION DOUBLE-CHARGE-EXCHANGE REACTION: EXPERIMENTS ON THE ISOTOPIC PAIRS OXYGEN-16, 18 AND MAGNESIUM-24, 26 Ph.D. Thesis Texas Univ., Austin
Steven Joseph Greene Jun. 1981 141 p refs
(Contract W-7405-eng-36)
(DE81-028515; LA-8891-T) Avail: NTIS HC A07/MF A01

Energy excitation functions of d sigma/d lambda, across the (3,3) (LC omega) -N resonance, are presented for transitions to double isobaric analog state (DIAS) and non-DIAS ground state residual nuclei. Angular distributions in the region of 5 deg. to 33 deg. are presented for the DIAS from the T = 1 nuclei. The similarities and differences of DIAS and non DIAS distributions in reaction mechanism and nuclear structure effects are discussed. Also, a two-amplitude model for the 18 o excitation function consistent with the data is presented. DOE

N82-10828# Consolidated Controls Corp., Bethel, Conn.
NEUTRON-ACTIVATION ANALYSIS OF TURBINE DEPOSITS Interim Report
Aug. 1981 65 p refs Sponsored in part by EPRI
(EPRI Proj. 1409)
(DE81-904189; EPRI-CS-1958) Avail: NTIS HC A04/MF A01

A nonintrusive system employing the associated particle time of flight technique was examined. The inelastic gamma rays induced by 14 MeV neutrons incident upon corrodent elements deposited upon the blades of an operating steam or combustion turbine was determined. Measurements of steam and combustion turbine blades with simulated corrodent chemicals demonstrated that deposits of Na2SO3, NaCl, and Na2P04 as small as 10(+3) g/sqcm are detected by this technique. DOE

N82-10829# Rochester Univ., N. Y.
LOW-ENERGY ION-MOLECULE REACTION DYNAMICS AND CHEMIIONIZATION KINETICS Progress Report, 1 Feb. 1981- 31 Jan. 1982
James M. Farrar 1981 8 p refs
(Contract DE-AS02-78ER-04694)
(DE81-030040; DOE/ER-04694/T1) Avail: NTIS HC A02/MF A01

Experiments in photodissociation of organic cations to study the competition between isomerization and fragmentation and low energy proton transfer reactions of HCO(+) with selected neutrals are described. The former area provides a sideline to combustion studies of proton transfer in hydrocarbon flames, but the question of energy transfer in highly excited gas phase ion impacts directly upon questions closely related to the fate of ions in combustion. The latter area, currently in progress, focuses upon the dynamics of biomolecular reactions of direct relevance to combustion. DOE

N82-10830# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Physics.
EXOTIC ATOMS, K-NUCLEUS SCATTERING AND HYPERNUCLEI
P. D. Barnes 1981 18 p refs Presented at 9th Intern. Conf. on High Energy Phys. and Nucl. Structure, Versailles, France, 6-10 Jul. 1981
(Contract DE-AS02-76ER-03244)
(DE81-027957; DOE/ER-03244/T3; COO-3244-84; CONF-810747-2) Avail: NTIS HC A02/MF A01

Progress in exotic atom physics, kaon nucleus scattering, and hypernuclear physics is reviewed. Specific problems discussed include searches for muon-nucleon interactions beyond QED, a comparison of data and recent calculation of K(+) + (12)C elastic and inelastic scattering, and studies of (UC omega) and (delta) hypernuclei and data on the level structure of (13)C/(delta). DOE

N82-10831# Texas Univ., Austin. Center for Particle Theory.
RESEARCH PROGRAM IN ELEMENTARY-PARTICLE THEORY Progress Report
E. C. G. Sudarshan and Y. Neeman 1981 78 p
(Contract DE-AS05-76ER-03992)
(DE81-028454; DOE/ER-03992/452) Avail: NTIS HC A05/MF A01

Progress is reported: the physics of ultra high energies and cosmology, the phenomenology of particle physics, composite models of particles and quantum field theory, quantum mechanics, geometric formulations, fiber bundles, and other algebraic models. DOE

N82-10832# Wesleyan Univ., Middletown, Conn. Dept. of Physics.
COLLISION CROSS SECTIONS AND EQUILIBRIUM FRACTIONS OF IONS AND ATOMS IN METAL-VAPOR TARGETS Progress Report, 1 Jun. 1980 - 30 Apr. 1981
Thomas J. Margan 1981 4 p refs
(Contract DE-AC02-76ET-53048)
(DE81-027886; DOE/ET-53048/T1; COO-4022-4) Avail: NTIS HC A02/MF A01

Atomic collision cross sections and equilibrium fractions of ions and atoms in metal vapor targets were measured. In the development of negative ion sources, D(+) formation cross sections were measured in alkaline-earth metal vapor targets. Electron transfer cross section measurements of D( ) ions and DO atoms in collision with calcium and strontium vapor and differential cross section measurements for H(+) formation in H( ) + Mg collisions were completed. DOE

N82-10833# Florida State Univ., Tallahassee.
SELECTIVE EXCITATION, RELAXATION, AND ENERGY CHANNELING IN MOLECULAR SYSTEMS Progress Report, 1 Dec. 1980 - 30 Nov. 1981
William C. Rhodes 1981 14 p
(Contract DE-AS05-78o-5784)
(DE81-028658; DOE/OR-05784/1) Avail: NTIS HC A02/MF A01

The role of the intensity of laser coupling with a molecule on the dynamics and selectivity of nonradiative processes was studied theoretically and quantitatively in terms of computer simulations for some simple multistate models. This complements existing results which emphasize frequency selectivity of photochemical and photophysical processes. The stochastic effects of the molecular medium (bath) were formulated in terms of molecular energy surfaces for the molecule-bath modes and the associated sudden potential. This leads to a better understanding of the microscopic quantum bases for stochastic modulation effects on resonance emission of light. Two distinct kinds of molecular resonances (termed dissipative and stochastic) were formulated in terms of prototype coupling schemes for a molecule and the modes to which it is coupled. A coupling strength ordering rule was developed which explains the propensity for kinetic slowing effects due to background interactions. The tendency for stochastic modulation to induce sequential and parallel resonances was discovered. DOE

N82-10834# Ames Lab., Iowa. Physics Dept.
APPLICATIONS OF MOMENT METHODS TO FINITE NUCLEI
J. P. Vary 1981 9 p refs Presented at the 2nd Intern. Conf. of Recent Progr. in Many-Body Theories, Mexico City, 12-17 Jan. 1981
(DE81-023788; IS-M-320; CONF-810107-5) Avail: NTIS HC A02/MF A01

Many-body problems utilizing moment methods are summarized. Some tests with valence particle systems and some tests with the soluble Lipkin-Meshkov-Glick Hamiltonian are developed to assess accuracy of the moment method approach for finite nuclei. Results for the blinding energy and for the elastic electron scattering cross sections of O using a realistic microscopic no-core effective Hamiltonian are presented. DOE

N82-10835# Argonne National Lab., Ill. Applied Physics Div.
NEUTRON STRENGTH FUNCTIONS: THE LINK BETWEEN RESOLVED RESONANCES AND THE OPTICAL MODEL
P. A. Moldauer 1980 17 p refs Presented at the Workshop on Nucl. Data Evaluation Methods and Procedures, Upton, N.Y., 22-25 Sep. 1980
(Contract W-31-109-eng-38)
(DE81-023896; CONF-800979-18) Avail: NTIS HC A02/MF A01

The use of neutron strength functions and scattering radii as energy and channel radius independent parameters characterizing neutron scattering resonances and provide a connection between R-matrix resonance analysis and the optical model is considered. The choice of R-matrix channel radii is discussed, as are limitations on the accuracies of strength functions. New definitions of the p-wave strength function and scattering radius are proposed. For light nuclei, where strength functions display optical model energy variations over the resolved resonances, a doubly reduced partial neutron width is introduced for more meaningful statistical analyses of widths. The systematic behavior of strength functions and scattering radii is discussed. DOE

N82-10836# Argonne National Lab., Ill. Applied Physics Div.
DATA INTERPRETATION, OBJECTIVE EVALUATION PROCEDURES AND MATHEMATICAL TECHNIQUES FOR THE EVALUATION OF ENERGY DEPENDENT RATIO, SHAPE AND CROSS SECTION DATA
W. P. Poenitz 1980 39 p refs Presented at Workshop on Nucl. Data Methods and Procedures, 22-25 Sep. 1980
(Contract W-31-109-eng-38)
(DE81-023897; CONF-800979-19) Avail: NTIS HC A03/MF A01

The evaluation of several energy dependent neutron cross sections which are of importance for practical applications is considered. The evaluation process is defined as the procedure which is used to derive the best knowledge of these cross sections based on the available direct experimental data information, and, using theoretical models, on the auxiliary data base. The experimental data base represents a multiple overdetermination of the unknown cross sections with various correlations between the measured values. Obtaining the least squares estimator is considered as the standard mathematical procedure to derive a consistent set of evaluated cross section values. Various approximations made in order to avoid the monstrous system of normal equations are considered and the feasibility of the result, its reliability and the improvements obtained in iterative steps are discussed. The inclusion of auxiliary supplementary information is considered. DOE

N82-10837# Argonne National Lab., Ill.
CASE FOR EXOTIC BARYON-BARYON STATES
Gerald H. Thomas 1980 12 p refs Presented at the Intern. Symp. on High Energy Phys. with Polarized Beams, Lausanne, Switzerland, 25 Sep. - 1 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-024458; ANL/HEP/CP-80-75; CONF-800994-18) Avail: NTIS HC A02/MF A01

Three main points are presented. Current theoretical prejudices are presented for why dibaryon states are interesting, and why they should be expected. A review is given of some of the unsettled experimental issues which emerged during this conference concerning dibaryons. Phenomenological issues are raised which are critical to understanding whether dibaryon states are observable in the medium energy NN system. DOE

N82-10838# Argonne National Lab., Ill.
FOIL DISSOCIATION OF FAST MOLECULAR IONS INTO ATOMIC EXCITED STATES
H. G. Berry, T. J. Gay, and R. L. Brooks 1980 6 p refs
Presented at the 6th Conf. on the Appl. of Accelerators in Res. and Ind., Denton, Tex., 3-5 Nov. 1980
(Contract W-31-109-eng-38)
(DE81-023805; CONF-801111-49) Avail: NTIS HC A02/MF A01

The intensity and polarizations of light emitted from atomic excited states of dissociated molecular ions were measured. The dissociations were induced by transmitting fast molecular ions (50 to 500 keV/amu) through thin carbon foils. A calculation of multiple scattering and the Coulomb explosion gives the average internuclear separation of the projectile at the foil surface. Experimentally, the foil thickness was varied to give varying internuclear separations at the foil surface and observe the consequent variation in light yield and optical polarization. Using HeH(+) projectiles, factors of 1 to 5 enhancements of the light yields from He I and some He II and H I emissions were observed. The results suggest a short range surface interaction of the electron pick-up followed by a slow molecular dissociation. Alignment measurements confirm the essential features of the model. Observation of Lyman alpha emission after dissociation of H2(+) and H3(+) show rapid variations in light yield for small internuclear separations at the foil surface. DOE

N82-10839# Illinois Univ., Urbana. Coll. of Liberal Arts and Sciences.
NEUTRON-ACTIVATION ANALYSIS OF SEVERAL US GEOLOGICAL SURVEY AND NATIONAL BUREAU OF STANDARDS REFERENCE MATERIALS B.S. Thesis
Andrew Thomas Daly 1981 38 p refs
(Contract DE-AC02-80EV-10403)
(DE81-025041; DOE/EV-10403/3) Avail: NTIS HC A03/MF A01

The homogeneity of geological reference samples was analyzed to improve the quality of elemental concentration data available on these materials, or use in a verification of factor analysis source resolution procedures. The analyses was performed by instrumental neutron activation analysis (INAA). The INAA has high sensitivity which is attained in determining elemental concentrations. The basic theory and technique are reviewed to show where problems can arise and how thay can be dealt with. DOE

N82-10840# Argonne National Lab., Ill.
A SIX TESLA ANALYZING MAGNET FOR HEAVY-ION BEAM TRANSPORT
R. P. Smith, L. Bollinger, J. Erskine, L. Genens, and J. Hoffman 1980 4 p ref Presented at the Appl. Superconductivity Conf., Santa Fe, N. Mex., 29 Sep. - 3 Oct. 1980 Submitted for publication
(Contract W-31-109-eng-38)
(DE81-023922; CONF-800980-39) Avail: NTIS HC A02/MF A01

A superconducting analyzer magnet for particle beam deflection was designed and is being fabricated for use at the Argonne tandem linac accelator system (ATLAS). This six tesla magnet will provide 45 deg of deflection fo the heavy-ion beams from the ATLAS tandem electrostatic accelerator and together with its twin will replace the existing conventional 90 deg analyzer magnet which will become inadequate when ATLAS is completed. DOE

N82-10841# Brookhaven National Lab., Upton, N. Y.
NEUTRON SCATTERING MEASUREMENTS OF LOW-TEMPERATURE HYDROGEN TUNNELING IN NIOBIUM
H. Wipf (Universitaet Muenchen), A. Magerl (National Bureau of Standards, Washington, D.C.), S. M. Shapiro, S. K. Satija, and W. Thomlinson 1981 9 p refs Presented at the Intern. Symp. on Metalhydrogen Systems, Miami Beach, Fla., 13 Apr. 1981 Sponsored in part by Bundesministerium fuer Forsch. und Technol.
(Contract DE-AC02-76CH-00016)
(DE81-025095; BNL-28332; CONF-810497-2) Avail: NTIS HC A02/MF A01

Low-temperature (0.09 K and 5 K) neutron spectroscopic measurements are presented demonstrating the existence of H tunneling states for O-H pairs in NbO0 013H0 016. From the results, a tunneling matrix element of (0.19 + or - 0.04) meV, and an estimate for the strain-induced interaction between different O-H pairs are obtained. These experiments show H tunneling in a metal. They contribute to an understanding of H diffusion, for which tunneling is considered to play an important role. DOE

N82-10842# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
BAC: A COMPUTER PROGRAM FOR CALCULATING SHIELDING IN BUILDINGS AGAINST INITIAL RADIATION [BAC - ETT DATORPROGRAM FOER BERAEKNING AV BYGGNADERS SKYDDSFAKTORER FOER INITIALSTRAALNING]
Goeran Danielson Oct. 1980 51 p refs In SWEDISH
(FOA-C-20376-A2) Avail: NTIS HC A04/MF A01

Calculation methodology and transmission data for BAC in the event of a nuclear explosion are considered. The shielding factor is the rate between the radiation dose at one point in the building and the dose in open air. It is separately calculated for neutrons, gamma rays from fission products, and secondary gamma rays. For this calculation, BAC uses data for radiation transmission in concrete. This program is utilized for fallout shelters and other buildings where walls and floors/roofs are mostly made of concrete and bricks. Instructions for the program are given, and BAC results and values are in certain cases compared with those obtained with the Monte Carlo method. Author (ESA)

N82-10843# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
HINK: AN INTERACTIVE COMPUTER PROGRAM GIVING DATA FOR THE BAC RADIATION SHIELDING PROGRAM [HINK - ETT DATORPROGRAM FOER ATT INTERAKTIVT SKAPA INDATA TILL STRAALSKYDDSPROGRAMMET BAC]
Lisbeth Pers, Kristina Laurin, and Eva Elvers Oct. 1980 59 p refs In SWEDISH
(FOA-C-20377-A2) Avail: NTIS HC A04/MF A01

This computer program considers a building which is a right angle parallelepiped with rooms on several levels and openings in the outside and inside walls. This geometrical data, complemented by other physical data, compose the in-data for the BAC program which calculates shielding factors for initial radiation of buildings. Instructions for the use of HINK are given and how the data for houses should be handled and controlled is shown. The principle of interaction is explained with programming methods. Author (ESA)

N82-10844# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
MEASUREMENT OF INTEGRAL EXCITATION CROSS SECTIONS DURING ALKALI RARE GAS COLLISIONS Thesis [MESSUNG INTEGRALER ANREGUNGSQUERSCHNITTE BEI ALKALI-EDELGAS-STOESSEN]
Helmut Joswig Dec. 1979 97 p refs In GERMAN
(MPIS-26/1979; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,55

For collisions in the energy range 50 to 10,000 eV, emitted light was measured, and a spectral analysis of the fluorescent light from 1450 to 9000 A was performed. The spectrometer setup and measurement techniques are described. Measurement data collection and processing are discussed, including an error analysis. Experimental results are presented. The diabatic Born approximation for a three-particle model under the influence of electronic excitation is then formulated and used to calculate scattering cross sections. Experimental results are critically reviewed. Author (ESA)

N82-10845# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATIONS OF THE VIBRATIONAL AND ROTATIONAL EXCITATION OF N2, CO, NO, O2, CO2, CH4, CF4

AND SF6 DURING COLLISION WITH PROTONS AND DEUTERONS AT AN ENERGY OF 9.8 eV Ph.D. Thesis - Georg-August Univ. [UNTERSUCHUNGEN ZUR VIBRATIONS- UND ROTATIONSANREGUNG VON N2, CO, NO, O2, CO2, CH4, CF4 UND SF6 BEIM STOSS MIT PROTONEN UND DEUTERONEN VON 9, 8 eV ENERGIE]
Uwe Gierz Jun. 1980 207 p refs In GERMAN
(MPIS-9/1980; ISSN-0436-1199) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 32,70

Inelastic collision processes of the class H(+) + AB(0,0) yields H(+) + AB(J,V) + Delta (translation energy), with (J,V) the excited state, were studied, experimentally. The measurements show varying results, in such a way that an unified interpretation is impossible. The strong vibrational excitation of O2 is characteristic. A series of models that deal with energy transmission processes are discussed. Only for NO and O2 do measurements agree, at least qualitatively, with theoretical predictions at hand. Trajectory calculations lead only in rare cases to usable results. Better calculation methods for the systems considered are called for. Author (ESA)

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-10846# California Univ., Berkeley. Lawrence Berkeley Lab. Particle Data Group.
COMPILATION OF CURRENT HIGH-ENERGY PHYSICS EXPERIMENTS
C. G. Wohl, R. L. Kelly, F. E. Armstrong, C. P. Horne, M. S. Hutchinson, A. Rittenberg, T. G. Trippe, G. P. Yost, L. Addis (Stanford Linear Accelerator Center, Calif.), C. E. W. Ward (Argonne National Lab., Ill.) et al May 1981 32 p Sponsored in part by NSF
(Contract W-7405-eng-48)
(DE81-028585; LBL-91-Rev-5-81) Avail: NTIS HC A03/MF A01

The compilation of current high energy physics experiments is presented. The compilation includes summaries of all high energy physics experiments that were approved before April 1981, and had not completed data recording by 1 January 1977. DOE

N82-10847# Rockwell International Corp., Richland, Wash. Material Sciences Group.
CHARACTERISTICS OF CANDIDATE GEOLOGIES FOR NUCLEAR WASTE ISOLATION: A REVIEW
R. G. Johnston 15 Aug. 1981 86 p refs
(Contract DE-AC09-79ET-41900)
(DE81-030153; DOE/ET-41900/6) Avail: NTIS HC A05/MF A01

The stratigraphy, chemical and mineral composition, hydrology, and physical properties of rock types are summarized. Basalt, granite, salt, shale, and tuff formations are proposed as sites for geologic disposal of high level nuclear waste. The choice of site affects the design of the waste package and the accompanying engineered barriers. It is emphasized that it is important to know the general properties of each type of repository rock to tailor an effective waste isolation system. DOE

N82-10848# Rockwell International Corp., Canoga Park, Calif. Dept. of Systems Engineering.
PREPARATION OF NONRADIOACTIVE SUBSTITUTES FOR RADIOACTIVE WASTES
M. J. Kupfer 31 Jul. 1981 56 p refs
(Contract DE-AC09-79ET-41900)
(DE81-028502; DOE/ET-41900/8; ESG-DOE-13352) Avail: NTIS HC A04/MF A01

Procedures for preparing simulated nuclear wastes that exhibit physical and chemical properties similar to those of actual wastes are given. The synthetic wastes were formulated using conditions similar to those defined in the original process flowsheets. Recipes suitable for laboratory-scale or pilot-scale preparation are given for wastes found at the Savannah River Plant, Hanford Site, Idaho Chemical Processing Plant, and the Western New York Nuclear Service Center facility. Recipes are also given for waste that is likely to be generated from future reprocessing of spent commercial nuclear fuels. DOE

N82-10849# Minnesota Univ., Minneapolis. School of Physics and Astronomy.
EXPERIMENTAL AND THEORETICAL HIGH ENERGY PHYSICS Progress Report, 1 Oct. 1980 - 30 Jun. 1981
1981 46 p refs
(Contract DE-AC02-76ER-01764; EY-76-C-02-1764)
(DE81-029024; DOE/ER-01764/T2) Avail: NTIS HC A03/MF A01

A high energy physics program is reviewed. The Soudan-1 baryon decay experiment was converted from a concept demonstrated by a small prototype into a working experiment, which yielded data about underground cosmic ray events. Data on direct photon production in pion nucleus and proton nucleus collisions were obtained that exists a signal exists for direct photon events at transverse momenta as large as 4 GeV/c. The mechanisms for inclusive hyperon polarization and precision measurements of the hyperon magnetic moments are analyzed. DOE

N82-10850# Sandia Labs., Albuquerque, N. Mex.
CHARACTERIZATION OF AN ACCELERATOR DESIGNED TO STUDY ELECTRON BEAM UNIFORMITY IN LARGE DIODES
E. L. Patterson, R. Hamil, and J. J. Ramirez 1981 16 p refs Presented at 3d IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex.
(Contract DE-AC04-76DP-00789)
(SAND-81-0844C; CONF-810659-2) Avail: NTIS HC A02/MF A01

Results are described of initial tests on an accelerator designed to investigate electron beam control and uniform excitation of large volume lasers. For these tests the accelerator is operated in the 50 nsec mode with diode voltages and currents up to 1 MV and 500 kA. The cathode emitting surface is a 30 cm x 105 cm carbon felt material. The diode is immersed in a nearly axial applied magnetic field variable from 0 to 3.7 kG. The spatial distribution of current is monitored by time resolved photography of Cherenkov radiation emitted by a dielectric converter plate placed perpendicular to the beam propagation direction. Diode performance is monitored as a function of the magnitude of the applied magnetic field. DOE

N82-10851# Argonne National Lab., Ill.
CARBON STRIPPER FOILS FOR HEAVY-ION ACCELERATORS
G. E. Thomas 1980 6 p refs Presented at the 6th Conf. on Appl. of Accelerators in Res. and Ind., Denton, Tex., 3-5 Nov. 1980; sponsored by the American Physical Society
(Contract W-31-109-eng-38)
(DE81-023802; CONF-801111-46) Avail: NTIS HC A02/MF A01

With the development of heavy ion accelerators and the resulting use of heavier ions, the carbon stripper foil lifetimes are greatly reduced. Even when using the new foils changer systems, which typically contain two hundred foils or more, it becomes necessary to have frequent accelerator shutdowns for foil reloading. Several techniques were tried with varying degrees of success to strengthen these foils so that they will last longer; the most successful one reported a lifetime increase of the order of a factor of 30 over foils produced in the conventional manner. Methods of producing various types of foils, theories for foil breakage, and ideas will be for further increasing foil lifetimes are discussed. DOE

N82-10852# Brookhaven National Lab., Upton, N. Y. Dept. of Physics.
COMMENTS ON THE LINEAR SYSTEM FOR THE SELF DUAL YANG-MILLS FIELDS
Ling-Lie Chau Wang 1981 16 p refs Presented at the 18th Winter School of Theoret. Phys., Karpacz, Poland, 18 Feb. - 4 Mar. 1981

(Contract DE-AC02-76CH-00016)
(DE81-025076; BNL-29548; CONF-810257-1) Avail: NTIS HC A02/MF A01

One way of linearizing the self dual Yang-Mills equations using the infinite nonlocal currents, the properties of such linear systems and the solutions to such linear equations in the case of n-instanton with (5n+4) parameters are discussed. The connection with the linear system of Belavin-Zakharov, and the Atiyah-Ward construction for the self dual Yang-Mills equation. DOE

N82-10853# Princeton Univ., N. J. Plasma Physics Lab.
POSSIBLE NON-HYDROGEN NEUTRALIZERS FOR HIGH ENERGY D+ AND H+ BEAMS
L. R. Grisham and D. E. Post Jul. 1981 20 p refs
(Contract DE-AM02-76CH-03073)
(DE81-023134; PPPL-1803) Avail: NTIS HC A02/MF A01

The utility of using a gas other than hydrogen isotopes to neutralize energetic beams of D(+) or H(+) for applications in magnetic confinement fusion was explored. At D(+) energies above 160 keV, helium, relative to hydrogen, offers significant improvements in neutralization efficiency and in enrichment of the full energy component of the beam. Similar advantages accrue with neon at D(+) energies in excess of 200 keV. DOE

N82-10854# Department of Energy, Las Vegas, Nev.
NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS: QUALITY ASSURANCE PLAN
Apr. 1981 40 p
(DE81-025614; NVO-196-17-Rev-1) Avail: NTIS HC A03/MF A01

This document is the first revision of the Nevada Nuclear Waste Storage Investigations, Quality Assurance Plan (NVO-196-17) published in August 1980. It contains several substantive revisions and numerous minor revisions (e.g., WMPO/NV vs. Project Office, Los Alamos National Laboratory vs. Los Alamos Scientific Laboratory, etc.) which update or clarify the August 1980 document. NVO-196-17 (Rev. 1) supercedes NVO-196-17. DOE

N82-10855# Los Alamos Scientific Lab., N. Mex.
ACCEPTABILITY OF REACTORS IN SPACE
David Buden 1981 10 p refs Presented at the 16th Intersoc. Energy Conversion Eng. Conf., Atlanta, 9-14 Aug. 1981
(Contract W-7405-eng-36)
(LA-UR-81-1371) Avail: NTIS HC A02/MF A01

Nuclear reactors are the key to our future expansion into space. However, there has been some confusion in the public as to whether they are a safe and acceptable technology for use in space. The answer to these questions is explored. The US position is that when reactors are the preferred technical choice, they can be used safely. It does not appear that reactors add measurably to the risk associated with the Space Transportation System. American, Russian, and United Nations investigations into he safety of using nuclear reactors in space are reviewed. DOE

N82-10856# Department of Energy, Las Vegas, Nev.
NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. RADIONUCLIDE MIGRATION IN TUFF AND GRANITE: PEER REVIEW DOCUMENTATION
Apr. 1981 87 p
(DE81-769448; NVO-196-23) Avail: NTIS HC A05/MF A01

A compilation of review comments on the geologic and hydrologic investigation of Yucca Mountain is presented. Emphasis is placed on whether Yucca Mountain is a technically acceptable location to site an underground, high level nuclear waste repository. DOE

N82-10857# Department of Energy, Las Vegas, Nev.
NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS. GEOLOGIC AND HYDROLOGIC INVESTIGATION OF YUCCA MOUNTAIN: PEER REVIEW DOCUMENTATION
Apr. 1981 106 p
(DE81-769447; NVO-196-22) Avail: NTIS HC A06/MF A01

A compilation of review comments on the tuff and granite radionuclide migration investigations is presented. Radionuclide migration/retardation in tuffaceous and granitic rocks in situ the technology for high level nuclear waste handling, containment, and isolation, and whether potentially suitable rock units on or adjoining the Nevada Test Site (NTS) are technically acceptable for a licensed, permanent nuclear waste repository are addressed. DOE

N82-10858# Department of Energy, Aiken, S.C.
STRATEGY DOCUMENT LONG-TERM HIGH-LEVEL WASTE TECHNOLOGY PROGRAM
May 1981 57 p refs
(DE81-026337; DOE/SR/WM-79/3-Rev-5/81) Avail: NTIS HC A04/MF A01

The research and development plan of the Office of Waste Operations and Technology for long-term immobilization of the high-level radioactive wastes resulting from chemical processing of nuclear reactor fuels and targets is presented. The basic plan to achieve the goal of immobilizing all US nuclear high-level wastes (HLW) for terminal storage is to develop technology to support a realistic choice of an isolation system for each site, to provide design data for full-scale facilities, and to construct and operate the facilities necessary to immobilize the DOE defense wastes. Plans for an HLW immobilization plant at the Savannah River Plant are presented. DOE

74 OPTICS

Includes light phenomena.

N82-10859 California Inst. of Tech., Pasadena.
A1GaAs OPTOELECTRONIC DEVICES FOR OPTICAL COMMUNICATIONS Ph.D. Thesis
Joseph Katz 1981 163 p
Avail: Univ. Microfilms Order No. 8118977

Semiconductor injection laser diodes and related optoelectronic devices which can be used as high sources for optical communication systems are described, and the intrinsic electrical model of the laser diode is developed. The devices were grown from the GaAs-GaAlAs ternary system using the input phase epitaxy technique. The translaser, a monolithically integrated heterostructure bipolar transistor with an injection laser and two devices possessing bistable electrical characteristics (a laser SCR switch and a device consisting of multi-PN heterostructure devices) are described. Each performs an electronic function of modulating the light output of the laser associated with it. Two low threshold single mode laser diodes whose properties make them attractive candidates for sources in optical fiber communication systems, the embedded stripe laser, and a version of the buried heterostructure laser are investigated. An equivalent circuit of the laser diode is presented. This model demonstrates the operation of the laser diode, which is particularly important in applications which involve its high frequency operation with other electronic components and when a modification of its frequency response is needed. Dissert. Abstr.

N82-10860 Rockefeller Univ., New York.
ON THE THEORY OF LIGHT SCATTERING FROM FLUIDS IN NONEQUILIBRIUM STEADY STATES Ph.D. Thesis
Theodore Ross Kirkpatrick 1981 197 p
Avail: Univ. Microfilms Order No. 8118671

The light scattering of a fluid in a nonequilibrium steady state is studied. The effect of long range correlations in the equal time correlation functions on the light scattering are calculated, experimental predictions are made, new experiments are suggested and a comparison with existing experimental results is given. The theory is developed for dilute gases using kinetic theory as well as for fluids of arbitrary densities using a hydrodynamic theory. The long range correlations that exist in nonequilibrium fluids are due to mode coupling effects. The existence of mode coupling effects in fluids far away from a critical point is supported. Other effects predicted theoretically for fluids and so far only found in computer simulation are supported; the long time tails in the time correlation functions that determine the transport coefficients and the nonexistence of a virial expansion for the transport coefficients. Dissert. Abstr.

N82-10861 Texas Univ. at Arlington.

STOCHASTIC SWITCHING IN ABSORPTIVE OPTICAL BISTABILITY Ph.D. Thesis

Robert Frank Gragg 1981 1 p
Avail: Univ. Microfilms Order No. 8119294

The dynamics of a Fabry-Perot cavity filled with a gas of two-level atoms and injected with an external laser beam are examined. The semiclassical Maxwell-Bloch equations are found to show a range of behavior from the second order lasing phase transition to the first order transition of absorptive optical bistability. In the latter case, an adiabatic elimination is performed which removes the mean values of the atomic variables but retains their fluctuations in a stochastic differential equation. The resulting Fokker-Planck equation (which is identical to the one from the quantum optical treatment of the problem) has a bimodal steady state probability density. Transition rates between the metastable states (probability peaks) are calculated by a method originated by Kramers for chemical reaction rates and are compared to mean first passage results and the results of other authors. Dissert. Abstr.

N82-10862*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

REAL-TIME 3D X-RAY AND GAMMA-RAY VIEWER Patent Application

Lo I. Yin, inventor (to NASA) Filed 22 May 1981 21 p
(NASA-Case-GSC-12640-1; US-Patent-Appl-SN-267178) Avail: NTIS HC A02/MF A01 CSCL 20F

A multi-pinhole aperture lead screen forms an equal plurality of invisible mini-images having dissimilar perspectives of an X-ray and gamma-ray emitting object onto a rare-earth phosphor layer which, in turn, provides visible light mini-images directly into a visible light image intensifier. A viewing screen having an equal plurality of dissimilar perspective apertures distributed across its face in a geometric pattern identical to the lead screen, provides a viewer with a real, pseudoscopic image of the object with full horizontal and vertical parallax. NASA

N82-10863# Sandia Labs., Albuquerque, N. Mex. Photometrics and Optical Development Div.

AUTOMATED FRESNEL LENS TESTER SYSTEM

Gary S. Phipps Jul. 1981 71 p
(Contract DE-AC04-76DP-00789)
(DE81-029483; SAND-81-1187) Avail: NTIS HC A04/MF A01

An automated data collection system controlled by a desktop computer for testing Fresnel concentrators (lenses) intended for solar energy applications was developed. The system maps the two dimensional irradiance pattern formed in a plane parallel to the lens, whereas the lens and detector assembly track the Sun. A point detector silicon diode measures the irradiance at each point of an operator defined rectilinear grid of data positions. Comparison with a second detector measuring solar insolation levels results in solar concentration ratios over the image plane. Summation of image plane energies allows calculation of lens efficiencies for various solar cell sizes. DOE

N82-10864# Los Alamos Scientific Lab., N. Mex.

PHOTOEMISSION MEASUREMENTS FOR LOW ENERGY X-RAY DETECTOR APPLICATIONS

Robert H. Day 1981 16 p refs Presented at the Low Energy X-ray Conf., Monterey, Calif., Jun. 181
(Contract W-7405-eng-36)
(DE81-025255; LA-UR-81-1712; CONF-8106108-1) Avail: NTIS HC A02/MF A01

A review of X-ray photoemission measurements in the 50 eV to 10 keV X-ray region is given and the experimental techniques are reviewed. A semiempirical model of X-ray photoemission is discussed and compared to experimental measurements. Examples of absolutely calibrated instruments are shown. DOE

N82-10865# Oak Ridge National Lab., Tenn.

MEASUREMENT OF PEAK TEMPERATURE ALONG AN OPTICAL FIBER

R. J. Fox 29 May 1981 6 p refs
(Contract W-7405-eng-26)
(DE81-023186; DOE/TIC-1023186) Avail: NTIS HC A02/MF A01

The design and operation of a fiber optic line sensor that distinguishes between a long warm region and a short hot zone is described. The sensor is used for the measurement of hot spots in large, high voltage transformers where high electric fields preclude the use of metallic lead wires to join remote readout equipment to the thermocouple or thermistor sensors. The use of a length of fiber to determine remotely the maximum temperature achieved at any point along the length of the fiber, i.e., a distributed line sensor, is considered. DOE

N82-10866# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

OPTICAL MULTIPLEX TECHNIQUE [OPTISK MULTIPLEX-TEKNIK]

Lars Knutsson Sep. 1980 100 p refs In SWEDISH
(FOA-C-30022-E) Avail: NTIS HC A05/MF A01

Survey and short description is given of the devices reviewed in the literature. About 50 articles and books were analyzed. Stress is laid on duplex-transmission on single fiber and special multimode optical fibers. Recently a fiber material with very low attenuation was produced. Most interesting is the wavelength-multiplex where the different wavelengths represent the different channels. It gives simple multiplexes with good data. Waveguides can be made in the substratum by ion implanting and several components can be placed on the same chip. Description of a duplex telephone coupler on a single-fiber is given. Author (ESA)

N82-10867# Research Inst. of National Defence, Umea (Sweden). Huvudavdelning 4.

REGISTRATION METHODS FOR MEASURING OF LUMINESCENCE-CELL LIGHT BY MEANS OF PHOTOMULTIPLIERS [REGISTREINGSMETODER VID MAETNING AV LUMINESCENCELJUS MED FOTOMUL TIPLIKATORER]

Goeran Hulten and Hans-Goeran Larsson Mar. 1980 27 p refs In SWEDISH
(FOA-C-40109-B2) Avail: NTIS HC A03/MF A01

Photomultipliers (two EMI 9781 R, one EMI 9757 B, and one RCA IP 21) were exposed to light from bioluminescent reactions and from a radioactive light source. The signal was recorded as an analog current (filtration) or by counting the pulses per unit of time (photon counting). With photon counting, an increase by a factor of 1.5, in comparison with conventional filtration, was recorded for the background-noise ratio and for the signal background ratio. An EMI 9757 B has a sensitivity 100 times higher than the RCA IP 21. Author (ESA)

N82-10868# Engins Matra, Velizy (France).

FIBER OPTICS [FIBRES OPTIQUES]

E. Gellee 24 Nov. 1980 87 p refs In FRENCH
Avail: NTIS HC A05/MF A01

Technological progress in the domain of optical transmission, specifically via fiber optical cables, was reviewed. The different types of fibers are discussed, and the principle of luminous propagation in fibers is explained. Attenuation in optical fibers is considered and the various causes of losses are listed. Insertion losses are then dealt with and methods of connecting fiber optic cables are summarized. Factors affecting the choice of a fiber optic transmission system were also surveyed. In conclusion, several military applications are cited. Author (ESA)

N82-10869# Agfa-Gevaert A.G., Munich (West Germany). Camera-Werk.

APPLICATION OF REFRACTIVE OPTICAL MICROSTRUCTURES Final Report

Reinhold Deml Bonn Bundesministerium fuer Forschung und Technologie Nov. 1980 118 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-106; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationzsentrum, Karlsruhe, West Germany DM 24.80

Photographic and photochemical production methods are presented with special applications. In the framework of the investigation of light-sensitive relief materials, several chromate-gelatin processes and a positive photoresistive process were examined in detail. Periodic microstructures in the range from 0.01 to 1mm, showing acceptable surface quality as well as profile tolerances of about 0.2 micron are obtained. Various lenticular arrays, a lenticular system for 1/1 copying, and a contrast enhancing lenticular projection screen are produced. The procedure offers the possibility of generating grating. Fresnel and lenticular profiles of almost arbitrary shape, showing precision and quality of surface which can in general not be obtained by means of the existing methods. Author (ESA)

N82-10870# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.

STUDY ON THE ELECTRONIC IMAGING SYSTEM MOMS IN THE REFLECTED AND THERMAL INFRARED SPECTRUM Final Report

Bernd Kunkel Bonn Bundesministerium fuer Forschung und Technologie Sep. 1980 105 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-80-026; MBB-R-3700/2129-R;
ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22,10

The modular opto-electronic multispectral scanner (MOMS) system is discussed. It has a separate module per spectral range for visible and near infrared radiation (NIR). The extension of the MOMS system into the reflected infrared (IR) and thermal IR spectral ranges are dealt with. Main emphasis is on the technical realization possibilities and concepts for the linear IR detector arrays, the optics, and the signal readout electronics. Technical solutions were investigated in detail, aiming at a spaceborne scanner system in connection with the visible/NIR MOMS modules, and a thermal IR breadboard is described. Author (ESA)

N82-10871 Arizona Univ., Tucson.

AN INVESTIGATION OF COMPUTER-ASSISTED STRAY RADIATION ANALYSIS PROGRAMS Ph.D. Thesis

Janet Sue Fender 1981 195 p
Avail: Univ. Microfilms Order No. 8117741

The capabilities and limitations of computer assisted stray radiation analysis programs are evaluated. Arizona's Paraxial Analysis of Radiation Transfer (APART) and Honeywell's General Unwanted Energy Rejection Analysis Program (GUERAP III) were examined to identify major assumptions and approximations, to gauge any resulting errors, and to devise possible remedies to extend the accuracy and capabilities of each program. One important vehicle for comparison was the spray light analysis of a heat seeking missile. Both APART and GUERAP III were used to analyze the same opto-mechanical catadioptric system. APART was then used as a tool for design modifications that resulted in predicted performance improvements of four orders of magnitude. Performance measurements were not available to verify predictions. Dissert. Abstr.

N82-10872# Arizona Univ., Tucson.

NEW METHODS OF NONLINEAR DIGITAL IMAGE RESTORATION Ph.D. Thesis

Eric Grant Hawman 1981 200 p
Avail: Univ. Microfilms Order No. 8118458

Four methods for image restoration are developed and presented. The object estimates have a nonlinear dependence on the image data and iterative methods of solution are needed. The restoration algorithms are compared with previously developed methods by means of computer simulations. The problem of restoring noisy images where the spread function is known is regarded as a constrained least squares optimization problem and methods for enforcing upper and lower bounds on the restoration are considered. A statistical approach to the known spread function restoration problem based on maximum entropy methods allows the synthesis of estimators to comply with various prior constraints the image restorer wishes to impose. In restoration of atmospherically degraded images, in addition to random noise in the image, one is faced with a randomly changing spread function. Two algorithms for restoration having high noise immunity are proposed. Dissert. Abstr.

N82-11004# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

COLOR DISCRIMINATION BY A COLOR-PICTURE READER

Chen Chenghang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 253-272 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-10873 Illinois Univ. at Urbana-Champaign.

AN ENERGY-DEPENDENT FINITE-ORBIT TREATMENT FOR PLASMA BUILDUP IN MIRROR FUSION DEVICES Ph.D. Thesis

Mark Mundy Campbell 1981 159 p
Avail: Univ. Microfilms Order No. 8114396

A computer simulation of hot plasma buildup in mirror fusion devices and results from this model are presented. Finite gyro-radius effects are treated by a dynamic model called FOREMD (finite orbit, radial, energy and magnetic-field dependent). The model includes a quasi-liner treatment for the drift cyclotron loss cone instability. Also included are effects of the local magnetic-field on ion orbits. The model was used to study plasma buildup (particularly early states) in presently operating and proposed mirror devices (2XII-B, TMX, FERF) and in the twin beam mirror. Results of these simulatons compared to experiments or design expectations are presented. General factors in plasma buildup and their relative importance are also examined with recommendations on how to achieve plasma buildup under c-x erosion conditions with minimal injected beam power. Dissert. Abstr.

N82-10874 Wisconsin Univ. - Madison.

PLASMA TRANSPORT IN A SIMULATED MAGNETIC DIVERTOR CONFIGURATION Ph.D. Thesis

Clifford Mark Strawitch 1981 210 p
Avail: Univ. Microfilms Order No. 8116021

The transport properties of plasma on magnetic field lines that intersect a conducting plate were studied experimentally in an internal rind D.C. machine to simulate certain aspects of plasma phenomena that may take place in a Tokamak divertor. It was found by a variety of measurements that the cross field transport is non-ambipolar and that although the nonambipolarity may be reduced, it is difficult to eliminate entirely. The plasma flow velocity parallel to the magnetic field is found to be near the ion acoustic velocity in all cases. The experimental density and electron temperature profiles are compared to the solutions to a one dimensional transport model that is model that is commonly used in divertor theory. Solutions to both the steady state density, and time dependent coupled density and temperature equations of this model, agree well with the experimental profiles, for cross field coefficients that scale like the classical coefficients due to ion-neutral collisons, cross field conductivities that scale like the classical conductivities due to ion-neutral collisions, cross field conductivities that scale like the classical conductivities due to electron-neutral collisions, and parallel loss terms that scale like the ion acoustic velocity. Dissert. Abstr.

N82-10875 Texas Univ. at Arlington.

CHARACTERISTICS OF LOW FREQUENCY MHD FLUCTUATIONS IN THE PRETEXT TOKAMAK Ph.D. Thesis

Thaddeus Paul Kochanski 1981 193 p
Avail: Univ. Microfilms Order No. 8119320

The temporal an spectral characteristics of low frequency (< 100 KHz) MHD fluctuations, which are commonly associated with disruptions, were investigated. There exists rigid phase coherence between the internal m = 1, and externally detected m = 2 modes indicative of strong mode coupling. A parametric study of the frequency of the mode, in the saturated state, indicates that the frequency scales with the toroidal magnetic field, and is inversely proportional to the plasma current. The frequency was observed to decrease abruptly as the mode amplitude rapidly increases prior to a plasma disruption. The burst type growth of the m = 2 mode appears to be inextricably

linked to the occurrence of the distruptive instability.
Dissert. Abstr.

N82-10876 California Univ., Davis.
GYROELASTIC FLUIDS Ph.D. Thesis
Gary Dean Kerbel 1981 131 p
Avail: Univ. Microfilms Order No. 81/7571

A simple scale model in three dimensions of a guiding center plasma is studied within the purview of gyroelastic (also known as finite-gyro-radius or finite-angular-momentum-density) magnetohydrodynamics. The (nonlinear) system sustains a particular symmetry called isorrhopy as a result of which drift oscillations and fluid oscillations are decoupled. Isorrhopic equilibria are analyzed first within the framework of geometrical optics, resulting in (local) dispersion relations and ray constants. A general scheme is then developed to evolve an arbitrary linear perturbation of a screwpinch equilibrium as an invertible integral transform (over the complete set of generalized eigenfunctions defined naturally by the equilibrium.) Details of the structure of the function space and the associated spectra are elucidated. Features of the (global) dispersion relation owing to the presence of gyroelastic stabilization are revealed. An energy principle is developed and applied to study the stability of the tubular screwpinch.
Dissert. Abstr.

N82-10877 Polytechnic Inst. of New York, Brooklyn.
PROPAGATION AND NONLINEAR STUDIES OF ELECTROMAGNETIC WAVES IN A SELFSUSTAINED PLASMA BEAM Ph.D. Thesis
Hao-Ming Huang 1981 122 p
Avail: Univ. Microfilms Order No. 8118875

The electrostatic ion-cyclotron wave was excited parametrically with the second harmonic electron-cyclotron wave by injecting a monochromatic electromagnetic wave. The generation of the second and of the third harmonic waves was clearly observed on the spectrum analyser. The evolution process of suppression of the second harmonic and enhancement of the third harmonic wave was studied by varying a d.c. voltage from zero value on the probe that is used to pick up the signal. The rate equations for the second and the third harmonics was obtained and coupling coefficients were calculated by using the Vlasov equation. By adjusting the operating parameters of the device, two distinct modes of plasma column were obtained. The microwave intensity is maximum at the center of the column for the second mode. A theoretical model is proposed in which the plasma is considered as cylindrical dielectric wave medium situated in a longitudinally applied d.c. magnetic field. Full Maxwell's equations are used examine the problem instead of the usual simplified electrostatic approximation.
Dissert. Abstr.

N82-10878 California Univ., Riverside.
A SEARCH FOR SLOW MODE SHOCKS IN THE DOUBLE INVERSE PINCH DEVICE Ph.D. Thesis
George William Kamin 1981 250 p
Avail: Univ. Microfilms Order No. 8119571

This study of a simulated solar flare mechanism reports the results of experiments designed to replicate the original findings in the double inverse pinch device (DIPD). It was proposed that the Petschek energy release mechanism of solar flares was accurately simulated in the device. This search for shock structures was conducted in a close replica of the original DIPD and for the same plasma parameters. No separated shocks were found, only a single current sheet along the contact region between the inverse pinches was seen. Furthermore, measurements of bulk flow velocities cast significant doubt on the applicability of using the Petschek mechanism to describe the flow field in the DIPD.
Dissert. Abstr.

N82-10879 Texas Univ. at Arlington.
THE ION THERMAL CONDUCTIVITY FOR A PURE TOKAMAK PLASMA Ph.D. Thesis
Curtis Willaim Bolton, III 1981 118 p
Avail: Univ. Microfilms Order No. 8119263

The ion thermal conductivity was calculated for a wide range of aspect ratios and collision frequencies by solving the drift kinetic equation, with a model collision operator, using a finite element method, and then calculating the energy weighted friction force to determine the heat flux. The thermal conductivity, determined from the heat flux was then curve fitted to analytic formulas. These formulas allow the conductivity to be calculated at all collision frequencies and aspect ratios down to about 3. The two main results of these calculations are, first, energy scattering increases the thermal conductivity, over values previously calculated, by a factor on the order of 1.5-2 and second, the Pfirsch-Schluter contribution becomes significant at low collision frequencies, when the aspect ratio is small. Comparisons of the thermal conductivity with the results of previous authors are given. The distribution function for various collision frequencies, aspect ratios and collision operators is included.
Dissert. Abstr.

N82-10880*# Colorado State Univ., Fort Collins. Dept. of Physics.
EXPERIMENTAL SIMULATION OF BIASED SOLAR ARRAYS WITH THE SPACE PLASMA Annual Report
Harold R. Kaufman and Raymond S. Robinson May 1981 71 p refs
(Grant NsG-3196)
(NASA-CR-165485) Avail: NTIS HC A04/MF A01 CSCL 20I

The phenomenon of unexpectedly large leakage currents collected by small exposed areas of high voltage solar arrays operating in a plasma environment was investigated. Polyimide (Kapton) was the insulating material used in all tests. Both positive bias (electron collection) and negative bias (ion collection) tests were performed. A mode change in the electron collection mechanism was associated with a glow discharge process and was found to be related to the neutral background density. Results indicate that the glow discharge collection mode does not occur in a space environment where the background density is considerably lower than that of the vacuum facility used.
B.W.

N82-10881# JAYCOR, San Diego, Calif.
ANALYTICAL INVESTIGATION OF EMITTING PROBES IN AN IONIZED PLASMA
R. F. Leadon, A. J. Woods, E. P. Wenaas, and H. H. Klein 12 Apr. 1981 78 p refs
(Contract F19628-79-C-0121; AF Proj. 7601)
(AD-A104166; JAYCOR-J200-80-250A/2172; AFGL-TR-81-0138) Avail: NTIS HC A05/MF A01 CSCL 20/3

Analytical and computer model studies have been made of the electrostatic potentials achieved by electron- and ion-emitting atmospheric probes. The variables that were considered include the beam species, their energy and current, the density and temperature of the ambient plasma, ionization of the neutral atmosphere by the plasma electrons which supply the replacement current for electron-emitting probes, and the effects of the geomagnetic field on trajectories of the charged particles. Mean ionization distances as large as 100 meters have a pronounced effect on the potentials of electron-emitting probes for beam currents greater than 0.01 amperes. The calculations indicate a peak in the I-V curve for such probes.
Author (GRA)

N82-10882# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
KEY CONTRIBUTIONS IN MHD POWER GENERATION Quarterly Technical Progress Report, 1 Mar. - 31 May 1980
J. F. Louis May 1981 162 p refs
(Contract DE-AC01-79ET-15518)
(DE81-028121; DOE/ET-15518/5) Avail: NTIS HC A08/MF A01

Progress is reported in (1) investigating electrical behavior in the vicinity of electrode and insulating walls; (2) studying critical performance issues in the development of combustion disk generators; (3) developing and testing electrode modules (including studies of insulator properties); (4) determining coal combustion kinetics and ash behavior relevant to two-stage MHD combustors, and (5) investigating the mixing and flow aerodynamics of a high swirl geometry second stage.
DOE

N82-10883# Texas Univ., Austin. Inst. for Fusion Studies.
DYNAMIC MAGNETIC X-POINTS
J. N. Leboeuf, (Calif. Univ., Los Angeles), T. Tajima, and J. M. Dawson, (Calif. Univ., Los Angeles) Mar. 1981 63 p refs
(Contracts DE-FG05-80ET-53088;

DE-AM03-7650-0010-PA-26; Grants NSF PHY-79-01319; NSF ATM-79-26492)
(DE81-029830; DOE/ET-53088/15; IFSR-15) Avail: NTIS HC A04/MF A01

Two and one half dimensional magnetostatic and electromagnetic particle simulations of time varying magnetic x-points and the associated plasma response are reported. The stability and topology depends on the crossing angle of the field lines at the x-point, irrespective of the plasma. It is stipulated that the electrostatic field and finite Larmor radius effects are important in current penetration and shaping of the plasma flow. The snapping of the field lines, and dragging of the plasma into, and confinement of the plasma at, an o-point is observed. Magnetic island coalescence with explosive growth of the coalescence mode occurs and is accompanied by a large increase of kinetic energy and temperature as well as the formation of hot tails on the distribution functions. DOE

N82-10884# Texas Univ. at Austin. Fusion Research Center.
INVESTIGATION OF RUNAWAY ELECTRONS IN THE PRETEXT TOKAMAK Ph.D. Thesis
Stephen Alan Eckstrand Jan. 1981 120 p refs
(Contract DE-AS05-77ET-53042)
(DE81-029984; DOE/ET-53042/24) Avail: NTIS HC A06/MF A01

High energy (0.2 to 0.4 MeV) runaway electrons were studied in PRETEXT discharges by detecting the hard X-ray bremsstrahlung radiation produced when they escape from the discharge and strike the limiter. A pulse height analysis system, which included pileup rejection circuitry because of the high count rate, recorded both the amplitude and arrival time of each pulse. DOE

N82-10885# Texas Univ. at Austin. Fusion Research Center.
CHARACTERISTICS OF LOW FREQUENCY MHD FLUCTUATIONS IN THE PRETEXT TOKAMAK
Thaddeus Paul Kochanski May 1981 191 p refs
(Contract DE-AC05-76ET-53036)
(DE81-029720; DOE/ET-53036/27) Avail: NTIS HC A09/MF A01

The temporal and spectral characteritics of low frequency MHD fluctuations, commonly associated with disruptions, were investigated in the PRETEXT Tokamak. Rigid phase coherence between the internal m = 1, and externally detected m = 2 modes indicative of strong mode coupling was noted. The frequency of the mode, in the saturated state, indicates frequency scaling with the toroidal magnetic field, and is inversely proportional to the plasma current. The frequency is observed to decrease abruptly as the mode amplitude rapidly increases prior to a plasma disruption. The burst type growth of the m = 2 linked to the occurence of the disruptive instabilty. DOE

N82-10886# Los Alamos Scientific Lab., N. Mex.
POWER-CROWBAR IMPACTS ON PLASMA CHARACTERISTICS IN ZT-40
R. G. Watt Jul. 1981 8 p refs
(Contract W-7405-eng-36)
(DE81-027935; LA-8914-MS) Avail: NTIS HC A02/MF A01

The impact of I/sub phi/ and I/sub theta/ power crowbars on the Zt-40 plasma is presented. It is demonstrated that in both aided and self reversed modes the main effect of the I/sub phi/ power crowbar is to lengthen the time to I/e of peak current, whereas the main effect of the I/sub theta/ power crowbar is to extend the reversal of B/sub phi/ at the wall, primarily in self reversed operation. It is shown that this extension has the effect of also decreasing the current decay rate to the point where no distinction is seen between the two modes. A saturation is seen in the decay time (tau/sub 1/e less than or equal to 0.4 ms) once the field reversal in either mode exceeds approximately 0.3 ms. DOE

N82-10887# Argonne National Lab., Ill.
FIRST-WALL/BLANKET MATERIALS SELECTION FOR STARFIRE TOKAMAK REACTOR
D. Smith, R. F. Mattas, R. G. Clemmer, and J. W. Davis (McDonnell Douglas Astronautics Co., St. Louis) 1980 22 p refs Presented at the 4th Am. Nucl. Soc. Topical Meeting on the Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023915; CONF-801011-95) Avail: NTIS HC A02/MF A01

The major parameters and properties that impact materials selection and design criteria for the development of the reference first-wall/blanket design of a Tokamak reactor are reviewed. Tradeoffs in the materials selection process for the breeding material, coolant structure, neutron multiplier, and reflector are detailed. DOE

N82-10888# TRW Defense and Space Systems Group, Redondo Beach, Calif. Combustion and Power Technology Dept.
HIGH PRESSURE MHD COAL COMBUSTORS INVESTIGATION, PHASE 2 Final Technical Report
H. Iwata and R. Hamberg May 1981 129 p
(Contract DE-AC22-78ET-11053)
(DE81-027238; DOE/ET-11053/T1; FE-2705-43) Avail: NTIS HC A07/MF A01

A high pressure MHD coal combustor was investigated. The purpose was to acquire basic design and support engineering data through systematic combustion experiments at the 10 and 20 thermal megawatt size and to design a 50 MW/sub t/ combustor. This combustor is to produce an electrically conductive plasma generated by the direct combustion of pulverized coal with hot oxygen enriched vitiated air that is seeded with potassium carbonate. Vitiated air and oxygen are used as the oxidizer, however, preheated air will ultimately be used as the oxidizer in coal fired MHD combustors. DOE

N82-10889# Argonne National Lab., Ill.
LOWER-HYBRID HEATING AND CURRENT DRIVE SYSTEM FOR THE STARFIRE TOKAMAK
D. A. Ehst, C. D. Boley, K. Evans, Jr., R. Fuja, J. Jung, C. A. Trachsel (McDonnell Douglas Astronautics Co., St Louis), and T. Hino (General Atomic Co., San Diego, Calif.) 1980 9 p refs Presented at the 4th ANS Topical Meeting on the Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023845; CONF-801011-97) Avail: NTIS HC A02/MF A01

Starfire is a commercial Tokamak reactor which is designed to operate in a purely steady-state mode with the electron current maintained by momentum transfer from lower-hybrid waves launched from end-fire waveguide arrays. The RF system was designed for consistency with plasma physics constraints, and its components have been selected with the goal of minimizing the electric power required to maintain the plasma current. The system was analyzed in the thermal, electrical, magnetic, and radiative environments of reactor operation and appears to provide reliable, low-maintenance performance. DOE

N82-10890# Argonne National Lab., Ill.
CHOICE OF COOLANT IN COMMERCIAL TOKAMAK POWER PLANTS
Mohamed A. Abdou and D. Graumann 1980 9 p refs Presented at the 4th Am. Nucl. Soc. Topical Meeting on the Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023716; CONF-801011-87) Avail: NTIS HC A02/MF A01

Two coolants, water and helium, were compared and the advantages of pressurized water for the conditions of the STARFIRE Tokamak power plant design are shown. The STARFIRE design focuses on solid tritium breeder blankets to minimize the stored chemical energy. It is suggested that the most suitable coolant with solid tritium breeders are water and helium. The areas where development is required to utilize the potential advantages of helium are identified. DOE

N82-10891# Argonne National Lab., Ill.
STARFIRE BURN CYCLE
Jeffrey N. Brooks, Charles D. Boley, and Daniel Driemeyer 1980 9 p refs Presented at the 4th Am. Nucl. Soc. Topical Meeting on the Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023708; CONF-801011-89) Avail: NTIS HC A02/MF A01

The STARFIRE burn cycle from pulsed reactor burn cycles

were examined. The startup and shutdown periods are considerably longer, and the power supply requirements considerably smaller, than for pulsed operation. Plasma initiation is accomplished with electron cyclotron resonance heating to eliminate the problems of high voltage coils. During the main burn the plasma is thermally stabilized by the addition of trace quantities of iodine, which serve to radiate most of the alpha heating energy. The burn cycle is compatible with lower hybrid current drive operation.
DOE

N82-10892# Argonne National Lab., Ill.
ELECTROMAGNETIC EFFECTS INVOLVING A TOKAMAK REACTOR FIRST WALL AND BLANKET
L. Turner, K. Evans, Jr., E. Gelbard, and R. Prater 1980 12 p refs Presented at the 4th Am. Nucl. Soc. Topical Meeting on the Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023719; CONF-801011-91) Avail: NTIS
HC A02/MF A01

Four electromagnetic effects experienced by the first wall and blanket of a Tokamak reactor are considered. The first wall provides reduction of the growth rate of vertical axisymmetric instability and stabilization of low mode number interval kink modes. If a rapid plasma disruption occurs, a current will be induced on the first wall, tending to maintain the field formerly produced by the plasma. Correction of plasma movement can begin o a time scale much faster than the L/R time of the first wall and blanket. Field changes, especially those from plasma disruption or from rapid discharge of a toroidal field coil, can cause substantial eddy current forces on elements of the first wall and blanket.
DOE

N82-10893# Argonne National Lab., Ill.
DEVELOPMENT OF TRITIUM BREEDING BLANKETS FOR DT BURNING FUSION REACTORS
R. G. Clemmer 1980 11 p refs Presented at the 4th Am. Nucl. Soc. Topical Meeting on the Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023904; CONF-801011-92) Avail: NTIS
HC A02/MF A01

Blanket tritium recovery and the performance of potentially viable tritium breeding materials under conditions anticipated in a DT fueled fusion reactor environment was studied. The existing physicochemical, thermophysical, and ceramographic data for candidate liquid and solid breeders are reviewed and appropriate operating conditions defined. It is shown that selection of a breeding material and an appropriate tritium recovery method can impose significant constraints upon blanket design, particularly when considerations of breeder/coolant/structure compatibility and temperature limitations are taken into accoum. DOE

N82-10894# Argonne National Lab., Ill.
IMPLICATIONS OF THE DD FUEL CYCLE ON TOKAMAK REACTOR TECHNOLOGY CONSIDERATION
C. C. Baker, J. N. Brooks, D. A. Ehst, K. Evans, Jr., J. Jung, R. Mattas, B. Misra, D. L. Smith, H. Stevens, and L. R. Turner 1980 14 p refs Presented at the 4th ANS Topical Meeting on the Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023712; CONF-801011-93) Avail: NTIS
HC A02/MF A01

The initial results of a study to develop a conceptual design of a DD Tokamak reactor are reported. A comprehensive steady-state power and particle balance code was used to survey a variety of design points. A reference set of parameters was selected for further study. The concepts of RF driven currents and a limiter-vacuum system were examined and appear to offer promise.
DOE

N82-10895# Argonne National Lab., Ill.
OVERVIEW OF THE STARFIRE REFERENCE COMMERCIAL TOKAMAK FUSION POWER REACTOR DESIGN
C. C. Baker, M. A. Abdou, D. A. DeFreece (McDonnell Douglas Astronautics Co., St. Louis), C. A. Trachsel (McDonnell Douglas Astronautics Co., St. Louis), D. Graumann (General Atomic Co.), and K. Barry (Ralph M. Parsons Co.) 1980 16 p refs Presented at the 4th Am. Nucl. Soc. Topical Meeting on the Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-203912; CONF-801011-94) Avail: NTIS
HC A02/MF A01

A design concept for a commercial Tokamak fusion electric power plant based on the deuterium/tritium/lithium fuel cycle is discussed. The major features include a steady-state operating mode based on a continuous RF lower-hybrid current drive and auxiliary heating, solid tritium breeder material, pressurized water cooling, limiter/vacuum system for impurity control and exhaust, high tritium burnup, superconducting poloidal coils outside the toroidal field superconducting coils, fully remote maintenance, and a low-activation shield. DOE

N82-10896# Argonne National Lab., Ill.
LIMITER/VACUUM SYSTEM FOR PLASMA IMPURITY CONTROL AND EXHAUST IN TOKAMAKS
M. A. Abdou, J. N. Brooks, R. Mattas, R. G. Clemmer, P. Finn, D. Smith, B. Misra, H. Schreyer, H. Stevens, and L. Turner 1980 11 p refs Presented at the 4th ANS Topical Meeting on the Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980 Prepared in cooperation with McDonnell Douglas Astronautics Co., St. Louis.
(Contract W-31-109-eng-38)
(DE81-023843; CONF-801011-96) Avail: NTIS
HC A02/MF A01

It is shown that the limiter/vacuum concept is a very attractive option for power reactors. It is relatively simple and inexpensive and deserves serious experimental verification. DOE

N82-10897# Argonne National Lab., Ill.
FIRST-WALL, BLANKET, AND SHIELD ENGINEERING TEST PROGRAM FOR MAGNETICALLY CONFINED FUSION POWER REACTORS
Victor A. Maroni 1980 15 p refs Presented at the 4th Am. Nucl. Soc. Topical Meeting on the Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023911; CONF-801011-100) Avail: NTIS
HC A02/MF A01

First wall blanket and shield (FW/B/S) system thermal-hydraulics, thermomechanics, nucleonics, electromagnetic, assembly, maintenance, and repair are identified. Planning exercises that: indicated (1) meaningful near term engineering testing should be feasible within the bounds of a modest funding base; (2) there are existing facilities and expertise which can be profitably utilized in this testing; and (3) near term efforts should focus on the measurement of engineering data and the verification/calibration of predictive methods for anticipated normal operational and transient FW. B/S conditions. The planning strategies, approach to near term testing, and longer range needs for integrated FW/BS/ test facilities are also discussed. DOE

N82-10898# Argonne National Lab., Ill.
SAFETY OF SUPERCONDUCTING MAGNETS FOR FUSION: THERMAL AND ELECTROMAGNETIC EFFECTS OF RAPID TF COIL DISCHARGE
Larry R. Turner 1980 9 p refs Presented at the 4th Am. Nucl. Soc. Topical Meeting on Technol. of Controlled Nucl. Fusion, King of Prussia, Pa., 14-17 Oct. 1980
(Contracts W-31-109-eng-38; DE-AC07-76ID-01570)
(DE81-203844; CONF-801011-103) Avail: NTIS
HC A02/MF A01

The consequences of a sudden voltage damp of 20 kV (0.83 omega for a 24 kA current) in a magnet system of a Tokamak device were investigated. DOE

N82-10899# Union Carbide Corp., Oak Ridge, Tenn. Nuclear Div.
QUALITY-ASSURANCE APPROACH FOR THE ELMO BUMPY TORUS PROOF-OF-PRINCIPAL EXPERIMENT
F. M. Sticksel 1981 16 p Presented at the IEA Tokamak Quality Assurance Workshop, Princeton, N.J., 2 Jun. 1981
(Contract W-7405-eng-26)
(DE81-023224; CONF-810654-2) Avail: NTIS
HC A02/MF A01

A brief description of the Elmo Bumpy Torus of Principle (EPT-P) is given highlighting various components. Development of a quality control program to assure that the design, development, and implementation of effective quality requirements for the EBT-P are met is outlined. Aspects of this program discussed include: receiving inspection, fabrication control, final inspection and test, nonconformance control, shipping inspection, and surveillance during installation and testing. S.L.

N82-10900# Sandia Labs., Albuquerque, N. Mex.
UV-LASER-TRIGGERED SWITCHES
J. R. Woodworth, C. A. Frost, and T. A. Green 1981 13 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-769486; SAND-81-0695C; CONF-810659-1) Avail: NTIS HC A02/MF A01

Two techniques of UV laser triggering for high voltage spark gaps were developed in which a KrF laser (248nm) is used to create an ionized channel through the dielectric gas in the spark gap. Laser induced breakdown in SF6 was studied and this phenomenon was applied to trigger a 0.5MV spark gap. The use of additives to the usual dielectric gas, such as Tripropylamine, which undergo 2-step ionization in a KrF laser field, is studied. They allow nanosecond-jitter laser triggering even with the use of a relatively low optical quality beam. Data are presented for a 0.5 MV pulse charged switch triggered with a low divergence KrF laser at 80% of its self-breakdown voltage which demonstrate a 1-sigma jitter of 150 ps. DOE

N82-10901# Los Alamos Scientific Lab., N. Mex.
INFLUENCES ON TARGET IRRADIATION SYMMETRY IN CO2 LASER-FUSION EXPERIMENTS
R. L. Carman 1981 28 p refs Presented at the Topical Conf. on Symmetry Aspects of Inertial Fusion Implosions, Washington, D.C., 27 May 1981
(Contract W-7405-eng-36)
(LA-UR-81-1566; CONF-810570-1) Avail: NTIS HC A03/MF A01

The presence of CO2 laser deposits its energy of very steep density profiles and high upper shelf densities the CO2 laser deposits its energy spatially quite close to the ablation surface. Calculations indicate that a high degree of symmetry exist to achieve the necessary high compression ratios. Energy transport provides only limited improvement in the ablative symmetry over that achieved in the irradiation symmetry. It is suggested that a balance between radiation pressure and hydrodynamic pressure underestimates the density to which the CO2 laser light penetrates for early times. DOE

N82-10902# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
ON KINK STABILIZATION BY VIOLATION OF THE SECOND ADIABATIC INVARIANT Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Research (EUR-NE)
B. Lehnert Dec. 1980 17 p refs
(TRITA-PFU-80-11; ISSN-0348-7644) Avail: NTIS HC A02/MF A01

An attempt is made to determine the nonadiabatic effects arising from the violation of the constancy of the second adiabatic invariant. The major focus is on the case of a plane kink disturbance of a cylindrical plasma column. It is shown that nonadiabatic ion motion arise at small and intermediate wave lengths from the changes in curvature of the drift surface. R.C.T.

N82-10903 California Univ., Irvine.
PLASMA MOTION ACROSS A MAGNETIC FIELD Ph.D. Thesis
William Kalman Peter 1981 191 p
Avail: Univ. Microfilms Order No. 8118488

The possibility of injecting pulsed, neutralized, ion beams into toroidal fields for the purpose of driving currents or of supplementary Tokamak heating was assessed. Cross field injection experiments are divided into two categories: those in which the beam radius R is much greater than in ion gyroradius a sub i, and those in which R >> a sub i. Condition one is usually applicable to beams injected from plasma guns while condition two is usually applicable to high energy neutralized ion beams injected from ion diodes. Dissert. Abstr.

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N82-10904 Princeton Univ., N. J.
AUGER INVESTIGATION OF ANNEALING PROCESSES IN MOS TECHNOLOGY Ph.D. Thesis
Steven Robert Jost 1981 65 p
Avail: Univ. Microfilms Order No. 8118666

Thin oxides of SiO2 on clean Si surfaces were studied by Auger electron spectroscopy to determine the effects of various annealing processes on the Si/SiO2 interface. A defect peak was observed in the Auger spectrum near 83 eV that is theoretically associated with dangling Si bonds at the interface which are caused by lattice mismatch between Si and SiO2. Exposure to hydrogen significantly reduced the magnitude of this Auger peak which corresponds to the reduction in interface-state density in MOS structures following a low temperature forming gas anneal. Subsequent heat treatment in ultrahigh vacuum resulted in the return of the defect peak in the spectrum showing the reversibility of the role of hydrogen in interface state passivation. Nitrogen, argon, and vacuum high temperature anneals were also investigated, and it was found that nitrogen anneals seem to be more effective in the reduction of interface-state density, although a mechanism for its effectiveness could not be determined. Dissert. Abstr.

N82-10905 Colorado State Univ., Fort Collins.
PHOTOELECTRON SPECTROSCOPY AND INITIAL OXIDATION OF ION DISORDERED SILICON Ph.D. Thesis
Daniel Lloyd Ellsworth 1981 204 p
Avail: Univ. Microfilms Order No. 8119699

The physical and chemical properties of the silicon surface disordered by ion bombardment are described. The unique properties of this surface are exploited by UPS valence band studies of oxygen adsorption to reveal the presence of substrate structure dependent oxygen bonding. An extended surface model is proposed for the structure of the surface. Quantitative oxygen adsorption kinetics studies are presented in terms of oxygen silicon bond formation rate, as well as total presence of oxygen. Correlation of these results with observations for valence band photoemission density of states signatures has provided data which are interpreted in terms of the details of initial oxygen silicon bond formation. Disordered surface experiments are discussed in terms of results for adsorption on cleaved surfaces. In characterizing various applications of ion beam sputtering, a simple, quantitative time dependent mixing model is suggested as an explanation for changes which occur in Si/SiO2 interfaces core level spectra with increasing ion dose. Dissert. Abstr.

N82-10906 Pennsylvania Univ., Philadelphia.
MECHANISMS OF FATIGUE DEFORMATION AND FAILURE IN COPPER SINGLE CRYSTALS Ph.D. Thesis
Alex Sinn-Jeng Cheng 1981 225 p
Avail: Univ. Microfilms Order No. 8117768

In low-strain fatigue, an initially annealed metal hardens rapidly by accumulating dislocation structures. These consist of patches of dislocation dipolar loops in edge orientation separated by channels relatively free of dislocation debris. The plastic strain is carried both by screw dislocations gliding in the channels between loop patches and by the loop patches themselves, deforming by flip-flop motions of the dipoles. Two factors, applied strain amplitude and crystal orientation, which strongly affect rapid hardening, were explored by constant strain amplitude tests on single crystals. In general, a higher strain amplitude and a higher ratio of stress on the secondary system to that on the primary system act to increase the back stress and the friction stress in the specimen so the resultant cyclic flow stress is higher at a given cumulative strain, but only during rapid hardening. These results are discussed in terms of Kuhlmann-Wilsdorf's theory of rapid hardening. Dissert. Abstr.

N82-10907 State Univ. of New York at Albany.
DEFECTS IN SEMICONDUCTORS Ph.D. Thesis
James Peter Karins, Jr. 1981 212 p
Avail: Univ. Microfilms Order No. 8118750

Stable configurations of several defects to silicon were obtained using molecular mechanics, a theoretical technique in organic chemistry. Major modifications of the technique were necessary and a set of semiempirical parameters for silicon clusters with and without oxygen impurities was obtained. Calculations of the split - < 100 > interstitial yielded a stable configuration in agreement with previously speculated structures. Calculations of vacancies, divacancies, trivacancies and tetravacancies in different bonding configurations compared extremely well with experimental structures. Molecular mechanics structures of the oxygen interstitial and oxygen vacancy pair agreed quantitatively with experimental results. At the present molecular mechanics is the only practical and accurate technique to determine semiconductor defect structures. Dissert. Abstr.

N82-10908 State Univ. of New York at Stony Brook.
STUDIES OF EXACTLY SOLVABLE SPIN SYSTEMS Ph.D. Thesis
Mahalingam Mohan 1981 67 p
Avail: Univ. Microfilms Order No. 8119238

The long time behavior of transverse spin self-correlations is studied in the one dimensional XY model for two special sets of values of the coupling constants. A summation of leading long-time divergences is made at finite temperatures. This leading order result is compared with long time behavior of self correlations predicted by some approximate theories, as well as with experimental data on one dimensional systems. The form of the n-point Green's functions of two dimensional Ising field theory (for the case when the critical temperature is approached from below) is used to obtain the connected three-point Green's function for large separations in the presence of a magnetic field, by a procedure of formal summation. It is demonstrated nontrivially that upon integration over the coordinates of the intermediate point this reduces in terms of the result for the two-point function in a magnetic field. Dissert. Abstr.

N82-10909 American Univ., Washington, D. C.
ENERGY LOSSES IN INDUCTIVE SUPERCONDUCTING SOLENOIDS WITH TIME VARYING CURRENTS Ph.D. Thesis
James Thomas Broach, Jr. 1981 120 p refs
Avail: Univ. Microfilms Order No. 8117925

A helium boil off technique was used to measure losses in inductive, multilayer superconducting solenoids carrying time varying transport currents and comparisons are made with existing loss models. The coils were wound using commercially available, multifilament, NbTi conductors of varying filament sizes, twist rates, and conductor geometries. Loss measurements were made for pulsed dc and 60 Hz ac transport currents. The pulsed dc data were taken as a function of peak magnetic field at 10 Hz and as a function of frequency (1-10 Hz) at a constant magnetic field. The 60 Hz ac loss data were taken as a function of magnetic field. Conventional loss models are reviewed, and expressions for coil losses for full and partial penetration were developed. Dissert. Abstr.

N82-10910 California Inst. of Tech., Pasadena.
LOW TEMPERATURE PHOTOLUMINESCENCE PROPERTIES OF SILICON AND SILICON GERMANIUM ALLOYS Ph.D. Thesis
Gordon Stuart Mitchard 1981 213 p
Avail: Univ. Microfilms Order No. 8118979

Three examples of the application of the photoluminescence technique to indirect semiconductors at low temperatures are presented. The effect of increasing concentrations on the photoluminescence spectrum was studied. Results for the Si:(B,In) system are presented. As the In concentration is increased, quenching of B luminescence are observed. A model based on exciton transfer from B to In impurities, which agrees well with the experimental results when the exchange mechanism is assumed for the transfer is proposed. Dissert. Abstr.

N82-10911 Colorado State Univ., Fort Collins.
TWO-DIMENSIONAL OXYGEN CLUSTERS AND FILMS ABSORBED ON GRAPHITE Ph.D. Thesis
Ru-Pin Chao Pan 1981 91 p
Avail: Univ. Microfilms Order No. 8119723

The orientations, structures and phase transitions of two dimensional oxygen molecular clusters adsorbed on the graphite plane were studied using the Monte Carlo method. Orientation phase transitions were found for all cluster sizes studied. Melting temperatures show agreement with measured values for extremely low coverage films. Two different approximations were used in the cluster studies. In one approximation, the interaction between a cluster and the surface was ignored and the center of mass of each oxygen molecule was fixed on a plane. In the other case an atom-atom Lennard-Jones potential was used to determine the surface interaction. An analytic expression was used for the summation over all the carbon atoms in the graphite. The minimal energies and structures of infinite adsorbed films were studied using an energy minimization method. Dissert. Abstr.

N82-10912 Pennsylvania Univ., Philadelphia.
OPTICAL PROPERTIES OF QUASI ONE DIMENSIONAL SYNTHETIC METALS Ph.D. Thesis
Dale Lewis Peebles 1981 180 p
Avail: Univ. Microfilms Order No. 8117832

The electronic and optical properties of two synthetic metals, Hg2.82AsF6 and (SNBr0.4) sub x; and of trans(CH) sub x, a semiconductor that can become a metal when doped, are described. Reflectivity studies of the structures of the synthetic metals are presented, and fit to the Drude formula is considered. Perpendicular reflectance, electronic anisotropy, and changes in dc conductivity are described. The photovoltaic effect of trans(CH) sub x was investigated. Reflectance and electronic anisotropy are considered and its semiconductor characteristics described in detail. Dissert. Abstr.

N82-10913 City Univ. of New York, N. Y.
ENERGY TRANSFER IN THE PRIMARY STAGES OF THE PHOTOSYNTHETIC PROCESS INVESTIGATED BY PICOSECOND TIME RESOLVED FLUORESCENCE SPECTROSCOPY Ph.D. Thesis
Francesco Pellegrino 1981 360 p
Avail: Univ. Microfilms Order No. 8119756

The fate of the absorbed light energy in the primary stages of the photosynthetic process was studied. In particular, the energy transfer in the accessory pigment complex consisting of carotenoids, Chl. a and Chl. b in higher green plants and phycobiliproteins in blue-green algae were investigated. These accessory pigments are responsible for the highly efficient transfer of the excitation energy to the photochemically active reaction center traps. The risetime, decay time, fluorescence depolarization, temperature and intensity dependence of the fluoresence emission from higher green plant and algal photosystems were directly measured. Excitation was provided by single picosecond laser pulses, as well as a train of pulses at 530 nm, within an intensity range of 10 to the 12th power to 10 to the 16th power photons/sq cm per pulse. Dissert. Abstr.

N82-10914 Virginia Univ., Charlottesville.
METAL/GaAs INTERFACES: THE SCHOTTKY BARRIER Ph.D. Thesis
Atilla Aydinli 1981 313 p
Avail: Univ. Microfilms Order No. 8117920

The analysis of metal-GaAs interfaces in a attempt toward improving Schottky mixer diodes for mm wave applications is described. The interfaces were investigated employing C-V and I-V measurements and Auger electron Spectroscopy (AES). The theory of Auger process along with its application to the specific problem at hand is discussed. The Pt/GaAs interface is studied with different chemical treatments and laser annealing conditions. Electrical measurements are carried out and correlated to AES results. It is found that excess As degrades electrical performance of Schottky diodes. Au/GaAs and Au/Pt interfaces are discussed for their relevance in Schottky diodes. A specific ohmic contact to GaAs is analyzed and the result discussed in ohmicity formation. Dissert. Abstr.

N82-10915 Louisiana State Univ. and A&M Coll., Baton Rouge.
ENERGY BANDS IN SOME TRANSITION METALS

Ph.D. Thesis
Duane Giles Laurent 1981 128 p
Avail: Univ. Microfilms Order No. 8117635

Self consistent linear combination of Gaussian orbitals energy band calculations were performed for the two paramagnetic 3d transition metals, chromium and vanadium. The energy bands densities of states and Fermi surfaces were obtained using the two most popular local exchange correlation potentials (Kohn-Sham-Gaspar and von Barth-Hedin) for chromium and the Kohn-Sham-Gaspar potential alone for vanadium. A comparison was made with the available experimental data. New interpretations for some of the neutron scattering data are made in the chromium case. Results are also presented for the Compton profiles and optical conductivities. These correlate well with the experiments if appropriate angular averages (for the Compton profile) and lifetime effcts (for the optical conductivity) are included. The electron energy loss spectrum, computed over the range 0-6.5 eV agreed well with experiment. Dissert. Abstr.

N82-10916 Virginia Univ., Charlottesville.
THEORY OF RESONANT ATOM SURFACE SCATTERING Ph.D. Thesis
James Sedwick Hutchison 1980 90 p
Avail: Univ. Microfilms Order No. 8117899

The general features of resonant atom surface scattering are reviewed and several previous approaches to the scattering problem are discussed. An alternate description is developed which separates the potential into a corrugated repulsion and a laterally smooth long range attraction. The resulting formulation explains qualitative features of the observed spectra in an intuitive way and additionally provides an efficient method for quantitative calculation. Dissert. Abstr.

N82-10917 Pennsylvania Univ., Philadelphia.
RESONANT RAMAN SCATTERING AT InAs INTERFACES Ph.D. Thesis
Lih-Ying Ching 1981 111 p
Avail: Univ. Microfilms Order No. 8117769

An investigation of semiconductor surface space charge regions in InAs surfaces in air and in metal oxide semiconductor (MOS) junctions is described. Resonant Raman scattering at the E sub 1 energy gap of InAs by longitudinal optical (LO) phonons, and that coupled modes with charge carrier excitations, was used. Backscattering data were obtained using laser excitation frequencies in the vicinity of the E sub 1 gap where LO phonon scattering mechanisms, i.e., allowed deformation potential, and electro-optic scattering mechanisms, and forbidden electric field induced and wave vector dependent scattering mechanisms, are strongly enhanced. Polarization selection rules were used, in the case of (100) surfaces, to distinguish the allowed and forbidden scattering mechanisms and, in the case of (111) surfaces to observe their interference. Dissert. Abstr.

N82-10918 State Univ. of New York at Binghamton.
HEAT PULSE TRANSMISSION ACROSS A SOLID HE 1 INTERFACE Ph.D. Thesis
Nathaniel Ellmaker Hager, III 1981 155 p
Avail: Univ. Microfilms Order No. 8118946

A study of the thermal boundary resistance (Kapitza Resistance) between a solid crystal and liquid Helium 1 was made. Measurements were made by use of the fast heat pulse technique, allowing a direct observation of phonons emitted from the solid surface into the helium. Separate pulses originating from longitudinal and transverse crystal modes was resolved at the detector. An initial transient occurring at the beginning of the detected longitudinal pulse was used as a reference for the magnitude of the energy crossing the boundary. Changes in the detected signal are noted for variations in input pulse amplitude and detector positioning. A comparison of these and other results with previous boundary resistance measurements is made. Dissert. Abstr.

N82-10919 Pennsylvania Univ., Philadelphia.
ATOMIC STRUCTURE AND INTERACTIONS AT SINGLE CRYSTAL METAL SURFACES Ph.D. Thesis
Raymond Tzutse Tung 1981 190 p
Avail: Univ. Microfilms Order No. 8117868

The aim of the research was to broaden the range of available surface diffusion data, specifically extending the established technique to include lighter metals of metallurgical and theoretical interest, and to investigate the capabilities and limitations of the FIM for determining the atomic structure of metal surfaces that are known to display clean surface reconstruction. Accordingly the diffusional chaacteristics of nickel and aluminum surfaces were examined, using an extension of routine FIM procedures, and the atomic structure of W, Mo and Nb(001) surfaces were studied using a new procedure which provides results that clearly demonstrate the power of the FIM technique for the study of surface reconstruction. Dissert. Abstr.

N82-10920 California Inst. of Tech., Pasadena.
MOESSBAUER EFFECT STUDIES IN YTTRIUM BASED METALLIC GLASSES Ph.D. Thesis
Michael Alan Tenhover 1981 111 p
Avail: Univ. Microfilms Order No. 8118922

The short range order of a variety of yttrium-3d transition metal glasses was investigated using Fe57 Mossbauer effect (ME) spectroscopy. It was found that the ME spectra of these glasses could best be described in terms of a model which assumes two kinds of sites for the 3d elements. The nature of the two sites is radically different depending on whether the transition metal is Mn, Fe, Co, and Ni or Cu and Zn. The difference in the structure of these glasses is attributed to the same factors which determine whether a C-15 crystalline compound is stable in equilibrium. The microscopic nature of ME spectroscopy provides an interesting comparison between the nature of the short range order in crystalline and amorphous alloys. The process of crystallization was also studied for a few glasses, and was found to occur in two distinct steps associated with the formation of hcp Y and C-15 compound. A high field superconducting material was designed. Dissert. Abstr.

N82-10921 State Univ. of New York at Albany.
PHASE DIAGRAMS OF TWO-DIMENSIONAL LATTICE SPIN MODELS Ph.D. Thesis
George Orland Williams 1981 101 p
Avail: Univ. Microfilms Order No. 8118760

The phase diagrams are determined for two separate two dimensional lattice spin models. General q state planar spin models on a square lattice are studied for q = 2-7. The phase diagrams are calculated by a variational method and the infinitesimal Migdal renormalization group (RG) transformations. All exactly known critical points are reproduced together with a fair numerical simulation of lines of critical joints: existence of massless phases for q = 6 and 7 are clearly indicated. The two dimensional axial next nearest neighbor Ising (ANNNI) model is studied by perturbation theory and numerically using finite lattice results. Although no clear evidence for the existence of a massless phase is obtained, the phase boundaries obtained give a strong indication of the presence of a sinus phase between the paramagnetic phase and the < 2 > antiphase. Dissert. Abstr.

N82-10922*# Lincoln Lab., Mass. Inst. of Tech., Lexington. Solid State Div.
SOLID STATE RESEARCH Quarterly Technical Summary Report, 1 Nov. 1980 - 31 Jan. 1981
Alan L. McWhorter 15 Feb. 1981 80 p refs Sponsored in part by Army, DARPA, Navy, NASA and DOE
(Contract F19628-80-C-0002; AF Proj. 649L)
(NASA-CR-164796; AD-A103887; ESD-TR-81-7) Avail: NTIS HC A05/MF A01 CSCL 20/12

This report covers in detail the solid state research work of the Solid State Division at Lincoln Laboratory for the period 1 November 1980 through 31 January 1981. The topics covered are Solid State Device Research, Quantum Electronics, Materials Research, Microelectronics, and Analog Device Technology. GRA

N82-10923# Varian Associates, Palo Alto, Calif. Solid State Lab.
RESEARCH ON LATTICE-MISMATCHED SEMICONDUCTOR LAYERS Final Report, 24 Sep. 1979 - 24 Sep. 1980
C. Burleigh III Cooper Nov. 1980 61 p refs
(Contract DE-AC03-79SF-10610)
(DOE/SF-10610/T1) Avail: NTIS HC A04/MF A01

The epitaxial growth of AlGaAsSb and the component binary and ternary alloys by organometallic vapor phase epitaxy (OM-VPE) is reported. The OM-VPE growth of the binary compounds, GaAs and GaSb, and ternary compounds, AlGaAs, AlGaSb, AlAsSb, and GaAsSb, are discussed, and the Sb-containing alloys are emphasized. Growth parameters are reviewed and it is noted that the growth temperatures and ratio of input fluxes for the growth of Sb rich alloys are different from the conditions for the growth of As rich alloys. The binary ternary components are integrated to grow the quaternary, AlGaAsSb. The exploration of III-V compound materials which can be grown by OM-VPE is discussed. DOE

N82-10924# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

ROLE OF ENERGY EXCHANGE IN VIBRATIONAL DEPHASING PROCESSES IN LIQUIDS AND SOLIDS Ph.D. Thesis

S. Marks Aug. 1981 171 p refs Sponsored in part by NSF
(Contract W-7405-eng-48)
(DE81-029819; LBL-13124) Avail: NTIS HC A08/MF A01

Three theories on the dephasing of molecular vibrations in condensed phase matter are presented. The theories predict that the widths and shifts of molecular vibrations will obey an Arrhenius temperature dependence. A model based on intermolecular energy exchange of low frequency modes, results in dephasing the high frequency modes when anharmonic coupling is present. Isotopic dilution resulted in a detailed picture of the energy transfer dynamics of the low frequency modes. Spontaneous Raman spectra support a model of inhomogeneous broadening in liquids based on results of picosecond stimulated Raman spectroscopy. The model distributes environmental sites created by a distribution in the local density and creates inhomogeneous broadening. DOE

N82-10925# Northwestern Univ., Evanston, Ill. Dept. of Materials Science and Engineering.

EFFECT OF POINT DEFECTS ON MECHANICAL PROPERTIES OF METALS Technical Progress Report, 1 Sep. 1980 - 31 Jul. 1981

M. Meshii Jul. 1981 4 p
(Contract DE-AS02-76ER-01367)
(DE81-028882; DOE/ER-01367/T1; COO-1367-130) Avail: NTIS HC A02/MF A01

Research activities areas of low temperature plastic deformation of niobium and niobium oxygen single crystals, and the effect of hydrogen on the plastic deformation and fracture of iron are reported. DOE

N82-10926# Illinois Univ., Urbana. Dept. of Physics.

COHERENT BREMSSTRAHLUNG AND CHANNELING RADIATION FROM ELECTRONS OF ONE TO THREE MeV IN SILICON AND GOLD Ph.D. Thesis

James Edwin Watson 1981 105 p refs
(Contract DE-AC02-76ER-01198)
(DE81-029490; DOE/ER-01198/1362) Avail: NTIS HC A06/MF A01

The observation of sharp peaks in the X-ray spectrum from 1 to 3 MeV electrons striking thin single crystals of silicon and gold is reported. These peaks were observed in the range 1 to 25 keV. The peaks are of two different origins, both direct results of the periodic nature of the target crystals. The first kind of radiation is caused by the interference of incoming and scattered electron wave functions. Because of the periodicity of the target material there is coherence effect for certain bremsstrahlung wave vectos. Detailed agreement between theoretical prediction and observation in silicon is shown. The second kind of radiation is caused by electrons channeled along major crystal axes. The electrons enter certain quantized orbits as they channel and may emit photons as a consequence of transitions between the various orbits. Observations of channeling radiation for various crystal axes in silicon are presented. Both phenomena were observed in gold. DOE

N82-10927# Argonne National Lab., Ill.

VORTEX UNBINDING IN SUPERCONDUCTING THIN FILMS

Peter A. Bancel and Kenneth E. Gray 1980 5 p refs Presented a the Intern. Conf. on Ordering in Two Dimensions, Lake Geneva, Wisc., 28-30 May 1980
(Contract W-31-109-eng-38)
(DE81-023540; CONF-800561-4) Avail: NTIS HC A02/MF A01

The study of the origin of broad resistive transitions in 2D superconducting films requires extremely homogeneous samples. Granular aluminum evaporated onto freshly eleaved mica substrates are shown to satisfy this criterion. Values of T/sub c/, as a function of resistance per square, are in agreement with a one parameter model of independent grains coupled by the Josephson effect, and not the predictions o the Kosterlitz-Thouless vortex unbinding model. DOE

N82-10928# Argonne National Lab., Ill. Materials Science Div.

ENERGIES OF <110> COINCIDENCE TWIST BOUNDARIES, STACKING FAULTS, AND FREE SURFACES IN METAL OXIDES WITH NaCl STRUCTURE

Dieter Wolf New York City Plenum Publishing Corp. 1980 12 p refs Presented at the 7th LLR/MMRD Intern. Symp. of Interfaces in Glass-Metal Systems, Berkeley, Calif., 28 Jul. - 1 Aug. 180
(Contract W-31-109-eng-38)
(DE81-203113; CONF-800765-9) Avail: NTIS HC A02/MF A01

A computer code developed for the determination of energies and structures of coincidence twist boundaries, stacking faults, and free surfaces is applied to MgO and NiO for which the energies of such <110> interfaces and the free surface are determined starting from empirical ionic central potentials. DOE

N82-10929# Sandia Labs., Albuquerque, N. Mex.

RESHOCK AND RELEASE BEHAVIOR OF BERYLLIUM

L. C. Chhabildas, J. L. Wise, and J. R. Asay 1981 9 p refs Presented at the APS Conf. on Shock Wave in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024064; SAND-80-2864C; CONF-810684-19) Avail: NTIS HC A02/MF A01

Reshock and release wave profile measurements in beryllium over the stress region 6 to 35 GPa were taken. The results indicated no evidence of an hcp-bcc phase transition as previously suspected. The measurements show that the yield strength of the material is 1.8 GPa at 34 GPa, a substantial increase from the ambient value of 0.3 GPa. DOE

N82-10930# Argonne National Lab., Ill. Materials Science Div.

DEFORMATION MICROSTRUCTURES AND MECHANICAL EQUATIONS OF STATE

A. P. L. Turner and T. Hasegawa (Tokyo Univ. of Agriculture and Technology, Japan) 1980 30 p refs Presented at the ASTM Conf. on Mech. Testing for Deformation Model Develop., Bal Harbour, Fla., 12-13 Nov. 1980
(Contract W-31-109-eng-38)
(DE81-023839; CONF-801148-6) Avail: NTIS HC A03/MF A01

Results of experiments involving various monotonic and cyclic deformation paths and annealing treatments are described. The results show that a state variable theory for constitutive behavior must be based on several independent parameters. Correlations which show that different mechanical responses may depend on the same state variables are discussed. TEM characterization of the microstructures developed during the tests are reported. Some correlations between microstructure and mechanical behavior are shown, but other cases are reported where no correlation can be found. DOE

N82-10931# Mound Lab., Miamisburg, Ohio.

QUADRUPOLE INTERACTIONS IN LIQUID AND SOLID DEUTERIUM

G. T. McConville and David White 1981 2 p refs Presented at the 16th Intern. Conf. on Low Temp. Phys., Los Angeles, 19 Aug. 1981
(Contract DE-AC04-76DP-00053)
(DE81-769974; MLM-2817(OP); CONF-810809-7) Avail: NTIS HC A02/MF A01

From differential vapor pressure measurements in both liquid and solid deuterium, an effective D2 molecular quadrupole moment was determined from observed nonidealities of ortho-para mixtures. DOE

N82-10932# Sandia Labs., Albuquerque, N. Mex.
SHOCK-INDUCED DEFECTS IN CADMIUM SULFIDE
B. W. Dodson and E. L. Venturini 1981 5 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023167; SAND-81-1354C; CONF-810684-15) Avail: NTIS HC A02/MF A01

The explosive shock loading of CdS powders pressed to 50 percent of theoretical density in a copper recovery capsule, to pressures in the copper of about 3, 13, and 20 GPa is described. Preservation of the samples for post shock study is considered. No residual structural changes were detected via X-ray diffraction, but large densities (approximately 10 quadrillion/cu cm) of two types of defects were detected using electron spin resonance techniques. One defect had an isotropic spectrum, with g = 2.0028, and the other had an axial spectrum with g/sub parallel/ = 1.790 and g/sub perpendicular to/ = 1.775. The axial defect seems to be connected with the wurtzite-rocksalt phase transition in CdS. DOE

N82-10933# Sandia Labs., Albuquerque, N. Mex.
CRYSTALLOGRAPHIC PROPERTIES OF LITHIUM NIOBATE SHOCK-LOADED FROM 3.7 TO GPa AND PRESERVED FOR POST-SHOCK STUDY
B. Morosin and R. A. Graham 1981 5 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023168; SAND-81-1315C; CONF-810684-16) Avail: NTIS HC A02/MF A01

Optical and X-ray diffraction observations are reported for lithium niobate crystals which were subjected to shock loading along the c axis and recovered for post-shock study. At pressures of 3.5 and 5.5 GPa, no unusual X-ray diffraction results are observed. Optical observations on these samples show planar features similar to prior observations in other crystals. At 9.5 and 19 GPa, the X-ray observations indicate that the samples are recrystallized into micro size crystalites with well coordinated crystallographic alignment changes from the original crystal axis. The observed effects are thought to be initiated by localized heating accompanying heterogeneous yielding. DOE

N82-10934# Argonne National Lab., Ill.
NbN MATERIALS DEVELOPMENT FOR PRACTICAL SUPERCONDUCTING DEVICES
R. T. Kampwirth and K. E. Gray 1980 5 p refs Presented at the Appl. Superconductivity Conf., Santa Fe, N. Mex., 29 Sep. - 2 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023891; CONF-800980-38) Avail: NTIS HC A02/MF A01

The preparation of thick wide film of NbN on suitable substrates, using reactive sputtering and to characterize the films for superconductivity and to determinate sputtering parameters is reported. Severe degradation in J/sub c/ was observed with increasing film width and for millisecond current pulses. It is suggested that this degradation could be substantially reduced by stabilization with either low rho/sub n/ normal metal or the use of a sapphire substrate. The resistivity and critical current dependence both imply Josephson coupled grains. DOE

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-10935 Texas Univ. at Arlington.
QUANTUM FIELD THEORY IN STATIONARY COORDINATE SYSTEMS Ph.D. Thesis
Jonathan David Pfautsch 1981 163 p
Avail: Univ. Microfilms Order No. 8119354

Quantum field theory in stationary coordinate systems in Minkowski space was examined. Preliminary to quantization of the scalar field, all of the possible stationary coordinate systems in flat spacetime are classified and explicitly constructed. Six distinct classes of such systems are found. The scalar field is canonically quantized and a vacuum defined in each of the particular coordinate systems chosen. The responses of monopole detectors traveling along stationary world lines are calculated in both the Minkowski and Fulling vacuums. Quantization of the scalar field within a rotating wedge is examined. The asymptotic form of the renormalized stress tensor near the surfaces is calculated and is found to include momentum terms which represent a circulation of energy within the wedge. Author

N82-10936 City Univ. of New York, N. Y.
THERMOELECTRIC CONVERSIONS BASED ON NOISE RECTIFICATION Ph.D. Thesis
Andrei Cernasov 1981 178 p
Avail: Univ. Microfilms Order No. 8119649

A complete analysis of the feasibility, operation, and performance of heat engines based on the rectification of thermal noise is presented. Both the close to thermodynamic equilibrium and 'far from thermodynamic equilibrium' cases are considered. All standard thermodynamic results, including the Second Law, are found to hold for all cases. While high efficiencies and output power densities are possible, if normal exponential type diodes are used the small physical sizes of efficient fluctuation heat engines are beyond the capabilities of present technology. However, no thermodynamics reasons for the weakly nonlinear character of practical diodes, like PN junctions, are found. Since high nonlinearity ca compensate for large system sizes, when highly nonlinear diodes are discovered, efficient fluctuation heat engines could become feasible. Dissert. Abstr.

N82-10937 Texas Univ. at Dallas.
CONTRIBUTIONS TO THE DYNAMICAL FORMULATION OF GENERAL RELATIVITY Ph.D. Thesis
Mauro Carfora 1981 163 p
Avail: Univ. Microfilms Order No. 8118234

The (3 + 1) dynamical formulation of general relativity was investigated. The introduction of a suitable dynamical gauge which allows identification of the dynamical degrees of freedom of the gravitational field and the kinematics of spacelike foliations, in particular of the mechanism which halts the description of the dynamics of a 3-geometry with respect to a given foliation are discussed. The shift vector field beta for a given foliation provide automatically the transverse traceless part of the second fundamental form K associated with the slices of the foliation specified. Smarr & York's prescription for foliating spacetime, and the circumstances a large class of such foliations become critical are discussed. It is found in the class of foliations considered, the maximal foliations cover the largest part of the Cauchy development. Dissert. Abstr.

N82-10938# Battelle Columbus Labs., Ohio.
THERMOPHYSICAL PROPERTIES OF COAL LIQUIDS Quarterly Technical Status Report, 1 Apr. - 30 Jun. 1981
J. W. Droege, R. Venkateswar, and S. P. Chauhan 17 Jul. 1981 40 p
(Contract DE-AC22-79ET-14941)
(DE81-0279446; BMI-2086; QTSR-7) Avail: NTIS HC A03/MF A01

The rheological properties of coarse coal which grind at relatively low temperature (450 K) showed a substantially lower viscosity. It is also shown that coal and solvent from a plant give slurries of much higher viscosity than slurries from reference coal and solvent. The same relationships are shown at higher temperatures. The effect of solvent to coal ratio is also very great. Differential scanning calorimetry give low reliability specific heat results and a probable heat effect at about 500 K is shown. DOE

N82-10939# Colorado School of Mines, Golden.
ENTHALPY MEASUREMENT OF COAL-DERIVED LIQUIDS Technical Progress Report, May - Jun. 1981
A. J. Kidnay and V. F. Yesavage 15 Jul. 1981 14 p
(Contract DE-AC22-81PC-40787)
(DE81-029481; DOE/PC-40787/1) Avail: NTIS HC A02/MF A01

Enthalpy for coal derived liquids on the model compound quinoline was measured. Compounds over the pressure and temperature and temperature regions encountered in liquification and processing systems were modeled. Preliminary results are presented for the temperature region 186 to 7320 F along isobars of 75, 100, and 200 psia. DOE

N82-10940# Arizona State Univ., Tempe. Dept. of Chemistry.
THERMODYNAMIC PROPERTIES OF CRYSTALS AND MELTS BASED ON CALORIMETRIC DATA AND PLAGIOCLASE-MELT EQUILIBRIA IN THE SYSTEM ALBITE-ANORTHITE-DIOPSIDE
D. J. Henry, A. Navrotsky, and H. D. Zimmerman (Aarhus Univ.) May 1981 46 p refs Submitted for publication
(Contract DE-AC02-80ER-10765)
(DE81-024473; DOE/ER-10765/T1) Avail: NTIS HC A03/MF A01

Thermochemical data for high plagioclase (P) solid solutions and for glasses in the system albite-anothite-diopside (AAD) can be coupled with the heats of fusion of albite and anorthite, ion exchange equilibria between P crystal and aqueous fluid, and coexisting P and melt compositions in AAD to produce a consistent model of mixing properties in crystals and melts in AA. the crystalline high temperature Ps are described by positive heats of mixing and an aluminum-avoidance entropy model. Liquids in the region of the P saturation surface of AAD are shown to have entropies of mixing significantly less positive than predicted by the two lattice model of Waill et al. (1980), which was adequate for the pyroxene saturation surface of that system. Along the AA binary these deviations are not consistent with aluminum avoidance in the liquid, but can be described by an empirical regular excess entropy term or the assumption of strong Ca-Al charge balance. DOE

N82-10941# Sandia Labs., Albuquerque, N. Mex.
SANDIA SHOCK THERMODYNAMICS APPLIED RESEARCH FACILITY
Lalit C. Chhabildas 1981 5 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif. 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024066; SAND-81-1528C; CONF-810684-1) Avail: NTIS HC A02/MF A01

The Sandia Shock Thermodynamics Applied Research Facility is described. Three different smoothbore guns are used to launch projectiles for controlled planar impact studies. Combined pressure-shear loading conditions can also be obtained through use of an intervening anisotropic crystal. Time-resolved interferometric and holograhic instrumentation is used for diagnostics. This facility has the unique capability of providing time-resolved measurements in shock loaded specimens over the stress range 0.1 to 700 GPa. DOE

N82-10942# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
COMPUTER PROGRAM FOR THERMOCHEMICAL EQUILIBRIUM CALCULATIONS ACCORDING TO GORDON-MCBRIDE, NASA SP-273 [DATAPROGRAM FOER TERMOKEMISKA JAAMVIKTSBERAAKNINGAR ENLIGT GORDON-MCBRIDE, NASA SP-273]
Sven-Erik Flygar Sep. 1980 26 p ref In SWEDISH
(FOA-C-20367-D3) Avail: NTIS HC A03/MF A01

The modifications include: dimensions noted in SI-units; and easier reading and handling of recorded data, resulting in a much shorter calculation-time. The correction of an error in the original NASA-program, concerning the calculation of the internal energy of the combustion products is reported. Author (ESA)

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N82-10943# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 5.
GROUP COMMUNICATION VIA COMPUTER. INTRODUCTORY SOCIOPSYCHOLOGICAL STUDIES ON THE KOM-SYSTEM AT RESEARCH INSTITUTE OF NATIONAL DEFENCE, PART 1 [GRUPPKOMMUNIKATION VIA DATOR: INLEDANDE SOCIALPSYKOLOGISKA STUDIER PAA KOM-SYSTEMET VID FOA, RAPPORT 1]
Lillemor Adrianson Oct. 1980 89 p refs In SWEDISH 2 Vol.
(FOA-C-56023-H9(M3)-Vol-1) Avail: NTIS HC A05/MF A01

The system was brought into service in 1978, after a feasability study. Potential users were at that time well disposed, regarding the KOM-system. Wider contact, cohesion within the group, and time saving were expected. After one year, the same persons who worked with the system, were asked to give their opinion. Positive expectations are generally met. Author (ESA)

N82-10944# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 5.
GROUP COMMUNICATION VIA COMPUTER. INTRODUCTORY SOCIOPSYCHOLOGICAL STUDIES ON THE KOM-SYSTEM AT THE RESEARCH INSTITUTE OF NATIONAL DEFENCE, PART 2 [GRUPPKOMMUNIKATION VIA DATOR: INLEDANTE SOCIALPSYKOLOGISKA STUDIER PAA KOM-SYSTEMET VID FOA. RAPPORT 2]
Lillemor Drianson and Lennart Sjoeberg Oct. 1980 139 p refs In SWEDISH 2 Vol.
(FOA-C-56024-H9(M3)-Vol-2) Avail: NTIS HC A07/MF A01

The psychosocial aspects associated with the use of the KOM teleconferencing system are discussed. The opinions of several KOM users are reported with respect to the capability of the system to bridge the gap between groups of people scattered over great distances. A sample questionaire is presented as well as all tallied results. R.C.T.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-10945# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Apparate.
HOW CAD/CAM AFFECTS TASK COMPLEXITY IN MANAGEMENT PLANNING: ORGANIZATIONAL, STRUCTURAL, AND PERSONNEL IMPLICATIONS [WIE VERAENDERT CAD/CAM DEN AUFGABENBEREICH DER AV]
Julius Weyand 30 Jun. 1980 17 p In GERMAN
(MBB-UA-547/80-OE) Avail: NTIS HC A02/MF A01

The impact of computer systems on management methods is assessed. Through the introduction of CAD/CAM into an enterprise, a wide range of information acquisition, processing and communication procedures are fundamentally changed. Essential characteristics of this change are: (1) systems which support information acquisition are partially, or even wholly, automated; (2) total integration of systems can be achieved; and (3) data are acquired only once (preferably at the source) and used in accordance with the requirements of all associated systems. Author (ESA)

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N82-10946 Wisconsin Univ. - Madison.
ON THE USE OF DATA-FLOW TECHNIQUES IN DATABASE

MACHINES Ph.D. Thesis
Haran Boral 1981 238 p
Avail: Univ. Microfilms Order No. 8116638

It is shown that major data base machine designs suffer from some flaw leading to the inefficient execution of one or more operations. A number of possible algorithms for the relational algebra operators are considered and a design based on these is proposed. The proposed machine utilizes a local network communication mechanism and employs a data flow strategy for processing. It is shown how such a strategy can be employed without large control overhead. Also, the problem of associating logic with a disk for the implementation of certain operations 'on the fly' is considered. Three design approaches are examined and compared. It is shown how an associative disk can be incorporated into a data base that supports both on-the-disk and off-the-disk processing. Dissert. Abstr.

N82-10947 Polytechnic Inst. of New York, Brooklyn.
AN EFFICIENT IMPLEMENTATION OF A SYNTACTIC MODEL FOR SEMANTIC INTEGRITY IN DATA BASE SYSTEMS Ph.D. Thesis
Samuel Davidovics 1981 150 p
Avail: Univ. Microfilms Order No. 8118868

The semantic integrity of a data base is defined in terms of a complete set of predicates on its record type. These predicates are shown to define a type 3 grammar and thus determine the specification of a finite data automata which will detect, by syntactic checking, whether the semantic integrity of the data base has been violated. Moreover, if the record types are of length n, these automata will make the determination in O(N) time. Implementation procedures and optimization techniques are explored to further reduce search time. Dissert. Abstr.

N82-10948 Pennsylvania Univ., Philadelphia.
VIRTUAL MERGING OF DATABASES Ph.D. Thesis
Amihai Motro 1981 211 p
Avail: Univ. Microfilms Order No. 81178[illegible]6

Even with the increased use of large and complex databases, it often happens that the information required for a specific application extends over two or more physically independent databases. The writing of such applications is considerably simplified if the databases appear to the programmer as a single integrated database. However, the cost of performing any physical restructuring may be prohibitive and many impose unnecessary constraints on the structure and content of the database as it is viewed by the original users. A method was developed that performs a virtual merge of existing independent databases: it presents the user with a larger conceptual structure that may be queried without compromising the independence of the existing databases. Dissert. Abstr.

N82-10949 California Inst. of Tech., Pasadena.
COMMUNICATIVE DATABASES Ph.D. Thesis
Kwang-I Yu 1981 152 p
Avail: Univ. Microfilms Order No. 8118610

A hierarchical organization stores its information in a large number of databases. These databases are interrelated, forming a closely coupled database system. Traditional information systems and current database management systems do not have a means of expressing these relationships. A model of the information structure of the hierarchical organization that identifies the nature of database relationships is described. The design and implementation of the Communicative Database Management System (CDMS) is also described. Dissert. Abstr.

N82-10950 Aeronautical Research Labs., Melbourne (Australia).
COMMAND AND INFORMATION SYSTEM PROGRAMMING AND OPERATION MANUAL
D. K. Warne, T. Kinsella, and H. A. Thelander Sep. 1980 30 p
(ARL-SYS-Note-74; AR-002-233) Copyright. Avail: Issuing Activity

The reference manual for CISPAC, DECsystem-10 FORTRAN callable subroutine package for driving command and information system mark1 CIS is outlined. Two utility programs for on-line display of DECsystem-10 text and plot files are described. DECsystem-10 and PDP-11/20 programming for CIS is covered, the hardware is described, and the process of generation of alphanumeric and symbolic character fonts for use with it is explained. E.A.K.

N82-10951 British Library Lending Div., Boston Spa (England).
THE TRAVELING WORKSHOP EXPERIMENT IN LIBRARY USER EDUCATION
D. Clark, C. G. S. Harris, P. J. Taylor, A. Douglas, and S. M. J. Lacey Mar. 1981 275 p refs
(BLL-BLRDR-5602; ISBN-0-905984-63-3; ISSN-0308-2385) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

Workshops on library use for students of biology, mechanical engineering, and social welfare were conducted. The learning materials developed for use in these workshops were made available as packages for librarians and lecturers to use themselves. The findings of an independent assessment of the traveling workshop experiment are presented. T.M.

N82-10952# Argonne National Lab., Ill.
SOLAR DATA BASE MANAGEMENT SYSTEM
I. Singh (Mohawk Coll., Hamilton, Ont.), R. M. Wolosewicz, H. Singh, and P. S. Chopra 1980 8 p refs Presented at the ASME Century 2 Emerging Technol. Conf., San Francisco, 12-15 Aug. 1980
(Contract W-31-109-eng-38)
(DE81-023122; CONF-800804-40) Avail: NTIS HC A02/MF A01

The data base management system established to handle the reliability and materials assessment data generated by over 100 solar heating and cooling systems was assessed. The planning, the design, and some of the software used to handle data processing and reduction requirements are described. DOE

N82-10953# VDI-Technologiezentrum, Berlin (West Germany).
DOCUMENTATION AND INFORMATION ON PROTECTIVE RIGHTS RELATING TO GOVERNMENT SUPPORT ON TECHNOLOGICAL RESEARCH AND DEVELOPMENT Final Report
Irmgard Gretscher Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 245 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-177; ISSN-0340-7608) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 41

Patent applications filed in 1978 in government-sponsored research are listed. Applications of microelectronics, electronics, metallurgy and materials technology, non-nuclear energy and communication are included. Protective rights, inventor, license holder and descriptions of the invention with diagrams are given. Author (ESA)

N82-10954# Arbeitsgemeinschaft Ausseruniv. Historischer Forschungseinrichtungen, Munich (West Germany).
DOCUMENTATION OF LITERATURE IN THE HISTORICAL SCIENCES. ANALYSIS OF THE CURRENT SERVICES AND CONCEPT UTILIZATION OF AN INFORMATION AND DOCUMENTATION SYSTEM Final Report
Franziska Jungmann-Stadler Bonn Bundesministerium fuer Forschung und Technologie Sep. 1980 116 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-ID-80-012; ISSN-0170-8996) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 24.40

Current bibliographical services are analyzed by means of a standardized questionnaire. A concept for the documentation of recently published historical literature is introduced. In order to obtain an estimate of the size and the necessary expenditure, the annual output of publications is determined. The documentation process and the tools (data acquisition chart, classification, indexing tools and instructions) are described. As a fundamental improvement of the present information on literature, it is proposed to publish printed services and to establish a computer-aided information system as part of a general information system for the historical sciences. Author (ESA)

N82-10955 Sheffield Univ. (England). School of Librarianship and Information Science.
THEORETICAL APPROACHES TO INFORMATION RETRIEVAL
Tadeusz Radecki (Technical Univ. of Wroclaw) Apr. 1981 44 p refs
(BLL-BLRDR-5651) Avail: British Library Lending Div., Boston Spa, Engl.

A number of information retrieval techniques applicable in systems based on Boolean searches are introduced. Efforts are made to incorporate into the standard Boolean retrieval schemes a weighting mechanism to produce ranked lists of documents. Several alternative approaches are offered which are based on results of fuzzy set theory and fuzzy logic, probability theory and decision analysis, and the theory of Boolean functions. Topics covered include: (1) retrieval methods of documents indexed by weighted index terms; (2) similarity measures for Boolean search request formulations and their applications; (3) document-clustering-based information retrieval: document clustering utilizing previously formed query clusters; and (4) a probabilistic approach to information retrieval in systems with Boolean search request formulations. A.R.H.

N82-10956# Cambridge Univ. (England). Computer Lab.
RESEARCH ON RELEVANCE WEIGHTING 1976 - 1979
K. Sparck Jones and C. A. Webster 1980 68 p refs
(BLL-BLRDR-5553) Avail: British Library Lending Div., Boston Spa, Engl.

Experiments on relevance weighting of search terms are reported. The tests were designed to study the behavior of relevance weights in relation to other forms of request modification, and in the context of different collection environments, specifically those defined by variations in the amount of relevance information available for weight calculation. It is shown that relevance weighting is effective in a wide variety of situations, and effective even in very unfavorable circumstances. E.A.K.

N82-10957# Royal Coll. of Art, London (England). Graphic Information Research Univ.
THE PRESENTATION OF BIBLIOGRAPHIC INFORMATION ON PRESTEL
Linda Reynolds Mar. 1980 27 p refs
(BLL-BLRDR-5536) Avail: British Library Lending Div., Boston Spa, Engl.

The possibility of using color coding is discussed. Seven colors are available at no extra cost, however these colors differ in legibility and also in their apparent importance when viewed on the screen. The characteristics of Prestel displays, and in basic principles in the presentation of bibliographic information established in other media, a number of alternative designs for book lists on topical subjects are presented. Designs for author, title, date and classified listings are included. It is recommended that the layout is kept as simple as possible, and the number of colors used is restricted to two in most cases. E.A.K.

N82-10958# Liverpool Polytechnic (England). Dept. of Library and Information Studies.
TEACHING ON-LINE INFORMATION RETRIEVAL USING INTELLIGENT TERMINALS Final Report, Jul. - Nov. 1979
Bernard Houghton and Maria Fortune Dec. 1979 10 p refs
(BLL-BLRDR-5567) Avail: British Library Lending Div., Boston Spa, Engl.

The use of magnetic tape of a Hewlett-Packard 2645A Display Station to develop a series of teaching packages was examined. A workbook was compiled using printout of the searches with simple explanatory notes. It is anticipated that confidence is gained in use of the keyboard before a live search is undertaken. The commands are demonstrated in a meaningful way, as well as the systems and bases with their various disadvantages and advantages. E.A.K.

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-10959# Committee on Science and Technology (U. S. House).
NASA AUTHORIZATION, 1982: INDEX
Washington GPO 1981 316 p Hearings on H.R. 1257 before the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 2, 1981
(GPO-84-713) Avail: Committee on Science and Technology

A subject and name index is presented to the testimony delivered, statements received, and questions raised in relation to NASA's budget requests, for program management, construction of facilities, and research and development. A.R.H.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

N82-10960# Committee on Science and Technology (U. S. House).
REVIEW OF 1980 FIVE-YEAR OUTLOOK REPORT ON SCIENCE AND TECHNOLOGY
Washington GPO 1981 100 p refs Hearing before the Subcomm. on Sci., Res., and Technol. of the Comm. on Sci. and Technol., 96th Congr., 2nd Sess., No. 180, 13 Jun. 1980
(GPO-67-284) Avail: Subcommittee on Science, Research and Technology

Current and emerging problems of national significance that are identified through scientific research, or in which scientific or technical considerations are of major significance, are described. Opportunities and constraints in science and technology were examined. The problems of accurately forecasting technological growth are discussed. T.M.

N82-10961# Los Alamos Scientific Lab., N. Mex.
DESIGN CONSIDERATIONS FOR VEHICULAR FUEL CELL POWER PLANTS
D. K. Lynn, J. B. McCormick, R. E. Bobbett, S. Srinivasan, and J. R. Huff 31 Mar. 1981 14 p refs Presented at 16th Intersoc. Energy Conversion Engr. Conf., Atlanta, 9-14 Aug. 1981
(Contract W-7405-eng-36)
(DE81-769737; LA-UR-81-1054; CONF-810812-7) Avail: NTIS HC A02/MF A01

Designs in fuel cells as an efficient, nonpolluting vehicular power source that can operate on nonpetroleum fuel were investigated. Phosphoric acid fuel cell power plant designs were studied to determine the performance level they would provide, both for a compact passenger vehicle and a 40 ft city bus. The fuel is steam reformed methanol. It is indicated that 1978 fuel cell technology provides a 22 to 50% improvement in fuel economy over the 1980 EPA estimate for the conventionally powered General Motors X car. A reasonable advanced in fuel cell technology improves performance and fuel consumption of both vehicles substantially. DOE

N82-10962# Argonne National Lab., Ill.
STATUS OF NICKEL/ZINC AND NICKEL/IRON BATTERY TECHNOLOGY FOR ELECTRIC VEHICLE APPLICATIONS
N. P. Yao, C. C. Christianson, R. C. Elliott, and J. F. Miller 1980 43 p refs Presented at the 29th Power Sources Conf., Cherry Hill, N.J., 10-13 Jun. 1980
(Contract W-31-109-eng-38)
(DE81-023572; CONF-800612-6) Avail: NTIS HC A03/MF A01

Progress in nickel/zinc and nickel/iron technology was to achieve battery technical performance goals necessary for widespread use in electric vehicle applications is reviewed. Nickel/zinc module test data show a specific energy of nearly 70 Whr/kg and a specific power of 130 W/kg. Nickel/iron module demonstrate a specific energy of nearly 50 Wh/kg and a specific power of 100 W/kg. Energy efficiency is improved from less than 50 percent to over 65 percent. Cost reduction is emphasized in the development of both nickel/zinc and nickel/iron batteries to achieve the lowest possible life cycle cost to the battery user. DOE

N82-10963# Renault Vehicles Industriels (France). Direction des Etudes et Recherches.
THE EVOLUTION OF THE INDUSTRIAL VEHICLE BY THE YEAR 2000 [L'EVOLUTION DU VEHICULE INDUSTRIEL A L'HORIZON 2000]
Pierre Soret 1980 32 p In FRENCH Presented at SIA Journees Poids Lourds, Paris, 8-9 Oct. 1980
Avail: NTIS HC A03/MF A01

The possible evolution, if not probable, of those constraints which affect the design and use of tractor trucks is reviewed. These constraints include energy requirements, environmental codes, safety and security, reliability, and working conditions for the drivers. A profound change in the form and functioning of these vehicles is forecast. Author (ESA)

N82-10964# Unified Industries, Inc., Springfield, Va.
ELECTROMAGNETIC INTERFERENCE CHARACTERISTICS OF ADVANCED PROPULSION SYSTEMS FOR URBAN RAIL VEHICLES Final Report, Feb. 1980 - Feb. 1981
Viles D. Nene Feb. 1981 173 p refs
(Contract DTUM60-80-C-72025)
(PB81-212730; UMTA-VA-06-0075-81-1) Avail: NTIS HC A08/MF A01 CSCL 13F

Track circuit signalling systems and different modes of possible electromagnetic interference from onboard electrical power subsystems for urban rail vehicles are described. Chopper controlled ac drives and inverter controlled ac drives are analyzed and characterized as electromagnetic noise sources. Wave forms of currents through various reactors in the drive circuitry are presented. Eleven different chopper circuit configuration are analyzed and the characteristics of multiple car trains are reviewed. GRA

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-10965 Polytechnic Inst. of New York, Brooklyn.
THE ANALYSIS OF STEAM IN MIRA STARS Ph.D. Thesis
Lewis L. Smith 1981 224 p
Avail: Univ. Microfilms Order No. 8118899

The analysis is treated using model atmospheres and radiative transfer theory to predict the line by line flux of H2O in the spectral region 4400-4500 cm. The H2O lines are quite weak in this region, hence, are unsaturated in the stellar atmosphere. The resulting computed spectra were to spectroscopic observations from the ground and high altitude aircraft for three stars--R Aql, Mira, and R Cas. Abundances of H2O and effective temperature Te were determined as a function of the phase of the visible light cycle. The radial velocity measurements of H2O and also CO and OH provide information on the infrared molecular forming regions of these stars. Dissert. Abstr.

N82-10966*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DOCUMENTATION FOR THE MACHINE-READABLE VERSION OF THE 0.2-A RESOLUTION FAR-ULTRAVIOLET STELLAR SPECTRA MEASURED WITH COPERNICUS
William T. Sheridan and Wayne H. Warren, Jr. Sep. 1981 10 p ref
(NASA-TM-84027; NSSDC/WDC-A-R&D-81-12) Avail: NTIS HC A02/MF A01 CSCL 03A

The spectra described represent a subset comprising data for 60 O- and B-type stars. The tape contains data in the spectral region lamda lamda 1000-1450 A with a resolution of 0.2 A. The magnetic tape version of the data is described. T.M.

N82-10967*# California Univ., Berkeley. Dept. of Physics.
HIGH SPECTRAL AND SPATIAL RESOLUTION OBSERVATIONS OF THE 12.28 MICRON EMISSION FROM H2 IN THE ORION MOLECULAR CLOUD
S. C. Beck, E. E. Bloemhof, E. Serabyn, C. H. Townes, A. T. Tokunaga (Hawaii Univ., Honolulu), J. H. Lacy (California Inst. of Technol., Pasadena), and H. A. Smith (NRL, Washington, D.C.) [1981] 14 p refs
(Grant NGL-05-003-272)
(NASA-CR-164889) Avail: NTIS HC A02/MF A01 CSCL 03A

The pure rotational S(2) line of molecular hydrogen at 12.28 microns was looked for in 44 positions in the Orion moleular cloud with 6 in. beams and 35 km/s spectral resolution; it was detected in 27 positions. Emission was observed over a velocity range of + or - 100 km/s. The lines are approximately symmetric, and have full widths at half maximum ranging from 100 km/s down to the resolution limit. The distribution of intensities and line shapes is largely consistent with that seen in the 2 micron hydrogen transitions. However, unexpectedly complex line profiles and point-to-point variations in linear shapes appear, particularly in the region near IRc9. J.M.S.

N82-10968 California Inst. of Tech., Pasadena.
THE ORIGIN OF THE KIRKWOOD GAPS: A MAPPING FOR ASTEROIDAL MOTION NEAR THE 3/1 COMMENSURABILITY 1. THE RESONANCE OVERLAP CRITERION AND THE ONSET OF STOCHASTIC BEHAVIOR IN THE RESTRICTED THREE-BODY PROBLEM 2. Ph.D. Thesis
Jack Leach Wisdom 1981 73 p
Avail: Univ. Microfilms Order No. 8118609

A mapping of the phase space onto itself with the same low order resonance structure as the 3/1 commensurability in the planar elliptic three-body problem is derived. This mapping is approximately one thousand times faster than the usual method of numerically integrating the averaged equations of motion. This mapping exhibits some behavior that might provide the key to the origin of the gaps. Also the resonance overlap criterion for the onset of stochastic behavior is applied to the planar circular-restricted three-body problem with small mass ratio (mu). Its predictions for mu = 0.001, 0.0001, and 0.00001 are compared to the transitions in the numerically determined Kolmogorov-Sinai entropy and found to be in remarkably good agreement. In addition, an approximate scaling law for the onset of stochastic behavior is derived. Dissert. Abstr

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-10969*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A NEW VIEW OF BARYON SYMMETRIC COSMOLOGY BASED ON GRAND UNIFIED THEORIES

F. W. Stecker Sep. 1981 23 p refs Presented at Oxford Intern. Symp. on Progress in Cosmology, England, Sep. 1981 Submitted for publication
(NASA-TM-83828) Avail: NTIS HC A02/MF A01 CSCL 03B

Within the framework of grand unified theories, it is shown how spontaneous CP violation leads to a domain structure in the universe with the domains evolving into separate regions of matter and antimatter excesses. Subsequent to exponential horizon growth, this can result in a universe of matter galaxies and antimatter galaxies. Various astrophysical data appear to favor this form of big bang cosmology. Future direct tests for cosmologically significant antimatter are discussed. A.R.H.

N82-10970# Los Alamos Scientific Lab., N. Mex.

RADIATIVE TRANSFER APPROXIMATIONS IN STELLAR PULSATION THEORY

C. G. Davis Aug. 1981 26 p refs
(Contract W-7405-eng-36)
(DE81-030513; LA-8931-MS) Avail: NTIS HC A03/MF A01

Pulsation theory is discussed in light of recent improvements in the theory of radiative transfer and hydrodynamics with applications to Cepheids, RR Lyrae, and W Virginis stars. It is concluded that the variable Eddington method is computational fast and a complete transfer approximation can be obtained. DOE

N82-10971 California Inst. of Tech., Pasadena.

NUCLEAR WEAK INTERACTION RATES DURING STELLAR EVOLUTION AND COLLAPSE Ph.D. Thesis

George Michael Fuller 1981 287 p
Avail: Univ. Microfilms Order No. 8118603

Nuclear weak interaction rates including electron and positron emission rates, and continuum electron and positron capture rates, as well as the associated Nu and bar nu energy loss rates are calculated on a detailed grid of temperature and density for the free nucleons and 226 nuclei with masses between A = 21 and 60. Gamow-Teller and Fermi discrete state transition matrix element systematics and the Gamow-Teller resonance transitions are discussed and are implemented in the stellar rate calculations. Results are presented on an abbreviated grid of temperature and density and compared where possible to terrestrial weak transition rates. Neutron shell blocking of allowed electron capture on heavy nuclei during stellar core collapse is discussed along with several unblocking mechanisms operative at high temperature and density. The results of one-zone collapse calculations suggest that the effect of neutron shell blocking is to produce a large core lepton fraction at neutrino trapping which leads to a larger inner core mass and hence a stronger post bounce shock. Dissert. Abstr.

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-10972*# Planetary Science Inst., Pasadena, Calif. Planetary Science Inst.

PLANETARY RADAR STUDIES Final Report

T. W. Thompson and J. A. Cutts 30 Apr. 1981 157 p refs
(Contract NASw-3383; NSR-09-051-001)
(NASA-CR-164784; SAI-1-142-078-S1) Avail: NTIS HC A08/MF A01 CSCL 03B

A catalog of lunar and radar anomalies was generated to provide a base for comparison with Venusian radar signatures. The relationships between lunar radar anomalies and regolith processes were investigated, and a consortium was formed to compare lunar and Venusian radar images of craters. Time was scheduled at the Arecibo Observatory to use the 430 MHz radar to obtain high resolution radar maps of six areas of the lunar suface. Data from 1978 observations of Mare Serenitas and Plato are being analyzed on a PDP 11/70 computer to construct the computer program library necessary for the eventual reduction of the May 1981 and subsequent data acquisitions. Papers accepted for publication are presented. A.R.H.

N82-10973*# Planetary Science Inst., Pasadena, Calif.

PLANETARY RADAR STUDIES Quarterly Progress Report

T. W. Thompson and J. A. Cutts 15 Aug. 1981 126 p refs
(Contract NASw-3383)
(NASA-CR-164615; SAI-1-142-08-078-00) Avail: NTIS HC A07/MF A01 CSCL 03B

Progress made in studying the evolution of Venusian craters and the evolution of infrared and radar signatures of lunar crater interiors is reported. Comparison of radar images of craters on Venus and the Moon present evidence for a steady state Venus crater population. Successful observations at the Arecibo Observatory yielded good data on five nights when data for a mix of inner and limb areas were acquired. Lunar craters with radar bright ejecta are discussed. An overview of infrared radar crater catalogs in the data base is included. A.R.H.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-10974 New Mexico State Univ., Las Cruces.

THE APPLICABILITY OF THE FOURIER CONVOLUTION THEOREM TO THE ANALYSIS OF LATE-TYPE STELLAR SPECTRA Ph.D. Thesis

David Hall Bruning 1981 140 p
Avail: Univ. Microfilms Order No. 8119219

Solar flux and intensity measurements, to test the validity of the Fourier convolution method as a means of analyzing the spectral line shapes of late-type stars, shows that, in general, the convolution method is not a suitable approximation for the calculation of the flux profile. Explicit disk integrations are promoted as the only reliable method spectral line analysis for late-type stars. Several methods of performing the disk integration are investigated. Center-to-limb variations of line depth and shape are considered for the modification of the rotational broadening functin used in the convolution. It is shown that central depth variations alone mimic limb-darkening and do not effectively change the shape of the line broadening function, thus leading to the failure of this simple modification to reproduce observed line shapes. Stylized line shape variations are used to demonstrate why the convolution method works for fast rotators like A-type stars but not for the slow rotators like the Sun. Dissert. Abstr.

N82-10975*# Stanford Univ., Calif. Inst. for Plasma Research.

TEMPERATURE MINIMUM HEATING IN SOLAR FLARES BY RESISTIVE DISSIPATION OF ALFVEN WAVES

A Gordon Emslie and P. A. Sturrock Aug. 1981 23 p refs
(Grants NGL-05-020-272; NAGw-92; Contract N00014-75-C-0673)
(SU-SUIPR-856; NASA-CR-164900) Avail: NTIS HC A02/MF A01 CSCL 03B

The possibility that the strong heating produced at temperature-minimum levels during solar flares is due to resistive dissipation of Alfven waves generated by the primary energy release process in the corona is studied. It is shown how, for suitable parameters, these waves can carry their energy essentially undamped into the temperature-minimum layers and can then produce a degree of heating consistent with observations. S.L.

N82-10976 California Inst. of Tech., Pasadena.
ELEMENTAL COMPOSITION OF SOLAR ENERGETIC PARTICLES Ph.D. Thesis
Walter Richardson Cook, III 1981 182 p
Avail: Univ. Microfilms Order No. 8118975

The low energy telescope on the Voyager spacecraft was used to measure the elemental composition and energy spectra of solar energetic particles (SEPs) in seven large flare events. Four flare events are selected which have SEP abundance ratios approximately independent of energy/nucleon. The abundances for these vents are compared from flare to flare and are compared to solar abundances from othe sources: spectroscopy of the photosphere and corona, and solar wind measurements. The four flare average SEP composition is significantly different from the solar composition determined by photospheric spectroscopy but is in agreement with solar wind abundance results and with a number of recent coronal abundance measurements. The evidence for a common depletion of oxygen in SEPs, the corona and the solar wind relative to the photosphere suggests that the SEPs originate in the corona and that both the SEPs and solar wind sample a coronal composition which is significantly and persistently different from that of the photosphere. Dissert. Abstr.

N82-10066*# Scientific Analysts and Consultants, Inc., Rockville, Md.
A GENERAL METHOD FOR COMPUTING THE TOTAL SOLAR RADIATION FORCE ON COMPLEX SPACECRAFT STRUCTURES
F. K. Chan *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 12 p refs (For primary document see N82-10064 01-12)
Avail: NTIS HC A13/MF A01 CSCL 03B

N82-10067*# Computer Sciences Corp., Silver Spring, Md.
SOLAR RADIATION FORCE MODELING FOR TDRS ORBIT DETERMINATION
Taesul Lee, Michael J. Lucas, and Robert E. Shanklin, Jr. *In* NASA. Goddard Space Flight Center Sixth Ann. Flight Mech./Estimation Theory Symp. Oct. 1981 25 p refs (For primary document see N82-10064 01-12)
(Contract NAS5-24300)
Avail: NTIS HC A13/MF A01 CSCL 03B

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-10977 California Inst. of Tech., Pasadena.
STUDIES OF COMPACT EXTRAGALACTIC RADIO SOURCES Ph.D. Thesis
Roger Paul Linfield 1981 68 p
Avail: Univ. Microfilms Order No. 8118918

Very long base interferometry maps are presented of the nuclear cores of four radio galaxies which have large symmetric radio lobes: 3C111, 3C390.3, Cyg A, and 0055 + 30. Each source contains a nuclear jet having a scale of 1 pc, but no counterjets are seen. The jets in 3C111 and 0055 + 30 point directly at the outer radio lobes, but in 3C390.3 and Cyg A the jets are pointed from 4 to 6 degrees away from the lobes. In all four cases, the observed asymmetry reflects an intrinsic asymmetry on a msec scale. The minimum pressure in the four jets is calculated, and it is concluded that the jet in Cyg A is very unlikely to be confined by gas pressure. An attempt is made to explain the structure of compact radio sources with a precession like motion of a relativistic jet. It is found that the curvature of these sources can be readily explained in this way. In addition, the knots which are often revealed by VLBI observations arise naturally in such a model. Dissert. Abstr.

99 GENERAL

N82-10978# Council for Scientific and Industrial Research, Pretoria (South Africa). Publishing Div.
CSIR: COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, Annual Report
1 May 1981 74 p Original contains color illustrations
(CSIR-36; ISBN-0-7988-2069-1; ISSSN-0370-8454) Avail: NTIS HC A04/MF A01

Research conducted and technologies developed to improve industrial processes and better utilize natural resources of the Republic of South Africa are described. International cooperation in meteorology, the use of remote sensing and advances in medical science, materials science, astronomy, and electronics are among the 42 areas of study summarized. A.R.H.

N82-10979# Office of Naval Research, San Francisco, Calif. Scientific Liaison Group.
ONR TOKYO SCIENTIFIC BULLETIN, VOLUME 6, NUMBER 2, APRIL-JUNE 1981
Young B. Kim and Mary Lou Moore Jun. 1981 136 p
(AD-A103321) Avail: NTIS HC A07/MF A01 CSCL 05/2

Contents: National Research Institute for Metals Revisited; Fresh Winds in the Land of Morning Calm; First Asian Congress on Fluid Mechanics; Nuclear Magnetic Resonance (NMR) Imaging in Japan; 1980 Annual Meeting of the Institute of Electrostatics in Japan; U.S.-Japan Seminar: Measurement and Control of Particulates Generated from Human Activities; Fifth International Acoustic Emission Symposium; Japan-United States Conference on Composite Materials Mechanics, Mechanical Properties, and Fabrication; XI International Conference on Defects and Radiation Effects on Semiconductors; Fifth International Symposium on Air Breathing Engines; The First China-Japan-U.S.A. Seminar on Organometallic Chemistry; International Meetings in the Far East 1980-1981; and Chemistry in Japan Today: An Interview with O. Hayaishi and M. Mukooyama. GRA

N82-10980# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RECENT SELECTED PAPERS OF NORTHWESTERN POLYTECHNICAL UNIVERSITY, PART 1
20 Aug. 1981 381 p refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 p 1-3, 1-4, 1-25, 27-35, 37-49, 51-105, and 107-200 2 Vol.
(FTD-ID(RS)T-0259-81-Pt-1) Avail: NTIS HC A17/MF A01

Methods and techniques used in aeronautical engineering and structural design are presented. The aerodynamics of airfoils and the prediction of flow distribution associated with them are discussed. Structural analysis methods such as matrix methods and finite element methods were reviewed. Emphasis is placed on fracture mechanics and the study of crack initiation in structural members and machine parts. For individual titles, see N82-10981 through N82-10995.

N82-10981# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
FINITE DIFFERENCE COMPUTATION OF THE STEADY TRANSONIC POTENTIAL FLOW AROUND AIRPLANES
c02
Luo Shijun, Zheng Yuwen, Qian Hong, and Wang Dieqian *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 5-30 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The velocity potential equation was approximated by assuming that the perturbation velocity component in the transverse plane of the body is much smaller than the undistributed flow velocity, while the perturbation velocity component in the longitudinal direction may not be so. It was then solved with mixed schemes of finite differences. The boundary condition on wings (tails) and its wake were approximated similarly. Two numerical examples are included and the results agree well with known wind tunnel test results. T.M.

N82-10982# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SECOND ORDER APPROXIMATION THEORY OF AN ARBITRARY AEROFOIL IN COMPRESSIBLE POTENTIAL FLOW c02

Lin Chaoqiang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 31-50 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The region outside an arbitrary airfoil is conformally transformed into the region outside a unit circle. The transformation functions are expanded into ascending power series and then only those terms up to and including the second order are retained. The resulting formulae are given analytically. The method is nearly an exact solution from the engineering point of view, even for an airfoil with thickness as much as 30 percent of the chord and with maximum camber as much as 10 percent of the chord. T.M.

N82-10983# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

AERODYNAMIC CALCULATIONS AND DESIGN OF SUBCRITICAL AEROFOILS c02

Lin Chaoqiang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 51-64 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

A method of calculating the velocity and pressure distribution on an airfoil of given geometrical profile at a given angle of attack in subcritical potential flow is described. Inversely, designing appropriate airfoil geometry and the corresponding angle of attack for a given pressure distribution is discussed. T.M.

N82-10984# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

AN AERODYNAMIC DESIGN METHOD FOR TRANSONIC AXIAL FLOW COMPRESSOR STAGE c07

Zhu Fangynan, Zhou Xinhai, Liu Songling, and Fan Feida *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 65-86 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The method is comprised of three main parts: the mean S sub 2 streamsurface calculation, the approximate calculation of S sub 1 streamsurface of revolution, and defining the blade element on the conical surface and stacking the blade airfoil sections. The method is unusual in that the calculation stations for making the S sub 2 streamsurface computations are curves, and particularly in that the airfoil parameters of blade are calculated on a plane tangent to the approximate streamsurface of revolution. On this tangential plane, two dimensional flow is used as basic model to calculate the Mach wave system on the suction surface of cascade entrance region. T.M.

N82-10985# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF PERFORMANCE OF SUPERSONIC EJECTOR NOZZLE c34

Shen Huili and Chen Zhongqing *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 87-109 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The calculations involve the real sonic line at the exit of the primary nozzle, the inviscid primary flow field, the correction for viscosity effect and the pumping, and thrust characteristics. In order to bring calculated results into agreement with experimental data, the real sonic line, instead of the plane sonic line, is taken as the initial base line of calculations. The real sonic line is obtained by joining the points of intersection of constant flow angle lines in the throat region with Mach lines at the lip of the primary nozzle. First, the inviscid primary flow field of the nozzle is calculated and then corrected to account for the viscosity effect. On the basis of the corrected coordinates, the actual primary flow field and pumping performance of the nozzle are then calculated. The proposed method proves to be quite simple and accurate. T.M.

N82-10986# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

AN OPTIMUM DESIGN PROCEDURE OF TOTAL-TEMPERATURE THERMOCOUPLE PROBE c35

Liu Cihong and Zhao Jue-liang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 110-131 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The gas velocity in the sheath or the optimum internal flow velocity was determined on the principle that the Sun of the radiation error, the conduction error and the velocity error is a minimum under given operating conditions. After determining the optimum internal flow velocity, the diameter of the exhaust hole was determined and the layout of the probe was designed. The programming of the optimum design of total-temperature thermocouple probes, the formula for manually estimating the appropriate optimum internal flow velocity, and the design procedure are presented. T.M.

N82-10987# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A SYNTHESIS TECHNIQUE FOR ARRAY ANTENNAS OF HIGH DIRECTIVITY AND LOW SIDELOBE c32

Wan Wei, Huang Jingxi, and Hu Shiming *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 132-155 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

Two techniques were reviewed with a view towards finding a synthesis optimization technique that is applicable to the simultaneous consideration of two or more performance indices. These performance indices include: the directivity and/or signal to noise ration, efficiency, sidelobe level, and the questions of null and maximum sidelobe. T.M.

N82-10988# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

MODEL METHOD OF STATE ESTIMATION c63

Dai Guanzhong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 156-190 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The problem of estimating the state of a stochastic dynamical system from noisemixed observed values taken from the state is of central importance in modern control theory. In accordance with the relationships of correspondence between the dynamical systems (original) and the filters (model), a unified and direct approach to derive the recursive equations for discrete time and continuous time. Linear and nonlinear, unbiased and minimum variance filters is presented. For the nonlinear sytems only the second order approximation suboptima filters were studied. T.M.

N82-10989# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SOLIDIFICATION CHARACTERISTICS OF SUPERALLOYS UNDER NONEQUILIBRIUM CONDITION c26

Fu Hengzhi *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 191-219 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xiam Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The effect of the solute distribution coefficient on the crystallization process under nonequilibrium conditions is discussed. The effect of adding alloying elements for additional strength on the cooling curve and crystallization characteristics was investigated. T.M.

N82-10990# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE PLASTIC DEFORMATION, MICRO-CRACK INITIATION AND FATIGUE CRACK INITIATION LIFE OF 30CrMnSiNi2A HIGH STRENGTH MARTENSITE STEEL c26
Zheng Xiulin and Qiao Shengru *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 220-238 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The analysis was carried out using electron microscopy, optical microscopy, and impact fatigue machines. Results show that lathy Martensite is the predominating structure of 30CrMnSiNi2A steel when oil quenched and martempered. It is found that, on the polished surfaces of test pieces, the so-called deformation reliefs appear in the plastic zone around the tip of the fatigue crack. Both the orientation and the size of the deformation reliefs correspond exactly with those of the Martensite laths. T.M.

N82-10991# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE COMPUTATION OF INTEGRAL TYPE FLEXURE HINGE ASSEMBLY OF DYNAMICALLY TUNED GYROSCOPES c35
Mei Shuo-ji *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 239-270 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

In order to satisfy the requirements of gyroscopic tuning, the degree of the angular displacement stiffness which is designed into the piece of equipment must have a high degree of accuracy. In order to eliminate the error associated with g(2) drift, the axial stiffness and the radial stiffness of the hinge assembly of the gyroscopes being considered should be equal. Design methods for such hinge assemblies are discussed. T.M.

N82-10992# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A THEORETICAL ANALYSIS OF INVOLUTE HARMONIC GEARING c37
Shen Yunwen *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 271-314 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The influence of errors in the theoretical profiling of gears was studied. A theoretical demonstration of the feasibility of using involute gearing profiles to replace theoretical gearing profiles is presented. Conditions in which transmission will not give rise to interference are presented and optimization techniques are used as part of practical method for solving the problem of controlling side cracking. T.M.

N82-10993# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A METHOD OF EVALUATION OF THE TORSIONAL RIGIDITY AND THE THIRD STRESS INTENSITY FACTOR OF PRISMATICAL BAR OF RECTANGULAR CROSS SECTION WITH CRACKS c39
Chen Yizhou *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 315-337 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

Three cases are discussed: a single crack not originating from the center of the edges of the rectangular cross section; a single crack originating from the midpoint of one edge of the rectangular cross section; and two cracks of equal length originating from the midpoints of opposite edges of the rectangular cross section. Under these three conditions, the cracks are perpendicular to the edges of the cross section of the prismatic bar. T.M.

N82-10994# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE AUTOMATIC MATRIX FORCE METHOD AND TECHNIQUES FOR HANDLING MORE COMPLEX COMPUTATIONS WITH GIVEN COMPUTER CAPACITY c61
Yang Qingxiong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 338-358 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The history of using the method for structural computation in domestic aeronautical engineering was reviewed. The development and application of the matrix method was examined. T.M.

N82-10995# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
STRUCTURAL ANALYSIS OF FUSELAGES WITH CUTOUTS BY FINITE ELEMENT METHOD c39
G. Shoulian, Sun Can, Tang Xuunchun, and Ye Tiangi *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 359-378 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979 (For primary document see N82-10980 01-99)
Avail: NTIS HC A17/MF A01

The rear part of a transport aircraft's fuselage was studied. It consists of two sections, the front section being a closed cylinder with a floor and the other section containing a large cutout. An idealized structure is considered to have 1950 degrees of freedom. In this analysis, three kinds of finite element were adopted: a flange element with various cross sections; a constant shear flow quadrilateral of arbitrary shape; and a beam element of various cross sections taking account of eccentricity of the nodes from the axes of moment and inertia. A factorization algorithm was adopted in the solution of the system of linear algebraic equations. T.M.

N82-10996# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RECENT SELECTED PAPERS OF NORTHWESTERN POLYTECHNICAL UNIVERSITY, PART 2
28 Aug 1981 418 p refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 p 1-137, 139-167, 169-185, 187-201, 203-215, and 217-240 2 Vol.
(FTD-ID(RS)T-0260-81-Pt-2) Avail: NTIS HC A18/MF A01

Relevant topics of significance to the aerospace industry are discussed. Included are: dynamic analysis of various aircraft structures; fuel combustion stability; and propulsion system performance. For individual titles, see N82-10997 through N82-11011.

N82-10997# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DUAL PROPERTIES OF ELASTIC STRUCTURES c39
Chen Baiping *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 1-75 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

One, two, and three dimensional problems in the statistics of elastic bodies are considered with respect to their involvement with four function vectors. These include displacement, strain, stress, and distributed-load function vectors. R.C.T.

N82-10998# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
MATRIX ANALYSIS OF WINGS c05
Xu Yuan, Zhu Runziang, Jiang Jinqiag, and Cai Yiuliu *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)

T-0260-81-Pt-2) 28 Aug. 1981 p 76-111 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

The plate-beam wing constructions are simplified either as plane stress or plate bending models. The triangular element matrix of a laminated plate is introduced as well as the element stiffness matrix of the beam of axially variable rectangular cross section. Two general computer calculation programs are also compiled. Calculations are shown for wings consisting of plates and beams, honeycomb core and solid wings. Compared to the experimental results, the errors in the nodal deflections are generally less than 5%. It is clear that the method adopted has finite accuracy and generality. R.C.T.

N82-10999# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON A METHOD FOR THE DETERMINATION OF PLANE STRESS FRACTURE TOUGHNESS K SUB c OF 30 CrMnSiNi2A STEEL AND SOME RELATED PROBLEMS c39
Cui Zhenyuan, Zheng Changqing, Shi Jize et al *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 112-136 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

The fracture toughness for various materials was determined. Some experimental results with 30CrMnSiNi2A steel are discussed and some of the key problems in the determination of fracture toughness using CCT samples as the test vehicle are discussed. R.C.T.

N82-11000# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE ISLAND STRUCTURE OF (M-A) IN HARDENED LOW-ALLOY HIGH-STRENGTH STEELS c26
Kang Mokuang, Guan Dunhui, Guo Chengdao, and Zhu Jinrong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 137-173 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

The quenching of low alloy high strength steel was investigated in terms of isothermal quenching and direct quenching (which is continuous cooling in a medium such as water, oil, or air). Production results showed that neither quenching method can produce a uniform single structure. Island formed structure constituents exist in various quenched steels. R.C.T.

N82-11001# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A STUDY ON INSULATED RISERS c34
Zhoe Yaohe, Zhang Yanwei, Qu Weitao, Lin Zaiue, Mao Zhiying, Wang Youxu, Niu Jingxin, and Zhang Qixn *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 174-196 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

The plate-shaped casting method was used to determine the thermal physical parameters of three insulating materials: pearlite; formed plaster; and ceramic wool together with a wet sand mode. From the freezing characteristics of sand castings, a calculation method was formulated to describe the insulated riser. Using the measured physical thermal coefficients, this method was verified on a pure aluminum cubic casting. Experimental and calculated results were consistent. Pearlite and formed plastic risers were seven times smaller than the conventional ones. A ceramic wool riser was found to be eight times smaller. A theoretical analysis of the effectiveness of the insulated risers was also conducted. R.C.T.

N82-11002# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE STUDY ON TECHNOLOGICAL FUNDAMENTALS OF PULSED SPRAY TRANSFER ARC WELDING (IV). OBSERVATIONS ON ARC PHENOMENA IN THE CASE OF STABLE WELDING CONDITION c37
Duan Liyu, Cheng Gongshou, Feng Jijiang, Wang Xuxi, and Lu Xuezhen *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 197-236 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
(Rept-1) Avail: NTIS HC A18/MF A01

The observations made on arc phenomena in the case of stable arc conditions of pulsed spray transfer arc welding are reported. A large quantity of high speed photographic pictures and synchronous oscillograms of the arc parameters are used as the basis for describing the arc phenomena. The major focus is on arc forming, droplet transfer, and sputter at representative test condition points. Efforts are also made to describe the droplet transfer-back problem in a pulsed arc. R.C.T.

N82-11003# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A FAST FOURIER TRANSFORM HARDWARE PROCESSOR c37
Kang Ji-Chang and Xu Naiping *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-PT-2) 28 Aug. 1981 p 237-252 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

A real time fast Fourier transformation processor was developed to analyze acoustic frequency signals. The analysis time for the 1024 frequency spectrum points was approximately 40 ms. A different approach in the development of this processor is proposed in order to simplify the original design. With this modified approach, the size of the CPU and memory can be reduced by about one-half. The design concepts and main circuits in the approach are introduced. R.C.T.

N82-11004# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COLOR DISCRIMINATION BY A COLOR-PICTURE READER c74
Chen Chenghang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 253-272 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

An outline is given of a convenient process for color discrimination which identifies the hue, purity, and brightness of a color. Simple circuits are developed to separate twelve colors and produce the color code output for each color directly. Results are presented which confirm the stability and reliability of the process for color discrimination. R.C.T.

N82-11005# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON THE UNIQUENESS OF THE SOLUTION TO THE VELOCITY POTENTIAL INTEGRAL EQUATION ESTABLISHED BY USING GREEN'S THEOREM c64
Liu Qiangang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 273-286 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

The Green theorem was used in conjunction with the singularity method to solve the potential flow problem around an object. The major focus was on gas dynamic numerical computation to establish the distribution of singularities on the surface of an object. R.C.T.

N82-11006# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INITIAL EXPERIMENTAL RESEARCH INTO THE RESPONSE OF TURBOJET ENGINE COMPRESSORS TO DISTORTION OF INTAKE PRESSURE c07
Chen Fu-qun, Tang Di-yi, Hu Zi-long, Id Wen-lan, Yu Jin-di, Wu

Xin-yuan, Zhao Jue-liang, Lin Qi-xun, Wang Zong-yuan, Liu Si-hong et al *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 287-316 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

The influence which distorations in intake pressure have on the stability and characteristics of the compressors of turbojet engines was investigated. The test bed of a turbojet engines with a nine stage compressor was used as a test bed. The first stage of the compressor was transonic. It was concluded that the capabilities of compressors of this type of turbojet engine are not only determined by the capabilities or characteristics of the compressor but also by the structural arrangement and actual situation of the other components in system of the compressor. Other significant conclusions are reported. R.C.T.

N82-11007# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A PRELIMINARY EXPERIMENTAL INVESTIGATION OF THE RESPONSE OF A TURBOJET ENGINE TO INLET PRESSURE DISTORTION c07
Chen Fu-qun, Tang Di-yi, Hu Zi-long, Id Wen-lan, Yu Jin-di, Wu Xin-yuan, Zhao Jue-liang, Lin Qi-xun, Wang Zong-yuan, and Liu Si-hong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 317-346 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

Preliminary experimental results about the effect of inlet pressure distortion on the characteristics and instability of the axial compressor of a turbojet engine are presented. The experiments were conducted on the test bed on a turbojet engine with a 9-stage compressor, whose first stage is transonic. The tests were run for each of the following cases: (1) at 99% design speed with 180 deg triple-deck 36 mesh screen in front of the engine inlet, i.e., 3x36 mesh; (2) at 90% design speed with 180 deg single-deck 35 mesh screen, i.e., 1x36 mesh; (3) at 90% design speed with clean inlet; and (4) at 87% design speed with a decrease of about 12% of the first stage turbine nozzle exit area. R.C.T.

N82-11008# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AN EXPERIMENTAL INVESTIGATION OF THE ROTATING STALL, SURGE AND WAKE BEHIND THE ROTOR FOR A SINGLE STAGE AXIAL COMPRESSOR c07
Zhang Weide, Zbang Changsheng, Liu Zhiwei, and Liu Jiatong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 347-370 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

Dynamic tests were conducted in order to investigate the rotating stall, surge, and wake behind the rotor of a single stage axial compressor. The relationship between the rotating stall and the total turbulence behind the rotor caused by the wake was also studied. It was found that the waveform of the wake behind the rotor shows marked changes when rotating stall approaches. The wake induced degree of total turbulence increases sharply, and therefore may be used as a way to predict rotating stall. The total process of rotating stall and surge as well as the differences between the two and their connection were also compared. R.C.T.

N82-11009# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
EXPERIMENTAL INVESTIGATION OF A VAPORIZING COMBUSTION WITH DOUBLE COMBUSTION SPACES c25
In its Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 371-387 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

The special design features of the prevaporizing installation in the head section of and the combustion chamber are introduced. The combustor is to be used in a high temperature, hot wind tunnel to provide a steady uniform hot gas stream. R.C.T.

N82-11010# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A VAPORIZING COMBUSTOR WITH DOUBLE COMBUSTION SPACES c25
Tang Ming, Zhu Huiling, and Du Qinfang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 388-411 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

A tubular combustor with a novel type of prevaporizing tube, which is of annular cross-section was examined. The dome of the combustor was divided into two combustion spaces. Fuel was injected under moderate pressure into the annular space of the prevaporizing tube, through the orifices on the two fuel distribution rings. The combustor was designed to be used as an air heater for the test setup of a hot wind tunnel. It was required that the combustor furnish a steady uniform hot gas stream at a temperature of 400-1100 C and that the flame should not extend beyond the exit of the flame tube. A lean fuel-air mixture with an excess-air coefficient of nearly unit was adopted in the design of the prevaporizing tube. This required the entrance area of the air to be prevaporized to make up about 30% of the total air entrance area. Air film cooling technique was adopted by using corrugated strips to form a number of cooling slots. The area of the cooling slots was selected to be about 20% of the total air entrance area. It was found that the cooling effect is satisfactory. Author

N82-11011# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE ACOUSTIC INSTABILITY OF COMBUSTION IN SOLID PROPELLANT ROCKET MOTORS WITH TUBULAR GRAIN c20
Wu Xinping *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 412-413 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979 (For primary document see N82-10996 01-99)
Avail: NTIS HC A18/MF A01

Certain design considerations (including discernment, analysis, and suppression) regarding combustion instability of solid rocket motors are discussed. The major focus is on the combustion instability of solid rocket motors with tubular or multitubular grains. R.C.T.

N82-11012# Ames Lab., Iowa.
AMES LABORATORY RESEARCH REPORT, 1980
1980 100 p
(Contract W-7405-eng-82)
(DE81-027399; IS-4767) Avail: NTIS HC A05/MF A01

Some of the research activities at Ames Laboratory described include coal research, solar cells, solar space heating of buildings, superconducting wires, coal carcinogens, lasers, solid waste recovery, nuclear physics, and high energy physics. Publications are listed. DOE

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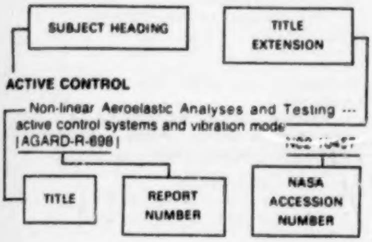

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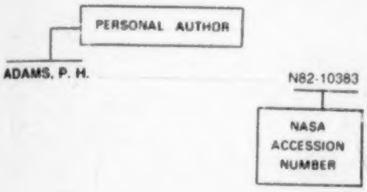

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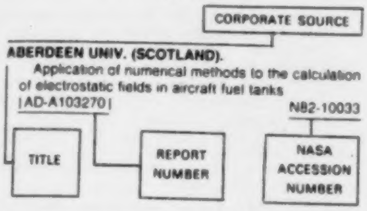
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DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BERLIN (WEST GERMANY).

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DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BONN (WEST GERMANY).

Development and construction of pilot ejector seats in Germany from 1938-1945
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DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).

Mathematical model for the maintenance program of modern jet aircraft
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DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FÜER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).

The determination of high temperature strength of ceramic discussion of testing techniques: Flexural and tensile tests creep tests with flexural and tensile loading
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Proposal for a ground station antenna for geostationary satellites with a simple concept of beam steering
[DFVLR-MITT-81-05] N82-10100

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Physical results and problems occurring during the qualification of the thruster RIT-10
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DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN (WEST GERMANY).

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Structural mechanics program: Progress in 1980
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ELECTRONICS ENGINEERING GROUP (1842ND), SCOTT AFB, ILL.

Scintillation effects, mitigations and recommendations for AFSATCOM and other satellite communications systems
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ENERGY AND ENVIRONMENTAL RESEARCH CORP., SANTA ANA, CALIF.

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Drag measurements of conical afterbodies at subsonic and transonic speeds
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SYMPHONIE. Natural nutation damping due to the ergols of the hot gas propulsion system. Synthesis of MV1 and MV2 in flight results
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Experiments with thin-walled, isotropic cones subjected to axial load, axial load combined with constant internal pressure and external hydrostatic pressure
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[ESA-TT-658] N82-10657

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EXIDE CORP., HORSHAM, PA.

Handbook of secondary storage batteries and charge regulators in photovoltaic systems
[DE81-029464] N82-10523

EXIDE CORP., RALEIGH, N.C.

Handbook of secondary storage batteries and charge regulators in photovoltaic systems
[DE81-029464] N82-10523

EXIDE MANAGEMENT AND TECHNOLOGY CO., YARDLEY, PA.

Handbook of secondary storage batteries and charge regulators in photovoltaic systems
[DE81-029464] N82-10523

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FAIRCHILD WESTON SYSTEMS, INC., ARCHBALD, PA.

Modifications to CTVS TV cameras for space shuttle compatibility and evaluation
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FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.

Data General Corporation AOS Cobol revision 3.10
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Computer Sciences Corporation CSTS 74 Cobol, Version COB230
[PB81-219214] N82-10738

NCR Corporation NCR IRX Cobol, release 4.0
[PB81-219222] N82-10739

NCR Corporation NCR IRX Cobol, release 4.0 indexed 1-0 module, level 1
[PB81-219230] N82-10740

COBOL compiler validation system 1974. Version 4.1 user's guide (implementation document)
[PB81-219040] N82-10741

COBOL compiler validation system 1974. Version 4: Evaluation guide
[PB81-219057] N82-10742

Control Data Corporation COBOL 5.3 level 540 Cyber 73, NOS/BE 1.4 level 530
[PB81-213837] N82-10743

FILTRONIC COMPONENTS LTD., LEEDS (ENGLAND).

Microwave devices with asymmetric frequency characteristics and cascade decomposition study
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FLORIDA INST. OF TECH., MELBOURNE.

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The effects of cold- and exercise-induced alterations in skin and core temperature on substrate mobilization and utilization N82-10719

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FLORIDA UNIV., GAINESVILLE.

Models of carbon flow in tropical ecosystems with emphasis on their roles in the global carbon cycle
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FMC CORP., ENGLEWOOD, COLO.

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FRAUNHOFER-INST. FUER BETRIEBSFESTIGKEIT, DARMSTADT (WEST GERMANY).

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GENERAL ELECTRIC CO., ST. PETERSBURG, FLA.

Thermal-barrier-coated turbine blade study
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Experimental evaluation of the steady-state and dynamic performance characteristics of the interactive units of a coal-gasification process
[DE81-028995] N82-10259

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Water-cooled gas turbine development program
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GEOLOGICAL SURVEY, CHAMPAIGN, ILL.

Coal fly ash: A review of the literature and proposed classification system with emphasis on environmental impacts
[PB81-215014] N82-10608

GEORGE WASHINGTON UNIV., WASHINGTON, D.C.

Effect of driven wall motion on boundary layer flow
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Cooperative program of applied energy research technology development
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Research program in fully distributed processing systems
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GEOTRANS, INC., HERNDON, VA.

Review of simulation techniques for Aquifer Thermal Energy Storage (ATES)
[DE81-029943] N82-10532

GILBERT/COMMONWEALTH, READING, PA.

Magnetohydrodynamics MHD Engineering Test Facility ETF 200 MWe power plant. Conceptual Design Engineering Report CDER. Volume 3: Costs and schedules
[NASA-CR-165452-VOL-3] N82-10495

GRONINGEN RIJKSUNIVERSITEIT (NETHERLANDS).

Design of high integrity multivariable control systems N82-10055

GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.

Directional solidification of magnetic composites
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GULF RESEARCH AND DEVELOPMENT CO., PITTSBURGH, PA.

Underground gasification of steeply dipping beds. Phase 2 report: Results of Rawlins test No. 1
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HADRON, INC., ARLINGTON, VA.

Ayame/PAM-D apogee kick motor nozzle failure analysis
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HANSEN (JAMES) AND ASSOCIATES, SPRINGFIELD, VT.

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HART (FRED C.) ASSOCIATES, INC., NEW YORK, N.Y.

Methodology for determining the impact of environmental regulatory programs
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HARVARD UNIV., CAMBRIDGE, MASS.

Optimization of transparent electrode for solar cells
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Case studies in the application of air quality modelling in environmental decision making: Summary and recommendations
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HIBBING PUBLIC UTILITIES COMMISSION, MINN.

Feasibility of a small scale pumped storage demonstration project, Hibbing, Minnesota
[DE81-028678] N82-10525

HONEYWELL, INC., CLEARWATER, FLA.

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HONEYWELL, INC., MINNEAPOLIS, MINN.

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HOPE ASSOCIATES, INC., WASHINGTON, D.C.

A comprehensive bibliography of literature on helicopter noise technology
[AD-A103331] N82-10612

HYDROCARBON RESEARCH, INC., LAWRENCEVILLE, N. J.

H-coal process improvement study. Bench unit baseline run with preheater/reactor
[DE81-026022] N82-10260

I

IDAHO NATIONAL ENGINEERING LAB., IDAHO FALLS.

Corrosion testing of carbon steel in aerated geothermal brine
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IDAHO UNIV., MOSCOW.

Forecasting subsurface water flow and storage on forested slopes using a finite element model
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IIT RESEARCH INST., CHICAGO, ILL.

Thermal fatigue and oxidation data of TAZ-8A and M22 alloys and variations
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ILLINOIS INST. OF TECH., CHICAGO.

Separation of particles from coal derived liquids via surface charge properties
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ILLINOIS STATE WATER SURVEY, URBANA.

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ILLINOIS UNIV. AT URBANA.

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ILLINOIS UNIV. AT URBANA-CHAMPAIGN.

The propagation of stress corrosion cracks in alpha-brasses N82-10175

An energy-dependent finite-orbit treatment for plasma buildup in mirror fusion devices N82-10673

ILLINOIS UNIV., URBANA.

Investigation on non-glass laser fusion targets: Their fabrication, characterization, and transport
[DE81-026566] N82-10392

Neutron-activation analysis of several US Geological Survey and National Bureau of Standards reference materials
[DE81-025041] N82-10639

Coherent bremsstrahlung and channeling radiation from electrons of one to three MeV in silicon and gold
[DE81-029490] N82-10926

IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).

Experimental and theoretical investigation of three dimensional turbulent mixing in jets and ducts
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Applications of a low Reynolds number turbulence model and wall functions for steady and unsteady heat-transfer computations
[HTS/80/7] N82-10378

INDIAN LEAD ZINC INFORMATION CENTRE, NEW DELHI.

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[PB81-120297] N82-10282

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INDIANA UNIV., INDIANAPOLIS.

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Chemical response of the middle atmosphere to solar variations
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INSTITUTE OF GAS TECHNOLOGY, CHICAGO, ILL.

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INTERA ENVIRONMENTAL CONSULTANTS LTD., HOUSTON, TEX.

Review of simulation techniques for Aquifer Thermal Energy Storage (ATES)
[DE81-029943] N82-10532

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION, OGDEN, UTAH.

Large-scale color aerial photography as a tool in sampling for mortality rates
[PB81-214777] N82-10469

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Active lamp pulse driver circuit
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INTERNATIONAL NICKEL CO., INC., SUFFERN, N. Y.

Evaluation of the effects of heat treatment on the passive behavior of Ni-CR-Fe alloys in high temperature water
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INTERNATIONAL RESEARCH AND TECHNOLOGY CORP., MCLEAN, VA.

Proceedings: Workshop on Cycling and Effects of Toxic Substances
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KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
Icing tunnel test of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-165444] N82-10021

KARLSRUHE UNIV. (WEST GERMANY).
High temperature properties of Si3N4. Creep of reaction bonded silicon nitride
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KENTUCKY UNIV., LEXINGTON.
EMC analysis at the equipment level N82-10309
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A Swedish proposal for an EISCAT/GEOS-2 experiment
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Quiet time convection electric field properties derived from keV electron measurements at the inner edge of the plasma sheet by means of GEOS-2
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Baseline data on utilization of low-grade fuels in gas turbine applications. Volume 3: Emissions evaluation
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LABORATORIO DE ACUSTICA E SONICA, SAO PAULO (BRAZIL).
The industrial noise problem and its effects and social implications N82-10584

LEAR SIEGLER, INC., SANTA MONICA, CALIF.
Development and evaluation of automatic landing control laws for light wing loading STOL aircraft
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LEEDS AND NORTHRUP CO., NORTH WALES, PA.
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LEHIGH UNIV., BETHLEHEM, PA.
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LITTLE (ARTHUR D.), INC., CAMBRIDGE, MASS.
Large wind turbine generator performance assessment, technology status report no. 3
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Solar Heating And Cooling (SHAC) simulation programs: Assessment and evaluation. Volume 2: Detailed findings
[EPRI-EM-1866-VOL-2] N82-10564

LIVERPOOL POLYTECHNIC (ENGLAND).
Teaching on-line information retrieval using intelligent terminals
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Modular antenna design study
[NASA-CR-3316] N82-10402

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User's manual: Thermal Radiation Analysis System TRASYS 2
[NASA-CR-161077] N82-10754

MARTIN MARIETTA CORP., DENVER, COLO.
Onboard utilization of ground control points for image correction. Volume 1: Executive summary
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[NASA-CR-166732] N82-10470
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MARTIN MARIETTA LABS., BALTIMORE, MD.
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MARYLAND UNIV., COLLEGE PARK.
Climatological relationships between monthly mean surface temperature and mid-tropospheric heights
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Study for compacting the explosive LX-17
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MASSACHUSETTS UNIV., BOSTON.

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MATERIALS RESEARCH LABS., MELBOURNE (AUSTRALIA).

Use of weight functions to determine the stress intensity for a cracked thick-walled cylinder
[MRL-R-814] N82-10425

MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).

Measurement of integral excitation cross sections during alkali rare gas collisions
[MPIS-20/1979] N82-10844

Investigations of the vibrational and rotational excitation of N2, CO, NO, O2, CO2, CH4, CF4 and SF6 during collision with protons and deuterons at an energy of 9.8 eV
[MPIS-9/1980] N82-10845

MCDONNELL-DOUGLAS ASTRONAUTICS CO., ST. LOUIS, MO.

Limiter/vacuum system for plasma impurity control and exhaust in Tokamaks
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MCGILL UNIV., MONTREAL (QUEBEC).

Multivariables design: The optimization of approximate inverses N82-10057

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MEDICAL PHYSICS INST. UTRECHT (NETHERLANDS).

Medical research activities in the Netherlands
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MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., MUNICH (WEST GERMANY).

Standard tests of a research model rotor in a wind tunnel, including model similarity
[BMVG-FBWT-79-16] N82-10016

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).

Calculation of the viscous flow about an infinite streamlined airfoil with flaps, making use a panel method by Woodward and Dvorak
[MBB-FE-122/S/PUB/35] N82-10014

A CFRP taileron for the Tornado: Construction and production
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Active control elements on the transonic wing of the Airbus A-300 (ACTTA A). Airbus A-300 with reduced longitudinal stability (ACTTA-C) N82-10044

Positioning motors and motive power supplies for thrust rudders on guided missiles
[MBB-UA-53E/80-OE] N82-10095

Future space transportation systems for Europe. Volume 1: Summary study report
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Technological activities for high performance receivers
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Study on the electronic imaging system MOMS in the reflected and thermal infrared spectrum
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MICHIGAN STATE UNIV., EAST LANSING.

Radar waveform synthesis for target identification
[AD-A103805] N82-10294

MICHIGAN UNIV., ANN ARBOR.

Precision positron polarimetry: A new technique in weak-interaction studies
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Study of the formation of submicron particulates generated by coal combustion
[DE81-027447] N82-10586

MID-AMERICAN SOLAR ENERGY COMPLEX, MINNEAPOLIS, MINN.

Quarterly report of solar federal buildings program in the MASEC region
[DE81-027968] N82-10276

Summary of passive-solar-retrofit workshops
[DE81-028146] N82-10547

MIDWEST RESEARCH INST., GOLDEN, COLO.

Alcohol fuels bibliography, 1901 - March 1980
[DE81-025482] N82-10263

Optimization of transparent electrode for solar cells
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Standards application and development plan for solar thermal technologies
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Fabrication, testing, and modeling plans for a 125-kW counter-rotating-turbine wave energy converter
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Application of solar thermal energy to buildings and industry
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Measured performance of falling-jet flash evaporators
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MIDWEST RESEARCH INST., KANSAS CITY, MO.

Energy end-use requirements in manufacturing, volume 1
[DE81-028975] N82-10512

Investigation of photovoltaic mechanisms in polycrystalline thin-film solar cells
[DE81-027272] N82-10539

MINNESOTA UNIV., MINNEAPOLIS.

Experimental and theoretical high energy physics
[DE81-029024] N82-10849

MINNESOTA UNIV., ST. PAUL.

Earth shelter 2. 1979-1980 USC series
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MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.

A study of high density bit transition requirements versus the effects on BCH error correcting coding
[NASA-CR-161881] N82-10753

MISSISSIPPI UNIV., UNIVERSITY.

On the solutions of mixed boundary value problems via variational techniques and integral equations
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MISSOURI UNIV. -KANSAS CITY.

Acid catalyzed homopolymerization of cyclic glycylglycine and copolymerization with cyclic leucylleucine to linear peptides N82-10219

MITRE CORP., MCLEAN, VA.

Status of the DOE battery and electrochemical technology program 2
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MOBIL TYCO SOLAR ENERGY CORP., WALTHAM, MASS.

Large area silicon sheet by EFG
[NASA-CR-164881] N82-10497

MONTANA DEPT. OF NATURAL RESOURCES AND CONSERVATION, HELENA.

Montana geothermal handbook: A guide to agencies, regulations, permits and financial aids for geothermal development
[DE81-024315] N82-10562

MONTANA STATE UNIV., BOZEMAN.

Electrical properties of lanthanum chromite based ceramics in hydrogen and oxidizing atmospheres at high temperatures
[DE81-028306] N82-10336

MOTOROLA, INC., SCOTTSDALE, ARIZ.

Handbook of secondary storage batteries and charge regulators in photovoltaic systems
[DE81-029464] N82-10523

MOULTON NIGUEL WATER DISTRICT, LAGUNA NIGUEL, CALIF.

Wastewater treatment by rooted aquatic plants in sand and gravel trenches
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MOUND LAB., MIAMISBURG, OHIO.

Pricetown 1 underground coal gasification field test: Operations report
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Quadrupole interactions in liquid and solid deuterium
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N

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.

Quiet short-haul research aircraft familiarization document, revision 1
[NASA-TM-81298] N82-10031

Mission operation report: OSTA-1
[NASA-TM-84053] N82-10102

Mission operation report: Space Shuttle program, STS-2 launch
[NASA-TM-84054] N82-10103

Aerospace Medicine and Biology: A continuing bibliography (supplement 223)
[NASA-SP-7011(223)] N82-10709

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.

A new solution-adaptive grid generation method for transonic airfoil flow calculations
[NASA-TM-81330] N82-10010

Oil-flow separation patterns on an ogive forebody
[NASA-TM-81314] N82-10011

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A compilation of unsteady turbulent boundary-layer experimental data
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A documentation of a three-dimensional shock separated turbulent boundary layer
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[NASA-TM-84056] N82-10466

Remotely piloted vehicle: Application of the GRASP analysis method
[NASA-TM-81261] N82-10767

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. HUGH L. DRYDEN FLIGHT RESEARCH CENTER, EDWARDS, CALIF.

Analytic study of orbiter landing profiles
[NASA-TM-81365] N82-10001

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

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NASA LARC RAFTOR documentation version 1.0
[NASA-TM-83173] N82-10752
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Creep shear behavior of the oxide dispersion strengthened superalloy MA 6000E
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Effect of positive pulse charge waveforms on the energy efficiency of lead-acid traction cells
[NASA-TM-82709] N82-10503
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
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SCIENCE APPLICATIONS, INC., LA JOLLA, CALIF.

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SCIENCE APPLICATIONS, INC., MCLEAN, VA.

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SCIENCE RESEARCH COUNCIL, SLOUGH (ENGLAND).

Study on satellite radar altimetry in climatological and oceanographic research, volume 1 [SP/153/06/01/FR(80)-VOL-1] N82-10486

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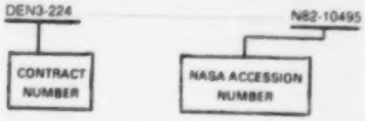

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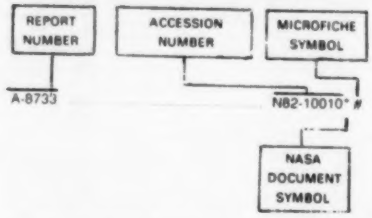

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DFVLR-FB-81-07 N82-10452 #
DFVLR-FB-81-09 N82-10409 #
DFVLR-FB-81-12 N82-10017 #
DFVLR-FB-81-14 N82-10002 #

DFVLR-MITT-79-13 N82-10107 #
DFVLR-MITT-79-16 N82-10045 #
DFVLR-MITT-79-21 N82-10774 #
DFVLR-MITT-80-02 N82-10453 #
DFVLR-MITT-80-05 N82-10046 #
DFVLR-MITT-81-03 N82-10231 #
DFVLR-MITT-81-05 N82-10100 #
DFVLR-MITT-81-06 N82-10397 #

DOE/BC-20001/10 N82-10477 #

DOE/BETC/OR-19 N82-10478 #

DOE/BETC/QPR-80/4 N82-10250 #

DOE/CE-20088/01 N82-10550 #

DOE/CS-20300/2 N82-10522 #
DOE/CS-40037/T2 N82-10262 #

DOE/DP-40071/T1 N82-10393 #

DOE/EIA-0297 N82-10474 #

DOE/ER-0105 N82-10117 #
DOE/ER-0106 N82-10116 #
DOE/ER-01198/1362 N82-10926 #
DOE/ER-01367/T1 N82-10925 #
DOE/ER-01764/T2 N82-10849 #
DOE/ER-02407/9 N82-10122 #
DOE/ER-02422/29 N82-10432 #
DOE/ER-03023/T1 N82-10634 #
DOE/ER-03162/T1 N82-10520 #
DOE/ER-03244/T3 N82-10830 #
DOE/ER-03992/448 N82-10296 #
DOE/ER-03992/452 N82-10831 #
DOE/ER-04694/T1 N82-10829 #
DOE/ER-10451/2 N82-10382 #
DOE/ER-10475/2 N82-10198 #
DOE/ER-10554/8 N82-10151 #
DOE/ER-10558/2 N82-10521 #
DOE/ER-10765/T1 N82-10940 #
DOE/ER-10814/1 N82-10202 #

DOE/ET-5047/1 N82-10527 #
DOE/ET-5047/2 N82-10528 #
DOE/ET-5047/5 N82-10529 #
DOE/ET-5047/9D N82-10530 #
DOE/ET-5047/12 N82-10574 #
DOE/ET-10152/T6 N82-10260 #
DOE/ET-10154/T9 N82-10261 #
DOE/ET-10296/T2 N82-10251 #
DOE/ET-10325/T11 N82-10152 #
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DOE/ET-10626/T1 N82-10149 #
DOE/ET-11053/T1 N82-10888 #
DOE/ET-13108/T14 N82-10255 #
DOE/ET-13511/T8 N82-10404 #
DOE/ET-14674/16 N82-10257 #
DOE/ET-14879/T6 N82-10143 #
DOE/ET-14928/1 N82-10259 #
DOE/ET-15415/1 N82-10336 #
DOE/ET-15518/5 N82-10882 #
DOE/ET-20279/T8 N82-10333 #
DOE/ET-20279/130 N82-10558 #
DOE/ET-20279/140 N82-10519 #
DOE/ET-23010/T10 N82-10518 #
DOE/ET-25407/1 N82-10540 #
DOE/ET-27225/9 N82-10366 #
DOE/ET-41900/6 N82-10847 #
DOE/ET-41900/8 N82-10848 #
DOE/ET-53036/27 N82-10885 #
DOE/ET-53042/24 N82-10884 #
DOE/ET-53048/T1 N82-10832 #
DOE/ET-53088/15 N82-10883 #
DOE/ET-53088/30 N82-10800 #
DOE/ET-60058/T1 N82-10517 #

DOE/EV-01340/1 N82-10592 #
DOE/EV-02958/T1 N82-10148 #
DOE/EV-03264/20 N82-10705 #
DOE/EV-04733/T1 N82-10704 #
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DOE/EV-10403/3 N82-10639 #
DOE/EV-10404/T4 N82-10147 #
DOE/EV-10404/2 N82-10145 #
DOE/EV-10404/6 N82-10146 #
DOE/EV-10539/T1 N82-10654 #

DOE/FC-02101/18 N82-10249 #

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DOE/JPL-954355-81/18 N82-10497* #
DOE/JPL-955089-81/12 N82-10500* #
DOE/JPL-955648-81/6 N82-10498* #
DOE/JPL-955688-80/1 N82-10499* #

DOE/NASA/0160-3 N82-10506* #
DOE/NASA/0224-1-VOL-3 N82-10495* #
DOE/NASA/51044-22 N82-10503* #

DOE/NOAA-OTEC-35 N82-10566 #

DOE/NV-10039/3 N82-10475 #
DOE/NV-10061/7 N82-10411 #

DOE/OR-05784/1 N82-10833 #

DOE/PC-30239/T2 N82-10252 #
DOE/PC-30292/3 N82-10155 #
DOE/PC-30294/3 N82-10158 #
DOE/PC-30298/T3 N82-10150 #
DOE/PC-30300/T3 N82-10157 #
DOE/PC-30305/T3 N82-10566 #
DOE/PC-30306/T3 N82-10159 #
DOE/PC-40770/T2 N82-10144 #
DOE/PC-40787/1 N82-10939 #
DOE/PC-41035/1 N82-10154 #

DOE/PE-70278/T15 N82-10801 #

DOE/RL-10121/T1 N82-10526 #

DOE/SF-10610/T1 N82-10023 #
DOE/SF-10802/T4 N82-10516 #

DOE/SR/WM-79/3-REV-5/81 N82-10859 #

DOE/TIC-11452 N82-10289 #
DOE/TIC-1023186 N82-10865 #
DOE/TIC-1028678 N82-10525 #

DRSMI/RK-81-5-TR N82-10246 #

D180-25927-2 N82-10326 #

E-985 N82-10195* #
E-991 N82-10503* #

ECR-105 N82-10734 #
ECR-106 N82-10448 #

ED-AX-225 N82-10325* #

EGG-GTH-5474 N82-10201 #

EGG-2113 N82-10591 #

EOARD-TR-81-9 N82-10033 #

EPA-600/2-81-084 N82-10609 #
EPA-600/2-81-091 N82-10606 #
EPA-600/2-81-095 N82-10607 #
EPA-600/2-81-096 N82-10388 #
EPA-600/4-81-034 N82-10605 #

EPRI-AP-1882-VOL-2 N82-10253 #
EPRI-AP-1882-VOL-3 N82-10254 #
EPRI-AP-1889-VOL-1 N82-10406 #
EPRI-AP-1889-VOL-2 N82-10407 #
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EPRI-AP-1959 N82-10524 #

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EPRI-CS-1958 N82-10828 #

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EPRI-EA-1988 N82-10587 #
EPRI-EA-1989 N82-10588 #

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EPRI-EL-1916	N82-10330	#
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EPRI-EL-2016	N82-10331	#
EPRI-EM-1569-VOL-1	N82-10527	#
EPRI-EM-1569-VOL-2	N82-10528	#
EPRI-EM-1569-VOL-3	N82-10546	#
EPRI-EM-1569-VOL-5	N82-10529	#
EPRI-EM-1569-VOL-9-APP-D	N82-10530	#
EPRI-EM-1569-VOL-12	N82-10574	#
EPRI-EM-1966-VOL-2	N82-10564	#
EPRI-NP-1824	N82-10275	#
EPRI-NP-1873	N82-10431	#
EPRI-NP-1884	N82-10199	#
EPRI-NP-1969-SR	N82-10435	#
ERC41001.30FR	N82-10090*	#
ERS-E-240	N82-10367	#
ERS-E-248	N82-10449	#
ERS-E-262	N82-10450	#
ERS-E-267	N82-10230	#
ERS-E-273	N82-10343	#
ERS-E-276	N82-10735	#
ESA-CR(P)-1436	N82-10098	#
ESA-CR(P)-1437-VOL-1	N82-10486	#
ESA-CR(P)-1437-VOL-2	N82-10487	#
ESA-CR(P)-1439	N82-10344	#
ESA-CR(P)-1441-VOL-1	N82-10104	#
ESA-CR(P)-1443	N82-10488	#
ESA-TT-646	N82-10018	#
ESA-TT-656	N82-10657	#
ESA-TT-660	N82-10107	#
ESA-TT-666	N82-10045	#
ESA-TT-669	N82-10774	#
ESA-TT-670	N82-10453	#
ESA-TT-671	N82-10099	#
ESA-TT-674	N82-10019	#
ESA-TT-679	N82-10046	#
ESA-TT-681	N82-10036	#
ESA-TT-685	N82-10106	#
ESA-TT-686	N82-10113	#
ESD-TR-81-7	N82-10922*	#
ESD-TR-81-98	N82-10292	#
ESG-DOE-13352	N82-10848	#
ESG-DOE-13363	N82-10251	#
ESS/SS-1023	N82-10095	#
ETL-R025	N82-10630	#
ETL-0260	N82-10105	#
FAA-EE-81-4	N82-10812	#
FCTC/CCVS74EG-81/16	N82-10742	#
FCTC/CCVS74UG-81/17	N82-10741	#
FCTC/TR-81/18	N82-10740	#
FE-2270-80	N82-10261	#
FE-2706-43	N82-10666	#
FE-10152-65	N82-10260	#
FOA-A-30023-E4	N82-10300	#
FOA-A-40034-C2/A2/,B2	N82-10722	#
FOA-C-10166-M6(H9)	N82-10301	#
FOA-C-10172-M6	N82-10763	#
FOA-C-20363-E3	N82-10773	#
FOA-C-20366-D3	N82-10112	#
FOA-C-20367-D3	N82-10942	#
FOA-C-20372-D4(A3)	N82-10445	#
FOA-C-20373-D4(A3)	N82-10446	#
FOA-C-20374-D8	N82-10783	#
FOA-C-20376-A2	N82-10842	#
FOA-C-20377-A2	N82-10843	#
FOA-C-20379-D2	N82-10096	#
FOA-C-20386-F9	N82-10024	#
FOA-C-20388-D1	N82-10270	#
FOA-C-20397-D6(F8)	N82-10483	#
FOA-C-30022-E	N82-10866	#
FOA-C-30193-E1	N82-10814	#
FOA-C-30194-E1(E3)	N82-10298	#
FOA-C-30196-E1	N82-10396	#
FOA-C-30199-E1	N82-10299	#
FOA-C-30200-E	N82-10337	#
FOA-C-30202-E4	N82-10302	#
FOA-C-30204-E1	N82-10481	#
FOA-C-30205-E5	N82-10280	#
FOA-C-30206-F4	N82-10081	#
FOA-C-30208-E1	N82-10385	#
FOA-C-30209-E4	N82-10303	#
FOA-C-30210-E	N82-10342	#
FOA-C-40109-B2	N82-10867	#
FOA-C-40124-C2(B2)	N82-10615	#
FOA-C-40126-W4(C3)	N82-10715	#
FOA-C-40127-H2	N82-10602	#
FOA-C-56023-H9(M3)-VOL-1	N82-10943	#
FOA-C-56024-H9(M3)-VOL-2	N82-10944	#
FOA-C-58008-H3-PT-2	N82-10714	#
FR-80-72/EE	N82-10261	#
FSRP/INT-269	N82-10489	#
FTD-ID(RS)T-0259-81-PT-1	N82-10980	#
FTD-ID(RS)T-0260-81-PT-2	N82-10996	#
GA-A-16001	N82-10441	#
GA-A-16144	N82-10203	#
GJBX-114(81)	N82-10476	#
GJBX-260-81	N82-10633	#
GPO-66-020	N82-10022	#
GPO-67-284	N82-10960	#
GPO-68-874	N82-10291	#
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Includes topology and number theory.

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71 ACOUSTICS 260
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Includes elementary and nuclear particles; and reactor theory.
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For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

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Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

77 THERMODYNAMICS AND STATISTICAL PHYSICS 277
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) N.A.
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT 277
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE 278
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software*.

83 ECONOMICS AND COST ANALYSIS 279
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84 LAW AND POLITICAL SCIENCE 279
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION 279
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences*.

88 SPACE SCIENCES (GENERAL) N.A.

89 ASTRONOMY 280
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS 282
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION 282
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

92 SOLAR PHYSICS 283
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION 284
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

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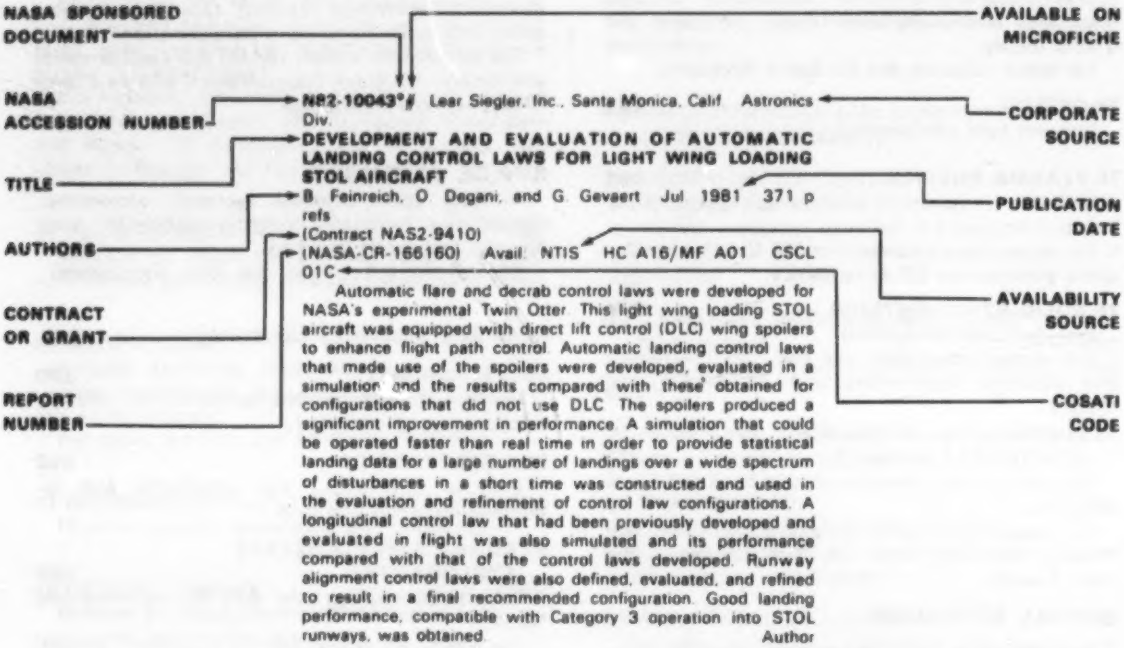

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N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
(Contract NAS2-9410)
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

VOLUME 20 NUMBER 2/JANUARY 23, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-11013*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF VORTEX FLAPS ON THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF AN ARROW WING
Long P. Yip and Daniel G. Murri Nov. 1981 64 p refs
(NASA-TP-1914; L-14575) Avail: NTIS HC A04/MF A01 CSCL 01B

Tests were conducted in the Langley 12-foot low-speed wind-tunnel to determine the longitudinal and lateral-directional aerodynamic effects of plain and tabbed vortex flaps on a flat-plate, highly swept arrow-wing model. Flow-visualization studies were made using a helium-bubble technique. Static forces and moments were measured over an angle-of-attack range from 0 deg to 50 deg for sideslip angles of 0 deg and + or - 4 deg. A.R.H.

N82-11014# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technol. Div.
ACTA MECHANICA SINICA
11 Sep. 1981 47 p refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 70-73
(AD-A105184; FTD-ID(RS)T-0704-81) Avail: NTIS HC A03/MF A01 CSCL 01/2

Various fluid dynamics problems are discussed including the computation of three-dimensional flow in turbomachinery, the design of wing root regions of aircraft wing-body combinations, and the diffraction and reflection of traveling shock waves. For individual titles, see N82-11015 through N82-11017.

N82-11015# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE ARBITRARY QUASI-ORTHOGONAL SURFACE METHOD FOR COMPUTING THREE-DIMENSIONAL FLOW IN TURBINE MACHINERY. 2. CALCULATION OF THE THREE-DIMENSIONAL FLOW WITH THE S SUB 1-SURFACE TWISTED c07
Xin Xiao-Kang, Jiang Jin-Liang, and Zhu Shi-Can *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 1-19 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

On the basis of the quasi-orthogonal surface method, a three-dimensional flow field solution of inviscous fluids in turbine machinery is obtained. This method, under the condition allowed by the storage of the computer, can calculate any shapes of S sub 1 and S sub 2 surfaces (including twisting S sub 1 surfaces) and obtain the shapes of space streamlines and the three-dimensional distribution of parameters such as velocity. The calculations for the two conditions of a centrifugal compressor with a small impeller (phi 110) indicate the relative value of the twist of the S sub 1 surface is about 3 to 10 percent. The S sub 1 surface shows a double twist like a twist drill from the inlet to the outlet. M.G.

N82-11016# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE PRINCIPLES AND METHODS FOR SHAPING THE WING ROOT REGIONS OF A WING-BODY COMBINATION AT TRANSONIC AND LOWER SUPERSONIC SPEEDS c05
Yang Tso Sheng, Tai Chia Tsun, Chen Ching Sung, and Fan I. Chia *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 20-35 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

The principles and methods for the combined shaping of the wing root regions of a wing-body combination, in accordance with the requirements of area rule and shockless pressure field, are discussed. It is shown that the favorable non-midwing arrangement is able to reduce the amount of fuselage shaping required for the reduction of the zero lift wave drag of a wing-body combination. The combined shaping so designed may thus be realized more easily in structural arrangement. M.G.

N82-11017# Joint Publications Research Service, Arlington, Va. Foreign Technology Div.
THE WAVE DIAGRAMS FOR DIFFRACTION AND REFLECTION OF A TRAVELING WEAK SHOCK WAVE FROM AN OPEN END OF A SHOCK TUBE c02
Wei Chung Lei, Wang Ping-Cheng, and Chang Chun Hsiu *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 36-44 Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

The free diffractions of a weak shock wave issuing from an open end of a shock tube and the formation and development of a vortex ring from the end of the tube were observed by a Schlieren method. Also observed were the oblique reflections from the horizontal floor and the vertical plate. As the wave impinges on the horizontal surface near grazing incidence, the Mach stem forms. Under certain conditions, when this Mach stem travels along a slanted surface with an incidence angle which is larger than the critical value with respect to the horizontal axis, the phenomenon of 'dissolution' of the Mach stem occurs. In this phenomenon the incident wave and the reflected wave travel separately along the slanted surface. M.G.

N82-11018*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ALGORITHM FOR FUEL CONSERVATIVE HORIZONTAL CAPTURE TRAJECTORIES
Frank Neuman and Heinz Erzberger Oct. 1981 31 p refs
(NASA-TM-81334; A-8746) Avail: NTIS HC A03/MF A01 CSCL 01B

A real time algorithm for computing constant altitude fuel-conservative approach trajectories for aircraft is described. The characteristics of the trajectory computed were chosen to approximate the extremal trajectories obtained from the optimal control solution to the problem and showed a fuel difference of only 0.5 to 2 percent for the real time algorithm in favor of the extremals. The trajectories may start at any initial position, heading, and speed and end at any other final position, heading, and speed. They consist of straight lines and a series of circular arcs of varying radius to approximate constant bank-angle decelerating turns. Throttle control is maximum thrust, nominal thrust, or zero thrust. Bank-angle control is either zero or approximately 30 deg. M.G.

N82-11019# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ACTA MECHANICA SINICA (SELECTED ARTICLES)

15 Sep. 1981 47 p refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979
(AD-A105636; FTD-ID(RS)T-0706-81) Avail: NTIS HC A03/MF A01 CSCL 01/2

Various techniques for the analysis of nozzle flows are addressed. Specifically, compression processes in hypersonic gun tunnels, turbulent boundary layer separation with gas inlet ducts, and transonic flow characteristics in Laval nozzles are considered. For individual titles, see N82-11020 through N82-11022.

N82-11020# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ON TRANSONIC FLOW IN HYPERBOLIC LAVAL NOZZLES c02

Jia Zhen-xue and Lin Tong-ji *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 1-18 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 (For primary document see N82-11019 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

Transonic flow in the throat region of hyperbolic Laval nozzles is analyzed using the conformal curvilinear coordinate method. A solution to this type flow is given for the cases of different radii of wall curvature at the throat and different values of the ratio of the specific heats. The general behavior of the transonic flow and Mach number distribution in the throat region are presented. It can be applied to the design of nozzles, especially, in the design of aerodynamic laser nozzles. J.M.S.

N82-11021# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

COMPRESSION PROCESSES OF FREE PISTONS AFTER THE OPENING OF NOZZLE IN A HYPERSONIC GUN TUNNEL c02

Qian Fu-xing, Xiao Lin-kui, and Shi Zhen-ping *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 19-36 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 Presented at the 1st Natl. Shock Wave Conf., 12 Nov. 1978 (For primary document see N82-11019 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

Compression processes of free pistons after opening the nozzle in a hypersonic gun tunnel are addressed. The nozzle flow starts at the time when the primary shock running ahead of the piston reaches the diaphram at the entrance of the nozzle and the piston starts to decelerate at the time when the shock reflected from the nozzle strikes it. The momentum equation for the motion of the piston and the continuity equation of mass of the gas are derived respectively, and the finite difference calculations are carried out using computers. According to the results obtained, piston deceleration, overrush, rebound, oscillations, equilibrium running, and peak pressure are discussed for various given initial conditions. It is shown that compression processes of free pistons after the opening of nozzle in a hypersonic guh tunnel are significantly different from those for a closed nozzle. The results are compared with those obtained with equilibrium technique based on closed nozzle and with some experimental data, and furnish important information for the operation of hypersonic gun tunnels. J.M.S.

N82-11022# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

PREDICTION OF TURBULENT BOUNDARY LAYER SEPARATION c34

Wu Guo-chuan *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 37-44 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 (For primary document see N82-11019 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

Theoretical, analytical predictions and experimental results concerning turbulent boundary layer separation are presented. The results indicate that the occurrence of boundary layer separation can be predicted based on the variation of velocity in the main flow region. The analysis presented provides a basis for the design of gas inlet ducts with good flow characteristics and small stagnation pressure loss. Also, it can predict the quality of the gas inlet duct already designed. J.M.S.

N82-11023*# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

JOURNAL OF ENGINEERING THERMOPHYSICS (SELECTED ARTICLES)

16 Sep. 1981 79 p refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 p 20-42, 46-52, 73-75, 89-91
(AD-A105604; FTD-ID(RS)T-0570-81) Avail: NTIS HC A05/MF A01 CSCL 21/5

Inlet and cascade flow in turbocompressors, internal blade cooling in gas turbine engines, turbulent aerodynamic heating, and recirculating flow in the wake of flow stabilizers are considered. For individual titles, see N82-11024 through N82-11028.

N82-11024# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THEORETICAL INVESTIGATIONS AND EXPERIMENTAL RESEARCHES FOR HIGHER SUBSONIC TWO-DIMENSIONAL COMPRESSOR CASCADE c07

Yan Ru-qun and Qian Zhao-yan *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 1-34 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Thermophys. Eng. Technol. Conf., Gui Lin, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

Compressible turbulence flow boundary layer theory and several characteristic boundary layer parameters (momentum thickness, form factors, energy factors and other combinational parameters) were combined with simplified gas flow speed distributions in the boundary layers in the wake behind the blade cascade and used to deduce, on the basis of the research foundation accumulated in the past about the theory of blade cascade losses, a simplified equation for the calculation of total two-dimensional blade cascade pressure losses for subsonic and transonic speeds. With this equation, it is possible to calculate the two-dimensional blade cascade pressure losses in designed operational configurations and off-designed operational configurations. A graphical method for determining the corrected gas compressibility effect in the blade cascade of compressors under operating conditions involving higher subsonic and transonic speeds is also introduced. A.R.H.

N82-11025# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A THEORETICAL ANALYSIS OF THE STREAM SURFACE OF REVOLUTION WITH SUPERSONIC INLET FLOW IN A TRANSONIC AXIAL COMPRESSOR c07

Xu Jian-zhong, Jiang Zuo-ren, Yang Jin-sheng, Zhang Ying, and Du Zhuan-she *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 35-50 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. and Technol. Conf., Gui Lin, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

Changes in the gas flow velocity triangle behind the shock waves being considered were studied in an effort to analyze the effect which shock waves have on gas flow. A planar oblique relationship formula was used to deduce the corresponding values of changes in velocity moment, pressure losses, and total pressure ratios. This explains the important phenomenon involved when the supersonic intake cross section shock waves of transonic compressors cause addition pressurization of gas flow (supercharging). Aerodynamic and thermodynamic analyses and calculations were then carried out on the tip cross sections of the rotors. The characteristic curve calculations for the shock waves in front of the blade cascades and for the intake areas of these cascades are examined. Passageway shock waves are also calculated. Results are discussed. A.R.H.

N82-11026# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A PRIMARY RESEARCH ON ABLATION EXPERIMENT TECHNIQUE OF THE TURBULENT FLOW OVER A FLAT PLATE SPECIMEN c02

Han Yin-da, Wang Ke-xiang, and Yu Guang-rong *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 51-64 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhou, China, Apr. 1980 (For primary document see N82-11023 02-01)

Avail: NTIS HC A05/MF A01 CSCL 21/5

A method utilizing a flat plate specimen placed at a small angle to a supersonic arc heated flow was developed to study ablation under turbulent flow conditions. The technique can surmount the disadvantages of the usual pipe test method. Its observable recession rate is relatively uniform, and surface temperature and radiant heat flux can be easily performed. The experiment principles, the configuration of the facility, measurement and theoretical calculating method of the parameters are presented. Measured reservoir pressures ranging from 10.2 to 17.3 k/sq cm and total enthalpies from 520 to 2440 kcal/kg. were accomplished. Under five turbulent conditions the ablation test result teflon models are given. A.R.H.

N82-11027# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A NEW METHOD OF COOLING TURBINE VANES c07

Gu Wei-zao, Zhang Yu-ming, and Xu Hong-kun *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 65-71 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhoy, China, Apr. 1980 (For primary document see N82-11023 02-01)

Avail: NTIS HC A05/MF A01 CSCL 21/5

The combined use of an internal cooling process with strengthened blades and of additives to lessen heat transfer to the blades from fuel gasses is proposed as a means of increasing intake temperature in aircraft turbine engines. Topics covered include coarseness-strengthened heat exchange in the inner passageways of blades and the precipitation of silicon dioxide particles in fuel gases onto blade surfaces. Temperature calculations made for the first stage guide vanes of the MK202 engine are included. A.R.H.

N82-11028# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

RESEARCH ON THE RECIRCULATING FLOW RATE IN THE WAKE OF TWO-DIMENSIONAL FLAME STABILIZERS (UNDER COLD CONDITIONS) c02

Zhana Qing-fan *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81 16 Sep. 1981 p 72-76 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhou, China, Apr. 1980 (For primary document see N82-11023 02-01)

Avail: NTIS HC A05/MF A01 CSCL 21/5

On the basis of a jet flow theory it is possible to deduce an equation representing the relationship flow. To measure the parameters of the reflex area in a cold condition, the dimensions of the transparent passage are 100 x 150 sq mm. The length of the stabilizer device is 100 mm. The average flow speed in front of the stabilizer device is 34m/s. By the use of the normal pressure values and round dish investigation techniques, the reflux flow area total static pressure and the reflux flow introduced in the lower sections can be determined to be the largest amounts of reflux flow in the center cross sections. The experimental results for three types of blockage ratios and three types of stabilizer devices are presented. A.R.H.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-11029 Royal Aircraft Establishment, Bedford (England). Library.

THE COMPARISON BETWEEN THE UNSTEADY PRESSURE FIELDS CALCULATED AND MEASURED ON THE ZKP MODEL

M. Couston, J. J. Angelini, and J. P. Meurzec Nov. 1980 29 p refs Transl. into ENGLISH from AGARD Conf. Rept. No. 688, 1980 Presented at the 50th Meeting of AGARD Struct. and Materials Panel, Athens, Greece, Apr. 1980

(RAE-Lib-Trans-2061; BR78139) Copyright. Avail: Issuing Activity

The unsteady pressure fields prediction for a supercritical wing is considered from a two-dimensional nonlinear method corrected for three dimensional interactions between strips using an asymptotic approximation. This approximation is derived for wings with large aspect ratio and low sweep angle. An application of this method to a real case, that is the unsteady experiment carried out with oscillation of the control surface on a rigid model in the S1-Modane transonic wind-tunnel, is described. T.M.

N82-11030# Royal Aircraft Establishment, Bedford (England).

SOME FEATURES OF FLOW PAST SLOTTED WINGS

A. V. Petrov Nov. 1980 10 p refs Transl. into ENGLISH from Uch. Zap. TsAGI (USSR), v. 8, no. 6, 1977 p 119-124

(RAE-Lib-Trans-2050; BR-77840) Copyright. Avail: Issuing Activity

The results are presented for a wide range of variation in the maximum relative curvature of the slotted profile (f sub max = 0.1 to 0.3), angle of incidence (alpha = 0 to 40 deg) and Reynolds number (Re = 0.5 x 10 to the sixth power to 1.55 x 10 the sixth power). Features of the development of viscous wakes behind elements of the slotted wing were apparent; the presence was discovered of local regions of return flow, both at the surface of the wing and beyond it within the wakes of the upstream elements. Changes are shown in the configuration of the regions of return flow depending on the angle of incidence, the angle of deflection of the double-slotted flap and on the Reynolds number. A relationship is established between the characteristics of the change in the lifting properties of the slotted wing and the development of regions of return flow. T.M.

N82-11031*# Pennsylvania State Univ., University Park. Dept. of Aerospace Engineering.

ANALYTICAL AND EXPERIMENTAL STUDY OF FLOW PHENOMENA IN NONCAVITATING ROCKET PUMP INDUCERS Final Report

B. Lakshminarayana Washington NASA Oct. 1981 104 p refs

(Grant NGL-39-009-007)

(NASA-CR-3471; PSU-TURBO-R81-3) Avail: NTIS HC A06/MF A01 CSCL 01A

The flow processes in rocket pump inducers are summarized. The experimental investigations were carried out with air as the test medium. The major characteristics features of the rocket pump inducers are low flow coefficient (0.05 to 0.2) large stagger angle (70 deg to 85 deg) and high solidity blades of little or no camber. The investigations are concerned with the effect of viscosity not the effects of cavitation. Flow visualization, conventional and hot wire probe measurement inside and at the exit of the blade passage, were the analytical methods used. The experiment was carried out using four three and two bladed inducers with cambered blades. Both the passage and the exit flow were measured. The basic research and boundary layer investigation was carried out using a helical flat plate (of some dimensions as the inducer blades tested), and flat plate helical inducer (four bladed). Detailed mean and turbulence flow field inside the passage as well as the exit of the rotor were derived from these measurement. The bousandary layer, endwall, and other passage data reveal extremely complex nature of the flow, with major effects of viscosity present across the entire passage. Several analyses were carried out to predict the flow field in inducers. These included an approximate analysis, the shear pumping analysis, and a numerical solution of exact viscous equations with approximate modeling for the viscous terms. S.L.

N82-11032*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SOME OBSERVATIONS ON A NEW NUMERICAL METHOD FOR SOLVING NAVIER-STOKES EQUATIONS

Ajay Kumar Nov. 1981 19 p refs
(NASA-TP-1934; L-14746) Avail: NTIS HC A02/MF A01 CSCL 01A

An explicit-implicit technique for solving Navier-Stokes equations is described which, is much less complex than other implicit methods. It is used to solve a complex, two-dimensional, steady-state, supersonic-flow problem. The computational efficiency of the method and the quality of the solution obtained from it at high Courant-Friedrich-Lewy (CFL) numbers are discussed. Modifications are discussed and certain observations are made about the method which may be helpful in using it successfully. A.R.H.

N82-11033*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

WIND-TUNNEL RESULTS FOR A MODIFIED 17-PERCENT-THICK LOW-SPEED AIRFOIL SECTION

Robert J. McGhee and William D. Beasley Nov. 1981 87 p refs
(NASA-TP-1919; L-14666) Avail: NTIS HC A05/MF A01 CSCL 01A

Wind-tunnel tests were conducted in the Langley low-turbulence pressure tunnel to evaluate the effects on performance of modifying a 17-percent-thick low-speed airfoil. The airfoil contour was altered to reduce the pitching-moment coefficient by increasing the forward loading and to increase the climb lift-drag ratio by decreasing the aft upper surface pressure gradient. The tests were conducted over a Mach number range from 0.07 to 0.32, a chord Reynolds number range 1.0 x 10 to the 6th power to 12.0 x 10 to the 6th power, and an angle-of-attack range from about -10 deg to 20 deg. Author

N82-11034# National Aerospace Lab., Tokyo (Japan).

NEW ESTIMATION METHOD FOR FLUTTER OR DIVERGENCE BOUNDARY FROM RANDOM RESPONSES AT SUBCRITICAL SPEEDS

Yuji Matsuzaki and Yasukatsu Ando Apr. 1981 15 p refs
(NAL-TR-667T; ISSN-0389-4-10) Avail: NTIS HC A02/MF A01

A new technique for estimating the flutter or divergence boundary from responses due to turbulence at subcritical speeds is described. The boundary can be predicted without estimating or measuring the dampings and frequencies of the aeroelastic modes. The sampled time response is modeled by the mixed autoregressive moving average process. The orders and coefficients of both autogressive and moving average parts of the process are determined with the aid of Akaike's estimation procedure. The stability boundary is estimated by using Jury's stability determinants which are expressed in terms of the autogressive coefficients alone. The modal frequencies and dampings are also evaluated from the coefficients. The technique proposed has been applied with success to signals from a cantilever wing model tested in a low supersonic flow. Comparison between the actual and estimated flutter boundaries shows that an accurate estimation can be made from data obtained in a narrow range of the dynamic pressure which is sufficiently below the boundary. Author

N82-11035# National Aerospace Lab., Tokyo (Japan). First Airframe Div.

A STUDY ON NUMERICAL METHOD FOR EVALUATING SPANWISE INTEGRAL IN SUBSONIC LIFTING-SURFACE THEORY

Teruo Ichikawa Mar. 1981 22 p refs
(NAL-TR-661T; ISSN-3989-4010) Avail: NTIS HC A02/MF A01

Two disputable points are discussed. The first point is the coincidence of each collocation section with one of the spanwise integration points. The second point is the relatively small, but undesirable, sharp variation of the regularized influence functions near the collocation sections. Two proposals for coping with these difficulties are made. Their effects are examined by computing the downwash at the surface of a steady rectangular wing subjected to a simple wing loading. It is shown that method 1, which avoids the coincidence, makes it possible, with no losses in accuracy, to greatly reduce the computing time in cases of oscillating wings. Further, it is shown that remarkable improvement in convergence with respect to the number of spanwise integration points is obtained by method 2 which distributes the spanwise integration points densely only near the collocation sections. T.M.

N82-11036# College of Aeronautics, Cranfield (England).

A WAKE SOURCE MODEL FOR ASYMMETRIC POTENTIAL FLOW PAST BODIES OF WEDGE SHAPE

P. A. T. Christopher and I. Wolton Oct. 1981 55 p refs
(C-of-A-Memo-8112) Avail: NTIS HC A04/MF A01

The wake source model of Parkinson & Jandali was generalized in several ways to accommodate the lack of symmetry and the experimentally observed difference in base pressure at the points of flow separation. A basic indeterminacy is revealed which arises partly from the simple form of the model and partly from the Schwarz-Christoffel mapping employed. This indeterminacy is shown to be relatively unimportant in one symmetric case, but leaves open the more general case to further exploration. Application of the method to wedges having short and long afterbodies shows that, in the former case, the agreement between theory and experiment is substantially better than that for the long afterbody. T.M.

N82-11037# College of Aeronautics, Cranfield (England).

A WAKE SOURCE MODEL FOR NON-SYMMETRIC FLOW PAST BLUFF BODIES IN TWO-DIMENSIONAL FLOW

P. A. T. Christopher and I. Wolton Sep. 1981 37 p refs
(C-of-A-Memo-8109) Avail: NTIS HC A03/MF A01

The Parkinson and Jandali model was extended to the case where the bluff body and its wake are not symmetric with respect to the incident flow. In the case of flat plates good agreement with experiment is obtained. With a cylinder of square section agreement is good at low incidence, but at higher incidences the position of the stagnation point is less accurately predicted and there is an associated distortion of the pressure distribution. T.M.

N82-11038# College of Aeronautics, Cranfield (England).

GENERATION OF AXI-SYMMETRIC BODY SHAPES IN SUBSONIC FLOW BY MEANS OF POLYNOMIAL DISTRIBUTIONS OF SOURCES AND DOUBLETS ALONG THE AXIS OF SYMMETRY

P. A. T. Christopher and C. T. Shaw Oct. 1981 52 p refs
(C-of-A-Memo-8110) Avail: NTIS HC A04/MF A01

A method is presented for determining the potential flow around bodies of revolution, at incidence, in uniform, incompressible, flow. This method utilizes polynomial distributions of both sources and doublets, and give considerable advantage over existing techniques. In particular, in a typical case, the computer storage requirement is reduced by a factor of eleven. Compared with panel methods the saving is very much greater. Both body surface and flow field conditions are obtainable and it would appear that the new method is ideally suited to the store trajectory application in place of the existing discrete source method. T.M.

N82-11039*# North Carolina State Univ., Raleigh. Center for Sound and Vibration.

AIRCRAFT WING TRAILING-EDGE NOISE

Ronald L. Underwood and Thomas H. Hodgson 1981 145 p refs
(Grant NsG-1377)
(NASA-CR-164952) Avail: NTIS HC A07/MF A01 CSCL 01A

The mechanism and sound pressure level of the trailing-edge noise for two-dimensional turbulent boundary layer flow was examined. Experiment is compared with current theory. A NACA 0012 airfoil of 0.61 m chord and 0.46 m span was immersed in the laminar flow of a low turbulence open jet. A 2.54 cm width roughness strip was placed at 15 percent chord from the leading edge on both sides of the airfoil as a boundary layer trip so that two separate but statistically equivalent turbulent boundary layers were formed. Tests were performed with several trailing-edge geometries with the upstream velocity U sub infinity ranging from a value of 30.9 m/s up to 73.4 m/s. Properties of the boundary layer for the airfoil and pressure fluctuations in the vicinity of the trailing-edge were examined. A scattered pressure field due to the presence of the trailing-edge was observed and is suggested as a possible sound producing mechanism for the trailing-edge noise. T.M.

N82-11040*# Northrop Services, Inc., Huntsville, Ala.
SPACE SHUTTLE SOLID ROCKET BOOSTER STING INTERFERENCE WIND TUNNEL TEST ANALYSIS Final Report
B. Conine and W. Boyle 15 Sep. 1981 235 p refs
(Contract NAS8-33816)
(NASA-CR-161885; TR-230-2042) Avail: NTIS HC A11/MF A01 CSCL 01A

Wind tunnel test results from shuttle solid rocket booster (SRB) sting interference tests were evaluated, yielding the general influence of the sting on the normal force and pitching moment coefficients and the side force and yawing moment coefficients. The procedures developed to determine the sting interference, the development of the corrected aerodynamic data, and the development of a new SRB aerodynamic mathematical model are documented. R.J.F.

N82-11041*# Flow Research, Inc., Kent, Wash.
CALCULATIONS OF TRANSONIC POTENTIAL FLOW OVER CASCADES Final Report
Wen-Huei Jou Oct. 1981 36 p refs
(Contract NAS3-22129)
(NASA-CR-165471; FRR-182) Avail: NTIS HC A03/MF A01 CSCL 01A

Transonic flow through a cascade was studied by using the full potential equation and the finite volume method of Jameson and Caughey. The C-type computational grid is generated by an electrostatic analogy and simple shearing transformation. The solution algorithm includes an option of using either an artificial density or an artificial viscosity formulation of the dissipative term. Using the developed code, flows through a cascade of NACA 0012 airfoils and flows through a cascade of shockless blades were computed. It is found that the designed flow through the shockless blade is accurately predicted, the artificial density formulation shows more tolerance to the mesh irregularity, and the C-type mesh does not extend very far upstream for a small pitch-cord ratio. T.M.

N82-11042*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOW SPEED TESTING OF THE INLETS DESIGNED FOR A TAMDEN-FAN V/STOL NACELLE
Robert C. Williams and Andres H. Ybarra (Vough Corp., Dallas) 1981 13 p refs Presented at the V/STOL Conf., Palo Alto, Calif., 7-9 Dec. 1981
(NASA-TM-82728; E-1031; AIAA-81-2627) Avail: NTIS HC A02/MF A01 CSCL 01A

An approximately 0.25 scale model of a tandem fan nacelle, designed for a subsonic V/STOL aircraft, was tested in a Lewis wind tunnel. Model variables included long and short aft inlet cowls and the addition of exterior strakes to the short inlet cowl. Inlet pressure recoveries and distortion were measured at pitch angles to 40 deg and at combinations of pitch and yaw to 30 deg. Airspeeds covered a range to 135 knots (69 m/sec). The short aft inlet with added strakes had the best aerodynamic performance and is considered suitable for the intended V/STOL application. T.M.

N82-11043*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A SUMMARY OF V/STOL INLET ANALYSIS METHODS
Danny P. Hwang 1981 12 p refs Presented at the V/STOL Conf., Palo Alto, Calif., 7-9 Dec. 1981
(NASA-TM-82725; E-1027) Avail: NTIS HC A02/MF A01 CSCL 01A

Recent extensions and applications of the methods are emphasized. They include the specification of the Kutta condition for a slotted inlet, the calculation of suction and tangential blowing for boundary layer control, and the analysis of auxiliary inlet geometries at angles of attack. A comparison is made with experiment for the slotted inlet. An optimum diffuser velocity distribution was developed. T.M.

N82-11044# Sandia Labs., Albuquerque, N. Mex. Advanced Energy Projects Div.
WIND RIPPLE ANALYSIS
R. E. Akins 1981 8 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030129; DOE/DP-00789/T15) Avail: NTIS HC A02/MF A01

Experimental techniques were developed which allow analysis of full scale performance of wind turbines with particular emphasis on the effects caused by turbulence in the incident wind. These techniques are presented, using data from the DOE/Sandia Vertical Axis Wind Turbine program. Three techniques were developed for use in evaluating the fluctuating output of a wind turbine. Techniques were sought which allowed accurate assessment of the wind ripple of the contributions to the fluctuation in turbine output caused by atmospheric turbulence. The advantages and disadvantages of these techniques are addressed. DOE

N82-11045# Washington Univ. Technology Associates, Inc., St. Louis, Mo.
YAWING OF WIND TURBINES WITH BLADE CYCLIC PITCH VARIATION
K. H. Hohenemser, A. H. P. Swift, and D. A. Peters Aug. 1981 15 p
(Contract DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-030091; SERI/TR-8085-3-T1) Avail: NTIS HC A02/MF A01

A two-bladed wind rotor with passive cyclic pitch variation, yawed for the purpose of rotor speed and torque control was studied to determine the potential cost effectiveness of wind energy conversion. A simple mechanism adopted from rotorcraft technology for obtaining passive cyclic pitch variation makes rapid yaw rates possible without causing vibratory hub moments and without producing appreciable out-of-plane blade excursions. A 7.6 m diameter vane stabilized fully instrumented wind rotor having low blade solidity was operated 1980, during 41 days for 96 hours. The operational envelope extended to 16m/sec wind velocity, to 45 degree yaw angle power on and 80 degree yaw angle power off. The rotor was automatically yawed when 228 rpm at 10 kW rotor power was exceeded. Reverse yawing was performed manually. Within the tested performance envelope, loads and vibrations were low. The rotor ran smoothly even at high yaw angles and at high yaw rates. DOE

N82-11046*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPUTATION OF HIGH REYNOLDS NUMBER INTERNAL/EXTERNAL FLOWS
Michael C. Cline and Richard G. Wilmoth 1981 12 p refs Presented at the 5th AIAA Computational Fluid Dyn. Conf., Palo Alto, Calif., 22-23 Jun. 1981
(Contract W-7405-eng-36)
(NASA-TM-84049; DE81-025343; LA-UR-81-1882; CONF-810664-2) Avail: NTIS HC A02/MF A01 CSCL 01A

A general, user oriented computer program, called VNAP2, was developed to calculate high Reynolds number, internal/external flows. The VNAP2 program solves the two dimensional, time dependent Navier-Stokes equations. The turbulence is modeled with either a mixing-length, a one transport equation, or a two transport equation model. Interior grid points are computed using the explicit MacCormack Scheme with special procedures to speed up the calculation in the fine grid. All boundary conditions are calculated using a reference plane characteristic scheme with the viscous terms treated as source terms. Several internal, external, and internal/external flow calculations are presented. DOE

N82-11017# Joint Publications Research Service, Arlington, Va. Foreign Technology Div.
THE WAVE DIAGRAMS FOR DIFFRACTION AND REFLEC-

TION OF A TRAVELING WEAK SHOCK WAVE FROM AN OPEN END OF A SHOCK TUBE
Wei Chung Lei, Wang Ping-Cheng, and Chang Chun Hsiu *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 36-44 Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

N82-11020# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON TRANSONIC FLOW IN HYPERBOLIC LAVAL NOZZLES
Jia Zhen-xue and Lin Tong-ji *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 1-18 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 (For primary document see N82-11019 02-01)
Avail:NTIS HC A03/MF A01 CSCL 01/2

N82-11021# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COMPRESSION PROCESSES OF FREE PISTONS AFTER THE OPENING OF NOZZLE IN A HYPERSONIC GUN TUNNEL
Qian Fu-xing, Xiao Lin-kui, and Shi Zhen-ping *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 19-36 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 Presented at the 1st Natl. Shock Wave Conf., 12 Nov. 1978 (For primary document see N82-11019 02-01)
Avail:NTIS HC A03/MF A01 CSCL 01/2

N82-11026# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A PRIMARY RESEARCH ON ABLATION EXPERIMENT TECHNIQUE OF THE TURBULENT FLOW OVER A FLAT PLATE SPECIMEN
Han Yin-de, Wang Ke-xiang, and Yu Guang-rong *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 51-64 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhou, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

N82-11028# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RESEARCH ON THE RECIRCULATING FLOW RATE IN THE WAKE OF TWO-DIMENSIONAL FLAME STABILIZERS (UNDER COLD CONDITIONS)
Zhang Qing-fen *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81 16 Sep. 1981 p 72-76 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhou, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

N82-12023# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON THE KERNEL FUNCTION COLLOCATION METHOD IN STEADY SUBSONIC FLOW FOR WING WITH CONTROL SURFACES
Chen Jing Song *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 35-50 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N82-11047# Federal Aviation Administration, Washington, D.C. Systems Research and Development Service.
THREAT ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS) SYMPOSIUM
22 Jul. 1981 177 p refs Symp. held at Washington, D.C., 22 Jul. 1981
(AD-A104563; FAA-RD-81-76) Avail: NTIS HC A09/MF A01 CSCL 01/4

The Federal Aviation Administration held a symposium on Threat Alert and Collision Avoidance System (TCAS) in Washington, D.C., July 22, 1981, which was attended by representatives of 68 organizations and 21 airlines. This report contains the news release announcing the new approach to providing protection against mid-air collisions, 10 presentations and the transcript of the panel discussion. The TCAS will provide a range of capabilities and costs which will meet the requirements of all airspace users. The least complex part of the system is designed for private pilots and would cost about $2,500. The fully capable, or airline, version would cost between $45,000 and $50,000. This new concept represents a new capability which draws on all FAA has learned about collision avoidance in its past efforts, extends and simplifies FAA's efforts to date, provides new capabilities to all users, and is fully compatible with international standards and improvement activities on the Secondary Surveillance Radar (SSR). Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N82-11048# Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.
FLIGHT TRAJECTORY CONTROL INVESTIGATION Final Report, 15 May 1978 - 30 Oct. 1980
M. Bird and J. Karmarker Wright-Patterson AFB, Ohio AFWAL Mar. 1981 174 p refs
(Contract F33615-78-C-3607; AF Proj. 2403)
(AD-A104542; ID-05R-1180; AFWAL-TR-81-3012) Avail: NTIS HC A08/MF A01 CSCL 17/9

Optimal control algorithms for four-dimensional guidance of a transport aircraft were investigated for feasibility. Cost function constraints on the optimal reference path generator appeared impossible to achieve and the optimal guidance algorithms do not achieve significant performance improvement without excessive increases in sophistication and cost of the onboard avionics computer. A modularized existing Mission Management system allows a three-phase flight test plan to demonstrate the operational capability of the existing classical integrated flight trajectory control algorithms. Author (GRA)

N82-11049# General Accounting Office, Washington, D. C. Community and Economics Development Div.
FAA MISSES OPPORTUNITIES TO DISCONTINUE OR REDUCE OPERATING HOURS OF SOME AIRPORT TRAFFIC CONTROL TOWERS Report to the Congress
1 Jun. 1981 39 p
(PB81-224214; CED-81-100) Avail: NTIS HC A03/MF A01 CSCL 17G

FAA is not adequately surveying or evaluating air traffic levels at 24 hour control towers to identify opportunities to reduce operating hours and save money. GRA

N82-11130*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
AN ULTRASONIC TRANSDUCER WITH GAUSSIAN RADIAL VELOCITY DISTRIBUTION
Paul S. Zerwekh and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 71-73 refs Presented at the IEEE

Ultrasonics Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS 79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

N82-11131*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
OPTICAL DETECTION OF PULSED SURFACE PARTICLE DISPLACEMENTS
Paul S. Zewekh and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 78-80 refs Presented at the IEEE Region 3 Conf., Huntsville, Ala., Apr. 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS 79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

N82-11133*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electric Engineering.
DUAL DIFFERENTIAL INTERFEROMETER FOR MEASUREMENTS OF BROADBAND SURFACE ACOUSTIC WAVES
Tyson M. Turner and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 87-89 refs Presented at the IEEE Ultrasonic Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS-79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-11050*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PARAMETRIC STUDY OF MICROWAVE-POWERED HIGH-ALTITUDE AIRPLANE PLATFORMS DESIGNED FOR LINEAR FLIGHT
Charles E. K. Morris, Jr. Nov. 1981 74 p refs
(NASA-TP-1918; L-14606) Avail: NTIS HC A04/MF A01 CSCL 01C

The performance of a class of remotely piloted, microwave powered, high altitude airplane platforms is studied. The first part of each cycle of the flight profile consists of climb while the vehicle is tracked and powered by a microwave beam; this is followed by gliding flight back to a minimum altitude above a microwave station and initiation of another cycle. Parametric variations were used to define the effects of changes in the characteristics of the airplane aerodynamics, the energy transmission systems, the propulsion system, and winds. Results show that wind effects limit the reduction of wing loading and the increase of lift coefficient, two effective ways to obtain longer range and endurance for each flight cycle. Calculated climb performance showed strong sensitivity to some power and propulsion parameters. A simplified method of computing gliding endurance was developed. S.L.

N82-11051*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE EFFECTS OF LATERAL AERODYNAMIC UNCERTAINTIES ON THE HANDLING QUALITIES OF THE SPACE SHUTTLE ORBITER AT MACH NUMBERS OF 1.5 AND .6
Lawrence W. Brown Sep. 1981 42 p ref
(NASA-TM-83193) Avail: NTIS HC A03/MF A01 CSCL 01C

The effects of aerodynamic uncertainties on the handling qualities of the space shuttle orbiter were investigated with the use of six-degree-of-freedom, nonlinear equations of motion on the hybrid computer system. Flight condition characteristics for Mach numbers of 1.5 and .6 for the nominal and off nominal angle of attack conditions were selected for this investigation. Results revealed that at the low Mach number condition (.6), only a few problems existed for the angle of attack range considered and the many combinations of large aerodynamic variations considered. Moreover, none of these problems were considered to be related to poor handling qualities. For the angle of attack conditions considered at the high Mach number (1.5) problems existed with reduction of roll rate which can result in roll reversal conditions. In many cases, sideslip became proverse and increased rudder deflections and yaw jets were required. Author

N82-11052*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TESTS OF A COMPOSITE POROUS LEADING EDGE FOR USE WITH A LIQUID ANTI-ICE SYSTEM
David L. Kohlman Sep. 1981 21 p refs
(Grant NAG3-71)
(NASA-CR-164966; KU-FRL-464-3) Avail: NTIS HC A02/MF A01 CSCL 01C

The efficacy of liquid ice protection systems which distribute a glycol-water solution onto leading edge surfaces through a porous skin was demonstrated in tests conducted in the NASA Lewis icing research tunnel using a composite porous leading edge panels. The data obtained were compared with the performance of previously tested stainless steel leading edge with the same geometry. Results show: (1) anti-ice protection of a composite leading edge is possible for all the simulated conditions tested; (2) the glycol flow rates required to achieve anti-ice protection were generally much higher than those required for a stainless steel panel; (3) the low reservoir pressures of the glycol during test runs indicates that more uniform distribution of glycol, and therefore lower glycol flow rates, can probably be achieved by decreasing the porosity of the panel; and (4) significant weight savings can be achieved in fluid ice protection systems with composite porous leading edges. The resistance of composite panels to abrasion and erosion must yet be determined before they can be incorporated in production systems. A.R.H.

N82-11053*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SELECTED BIBLIOGRAPHY OF NACA-NASA AIRCRAFT ICING PUBLICATIONS
John J. Reinmann, comp. Aug. 1981 127 p
(NASA-TM-81651; E-668) Avail: NTIS HC E15/MF A01 CSCL 01C

A summary of NACA-NASA icing research from 1940 to 1962 is presented. It includes: the main results of the NACA icing program from 1940 to 1950; a selected bibliography of 132 NACA-NASA aircraft icing publications; a technical summary of each document cited in the selected bibliography; and a microfiche copy of each document cited in the selected bibliography. T.M.

N82-11054*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A COMPARISON OF THEORETICAL AND EXPERIMENTAL PRESSURE DISTRIBUTIONS FOR TWO ADVANCED FIGHTER WINGS
H. P. Haney (Vought Corp., Dallas) and R. M. Hicks Oct. 1981 87 p refs
(NASA-TM-81331; A-8741) Avail: NTIS HC A05/MF A01 CSCL 01C

A comparison was made between experimental pressure distributions measured during testing of the Vought A-7 fighter and the theoretical predictions of four transonic potential flow codes. Isolated wind and three wing-body codes were used for comparison. All comparisons are for transonic Mach numbers and include both attached and separate flows. In general, the wing-body codes gave better agreement with the experiment than did the isolated wing code but, because of the greater complexity of the geometry, were found to be considerably more expensive and less reliable. Author

N82-11055# Computational Mechanics Consultants, Knoxville, Tenn.
A NUMERICAL THREE-DIMENSIONAL TURBULENT SIMULATION OF A SUBSONIC VSTOL JET IN A CROSS-FLOW USING A FINITE ELEMENT ALGORITHM Final

Report, Sep. 1979 - Sep. 1980
A. J. Baker, J. A. Orzechowski, and P. D. Manhardt Jun. 1981
72 p refs
(Contract N62269-79-C-0295)
(AD-A104514; NADC-79021-60) Avail: NTIS
HC A04/MF A01 CSCL 01/3

The purpose of this study, the results of which are reported herein, was to formulate a mathematical model of the basic VSTOL jet, and to validate its appropriateness by performing a series of computational experiments on the discrete analog (numerical) approximation to the mathematical description. Since the VSTOL jet problem is essentially steady, turbulent and fully three-dimensional, the mathematical description must be quite comprehensive. The approach selected was to utilize a continuity-constrained, finite element algorithm for solution of the parabolized form of the time-averaged, three-dimensional Navier-Stokes equations (3DPNS). The essential ingredients of this algorithmic description are presented and discussed. A production finite element computer code (COMOC:3DPNS) was utilized to conduct the computational experiments, and the description of problem definition and data deck preparation is contained at the end of the report. The key results of the computational experiments are discussed, regarding the basic causal mechanisms of the VSTOL jet, as well as results for confirmation test cases documenting viability of the constructed computational model. Author (GRA)

N82-11056# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

ROTORCRAFT ICING: STATUS AND PROSPECTS

Aug. 1981 136 p refs
(AGARD-AR-166; ISBN-92-835-1397-5) Avail: NTIS
HC A07/MF A01

The impact of icing meteorological conditions on helicopter operations was examined, and methods for improving ice protection investigated. For individual titles, see N82-11057 through N82-11061.

N82-11057# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

OPERATIONAL ENVIRONMENT, METEOROLOGICAL CONDITIONS AND WEATHER FORECASTING

In its Rotorcraft Icing Aug. 1981 p 1-13 refs (For primary document see N82-11056 02-05)
Avail: NTIS HC A07/MF A01

Helicopter icing is a significant operational consideration for helicopters operating throughout Europe. Existing weather statistics demonstrate significant operational limitations during the winter months, and for as much as five percent of the time on a year-around basis. Unfortunately the existing meteorological data base is insufficient to describe the operating environment in which NATO rotorcraft must conduct flight. At present for design purposes, the United States Federal Air Regulation 25 Appendix C or the UK Icing Atmosphere are employed for determination of airworthiness release of helicopters. However, neither of these atmospheres adequately defines the operational environment. This condition is exacerbated by the fact that forecasting techniques are currently inadequate to allow unrestricted helicopter operations in icing conditions. Increased coordination among cloud physicists, forecasters, and helicopter icing specialists is needed - and ultimately a new icing atmosphere is required to better define the helicopter operational icing requirements. J.D.H.

N82-11058# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

TECHNOLOGY BASE FOR ICING INSTRUMENTATION AND MATHEMATICAL MODELLING

In its Rotorcraft Icing Aug. 1981 p 14-33 refs (For primary document see N82-11056 02-05)
Avail: NTIS HC A07/MF A01

The fundamental mechanisms of ice accretion and shedding from rotor airfoils are considered. It is felt that an opportunity exists to exploit a combination of two-dimensional model and three-dimensional model scale testing, measurement of ice release mechanisms, inclusion of heat transfer models, and consideration of icing simulation. These efforts should be aimed at development of analytical models verified by both laboratory and full-scale data which then can be used to better predict performance of rotors in icing conditions. Only with the above analytical basis can ice accretion and shedding characteristics become sufficiently predictable to permit the determination of what type of ice protection is necessary or, conversely, what degree of flight envelope release might be permitted with a given level of ice protection. Further improvement in research and development of operational icing sensors is recommended. J.D.H.

N82-11059# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

FACILITIES FOR DEVELOPMENT AND CLEARANCE

In its Rotorcraft Icing Aug. 1981 p 34-53 (For primary document see N82-11056 02-05)
Avail: NTIS HC A07/MF A01

A catalog of all NATO icing test facilities was compiled. It is recommended that the Canadian National Research Council's small high speed icing tunnel is a one-of-a-kind facility that needs to be available to support analytical development recommended, and that the tunnel should be reactivated or replaced. A decision has been made to retain the Ottawa Spray Rig in operational status for the near future. Efforts underway at the NASA-Lewis Research Center regarding rehabilitation of the Icing Research Tunnel and considering a major new icing test facility are endorsed. The US Army Helicopter Icing Spray System Improvement Program is also supported by the Working Group and, as a recommendation for future discussion, the need for European airborne icing spray systems should be considered. A conclusion reached by the Working Group is that current full scale development and qualification facilities and procedures are extremely expensive and time consuming. J.D.H.

N82-11060# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

ICE PROTECTION SYSTEM TECHNOLOGY

In its Rotorcraft Icing Aug. 1981 p 54-99 refs (For primary document see N82-11056 02-05)
Avail: NTIS HC A07/MF A01

Deicing systems technology concepts are discussed. The conclusion is that electrothermal deicing systems are the only effective present system for broad application. However, it is noted that the cost of electrothermal deicing in terms of weight, power and expense is high, and provides an incentive for examination of alternatives. Therefore, additional work is clearly warranted on options such as ice phobics, fluid ice suppressant systems, pneumatic boots, vibratory surface systems, microwave and other hybrid systems concepts. It is recommended that the operational limitations of ice protected aircraft such as the Black Hawk and Puma, be explored with the ice protection systems deliberately turned off, so as to simulate an aircraft without (or with inoperative) ice protection. Only through such definition of the actual icing environment can a better estimation be made of the operational impact of icing conditions on helicopter flight operations. J.D.H.

N82-11061# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

PROPOSED STANDARD REQUIREMENTS AND PROCEDURES FOR ICING CLEARANCE

In its Rotorcraft Icing Aug. 1981 p 100-117 (For primary document see N82-11056 02-05)
Avail: NTIS HC A07/MF A01

A set of proposed standard requirements and procedures for icing clearance is presented. It is felt that this clearance procedure constitutes a basis for NATO-wide icing clearance and should be adopted by the NATO military community as an interim approach. The opportunity also exists to consider this proposal for civil icing clearance. J.D.H.

N82-11016# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE PRINCIPLES AND METHODS FOR SHAPING THE WING ROOT REGIONS OF A WING-BODY COMBINATION AT TRANSONIC AND LOWER SUPERSONIC SPEEDS

Yang Tso Sheng, Tai Chia Tsun, Chen Ching Sung, and Fan I. Chia *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 20-35 refs Transl. into ENGLISH from Acta Mech.

Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N82-11062# Hughes Aircraft Co., El Segundo, Calif. Display Systems Lab.
STUDY AND DEVELOPMENT OF AN INTEGRATED HEAD-UP DISPLAY Final Report, 1 Jul. 1976 - 31 Aug. 1980
Michael N. Ernstoff Jun. 1981 112 p refs
(Contract F33615-76-C-1243; AF Proj. 2003)
(AD-A104337; HAC-D6210; AFWAL-TR-81-1042) Avail: NTIS HC A06/MF A01 CSCL 14/5

The purpose of the Integrated Head-Up Display (I-HUD) program was to demonstrate the advantages associated with using a Liquid Crystal Matrix Display and Diffraction Optics combiner in the design and construction of a high brightness head-up display system. The program resulted in the design and fabrication of the I-HUD brassboard consisting of a pilot's display unit, built in a form factor similar to that of the production F16 HUD, and test support equipment. The following devices and modules were developed: A 350-by-350 pixel Liquid Crystal Matrix Display complete with custom LSI circuit drivers, a diffraction optics combiner, a diffraction optics diffusing screen, a specular mode projector, and custom lamp with a narrow band (green) spectral output. Although the completed I-HUD brassboard did not meet all of its design goals, it does demonstrate the feasibility of applying advanced technology to the designs of Head-Up Displays. The I-HUD program has succeeded in solving many of the fundamental design problems associated with this approach and stands as a milestone in the development of solid state display devices and the development of more highly reliable, cost effective Head-Up Displays. GRA

N82-11063# Panametrics, Inc., Waltham, Mass.
ADVANCED FUEL FLOWMETER FOR FUTURE NAVAL AIRCRAFT Final Report, Dec. 1977 - Apr. 1981
L. C. Lynnworth, N. E. Pedersen, J. E. Bradshaw, J. E. Matson, E. S. Johansson, and T. H. Nguyen 28 Jun. 1981 149 p refs
(Contract N62269-78-C-0069)
(AD-A104364; NADC-80254-60) Avail: NTIS HC A07/MF A01 CSCL 21/4

A fuel mass flowmeter was developed with the objective of accurately measuring the mass flow rate M-dot of various fuels and their mixtures, for flow rates from 91 to 11,364 kg/hr (200 to 25,000 lb/hr). The delivered system included: (1) an area averaging zigzag flow velocimeter cell, in which the fuel was interrogated in opposite directions by an alternating sequence of ultrasonic pulses, to determine the area averaged flow velocity, V-bar; (2) a densitometer based on the Clausius-Mosotti law, in which the fuel density rho is determined; and (3) electronics which computed rho and V-bar separately, and then generated a square wave output having a frequency proportional to the product of rho and V-bar, namely M-dot = rho(V-bar)A, where A = velocimeter cell cross sectional area. The transducers can operate beyond the temperature range -38 to +150 C, and the flow cell, with transducers, at pressures up to 1500 psig and in the 3-axis, 20 g, 5 to 2000 Hz vibration environment specified by MIL Std. 810-514.1, except for noise problems at a few discrete frequencies. GRA

N82-11064# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.
ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM, DATA TRANSMISSION STUDY Interim Report, Jun. 1979 - Aug. 1980
Aug. 1980 57 p refs
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85)
(AD-A104243; ACS-12177; USAAVRADCOM-TR-79-0270-1; IR-1) Avail: NTIS HC A04/MF A01 CSCL 17/2

The development of nonmission related status information is one area of rotary wing instrumentation which has not kept pace with the state of art. This includes raw data, discrete and summary status information related to the engine, transmission, rotor, fuel, hydraulic and electrical subsystems. The objective of this report is to define an efficient and cost effective data transmission method for an electronic master monitor and advisory display system (EMMADS). Several current standard and nonstandard data bus specifications which are applicable to the EMMADS system are introduced. Their tradeoff in terms of hardware, software and system considerations are compared. It should be noted that a typical standard bus specs addresses only the protocol and message formats, not the mechanization of the control algorithm. Hence there is a considerable variation in implementation and cost even for the same bus standard. The materials represent a snapshot of the current state of the art technology. The use of optical fiber instead of conventional electrical cable (such as coaxial) as the transmission medium is also investigated based on the current technical reports. The problems of electromagnetic interference (EMI), and rejection techniques are mentioned. GRA

N82-11065# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.
ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM, HUMAN ENGINEERING SUMMARY REPORT Interim Report, Jun. 1979 - Jun. 1981
Jun. 1981 227 p refs
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85)
(AD-A104244; ACS-12385; USAAVRADCOM-TR-79-0270-3; IR-3) Avail: NTIS HC A11/MF A01 CSCL 17/2

Information requirements, information handling formats, and the necessary display/control design criteria are discussed for a system being developed to integrate and display nonmission related information on the status of various subsystems on rotary wing aircraft. GRA

N82-11066# Los Alamos Scientific Lab., N. Mex. Electronics Div.
OUTSIDER'S LOOK AT FLIGHT INSTRUMENTATION
Arvid S. Lundy 1981 7 p refs Presented at the AIAA/SAE/ASME Joint Propulsion Conf., Colorado Springs, Colo., 27-29 Jul. 1981
(Contract W-7405-eng-36)
(DE81-025409; LA-UR-81-1748; CONF-810724-1) Avail: NTIS HC A02/MF A01

Ideas and speculations on possible diagnostic instrumentation for use in missile flight testing are presented. Techniques for use in the development of flight instrumentation are recommended. DOE

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-11067# National Aerospace Lab., Tokyo (Japan).
NEW MOLDING METHOD OF THREE-DIMENSIONAL HOLLOW PHOTOELASTIC MODEL AND CENTRIFUGAL STRESS ANALYSIS OF AIR COOLED TURBINE BLADE MODEL
Toyoaki Yoshida, Katsutashi Matsusue, Kitao Takahara, and Ryosaku Hashimoto May 1981 17 p refs In ENGLISH; JAPANESE Summary
(NAL-TR-427T; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

A new molding method for a three dimensional hollow photoelastic model was invented and centrifugal stress analysis performed for air cooled turbine blade models to which the new method was applied. A distinctive feature of the molding method is the introduction of a copper coated wax core which forms a three dimensional hollow shape inside a model. The air cooled turbine photoelastic model with a coolant passage simulates the first stage rotor blade in the high temperature turbine full scale model HT-10H used at the NAL. The results of stress analysis cleared the critical regions and stress magnitude and thus they are of great aid to the successful development of a full scale turbine model. Author

N82-11068*# Teledyne Continental Motors, Muskegon, Mich. General Products Div.
LIGHTWEIGHT DIESEL ENGINE DESIGNS FOR COMMUTER TYPE AIRCRAFT
Alex P. Brouwers Jul. 1981 70 p refs
(Contract NAS3-22149)
(NASA-CR-165470; Rept-995) Avail: NTIS HC A04/MF A01 CSCL 21E

Conceptual designs and performance of advanced technology lightweight diesel engines, suitable for commuter type aircraft power plants are defined. Two engines are discussed, a 1491 kW (2000 SHP) eight-cylinder engine and a 895 kW (1200 SHP) six-cylinder engine. High performance and related advanced technologies are proposed such as insulated cylinders, very high injection pressures and high compressor and turbine efficiencies. The description of each engine includes concept drawings, a performance analysis, and weight data. Fuel flow data are given for full and partial power up to 7620m altitude. The performance data are also extrapolated over a power range from 671 kW(900 SHP) to 1864 kW (2500 SHP). The specific fuel consumption of the 1491 kW (2000 SHP) engine is 182 g/hWh (.299 lb/HPh) at cruise altitude, its weight 620 kg (1365 lb.) and specific weight .415 kg/kW (.683 lb/HP). The specific fuel consumption of the 895 kW (1200 SHP) engine is 187 g/hWh (.308 lb/HPh) at cruise altitude, its weight 465 kg (1025 lb.) and specific weight .520 kg/kW (.854 lb/HP). R.J.F.

N82-11069# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
SUBSONIC CASCADE WIND TUNNEL TESTS USING A COMPRESSOR CONFIGURATION OF DCA BLADES M.S. Thesis
Frank S. Cina Jun. 1981 210 p refs
(AD-A104597) Avail: NTIS HC A10/MF A01 CSCL 21/5

Tests are reported in which air incidence angle was varied to a cascade of 20 blades, 5 inches in chord with aspect ratio of 2.0 and solidity of 1.67. Preliminary blade element performance data were obtained using pneumatic probe surveys and surface pressures were also measured. Results of preparatory tests of a similar cascade of 15 C-series blades at a solidity of 1.28 are also included. Whereas the flow in the C-series blading cascade was always acceptable, the flow in the DCA blading cascade was not acceptable at negative incidence angles. A modification of the cascade inlet guide vanes is recommended which will guarantee periodic conditions and serve to generate more nearly uniform inlet flow at all test conditions. Author (GRA)

N82-11015# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE ARBITRARY QUASI-ORTHOGONAL SURFACE METHOD FOR COMPUTING THREE-DIMENSIONAL FLOW IN TURBINE MACHINERY. 2. CALCULATION OF THE THREE-DIMENSIONAL FLOW WITH THE S SUB 1-SURFACE TWISTED
Xin Xiao-Kang, Jiang Jin-Liang, and Zhu Shi-Can *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 1-19 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

N82-11024# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THEORETICAL INVESTIGATIONS AND EXPERIMENTAL RESEARCHES FOR HIGHER SUBSONIC TWO-DIMENSIONAL COMPRESSOR CASCADE
Yan Ru-qun and Qian Zhao-yan *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 1-34 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Thermophys. Eng. Technol. Conf., Gui Lin, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

N82-11025# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A THEORETICAL ANALYSIS OF THE STREAM SURFACE OF REVOLUTION WITH SUPERSONIC INLET FLOW IN A TRANSONIC AXIAL COMPRESSOR
Xu Jian-zhong, Jiang Zuo-ren, Yang Jin-sheng, Zhang Ying, and Du Zhuan-she *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 35-50 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. and Technol. Conf., Gui Lin, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

N82-11027# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A NEW METHOD OF COOLING TURBINE VANES
Gu Wei-zao, Zhang Yu-ming, and Xu Hong-kun *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 65-71 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhoy, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-11070*# Analytical Mechanics Associates, Inc., Hampton, Va.
AN INFLUENCE COEFFICIENT METHOD FOR THE APPLICATION OF THE MODAL TECHNIQUE TO WING FLUTTER SUPPRESSION OF THE DAST ARW-1 WING Final Report
Samuel Pines Nov. 1981 49 p refs
(Contract NAS1-15593)
(NASA-CR-165772; AMA-81-25) Avail: NTIS HC A03/MF A01 CSCL 01C

The methods used to compute the mass, structural stiffness, and aerodynamic forces in the form of influence coefficient matrices as applied to a flutter analysis of the Drones for Aerodynamic and Structural Testing (DAST) Aeroelastic Research Wing. The DAST wing was chosen because wind tunnel flutter test data and zero speed vibration data of the modes and frequencies exist and are available for comparison. A derivation of the equations of motion that can be used to apply the modal method for flutter suppression is included. A comparison of the open loop flutter predictions with both wind tunnel data and other analytical methods is presented. S.L.

N82-11071*# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
AEROACOUSTIC THEORY FOR NONCOMPACT WING-GUST INTERACTION
Rudolph Martinez and Sheila E. Widnall Oct. 1981 124 p refs
(Grant NsG-2142)
(FDRL-81-7) Avail: NTIS HC A06/MF A01 CSCL 01C

Three aeroacoustic models for noncompact wing-gust interaction were developed for subsonic flow. The first is that for a two dimensional (infinite span) wing passing through an oblique gust. The unsteady pressure field was obtained by the Wiener-Hopf technique; the airfoil loading and the associated acoustic field were calculated, respectively, by allowing the field point down on the airfoil surface, or by letting it go to infinity. The second model is a simple spanwise superposition of two dimensional solutions to account for three dimensional acoustic effects of wing rotation (for a helicopter blade, or some other rotating planform) and of finiteness of wing span. A three dimensional theory for a single gust was applied to calculate the acoustic signature in closed form due to blade vortex interaction in helicopters. The third model is that of a quarter infinite plate with side edge through a gust at high subsonic speed. An approximate solution for the three dimensional loading and the associated three dimensional acoustic field in closed form was obtained. The results reflected the acoustic effect of satisfying the correct loading condition at the side edge. R.J.F.

N82-11072# Boeing Military Airplane Development, Seattle, Wash. Advanced Airplane Branch.

AIRCRAFT DIGITAL INPUT CONTROLLED HYDRAULIC ACTUATION AND CONTROL SYSTEM Final Report, Aug. 1977 - Dec. 1980

Eugene T. Raymond and Curtiss W. Robinson Mar. 1981 214 p refs
(Contract F33615-77-C-2034; AF Proj. 3145)
(AD-A104263; AFWAL-TR-81-2012) Avail: NTIS HC A10/MF A01 CSCL 09/2

The development of an incremental digitally-controlled electrohydraulic incremental digitally-controlled electrohydraulic actuation system (DEHA) is reported. An electronic digital controller and a prototype DEHA unit, with an electric-stepper-motor-driven rotary distributor valve, two hydraulic drive motors, and a torque-summing gearbox, were assembled. Significant reductions in the hydraulic power normally required with a conventional geared hydraulic motor system, and some degree of hydraulic power recovery were obtained. Author (GRA)

N82-11073# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Guidance and Control Panel.

THEORY AND APPLICATIONS OF OPTIMAL CONTROL IN AEROSPACE SYSTEMS

Pieter Kant, ed. (National Aerospace Lab., Emmeloord, Netherlands) London Jul. 1981 283 p refs
(AGARD-AG-251; ISBN-92-835-1391-6) Copyright. Avail: NTIS HC A13/MF A01

The basic concepts of control theory were reviewed. Pratical design techniques that were developed from the theory are presented. Design examples and practical applications in real systems are described. Major emphasis is on flight control of distributed parameter systems. For individual titles, see N82-11074 through N82-11087.

N82-11074# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.

AN OVERVIEW OF OPTIMAL CONTROL IN AEROSPACE SYSTEMS

Arthur E. Bryson, Jr. *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 5 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

Optimal control started with the calculus of variations (COV). The digital computer made the calculus of variations a practical tool for synthesis of optimal control logic. Optimal control concepts and algorithms are used not only in the field of automatic control but also in fields of structural optmization, econometrics, and operations research. T.M.

N82-11075# Universite Catholique de Louvain (Belgium).

THEORY OF STOCHASTIC OPTIMAL CONTROL SOME BASIC NOTIONS

In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 19 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

The optimal control problem for stochastic systems is described in details. Several classes of policy are defined and compared. The corresponding solutions are deduced from Bellman's principle and discussed in connection with the concept of dual effect of the control. After the derivation of the optimal closed-loop solution for the linear quadratic Gaussian problem, several algorithms are proposed for the nonlinear problem and discussed in the perspective of their implementation in aerospace applications. T.M.

N82-11076# Princeton Univ., N. J. Flight Research Lab.

AN INTRODUCTION TO STOCHASIC OPTIMAL CONTROL THEORY

In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 33 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

The design of control logic that commands a dynamic system to a desired output or that augments the system's stability is facilitated if objectives are expressed in a quantitative criterion, because the optimization of this criterion establishes a feasible design point for control. If the information which the control logic must use is uncertain or if the dynamic system is forced by random disturbances, only the expected value can be optimized. The methodology for design is based upon stochastic optimal control theory. After introducing the dynamic models of interest, optimal control and estimation are presented separately. Limitations of this approach are addressed, and the unified design of linear stochastic optimal controllers for analog and digital implementations is described. The principal benefit of stochastic optimal control theory is that it provides an engineering framework within which practical control design can be accomplished for complex dynamic systems. T.M.

N82-11077# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.

DESIGN CONSIDERATIONS FOR OPTIMAL FLIGHT CONTROL SYSTEMS

F. R. Gill *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 21 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

Following a review of the several interacting factors affecting the design of control laws for any kind of flight control system (FCS), the modelling problem is discussed, including accuracy requirements for computer models of the aircraft, FCS, external disturbances and sensor noise. The state-of-the-art in designing the control and scheduling laws is surveyed and the limits of conventional control techniques are exposed. To overcome these limits, the use of selected nonlinear control techniques is discussed, including the concept of redundant adaptation with safeguards. T.M.

N82-11078*# Honeywell Systems and Research Center, Minneapolis, Minn. Systems and Control Technology Sect.

DESIGN TECHNIQUES FOR MUTLIVARIABLE FLIGHT CONTROL SYSTEMS

In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 33 p refs (For primary document see N82-11073 02-08)
(Contracts NAS4-2518; N00014-75-C-01444)
Avail: NTIS HC A13/MF A01 CSCL 01C

Techniques which address the multi-input closely coupled nature of advanced flight control applications and digital implementation issues are described and illustrated through flight control examples. The techniques described seek to exploit the advantages of traditional techniques in treating conventional feedback control design specifications and the simplicity of modern approaches for multivariable control system design. T.M.

N82-11079# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany).

PRACTICAL DESIGN AND REALIZATION OF A DIGITAL ADAPTIVE FLIGHT CONTROL SYSTEM

V. Krebs and U. Hartmann *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 22 p refs Sponsored in part by the West German Ministry of Defense (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

A new approach for the design and the practical realization of a digital adaptive command and stability system is proposed. The control law for the longitudinal motion of the aircraft is obtained by state vector feedback using the MIL-F-8785 B handling qualities requirements. The design principle is based on decoupling of the angle of attack and pitch rate on the one hand and the pole allocation method for the eigenvalues of the control system on the other hand. Since the necessary gain factors contain unknown and variable aircraft parameters, an on-line fading-memory least squares algorithm for the estimation of these parameters is used. Only conventional aircraft sensors (rate gyros and accelerometers) and an airborne digital computer are necessary. Hybrid simulations of the complete system as well as flight test results demonstrate the efficiency of the concept. T.M.

N82-11080# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany).

CONTROL LAW DESIGN FOR TRANSPORT AIRCRAFT FLIGHT TASKS

Vollmar Adam and Hagen Leyendecker *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 13 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

An integrated digital flight control system was developed. The primary objective of the program was, both to improve the manual control of the aircraft assisted by control systems, and to develop new control and display systems. In addition, automation is to be provided for loner flight phases which are to be optimized with respect to fuel consumption, flight time, or other criteria. Aspects of the control law design and flight test experience with the integrated digital flight control system are described. DOE

N82-11081# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.

CONTROL DESIGN OF FLEXIBLE SPACECRAFT

Robert E. Skelton *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 28 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

When compared to other large scale systems, flexible spacecraft have some peculiarities which can make control more difficult. Emphasis is placed upon the time domain and suboptimal linear quadratic guassian (LQG) methods, with special attention given to the effects of modeling errors. These effects are discussed in light of the model reduction problem, stability, and control design. Stability, controllability and observability computations are reduced to their simplest form possible to provide insight and to facilitate the location of sensors and actuators. The techniques of modal cost analysis are used to identify the critical parameters and the critical models of the structure. In the final stage of design, component cost analysis reveals which states of the optimal dynamical controller should be deleted to produce a reduced controller which is compatible with the on-line computer software limitations. T.M.

N82-11082*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

OPTIMUM CLIMB AND DESCENT TRAJECTORIES FOR AIRLINE MISSIONS

Heinz Erzberger *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 15 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01 CSCL 01C

The characteristics of optimum fixed-range trajectories whose structure is constrained to climb, steady cruise, and descent segments are derived by application of optimal control theory. The performance function consists of the sum of fuel and time costs, referred to as direct operating cost (DOC). The state variable is range to go and the independent variable is energy. In this formulation a cruise segment always occurs at the optimum cruise energy for sufficiently large range. At short ranges (400 n. mi. and less), a cruise segment may also occur below the optimum cruise energy. The existence of such a cruise segment depends primarily on the fuel flow vs thrust characteristics and on thrust constraints. If thrust is a free control variable along with airspeed, it is shown that such cruise segments will not generally occur. If thrust is constrained to some maximum value in climb and to some minimum in descent, such cruise segments generally will occur. T.M.

N82-11083*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

APPLICATION OF NONLINEAR SYSTEMS INVERSES TO AUTOMATIC FLIGHT CONTROL DESIGN: SYSTEM CONCEPTS AND FLIGHT EVALUATIONS

George Meyer and Luigi Cicolani *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 29 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01 CSCL 01C

A practical method for the design of automatic flight control systems for aircraft with complex characteristics and operational requirements, such as the powered lift STOL and V/STOL configurations, is presented. The method is effective for a large class of dynamic systems requiring multi-axis control which have highly coupled nonlinearities, redundant controls, and complex multidimensional operational envelopes. It exploits the concept of inverse dynamic systems, and an algorithm for the construction of inverse is given. A hierarchic structure for the total control logic with inverses is presented. The method is illustrated with an application to the Augmentor Wing Jet STOL Research Aircraft equipped with a digital flight control system. Results of flight evaluation of the control concept on this aircraft are presented. T.M.

N82-11084*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

MANAGEMENT OF REDUNDANCY IN FLIGHT CONTROL SYSTEMS USING OPTIMAL DECISION THEORY

In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 12 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01 CSCL 01C

The problem of using redundancy that exists between dissimilar systems in aircraft flight control is addressed. That is, using the redundancy that exists between a rate gyro and an accelerometer--devices that have dissimilar outputs which are related only through the dynamics of the aircraft motion. Management of this type of redundancy requires advanced logic so that the system can monitor failure status and can reconfigure itself in the event of one or more failures. An optimal decision theory was tutorially developed for the management of sensor redundancy and the theory is applied to two aircraft examples. The first example is the space shuttle and the second is a highly maneuvering high performance aircraft--the F8-C. The examples illustrate the redundancy management design process and the performance of the algorithms presented in failure detection and control law reconfiguration. T.M.

N82-11085# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.

OPTIMAL CONTROL IN THE LUNAR MODULE DIGITAL AUTOPILOT

In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 17 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

The Apollo lunar module (LM) digital autopilot was a first generation computer-based automatic control system. The use of a digital computer permitted the implementation of a controller structure and control algorithms that would have been difficult to synthesize using analog controller technology. Optimal control theory recommended a cascade synthesis for controller design: an observer or estimator of the state followed by memoryless control laws. This structure was utilized in the LM autopilot. The state estimator had some similarities to a Kalman filter, but the variable gains were chosen to minimize nonlinear measurement quantization effects. The memoryless reaction control system (RCS) laws employed parabolic switching curves as suggested by minimum time/fuel control theory for a double integral plant. T.M.

N82-11086# Analytic Sciences Corp., Reading, Mass.

APPLICATION OF OPTIMAL CONTROL TECHNIQUES TO TACTICAL MISSILE GUIDANCE

Charles F. Price *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 13 p refs (For primary document see N82-11073 02-08)
(Contracts N00014-69-C-0391; F08635-77-C-0034)
Avail: NTIS HC A13/MF A01

A survey of applications reported in the literature is presented.

Case studies were developed using several different linear-quadratic-Gaussian formulations of stochastic optimal control problems. A new guidance law is presented which explicitly accounts for target parameter uncertainty. Simulation results and parameter sensitivity studies are presented which provide performance comparisons between the optimal guidance techniques and conventional proportional guidance. T.M.

N82-11087# Systems Control, Inc., Palo Alto, Calif.
DEVELOPMENT OF MULTIVARIABLE CONTROLLERS FOR AIRCRAFT TURBINE ENGINES
Ronald L. DeHoff, Stephen M. Rock, and Muhammed M. Akhter *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 12 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

A model reference structure is discussed which is shown to be a flexible framework within which digital control programs of a wide variety of function and complexity can be formulated. The development of the plant reference model is discussed and trade-offs between accuracy and complexity presented. The techniques used to produce optimized, feed-forward state, control and output trajectories are presented. The well-known methods of regulator synthesis using quadratic performance functions are briefly reviewed and the results of several successful applications of this methodology are summarized. T.M.

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

- For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-11088* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND TUNNEL SUPPLEMENTARY MACH NUMBER MINIMUM SECTION INSERT Patent
Lana M. Couch, inventor (to NASA) Issued 1 Sep. 1981 6 p Filed 28 Mar. 1980 Supersedes N80-22369 (18 - 13, p 1674
(NASA-Case-LAR-12532-1; US-Patent-4,286,460; US-Patent-Appl-SN-135040; US-Patent-Class-73-147) Avail: US Patent and Trademark Office CSCL 14B

A device is described which changes the Mach number capability of a wind tunnel without permanently altering the existing nozzle of the tunnel. An insert is removably attached to the wall of the existing nozzle expansion area thereby creating a second minimum section upstream of the model test section. The added insert may be removed without complicated and expensive changes to the basic wind tunnel. In one embodiment, a removable insert is disposed within wind tunnel nozzle walls with a portion of the flow boundary layer being bled off from the tunnel via passageway and tunnel exit to reduce the extent of separated flow normally occuring upstream of the insert contraction section.

Official Gazette of the U.S. Patent and Trademark Office

N82-11089 Royal Aircraft Establishment, Bedford (England). Library.
ADAPTATION OF A TURBINE TEST FACILITY TO HIGH-TEMPERATURE RESEARCH
J. Francois, Y. LeBot, J. Michard, and P. Deguest Dec. 1980 30 p refs Transl. into ENGLISH from AGARD Conf. Proc. No. 229, Ankara, Sept.
(RAE-Lib-Trans-2064; BR78650) Copyright. Avail: Issuing Activity

A facility for research on a high temperature (1800 K) and high pressure (4.5 bar) turbine stage is described. The turbine operates in a realistic engine environment and is comprehensively instrumented to permit wide variation of mainstream and coolant flow parameters. The development of robust probes for the measurement of turbulence and temperature fluctuations and optical pyrometry techniques is described. Results of studies of nozzle guide vane heat transfer coefficients, metal temperatures and film cooling efficiency are presented together with rotor blade surface temperature distributions. The MINOS rig confirmed the validity of turbine design prediction methods by providing performance data to correlate theory, scale model testing and gas turbine engine testing. T.M.

N82-11090*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN ALGORITHM FOR MINIMUM-COST SET-POINT ORDERING IN A CRYOGENIC WIND TUNNEL
John S. Tripp Nov. 1981 32 p refs
(NASA-TP-1923; L-14695) Avail: NTIS HC A03/MF A01 CSCL 14B

An algorithm for minimum cost ordering of set points in a cryogenic wind tunnel is developed. The procedure generates a matrix of dynamic state transition costs, which is evaluated by means of a single-volume lumped model of the cryogenic wind tunnel and the use of some idealized minimum-costs, which is evaluated by means of a single-volume lumped model of the cryogenic wind tunnel and the use of some idealized minimum-cost state-transition control strategies. A branch and bound algorithm is employed to determine the least costly sequence of state transitions from the transition-cost matrix. Some numerical results based on data for the National Transonic Facility are presented which show a strong preference for state transitions that consume to coolant. Results also show that the choice of the terminal set point in an open odering can produce a wide variation in total cost. Author

N82-11091# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
DETERMINING THE TRAINING EFFECTIVENESS AND COST-EFFECTIVENESS OF VISUAL FLIGHT SIMULATORS FOR MILITARY AIRCRAFT M.S. Thesis
George Benjamin Mayer, Jr. Jun. 1981 140 p refs
(AD-A104627) Avail: NTIS HC A07/MF A01 CSCL 05/9

The constraint on oil flow from the Middle East as a result of the 1973 war and the increased sophistication of aircraft weapons systems are two important factors which have contributed significantly to the interest in visual flight simulation as an integral part of military flight training. Costs associated with these factors, such as procurement and fuel costs, are providing pressure to the military establishment to improve their capability to provide military pilots with visual flight simulation systems which do not impair combat effectiveness or aviation safety. This thesis describes the results of flight simulation utilization by the commercial airline industry, analyzes the effectiveness realized by using flight simulators to supplement military training in different aviation environments, and outlines methodologies for measuring and improving the cost-effectiveness of the systems. Recommendations for careful study are made in areas that would improve military utilization of flight simulation. Author (GRA)

N82-11092# National Highway Traffic Safety Administration, East Liberty, Ohio. Safety Research Lab.
SIDE IMPACT SLED AND PADDING DEVELOPMENT Final Report, Jun. 1979 - Feb. 1981
Michael W. Monk and Lisa K. Sullivan Feb. 1981 288 p refs
(PB81-217952; DOT-HS-805889; SRL-17) Avail: NTIS HC A13/MF A01 CSCL 13F

A study was conducted to devise and fabricate a HYGE sled buck which could be used to simulate oblique side impact collisions. Once completed the buck was demonstrated by simulating the occupant and side door interactions of two separate laboratory car to car impacts. The degree of success of these two simulations is discussed. Following the simulations, the sled buck was used to select padding materials which appeared promising for occupant protection in side impact collisions. The selection criteria and results are presented. GRA

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see 91 Lunar and Planetary Exploration.

N82-11093* National Aeronautics and Space Administration, Washington, D. C.
TECHNOLOGY FOR LARGE SPACE SYSTEMS: A SPECIAL BIBLIOGRAPHY
Jul. 1981 109 p
(NASA-SP-7046(05)) Avail: NTIS HC $11.00 CSCL 22A

This bibliography lists 298 reports, articles, and other documents introduced into the NASA scientific and technical information system between January 1, 1981 and June 30, 1981. Its purpose is to provide helpful, information to the researcher, manager, and designer in technology development and mission design in the area of the Large Space Systems Technology (LSST) Program. Subject matter is grouped according to systems, interactive analysis and design, structural concepts, control systems, electronics, advanced materials, assembly concepts, propulsion, solar power satellite systems, and flight experiments. T.M.

N82-11094*# Athens Coll., Ala.
SPACE PROCESSING OF ELECTRONIC MATERIALS Final Report, 27 Jan. - 20 Aug. 1981
Gary L. Workman and Lawrence R. Holland 28 Sep. 1981 12 p
(Contract NAS8-32920)
(NASA-CR-161892) Avail: NTIS HC A02/MF A01 CSCL 22A

The relative values of thermal conductivity of solid and liquid HgCdTe are critically important in the design configuration of the furnaces used for Bridgman crystal growth. The thermal diffusivity of the material is closely linked to the conductivity by the defining relation D = k/rho c, where D is the diffusivity, K is the thermal conductivity, rho is the density, and c is the specific heat. The use of transient and periodic heating approaches to measure the diffusivity are explored. A system for securing and extracting heat from silica or glass tubes under high C vacuum conditions is described. A.R.H.

N82-11095*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A PROPOSED NEW POLICY FOR PLANETARY PROTECTION
J. B. Barengoltz, S. L. Bergstrom, G. L. Hobby, and P. D. Stabekis (Exotech, Inc.) 15 Sep. 1981 82 p refs
(Contract NAS7-100)
(NASA-CR-164947; JPL-Pub-81-90) Avail: NTIS HC A05/MF A01 CSCL 22A

A critical review of the present policy was conducted with emphasis on its application to future planetary exploration. The probable impact of recent data on the implementation of the present policy was also assessed. The existing policy and its implementation were found to: be excessive for certain missions (e.g., Voyager), neglect the contamination hazard posed by the bulk constituent organics of spacecraft, be ambiguous for certain missions (e.g., Pioneer Venus), and treat all extraterrestrial sample return missions alike. The major features of the proposed policy are planet/mission combinations, a qualitative top level statement, and implementation by exception rather than rule. The concept of planet/mission categories permits the imposition of requirements according to both biological interest in the target planet and the relative contamination hazard of the mission type. T.M.

N82-11096*# National Aeronautics and Space Administration, Washington, D. C.
WHERE ARE WE IN THE SPACE WAR?
J. H. Lee Aug. 1981 18 p Transl. into ENGLISH from Monthly, Korea, South Korea, no. 6, Jun. 1981 p 146-155 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76604) Avail: NTIS HC A02/MF A01 CSCL 22A

Space war and the use of laser weapons is addressed. The divergent opinions of American scientists on laser weapons are included. A comparison of the U.S. and Soviet attitudes is made. A proposal for producing a laser directly from sunlight without using solar panels is presented. J.M.S.

N82-11097*# National Aeronautics and Space Administration, Washington, D. C.
HUNGARIAN COSMONAUT IN SPACE
Sep. 1981 100 p Transl. into ENGLISH of "Magyar urhajos a vilagrurben, mtijelenti" Special Edition, 26 May 1980 p 1-31 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-76719) Avail: NTIS HC A05/MF A01 CSCL 22A

The selection and training of cosmonauts and the preparation of the first Hungarian for flight on Salyut 36 and its linking with Soyuz 6 are described. Biographical sketches of the crew members, the reasons for different types of wearing different types of spacesuits during flight in the space station, and the experiments conducted are discussed. Photographs are included. A.R.H.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

No abstracts in this category.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N82-11098*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NONPARAMETRIC IDENTIFICATION OF A CLASS OF NONLINEAR CLOSE-COUPLED DYNAMIC SYSTEMS
F. E. Udwadia and Chin-Po Kuo 1 Oct. 1981 76 p refs
(NASA-CR-164948; JPL-Pub-81-48) Avail: NTIS HC A05/MF A01 CSCL 22D

A nonparametric identification technique for the identification of close coupled dynamic systems with arbitrary memoryless nonlinearities is presented. The method utilizes noisy recorded data (acceleration, velocity and displacement) to identify the restoring forces in the system. The masses in the system are assumed to be known (or fairly well estimated from the design drawings). The restoring forces are expanded in a series of orthogonal polnomials and the coefficients of these polynomial expansions are obtained by using least square fit method. A particularly simple and computationally efficient method is proposed for dealing with separable restoring forces. The identified results are found to be relatively insensitive to measurement noise. An analysis of the effects of measurement noise on the quality of the estimates is given. The computations are shown to be relatively quick (when compared say to the Wiener identification method) and the core storage required relatively small, making the method suitable for onboard identification of large space structures. B.W.

N82-11099*# Rensselaer Polytechnic Inst., Troy, N. Y.
PARAMETER ESTIMATION OF LARGE FLEXIBLE AEROSPACE STRUCTURES WITH APPLICATION TO THE CONTROL OF THE MAYPOLE DEPLOYABLE REFLECTOR
Mark J. Balas 6 Nov. 1981 20 p refs
(Grant NAG1-171)
(NASA-CR-164871) Avail: NTIS HC A02/MF A01 CSCL 22B

Systems such as the Maypole deployable reflector have a distributed parameter nature. The flexible column and hoop structure and the circular antenna of 30-100 meter diameter which it supports are described by partial, rather than ordinary, differential equations. Progress completed in reduced order modelling andd controller design and digital parameter estimation and control is summarized. Topics covered include deployment and on-orbit operation; quasi-static (steady state) operation; dynamic distributed parameter system; autoregressive moving average identification; frequency domain procedures; direct or implicit active control; adaptive observers; parameter estimation using a linear reinforcement learning factor; feedback control; and reduced order modeling for nonlinear systems. A.R.H.

N82-11100*# Howard Univ., Washington, D. C. Dept. of Mechanical Engineering.
ON THE SHAPE AND ORIENTATION CONTROL OF AN ORBITING SHALLOW SPHERICAL SHELL STRUCTURE
Peter M. Bainum and A. S. S. R. Reddy 9 Jul. 1981 7 p refs Presented at the Joint IFAC/ESA Symp. on Automatic Control in Space, Noordwijkerhout, The Netherlands, 5-9 Jul. 1981
(Grant NsG-1414)
(NASA-CR-164970) Avail: NTIS HC A02/MF A01 CSCL 22B

A proposed method for controlling the shape and orientation of very large shallow dish type receiver/reflectors to be used in communication, radiometry and in electronic orbital based mail systems involves connecting a rigid light weight dumbell with heavy tip masses to the shell at its apex by a spring loaded double gimballed joint with damping. To completely damp the system transient motion in all of the important lower frequency modes, an active control system is required. A mathematical model is extended to include the effects of point actuators located at preselected positions on the shell surface. The formulation of the uncontrolled dynamics assumes an a priori knowledge of the frequencies of all the elastic modes to be incorporated within the system model. As an example, three rigid body modes and six elastic modes are included in the model and six actuators are assumed, none of which lies on a nodal line or circle. A.R.H.

N82-11283*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NETWORKS CONSOLIDATION PROGRAM
M. L. Yeater and D. T. Herrman *In its* The Telecommun. and Data Acquisiton Rept. 15 Oct. 1981 p 19-24 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

N82-11285*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PIONEERS 6 THROUGH 12 MISSION SUPPORT
R. E. Nevarez *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 32-33 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

N82-11303*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NETWORKS CONSOLIDATION PROGRAM: MAINTENANCE AND OPERATIONS (M&O) STAFFING ESTIMATES
J. P. Goodwin *In its* The Telecomm. and Data Acquisition Rept. 15 Oct. 1981 p 167-174 ref (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

N82-11304*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NOCA UPGRADE
G. D. Gould *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 175-179 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

N82-11305*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RELOCATION OF THE DEEP SPACE NETWORK MAINTENANCE CENTER
K. F. Beutler *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 180-181 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

N82-11307*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SPECIAL ACTIVITY UTILIZATION OF GDSCC ANTENNAS DURING 1980
E. B. Jackson and J. W. Hudson (Bendix Field Engineering Corp.) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 192-196 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-11101*# Westinghouse Electric Corp., Linthicum Heights, Md.
ATS-5 12 YEAR IN ORBIT EVALUATION
F. J. Kissel and J. Schaffer Sep. 1981 140 p refs
(Contract NAS5-20825)
(NASA-CR-166728) Avail: NTIS HC A07/MF A01 CSCL 22B

The results of the ATS 5 End-of-Life (EOL) tests are presented. Whenever possible, the test data were compared with prelaunch and inflight data. Pertinent memos and other informal documents containing these data are included as appendixes. The EOL tests include communication subsystems tests, power sybsystem tests, and gravity gradient television camera system tests. S.L.

N82-11102*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT: RCA-D/DELTA LAUNCH
18 Nov. 1981 27 p
(NASA-TM-84063; 0-492-206-81-04) Avail: NTIS HC A03/MF A01 CSCL 22B

The planned launch of the RCA-D Satcom satellite is described. A Delta 3910 configuration which incorporates an extended long tank Thor booster, nine Castor 4 strap-on motors, a TRW-201 second stage, and an 9-foot fairing will place the spacecraft along a suborbital trajectory. A Thiokol propulsion apogee motor stage will place it in a synchronous transfer orbit. Three days after launch, the spacecraft apogee kick motor will be fired at transfer orbit apogee to circularize its orbit at a geosynchronous altitude of 19,300 nautical miles above the equator at approximately 132 miles west longitude. R.J.F.

N82-11103*# Computer Sciences Corp., El Segundo, Calif.
MAGNETIC FIELD SATELLITE (MAGSAT) DATA PROCESSING SYSTEM SPECIFICATIONS
D. Berman, R. Gomez, and A. Miller Oct. 1980 136 p refs
(Contract NAS5-24391)
(NASA-CR-166737; CSC/TM-80/6214) Avail: NTIS HC A07/MF A01 CSCL 22B

The software specifications for the MAGSAT data processing system (MDPS) are presented. The MDPS is divided functionally into preprocessing of primary input data, data management, chronicle processing, and postprocessing. Data organization and validity, and checks of spacecraft and instrumentation are dicussed. Output products of the MDPS, including various plots and data tapes, are described. Formats for important tapes are presented. Dicussions and mathematical formulations for coordinate transformations and field model coefficients are included. S.L.

N82-11104# Bell-Northern Research Ltd., Ottawa (Ontario).
ELECTROMAGNETIC FIELD MAPPING OF CYLINDER AND MISSILE NOSECONE Final Technical Report, Aug. 1979 - Sep. 1980
Richard R. Goulette and Kent E. Felske Jul. 1981 199 p refs
(Contract F30602-79-C-0197; AF Proj. 2338)

(AD-A104312: RADC-TR-81-179) Avail: NTIS HC A09/MF A01 CSCL 16/3

This technical report describes the technology and instrumentation developed for the measurement of vector electric and magnetic fields with cylindrical configurations, when the configurations are illuminated by a plane electromagnetic wave in the frequency range of 225 to 400 MHz. A set of such contour maps are presented for a missile nosecone and a right circular cylinder illuminated by a 300 MHz planewave. Author (GRA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

No abstracts in this category.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N82-11289*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SYMBOL ERROR RATE PERFORMANCE EVALUATION OF THE LM37 MULTIMEGABIT TELEMETRY MODULATOR-DEMODULATOR UNIT

H. Malek *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 59-74 refs (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 09F

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-11105*# California Univ., Los Angeles. Inst. of Geophysics and Planetary Physics.

MAGNETIC FIELD INVESTIGATION FOR ISEE MOTHER AND DAUGHTER SPACECRAFT Final Report

C. T. Russell 7 Jun. 1981 4 p refs

(Contract NAS5-20064)

(NASA-CR-166713) Avail: NTIS HC A02/MF A01 CSCL 22B

Highlights of the design and fabrication of fluxgate magnetometers for the ISEE A and B satellites which were launched from a single launch vehicle into the same highly elliptical orbit are presented. The instrument consisted of four basic assemblies: the sensors, the drive and sense electronics, the data handling unit; and the flipper. The digital handling data handling assembly contained a digital filter that mantained a uniform transfer function for all three axes of both spacecraft. Initial studies centered on the bow shock and the magnetopause and show that both boundaries are in rapid motion. The bow shock was found to be very thin, close to an ion inertial length in thickness, but the magnetopause was much thicker than expected, about 400 to 1000 km on average. The magnetometers have each logged over 3 2/3 years of continuous operation. A.R.H.

N82-11106*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TESTING OF A SPACECRAFT MODEL IN A COMBINED ENVIRONMENT SIMULATOR

J. V. Staskus and J. C. Roche 1981 11 p refs Presented at the 18th Ann. Conf. on Nucl. and Space Radiation Effects, Seattle, 20-24 Jul. 1981

(NASA-TM-82723; E-1024) Avail: NTIS HC A02/MF A01 CSCL 22B

A scale model of a satellite was tested in a large vacuum facility under electron bombardment and vacuum ultraviolet radiation to investigate the charging of dielectric materials on curved surfaces. The model was tested both stationary and rotating relative to the electron sources as well as grounded through one megohm and floating relative to the chamber. Surface potential measurements are presented and compared with the predictions of computer modelling of the stationary tests. Discharge activity observed during the stationary tests is discussed and signals from sensing devices located inside and outside of the model are presented. M.G.

N82-11107*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

VOLTAGE GRADIENTS IN SOLAR ARRAY CAVITIES AS POSSIBLE BREAKDOWN SITES IN SPACECRAFT-CHARGING-INDUCED DISCHARGES

N. John Stevens, Hilton E. Mills, and Lisa Orange 1981 10 p refs Presented at the Ann. Conf. on Nucl. and Space Radiation Effects, Seattle, 21-24 Jul. 1981

(NASA-TM-82710; E-1003) Avail: NTIS HC A02/MF A01 CSCL 10B

A possible explanation for environmentally-induced discharges on geosynchronous satellites exists in the electric fields formed in the cavities between solar cells - the small gaps formed by the cover slides, solar cells, metallic interconnects and insulating substrate. When exposed to a substorm environment, the cover slides become less negatively charged than the spacecraft ground. If the resultant electric field becomes large enough, then the interconnect could emit electrons (probably by field emission) which could be accelerated to space by the positive voltage on the covers. An experimental study was conducted using a small solar array segment in which the interconnect potential was controlled by a power supply while the cover slides were irradiated by monoenergetic electrons. It was found that discharges could be triggered when the interconnect potential became at least 500 volts negative with respect to the cover slides. Analytical modeling of satellites exposed to substorm environments indicates that such gradients are possible. Therefore, it appears that this trigger mechanism for discharges is possible. T.M.

N82-11108# Air Force Geophysics Lab., Hanscom AFB, Mass.

THE ANGULAR IMPACT DISTRIBUTION OF CHARGED PARTICLES ATTRACTED TO A CHARGED CYLINDRICAL SPACECRAFT

Arthur L. Besse and Allen G. Rubin 13 May 1981 12 p refs (AF Proj. 7661)

(AD-A104519; AFGL-TR-81-0142; AFGL-ERP-741) Avail: NTIS HC A02/MF A01 CSCL 22/1

The angular distribution of incident particles is obtained for attracted and repelled particles incident on a charged cylindrical spacecraft. The angular distributions are important when backscattering and secondary emission are significant processes. Results are given for planes and spheres as well. Author (GRA)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-11109*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CONCEPT FOR A POWER SYSTEM CONTROLLER FOR LARGE SPACE ELECTRICAL POWER SYSTEMS
Louis F. Lollar, John R. Lanier, Jr., and James R. Graves Nov. 1981 15 p refs
(NASA-TP-1939) Avail: NTIS HC A02/MF A01 CSCL 22B

The development of technology for a fail-operatonal power system controller (PSC) utilizing microprocessor technology for managing the distribution and power processor subsystems of a large multi-kW space electrical power system is discussed. The specific functions which must be performed by the PSC, the best microprocessor available to do the job, and the feasibility, cost savings, and applications of a PSC were determined. A limited function breadboard version of a PSC was developed to demonstrate the concept and potential cost savings. A.R.H.

N82-11110*# Boeing Aerospace Co., Seattle, Wash.
STUDY OF ELECTRICAL AND CHEMICAL PROPULSION SYSTEMS FOR AUXILIARY PROPULSION OF LARGE SPACE SYSTEMS. VOLUME 1: EXECUTIVE SUMMARY
W. W. Smith and J. P. Clark Nov. 1981 35 p refs 2 Vol.
(Contract NAS3-21952)
(NASA-CR-165502-Vol-1; D180-25956-3-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 21H

The objective was to determine the direction auxiliary propulsion research and development should take to best meet upcoming needs. The approach used was to define the important electrical and chemical propulsion characteristics in terms of the demands that will be imposed by future spacecraft. Comparison of these desired characteristics and capabilities with those presently available was then used to identify deficiencies. T.M.

N82-11111*# Boeing Aerospace Co., Seattle, Wash.
STUDY OF ELECTRICAL AND CHEMICAL PROPULSION SYSTEMS FOR AUXILIARY PROPULSION OF LARGE SPACE SYSTEMS, VOLUME 2 Final Report
W. W. Smith Nov. 1981 540 p refs 2 Vol.
(Contract NAS3-21952)
(NASA-CR-165502-Vol-2; D180-2595-4-Vol-2) Avail: NTIS HC A23/MF A01 CSCL 21H

The five major tasks of the program are reported. Task 1 is a literature search followed by selection and definition of seven generic spacecraft classes. Task 2 covers the determination and description of important disturbance effects. Task 3 applies the disturbances to the generic spacecraft and adds maneuver and stationkeeping functions to define total auxiliary propulsion systems requirements for control. The important auxiliary propulsion system characteristics are identified and sensitivities to control functions and large space system characteristics determined. In Task 4, these sensitivities are quantified and the optimum auxiliary propulsion system characteristics determined. Task 5 compares the desired characteristics with those available for both electrical and chemical auxiliary propulsion systems to identify the directions technology advances should take. T.M.

N82-11112# Aerospace Corp., El Segundo, Calif.
RANDOM ERROR PROPAGATION ANALYSIS IN THE PLUME DIAGNOSTIC CODE EMABIC
Stephen J. Young Edwards AFB, Calif. AFRPL Jul. 1981 30 p refs
(Contract F04701-80-C-0081; AF Proj. 5730)
(AD-A104495; TR-0081(6623)-2; AFRPL-TR-81-59) Avail: NTIS HC A03/MF A01 CSCL 12/1

The formal theory of linear error propagation is applied to the data smoothing and profile inversion routines of the plume diagnostic code EMABIC. In addition to the normal operation of retrieving the radial temperature and concentration profiles of the plume from measured transverse profiles of emission and absorption, EMABIC can now automatically estimate the accuracy of retrieval from estimates of the experimental random error of the measurements. An application of the method is made for a case previously examined with an empirical error propagation method. The present results are essentially in agreement with those of the previous study. Author (GRA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-11113 Washington Univ., Seattle.
PHYSICAL STUDIES OF AROMATIC METHYLENES Ph.D. Thesis
Daniel Joseph Graham 1981 200 p
Avail: Univ. Microfilms Order No. 8122737

A study of the low lying excited triplet states of aromatic methylenes is presented. The molecular orbitals of diphenylmethylene and its derivatives are examined via the Simple Huckel and Extended Huckel theories. The electronic transitions involving the ppi and p sigma valence and lowest pi* molecular orbitals are discussed with respect to the anticipated polarizations, intensities, and substituent effects. Similar considerations are also given to the Simple Huckel and Extended Huckel molecular orbitals of fluorenyldene. It was found that the Extended Huckel ordering of the ppi and p sigma valence orbitals of fluorenylidene was opposite to that determined for diphenylmethylene. Dissert. Abstr.

N82-11114# Ohio State Univ., Columbus. Dept. of Chemistry.
DEVELOPMENT AND OPTIMIZATION OF METHODOLOGIES FOR ANALYSIS OF COMPLEX HYDROCARBON MIXTURES Technical Progress Report, 1 Sep. 1980 - 31 Aug. 1981
R. J. Laub 1981 55 p refs
(Contract DE-AC02-80ER-10554)
(DE81-025875; DOE/ER-10554/7) Avail: NTIS HC A04/MF A01

Rotating-disk thin-layer chromatography techniques were studied and a number of design innovations were explored, implementation of which could result in a separations system which rivals conventional-column lc for pre-analysis fractionation of petroleum. Studies with liquid-chromatographic (lc) columns of conventional dimensions examined the variation of retentions of aromatic hydrocarbon solutes with mobile phases of methanol + water (reversed-phase sorbent) and hexame + isopropyl alcohol (silica sorbent). Microbore reversed-phase column systems were examined from the standpoints of efficiency and analysis times. Optimization of conditions relating to the fabrication and use of open-tubular gc glass-capillary columns continued. Total analysis of a commercial gasoline provided illustration of the ultrahigh resolution available from the resultant column systems. DOE

N82-11115# Sandia Labs., Albuquerque, N. Mex.
SHOCK-INDUCED ORGANIC CHEMISTRY
B. W. Dodson and R. A. Graham 1981 16 p refs Presented at APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024442; SAND-81-1353C; CONF-810684-35) Avail:

NTIS HC A02/MF A01

A wide variety of chemical reactions are known to occur in organic compounds subjected to shock loading. An overview is presented of the evidence that (a) shock loading can cause nonthermal reactions, i.e., reactions which do not take place under equivalent combinations of static temperature and pressure; (b) unique and/or unusual reactions can occur under shock; and (c) reactions can occur in the shock front itself. Rules obtained for reactivity of organic compounds under shock loading are used to address the problem of initiation sensitivity of aromatic explosives. DOE

24 COMPOSITE MATERIALS

Includes laminates.

N82-11116*# TRW Defense and Space Systems Group, Redondo Beach, Calif. Mechanical Engineering Lab.
RADIATION TESTING OF COMPOSITE MATERIALS, IN SITU VERSUS EX SITU EFFECTS Final Report
R. M. Kurland, J. F. Thomasson, and W. C. Beggs Nov. 1981 109 p refs
(Contract NAS1-15848)
(NASA-CR-3475; Rept-351710-6028-UT-01) Avail: NTIS HC A06/MF A01 CSCL 11D

The effect of post irradiation test environments on tensile properties of representative advanced composite materials (T300/5208, T300/934, C6000/P1700) was investigated. Four ply (+ or - 45 deg/+ or - 45 deg) laminate tensile specimens were exposed in vacuum up to a bulk dose of 1 x 10 to the 10th power rads using a mono-energetic fluence of 700 keV electrons from a Van de Graaff accelerator. Post irradiation testing was performed while specimens were being irradiated (in situ data), in vacuum after cessation of irradiation (in vacuo data), and after exposure to air (ex situ data). Room temperature and elevated temperature effects were evaluated. The radiation induced changes to the tensile properties were small. Since the absolute changes in tensile properties were small, the existance of a post irradiation test environment effect was indeterminate. B.W.

N82-11117*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NOVEL IMPROVED PMR POLYIMIDES
Ruth H. Pater 1981 18 p refs Presented at the 13th Natl. SAMPE Tech. Conf., Mt. Pocono, Pa., 13-15 Oct. 1981
(NASA-TM-82733; E-1045) Avail: NTIS HC A02/MF A01 CSCL 11D

A series of N-phenylnadimide (PN) modified PMR polyimide composites reinforced with graphite fibers was investigated. The improved flow matrix resins consist of N-phenylnadimide (PN), monomenthyl ester of 5-norbornene-2, 3-dicarboxylic acid (NE), dimethyl ester of 3,3, 4,4-benzophenonetetracarboxylic acide (BTDE), and 4,4 methylenedianiline (MDA). Five modified PMR resin systems were formulated by the addition of 4 to 20 mole percent N-phenylnadimide to the standard PMR-15 composition. These formulations and the control PMR resin were evaluated for rheological characteristics. The initial thermal and mechanical properties of the PN modified PMR and the control PMR/Celion 6000 composites were determined. The results show that the addition of N-phenylnadimide to PMR-15 significantly improved the resin flow characteristics without sacrificing the composites properties. Concentrations of 4 and 9 mole percent PN appear to improve the thermoxidative stability of PMR composites. A.R.H.

N82-11118*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THERMAL CONTROL COATINGS BASED ON TRIALKOXYSILANE HYDROLYSATE BINDERS Patent Application
William J. Patterson and James E. Curry, inventors (to NASA) Filed 28 Aug. 1981 12 p
(NASA-Case-MFS-25620-1; US-Patent-Appl-SN-297487) Avail: NTIS HC A02/MF A01 CSCL 11D

Certain trialkoxysilanes react with water to produce trifunctional monomers, which in turn undergo condensation polymerication to product a 'laddered' silicon resin. The resin is then combined with a selected pigment to provide a mixture suitable for application as a coating. Such coatings have a low absorptance and a high emittance, along with resistance to degradation of reflective and mechanical properties upon prolonged exposure to ultraviolet radiation in vacuum. NASA

N82-11119*# National Aeronautics and Space Administration, Washington, D. C.
THE INDUSTRIAL PROCESSING OF UNIDIRECTIONAL FIBER PREPREGS
B. Laird Jun. 1981 18 p refs Transl. into ENGLISH from Plastiques Renforces, Fibres de Verre Textile v. 18, Jul.-Aug. 1980 p 9-16 Original language document announced as A80-44924 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Ciba-Geigy France, S. A.
(Contract NASw-3199)
(NASA-TM-76599) Avail: NTIS HC A02/MF A01 CSCL 11D

Progress made in the industrial processing of preimpregnated composites with unidirectional fibers is discussed, with particular emphasis on applications within the aerospace industry. Selection of industrial materials is considered. Attention is given to the conditions justifying the use of composites and the properties required of industrial prepregs. The hardening cycle is examined for the cases of nonmodified and polymer modified resins, with attention given to the stabilization of flow, the necessary changes of state, viscosity control, and the elimination of porosity. The tooling necessary for the fabrication of a laminated plate is illustrated, and the influence of fabrication and prepreg properties on the mechanical characteristics of a laminate are indicated. Finally, the types of prepregs available and the processing procedures necessary for them are summarized. S.L.

N82-11120*# National Aeronautics and Space Administration, Washington, D. C.
SILICON CARBIDE AS AN OXIDATION-RESISTANT HIGH-TEMPERATURE MATERIAL. 1: OXIDATION AND HEAT CORROSION BEHAVIOR
J. Schlichting Aug. 1981 11 p Transl. into ENGLISH from Ber. Dtsche. Keram. Ges., West Germany, v. 56, no. 8, 1979 p 196-200 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76608) Avail: NTIS HC A002/MF A01 CSCL 11D

The oxidation and corrosion behavior of SiC (in the form of a SiC powder) and hot-pressed and reaction-bound material were studied. The excellent stability of SiC in an oxidizing atmosphere is due to the development of protective SiO2 coatings. Any changes in these protective layers (e.g., due to impurities, reaction with corrosive media, high porosity of SiC, etc.) lead in most cases to increased rates of oxidation and thus restrict the field of SiC application. Author

N82-11121*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
OPTICAL FIBER INTERFEROMETER FOR THE STUDY OF ULTRASONIC WAVES IN COMPOSITE MATERIALS Final Report, 1 Oct. 1980 - 30 Sep. 1981
Richard O. Claus, Paul S. Zewekh, Tyson M. Turner, Janet C. Wade, Robert T. Rogers, and A. O. Garg Oct. 1981 98 p refs
(Grant NAG1-66)
(NASA-CR-164916) Avail: NTIS HC A05/MF A01 CSCL 11D

The possibility of acoustic emission detection in composites using embedded optical fibers as sensing elements was investigated. Optical fiber interferometry, fiber acoustic sensitivity, fiber interferometer calibration, and acoustic emission detection are reported. Adhesive bond layer dynamical properties using ultrasonic interface waves, the design and construction of an ultrasonic transducer with a two dimensional Gaussian pressure profile, and the development of an optical differential technique for the measurement of surface acoustic wave particle displacements and propagation direction are also examined. For individual titles, see N82-11122 through N82-11133.

N82-11122*# Virginia Polytechnic Inst. and State Univ., Blacksburg.

OPTICAL FIBER INTERFEROMETER FOR THE STUDY OF ULTRASONIC WAVES IN COMPOSITE MATERIALS. DISCUSSION

In its Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 2-6 refs (For primary document see N82-11121 02-24)

Avail: NTIS HC A06/MF A01 CSCL 11D

Ultrasonic waves in composite materials using optical fiber waveguide as the detecting device were studied. The possibility of using embedded probes in composites for nondestructive evaluation is discussed. It is found that interferometric system is sensitive but requires accurate optical positioning at both fiber input and output. E.A.K.

N82-11123*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DETECTION OF ULTRASONIC WAVES IN SOLIDS BY AN OPTICAL FIBER INTERFEROMETER

Richard O. Claus (Virginia Polytechnic Inst. and State Univ., Blacksburg) and John H. Cantrell, Jr. *In* Va. Polytech. Inst. and State Univ. Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 7-11 refs Repr. from IEEE Ultrasonics Symp., 1980 p 719-721 (For primary document see N82-11121 02-24)

Avail: NTIS HC A06/MF A01 CSCL 11D

An optical fiber interferometer was developed for the detection of ultrasonic waves in solids. The optical paths in both the signal and reference arms of the Mach-Zehnder interferometer are through the cores of similar lengths of single mode fiber mode stripped at both input and output. Instantaneous translation of the pattern is proportional to the localized strain produced by ultrasonic bulk waves generated in the disc and integrated along the fiber path. By spatially filtering the moving fringe pattern and synchronously demodulating the filtered optical intensity distirbution, a signal proportional to the integrated strain is obtained. E.A.K.

N82-11124*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DC CALIBRATION OF THE STRAIN SENSITIVITY OF A SINGLE MODE OPTICAL FIBER INTERFEROMETER

Richard O. Claus (Virginia Polytechnic Inst. and State Univ., Blackburg) and John H. Cantrell, Jr. *In* Va. Polytech. Inst. and State Univ. Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 13-15 refs presented at IEEE Region 3 Conf., Huntsville, Ala., Apr. 1981 (For primary document see N82-11121 02-24)

Avail: NTIS HC A06/MF A01 CSCL 11D

The strain sensitivity of an optical fiber interferometer developed for the detection of pulsed ultrasonic waves in solids was calibrated. Light from the output ends of both fibers was superimposed to form an interference fringe pattern that was interrogated in the far field to give a signal proportional to the differential optical fiber path length. Strain sensitivity is determined by comparing data obtained by clamping and bending the bar at different lengths to simple cantilever beam theory. A minimum theoretical detectable strain of less than 10 to the minus 10th power is indicated. E.A.K.

N82-11125*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.

DETECTION OF ACOUSTIC EMISSION IN COMPOSITES BY OPTICAL FIBER INTERFEROMETRY

Janet C. Wade, Paul S. Zerewekhn, and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 17-23 refs Presented at the IEEE Ultrasonic Symp., Chicago, 1981 (For primary document see N82-11121 02-24)

(Grant NSF ECS-79-25340)

Avail: NTIS HC A06/MF A01 CSCL 11D

Acoustic emission in prestressed composite panels using embedded single mode optical fiber was detected. Static loading of the composite matrix produces acoustic emission events, pulsed ultrasonic waves, which mechanically modulate the embedded fiber geometry and phase modulate the transmitted optical field. The modulation is detected by optical interferometry and Fourier optical processing techniques to produce an electronic signal proportional to acoustic field amplitude integrated along the length of the fiber in the specimen. Static and dynamic calibration of the detection system is discussed and frequency domain characterization of the acoustic field interaction with the fiber is presented. E.A.K.

N82-11126*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.

PULSED-ECHO INTERFACE WAVE CHARACTERIZATION OF BOLTED PLATES

Tyson M. Turner, Richard O. Claus, and Stewart L. Ocheltree *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 25-27 refs Presented at the IEEE Region 2 Conf., Huntsville, Ala., Apr. 1981 (For primary document see N82-11121 02-24)

(Grant NSF ECS-79-25340)

Avail: NTIS HC A06/MF A01 CSCL 11D

Ultrasonic waves which propagate along the plane boundary separating two solid substrates were used to characterize aluminum and titanium plates adhesively bonded and bolted together. Wave pulses were used to produce interface waves between the aluminum and a Ti-6Al-4V titanium alloy bar by normal mode conversion. Interface wave reflections from bolt holes drilled through the interface were reconverted to surface wave pulses and detected by the same wedge by standard pulse-echo techniques. Time of flight measurements indicate that the reflected waves are a supersonic of longitudinal modes and circularly symmetric waves that propagate around the bolt hole. E.A.K.

N82-11127*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.

ATTENUATION OF ULTRASONIC INTERFACE WAVES ON METAL-POLYMER-METAL BOUNDARIES

Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 29-34 refs Presented at the 7th Intern. Conf. on Internal Friction and Ultrasonic Attenuation in Solids, Lausanne, Switzerland, 6-9 Jul. 1981 (For primary document see N82-11121 02-24)

(Grant NSF ECS-79-25340)

Avail: NTIS HC A06/MF A01 CSCL 11D

The measured sensitivity of interface wave attenuation to defects near the bondline and to variations in the viscosity of the adhesive layer was compared with theoretical changes predicted by the Rokhin model. Differential interferometric optical measurements of interface wave attenuation due to defects near glass polymer metal boundaries are discussed. Pitch catch and pulse echo methods which use variable angle wedge transducers to generate and receive modified interface waves and to measure large bondline defects and adhesive viscosity are described. E.A.K.

N82-11128*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.

CHARACTERIZATION OF METAL-POLYMER BOUNDARIES USING STONELEY AND LEAKY WAVES

Richard O. Claus *In its* Opt. Fiber Interferometry for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 36-63 refs Presented at the Intern. Symp. on Physicochem. Aspects of Polymer Surfaces, New York, Aug. 1981 (For primary document see N82-11121 02-24)

(Grant NSF ECS-79-25340)

Avail: NTIS HC A06/MF A01 CSCL 11D

Optical and acoustooptical techniques for bonded surface inspection and interface wave detection are discussed. Interface wave propagation models based on viscous, elastic, and viscoelastic mechanical properties are reviewed. Gross boundary anomalies such as large defects and localized disbond regions were measured using conventional high frequency pulse echo and pitch catch ultratechniques. Bond durabilty is estimated by comparing detected wave attenuation versus frequency as a function of prebond surface preparation with the experimental limit obtained for perfect welded contact. Sensitivity of interface acoustic field periodicity to both residual and dc applied stress at the boundary surface is observed as well as hysteresis due to viscoelastic polymeric behavior as the applied stress is cycled. E.A.K.

N82-11129*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.

WAVES GUIDED BY A THIN VISCOELASTIC LAYER BETWEEN ELASTIC SOLIDS

Richard O. Claus and Robert T. Rogers *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 65-69 refs Presented at the IEEE Ultrasonics Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS-79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

The propagation of ultrasonic waves guided along a viscoelastic layer which separates two dissimilar elastic solid half spaces is described. For the limiting cases of rigid and soft bonding by a layer thin compared to acoustic wavelength, Stoneley and independent Rayleigh wave characteristic equations, respectively, result. For combinations of layer rigidity and wave length that correspond to guided wave propagation, external cyclic loading of the layer produces mechanical hysteresis and a resulting dynamic change in bond properties. Measurements of velocity hysteresis in an aluminum polymer adhesive aluminum system are described. E.A.K.

N82-11130*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.

AN ULTRASONIC TRANSDUCER WITH GAUSSIAN RADIAL VELOCITY DISTRIBUTION c04

Paul S. Zerwekh and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 71-73 refs Presented at the IEEE Ultrasonics Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS 79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

A transducer with a velocity profile which is Gaussian as a function of radius and independent of angle is described. In materials evaluation applications requiring the interrogation of modified far field patterns of an ultrasonic transducer, it is desirable to use a transducer which produces a beam with a Gaussian profile. A computer aided electrode design and calibrated three dimensional interferometric optical and ultrasonic measurements of the far field distribution are presented. E.A.K.

N82-11131*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.

OPTICAL DETECTION OF PULSED SURFACE PARTICLE DISPLACEMENTS c04

Paul S. Zewekh and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 78-80 refs Presented at the IEEE Region 3 Conf., Huntsville, Ala., Apr. 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS 79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

The detection of acoustic surface wave pulses by a wideband differential interferometric laser technique which is insensitive to low frequency noise is described. System bandwidth is determined by the relationship between acoustic wavelength and the variable spacing between two laser probe beams focused on the solid surface which supports the waves. Response to an ideal step function displacement is analyzed and experimental measurements of gated 2.5 MHz pulses generated on an aluminized pyrex plate are discussed. E.A.K.

N82-11132*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

WIDEBAND OPTICAL MEASUREMENTS OF ULTRASONIC PULSES

Richard O. Claus (Virginia Polytechnic Inst. and State Univ., Blacksburg) and John H. Cantrell, Jr. *In* Va. Polytech. Inst. and State Univ. Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 82-85 refs Presented at the Ultrasonics Intern., Brighton, Engl., Jun. 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS 79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

Calibrated masurements of acoustic surface wave pulses by wide bandwidth differential interferometry are described. By interrogating the interference pattern formed by superimposing two optical beams reflected from the surface at slightly separated points, an output signal proportional to instantaneous surface particle displacement is obtained. Response to ideal propagating step function displacements is analyzed and measurements of gated pulses are described. E.A.K.

N82-11133*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electric Engineering.

DUAL DIFFERENTIAL INTERFEROMETER FOR MEASUREMENTS OF BROADBAND SURFACE ACOUSTIC WAVES c04

Tyson M. Turner and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 87-89 refs Presented at the IEEE Ultrasonic Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS-79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

A simple dual interferometer which uses two pairs of orthogonally polarized optical beams to measure both the amplitude and direction of propagation of broadband ultrasonic surface waves is described. Each pair of focused laser probe beams is used in a separate wideband differential interferometer to independently detect the component of surface wave motion along one direction on the surface. By combining the two output signals corresponding to both components, the two dimensional surface profile and its variation as a function of time is determined. E.A.K.

N82-11134# Aerospace Corp., El Segundo, Calif. Lab. Operations.

THERMAL EXPANSION OF METAL MATRIX COMPOSITES

E. G. Wolff 1 Aug. 1981 46 p refs
(Contract F04701-80-C-0081)
(AD-A104680; TR-0081(6950-01)-1; SD-TR-81-56) Avail: NTIS HC A03/MF A01 CSCL 11/4

Metal matrix composites offer numerous options in materials performance over the more conventional resin matrix composites; consequently, it is necessary to obtain a complete data base on this class of materials. In this report are described methods and results of thermal expansion measurements. Because theoretical predictions indicate that very low expansion values can be achieved, there is an interest in related thermal measurements, such as thermal cycling behavior, the effects of internal stresses, and microcracking. In particular, there must be adequate experimental accuracy to measure these quantities as a function of fiber-metal system. The advantages of essentially contactless measurement techniques such as Michelson interferometers are presented, including a lack of restriction on sample size or shape. The special requirements in laser characteristics, optics, gaseous and thermal environments, signal processing, and data reduction needed to describe fully low thermal expansion behavior are outlined. Dimensional changes must be measured with an accuracy on the order of + or - .00000001 m. Since differential thermal strains between fiber and matrix have been found to produce stresses that exceed the transverse strength of resin matrixes, a new acousto-optical technique is employed to study microcracking in metal matrix composites at low temperatures concurrently with coefficient of thermal expansion (CTE) measurements. The instrumentation required to analyze high-frequency signals in laser interferometers is described. Experimental results are presented for B-A1, graphite-A1, SiC/Al and graphite-Mg composites.GRA

N82-11135# Manlabs, Inc., Cambridge, Mass.

PHYSICAL CHARACTERIZATION OF ELECTRONIC MATERIALS Final Technical Report, 3 Jan. 1978 - 30 Sep. 1980

S. Andrew Kulin and E. P. Warekois Jul. 1981 43 p refs
(Contract F19628-78-C-0060; AF Proj. 2306)
(AD-A104494; RADC-TR-81-167) Avail: NTIS HC A03/MF A01 CSCL 11/4

Methods were developed to fabricate samples from the glass preforms used as source materials for fiber optics, and analytical methods were adapted to determine the chemistry of those source materials. The fabrication of oriented specimens of seeds resonators, and cells used for the growth and characterization of hydrothermally grown quartz and some other quartz like crystals is described as well as analytical methods used to obtain data

on the characteristics of material grown in a 'skull-melt' type facility. The evaluation of new semiconductor materials and devices involved Auger analysis of deposited materials of deposited films of semiconductor alloys. The vapor-liquid-vapor-solid equilibrium in the cadmium telluride mercury system was also calculated.
GRA

N82-11136# Naval Postgraduate School, Monterey, Calif.
THE EFFECTS OF JET EXHAUST BLAST IMPINGEMENTS ON GRAPHITE-EPOXY COMPOSITES M.S. Thesis
John Michael Hampey Jun. 1981 134 p refs
(AD-A104622) Avail: NTIS HC A07/MF A01 CSCL 11/4

The effect of jet exhaust blasts on graphite epoxy composites (Hercules 3501-6/AS4) is examined. The material degradation of the composites is determined by means of the short beam shear test. The jet exhaust tests were designed to test the worst case conditions for an F-18 aircraft operating off an aircraft carrier. Results indicate that the composites show no significant property changes if the temperature is maintained at less than 2300 C. At temperatures in excess of these, strength degradation occurs. It was also observed that when strength degradation occurs, obvious discoloration and delamination of the composite are evident.
Author (GRA)

N82-11137# Bendix Corp., Kansas City, Mo.
STRESS RELAXATION OF CELLULAR SILICONE MATERIAL: 1981
J. W. Schneider Sep. 1981 21 p refs
(Contract DE-AC04-76DP-00613)
(DE81-030692; BDX-613-2645) Avail: NTIS HC A02/MF A01

The long-term (10 years) stress relaxation properties of cellular silicone materials at room temperature are under evaluation. Both equilibrium (Union Carbide W-97, random copolymer) and condensation (Union Carbide Y-3976, block copolymer) type base polymers are included. Each material was compounded to yield densities of 0.34 and 0.52 g/cm (3) for thickness of 1.17, 1.52, and 2.54 mm. These density-thickness combinations were compressed to nominal compressions of 20 and 40 percent with nine replicates at each condition. A specially-designed fixture is used to maintain a specific compression on the cellular sample and a universal test machine is used to acquire the load data. Currently, the predicted load retention is between 58 and 66 percent of the original load.
DOE

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-11138 Arizona State Univ., Tempe.
A STRUCTURAL STUDY OF ALUMINOSILICATE GLASSES BY RAMAN SPECTROSCOPY Ph.D. Thesis
Paul Francis McMillan 1981 399 p
Avail: Univ. Microfilms Order No. 8122455

A wide range of glasses in the systems CaO-MgO-SiO2 and CaO-Al2O3-SiO2 were studied. Use of a high temperature solar furnace and its rapid quench facility allowed preparation of samples outwith the normal glass forming regions. The CMS system was examined to investigate the behavior of silicate structures with changing composition. Molecular groups were identified by comparison of glass and corresponding crystal spectra, and by consideration of simple vibrational theory. The results for the alkaline earth silicates were compared with those for corresponding alkali silicate systems, and used to construct a model for the vibrational behavior of these systems.
Dissert. Abstr.

N82-11139 Colorado Univ. at Boulder.
THE USE OF LANTHANIDE CHELATES AS SELECTIVE COMPLEXING SORBENTS FOR GAS CHROMATOGRAPHY Ph.D. Thesis
James Edward Picker 1981 158 p
Avail: Univ. Microfilms Order No. 8122316

A coordination polymer of europium with the empirical formula NaEu2(dished)3NO3x was synthesized and found to be suitable for use as a selective complexing sorbent. Experiments were performed to determine the range of analyte volatility over which the sorbent is effective and selective. At selected temperatures, the sorbent can retain very volatile donor species while nondonor species with boiling points 200 C higher are not retained. The sorbent was applied to the separation of complex mixtures arising from fragrances, tobacco smoke, urinary metabolites and gasoline decomposition. In each case passing the mixture through the sorbent resulted in separation of the mixture into retained and nonretained fractions. This separation simplified the chromatography needed for analysis, facilitated mass spectral identification, and, in the case of the gasoline decomposition, made analysis of trace levels of oxygenated compounds possible.
Dissert. Abstr.

N82-11140 Illinois Univ. at Chicago Circle, Chicago.
STUDIES OF THE KINETICS AND MECHANISM OF GAS-SURFACE REACTIONS ON METAL AND METAL OXIDE SURFACES Ph.D. Thesis
Pin Ho 1981 179 p
Avail: Univ. Microfilms Order No. 8120566

The coadsorption of SO2 and CO on Pt is studied by using flash desorption mass spectrometry and auger electron spectroscopy. Sulfur dioxide chemisorbs on clean Pt with an initial sticking probability of unity and with at least three first order, coverage independent binding states with E sub d of 7, 11 and 23 kcal/mole respectively. Carbon monoxide adsorbs on clean Pt with an initial sticking probability of 0.6 and with at least two first order and coverage dependent binding states with E sub d around 18 and 22 kcal/mole respectively. In the coadsorption experiments, the surface reaction proceeds between the adsorbed species to form a complex which dissociates to form CO2 and sulfur. The sulfur diffuses into the bulk of the Pt foil. The complex formation modifies the surface bonding. The E sub d for CO is decreased while the E sub d of the two low temperature binding states for SO2 are increased.
Dissert. Abstr.

N82-11141 Kent State Univ., Ohio.
ADSORPTION OF MIXED LIQUIDS AND SOLIDS FROM WATER SOLUTION ONTO ACTIVATED CARBON Ph.D. Thesis
Mick Greenbank 1981 486 p
Avail: Univ. Microfilms Order No. 8121089

Adsorption was investigated for the following kinds of mixed organic solutes: binary and ternary liquids with complete mutual miscibility, limited miscibility with water, and comparable refractive indices; binary liquid mixtures exhibiting wide differences in refractive index; one binary liquid system (bromoform-molten p-nitrophenol) with limited mutual miscibility; binary liquid solid systems in which the liquid is more strongly adsorbed, including both solid from relatively concentrated liquid and liquid from relatively concentrated solid solution; binary liquid solid systems with solid more strongly adsorbed, including liquids from solutions of solids and solids from solutions of liquids; and one ternary system (1-pentanol-ethyl acetate-coumarin) of two liquids and one solid. The data were compared with the predictions of the ideal adsorbate (IAS) model of Radke and Prausnitz (for which the Polany model leads to improved convenience in calculation) and of several Polanyian based models.
Dissert. Abstr.

N82-11142 Miami Univ., Fla.
THE VOLUMES AND HEAT CAPACITIES OF NONELECTROLYTES AND ORGANIC ELECTROLYTES IN METHANOL AT 25 C Ph.D. Thesis
Raymond Nicholas French 1981 181 p
Avail: Univ. Microfilms Order No. 8121110

A flow heat capacity calorimeter and a flow vibrating tube densimeter was used to measure the apparent molar heat capacities and volumes of 40 nonelectrolytes and 3 organic electrolytes. These quantities were extrapolated to infinite dilution to obtain the standard partial molal heat capacities and volumes. Plots of the Cp sub 2(0) and V sub 2(0) with the number CH2

group which was found to be constant for all four series.
Dissert. Abstr.

N82-11143 Georgetown Univ., Washington, D.C.
VIBRATIONAL SENSITIZATION OF OF 14N14NO, 15N14NO AND H2O BY LASER EXCITED SF6 Ph.D. Thesis
Asghar Faldr 1981 257 p
Avail: Univ. Microfilms Order No. 8122465

Fluorescence from N-14 N-14O, N-15 N-14O and H2O molecules as probes in mixtures of each of these species with SF6 was monitored following excitation of the SF6 by a CO2 laser pulse. The fluorescence monitors the availability of input energy in the vibrational states of SF6 and the time scale on which this energy can excite states in probe molecules. Rapid, selective, collision-dependent excitation of N-14N-14O by vibrationally excited SF6 was observed. The time dependence of the N-14N-14O fluorescence at 4.5 micrometers consists of three distinct phases. A very rapid rise depends on the pressure of each component and is dominated by the SF6 dependent contribution of 2290 m sec N-14n-14O torr(SF6). The N-14N-14O contribution to the observed rise-rate is 65 m sec N-14N-14O. Subsequently, the second phase is a rapid fall in the fluorescence intensity governed by V to V processes that redistribute the energy among the SF6 vibrational modes with a rate of 644 m sec N-14N-14O torr(SF6). Finally a slow V to T,R process is observable as the residual fluorescence, after the rapid rise and initial fall.
Dissert. Abstr.

N82-11144* National Aeronautics and Space Administration. Pasadena Office, Calif.
FLUIDIZED BED COAL COMBUSTION REACTOR Patent
Philip I. Moynihan (JPL, California Inst. of Technology, Pasadena) and Donald L. Young, inventors (to NASA) (JPL, California Inst. of Technology Pasadena) Issued 8 Sep. 1981 7 p Filed 15 Dec. 1978 Supersedes N79-14388 (17 - 05, 0601) Sponsored by NASA
(NASA-Case-NPO-14273-1; US-Patent-4,287,838;
US-Patent-Appl-SN-969759; US-Patent-Class-110-234;
US-Patent-Class-110-255; US-Patent-Class-110-266;
US-Patent-Class-110-245; US-Patent-Class-122-4D) Avail: US Patent and Trademark Office CSCL 21B

A fluidized bed coal reactor includes a combination nozzle-injector ash-removal unit formed by a grid of closely spaced open channels, each containing a worm screw conveyor, which function as continuous ash removal troughs. A pressurized air-coal mixture is introduced below the unit and is injected through the elongated nozzles formed by the spaces between the channels. The ash build-up in the troughs protects the worm screw conveyors as does the cooling action of the injected mixture. The ash layer and the pressure from the injectors support a fluidized flame combustion zone above the grid which heats water in boiler tubes disposed within and/or above the combustion zone and/or within the walls of the reactor.
Official Gazette of the U.S. Patent and Trademark Office

N82-11145*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
COAL DESULFURIZATION BY LOW TEMPERATURE CHLORINOLYSIS, PHASE 3 Technical Report, 1 Mar. 1980 - 1 Mar. 1981
John Kalvinskas, Naresh Rohatgi, and John Ernest 1 Mar. 1981 170 p refs Sponsored by NASA
(Contract DE-AI01-77ET-12547)
(NASA-CR-164957; JPL-Pub-81-82; DOE/ET-12547/1) Avail: NTIS HC A08/MF A01 CSCL 07D

Laboratory scale, bench scale batch reactor, and minipilot plant tests were conducted on 22 bituminous, subbituminous, and lignite coals. Chemical pretreatment and post treatment of coals relative to the chlorination were tried as a means of enhancing desulfurization by the chlorinolysis process. Elevated temperature (500-700 C) hydrogen treatment of chlorinolysis-processed coal at atmospheric pressure was found to substantially increase coal desulfurization up to 90 percent. Sulfur forms, proximate and ultimate analyses of the processed coal are included. Minipilot plant operation indicates that the continuous flow reactor provides coal desulfurization results comparable to those obtained in the batch reactor. Seven runs were conducted at coal feed rates of 1.5 to 8.8 kg per hour using water and methylchloroform solvents, gaseous chlorine feed of 3 to 31.4 SCFH at 21 to 70 C, and atmospheric pressure for retention times of 20 to 120 minutes.
Author

N82-11146*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ASSESSMENT OF ADVANCED COAL GASIFICATION PROCESSES
John McCarthy, Joseph Ferrall, Thomas Charng, and John Houseman Jun. 1981 200 p refs Sponsored in part by DOE and JPL
(Contracts NAS7-100; DE-AI21-77ET-13032; JPL Proj. 5030-470)
(NASA-CR-164949; JPL-Pub-81-45; DOE/ET-13032/2) Avail: NTIS HC A09/MF A01 CSCL 07D

A technical assessment of the following advanced coal gasification processes is presented: high throughput gasification (HTG) process; single stage high mass flux (HMF) processes; (CS/R) hydrogasification process; and the catalytic coal gasification (CCG) process. Each process is evaluated for its potential to produce synthetic natural gas from a bituminous coal. Key similarities, differences, strengths, weaknesses, and potential improvements to each process are identified. The HTG and the HMF gasifiers share similarities with respect to: short residence time (SRT), high throughput rate, slagging, and syngas as the initial raw product gas. The CS/R hydrogasifier is also SRT, but is nonslagging and produces a raw gas high in methane content. The CCG gasifier is a long residence time, catalytic, fluidbed reactor producing all of the raw product methane in the gasifier.
S.L.

N82-11147*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
STATIC CONTINUOUS ELECTROPHORESIS DEVICE Patent Application
Percy H. Rhodes, inventor (to NASA) Filed 6 Oct. 1981 19 p
(NASA-Case-MFS-25306-1; US-Patent-Appl-SN-309293) Avail: NTIS HC A02/MF A01 CSCL 07D

A separation chamber which includes a pair of spaced opposed moving walls which entrain the fluid to flow as a rigid body with minimized distortion and spaced opposed side walls is carried within a water-tight enclosure housing which contains the electrolytic buffer solution. A pair of substrate assemblies include opposed front substrate walls facing the separation chamber. Endless traveling belts are carried by the substrate assemblies defining the moving wall structure. By means of a vacuum which communicates with the front substrate walls through vacuum ports, the traveling belts are held positively sealed against the substrate walls so as to avoid and prevent leakage behind the belts. The walls are prevented from bowing. The moving belts are covered with a thin layer of low zeta-potential covering coating material such as methylcellulose with is advantageous in reducing the electroosmosis effect.
NASA

N82-11148# Babcock and Wilcox Co., Alliance, Ohio. Research and Development Div.
COMPUTATIONAL TOOLS FOR PULVERIZED-COAL COMBUSTION Quarterly Report, Mar. - Jun. 1981
W. J. Oberjohn, W. Fiveland, D. K. Cornelius, J. H. Wang, and R. J. Schnipke Jul. 1981 144 p refs
(Contract DE-AC22-81PC-40265)
(DE81-028582; DOE/PC-40265/1; QR-1) Avail: NTIS HC A07/MF A01

A computer code capable of modeling the major aspects of pulverized coal combustion was developed. The combustion model (COMO) consists of a number relatively independent modules that represent the major processes involved in pulverized coal combustion. Version one of COMO is used primarily to determine a satisfactory means of integrating the numerical models of the combustion processes into an overall combustion model. Detailed task descriptions were prepared, literature searches conducted, and process models selected for version one. The formulation and coding of the models was initiated and, in some cases, comparisons with data and other predictions were made. Code development guidelines were prepared and reviewed. The guidelines present the information required to allow process modules to be developed relatively independently, while providing for the subsequent integration of these modules into COMO. DOE

N82-11149# Battelle Pacific Northwest Labs., Richland, Wash.
TECHNIQUES FOR GEOTHERMAL LIQUID SAMPLING AND ANALYSIS
C. H. Kindle and E. M. Woodruff Jul. 1981 102 p refs
(Contract DE-AC06-76RL-01830)
(DE81-030151; PNL-3801) Avail: NTIS HC A06/MF A01

A methodology was developed that is particularly suited to liquid-dominated resources and adaptable to a variety of situations. It is intended to be a base methodology upon which variations can be made to meet specific needs or situations. The approach consists of recording flow conditions at the time of sampling, a specific insertable probe sampling system, a sample stabilization procedure, commercially available laboratory instruments, and data quality check procedures. DOE

N82-11150# Oak Ridge Y-12 Plant, Tenn. Development Div.
SURFACE ANALYSIS BY FOURIER TRANSFORM INFRARED (FTIR) SPECTROSCOPY
G. L. Powell, N. R. Smyrl, and E. L. Fuller 12 Aug. 1981 32 p refs
(Contract W-7405-eng-26)
(DE81-025741; Y/DU-192) Avail: NTIS HC A03/MF A01

A diffuse-reflectance capability for the Fourier transform infrared spectrometer at the Y-12 Plant Laboratory was implemented. A sample cell with a 25 to 400 C temperature-controlled sample stage and an ultrahigh-vacuum-to-atmospheric pressure gas-handling capability was developed. Absorbance of light from the spectrometer beam, resulting from the beam being scattered from a powder sample, can be measured. This capability of detecting molecular species on and in powders is to be used to compounds. Cell design is described along with experiments demonstrating its performance in detecting moisture absorption on uranium oxide, moisture and carbon dioxide absorption on the lithium hydride/hydroxide system, and carbon dioxide absorption on potassium borohydride. DOE

N82-11151# Oak Ridge National Lab., Tenn. Engineering Div.
TENNESSEE VALLEY AUTHORITY ATMOSPHERIC FLUIDIZED-BED COMBUSTOR SIMULATION Interim Annual Report, 1 Jan. - 31 Dec. 1980
J. W. Wells, M. H. Culver (Georgia Inst. of Technology), and R. P. Krishnan Sep. 1981 263 p refs
(Contract W-7405-eng-26)
(DE81-030262; ORNL/TM-7847) Avail: NTIS HC A12/MF A01

The development of a steady-state mathematical model with the capability of predicting trends in bed performance under various feed and operating conditions is discussed. Three additional predictive subcodes were developed: the SO2 capture subcode, the NO/sub x/ emissions subcode, and the freeboard subcode. The following subcodes were combined to form an overall simulation code of the AFBC bed: (1) bubble growth subcode; (2) elutriation-attrition subcode; (3) coal combustion subcode; (4) SO2 capture subcode; and (5) NO/sub x/ emissions subcode. An energy balance routine was added to the combined code. The resulting overall bed simulation is capable of predicting how some of the important operating variables affect AFBC's performance. The freeboard model was combined with the overall bed simulation and is currently being debugged. DOE

N82-11152# Illinois Univ. at Chicago Circle, Chicago.
VERTICAL COMBUSTOR FOR REFUSE COMBUSTION
Paul M. Chung Jun. 1981 64 p refs Prepared for Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE81-030002; ANL/CNSV-TM-80) Avail: NTIS HC A04/MF A01

A vertical combustor for refuse-particle combustion was analyzed for waste-to-energy recovery. A one dimensional model was constructed that consisted of fuel particles, inert solid particles, and the gaseous mixture. The gaseous mixture was divided further into six chemical species that are involved in combustion at temperatures below about 2000 F. It was concluded that such combustors may be viable in the United States since US refuse contains large amounts of volatile matter. Combustion of the relatively small char, however, may not be cost-effective in the present combustor where the fuel residence time is on the order of 2 s for a combustor height of 20 to 30 ft. A computer solution was designed to optimized a given combustor system. A simplified version of the solution was programmed for a TI-59 programmable hand calculator for field use. DOE

N82-11153# Stanford Univ., Calif. Petroleum Research Inst.
ALGORITHM FOR COMPUTING IN-SITU COMBUSTION OIL RECOVERY PERFORMANCE
Mohammed R. Fassihi, Brian D. Gobran, and Henry J. Ramey, Jr. Oct. 1981 29 p refs
(Contract DE-AC03-76ET-12056)
(DE81-030340; DOE/ET-12056/25; SU-SUPRI-TR-25) Avail: NTIS HC A03/MF A01

An algorithm was developed to estimate the in-situ combustion performance in the field. A calculator program was prepared using this algorithm. The program is efficient, simple and accurate. Given estimates of fuel concentration, air/fuel ratio, gas and oil saturations, and injection rate, for each volume burned, oil recovery, air requirement, and time may be calculated. DOE

N82-11154# Massachusetts Inst. of Tech., Oak Ridge, Tenn. School of Chemical Engineering Practice.
ALUMINUM RECOVERY FROM FLY ASH AND SHALE-RETORT WASTES
J. L. Plewsky, R. K. Helling, and M. E. Tsui Jul. 1981 72 p refs
(Contract W-7405-eng-26)
(DE81-027675; ORNL/MIT-331) Avail: NTIS HC A04/MF A01

The sparge-crystallization step in a proposed process for aluminum recovery from fly ash was studied. The effect of various feeds and HCl concentration on the solubility of six metal ions was investigated, and the yield and purity of the crystals obtained. Significant improvements in data consistency were obtained over previous work on this system. Multistage crystallization and washing will be necessary to achieve removal of K and Mg to meet product specification. The replacement of ferric ion with ferrous ion produced an increase in Mg solubility, leading to the conclusion that more work is required with ferrous feeds and with multistage crystallizations. Experiments with leachate from oil-shale-retort residues produced 99.87% aluminum purity. A predictive correlation proposed by Meissner was used to predict solubilities of pure and mixed salts in hydrochloric acid solutions. Modification of the correlation's parameters yielded excellent agreement with theory for the AlCl3-HCl system. DOE

N82-11155# Hydrogen Consultants, Inc., Denver, Colo.
HYDRIDE CHEMICAL COMPRESSOR, PHASE 1 Final Report
F. E. Lynch, R. A. Nye (Denver Research Inst.), and P. P. Turillon (ERGENICS) Jan. 1981 43 p refs Prepared for Brookhaven National Lab.
(Contract DE-AC02-76CH-00016)
(DE81-030199; BNL-51369) Avail: NTIS HC A03/MF A01

A proof-of-concept, bench-size hydride chemical compressor consists of two electrically heated tube bundles each containing 15 kg of hydriding alloys. The tube bundles are alternately heated and cooled in order to provide continuous output of high pressure hydrogen. Electrical resistance heating was selected for ease of demonstration and testing. In continuous operation, the compressor delivered 20.3 liters/min (43 SCFH) of hydrogen at a pressure of 42.2 atmospheres (650 psia). A step-by-step analysis of the parameters affecting overall efficiency shows that the major factors are the thermal mass of the system, the fraction of hydride decomposed at high temperature, and the losses by radiation and thermal convection. DOE

N82-11156# Tufts Univ., Medford, Mass. Dept. of Chemical Engineering.
STUDIES FOR THE STABILIZATION OF COAL-OIL MIXTURES Final Report, Aug. 1978 - May 1981
G. D. Botsaris, Y. M. Glazman, and M. Adams-Viola 1981 436 p refs
(DOE/ET-10746/T1) Avail: NTIS HC A19/MF A01

A fundamental understanding of the stabilization of coal-oil mixtures (COM) was developed. Aggregation of the coal particles was determined to control both the sedimentation and rheological propeties of the COM. The wettability of coal powders was evaluated by the Pickering emulsion test and spherical agglomeration test to assess its effect on the stability of various COM formulations. Sedimentation stability of hydrophilic coal-oil-water mixturos (COWM) involves the formation of water bridges between the coal particles, while less stabilization of oleophilic COWM is achieved by the formation of an emulsion. Anionic surface active agents (SAA) were least sensitive to the coal type and enhanced the aggregation stability of the suspension. The effect of cationic SAA, nonionic SAA and polymer additives depended upon the specific chemical structure of the SAA, the water content of the COM, and the type of coal. The sedimentation stability of ultrafine COM was not directly due to the fineness of the powder but due to the formation of a network of floculated particles. DOE

N82-11157# Oak Ridge National Lab., Tenn.

SCIENTIFIC INNOVATION AND RESONANCE IONIZATION SPECTROSCOPY

C. R. Richmond 1981 16 p refs Presented at Symp. on Resonance Ionization Spectry. and its Appl., Gatlinburg, Tenn., 2 Jun. 1981
(Contract W-7405-eng-26)
(DE81-023193; CONF-810668) Avail: NTIS HC A02/MF A01

An account is presented of the development and applications of resonance ionization spectroscopy and one atom detection. The process of technology transfer is examined. DOE

N82-11158# Polytechnic Inst. of New York, Farmingdale. Aerodynamics Labs.

ONE-DIMENSIONAL EQUILIBRIUM-CHEMISTRY FLOW MODEL FOR COAL COMBUSTORS

P. M. Sforza, M. Smorto, and W. Peter May 1981 108 p refs
(Contracts DE-AC01-78ET-11056; ET-78-C-01-3084)
(DE81-027622; DOE/ET-11056/T5; POLY-M/AE-81-8) Avail: NTIS HC A06/MF A01

A quasi one dimensional steady flow analysis for high temperature coal combustors was developed. Results for the case of global heat release based on fuel heating value were compared to those obtained with a finite rate chemical reaction combustor analysis and reasonable agreement between the two was demonstrated. An existing chemical equilibrium computer code was then coupled to the one dimensional gas dynamic code to improve the accuracy of the required thermodynamic and chemical input data; the coupled code is called COMBUSTOR. The second stage or a coal fired MHD combustor designed for large scale operation was modeled by means of the COMBUSTOR code for cases with and without heat transfer, and for varying amounts of potassium carbonate seed injection. Results for combustor exit temperature, composition, velocity, and electrical conductivity from the model are shown to agree well with those obtained in the operational combustor. DOE

N82-11159# Rockwell International Corp., Golden, Colo. Energy Systems Group.

AUTOMATION OF ELECTRON DIFFRACTION ANALYSIS IN AN ANALYTICAL ELECTRON MICROSCOPE

M. J. Carr Jul. 1981 17 p refs Presented at 16th Ann. Conf. of the Microbeam Analysis Soc., Vail, Colo., 13 Jul. 1981
(Contract DE-AC04-76DP-03533)
(DE81-027255; RFP-3188; CONF-810705-6) Avail: NTIS HC A02/MF A01

The concept of gathering and analyzing electron diffraction patterns in an AEM by using a computer to digitally control the operation of a set of post-projector lens scan coils is outlined. By digitally controlling the deflection of a static selected area diffraction pattern either to a fixed reference point or in a reduced raster over the apertured STEM detector, a set of electronic signals may be generated which contain information of the form I = f(x,y). Not only can this signal be rapidly processed to provide realtime analyses of diffracted distances and angles of spots in the pattern, but also the operator maintains control over the scanning coils (via joystick) allowing only selected spots to be gathered and analyzed, thus facilitating the analysis of imperfect multiple patterns. The hardware and software are described and preliminary results and current limitations are discussed. DOE

N82-11160# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.

SUBMICRON-PARTICLE ABSORPTION SPECTROSCOPY BY PHOTOTHERMAL MODULATION OF MIE SCATTERED LIGHT

A. J. Campillo and H. B. Lin 1981 4 p refs Presented at the Conf. on Lasers and Electro-Optics, Washington, D.C., 10 Jun. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025096; BNL-28979; CONF-810613-7) Avail: NTIS HC A02/MF A01

In situ particle specific absorption spectroscopy is performed using a CO2 laser to photothermally modulate visible MIE scattered light. This scheme is appropriate for ambient sulfate particulate analysis. DOE

N82-11161# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.

BRAGG CURVE SPECTROSCOPY

C. R. Gruhn May 1981 27 p Presented at the INS Intern. Conf. on Radiation Detectors, Tokyo, 23-28 Mar. 1981
(Contract W-7405-eng-48)
(DE81-025827; LBL-12678; CONF-810351-3) Avail: NTIS HC A03/MF A01

An alternative utilization is presented for the gaseous ionization chamber in the detection of energetic heavy ions, which is called Bragg Curve Spectroscopy (BCS). Conceptually, BCS involves using the maximum data available from the Bragg curve of the stopping heavy ion (HI) for purposes of identifying the particle and measuring its energy. A detector was designed that measures the Bragg curve with high precision. From the Bragg curve the range from the length of the track, the total energy from the integral of the specific ionization over the track, the dE/dx from the specific ionization at the beginning of the track, and the Bragg peak from the maximum of the specific ionization of the HI are determined. This last signal measures the atomic number, Z, of the HI unambiguously. DOE

N82-11162# Los Alamos Scientific Lab., N. Mex.

NUMERICAL MODEL STUDY OF BURNING AND DETONATION IN SMALL PETN-LOADED ASSEMBLIES

Charles A. Forest Jul. 1981 25 p refs
(Contract W-7405-eng-36)
(DE81-028594; LA-8790) Avail: NTIS HC A02/MF A01

A simple model was used in the 2DL code to calculate the burning and detonation in Robert Dinegar's all-PETN hot-wire assemblies. The model includes: (1) a constant velocity ignition front; (2) conductive X = BP/sup n/ burn of particles behind the ignition front; (3) inertial confinement; and (4) shock initiation of detonation in the assembly transition tube PETN charge. The surface-to-volume ratio of the burning particles and the ignition front velocity were varied in a parameter study of the model. DOE

N82-11163# Oak Ridge National Lab., Tenn. Atomic, Molecular and High Voltage Physics Group.

ELECTRON ATTACHMENT AS A PROBE OF PHOTOIONIZATION PROCESSES IN LIQUID MEDIA

K. Siomos, G. A. Kourouklis, and L. G. Christophorou 1981 7 p refs Presented at the 2nd Intern. Swarm Seminar, Oak Ridge, Tenn., 22 Jul. 1981
(Contract W-7405-eng-26)
(DE81-026352; CONF-810720-3) Avail: NTIS HC A02/MF A01

The effects of electron attaching additives on the photoionization threshold of pyrene in seven liquid media comprising a dielectric hydrocarbon liquid and an electron attaching additive, A, were studied. The photoionization threshold, I/sub L/, was found to be independent of the dielectric hydrocarbon liquid and the concentration of each A used. On the basis of these data, it is concluded that in the presence of an efficient A at high concentrations, the photoejected electron is captured by A at times shorter than those required for electron solvation (or any possible trapping by the solvent) and that the photoionization process for a solute molecule in these dielectric liquids is probably completed at times < or = 10 to the -14th power and > or = 10 to the -16th power s and its energetics are rather independent of the bulk properties of these liquids. DOE

N82-11164# AeroChem Research Labs., Inc., Princeton, N. J.
SOOT FORMATION IN SYNFUELS Quarterly Report, 1 Jan. - 31 Mar. 1981
D. B. Olson Aug. 1981 21 p refs Prepared in cooperation with the Pittsburgh Energy Technology Center, Pa.
(Contract DE-AC22-80PC-30304)
(DE81-030273; DOE/PC-30304/2; QR-2) Avail: NTIS HC A02/MF A01

An experimental program is underway to study the effects of molecular structure, pressure, and temperature on soot production in laboratory flames of selected synfuel component hydrocarbons. The objective of Task I is to measure the Threshold Sooting Index, flame temperature, and soot concentration for some 50 fuels in premixed and diffusion flames. During this reporting period a new liquid metered fuel vaporizer was built and tested to replace a boiler-type fuel system that failed to perform adequately. The three wavelength optical probe for measuring emission temperatures and soot concentrations was built and calibrated against a tungsten lamp. Sampling probes for the mass spectrometer being used in Task II for flame structure analysis were tested this period. The 900 stainless steel sampling probes failed due to overheating to 1200 probes were built (with thicker walls and a higher temperature steel alloy). A new electrostatic lens system to focus the flame ions into the mass filter was also built and installed in the apparatus. Author

N82-11165# Gulf Research and Development Co., Pittsburgh, Pa.
INVESTIGATION OF MECHANISMS OF HYDROGEN TRANSFER IN COAL HYDROGENATION Annual Progress Report, Feb. 1980 - Feb. 1981
D. C. Cronauer, R. I. McNeil, D. C. Young, and R. G. Ruberto Jul. 1981 72 p refs
(Contract DE-AC22-80PC-30080)
(DE81-030492; DOE/PC-30080/4) Avail: NTIS HC A04/MF A01

Hydrogen transfer experiments using Powhatan No. 5 bituminous coal (Pittsburgh Seam) and labeled solvents are complete. The liquefaction runs with d4-tetrain were made at temperatures of 300 to 4500 C and at run times of 0, 10 and 30 min; additional runs were made with d12-tetralin at 400 and 4500 C. Product samples were examined by (2)H-NMR to observe the site of deuterium transfer. The relative distribution of deuterium was primarily influenced by reaction temperature and not run time in spite of a major change in the absolute amount of hydrogen transfer with run time. Much of bituminous coal liquefaction occurs during the reactor heat-up time even though a low level of hydrogen transfer occurs. Therefore, the subsequent hydrogen (deuterium) distribution is strongly influenced by up-grading type reactions that occur. Hydrogen/deuterium exchange occurs to a sizable level at the severe conditions of coal liquefaction; this strongly affects the distribution of deuterium in the products. This exchange is enhanced by the pressure of heavy aromatic species and by mineral matter and unconverted coal solids DOE

N82-11166# Virginia Polytechnic Inst. and State Univ., Blacksburg.
DEVELOPMENT AND APPLICATION OF ANALYTICAL TECHNIQUES TO CHEMISTRY OF DONOR SOLVENT LIQUEFACTION Quarterly Progress Report, Apr. - Jun. 1981
H. C. Dorn and L. T. Taylor Aug. 1981 19 p refs
(Contract DE-AC22-80PC-30041)
(DE81-029125; DOE/PC-30041/T6) Avail: NTIS HC A02/MF A01

On-line IC-(h-1) nmr analysis of coal recycle solvents is presented. This technique is also complimented with a gas chromography-mass spectroscopic analysis of off-line LC fractions. DOE

N82-11167# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemistry.
DEVELOPMENT AND APPLICATION OF ANALYTICAL TECHNIQUES TO CHEMISTRY OF DONOR SOLVENT LIQUEFACTION Quarterly Progress Report, Jan. - Mar. 1981
H. C. Dorn and L. T. Taylor Jul. 1981 20 p refs
(Contract DE-AC22-80PC-30041)
(DE81-025961; DOE/PC-30041/T5) Avail: NTIS HC A02/MF A01

The operation of modern superconducting magnet based spectrometers in the liquid chromatography-proton nuclear magnetic resonance spectroscopy (LC-(1)H) NMR mode is fairly simple. In light of the considerable improvements made in this technique, LC-(1)H NMR has shown itself to be quite useful in fuel analysis. The limits of detection are now sufficiently low to be near that of the refractive index detector. Improvements in resolution (both chromatographic and spectroscopic) have made speciation within a class possible. The LC-(1)H NMR technique increases the convenience and reliability of determining the average degree of substitution. Results are reported of runs made on a jet fuel and a model mixture which was prepared by mixing n-butylbenene, m-xylene, tetralin, naphthalene, dodecane, isooctane, n-hexane, nonane, hexadecane and n-pentane. DOE

N82-11168# Air Products and Chemicals, Inc., Allentown, Pa.
CATALYST AND REACTOR DEVELOPMENT FOR A LIQUID-PHASE FISCHER-TROPSCH PROCESS Quarterly Technical Progress Report, 1 Jan. - 31 Mar. 1981
J. W. Brockington, Paul N. Dyer, Ronald Pierantozzi, Barry W. Brian, and Jeffrey V. Bauer Apr. 1981 47 p refs
(Contract DE-AC22-80PC-30021)
(DE81-028209; DOE/PC-30021/T4) Avail: NTIS HC A03/MF A01

The computerized literature search of Fischer-Tropsch literature was continued, refinements in analytical procedures were implemented, the first 300 mL slurry reactor was completed, and catalyst screening tests were begun in the 15 mL gas-phase tubular reactor. Two of ten modified conventional slurry catalysts were prepared. Two batches of one of these catalysts, representing different pretreatment procedures, and a baseline Fischer-Tropsch catalyst were tested in the gas phase reactor. Eight metal cluster catalysts were screened in a gas phase reactor. Construction of the cold flow reactor simulator was completed and initial experiments begun. The persistent foaming problem associated with the use of kerosene as a cold flow liquid was overcome by using a C (9)-C11 isoparaffin mixture instead of kerosene. DOE

N82-11169# Argonne National Lab., Ill. Fossil Energy Program Dept.
MATERIALS TECHNOLOGY FOR COAL-CONVERSION PROCESSES Progress Report, Jan. - Mar. 1981
W. A. Ellingson Jun. 1981 47 p refs
(Contract W-31-109-eng-38)
(DE81-028474; ANL-81-30) Avail: NTIS HC A03/MF A01

Microprobe studies of reaction layers on refractories exposed to a high (20 wt percent) iron oxide acidic coal slag suggest that the amount of iron oxide in the reaction layer immediately adjacent to the slag increases significantly as the chromia content in the refractory increases. Waveguides were installed at the SRC pilot plant to monitor erosive wear. Installation of the ANL-designed erosion scanner at the Exxon Coal Liquefaction Pilot Plant was completed. Nondestructive tests of the HYGAS high-pressure cyclone separator showed that the cyclone internal cone has eroded through in some areas. Evaluation of wear of the METC tar-separator cyclones and solids-separator cyclone continued; the addition of B4C hardfacing has reduced the wear rate in one of the tar cyclones. Preliminary tests were conducted on the capability of an electromagnetic acoustic transducers to measure wall thickness. Work on passive acoustic methods to detect leaks in block valves continued. Work continued to evaluate the effect of combustion gas stoichiometry and deposits on the corrosion behavior of air and steam heat-exchanger tubes. Results indicate that high-chromium alloys such as Type 310 stainless steel exhibit a protective Cr oxide layer in the absence of a deposit. DOE

N82-11170# National Bureau of Standards, Washington, D.C. Center for Thermodynamics and Molecular Science.
SELECTED VALUES OF CHEMICAL THERMODYNAMIC PROPERTIES: COMPOUNDS OF URANIUM, PROTACTINIUM, THORIUM, ACTINIUM, AND THE ALKALI METALS Final Report
D. D. Wagman, W. H. Evans, V. B. Parker, R. H. Schumm, and R. L. Nuttall May 1981 153 p refs
(PB81-223463; NBS-TN-270-8) Avail: NTIS HC A08/MF A01 CSCL 07D

Tables of recommended values for the standard enthalpies (heats) of formation, Gibbs free energies of formation, entropies, enthalpy contents and heat capacities at 298.15 K, and enthalpies of formation at zero K for compounds of uranium, protactinium, thorium, actinium, lithium, sodium, potassium, rubidium, cesium, and francium are given. GRA

N82-11171# Lafayette Coll., Easton, Pa. Dept. of Chemistry.
MANUAL OF ANALYTICAL QUALITY CONTROL FOR PESTICIDES AND RELATED COMPOUNDS IN HUMAN AND ENVIRONMENTAL SAMPLES
Joseph Sherma Apr. 1981 468 p refs
(Contract EPA-68-02-2474)
(PB81-222721; EPA-600/2-81-059) Avail: NTIS HC A20/MF A01 CSCL 07D

A systematic protocol for the quality control of analytical procedures and the problems that arise in the analysis of human or environmental media is provided, as well as a guide to the latest and most reliable methodology available for the analysis of pesticide residues in these and other sample matrices. Inter- and intra-laboratory quality control, the evaluation and standardization of materials used, and the operation of the gas chromatograph are highlighted. Many aspects of the problem areas involved in extraction and isolation techniques for pesticides in various types of samples are discussed. Techniques for confirming the presence or absence of pesticides in sample materials are treated. Gas chromatograph servicing and troubleshooting is covered. The value and need for systematic training programs for pesticide chemists is discussed. GRA

N82-11172# National Bureau of Standards, Washington, D.C. Chemical Thermodynamics Div.
A COMPILATION OF THERMODYNAMIC AND TRANSPORT PROPERTIES OF AQUEOUS SULFURIC ACID
Bert R. Staples and Theresa F. Wobbeking Aug. 1980 27 p
(Contract EW-78-X-03-0509)
(PB81-229171; NBSIR-81-2276) Avail: NTIS HC A03/MF A01 CSCL 07D

A detailed compilation of approximately 200 sources of data for the thermodynamic and transport properties of aqueous sulfuric acid is presented. All ranges of temperature, concentration, and pressure are included. GRA

N82-11173# National Bureau of Standards, Washington, D.C. Chemical Stability and Corrosion Div.
MASS SPECTROMETRIC STUDIES OF MHD SLAG THERMOCHEMISTRY Interim Report
J. W. Hastie and E. R. Plante Jun. 1981 36 p refs
(PB81-221434; NBSIR-81-2293) Avail: NTIS HC A03/MF A01 CSCL 07D

The following potassium-containing systems were studied: binary mixtures of K_2O with SiO_2, Al_2O_3, Fe_2O_3, and ZrO_2; a series of more complex synthetic slags containing K_2O, SiO_2, CaO, MgO, Al_2O_3, and Fe_2O_3; and MHD channel slag (Illinois No. 6 coal); and several slag-NaCl mixtures. Data were obtained over a sufficiently wide range of component-type, composition and temperature to reveal systematic trends in slag activities from which empirical predictions are possible. However, anomalous behavior was also noted, mainly in the form of nonequilibrium effects. Application of the vaporization and activity data to plasma-slag interaction and to the recovery of potassium seed from slag is also considered. GRA

N82-11174# Bureau of Mines, Albany, Oreg.
HIGH-TEMPERATURE ENTHALPY AND X-RAY POWDER DIFFRACTION DATA FOR ALUMINUM SULFIDE (Al_2S)
M. J. Ferrante and R. A. McCune May 1981 17 p refs
(PB81-226250; BM-RI-8526) Avail: NTIS HC A02/MF A01 CSCL 07D

High-temperature enthalphy and X-ray power diffraction studies are conducted on aluminum sulfide (Al_2S_3), to provide data for the advancement of mineral technology consistent with environmental preservation and energy conservation. GRA

N82-11175# Coordinating Research Council, Inc., Atlanta, Ga.
INFORMATIONAL REPORT ON THE MEASUREMENT AND CHARACTERIZATION OF DIESEL EXHAUST EMISSIONS
J. M. Perez, F. J. Hills, D. Schuetzle, and R. L. Williams Dec. 1980 286 p refs
(PB81-221251; CRC-APRAC-CAPI-1-64-517) Avail: NTIS HC A13/MF A01 CSCL 07D

Guidance on selection of methods for collection and analysis of the constituents in diesel exhaust to enable a complete chemical characterization of the exhaust is provided. A thorough review of the state of the art for measuring diesel emissions was prepared. Methods were compiled and their engineering applicability was evaluated. Available methods were reviewed to establish the state of the art. In some cases, sufficient documentation for the use of the method was available in the literature. In other cases, cooperative round-robin testing of the method was conducted and these findings are reported. The methods allow complete assessment of the constituents that are of current interest in diesel exhaust. GRA

N82-11176# Radian Corp., Austin, Tex.
RESPONSE OF PORTABLE VOC ANALYZERS TO CHEMICAL MIXTURES Final Report, Dec. 1980 - May 1981
D. A. DuBose, G. E. Brown, and G. E. Harris Jun. 1981 61 p refs
(Contract EPA-68-02-3171-28)
(PB81-234262; EPA-600/2-81-110) Avail: NTIS HC A04/MF A01 CSCL 14B

The responses of two types of portable volatile organic compounds analyzers, calibrated with methane and used to measure a variety of chemical vapor mixtures, instrument response data for both binary and ternary mixtures of selected chemicals are presented. Various empirical models were evaluated to determine an appropriate method of estimating mixture concentration based, on instrument response. The evaluation concludes that the instrument response for a mixture falls between the response expected for the pure compounds in the mixture. Thus, an interpolation or weighted average model is used to predict the response for mixtures based on known responses for individual chemicals. Both linear and logarithmic weighted average models are applied to the data and present with estimates of accuracy. In general, these models predict the instrument response to within 30% of the observed value. GRA

N82-11177# National Bureau of Standards, Washington, D.C. National Measurement Lab.
ENERGY DISPERSIVE X-RAY SPECTROMETRY: PROCEEDINGS OF A WORKSHOP ON ENERGY DISPERSIVE X-RAY SPECTROMETRY
K. F. J. Heinrich, D. E. Newbury, R. L. Myklebust, and C. E. Fiori (NIH) Jun. 1981 443 p Workshop held at Gaithersburg, Md., 23-25 Apr. 1979 Prepared in cooperation in NIH
(PB81-226334; NBS-SP-604; LC-81-600047) Avail: NTIS HC A19/MF A01 CSCL 14B

A detailed view of the state-of-the-art of energy dispersive X-ray spectrometry is given. The basic of the detection process and applications of the technique to quantitative X-ray microanalysis are discussed. GRA

N82-11178# NUCOR Corp., Denville, N. J.
DETECTION OF OIL IN WATER BY A FLAME EMISSION TECHNIQUE Final Report
Manfred Prager and Dennis Stainken Jul. 1981 52 p refs
(Contract EPA-68-02-0205)
(PB81-226185; EPA-600/14) Avail: NTIS HC A04/MF A01 CSCL 14B

A flame emission technique and basic instrument design is presented for measuring low concentrations of oil in oil-contaminated water. The flame emission instrument developed would be used as a detector for petroleum oils. The flame emission technique utilizes the selectivity of the hydrocarbon emission signal (at 431 nm) and oil detection is a function of the total

hydrocarbon concentration. Interference of metal ions is avoided by employing steam distillation and condensation techniques to vaporize oil from sample solutions. The prototype instrument successfully detected oil concentrations down to 10 ppm for oils with vapor pressure equal to or higher than No. 4 fuel oils.
GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-11179 Royal Aircraft Establishment, Bedford (England).
THE QUANTITATIVE DETERMINATION OF NON-METALLIC INCLUSIONS BY A MATHEMATICAL STATISTICAL METHOD
O. V. Rutes, S. B. Maslenkov, S. N. Kabuzenko, and V. V. Topilin Mar. 1981 8 p Transl. into ENGLISH from Kach Stali Splavy (USSR), v. 3, 1978 p 38-42
(RAE-Lib-Trans-2066; BR79866) Copyright. Avail: Issuing Activity

A comparison was made between open arc and vacuum arc melting. The results are shown in terms of the effect on nitride inclusions and on the dispersion of dendritic structures. A statistical analysis of the results was carried out in order to determine whether the results was significant. The heat resistant alloys CrNi56WMoTiAl (EP199) and CrNi67MoWTiAl (EP202) were used in the tests.
Author

N82-11180*# National Aeronautics and Space Administration, Washington, D. C.
STUDY OF CERTAIN FEATURES OF THE ELECTRONIC STRUCTURE OF THE TERNARY ALLOYS Ni2(Mn, Fe) AND Ni3(Mn, Co)
V. M. Zhukova and V. P. Fadin Sep. 1981 11 p refs Transl. into ENGLISH from Metallofiz. (USSR), no. 37, 1971 p 18-22 Original language document was announced as A72-35518 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Tomsk State Univ., USSR
(Contract NASw-3199)
(NASA-TM-76620) Avail: NTIS HC A02/MF A01 CSCL 11F

The changes in electronic structure related to transport processes occurring during the alloying of he alloy Ni3Mn with iron and cobalt, and the ordering of the ternary alloys thus formed are presented. The Hall effect, the absolute thermal emf, the internal saturation induction, the Nernst-Ettingshausen constant, and the electrical resistivity were measured. Results show a decrease in the contribution of hole sections of the Fermi surface to the transport process occurs together with a considerable increase in the contribution of electron sections. In this case, the mobility of 3 dimensional holes decreases and the mobility of 4s electrons increases considerably.
S.L.

N82-11181*# Kaiser Aluminum and Chemical Corp., Oakland, Calif. Center for Technology.
FLAW GROWTH OF 7075, 7475, 7050 AND 7049 ALUMINUM ALLOY PLATE IN STRESS CORROSION ENVIRONMENTS: 4-YEAR MARINE ATMOSPHERE RESULTS Interim Report
K. R. Hasse and R. C. Dorward 13 Oct. 1981 63 p refs
(Contract NAS8-30890)
(NASA-CR-161887; CFT-RR-81-15) Avail: NTIS HC A04/MF A01 CSCL 11F

After nearly 53 months of exposure to marine atmosphere, crack growth in SL DCB specimens from 7075, 7475, 7050, and 7049-T7X plate has slowed to the arbitrary 10 to the -10 power m/sec used to define threshold stress intensity. Because some specimens appear to be approaching crack arrest, the importance of self-loading from corrosion product wedging as a significant driving force for crack propagation in overaged materials is questioned. Crack length-time data were analyzed using a computer curve fitting program which minimized the effects of normal data scatter, and provided a clearer picture of material performance. Precracked specimen data are supported by the results of smooth specimen tests. Transgranular stress corrosion cracking was observed in TL DCB specimens from all four alloys. This process is extremely slow and is characterized by a striated surface morphology.
A.R.H.

N82-11182*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TRENDS IN HIGH TEMPERATURE GAS TURBINE MATERIALS
S. J. Grisaffe and R. L. Dreshfield 1981 18 p refs Presented at the 1981 Aerospace Conf., Anaheim, Calif., 5-8 Oct.
(NASA-TM-82715; E-999) Avail: NTIS HC A02/MF A01 CSCL 11F

High performance - high technology materials are among the technologies that are required to allow the fruition of such improvements. Materials trends in hot section components are reviewed, and materials for future use are identified. For combustors, airfoils, and disks, a common trend of using multiple material construction to permit advances in technology is identified.
S.L.

N82-11183*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
UNIVERSAL BINDING ENERGY RELATIONS IN METALLIC ADHESION
J. Ferrante, J. R. Smith (General Motors Research Lab.), and J. H. Rose (Ames Lab.) 1981 16 p refs Presented at the Conf. on Aspects Microscopiques de l'Adhesion et de le Lubrication, Paris, 14-18 Sep. 1981
(NASA-TM-82706; E-993) Avail: NTIS HC A02/MF A01 CSCL 11F

Scaling relations which map metallic adhesive binding energy onto a single universal binding energy curve are discussed in relation to adhesion, friction, and wear in metals. The scaling involved normalizing the energy to the maximum binding energy and normalizing distances by a suitable comination of Thomas-Fermi screening lengths. The universal curve was found to be accurately represented by E*(A*)= -(1+beta A) exp (-Beta A*) where E* is the normalized binding energy, A* is the normalized separation, and beta is the normalized decay constant. The calculated cohesive energies of potassium, barium, copper, molybdenum, and samarium were also found to scale by similar relations, suggesting that the universal relation may be more general than for the simple free electron metals.
R.J.F.

N82-11184*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FAILURE ANALYSIS OF A TOOL STEEL TORQUE SHAFT
John R. Reagan 1981 12 p Presented at the Conf. on Deformation, Fracture, Wear and Nondestructive Evaluation of Mater., New Orleans, 23-24 Nov. 1981; sponsored by Am. Phys. Soc. and Nat. Bureau of Standards
(NASA-TM-82758; E-1077; DOE/NASA/1011-35) Avail: NTIS HC A02/MF A01 CSCL 11F

A low design load drive shaft used to deliver power from an experimental exhaust heat recovery system to the crankshaft of an experimental diesel truck engine failed during highway testing. An independent testing laboratory analyzed the failure by routine metallography and attributed the failure to fatigue induced by a banded microstructure. Visual examination by NASA of the failed shaft plus the knowledge of the torsional load that it carried pointed to a 100 percent ductile failure with no evidence of fatigue. Scanning electron microscopy confirmed this. Torsional test specimens were produced from pieces of the failed shaft and torsional overload testing produced identical failures to that which had occurred in the truck engine. This pointed to a failure caused by a high overload and although the microstructure was defective it was not the cause of the failure.
A.R.H.

N82-11185*# National Aeronautics and Space Administration, Washington, D. C.
CERTAIN PHYSICAL PROPERTIES OF COBALT AND NICKEL BORIDES
I. I. Kostetskiy and S. N. L'vov (N. K. Krupskaya Kherson Pedagogical Inst.) Sep. 1981 14 p refs Transl. into ENGLISH from Fiz. Met. Metalloved., USSR, v. 33, Apr. 1972 p 773-780 Original language was announced as A72-40953 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3542)
(NASA-TM-76623) Avail: NTIS HC A02/MF A01 CSCL 11F

The temperature dependence of the electrical resistivity, the thermal conductivity, and the thermal emf of cobalt and nickel borides were studied. In the case of the nickel borides the magnetic susceptibility and the Hall coefficient were determined at room temperature. The results are discussed with allowance for the current carrier concentration, the effect of various mechanisms of current-carrier scattering and the location of the Fermi level in relation to the 3d band. A.R.H.

N82-11186*# National Aeronautics and Space Administration, Washington, D. C.
EFFECTS OF ALLOYING ON AGING AND HARDENING PROCESSES OF STEEL WITH 20% NICKEL
I. N. Bogachev, N. V. Zvigintsev, and T. M. Maslakova Sep. 1981 13 p refs Transl. into ENGLISH from Fiz. Met Metalloved., USSR, v. 33, Feb. 1972 p 362-368 Original language document was announced as A72-30408 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76624) Avail: NTIS HC A02/MF A01 CSCL 11F

Measurements of hardness, thermal emf, and electrical resistance were used to study the effects of Co, Mo, Ti and Al contents on aging and hardening processes in Fe 20%Ni steel. It is shown that the effects of these alloying elements differ substantially. Anomalies which arise in the temperature dependence of physical properties due to the presence of cobalt and molybdenum are reduced by the inclusion of titanium and aluminum (and vice versa). Author

N82-11187# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
LIQUID AND SOLID METAL EMBRITTLEMENT
Norman S. Stoloff 5 Sep. 1981 32 p refs
(Contract N00014-79-C-0583)
(AD-A103048; TR-3) Avail: NTIS HC A03/MF A01 CSCL 11/6

The recent literature on embrittlement induced by solid or liquid metal environments is critically reviewed. Evidence in support of an enhanced shear model of embrittlement is provided for amorphous metals, while decohesion is shown to be a viable concept for crystalline metals. The usefulness of the concept of specificity of embrittlement is questioned on the basis of evidence for new embrittlement couples as the range of experimental conditions is varied. In particular, strain rate and temperture are shown to have extremely important effects on the degree of embrittlement. Author (GRA)

N82-11188# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
ACTIVATION OF SUPERALLOYS AND STAINLESS STEELS FOR CHROMIUM PLATING Final Report
W. Baldauf and E. S. Chen Aug. 1981 20 p refs Presented at the Symp. on Plating on Difficult to Plate Mater. New Orleans, 30-31 Oct. 1980
(DA Proj. 1L1-61102-AH-60)
(AD-A104313; ARLCB-TR-81035) Avail: NTIS HC A02/MF A01 CSCL 11/6

The adhesion of electrodeposited chromium on cobalt, nickel and iron-nickel based superalloys such as Cg-27, Haynes alloy 25, and Udimet 700, as well as stainless steels was investigated. A number of pretreatments were used to activate these alloys. The results show that a hydrofluoric-sulfuric acid pretreatment used anodically produces excellent adhesion. A qualitative adhesion test, named the 'Groove Test' was developed to evaluate the adhesion of thick deposits of chromium on metallic substrates. The development of this test is described. Author (GRA)

N82-11189# Naval Postgraduate School, Monterey, Calif.
FATIGUE CHARACTERISTICS AND MICROSTRUCTURAL ANALYSIS OF THERMOMECHANICALLY-PROCESSED, HIGH-MAGNESIUM ALUMINUM-MAGNESIUM ALLOY M.S. Thesis
Charles A. Cadwell, Jr. Jun. 1981 70 p refs
(AD-A104569) Avail: NTIS HC A04/MF A01 CSCL 20/11

Particular emphasis was placed on study of the microstructural changes which occur during cyclic loading. The study was conducted utilizing a simple binary alloy, Al-10.2 wt pct Mg, and a ternary Al-8.14 wt pct Mg-0.40 wt pct Cu alloy. Both alloys were given similar processing; in particular, both alloys were examined for two rates of quenching to determine the effect of cooling rate from the homogenization temperature on the tensile properties and fatigue characteristics of the alloys. The primary strengthening mechanism in the high-magnesium aluminum-magnesium alloys was determined to be the dislocation substructure developed during warm rolling. In fatigue, the Al-10.2 wt pct Mg alloy appears to exhibit an endurance limit, with a fatigue strength to yield strength ratio in excess of 0.6 in the oil quenched condition. Microstructural refinement achieved through more rapid quenching or through alloying additions was found to degrade the fatigue response although providing improved strength and ductility. Author (GRA)

N82-11190# LaQue Center for Corrosion Technology, Inc., Wrightsville Beach, N.C.
EFFECT OF MECHANICAL CLEANING ON SEAWATER CORROSION OF CANDIDATE OTEC HEAT EXCHANGER MATERIALS. PART 2: TESTS WITH AMERTAP SPONGE RUBBER BALLS
D. G. Tipton Jun. 1981 32 p refs
(Contract W-31-109-eng-38)
(DE81-029953; ANL/OTEC-BCM-018-Pt-2) Avail: NTIS HC A03/MF A01

Corrosion evaluations were conducted on 3003 Alclad, C70600 copper-nickel, and commercially-pure titanium in natural seawater under simulated OTEC heat exchanger conditions to investigate the erosion-corrosion effects of mechanical tube cleaning under aggressive over-cleaning conditions. Test conditions for 3003 Alclad included Amertap soft sponge ball cleaning with and without chlorination, Amertap abrasive sponge ball cleaning with and without chlorination, and no mechanical cleaning as a control. C70600 was exposed to Amertap soft sponge ball cleaning with and without chlorination and with no mechanical cleaning as a control. Titanium was cleaned by abrasive Amertap sponge balls with and without chlorination and compared to no mechanical cleaning as a control. Test exposures of 8, 16, 30, 60, 90 and 180 days were made. The sequence of Amertap sponge ball cleaning utilized in the present tests significantly accelerated corrosion of 3003 Alclad. Chlorination brought about a further acceleration of erosion-corrosion of Alclad. Amertap soft sponge ball cleaning of C70600 caused significant acceleration of corrosion under these over-cleaning conditions. Chlorination somewhat decreased erosion corrosion of C70600. Titanium showed no substantial effect of Amertap abrasive sponge ball cleaning on corrosion, although measurable weight losses were incurred. Chlorination had no measurable effect on erosion-corrosion of titanium. DOE

N82-11191# Hanford Engineering Development Lab., Richland, Wash.
IRRADIATION-INDUCED SWELLING IN COMMERCIAL ALLOYS
J. F. Bates and R. W. Powell Oct. 1980 38 p refs
(Contract DE-AC14-76FF-02170)
(DE81-029755; HEDL-SA-2257-FP) Avail: NTIS HC A03/MF A01

Examination of a wide range of commercial alloys indicates that a minimum in swelling occurs at 40 to 50% nickel. Swelling in these alloys was measured after irradiation to peak fluences of 14.7 x 10(22) n/cm(22) (E > 0.1 MeV) at temperatures ranging from 400 C to 6500 C. The minimum in swelling extends over the full range of irradiation test temperatures. Swelling in the alloys appears to be more sensitive to preirradiation aging treatments than to relative position on the Fe-Cr-Ni ternary diagram. Preirradiation aging of an alloy removes swelling inhibitors from the matrix with a consequent increase in swelling. One of the more important swelling inhibitors removed is carbon. Carbon in solution in the configuration of atomic complexes, which may contain both lattice defects and carbon atoms, can reduce swelling by screening of the dislocation stress fields and hence cause a reduction in the dislocation-interstitial bias factor.

A reduction in swelling with increasing equivalent chromium content was also observed. DOE

N82-11192# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

MICROSTRUCTURE AND PROPERTIES OF DUAL-PHASE STEELS CONTAINING FINE PRECIPITATES

J. S. Gau, J. Y. Koo, A. Nakagawa, and G. Thomas Jul. 1981 19 p refs Sponsored in part by Exxon Research and Engineering Company, Linden, N.J.
(Contract W-7405-eng-48)
(DE81-029946; LBL-12177) Avail: NTIS HC A02/MF A01

Very fine particles (carbides or carbonitrides) of the order of 20 A were extensively examined in the ferrite regions of dual-phase steels subjected to intercritical annealing followed by fast quenching to room temperature. These particles are probably formed during quenching after intercritical annealing. The driving force for the precipitation reaction may arise from the supersaturation of carbon (or nitrogen) in the ferrite phase. These precipitates in certain alloy compositions cause a deviation from the generally observed two phase mixture rule in that the strength of the dual-phase steels having a higher volume fraction of martensite is lower than that having a lower volume fraction of martensite. Thus, the influence of such precipitates must be considered in the structure-property relations of dual-phase steels when fast quenching is employed after intercritical annealing. DOE

N82-11193# Battelle Pacific Northwest Labs., Richland, Wash.

DEPOSITION AND CORROSION PHENOMENA ON ALUMINUM SURFACES UNDER DELUGED DRY COOLING-TOWER CONDITIONS Interim Report

K. R. Wheeler, R. P. May, J. G. Douglas, and J. H. Tylczak Jul. 1981 88 p refs Sponsored in part by Electric Power Research Inst.
(Contract DE-AC06-76RL-01830; EPRI Proj. 422-3)
(DE81-025483; EPRI-CS-1926) Avail: NTIS HC A05/MF A01

Laboratory simulation shows that heat exchanger deposition buildup is linearly dependent on concentration factor and number of wet/dry cycles in the advanced concepts test (ACT) demonstration cooling tower. Deionized water rising after deluge reduced rate of deposition is examined. Technology transferable to ACT shows that deposition from supersaturated solution can be effectively controlled by attention to water chemistry, pH, water conditioning, and good heat transfer design. The additional mechanism of deposition by water film evaporation is effectively managed by soft water rising and uniform surface wetting. Exposure of a model TRANE surface (the ACT wet/dry exchanger) produced short-term deposition extrapolating to 0.011 mm buildup in three years. Studies continue to verify 4X as maximum cycles of concentration through control of water chemistry and rinsing after deluge. Deluge water used at ACT facility is sufficiently aggressive to warrant use of Alclad to extend tube service life. DOE

N82-11194# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Chemistry.

SPECIATION OF LABILE AND QUASI-LABILE METAL COMPLEX SYSTEMS USING THE KALMAN FILTER

Teri F. Brown, Donna M. Caster, and Steven D. Brown May 1981 8 p refs Presented at DOE/NBS Workshop on Environ. Speciation and Monitoring Needs, Gaithersburg, Md., 18 May 1981
(Contract W-7405-eng-48)
(DE81-025678; LBL-12625) Avail: NTIS HC A02/MF A01

Electrochemical techniques used to measure metal complex species have the advantage of sensitivity and specificity, but suffer a number of limitations. For voltammetric techniques, these include requirements of excess ligand and rapid kinetics. An approach to voltammetric studies of metal complexes is introduced which uses the Kalman filter, a recursive, linear, digital filter, to model overlapped electrochemical peaks arising from parallel reduction paths, including the situation where two or more complexes undergo slow exchange. Stability constants are calculated from the individual electrochemical responses extracted by the filter. This approach was applied to studies of the complexation of NTA with various trace metals. The model is described and results for the systems are discussed. DOE

N82-11195# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

DETERMINATION OF EXACT ORIENTATION RELATIONSHIPS BETWEEN MARTENSITE AND AUSTENITE IN STEELS BY MICRODIFFRACTION

M. Sarikaya Mar. 1981 10 p refs Presented at the Electron Microscopy Soc. of Am., Atlanta, 13-17 Aug. 1981
(Contract W-7405-eng-48)
(LBL-12289; CONF-810811-1) Avail: NTIS HC A02/MF A01

In a series of low alloy steels with carbon contents between 0.1 to 0.4 wt%, the existence of retained austenite as thin films (approximately 200 A thick) around the martensite lath boundaries makes it possible to do direct crystallographic analysis between martensite and austenite by microdiffraction. DOE

N82-11196# Brookhaven National Lab., Upton, N. Y.

ADSORPTION OF HYDROGEN ON IRON AND THE HYDROGEN EMBRITTLEMENT OF STEEL

K. Sieradzki and P. J. Ficalora (ORNL) 1981 13 p refs Presented at Intern. Conf. on Environ. Degradation of Engr. Mater., Blacksburg, Va., 21 Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025164; BNL-29672; CONF-810913-4) Avail: NTIS HC A02/MF A01

A model for the chemisorption of hydrogen on iron was developed and the calculated energies of the adsorbed states agree well with observed experimental values. The model is used to explain some of the experimental observations associated with the hydrogen embrittlement of steels. For example, the observed temperature dependence of crack growth rates can be readily interpreted within the framework of the model. The indications are that adsorption may be the key step in the embrittlement process. DOE

N82-11197# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.

HYDROGEN DAMAGE IN STAINLESS STEEL

G. R. Caskey, Jr. 1981 32 p refs Presented at Second Intern. Conf. on Environ. Degradation of Engr. Mater., Blacksburg, Va., 21-23 Sep. 1981
(Contract DE-AC09-76SR-00001)
(DP-MS-81-31; CONF-810913-1) Avail: NTIS HC A03/MF A01

Both internal and external hydrogen damage were evaluated by ductility or J-integral under rising tensile loads and by fractography. Analysis of the data emphasized the potential effects of strain-induced martensite on hydrogen damage. Strain-induced martensite was neither necessary nor sufficient for hydrogen damage in the alloys studied. Neither ductility loss nor fracture-mode change correlated generally with martensite formation. Alloy composition, particularly nickel and nitrogen contents, was the primary factor in resistance to hydrogen damage. Thermomechanical processing, however, could alter the degree of hydrogen damage in an alloy and was critical for optimizing resistance to hydrogen damage. DOE

N82-11198# Illinois Univ., Urbana. Dept. of Metallurgy and Mining.

CONTRIBUTION TO THE CHARACTERIZATION OF THE ANELASTIC PROPERTIES OF MULTI-PHASE SYSTEMS

F. M. Mazzolai (Ist. di Acustica O. M. Corbino, Rome) 1981 12 p refs Presented at the Intern. Conf. on Internal Friction and Acoustic Attenuation of Solids, Lausanne, Switzerland, Jun. 1981
(Contract DE-AC02-76ER-01198)
(DE81-025581; DOE/ER-01198/1356; CONF-8106105-2) Avail: NTIS HC A02/MF A01

The various kinds of acoustical effects associated with phase transformations were characterized. It is shown that useful distinction can be made between intrinsic and extrinsic effects and that phase transformations involving compositional changes usually involve extrinsic effects. Results described in conference papers are summarized as follows: (1) the structural mechanism of internal friction in Al-Ag (Ic) and Al-Zn (11c) was further clarified; (2) new effects were phenomenologically characterized even if not completely understood; (3) information of physical interest was found on atomic mobilities in alpha-CuZnNi, and on recrystallization of Al-Mg alloys; (4) technologically important results were obtained on temper-embrittlement of alloying steels, on lattice disruption and precipitation characteristics of hydrides in Nb and V precipitation, on high properties of Al-Zn and of grey cast iron, as well as on the phase separations in (Al2O3)n MgO. DOE

N82-11199# Illinois Inst. of Tech., Chicago.
ACTIVITY AND DIFFUSION OF METALS IN BINARY ALUMINUM ALLOYS M.S. Thesis
Chiang Seng Jao Dec. 1980 77 p refs
(Contract DE-AS02-77ER-04445)
(DE81-025535; DOE/ER-04445/T2) Avail: NTIS HC A05/MF A01

To determine the activity of zinc in Zn-Al alloys, the electromotive force (emf) of the cell: Zn/ZnCl2-KCl(eut)/Zn,Al was measured at temperatures between 569.5 K (296.5C) and 649.5 K(376.5C). The applicability of a two-suffix Margules equation was demonstrated, in good agreement with theoretical expectations. The diffusion coefficient of Zn in Al determined from a planar diffusion model for the experimental data was about 3 x 10 to the -10 power sqcm/sec to 2 x 10 to the -9 power sq cm/sec in the range of temperature studied. This is higher than that found in the literature. The most plausible reason appears to be the high alumina concentration in the working electrode because of partial oxidation. Oxidation of the alloying metals was the primary cause of poor alloying between calcium/or zinc and aluminum, thereby frustrating similar measurements at a Ca-Al/or Zn-Al alloy. The literature on the activity of calcium and zinc with aluminum is reviewed. DOE

N82-11200# Sandia Labs., Albuquerque, N. Mex.
SHOCK COMPRESSION OF BERYLLIUM
J. L. Wise, L. C. Chhabildas, and J. R. Asay 1981 10 p refs
Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024062; SAND-81-0022C; CONF-810684-25) Avail: NTIS HC A02/MF A01

Shock/reshock and shock/release experiments were performed on beryllium to obtain wave profile measurements spanning the stress range of 6 to 35 GPa. Particle velocity histories in the beryllium samples were determined using a velocity interferometer in conjunction with lithium fluoride windows. The shock velocity-particle velocity response of beryllium was obtained from the interferometer signals, which allowed determination of the Hugoniot for Be over the stress range studied. DOE

N82-11201# Sandia Labs., Albuquerque, N. Mex.
TRAPPING AND SURFACE PERMEATION OF DEUTERIUM IN Fe, Ni AND STAINLESS STEEL: AN ION-BEAM STUDY
S. M. Myers 1981 20 p refs Presented at the Intern. Conf. on Environmental Degradation of Eng. Mater., Blacksburg, Va., 21 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023303; SAND-81-1335C; CONF-810913-2) Avail: NTIS HC A02/MF A01

In He-implanted Fe containing approximately 1 nm He bubbles, D was trapped with an enthalpy of 0.75 + - 0.07 eV, referenced to a solution site. The proposed trapping mechanism is chemisorption on the walls of the bubbles. Deuterium was also bound to implantation defects, hypothesized to be vacancies and vacancy clusters, with enthalpies of 0.5 and 0.7 eV respectively. The permeability of the electropolished and air-exposed Fe surface was characterized by a recombination coefficient of K/sub L/ = to the -14 + - 0.7th power mm to the 4th power/s at a temperature of 500 K. Trapping of D was also observed in Ni and 304 stainless steel implanted with He, the measured binding enthalpy being about 0.5 eV in both cases. Bubble traps similar to those observed in Fe are presumed responsible. No surface-barrier effect was detected for Ni. In contrast, for electropolished and air exposed stainless steel, K/sub L/ < or = 10 to the -19th power mm to the 4th power/s at approximately 500 K. DOE

N82-11202# Lehigh Univ., Bethlehem, Pa.
CRACK ARREST PROPERTIES OF A 9 PERCENT NICKEL CRYOGENIC STEELS Final Report, Jul. 1980 - Feb. 1981
R. D. Stout and A. W. Pense 1 May 1981 88 p refs
(Contract GRI-5080-352-0322)
(PB81-227993; GRI-80/0037) Avail: NTIS HC A05/MF A01 CSCL 11F

A review and analysis of the literature on the fracture toughness of 9% nickel steels with emphasis on the crack arrest properties of these steels applicable to LNG storage vessels is presented. The concept of crack arrest is examined and the merits of the various tests that have been developed to measure crack arrest capability are discussed. The gaps in present knowledge are pointed out and four research programs are suggested to remedy these gaps: (1) the significance of the weld heat-affected zone to crack arrest, (2) correlation of crack initiation and crack arrest tests, (3) characterization of the fracture toughness of modern 9% nickel steels, and (4) the effect of fabrication defects on crack initiaton in 9% nickel steel. A bibliography is included. GRA

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-11203 Rensselaer Polytechnic Inst., Troy, N. Y.
EFFECTS OF IONIZING RADIATION ON THE CHEMICAL STRUCTURE, CRYSTALLINE CONTENT AND MOLECULAR WEIGHT DISTRIBUTION OF VARIOUS TEFLON RESINS Ph.D. Thesis
William Keith Fisher 1981 155 p
Avail: Univ. Microfilms Order No. 8121144

Changes in the chemical composition, crystalline content and structure, flow properties and molecular weight distribution in polytetrafluoroethylene (PTFE) after exposure to ionizing radiation are described. The radiation used was 0.8 MeV electrons. The effects of post irradiation annealing on the chemical composition and crystalline content are also analyzed. Radiation induced changes in the chemical composition and the role of oxygen and water vapor in these changes were determined by infrared spectroscopy of PTFE irradiated in ambient air, wet and dry oxygen atmosphere and under vacuum. It was found that when the irradiations are carried out in the presence of oxygen, acid fluoride endgroups are formed and that upon exposure to water vapor, these endgroups undergo hydrolysis to form carboxylic acid endgroups. Infrared absorption bands at 1730 and 1715 cm, which appear most strongly when PTFE is irradiated in a vacuum, were attributed to branch and crosslink formation. Dissert. Abstr.

N82-11204 Case Western Reserve Univ., Cleveland, Ohio.
EPITAXIAL MORPHOLOGIES AND DEPOSITION ENERGETICS OF POLYOXYMETHYLENE Ph.D. Thesis
Charles Maurice Balik 1981 109 p
Avail: Univ. Microfilms Order No. 8118613

Epitaxial crystallization of polyoxymethylene (POM; Delrin D-900) from iodobenzene solution was carried out between 150 C and 165 C on 11 different inorganic substrates. The most interesting results were found on mica, which yielded two different epitaxial morphologies. In one structure, the polymer forms epitaxial rodlike lamellae which exhibit preferential orientation in three directions spaced 60 deg apart. These lamellae are nearly identical with the epitaxial crystals grown on (001) alkali halide substrate surfces, where the chain axis is known to be parallel to the surface and perpendicular to the long axis of the lamellae. The same molecular geometry is assumed to exist for the rodlike epitaxy on mica. Large differences in the nucleation density of rodlike epitaxial crystals, observed over the various substrates are explained in terms of varying degrees of solvent substrate interaction. Results suggest that preferential solvent absorption may account for low polymer nucleation densities on higher surface energy substrates. Dissert. Abstr.

N82-11205# Royal Aircraft Establishment, Bedford (England).
THE EFFECT OF SURFACE TREATMENT OF CARBON FIBRES ON THE STRENGTH PROPERTIES OF CARBON-REINFORCED PLASTICS

G. M. Gunyaev et al Sep. 1980 9 p refs Transl. into ENGLISH from Mekh. Kompozitnykh Materialov (USSR), no. 4, 1979 p 603-606
(RAE-Lib-Trans-2052; BR77976) Copyright. Avail: Issuing Activity

The effect of silicon carbide coating on the shear, bending, stretching, and compression strengths of carbon fibers and epoxy resin 5-211B carbon composites is evaluated. The distribution of the silicon carbide coating over the surface was studies by electron microscopy techniques. It was observed that the surface structure of the original carbon fiber determined the morphology and the strength properties of the material. The inner surface of the SiC film reproduced the characters of the carbon fiber surface while a dense coating was formed along the perimeter of the fiber. There was no change in the dynamic modulus of elasticity of the coated fiber but the strength was dependent on the film thickness. The twisting and the shear characteristics of the carbon fiber increased uniformly with the increase in the thickness of a well bonded film. There was no effect of the SiC coating on the compression strength 5-211B carbon fiber composite for a film of 10 to 30 nm but optimum shear strengths were obtained for a film thickness of 10 to 15 nm. S.L.

N82-11206* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ALUMINUM ION-CONTAINING POLYIMIDE ADHESIVES Patent

Anne K. St.Clair, Larry T. Taylor (Old Dominion Univ.), and Terry L. St.Clair, inventors (to NASA) Issued 18 Aug. 1981 5 p Filed 7 Nov. 1979 Supersedes N80-16164 (18 - 07, p 0837)
(NASA-Case-LAR-12640-1; US-Patent-4,284,461; US-Patent-Appl-SN-092142; US-Patent-Class-156-331.5; US-Patent-Class-156-307.3; US-Patent-Class-156-307.5; US-Patent-Class-156.307.7; US-Patent-Class-528-172; US-Patent-Class-528-173; US-Patent-Class-528-180; US-Patent-Class-528-207; US-Patent-Class-528-208; US-Patent-Class-528-210; US-Patent-Class-528-211; US-Patent-Class-528-225; US-Patent-Class-528-228; US-Patent-Class-528-351; US-Patent-Class-528-353; US-Patent-Class-528-126) Avail: US Patent and Trademark Office CSCL 11A

A meta-oriented aromatic diamine is reacted with an aromatic dianhydride and an aluminum compound in the presence of a water or lower alkanol miscible ether solvent to produce an intermediate polyamic acid. The polyamic acid is then converted to the thermally stable, metal ion-filled polyimide by heating in the temperature range of 300 C to produce a flexible, high temperature adhesive.

Official Gazette of the U.S. Patent and Trademark Office

N82-11207*# IIT Research Inst., Chicago, Ill.

EVALUATION OF THE EFFECTS OF SOLAR RADIATION ON GLASSES Final Report, 9 Jul. 1979 - 31 Dec. 1980

Y. Harada Aug. 1981 61 p refs
(Contract NAS8-33388)
(NASA-CR-161907; IITRI-M06055-10) Avail: NTIS HC A04/MF A01 CSCL 11B

Four optical materials were exposed to simulated solar and particulate radiation in a space environment. Sapphire and fused silica experienced little change in transmittance while optical crown glass and ultra low expansion glass darkened appreciably. A complete analysis of the 500 hour simulated space exposure test was conducted. Additionally, studies were performed to aid in sample selection for a 100 hour simulated exposure test. J.M.S.

N82-11208*# Polytechnic Inst. of New York, Brooklyn.

THE STABILITY OF NEW TRANSPARENT POLYMERIC MATERIALS: THE EPOXY TRIMETHOXYBOROXINE SYSTEM. PART 1: THE PREPARATION, CHARACTERIZATION AND CURING OF EPOXY RESINS AND THEIR COPOLYMERS Final Report

Eli Pearce and S. C. Lin [1981] 58 p refs
(Grant NsG-2182)
(NASA-CR-164951) Avail: NTIS HC A04/MF A01 CSCL 11G

The effects of resin composition, curing conditions fillers, and flame retardant additives on the flammability of diglycidyl ether of bisphenol-A (DGEBA) as measured by the oxygen index is examined. The oxygen index of DGEBA cured with various curing agents was between 0.198 to 0.238. Fillers and flame retardant additives can increase the oxygen index dependent on the material and the amount used. Changes in the basic cured resin properties can be anticipated with the addition of noncompatible additives. High flame resistant epoxy resins with good stability and mechanical properties are investigated. S.L.

N82-11209*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

FRACTURE MECHANICS OF CELLULAR GLASS

J. G. Zwissler and M. A. Adams 1 Feb. 1981 53 p refs
(Contracts NAS7-100; DE-AI01-81ET-20307)
(NASA-CR-164959; JPL-Pub-81-16) Avail: NTIS HC A04/MF A01 CSCL 11A

The fracture mechanics of cellular glasses (for the structural substrate of mirrored glass for solr concentrator reflecting panels) are discussed. Commercial and developmental cellular glasses were tested and analyzed using standard testing techniques and models developed from linear fracture mechanics. Two models describing the fracture behavior of these materials were developed. Slow crack growth behavior in cellular glass was found to be more complex than that encountered in dense glasses or ceramics. The crack velocity was found to be strongly dependent upon water vapor transport to the tip of the moving crack. The existence of a static fatigue limit was not conclusively established, however, it is speculated that slow crack growth behavior in Region 1 may be slower, by orders of magnitude, than that found in dense glasses. B.W.

N82-11210*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

CASTABLE HIGH TEMPERATURE FRACTORY MATERIALS Patent Application

Isidor Zaplatynsky, inventor (to NASA) Filed 13 Oct. 1981 5 p
(NASA-Case-LEW-13080-2; US-Patent-Appl-SN-310713) Avail: NTIS HC A02/MF A01 CSCL 11B

The fabrication of chemically inert ceramic bodies that are both high refractory and porous is disclosed. A paste is formed by mixing alumina grain having a uniform particle size with colloidal silica that is stabilized with ammonia. This paste is then cast without forming a compact and dried without pressing. After drying, the cast body was sufficient green strength to be handled, and it is transferred to a furnance for curing. A green body prepared in accordance with the invention does not undergo shrinkage during either curing or prolonged subsequent heating. NASA

N82-11211*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

FABRICATION AND WEAR TEST OF A CONTINUOUS FIBER/PARTICULATE COMPOSITE TOTAL SURFACE HIP REPLACEMENT

Jack C. Roberts (Rensselaer Polytechnic Inst., Troy, N.Y.), Frederick F. Ling (Rensselaer Polytechnic Inst., Troy, N.Y.), and William R. Jones, Jr. 1981 29 p refs Presented at the Joint Lubrication Conf., New Orleans, 5-7 Oct. 1981; cosponsored by ASME and the Am. Soc. of Lubrication Engr.
(Grant DAAG29-79-C-0204)
(NASA-TM-81746; E-709) Avail: NTIS HC A03/MF A01 CSCL 06B

Continuous fiber woven E-glass composite femoral shells having the ame elastic properties as bone were fabricated. The shells were then encrusted with filleld epoxy wear resistant coatings and run dry against ultrahigh molecular weight polyethylene acetabular cups in 42,000 and 250,000 cycle were tests on a total hip simulator. The tribological characteristics of these shells atriculating with the acetabular cups are comparable to a vitallium bal articulating with an ultrahigh molecular weight polyethylene cup. S.L.

N82-11212# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.

POLYURETHANE FOAMS FOR AIRCRAFT SHOCK MOUNTS. 3: VIBRATION DAMPING BY POLYETHER

FOAMS Progress Report, Sep. 1979 - Jun. 1980
James V. Duffy Jul. 1981 38 p refs
(AD-A104496; NSWC/TR-80-343) Avail: NTIS
HC A03/MF A01 CSCL 11/9

The objective of this program was to develop flexible foam systems which would meet the specifications outlined in MIL-F-81334B(AS). The vibration damping and mechanical properties of a series of foams based on mixtures of poly (oxytetramethylene) glycol and poly(oxypropylene) polyol were determined. The effect of polyol ratio, foam density, surfactant type and unit loading on vibration output transmissibility for these systems is reported. Author (GRA)

N82-11213# Army Materials and Mechanics Research Center, Watertown, Mass. Polymer Research Div.
MECHANISM OF MONURON-ACCELERATED DICYANDIAMIDE CURE OF EPOXY RESINS Final Report
Bernard R. LaLiberte and Joseph Bornstein Jul. 1981 13 p refs
(DA Proj. 1L1-62105-AH-84)
(AD-A104658; AMMRC-TR-81-34) Avail: NTIS
HC A02/MF A01 CSCL 11/9

A very interesting and practical property of trisubstituted ureas such as Monuron, is the ability of this class of aryl ureas to accelerate the dicyandiamide (Dicy) cure of epoxy resins. Earlier workers had proposed that the in situ formation of dimethylamine from Monuron was an important factor in explaining the mechanism of the Monuron-accelerated dicyandiamide cure of epoxy resins. The main source of dimethylamine did not appear to us to be that which had been previously described. We have found that the amine is generated by a cyclocondensation reaction between the aryl urea and the resin to form a 2-oxazolidone. During this study, it was found that the effectiveness with which dimethylamine activates Dicy, especially when compared to other materials such as trimethylamine, made this amine unique. It is postulated that dimethylamine has a strong proclivity to remove a proton from Dicy, thereby creating a highly active nucleophilic species. This enhancement of the nucleophilic nature of the hardening agent (DICY) would account for the increased reactivity of Dicy toward epoxy resins. Author (GRA)

N82-11214# National Bureau of Standards, Washington, D.C. Metallurgy Div.
APPLICATION OF SOLIDIFICATION THEORY TO RAPID SOLIDIFICATION PROCESSING Semiannual Technical Report, 1 Oct. 1980 - 31 Mar. 1981
W. J. Boettinger, J. W. Cahn, S. R. Coriell, J. R. Manning, and R. J. Schaefer Jun. 1981 65 p refs
(ARPA Order 3751)
(AD-A104561) Avail: NTIS HC A04/MF A01 CSCL 11/2

The objective of this work is to develop guidelines based on kinetic and thermodynamic solidification theory for prediction and control of rapid solidification processes. In particular, segregation effects and rules governing the formation of equilibrium and non-equilibrium phases, including metallic glasses, will be investigated. Areas where significant improvements in alloy properties can be produced by rapid solidification will be emphasized. Author (GRA)

N82-11215# McDonnell Aircraft Co., St. Louis, Mo. Material and Process Development Dept.
CHEMORHEOLOGY AND QUALITY CONTROL FOR AN ADHESIVE Final Report, 15 Jul. 1980 - 15 Jul. 1981
J. F. Carpenter Jul. 1981 34 p ref
(Contract N00019-80-C-0319)
(AD-A104556) Avail: NTIS HC A03/MF A01 CSCL 11/1

The objective of this program has been to develop rheological test methods applicable to an adhesive system and demonstrate the viability of these techniques for in-plant quality control and to establish acceptance criteria with statistically valid accept/reject limits. Author (GRA)

N82-11216# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
MICROSTRUCTURE OF AMORPHOUS AND SEMI-CRYSTALLINE POLYMERS Final Report, Feb. 1977 - Oct. 1980
Donald R. Uhlmann 7 Jun. 1981 86 p refs
(Grant AF-AFOSR-3226-77; AF Proj. 2303)
(AD-A102853; AFOSR-81-0629TR) Avail: NTIS
HC A05/MF A01 CSCL 11/9

Work which was carried out under this grant has led to the development of a technique for scanning transmission electron microscope of polymers which seems to offer outstanding promise for the characterization of their structures. When applied to amorphous thermoplastics, the structures are found to be homogeneous down to the limit of resolution to the microscope, with no evidence found for the presence of nodular features or other structures characteristic of regions of local order in the materials. This finding is in accord with the results of small angle neutron scattering studies of same materials. Based on the combined results of these studies, it is suggested that the nodular hypothesis be laid to rest and that the structure of flexible chain amorphous polymers be represented by models such as the random coil. The technique of microtoming bulk samples followed by staining with heavy metal atoms and viewing with Z contrast in the scanning transmission electron microscope has also been used with success to characterize the structures of epoxy and polyimide resins. Commercial polyimide films have been shown to be homogeneous on a scale of 50-200 Angstroms with the scale and form of the heterogeneities varying through the thickness of the film. The structure of epoxy resins presents a more complicated issue. GRA

N82-11217# Westinghouse Research and Development Center, Pittsburgh, Pa.
DESIGN OF REFRACTORIES FOR RESISTANCE TO HIGH-TEMPERATURE EROSION-CORROSION Final Report
C. A. Andersson, A. Y. Ranadive, and T. Vojnovich Jul. 1981 149 p refs Sponsored in part by EPRI
(EPRI Proj. 625-2)
(DE81-904208; EPRI-AP-1955) Avail: NTIS
HC A07/MF A01

A theory describing erosion of refractory walls in pneumatic flow was developed. Measurements of particle/wall collisions, wall erosion rates and particle attrition in pneumatic transport of solids were taken. A model was formulated that relates the kinetic energies of striking particles to the fracture energies of wall materials using three failure criteria. Test measurements of the erosion rates of eight refractories with various eroding particle materials, at room temperature and at high temperatures were performed. Results of the erosion tests provided the unknown coefficients in the erosion model and identified the mode of particle attrition in pneumatic flow. DOE

N82-11218# Mound Lab., Miamisburg, Ohio.
MANGANESE GLASS-MOLYBDENUM METALLIZED AND COPPER BRAZED 99.5% ALUMINA CERAMICS M.S. Thesis
K. White (Dayton Univ.) 22 Jul. 1981 80 p refs
(Contract DE-AC04-76DP-00053)
(DE81-030423; MLM-2850) Avail: NTIS HC A05/MF A01

The seal strength of manganese glass-molybdenum metallized and copper brazed 99.5% alumina ceramics was studied as a function of the glass composition, the molybdenum content of the metallizing paint, and the metallizing temperature. Interactions of individual paint constituents with 99.5% alumina ceramic were also examined and related to the sealing mechanism. The paints made of glasses with high MnO content were found to produce excellent bonding strength at a approx. 13000 C metallizing temperature. The paints containing 70 vol % molybdenum exhibited the most consistent and the highest seal strengths. DOE

N82-11219# California Univ., Livermore. Lawrence Livermore Lab.
ELASTOMER UNISTRUCTURE INSULATORS
L. P. Bradley, E. L. Orham, and R. L. Anderson (American Controls, Inc., San Diego, Calif.) 1 Jun. 1981 4 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1-3 Jun. 1981
(Contract W-7405-eng-48)
(DE81-024366; UCRL-85721; CONF-810659-26) Avail: NTIS
HC A02/MF A01

A single elastomer high voltage dielectric insulator which provides low inductance interconnection of capacitors, railgaps, and vacuum load was developed. It complies against conductors to prevent tracking. Results indicate that operation below a threshold breakdown field provides long lifetime. DOE

N82-11220# California Univ., Livermore. Lawrence Livermore Lab.

MICROSTRUCTURE OF EXPLOSIVELY COMPACTED ALUMINUM NITRIDE CERAMIC

W. H. Gourdin, C. J. Echer, C. F. Cline, and L. E. Tanner (California Univ., Berkeley. Lawrence Berkeley Lab.) 1 May 1981 12 p refs Presented at the 7th Intern. Conf. on High Energy Fabric., Leeds, England, 15 Sep. 1981
(Contract W-7405-eng-48)
(UCRL-85274; CONF-810910-1) Avail: NTIS HC A02/MF A01

Observations are reported of the microstructure of aluminum nitride (AIN) ceramic produced by explosive consolidation of the powder. Similarities between the grain structure of the compact and the starting powders are striking. Grain growth does not occur during densification and the 0.1 mu particle size of the powder is retained, although considerable deformation is introduced into individual grains. Of particular interest is an intergranular phase which appears throughout the compact. Observations in the transmission electron microscope indicate that this phase is amorphous. The influence of this glassy intergranular phase on bonding is discussed. DOE

N82-11221# Sandia Labs., Albuquerque, N. Mex.

TRAP ACTIVATION MODEL FOR HYDROGEN RETENTION AND ISOTOPE EXCHANGE IN SOME REFRACTORY MATERIALS

D. K. Brice and B. L. Doyle 1981 5 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025995; SAND-81-0295C; CONF-810831-2) Avail: NTIS HC A02/MF A01

Our recently developed Local Mixing Model (LMM) has been successful in describing and predicting the properties of hydrogen retention and isotope exchange for a variety of refractory materials. For some materials, however, the detailed predictions of the LMM are not observed. A Trap Activation Model (TAM) is proposed here to account for the observed departures from the LMM. DOE

N82-11222# Pennsylvania State Univ., University Park. Materials Research Lab.

INNOVATIVE TECHNOLOGY FOR FABRICATION OF CERAMICS: EDS RAPID SOLIDIFICATION PROCESS APPLICATION TO SPECIALIZED MATERIALS Final Report, 30 Jun. 1975 - 30 Sep. 1980

Della M. Roy, Rustum Roy, and T. P. Holleran 15 Nov. 1980 53 p refs
(Grant DI-BM-GO-155191)
(PB81-214868; BM-OFR-66-81) Avail: NTIS HC A04/MF A01 CSCL 11B

A rapid solidification technology method to produce fine ceramic powders of many compositions with unique properties is examined. The process uses salt solutions and includes two steps, the first to evaporate the liquid and the second to very rapidly decompose the salt to a very fine powder. The process was demonstrated in terms of the following material applications: aluminates, ferrites, phosphors, ionic conductors, and cements. This technique of producing ceramic powders offers a number of potential advantages over existing methods such as ability to produce complex compositions, lower energy requirements, and improved properties. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-11223*# National Aeronautics and Space Administration, Washington, D. C.

TECHNICAL AND ECONOMIC ASPECTS OF HYDROGEN STORAGE IN METAL HYDRIDES

R. Schmitt Sep. 1981 44 p refs Transl. into ENGLISH from Proc. of the Intern. Workshop on Hydrogen and its Perspectives, v. 1, Liege, 1976 p 1-48 Presented at the Intern. Workshop on Hydrogen and its Perspectives, Liege, 15-18 Nov. 1976 Original language document was announced as A78-18842 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Battelle Memorial Inst., Geneva
(Contract NASw-3198)
(NASA-TM-76610) Avail: NTIS HC A03/MF A01 CSCL 21D

The recovery of hydrogen from such metal hydrides as LiH, MgH2, TiH2, CaH2 and FeTiH compounds is studied, with the aim of evaluating the viability of the technique for the storage of hydrogen fuel. The pressure-temperature dependence of the reactions, enthalpies of formation, the kinetics of the hydrogen absorption and desorption, and the mechanical and chemical stability of the metal hydrides are taken into account in the evaluation. Economic aspects are considered. Development of portable metal hydride hydrogen storage reservoirs is also mentioned. Author

N82-11224*# Lockheed-California Co., Burbank.

EXPERIMENTAL STUDY OF FUEL HEATING AT LOW TEMPERATURES IN A WING TANK MODEL, VOLUME 1 Final Report

Francis J. Stockemer Aug. 1981 75 p refs
(Contract NAS3-21977)
(NASA-CR-165391; LR-29935-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 21D

Scale model fuel heating systems for use with aviation hydrocarbon fuel at low temperatures were investigated. The effectiveness of the heating systems in providing flowability and pumpability at extreme low temperature when some freezing of the fuel would otherwise occur is evaluated. The test tank simulated a section of an outer wing tank, and was chilled on the upper and lower surfaces. Turbine engine lubricating oil was heated, and recirculating fuel transferred the heat. Fuels included: a commercial Jet A; an intermediate freeze point distillate; a higher freeze point distillate blended according to Experimental Referee Broadened Specification guidelines; and a higher freeze point paraffinic distillate used in a preceding investigation. Each fuel was chilled to selected temperature to evaluate unpumpable solid formation (holdup). Tests simulating extreme cold weather flight, without heating, provided baseline fuel holdup data. Heating and recirculating fuel increased bulk temperature significantly; it had a relativley small effect on temperature near the bottom of the tank. Methods which increased penetration of heated fuel into the lower boundary layer improved the capability for reducing holdup. S.L.

N82-11225*# National Aeronautics and Space Administration, Washington, D. C.

THE STORAGE OF HYDROGEN IN THE FORM OF METAL HYDRIDES: AN APPLICATION TO THERMAL ENGINES

C. Gales (Comm. a l'Energie Atomique, Centre d'Etudes Nucl. de Grenoble) and P. Perroud (Comm. a l'Energie Atomique, Centre d'Etudes Nucl. de Grenoble) Aug. 1981 39 p refs Transl. into ENGLISH from Proceedings of the Assoc. des Ingr. Electriciens sortis de L'Inst. Electrotech. Montefiore, Belgium, v. 1, 1977 p 1-34 Conf. held at Liege, Belgium, 15-18 Nov. 1976 Original language document was announced as A78-18845 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76609) Avail: NTIS HC A03/MF A01 CSCL 21D

The possibility of using LaNi56, FeTiH2, or MgH2 as metal hydride storage sytems for hydrogen fueled automobile engines is discussed. Magnesium copper and magnesium nickel hydrides studies indicate that they provide more stable storage systems than pure magnesium hydrides. Several test engines employing hydrogen fuel have been developed: a single cylinder motor originally designed for use with air gasoline mixture; a four-cylinder

engine modified to run on an air hydrogen mixture; and a gas turbine.
S.L.

N82-11226# Ballistic Research Labs., Aberdeen Proving Ground, Md. Ballistic Research Lab.

DEVELOPMENT OF INVERSE RAMAN SPECTROSCOPY FOR PROBING RAPIDLY DECOMPOSING EXPLOSIVES AND PROPELLANTS

David R. Crosley and Michael A. Schroeder Jul. 1981 78 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A104382; AD-E430677; ARBRL-TR-02345) Avail: NTIS HC A05/MF A01 CSCL 07/4

The techniques of inverse Raman spectroscopy and coherent anti-stokes Raman spectroscopy are considered for the purpose of development of rapid (single-shot) broad band detection of species in rapidly (explosively) decomposing materials. Experiments using inverse Raman spectroscopy with pulsed ruby laser, broad-band dye, 1-M spectrometer and optical multichannel analyzer are described. Results on benzaldehyde (neat and in mixtures with toluene) yield information on the quantitative limits of inverse Raman detection.
GRA

N82-11227# Army Armament Research and Development Command, Dover, N. J. Energetic Materials Div.

THE EFFECTS OF GASEOUS ATMOSPHERES ON THE PERFORMANCE CHARACTERISTICS OF ALUMINUM-SODIUM NITRATE FLARES

Patricia L. Farnell, Francis R. Taylor, and Anthony J. Beardell Aug. 1981 31 p refs
(AD-A104383; AD-E400687; ARLCD-TR-81026) Avail: NTIS HC A03/MF A01 CSCL 19/1

The burning rates and the light outputs produced by burning binary mixtures of aluminum and sodium nitrate have been studied as a function of composition and of atmospheric content. Also studied were the effects of loading pressure upon the combustion process. The gaseous atmospheres investigated were mixtures of oxygen and nitrogen, argon, or helium. For all systems except those in which the composition was pressed at high loading pressure, the burning rate was unaffected as oxygen concentration was changed, indicating that heat and radiation feedback from the flame have only a minor influence on the burning rate. Consequently, it is hypothesized that the burning rate is essentially controlled by the exothermic processes occurring at or very near to the burning surface. For all systems, the burning composition produced low light output when oxygen was excluded from the atmosphere. With increasing oxygen content, the light output increased by a large factor. This indicates that at low oxygen concentrations much of the metal escaped from the flame unburned. For compositions with low metal content, propagation is very difficult. It is believed that the decomposition of excess sodium nitrate removes heat from the burning surface. This heat loss reduces the rate of vaporization of the metal, causing this vaporization to become the rate controlling step. At the point at which the vaporization rate becomes considerably lower than the rate of oxidation of the metal, the flame will be quenched due to lack of fuel.
GRA

N82-11228# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Fuels and Lubrication Div.

JET FUEL LOCKS TO SHALE OIL: THE 1980 TECHNOLOGY REVIEW

Herbert R. Lander May 1981 156 p refs Proceedings of Conf. held at Cincinnati, 19-20 Nov. 1980
(AF Proj. 2480)
(AD-A104414; AFWAL-TR-81-2063) Avail: NTIS HC A08/MF A01 CSCL 11/4

The progress of several Air Force shale oil related programs is reported. Three shale oil processing studies evaluating the yield, cost, and quality of JP-4 and JP-8 turbine fuel produced from whole crude shale oil are discussed. Details of a fourth program that produced 11,300 gallons of specification JP-4 from Geokinetics shale oil are reported. Some of this jet fuel was tested in Air Force Fuel Mainburner/Turbine Effects Programs and was shown to behave very similar to petroleum derived JP-4. An additional study concentrated on developing hydrotreating catalysts that would more efficiently convert shale oil into aviation turbine fuel.
Author (GRA)

N82-11229# School of Aerospace Medicine, Brooks AFB, Tex. Crew Technology Div.

OPTOACOUSTIC SPECTROSCOPY TO DETECT HYDRAZINE FUELS Final Report, 1 May 1979 - 1 Feb. 1980

Edward S. Kolesar, Jr. Jul. 1981 74 p refs
(AF Proj. 7930)
(AD-A104675; SAM-TR-81-15) Avail: NTIS HC A04/MF A01 CSCL 14/2

This analysis has presented the basic theory of optoacoustic spectroscopy oriented toward designing a specific system to measure the hydrazine fuels. The fundamental goal in designing this system has been to measure absorption with the greatest possible sensitivity and, thus, maximize the signal-to-noise ratio. In this analysis, all vital components have been selected from commercially available sources and integrated into a system design. A word of caution is due, however, because only the fundamental sources of noise have been considered. In any real system, additional noise sources may further degrade performance. Some commonly encountered problems are extraneous acoustic noise, vibration-induced noise, and unwanted signals generated by absorption of laser beam energy, by sample cell walls and windows. To fine-tune a specific system, each of these practical problems would have to be resolved. For such purposes, experimentation has yielded the best results in the past, and would be expected to do so in the future.
Author (GRA)

N82-11230*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.

AN ASSESSMENT OF THE USE OF ANTIMISTING FUEL IN TURBOFAN ENGINES Final Report, Sep. 1979 - Nov. 1980

A. Fiorentino, R. DeSaro, and T. Franz Jun. 1981 53 p refs
(Contract NAS3-22045)
(NASA-CR-165258; AD-A104673; PWA-5697-29; FAA-CT-81-58) Avail: NTIS HC A04/MF A01 CSCL 21/4

An evaluation was made on the effects of using antimisting kerosene (AMK) on the performane of the components from the fuel system and the combustor of a current in-service JT8D aircraft engine. The objectives were to identify problems associated with using antimisting kerosene and to determine the extent of shearing or degradation required to allow the engine components to achieve satisfactory operation. The program consisted of a literature survey and a test program which evaluated the antimisting kerosene fuel in laboratory and bench component testing, and assessed the performance of the combustor in a high pressure facility and in an atitude relight/cold ignition facility. Performance of the fuel pump and control system was evaluated in an open loop simulation. Thus far, results of the program would not preclude the use of antimisting kerosene in a jet engine application.
GRA

N82-11231# Naval Ship Research and Development Center, Annapolis, Md. Ship Materials Engineering Dept.

OUTGASSING OF TWO SYNTHETIC FUELS Final Report

Peter Demas Sep. 1981 25 p refs
(ZF43451001)
(AD-A104580; DTNSRDC/SME-80/46) Avail: NTIS HC A02/MF A01 CSCL 21/4

The outgassing characteristics of two synthetic fuels proposed for Navy use were investigated to determine whether potentially toxic gases could be released into ships' atmospheres. The synthetic fuels studied were: (1) shale diesel fuel W-375 prepared to conform to MIL-F-16884G and (2) shale jet fuel W-383 prepared to conform to MIL-T-5624K. These outgassing characteristics of the synthetic fuels were compared to the outgassing characteristics of a conventional petroleum fuel conforming to MIL-16884G obtained from USS PONCE (LPD 15). Single samples of each fuel were sequentially exposed to temperatures of 50, 150, and 250 C for 3 hours at each temperature, and the types and amounts of the outgassed products were determined. Carbon monoxide, hydrocarbons, aldehydes, nitrogen oxides, and sulfur dioxide were outgassed. Of these, only the amount of carbon monoxide produced by diesel fuel W-375 and the amount of aldehydes produced by the conventional diesel fuel were relatively significant since each exceeded the Threshold Limit Value for these constituents by a factor of about 13. Some decomposition was evidenced when fuel W-375 was heated up to 245 C. It is recommended that similar studies be

performed with more types of synthetic fuels as these develop and become available in order to establish a better comparison of outgassing between these fuels and the conventional fuels.
Author (GRA)

N82-11232# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
AN INVESTIGATION OF THE COMBUSTION PROCESS IN SOLID FUEL RAMJETS M.S. Thesis
William Vernon Goodwin Jun. 1981 58 p refs
(AD-A104603) Avail: NTIS HC A04/MF A01 CSCL 21/4

An experimental investigation was conducted into four areas of the solid fuel ramjet combustion process: (1) the effects of near-wall turbulent mixing and equivalence ratio on combustion efficiency, (2) the effects of bypass air on combustion efficiency, (3) the combustion process in a cylindrically perforated fuel grain with a twin side-dump/dome configuration, and (4) the comparison of experimental radial temperature profiles to computer generated radial profiles. Polymethylmethacrylate fuel grains were burned in a ramjet motor and a thrust stand. Combustion efficiencies were determined and compared for different configurations. It was found to be insensitive to variations in the mixture ratio and to near-wall mixing. Bypass air was found to adversely affect the combustion efficiency both in stable and unstable combustion environments. The twin side-dump/dome configuration was unable to sustain combustion for all conditions investigated. Theoretical radial temperature profiles were found to have larger near wall gradients than were measured experimentally.
Author (GRA)

N82-11233# Bechtel Corp., San Francisco, Calif.
ALTERNATIVE FUEL FOR THE STEEL INDUSTRY OF NORTHERN INDIANA: A PREFEASIBILITY STUDY OF A CENTRAL COAL GASIFICATION PROJECT
May 1981 275 p refs Sponsored in part by Northern Indiana Public Service Co.
(Contract DE-FG01-80RA-50146)
(DE81-029314; DOE/RA-50146/1) Avail: NTIS HC A12/MF A01

A survey of the demand for natural gas indicates a wide variation, from a low of 220 billion Btu per day to a high of 387 billion Btu per day. After an examination of the market demand, it was concluded that the synthetic fuels plant should be sized to produce 120 billion Btu per day of gas. Due to the costs of installing additional gas distribution systems and modifying fuel burning equipment, it was concluded that a medium Btu gas should be produced that would have special properties to meet the requirements of existing equipment. The Lurgi and Texaco gasification processes were chosen as the basis for the study. The most significant environmental constraint will be air quality. Although the use of either process is feasible, NIPSCO selected the Texaco case for the development of the economics. A cash flow analysis indicates that the price of medium Btu gas required to yield a 15 percent DCF return on equity is $5.67 per million Btu in 1981 dollars. This is approximately equal to the current price of imported oil. It is based on a 20 year financial analysis using a 3:1 debt to equity ratio and assumes an annual escalation in cost and gas price of 10 percent. DOE

N82-11234# Gabrielson (James E.), Plymouth, Minn.
CATTAIL RHIZOME-DERIVED ALCOHOL Interim Report
J. E. Gabrielson 30 May 1981 22 p refs
(Contract DE-FG02-81AF-92016)
(DE81-028307; DOE/AF-92016/T1) Avail: NTIS HC A02/MF A01

Over 600 pounds of chizomes, weighted wet and dirty were harvested and air dried. Average yields, on low land, were 1.9 tons/acre. Yields from areas in ponds may have been higher but it is difficult to estimate the areas. Sixteen fermentations were made. The results show that the chizomes do not ferment well unless they are finely ground, and saccharified with acid, malt, or enzymes. Grinding and screening so the feed passes a 40 mesh screen and then saccharifying with two enzymes produced the best results. Over 50% of the solids were converted to alcohol and carbon dioxide, 25% yield of alcohol based on dry weight of solids. Based on the maximum land harvest rate and the best alcohol yield production of 285 gallons of alcohol/acre of cattails are projected.
DOE

N82-11235# Agri Stills of America, Springfield, Ill.
DEVELOPMENT OF A SMALL-SCALE COMMERCIAL ALCOHOL DEHYDRATION 190 TO 200 PROOF Final Report
1981 5 p refs
(Contract DE-FG02-81AF-92005)
(DE81-030158; DOE/AF-92005/T1) Avail: NTIS HC A02/MF A01

A small scale farm sized commercial unit to produce anhydrous 200 proof ethanol from 190 proof source of locally produced grain alcohol (ETOH) was investigated. The approach is to investigate a low pressure process to efficiently separate water from 190 proof alcohol, with and without the use of a third component to break the azeotrope of water and alcohol formed during atmospheric conditions. Results from this experiment show that a vacuum shell is not sufficient in design to effect wet alcohol to the anhydrous state.
DOE

N82-11236# Cincinnati Univ., Ohio. Dept. of Chemistry.
COAL HYDROGENATION VIA BONDING OF METALLIC COMPOUNDS TO COAL, PART 1. SOLUBILIZATION OF ILLINOIS BITUMINOUS COAL - THE CRITICAL IMPORTANCE OF METHYLENE GROUP CLEAVAGE, PART 2 Final Report
Milton Orchin 1981 23 p refs
(Contracts DE-AS01-76ET-10517; EF-76-01-2308-10)
(DE81-027562; DOE/ET-10517/T1) Avail: NTIS HC A02/MF A01

Data for the hydrogenation of Elkhorn coal at 390 C with the initial pressure of 13.8 MPa hydrogen and with various catalysts (stannous chloride and complexes of cobalt and tin), and solvents (decalin and tetralin) are presented in tabular form and results are discussed. Model compounds of coal, polystyrene beads were tin-bonded and tin-impregnated, then hydrogenated under various temperatures, pressures, and with either decalin or tetralin. Results show both hydrogen and the tin catalyst are necessary for liquefaction at 390 C, and under comparable conditions, bonded tin gave greater liquefaction than impregnated tin but with considerably greater hydrogen consumption. In the coal solubilization study, solubilization by hydroliquefaction and by chemical reduction with potassium in tetrahydrofuran seems to indicate that initial degradation of coal by both techniques proceeds by ether cleavage and that further degradation is achieved in both cases by methylene bridge attack. The nuclear magnetic resonance studies on hydroliquefaction products indicate that Illinois bituminous coal is structurally quiet homogeneous.
DOE

N82-11237# Northern Resources, Inc., Billings, Mont.
FEASIBILITY AND ECONOMIC STUDY OF MEDIUM-BTU COAL GAS BLENDED WITH HIGH-BTU BY PRODUCT GAS AS AN INDUSTRIAL ENERGY SOURCE AT BILLINGS, MONTANA
May 1981 23 p
(Contract DE-FG01-79RA-20219)
(DE81-025166; DOE/FE-20219/1) Avail: NTIS HC A02/MF A01

The technical and economic feasibility of blending a medium Btu gas (CMG) produced from coal by the Winkler fluidized bed gasification process with excess refinery fuel gas to be used as an industrial fuel in Billings, Montana is assessed. The background of the project; the site selection process, the conceptual design of the process and supporting facilities, the retrofit requirements and other costs associated with burning the MBG, the environmental and permitting aspects of the project, the cost estimates and economic considerations, the contract provisions for MBG buy/sell agreements, the government's role in supporting the project and the market potential for the project in Billings and similar projects in other markets are discussed. It is concluded that the project is technically feasible and economically viable today although parity with conventional fuels will not occur until 1985.
DOE

N82-11238# AmeriGas, Inc., Valley Forge, Pa.
CONCEPTUAL DESIGN FOR A MULTI-USER MEDIUM BTU COAL GASIFICATION COMPLEX. VOLUME 1: EXECUTIVE SUMMARY
Sep. 1980 106 p

(Contract DE-FG01-80RA-50135)
(DE81-027139; DOE/FE-50135/2) Avail: NTIS
HC A06/MF A01

On the basis of fuel requirements, a gasifier to produce immediate Btu gas (250 Btu/SCF) at a scale of 8.3 million Btu/day was designed. The basic conclusion, based upon the $6.45/MM Btu required selling price of IFG for this project, was that the facility, as designed, does not present a viable business opportunity. Still existing are the customer's need for long term, stable supplies of clean energy with high fuel utilization load factors. The failure to produce a viable business opportunity does not condemn the process or the project. Even at $6.45/MM Btu, the economic attractiveness of the project was not so poor as originally perceived. When the recent volatile energy price variations are coupled with current rates of inflation and proposed deregulation of natural gas, the long-term attractiveness of IFG is visible. The hurdle here is convincing management that the risks of accepting a higher, yet secure cost of energy now is more than off-set by future savings. Various financial incentives are considered. DOE

N82-11239# TRW, Inc., Redondo Beach, Calif.
LABORATORY STUDY FOR REMOVAL OF ORGANIC SULFUR FROM COAL Final Report
1 Jul. 1981 210 p refs
(Contract DE-AC22-80PC-30141)
(DE81-025132; DOE/PC-30141/T4) Avail: NTIS
HC A10/MF A01

A description of laboratory experimental equipment and a detailed discussion of the results is presented. Initial and concluding engineering design and cost estimations are also presented and the last two sections contain recommendations for future work and an appendix of laboratory data. The TRW Gravimelt Process involves the treatment of mine-cleaned coal with molten potassium and or sodium hydroxide to chemically extract both organic and pyritic sulfur into the molten alkali. The coal mineral content is broken down to forms insoluble in water but soluble in a second liquid, usually dilute sulfuric acid. The high density of the melt causes the desulfurized coal to float to the surface, where it is skimmed off. The coal is then washed with water to completely recover the alkali metal and the coal is dried. If the coal is next washed with a second liquid, almost all of the mineral matter is extracted into the solution. DOE

N82-11240# New York State Energy Research and Development Authority, New York.
LOW/MEDIUM-BTU COAL-GASIFICATION ASSESSMENT PROGRAM FOR SPECIFIC SITES OF TWO NEW YORK UTILITIES
Dec. 1980 377 p
(Contract DE-FG01-79RA-20223)
(DE81-025518; DOE/RA-20223/T1) Avail: NTIS
HC A17/MF A01

The technical and economic aspects of coal gasification to supply low or medium Btu gas to two power plant boilers are investigated. Coals from different regions of the country were investigated in terms of their availability, mode of transportation and delivered cost to each power plant site. The effects of burning low and medium Btu gas in the selected power plant boilers on efficiency, rating and cost of modifications are also examined. Both plants meet the federal, state and local environmental requirements for air quality, wastewater liquid disposal, and ground level disposal of byproduct solids of the synthetic gas alternative result in bus bar cost savings on a yearly basis within a few years of start up because the cost of gas is assumed to escalate at a lower rate than that of fuel oil, approximately 4 to 5%. DOE

N82-11241# Sandia Labs., Albuquerque, N. Mex. Explosive Materials Div.
DEFLAGRATION-TO-DETONATION TRANSITION (DDT) PROJECT Semiannual Report, Jun. - Nov. 1980
W. George Perkins, ed. Jul. 1981 40 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030979; SAND-81-0937) Avail: NTIS
HC A03/MF A01

A generalized computer model of the deflagration detonation transition was written and methods were developed for analyzing impurities in cobalt perchlorate (CP). A data base was established for the corrosion, compatibility, and reliability of CP-loaded detonators. Components for small, safe detonators were evaluated. DOE

N82-11242# Gulf Science and Technology Co., Pittsburgh, Pa. Chemical and Minerals Div.
EFFECTS OF COMPONENTS OF SYNFUELS ON SOOT FORMATION Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
J. E. Haebig and P. M. Goldberg Aug. 1981 16 p refs
(Contract DE-AC22-80PC-30307)
(DE81-027961; DOE/PC-30307/3; Gulf-627RM073; QTPR-3)
Avail: NTIS HC A02/MF A01

The development of an experimental system for the study of the relationships between the rate and amount of soot formation in the combustion of coal derived synfuels and the chemical composition and molecular constituents of those fuels was completed. A burner and pressure vessel were fabricated and assembled along with a flow control panel for seven gas streams. The optical components for laser light scattering were used. Future experimental features were identified. Data on coal liquid properties and composition are discussed. DOE

N82-11243# Minnesota Gas Co., Minneapolis.
PEAT BIOGASIFICATION DEVELOPMENT PROGRAM
Cambridge, Mass. Dynatech R/D Co. 21 Apr. 1981 240 p refs
(Contract DE-AC01-79ET-14696; Dynatech Proj. MGC-2)
(DE81-028299; DOE/ET-14696/T6; Dynatech-2115) Avail: NTIS HC A11/MF A01

The advantage of the biogasification method is it can use the peat in a high moisture state, thereby eliminating the need to provide energy for drying peat. A preliminary investigation (Appendix B) of the peat biogasification process (funded by Minnesota Gas Company) Showed potential technical and economic feasibility of the process, sufficient to carry out the present program. Based on the results of the present program the solubilization, oxidation, and digestion steps have been defined sufficiently to lead to a more reliable process design and preliminary estimate of the fuel gas production costs. This present program was initiated to develop an experimental data base for the solubilization, oxidation, and fermentation reactions, and to use this data base to develop a conceptual preliminary process design and thus enable a preliminary estimation of the economics (capital and operating costs and unit gas costs) for process. DOE

N82-11244# Argonne National Lab., Ill. Energy and Environmental Systems Div.
ADVANCED SYSTEM EXPERIMENTAL FACILITY: SOLID WASTE TO METHANE GAS. BACKGROUND AND PROCESS DESCRIPTION
R. Isaacson and J. Pfeiffer Mar. 1981 15 p refs
(Contract W-31-109-eng-38)
(DE81-030198; ANL/CNSV-22) Avail: NTIS
HC A02/MF A01

The Refuse Conversion to Methane Facility in Pompano Beach, Florida, a 100-ton/day experimental plant to convert municipal solid waste (MSW) to methane for fuel was designed to assess the technical merit of anaerobic digestion of the MSW process. Approximately 40 ton/day of volatile solids are fed to the digesters; of this, about 25 ton/day will be converted to gases. For each pound of volatile solids destroyed, 6.6 std. cu ft of methane gas and 6.6 std. cu ft of CO2 will be produced. Thus, the plant will yield approximately 330,000 std. cu ft/day each of methane and CO2. The most important process variables are to be tested allowing judgments to be made on scale up considerations. DOE

N82-11245# Aerospace Corp., Los Angeles, Calif.
NEAR-TERM GOALS FOR ALCOHOL FUELS FROM BIOMASS: AN OVERVIEW OF RESOURCE REQUIREMENTS, LAND USE, ENVIRONMENTAL, AND SOCIOECONOMIC IMPACTS
J. Halsey, D. Hazard, K. Kawaoka, K. Stephens, and G. DAlessio (DOE) Argonne, Ill. Argonne Natl. Lab. Dec. 1980 111 p refs

(Contract W-31-109-eng-38)
(DE81-029987; ANL/EES-TM-149) Avail: NTIS
HC A06/MF A01

The biomass resources needed to meet national alcohol production goals are examined, available technologies for utilizing agricultural products and byproducts are reviewed, and potential environmental and socioeconomic impacts of near-term alcohol production are identified. Near-term (1985 to 1986) land resource requirements and impacts are emphasized with particular attention to the major corn producing states. Results indicate that: (1) the grain availability for ethanol production does not appear to be limiting for these near-term production capacity goals; (2) major expansion of acreage planted in corn should not result from these goals; (3) environmental impacts on and from farm lands should not increase significantly; (4) food prices may increase due to the near-term goals, but farmers should benefit overall; and (5) the expansion of alcohol production in the longer term (1986 to 2000 and beyond) will necessitate the use of additional biomass feedstocks and residues. DOE

N82-11246# Battelle Pacific Northwest Labs., Richland, Wash.
PRODUCTION AND UTILIZATION OF METHANE FROM ANAEROBIC SLUDGE DIGESTION IN U.S. WASTEWATER-TREATMENT PLANTS
Jul. 1981 109 p refs
(Contract DE-AC01-76CS-20300)
(DE81-029958; DOE/CS-20300/3) Avail: NTIS
HC A06/MF A01

Three generic onsite uses were selected for energy and cost accounting analysis: heat generation, mechanical energy generation, and electrical energy generation. Of the gas utilization methods analyzed, the most energy efficient and cost effective was found to be the direct production of mechanical energy to drive aerators and pumps. Between 50 and 80 percent of the mechanical energy required for wastewater treatment can be provided by digester gas. In addition, waste heat can be recovered from the engines to aid in heating the digesters and buildings. Total energy costs for the mechanical energy generation scheme averaged around $30/million gallons treated, compared to $34/million gallons and $45/million gallons for the electrical energy generation and heat generation schemes, respectively. DOE

N82-11247# California Univ., Livermore. Lawrence Livermore Lab.
SOLAR COAL-GASIFICATION REACTOR FOR HYDROCARBON-FREE SYNTHESIS GAS
W. R. Aiman Jun. 1981 10 p Presented at the STTF Users Assoc. Ann. Meeting, Pasadena, Calif., 23 Apr. 1981
(Contract W-7405-eng-48)
(DE81-026600; UCRL-86260; CONF-810469-3) Avail: NTIS HC A02/MF A01

The products from a coal gasification process are discussed. In synthesis gas production, the end product is a high Btu gas composed of methane and higher hydrocarbons. Furthermore, the liquid hydrocarbons can be even more valuable as feedstocks for other processes. In other applications such as methanol production, the hydrocarbon content of the synthesis gas is a non-reactive diluent that must be bled away from the product synthesis area to keep its concentration from building up. In addition to the above benefits, this reactor requires substantially less steam in the coal gasification process. The reactor is able to produce hydrocarbon-free synthesis gas because it withdraws the pyrolysis gases from the reactor as they are formed and reinjects them above the char gasification zone where they are steam reformed into CO, CO2, and H2. Since almost all of the hydrocarbons released in coal gasification come off with the pyrolysis gases, the reactor will produce nearly hydrocarbon-free gas. DOE

N82-11248# California Univ., Livermore. Lawrence Livermore Lab.
CONTROLLED RETRACTING INJECTION POINT (CRIP) SYSTEM: A MODIFIED-STREAM METHOD FOR IN SITU COAL GASIFICATION
R. W. Hill and M. J. Shannon 15 Apr. 1981 10 p refs Presented at the 7th Underground Coal Conversion Symp., Fallen Leaf Lake, Calif., 8-11 Sep. 1981
(Contract W-7405-eng-48)
(DE81-026477; UCRL-85852; CONF-810923-2) Avail: NTIS
HC A02/MF A01

The principle of moving the injection point (where the combustion-supporting air or oxygen from the surface is fed into the coal seam) to new areas of unburned coal as the burn progresses in coal gasification is investigated. The controlled retracting injection joint or CRIP system is designed to keep the injection point on the bottom of the coal seam and to move it backwards away from the collapse zone into fresh, solid coal. The principle of controlled retraction allows the operator to choose the optimum time and distance to move the injection point, and consequently the burn zone, to get the best possible performance from the gasifier. Although this system will work with coal seams of any thickness, it is particularly well suited to thick coal seams where the cavity grows by coal collapse as well as combustion. Placement of the production channel at the top of the seam, above the injection well ensures, isolation from the effects of collapse and reduces the risk of plugging the production well. DOE

N82-11249# International Science and Technology Inst., Inc., Washington, D. C.
ASSESSMENT OF OIL-SHALE TECHNOLOGY IN BRAZIL Final Technical Report, 27 Oct. 1980 - 27 Jul. 1981
27 Jul. 1981 143 p refs
(Contract DE-AC01-80ER-30010)
(DE81-027574; DOE/ER-30010/1) Avail: NTIS
HC A07/MF A01

This assessment investigates whether US oil shale developers might benefit from the experience gained by the Brazilians in the operation of their Usina Prototipo do Irati oil shale demonstration plant at Sao Mateus do Sul, and from the data generated from their oil shale research and development programs. A chapter providing background information on Brazil and the Brazilian oil shale deposits is followed by an examination of the potential recovery processes applicable to Brazilian oil shale. The evolution of the Brazilian retorting system is reviewed and compared with the mining and retorting proposed for US shales. Factors impacting on the economics of shale oil production in Brazil are reviewed and compared to economic analyses of oil shale production in the US. Chapters examining the consequences of shale development in terms of impact on the physical environment and the oil shale worker complete the report. DOE

N82-11250# Avco-Everett Research Lab., Mass.
PREIGNITION VOLATILE YIELD AS RELATED TO COAL CHARACTERISTICS Quarterly Report, Apr. - Jun. 1981
Jul. 1981 16 p ref
(Contract DE-AC22-80PC30290)
(DE81-027584; DOE/PC-30290/T3; FE-30290-3Q) Avail: NTIS HC A02/MF A01

Twelve coals are currently being characterized regarding their proximate and ultimate analysis, reflectance, surface area, and petrographic composition. Devolatilization experiments were completed at two temperature levels for nine of the twelve coals. In addition the effect of particle size on preignition volatile yield was been investigated for Illinois No. 6 coal. The relation between preignition volatile yield and such coal characteristics as: (1) carbon content; (2) hydrogen to carbon ratio; (3) volatile matter; (4) reflectance; (5) surface area; and (6) various functions of the petrographic composition was studied. From the coals tested thus far the most direct relation is between the volatile yield and carbon content. The AERL coal combustion model modified to allow exploration of the effect of preignition volatile yields on flame stability in a swirl burner. DOE

N82-11251# Department of Energy, Morgantown, W. Va. Energy Technology Center.
ATMOSPHERIC FLUIDIZED-BED PROJECTS TECHNOLOGY OVERVIEW
Feb. 1981 66 p refs
(DE81-027143; DOE/METC-SP-108) Avail: NTIS
HC A04/MF A01

The methodology by which DOE-funded projects achieved program goals and objectives is examined. The status of the technology is reviewed, and areas where further development or research is required, and projects where this is being addressed are identified. Current program issues include feed systems, heat transfer, recycle, air-distributor grid design, ignition characteristics, output control, particulate emissions, reliability, and fuel flexibility. DOE

N82-11252# Department of Energy, Oak Ridge, Tenn.
SOLVENT-REFINED COAL-1 DEMONSTRATION PROJECT. FINAL ENVIRONMENTAL IMPACT STATEMENT, VOLUME 1 OF 2 Final Report
Jul. 1981 700 p refs
(DE81-025983; DOE/EIS-0073-Vol-1) Avail: NTIS HC A99/MF A01

The potential environmental impacts associated with the construction and operation of a 6000-tpsd-capacity coal liquefaction facility at Newman, Kentucky which will demonstrate the technical operability, economic viability, and environmental acceptability of an SRC-I process are assessed. Impacts assessed include the following: effects of the project on occupational and public health resulting from the production and use of SRC products; potential impacts on terrestrial and aquatic ecology; potential and expected impacts on land use; withdrawal and alteration of prime agricultural land; projected effects on flood-plain and wetland areas; potential impacts on surface water and groundwater; potential impacts on ambient air quality; potential change of the cultural landscape; potential impacts on sites of archaeological significance; and changes to existing economic and social characteristics of the site area. Long-range and cumulative impacts of a future commercial expansion of the proposed facility at the proposed site to an approximately 30,000-tpsd capacity are also addressed. A construction and operational monitoring plan to assess the effectiveness of the planned mitigatory measures for the duration of the demonstration phase is presented. DOE

N82-11253# Department of Energy, Morgantown, W. Va. Energy Research Center.
SURFACE COAL GASIFICATION
Oct. 1980 48 p refs
(DE81-030183; DOE/METC-SP-110) Avail: NTIS HC A03/MF A01

The successful commercial application of surface gasification of coal could enable the United States to use from its vast deposits of coal to produce a wide variety of energy products and chemical feedstocks. The technology base is well developed and extremely flexible for converting coal into alternate products suitable for the demands of a broad and heterogeneous market and a wide array of users/owners. To meet the defined program objectives, several pilot plant and process-development operations are being conducted. Four of these operations are described: (1) combustion engineering low-Btu entrained-bed gasifier; (2) bi-gas high-Btu entrained-bed gasifier; (3) ash-agglomerating fluid-bed gasifier; and (4) the short-residence time high-Btu hydrogasifier. Gasification technology-crosscut conclusions and results of technical problems and issues common to the four pilot plants are discussed. DOE

N82-11254# Department of Energy, Morgantown, W. Va.
ADVANCED-GASIFICATION PROCESSES
Dec. 1980 66 p refs
(DE81-030184; DOE/METC-SP-183) Avail: NTIS HC A04/MF A01

An analysis of the needs for commercial gasification reveals the following principal categories of information gaps that can be filled by programs already in progress or those readily initiated. The gaps are technology base need required for successful commercialization of both currently available and advanced-gasification processes. The needs are defined further in Table 2-1, which shows the current status of the technology data base. The need areas are classified as follows: Coal Preparation/Feeding/Fins Management, Reactor Design/Performance, Gas Cleaning/Cooling, Acid Gas Removal/Gas Shift and Conversion Data Base on State-of-the-Art and Advanced Technologies, Components/Materials/Instrument Development, Health/Environmental/Safety, and General. It is anticipated that solutions to many of the problems associated with the demonstration plants, the alternative fuel plants, and the Synthetic Fuel Corporation endeavors will not be available during the design and construction phases. However, during the operating and optimization phases of most of these projects prior to commercialization, where additional will have provided the additional data base needed to correct deficiencies and/or to advance the state of the art. DOE

N82-11255# Pittsburg Energy Technology Center, Pa. Combustion Technology Div.
TRANSPORT CHARACTERISTICS OF ALTERNATE SLURRY FUELS Quarterly Technical Progress Report, Apr. - Jun. 1981
1981 5 p Sponsored by DOE
(DE81-028580; DOE/TIC-1028580) Avail: NTIS HC A02/MF A01

Progress is reported in an effort to develop flow data for various alternate fuels, such as coal/water mixtures, in a pump loop which accurately simulates fuel feed systems found in boiler and furnace applications. Instruments and procedures were selected for the measurement and correlation of pressure loss as a function of slurry characteristics and system design. An existing loop was redesigned by lengthening both the vertical and horizontal straight sections and by simplifying the tank discharge/pump suction inlet section to eliminate unnecessary bends or elbows. Locations were selected for the pressure measurements, temperature measurements, flow measurements, and grab sample ports. A data acquisition system was defined. DOE

N82-11256# California Univ., Berkeley. Lawrence Berkeley Lab. , Chemical Biodynamics Div.
HYDROGEN PRODUCTION FROM THE PHOTOSYNTHETIC BACTERIUM RHODOPSEUDOMONAS SPHAEROIDES Ph.D. Thesis
B. A. Macler Jun. 1981 147 p refs
(Contract W-7405-eng-48)
(DE81-025831; LBL-12877) Avail: NTIS HC A07/MF A01

Rhodopseudomonas sphaeroides can produce H2 gas under certain conditions when supplied with an appropriate reduced carbon source. It was determined that the enzyme nitrogenase is responsible for this activity. Maximum rates of H2 biosynthesis were achieved when the organism was grown anaerobically in the light in a medium containing minimal amounts of reduced nitrogen. An atmosphere low in N2 also increased H2 yields. The organism can utilize lactate, malate, fructose or sucrose to produce H2. Ammonium ion completely inhibited H2 production completely and irreversibly in vivo when present above 8% in the atmosphere. N2 did not completely suppress H2 production at any level. Carbon monoxide at 10% in the atmosphere did not affect metabolism or inhibit H2 production. Monofluoroacetate inhibited H2 production from 10 to 70% depending on the strain and the carbon compound used for substrate. DOE

N82-11257# Brookhaven National Lab., Upton, N. Y.
FUSION AS A SOURCE OF SYNTHETIC FUELS
J. R. Powell, J. A. Fillo, and M. Steinberg 1981 10 p refs
Presented at the Energy in the Man-Built Environ.: The Next Decade Specialty Conf., Vail, Colo., 3 Aug. 1981
(Contract DE-AC02-76CH-00016)
(BNL-29281; CONF-810808-2) Avail: NTIS HC A02/MF A01

Efficient production of hydrogen-based fuels from fusion is addressed. Water splitting reactions discussed include high temperature electrolysis of steam, thermochemical cycles, hybrid electrochemical/thermochemical, and direct thermal decomposition. High temperature electrolysis appears to be the simplest and most efficient process with efficiencies of 50 to 70% (Fusion to hydrogen chemical energy), depending on process conditions. DOE

N82-11258# Battelle Pacific Northwest Labs., Richland, Wash. Biomass Program Office.
TRANSPORTATION FUELS FROM SYNTHETIC GAS
E. G. Baker and R. Cuello Aug. 1981 25 p refs
(Contract DE-AC06-76RL-01830)
(DE81-029614; PNL-3951) Avail: NTIS HC A02/MF A01

Twenty-five experimental Fischer-Tropsch synthesis runs were made with 14 different catalysts or combinations of catalysts using a Berty reactor system. Two catalysts showed increased selectivity to transportation fuels compared to typical Fischer-Tropsch catalysts. With a catalyst consisting of 5 wt percent

ruthenium impregnated on a Y zeolite (run number 24), 63 to 70 wt percent of the hydrocarbon product was in the gasoline boiling range. Using a 0.5 wt percent ruthenium on alumina catalyst (run number 22), 64 to 78 wt percent of the hydrocarbon product was in the diesel fuel boiling range. Not enough sample was produced to determine the octane number of the gasoline from run number 24, but it is probably somewhat better than typical Fischer-Tropsch gasoline (approx. 50) and less than unleaded gasoline (approx. 88). The diesel fuel produced in run number 22 consisted of mostly straight chained paraffins and should be an excellent transportation fuel without further refining. The yield of transportation fuels from biomass via gasification and the Fischer-Tropsch synthesis with the ruthenium catalysts is somewhat less, on a Btu basis, than methanol (via gasification) and wood oil (PERC and LBL processes) yields from biomass.
DOE

N82-11259# Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.
CHEMISTRY AND CATALYSIS OF COAL LIQUEFACTION: CATALYTIC AND THERMAL UPGRADING OF COAL LIQUID AND HYDROGENATION OF CO TO PRODUCE FUELS
Quarterly Progress Report, Oct. - Dec. 1979
W. H. Wiser Aug. 1980 73 p refs
(Contract DE-AC01-79ET-14700)
(DOE/ET-14700/1) Avail: NTIS HC A04/MF A01

Studies of the chemistry and catalysis of coal hydrogenation have been initiated with the construction of a flow reactor for extraction of coal and the development of analytical techniques. Work was initiated on the design of a rotor for (13)C nuclear magnetic resonance of solid coal and extracted coal. Studies on momentum, heat and mass transfer in a fluidized bed simulated conditions for coal hydrogenation and were used to investigate effects of particle size and solids loading. The catalytic upgrading of coal-derived liquids is investigated by studies of the catalytic denitrogenation, desulfurization, deoxygenation and cracking of model compounds. Aging of Co-Mo catalysts was found to reduce the number of active sites but not the nature of the sites. A Raney catalyst is being developed for the hydrogenation of carbon monoxide. Temperature programmed desorption was used to study the properties of an iron manganese oxide catalyst previously shown to give high yields of C2-C10 hydrocarbons. DOE

N82-11260# Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.
CHEMISTRY AND CATALYSIS OF COAL LIQUEFACTION: CATALYTIC AND THERMAL UPGRADING OF COAL LIQUID AND HYDROGENATION OF CO TO PRODUCE FUELS
Quarterly Progress Report, Jan. - Mar. 1980
Wendell H. Wiser Aug. 1980 70 p refs
(Contract DE-AC22-70ET-14700)
(DOE/ET-14700/2) Avail: NTIS HC A04/MF A01

Analysis of a group of coal liquids produced by catalytic hydrogenation of Utah coals with ZnCl2 catalyst was begun. Carbon-13 nuclear magnetic resonance and liquid chromatography techniques will be used to correlate chemical properties with hydrogenation reactivity. Equipment previously used for downflow measurements of heat and momentum transfer in a gas-coal suspension was modified for upflow measurements. The catalytic hydrodeoxygenation of methyl benzoate has been studied to elucidate the reactions of ester during upgrading of coal-derived liquids. The kinetics of hydrogenation of phenanthrene have also been determined. The catalytic cracking mechanism of octahydroanthracene is reported in detail. Studies of the hydrodesulfurization of thiophene indicate that some thiophene is strongly adsorbed as a hydrogen-deficient polymer on cobalt-molybdate catalyst. Part of the polymer can be desorbed as thiophene by hydrogenation. Poisoning of the catalyst inhibits the hydrosulfurization activity to a greater degree than the hydrogenation activity. Iron-manganese catalysts for carbon monoxide hydrogenation is studied to determine the role of iron carbide formation on selectivity. Pure iron catalyst forms a Hagg iron carbide phase unde reaction conditions. DOE

N82-11261# COECORP, Mountain View, Calif.
WORKSHOP PROCEEDINGS: COMBUSTION TURBINE RESIDUAL OIL
May 1981 291 p Workshop held at Atlanta, 17-18 Jul. 1980 Sponsored by EPRI
(EPRI-WS-80-132; CONF-8007109) Avail: NTIS HC A13/MF A01

Technology developed for the reliable and efficient operation of gas turbines using heavy fuel oils or alternative to petroleum distillates is described. Topics covered include combustion system design, turbine gas path design, corrosion resistant materials, turbine deposits, fuel treatment, fuel processing, and additives. Turbine operating conditions and performance are also discussed. A.R.H.

N82-11262# Los Alamos Scientific Lab., N. Mex.
HYDROGEN STORAGE-BED DESIGN FOR TRITIUM SYSTEMS TEST ASSEMBLY
Hatice S. Cullingford, Michael G. Wheeler, and John W. McMullen 1981 18 p refs Presented at the Intern. Symp. on Metal-Hydrogen Systems, Miami Beach, Fla., 13-15 Apr. 1981
(Contract W-7405-eng-36)
(DE81-025336; LA-UR-81-1906; CONF-810497-1) Avail: NTIS HC A02/MF A01

The Los Alamos National Laboratory complete the design of a hydrogen storage bed for the Tritium Systems Test Assembly (TSTA). Our objective is to store hydrogen isotopes as uranium hydrides and recover them by dehydriding. The specific use of the storage bed is to store DT gas as U(D,T)3 when it is required for the TSTA. The hydrogen storage bed consists of a primary container in which uranium powder is stored and a secondary container for a second level of safety in gas confinement. The primary container, inlet and outlet gas lines, cartridge heaters, and instrumentation are assembled in the secondary container. The design of the hydrogen storage bed is presented, along with the modeling and analysis of the bed behavior during hydriding-dehydriding cycles. DOE

N82-11263# California Univ., Livermore. Lawrence Livermore Lab.
POSSIBLE USE OF COAL IN HAWAII, 1980 - 2000
R. B. Bell 12 Feb. 1981 52 p refs
(Contract W-7405-eng-48)
(DE81-028266; UCRL-53121) Avail: NTIS HC A04/MF A01

The possibilities for the use of coal in the State of Hawaii are explored. The nature of the Hawaiian energy sector, the possible role coal could play in that sector, and some of the costs and consequences of introducing coal into the State are addressed. The technical issues connected with coal use are presented. DOE

N82-11264# California Univ., Livermore. Lawrence Livermore Lab.
CORRELATION OF SHOCK-INITIATION TESTS FOR EXPLOSIVES AND PROPELLANTS
A. M. Weston, J. R. Walton, E. James, E. Lee, and L. G. Green Jul. 1981 84 p refs Presented a the 7th Intern. Symp. on Detonation, Annapolis, 16-19 Jun. 1981
(DE81-026533; UCRL-85614; CONF-810602-31) Avail: NTIS HC A05/MF A01

Comparison among the shock initiation tests most commonly in use for evaluating explosives and propellants reveal a strong correlation of the results. Lagrange hydrodynamic calculations of the tests are employed to establish the precise nature of the correlation, but we also show how relatively simple approximations to the hydrodynamic results can be used to evaluate shock initiation thresholds. The results of this study provide both an equivalence relationship between the standard tests and a basis for evaluating shock initiation thresholds for hazard conditions in general. The correlations are quite reliably applied to propellants and explosives prepared at a near maximum density. Our analysis of available data shows that the correlation for porous materials is still uncertain. DOE

N82-11265# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
ALCOHOL FUELS IN THE UNITED STATES
R. R. Stiger 1981 12 p refs Presented at tht Am. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-026013; CONF-810606-75) Avail: NTIS HC A02/MF A01

An overview of the social and technical issues surrounding the production of alcohol for fuels is presented. A brief analysis of the United States Alcohol Program is followed by a discussion of technical and economic factors that affect the production of alcohol fuels. DOE

N82-11266# Sandia Labs., Albuquerque, N. Mex.

HOT-SPOT INITIATION OF HETEROGENEOUS EXPLOSIVES

M. E. Kipp, J. W. Nonziato, R. E. Setchell, and E. K. Walsh (Florida Univ., Gainesville) 1981 11 p refs Presented at 7th Symp. on Detonation, Annapolis, 19 Jun. 1981
(Contract DE-AC04-76DP-00789; Grant NSF ENG-76-18077)
(DE81-027801; SAND-80-2438C) Avail: NTIS HC A02/MF A01

It is generally accepted that the shock initiation of heterogeneous explosives begins with the formation of hot spots in the vicinity of microstructural defects such as voids, grain boundaries, and phase boundaries where three can be significant localized deformation as a result of material viscosity, plastic work, and intergranular friction. This phenomenon is described in the context of a recently developed theory of chemically reacting, multiphase mixtures. In particular, we consider a granular explosive with an energetic binder (e.g. PBX-9404) and represent it as a three-phase, saturated mixture consisting of the granular reactant, the binder, phase, and the product gases. Under dynamic loading, viscous dissipation results in high temperatures in the binder phase which subsequently thermally explodes to form product gases. Decomposition of the granular reactant is achieved by laminar grain burning. This model was incorporated into a 1-D Lagrangian finite-difference code (WONDY) and e evolution of compressive shock and acceleration (ramp) waves were calculated for PBX-9404. DOE

N82-11267# California Univ., Livermore. Lawrence Livermore Lab.

LLNL UNDERGROUND COAL GASIFICATION PROJECT Quarterly Progress Report, Jan. - Mar. 1981

D. U. Olness, ed. and Wallace Clements, ed. 27 Apr. 1981 42 p refs
(Contract W-7405-eng-48)
(DE81-030634; UCRL-50026-81-1) Avail: NTIS HC A02/MF A01

Laboratory studies of forward gasification through drilled holes in small blocks of coal, approximately 1 foot on a side were conducted. Such studies give insight into cavity growth mechanisms and particulate production. However, because of the small dimensions involved, the information these tests provide is necessarily limited to aspects of cavity growth at very early times. The preliminary process design of the Tono No. 1 field experiment in Washington was completed. The experimental plan and operational strategy was developed to ensure that the injection point remains near the bottom of the coal seam and that the experiment continues at least until a period of stable operation is reached and sustained for a time. A mathematical model for the small coal block experiments in order to further our understanding of the physical and chemical processes governing the burning of the coal and the growth of the cavity within the block is being developed. Groundwater samples from wells located at distances of a few feet to several hundred feet from the gasification cavities were collected before, during, and after each of the Hoe Creek tests. The analysis of the groundwater contamination data pertinent to the Hoe Creek No. 3 test was completed. DOE

N82-11268# Pittsburg and Midway Coal Mining Co., Englewood, Colo.

SOLVENT-REFINED-COAL (SRC) PROCESS Quarterly Technical Progress Report, Jul. - Sep. 1980

Jul. 1981 219 p
(Contracts DE-AC05-76ET-10104; EX-76-C-01-0496)
(DE81-029628; DOE/ET-10104/8) Avail: NTIS HC A10/MF A01

The Fort Lewis pilot plant complete the SRC- Preheat B test program on the 2" coil. After a one week shutdown, operation was resumed in the SRC-2 mode to repeat the low heat flux test program for slurry preheater B. Process development unit-99 made three runs part of a series designed to study operations at low feed coal concentrations. Several modifications were made to improve P-99 performance capabilities. Experiments to study feed coal effect on kinetics were completed. Modeling the P-99 and Fort Lewis reactors and control of unstable steady state reactor temperature. Work was initiated to develop the cost equation system for the follow and yield matrices of the model and to study the effects of pyrite/pyrrhotite on coking of SRC-2 process streams. DOE

N82-11269# Water Resources Council, Washington, D.C.

COAL LIQUEFACTION DEMONSTRATION PLANT NEAR MORGANTOWN, WEST VIRGINIA: WATER ASSESSMENT REPORT SECTION 13(b) Final Report

Nov. 1980 40 p refs Prepared in cooperation Ohio River Basin Commission
(PB81-216095) Avail: NTIS HC A03/MF A01 CSCL 08H

Water requirements and water supply availability were assessed for a proposed coal liquefaction demonstration project at Fort Martin near Morganown, WV. A policy for consumptive use makeup and the impact on other offstream uses, navigation, and water quality are also examined. GRA

N82-11270# Water Resources Council, Washington, D.C.

COAL LIQUEFACTION DEMONSTRATION PLANT NEAR MORGANTOWN, WEST VIRGINIA: WATER ASSESSMENT REPORT Summary Report

21 Aug. 1980 14 p refs Prepared in cooperation with Ohio River Basin Commission
(PB81-216103) Avail: NTIS HC A02/MF A01 CSCL 08H

A preliminary assessment of the commercial project as currently planned is presented. Topics covered include the need for water management policies for the Ohio River Basin to regulate water distribution, as well as a pollution monitoring system. GRA

N82-11271# TRW, Inc., McLean, Va. Energy Engineering Div.

GAS RECOVERY FROM COAL DEPOSITS Final Report

A. A. Lee, C. R. Skillern, and D. R. Watkins Jan. 1981 113 p refs
(Contract GRI-5011-321-0101)
(PB81-222291; GRI-80/0033) Avail: NTIS HC A06/MF A01 CSCL 08I

The production potential of coalbeds at depth below 2500 feet was assessed and the effectiveness of hydraulic fracturing in deep coalbeds was determined. Two deep tests were performed, one in the Greater Green River Area and one in the Piceance Basin, both in Colorado. GRA

N82-11272# IDL Chemicals Ltd., Hyderabad (India). Research and Development Dept.

AC FIRING ABILITY OF DETONATION Final Report

V. Arasu, P. Satyavratan, and R. Vedam 14 Dec. 1980 21 p refs Presented at the CMRS Silver Jubilee Symp. on Appl. of Electron. and Instrumentation for Mines, Tunnels and Dams, Dhanbad, India, 14 Dec. 1980
(PB81-216053; IDL/R/D-80) Avail: NTIS HC A02/MF A01 CSCL 19A

The series firing ability of detonators when subjected to AC mains voltage is analyzed. The analysis and conclusions are made based on actual experiments conducted with the help of a custom built electronic firing system. At lower currents there exists a narrow band of critical starting angles of which misfires occur. This critical zone is explained based on a hypothesis of desensitization of the fusehead by the current flowing during the falling slope region. This phenomena is less severe at higher currents which eliminates misfires under AC mains voltage firing. GRA

N82-11273# Research Triangle Inst., Research Triangle Park, N. C.

COAL GASIFIER PARAMETERS INFLUENCING ENVIRONMENTAL POLLUTANT PRODUCTION

D. A. Green, J. G. Cleland, D. P. Daugherty, W. J. McMichael, F. O. Mixon, and R. S. Truesdale Jun. 1981 95 p refs
(Grant EPA-R-804979)
(PB81-221301; RTI/1934/00-03F; EPA-600/7-81-098) Avail: NTIS HC A05/MF A01 CSCL 21D

A series of fixed-bed coal gasification and pyrolysis tests were performed in a laboratory scale reactor of 6.6 cm inside diameter. Chemical analyses were conducted on the product gas, the aqueous condensate, the tar, and the solid residue from the tests. The effects of process variables, such as feed mode, catalytic treatment, pressure, mesh size, and coal type, upon byproduct and pollutant yields are described. The production of gaseous sulfur compounds, benezene and derivatives (BTX), phenolics (phenol, cresols, and xylenols), and tar were measured, and the fate of trace elements such as arsenic, selenium, and lead were determined. Byproduct production associated with the pyrolysis phase of gasification was investigated with emphasis on the effects of particle size, residence time, and atmosphere. Continuous operation was found to result in greatly reduced tar and phenolic production. GRA

N82-11274# TRW, Inc., McLean, Va. Energy Systems Group.
ENVIRONMENTAL RESEARCH PLAN FOR GAS SUPPLY TECHNOLOGIES. VOLUME 2: ENVIRONMENTAL RESEARCH PLAN Final Report
L. M. Tipton 29 May 1981 168 p refs 2 Vol.
(Contract GR1-5080-351-0316)
(PB81-222317; GRI-80/0013.2) Avail: NTIS HC A08/MF A01 CSCL 21D

Federal environmental regulations affecting gas supply technologies are reviewed. The technological and environmental state of the art of each gas supply technology was analyzed with the help of a series of experts, in gas supply technology. Based on regulatory requirements technology status, and current environmental knowledge, the environmental issues associated with each technology area were identified. Environmental research being performed by government, industry and educational institutions was identified by computerized literature search and reviewed applicability recommended research activities for GRI funding were developed and a suitable prioritization methodology was devised. GRA

N82-11275# Cornell Univ., Ithaca, N. Y.
ETHANOL PRODUCTION IN SOUTHERN TIER EAST REGION OF NEW YORK: TECHNICAL AND ECONOMIC FEASIBILITY Final Report
Robert J. Kalter Mar. 1981 348 p refs Sponsored by New York State Energy Research and Development Authority
(PB81-226979; Rept-81-7; NYSERDA-81-7) Avail: NTIS HC A15/MF A01 CSCL 07A

This is the third of five region-specific feasibility studies on regional production of ethanol. It was found that deproteinized whey resources in this region of New York could support ethanol production in amounts ranging from about 1.5 million to 5 million gallons a year while also producing a high-protein, high-mineral animal feed. Ethanol is an octane booster which can be used as a gasoline extender to produce gashol. GRA

N82-11276# Missouri River Basin Commission, Omaha, Nebr.
SYNTHETIC FUEL DEVELOPMENT FOR THE UPPER MISSOURI RIVER BASIN. SECTION 13: WATER ASSESSMENT REPORT
Apr. 1981 129 p refs Sponsored in part by the Water Resources Council
(PB81-224537) Avail: NTIS HC A07/MF A01 CSCL 21D

The results of an assessment of water requirements, water supply availability and other water implication of synthetic fuel development in the Upper Missouri River Basin are summarized. The availability of water to support certain hypothetical levels of synfuel development for three types of coal conversion technologies is determined. The major effects that synfuel development could have on the water resources of the region are identified. GRA

N82-12025# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANALYTICAL DESIGN FOR INTERNAL BURNING STAR GRAINS OF SOLID ROCKETS
Changtang Lu *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 64-74 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-11277# South African Bureau of Standards, Pretoria.
STANDARD SPECIFICATION FOR LIGHT LADDERS
5 Nov. 1980 29 p In ENGLISH and AFRIKAANS
(SABS-1304-1980; ISBN-0-626-05677-2; GR-10) Avail: NTIS HC A03/MF A01

Requirements are given for the construction, inspection, and testing of single ladders, extension ladders, step-ladders, extending step-ladders, trestle ladders, extending trestle ladders, and special purpose ladders. The composition of the aluminum alloys, and of the steels and glass fiber reinforced polyester components coming into contact with the aluminum are included. Coatings used to provide corrosion resistence are also specified. A.R.H.

N82-11278# South African Bureau of Standards, Pretoria.
STANDARD SPECIFICATION FOR INDUSTRIAL SAFETY-BELT ASSEMBLIES
5 Nov. 1980 20 p In ENGLISH and AFRIKAANS
(SABS-809-1980; ISBN-0-626-05710-8; GR-8) Avail: NTIS HC A02/MF A01

Specifications are given for the general design, material, construction, and performance requirements for four types of industrial safety belts: (1) a waist belt; (2) a combination of a waist belt and shoulder, 11 leg, and back straps; (3) a combination of a waist belt and shoulder and back straps. Inspection procedures and test sequences are included with drawings. A.R.H.

N82-11279*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT Progress Report, Jul. - Aug. 1981
N. A. Renzetti, ed. 15 Oct. 1981 244 p refs
(Contract NAS7-100)
(NASA-CR-164939; TDA-PR-42-65) Avail: NTIS HC A11/MF A01 CSCL 17B

Progress in the development and operations of the Deep Space Network is reported including develoments in Earth-based radio technology as applied to other research programs. These programs are: geodynamics, astrophysics, and the radio search for extraterrestrial intelligence in the microwave region of the electromagnetic spectrum. For individual titles, see N82-11280 through N82-11310.

N82-11280*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RADIO ASTRONOMY c89
R. D. Shaffer, J. T. McCluskey, S. Gulkis, M. Klein, and T. Kuiper *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 1-3 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 03A

A K-band reflected-wave ruby maser was used on the 64-meter (DSS-43) antenna at the Tidbinbilla Tracking Station, near Canberra, Australia. Spectral line observations were carried out near 22 GHz for water vapor sources and near 24 GHz for ammonia sources. The water vapor observations were made in the direction of known southern OH and H2O maser sources. All of the previously detected water line sources examined were detected. In addition, two new water vapor maser sources were discovered, G301.1+1.1and G308.9+0.1. The spectrum of G301.0+1.1 is presented six ammonia sources were found: G291.3-0.7, G305.4+0.2, G322.2+0.6, G327.3-0.5, G333.6-0.2, and G268.4-0.8. Spectra of two of these sources, G291.3-0.7 (RCW 57) and G305.4+0.2, are presented. Both show clearly the presence of the quadrupole splitting satellite lines that will allow the determination of NH3 optical depths in these clouds. J.M.S.

N82-11281*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A DEDICATED 26-m SETI SKY SURVEY INSTRUMENT FACILITY: A FEASIBILITY STUDY c89
A. L. Berman and R. D. Shaffer *In its* The Telecommun. and Data Acquisiton Rept. 15 Oct. 1981 p 4-8 refs (For primary

document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 03A

The feasibility of converting a deactivated GSTDN 26 m facility into a dedicated SETI Instrument Facility is examined. Additional benefits that would accrue from the proposed utilization of these facilities are the capability for remote and control the Deep Space Communications Complex (DSCC) Signal Processing Center, combined with a reduction in ground-induced radio frequency interference due to the physical distance to the other DSCC front end areas and the Signal Processing Center. J.M.S.

N82-11282*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DSN GROUND COMMUNICATION FACILITY c32

R. H. Evans *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 9-18 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17B

A functional description of the GCF and its relationships with other elements of the DSN and NASCOM is presented together with development objectives and goals and comments on implementation activities in support of flight projects. Author

N82-11283*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

NETWORKS CONSOLIDATION PROGRAM c14

M. L. Yeater and D. T. Herrman *In its* The Telecommun. and Data Acquisiton Rept. 15 Oct. 1981 p 19-24 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

A single consolidated network of ground tracking stations to replace the present two ground-based spacecraft tracking networks is proposed. The proposed consolidated network uses facilities that are now included in the Ground Spaceflight Tracking and Data Network (GSTDN), operated by Goddard Space Flight (GSFC), as well as the existing Deep Space Network (DSN), operated by Jet Propulsion Laboratory (JPL). These facilities are combined and modified to provide a consolidated network managed and operated by JPL and capable of supporting the set of planetary and Highly Elliptical Earth Orbiter (HEEO) missions planned for the Tracking and Data Relay Satellite System (TDRSS) era. The consolidated network is planned to be operational after the TDRSS becomes operational. It will continue to support planetary missions that are now supported by the DSN and also provide support to a broad class of other spacecraft missions which are not compatible with or which, for other reasons, cannot be supported by the TDRSS. J.M.S.

N82-11284*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DSN MODEL FOR USE IN STRATEGIC PLANNING c81

K. C. Kelly, C. Y. Lin, and M. McKenzie *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 25-31 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 05A

A System Dynamics Model of the DSN to support strategic planning for the Network is addressed. Applications for the model are described, as well as the foundations of system dynamics and the methodology used to develop the model. Activities to date and plans for future work are also discussed. J.M.S.

N82-11285*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

PIONEERS 6 THROUGH 12 MISSION SUPPORT c14

R. E. Nevarez *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 32-33 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

The continuing efforts of the Deep Space Network in support of Pioneer Mission Operations during the cruise phases of the Pioneers 6 through 11 spacecraft and Pioneer Venus orbital operations are discussed. J.M.S.

N82-11286*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

STRATEGIES FOR WEATHER-DEPENDENT DATA ACQUISITION c32

E. C. Posner *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 34-46 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

A strategy for data acquisition from a very distant spacecraft is presented, when the system performance can be severely degraded by the Earth's weather due to the high microwave frequency being used. When there is no minimum rate to be maintained, the optimum strategy is the greedy strategy, which always transmits at the single rate which maximizes the expected data returned. If there is a minimum data rate, the optimum strategy transmits simultaneously at the minimum or base data rate and at a bonus data rate. A coding system designed for the bandwidth-constrained degraded broadcast channels used. The optimum version of this system can, under realistic assumptions, save on the order of 5 dB over the conservative strategy of just transmitting at a single lower data rate. J.M.S.

N82-11287*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

VIRTUAL CENTER ARRAYING c32

L. J. Deutsch, R. G. Lipes, and R. L. Miller *In its* the Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 47-52 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

Methods to increase the amount of data that can be received from outer planet missions are described with emphasis on antenna arraying systems designed to increase the total effective aperture of the receiving system. One such method is virtual center arraying (VCA). In VCA, a combined carrier reference is derived at a point that is, conceptually, the geometric center of the array. This point need not coincide with any of the actual antennas of the array. A noise analysis of the VCA system is given along with formulas for the phase jitter as a function of loop bandwidths and the amount of loop damping. If the ratio of the loop bandwidths of the center loop to the vertex loops is greater than 100, then the jitter is very nearly equal to that expected for ideal combined carrier referencing. J.M.S.

N82-11288*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE DEEP SPACE OPTICAL CHANNEL. 2: WAVE PROPAGATION EFFECTS c74

J. Katz *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 53-58 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

Propagation effects of optical waves in the deep space optical channel with a spacebased receiver are analyzed. It is found that these effects are negligible for all practical interplanetary systems designs. Author

N82-11289*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SYMBOL ERROR RATE PERFORMANCE EVALUATION OF THE LM37 MULTIMEGABIT TELEMETRY MODULATOR-DEMODULATOR UNIT c17

H. Malek *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 59-74 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09F

The LM37 multimegabit telemetry modulator-demodulator unit was tested for evaluation of its symbol error rate (SER) performance. Using an automated test setup, the SER tests were carried out at various symbol rates and signal-to-noise ratios (SNR), ranging from +10 to -10 dB. With the aid of a specially designed error detector and a stabilized signal and noise summation unit, measurement of the SER at low SNR was possible. The results of the tests show that at symbol rates below 20 megasymbols per second (MS)s) and input SNR above -6 dB, the SER performance of the modem is within the specified 0.65 to 1.5 dB of the theoretical error curve. At symbol rates above 20 MS/s, the specification is met at SNR's down to -2 dB. The results of the SER tests are presented with the description of the test setup and the measurement procedure. J.M.S.

N82-11290*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

RFI CHANNELS, 2 c32
R. J. McEliece *In its* The Telecommun. and Data Acquisitions Rept. 15 Oct. 1981 p 75-80 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

The cutoff parameters for a class of channel models exhibiting burst noise behavior were calculated and the performance of interleaved coding strategies was evaluated. It is concluded that, provided the channel memory is large enough and is properly exploited, interleaved coding is nearly optimal. L.F.M.

N82-11291*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE R SUB 0 PARAMETER FOR THE GAUSSIAN CHANNEL c32
R. J. McEliece and E. R. Rodemich *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 81-85 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17B

The cutoff R sub 0 for the additive white Gaussian channel is first defined and then computed. This important channel parameter seems not to have been previously computed for this important channel model except in the case when the input is restricted to be binary. Author

N82-11292*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DESIGN OF THROAT SECTION OF CONICAL CORRUGATED HORNS c32
A. D. Olver *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 86-93 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

A simple graphical method is presented for designing the junction between a conical corrugated horn and a smooth-wall circular waveguide. The method gives both an insight into the field behavior along the horn and an indication of the reflection coefficient at the horn-waveguide junction. It has been applied to the design of the DSN X-S band feedhorn and an improved corrugated throat section. Author

N82-11293*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CRYOGENIC FILTERS FOR RFI PROTECTION c33
J. J. Bautista and S. M. Petty *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 94-98 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

The increased bandwidth and sensitivity of the DSN maser-based receiver systems along with the increase in worldwide microwave spectrum usage dictated the need for employing additional measures to protect these systems from RFI (radio frequency inerference). Both in-band and out-of-band microwave signals at the input of the Deep Space Network (DSN) traveling wave masers (TWM) can adversely affect the maser performance in a variety of ways. Filters fabricated from superconducting materials operating below their superconducting transition temperature (Tc) possess the most potential for providing the necessary RFI protection without degrading the system performance. Author

N82-11294*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TRAVELING-WAVE MASER, CLOSED CYCLE REFRIGERATOR AUTOMATION c36
J. A. McNeil (Loyola Marymount Univ., Los Angeles) and S. M. Petty *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 99-103 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20E

At the present time all traveling-wave maser and closed-cycle refrigerator system (TWM-CCR) and their power supply and helium compressor assemblies are operated manually. Many man-hours are required of highly trained and experienced operators, resulting in high operator cost. Of greater importance are the problems of unpredictable failure and long downtimes. Since field performance is not monitored, system degradation is detected only when it has progressed to the point of catastrophic failure. Without the aid of performance histories, failure diagnosis is arduous and slow. Rational and functional requirements for the TWM-CCR Automation project are the following: (1) to improve reliability and reduce downtime by providing unattended monitor and control, alarm and fault location, failure prediction and self-corrective action; (2) to reduce operator cost by providing automatic tuning and cooldown procedures; and (3) to improve system operations and development by providing the needed engineering data. L.F.M.

N82-11295*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DIGITAL SAR PROCESSING USING A FAST POLYNOMIAL TRANSFORM c32
S. Butman, R. Lipes, A. Rubin, and T. K. Truong *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 104-112 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17I

A new digital processing algorithm based on the fast polynomial transform is developed for producing images from Synthetic Aperture Radar data. This algorithm enables the computation of the two dimensional cyclic correlation of the raw echo data with the impulse response of a point target, thereby reducing distortions inherent in one dimensional transforms. This SAR processing technique was evaluated on a general-purpose computer and an actual Seasat SAR image was produced. However, regular production runs will require a dedicated facility. It is expected that such a new SAR processing algorithm could provide the basis for a real-time SAR correlator implementation in the Deep Space Network. Author

N82-11296*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MINIMIZING THE TIME TO TROUBLESHOOT A FAILED SYSTEM c38
E. J. Subelman (California Univ., Los Angeles) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 113-117 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 14D

A procedure is presented to determine the order in which to inspect the components of a failed series system so as to minimize the expected time until the failed component is isolated. The model includes the case in which inspection of a component may falsely indicate the component is functioning. Author

N82-11297*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN ERROR BUDGET FOR THE JPL HYDROGEN MASER RECEIVER c36
C. A. Greenhall *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 118-126 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20E

The hydrogen maser receiver is a synthesizer that converts the maser signal, at about 1420 MHz, to a set of output signals at 100, 20, 10, 5, 1, and 0.1 MHz. The contribution of the receiver and its component modules to the frequency instability and phase noise of each of its outputs is estimated, and these results are compared to published measurements of the 100-MHz output of the frequency standard, which consists of a maser plus its receiver. One can then assess how much the receiver degrades the performance of the frequency standard. L.F.M.

N82-11298*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REMOVAL OF DRIFT FROM FREQUENCY STABILITY MEASUREMENTS c32
C. A. Greenhall *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 127-132 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

A method of estimating frequency drift rate and removing its effect from Allan variance plots is given. When tried on a test of hydrogen masers, the methods gives consistent results. An error in the previous Allan variance computation algorithm is corrected. Author

N82-11299*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

CLOSED FORM EVALUATION OF SYMMETRIC TWO-SIDED COMPLEX INTEGRALS c66
R. Winkelstein *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 133-141 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 12A

Evaluation of two-sided complex integrals is often required when analyzing linear systems to determine signal variances resulting from stochastic inputs and system noise bandwidths. Algebraic solutions of integrals in a closed matrix equation form, using coefficients of the numerator and denominator polynomials, are presented. The closed forms provide the possibility of obtaining some insight into parameter sensitivity in addition to greatly reducing the computational complexity required by the normal method of evaluation by residues. T.M.

N82-11300*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SURFACE RESISTIVITY MEASUREMENTS OF CANDIDATE SUBREFLECTOR SURFACES c33
E. H. Thom and T. Y. Otoshi *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 142-150 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

Subreflectors on DSN antennas have historically been of formed and welded sheet metal construction, which is quite costly. Flame-spray metallized fiberglass-epoxy offers an alternative technique at much lower cost. Results of a study to show that system noise temperature would be increased about 0.3 K at X-band when using the alternate material is presented. T.M.

N82-11301*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REHABILITATION OF 64-METER-ANTENNA RADIAL BEARING c37
H. McGinness and G. Gale *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 151-161 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 13I

The performances of the radial bearings on three 64-meter antennas are presented. Explanations for the distortion of the bearing at DSS 14 are made and the repairs are described. Recommendations for future tests and action are given. T.M.

N82-11302*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE QUALITY ASSURANCE ROLE IN THE DEEP SPACE NETWORK c38
R. L. Sirpilla *In its* The Telecomm. and Data Acquisition Rept. 15 Oct. 1981 p 162-166 ref (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 14D

The quality assurance section provides skilled personnel who perform the following functions: quality hardware engineering, quality software engineering, inspection and testing, and an independent assessment to quality, engineering and project requirements. The quality assurance section provides specifications, workmanship standards, process specifications and quality assurance procedures in support of DSN equipment. In addition, the quality assurance section reviews DSN engineering documents to ensure that appropriate and adequate quality provisions are included. T.M.

N82-11303*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NETWORKS CONSOLIDATION PROGRAM: MAINTENANCE AND OPERATIONS (M&O) STAFFING ESTIMATES c14
J. P. Goodwin *In its* The Telecomm. and Data Acquisition Rept. 15 Oct. 1981 p 167-174 ref (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

The Mark IV-A consolidate deep space and high elliptical Earth orbiter (HEEO) missions tracking and implements centralized control and monitoring at the deep space communications complexes (DSCC). One of the objectives of the network design is to reduce maintenance and operations (M&O) costs. To determine if the system design meets this objective an M&O staffing model for Goldstone was developed which was used to estimate the staffing levels required to support the Mark IV-A configuration. The study was performed for the Goldstone complex and the program office translated these estimates for the overseas complexes to derive the network estimates. T.M.

N82-11304*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NOCA UPGRADE c14
G. D. Gould *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 175-179 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

The network operations control area (NOCA) of the space flight operations facility (SFOF) is being upgraded in both hardware and software capabilities to provide the visibility and operability necessary for the operations control function to be performed within the present technological environment of the tracking network. The hardware implementation currently in progress is addressed. It provides a standard operating console with increased display capacity and improved ergonomics as a replacement for the existing, outmoded, circular consoles original to the SFOF. T.M.

N82-11305*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RELOCATION OF THE DEEP SPACE NETWORK MAINTENANCE CENTER c14
K. F. Beutler *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 180-181 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

The Jet Propulsion Laboratory maintains a Deep Space Network (DSN) maintenance center (DMC), whose task is to engineer and manage the repair and calibraion program for the electronic and mechanical equipment used in the tracking stations located at Madrid, Spain, and Canberra, Australia. The DMC also manages the Goldstone complex maintenance facility (GCMF), whose task is to repair and calibrate the Goldstone electronic and mechanical equipment. The rationale for moving the facility to Barstow, California, and the benefits derived from the move are discussed. T.M.

N82-11306*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GOLDSTONE (GDSCC) ADMINISTRATIVE COMPUTING c60
H. Martin *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 182-191 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09B

The GDSCC Data Processing Unit provides various administrative computing services for Goldstone. Those activities, including finance, manpower and station utilization, deep-space station scheduling and engineering change order (ECO) control are discussed. T.M.

N82-11307*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SPECIAL ACTIVITY UTILIZATION OF GDSCC ANTENNAS DURING 1980 c14
E. B. Jackson and J. W. Hudson (Bendix Field Engineering Corp.) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 192-196 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

In addition to direct spacecraft project support, the GDSCC antennas also support special activities. These activities can be categorized as advanced system program, crustal dynamics program, and radio astronomy program activities. The goals of these types of activities that received tracking support at Goldstone are discussed. All Goldstone stations (DSSs 11, 12, 13, and 14) provided a total of 2814.5 tracking hours to special activities during the period January through December 1980. T.M.

N82-11308*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GOLDSTONE HIGH POWER RADIATION CONTROL c32
B. A. Gaudian and R. B. Cushman (Bendix Field Engineering

Corp.) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 197-204 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20I

The airspace near Goldstone is shared by many users in carrying out their respective missions. Coordination of Goldstone high power transmitter radiation activity with mutual airspace users near Goldstone is an effective method to prevent aircraft from being exposed to radiation levels greater than 10 mW/sq cm, to allow Goldstone to transmit high power levels for planetary radar experiments and to provide the necessary information to both civil and military aircraft users to enable them to perform their necessary activities. T.M.

N82-11309*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PLANETARY RADAR c32
R. D. Shaffer, J. T. McCluskey, and G. S. Downs *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 205 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17I

The radar astronomy activities supported by the Deep Space Network during the third quarter of FY81 are reported. The planet Mercury was the principal object of interest. T.M.

N82-11310*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN OPTIMIZATION MODEL FOR ENERGY GENERATION AND DISTRIBUTION IN A DYNAMIC FACILITY c81
F. L. Lansing *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 206-222 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 05A

An analytical model is described using linear programming for the optimum generation and distribution of energy demands among competing energy resources and different economic criteria. The model, which will be used as a general engineering tool in the analysis of the Deep Space Network ground facility, considers several essential decisions for better design and operation. The decisions sought for the particular energy application include: the optimum time to build an assembly of elements, inclusion of a storage medium of some type, and the size or capacity of the elements that will minimize the total life-cycle cost over a given number of years. The model, which is structured in multiple time divisions, employ the decomposition principle for large-size matrices, the branch-and-bound method in mixed-integer programming, and the revised simplex technique for efficient and economic computer use. T.M.

N82-11311*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FIREFIGHTING MODULE DEVELOPMENT
Ralph A. Burns Oct. 1981 76 p refs
(NASA-TM-82444) Avail: NTIS HC A05/MF A01 CSCL 13L

The firefighting module is a lightweight, compact, self contained, helicopter-transportable unit for fighting harbor and other specialty fires as well as for use in emergency water pumping applications. Units were fabricated and tested. A production type unit is undergoing an inservice evaluation and demonstration program at the port of St Louis. The primary purpose is to promote enhanced harbor fire protection at inland and coastal ports. The module and its development are described. S.L.

N82-11312*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STIRLING CYCLE CRYOGENIC COOLER Patent Application
Allen Sherman, Max G. Gasser, Phillip A. Studer, Michael Goldowsky (Philips Labs., Briarcliff Manor, N.Y.), and Alexander Daniels (Philips Labs., Briarcliff Manor, N.Y.) Filed 2 Oct. 1981 26 p
(NASA-Case-GSC-12697-1; US-Patent-Appl-SN-308204) Avail: NTIS HC A03/MF A01 CSCL 13I

A long lifetime Stirling cycle cryogenic cooler particularly adapted for space applications comprised of a compressor section centrally aligned end to end with an expansion section and respectively including a reciprocating compressor piston and displacer radially suspended in interconnecting cylindrical housings by active magnetic bearings and having adjacent reduced clearance regions. One or more of these regions operates as clearance seals. The piston and displacer are reciprocated in their housings by linear drive motors to vary the volume of respectively adjacent compression and expansion spaces which contain a gaseous working fluid and a thermal regenerator to effect Stirling cycle cryogenic cooling. Electrical circuit means are included for energizing the magnetic bearings and for controlling the stroke amplitudes and relative phase angle between the compressor piston and displacer during the cooling cycle. NASA

N82-11313# New Mexico Univ., Albuquerque. Engineering Research Inst.
DESIGN OF AIRPORT PAVEMENTS FOR EXPANSIVE SOILS Final Report
R. Gordon McKeen Jan. 1981 198 p refs
(Contract F29601-76-C-0051)
(AD-A104660; NMERI-AP-37; FAA-RD-81-25) Avail: NTIS HC A09/MF A01 CSCL 08/13

Expansive soil subgrades exhibit volume changes with variation in moisture condition. These changes result in differential movement of airport pavements resting on these soils. Special design procedures must be used to account for the expansive soil activity during equilibration. In addition, special precautions are required to protect the subgrade from moisture variation with climate. Measurement of soil suction is a key step in quantifying moisture-induced soil behavior. Procedures are outlined for suction characterization of the soil and for estimating the in situ differential movement likely to occur under the pavement. Once the wavelength and amplitude characteristics of the differential movement are obtained, design calculations to select the thickness and materials for the pavement may proceed. GRA

N82-11314# Coastal Engineering Research Center, Fort Belvoir, Va.
AN INEXPENSIVE, PORTABLE VIBRACORING SYSTEM FOR SHALLOW-WATER AND LAND APPLICATION
Kenneth Finkelstein Jul. 1981 16 p refs
(AD-A104323; CERC-CETA-81-8) Avail: NTIS HC A02/MF A01 CSCL 14/2

A portable vibracoring system provides an efficient, rapid, and safe means of extracting cores up to 33 feet (10 meters) long. Short cores (< 10 feet or 3 meters long) are also obtained with a part of the system. This report describes the system and the coring procedures for intrusion, extraction, and packaging. The coring system is composed of the following modifications of existing designs: (a) a quick fasten-release clamp that attaches the vibrator head to the coring pipe (the clamp moves up and down the coring pipe like a 'sleeve,' eliminating having to completely remove the unit) and (b) a stable tripod with four separate, portable components. During extraction, the core is stabilized in a vertical position by a spring-loaded metal gate, using a core pipe slot cut into the tripod headplate, until extraction is completed. Author (GRA)

N82-11315# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
PROBABILISTIC MODELING OF SUBGRADE SOIL STRENGTHS Final Report
Yu T. Chou Sep. 1981 76 p refs
(DA Proj. 4A1-61101-A9-1D)
(AD-A104336; WES/MP/GL-81-5) Avail: NTIS HC A05/MF A01 CSCL 13/2

A concept of spatial average in probabilistic modeling of subgrade soil strength is presented. The advantage of the application of spatial average to pavement engineering is explained. The link between the concept and the overall probability-based pavement design procedure is formulated and explained. In the earlier part of the report, a literature review of the concept and procedure of probabilistic design of pavements, which includes the concepts of variations and reliability, is presented. Finally, an outline of a probability based pavement design procedure for the Corps of Engineers is presented. Author (GRA)

N82-11316# Mid-American Solar Energy Complex, Bloomington, Minn.

MASEC SOLAR 80 HOME DESIGNS
1980 19 p
(DE81-028344; MASEC-PA-80-007) Avail: NTIS
HC A02/MF A01

Plans of passive solar homes designed by ten teams from various sections of the mid-American region are presented. The energy efficient designs use up to 80% less fossil fuel energy for heating than those built to conventional construction standards. Energy conserving and passive design techniques are discussed. The design features of the ten (RidgeWay, ClaireMont, SolarWay, KirkWood, SunSource, ParkLand, CedarWood, SunRise, SunCrest, and WaterFord) homes are presented. DOE

N82-11317# Argonne National Lab., Ill.
SITE AND NEIGHBORHOOD DESIGN (SAND): DEVELOPMENT OF SIMPLIFIED AUTOMATED BUILDING THERMAL LOAD PROCEDURES, PHASE 1
G. T. Diderrich and R. A. Hrabak Jul. 1980 116 p refs
(Contract W-31-109-eng-38)
(DE81-027138; ANL/CNSV-TM-68) Avail: NTIS
HC A06/MF A01

Preliminary efforts toward the development of simplified procedures for estimating the thermal-loads of buildings are presented. The acquisition implementation, and documentation of the thermal load procedures and associated data files actually used by the five SAND participants are described. DOE

N82-11318# American Society of Heating, Refrigerating and Air-Conditioning Engineers, New York. Subcommittee for Simplified Energy Analysis.
ENERGY ANALYSIS SAMPLE BUILDING DATA
Mar. 1981 34 p refs
(Contract DE-AC01-78CS-20057)
(DE81-027188; DOE/CS-20057/T5) Avail: NTIS
HC A03/MF A01

Sample building data for energy calculations necessary for the comparative analysis between the proposed energy calculation procedure and the procedures using comprehensive hourly simulation of HVAC systems are presented. The comparison calculation includes data for the terminal reheat system, double-duct system, heat reclaim system, and standard VAV system for a hypothetical 20-story office building in Washington, DC. Each is evaluated in conjunction with electric centrifugal chiller and gas-fired boiler. DOE

N82-11319# American Society of Heating, Refrigerating and Air-Conditioning Engineers, New York. Subcommittee for Simplified Energy Conversion.
PROPOSED SIMPLIFIED ENERGY CALCULATION PROCEDURE FOR USE IN ENERGY CONSERVATION STANDARDS ACTIVITIES
Tammi Kasuda Mar. 1981 90 p refs
(Contract DE-AC01-78CS-20057)
(DE81-027190; DOE/CS-20057/T6) Avail: NTIS
HC A05/MF A01

In order to circumvent various difficulties involved in using the computer simulation-based building energy analysis procedure, a simplified manual procedure suitable for commercial buildings (internal and solar heat gain dominating over the envelope conduction heat transfer) was developed. This modified bin method compared favorably with seven computer simulation-based procedures, at least for a typical office building analysis, for Washington, DC climate. The basic principle of the proposed procedure, sample building data, and the results of parallel calculations with seven computer simulation-based energy analysis programs are described. DOE

N82-11320# Battelle Pacific Northwest Labs., Richland, Wash.
SAMPLING DESIGN FOR THE 1980 COMMERCIAL AND MULTIFAMILY RESIDENTIAL BUILDING SURVEY
W. M. Bowen, A. R. Olsen, and A. L. Nieves Jun. 1981 98 p
(Contract DE-AC06-76RL-01830)
(DE81-026783; PNL-3883) Avail: NTIS HC A05/MF A01

The extent to which new building design practices comply with the proposed 1980 energy budget levels for commercial and multifamily residential building designs (DEB-80) can be assessed by: (1) identifying small number of building types which account for the majority of commercial buildings constructed in the U.S.A.; (2) conducting a separate survey for each building type; and (3) including only buildings designed during 1980. For each building, the design energy consumption (DEC-80) will be determined by the DOE2.1 computer program. The quantity X = (DEC-80 - DEB-80). These X quantities can then be used to compute sample statistics. Inferences about nationwide compliance with DEB-80 may then be made for each building type. Details of the population, sampling frame, stratification, sample size, and implementation of the sampling plan are provided. DOE

N82-11321# DCS Corp., Washington, D.C.
ASSESSMENT OF BUILDING DIAGNOSTICS
George E. Courville Jul. 1981 118 p refs Prepared for ORNL
(Contract W-7405-eng-26)
(DE81-027078; ORNL/Sub-80/61602/1) Avail: NTIS
HC A06/MF A01

The building diagnostics requirements for in-situ or field measurements on energy consumption in conditioned spaces and on heat gain and loss in residential and nonresidential buildings are evaluated. Energy audit programs, energy performance monitoring, energy flow in buildings, and use of computer technology are considered. A diagnostics program is outlined. DOE

N82-11322# Oak Ridge National Lab., Tenn.
ASSESSMENT OF ROOFING RESEARCH
James N. Robinson Jul. 1981 59 p refs
(Contract W-7405-eng-26)
(DE81-027077; ORNL/TM-7640) Avail: NTIS
HC A04/MF A01

Problems related to roofing are assessed within the context of energy conservation. Appropriate actions for existing roofs, new roofs, and future roofs are ordered into a thermally efficient roofing plan, and priorities for its implementation are proposed. The methodology used in performing the assessment, an overview of issues encountered during the assessment, and the thermally efficient roofing plan that is recommended for implementation are given. DOE

N82-11323# National Bureau of Standards, Washington, D.C.
ENERGY ANALYSIS FOR A SAMPLE BUILDING BY THE PROPOSED ASHRAE SIMPLIFIED METHOD
T. Kasuda and K. Ishii Jan. 1981 265 p
(Contract DE-AC01-78CS-20057)
(DE81-027189; DOE/CS-20057/T4) Avail: NTIS
HC A12/MF A01

An energy analysis of a sample office building located in Washington, DC using the proposed ASHRAE method is presented. Calculations for space load are presented. The calculations for the energy distribution systems (air conditioning, outdoor air control, humidity control, airduct systems) are given. Equipment system calculations, and calculations for the annual energy consumption for air conditioning are presented. DOE

N82-11324# Syracuse Research Corp., N. Y. Energy Research Center.
THREE PROTOTYPE DESIGNS FOR AN EXTERIOR-MOUNTED, INTERIOR-OPERATED, MOVABLE INSULATION SYSTEM Final Report
Greg Dike, David Florey, Arthur Levy, Seymour Sacks, and Laurence Kinney Mar. 1981 357 p Sponsored in part by the New York State Energy Research and Development Authority
(Contract DE-FC02-80CS-30584)
(DE81-025586; DOE/CS-30584/1) Avail: NTIS
HC A16/MF A01

Design, construction, and preliminary testing of three exterior-mounted, interior-operated, movable window insulation systems are described. Two of the systems are hinged insulated shutter systems and the third is a sliding shutter system. The advantages of such systems are discussed. Development, schematics, and operation of the prototype systems are described. The thermal performance of the prototype shutters is analyzed. A preliminary market assessment study is reported. The prototype fabrication and test plan and estimated costs of the proposed designs are presented. DOE

N82-11325# Booz-Allen and Hamilton, Inc., Bethesda, Md., Energy and Environment Div.

USER NEEDS FOR SOLAR DECISION-MAKING TOOLS: THE HOMEBUILDING INDUSTRY Final Report

Min Kantrowitz, John Kurtz, and Kimball Hart 1981 131 p refs Prepared in cooperation with Midwest Research Inst., Golden, Colo.
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-027293; SERI/TR-98252-1b) Avail: NTIS HC A07/MF A01

The need for decision tools and design tools to be used by decision makers considering using solar energy in the single-family residential construction sector was studied. Three builder groups were found based upon decision making patterns relative to innovation and a five-step decision process. Eleven existing design tools were reviewed against identified user needs. The principal conclusions are that decision tools are largely lacking and design tools do not easily fit user needs. Recommendations for further study are made. DOE

N82-11326# Lehigh Univ., Bethlehem, Pa. Dept. of Civil Engineering.

SEISMIC RESISTANCE CHARACTERISTICS OF REINFORCED CONCRETE BEAM-SUPPORTED FLOOR SLABS IN BUILDING STRUCTURES: CONTRIBUTION OF FLOOR SYSTEMS TO EARTHQUAKE RESISTANCE OF BUILDING STRUCTURAL FRAMES

Masayoshi Nakashima, Ti Huang, and Le-Wu Lu Apr. 1981 353 p refs
(Grant NSF ENV-76-00715)
(PB81-219172; FEL-422.9) Avail: NTIS HC A16/MF A01 CSCL 13M

The in-plane seismic characteristics of reinforced concrete floor slabs which function as diaphragms placed between lateral load resisting systems were investigated. The floor slab system with edge beams, referred to as the beam-supported floor system is the focus of study. The experimental study, analytical study, parametric study, and dynamic response analysis are presented. Author

N82-11327# Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.

STOCHASTIC MODELS FOR DEPENDENT LOAD PROCESSES

Y. K. Wen and H. T. Pearce Mar. 1981 81 p refs
(Grant NSF CME-79-18053)
(PB81-219735; SER-489; UILU-ENG-81-2002) Avail: NTIS HC A05/MF A01 CSCL 13M

Stochastic models for dependent loads and load effects are presented. The effects of stochastic dependencies on load combination and structural reliability were investigated in the context of summation of pulse processes in which occurrence time, intensity, and duration are allowed to be correlated within each process and between processes. Approximate analytical solutions based on a load coincidence method were obtained and verified by Monte-Carlo simulations. It is found that while within-load positive correlations may generally have only moderate effect on the combined load probability, between-load dependencies may be dominant factors and significantly increase the probability of threshold level being exceeded by the combined load. Author

N82-11328# California Polytechnic State Univ., San Luis Obispo. Dept. of Architectural Engineering.

RACKING TESTS OF NON-STRUCTURAL BUILDING PARTITIONS (THE BEHAVIOR OF ARCHITECTURAL (NONSTRUCTURAL) BUILDING COMPONENTS DURING EARTHQUAKES) Final Technical Report

Satwant S. Rihal Dec. 1980 114 p refs
(Grant NSF PFR-78-23085)
(PB81-220790; ARCE-R80-1; NSF/RA-800526) Avail: NTIS HC A06/MF A01 CSCL 13M

The effects of inter-story displacement (drift) during simulated earthquake conditions are reported. The correlation between inter-story relative displacement and building partition behavior, the threshold levels of partition damage, and the fundamental characteristics of non-structural building partitions (stiffness, energy absorption capacity, and strength) under horizontal racking actions were investigated. Parameters in this study consist of geometry of partition configuration and placement of gypsum wallboard panels. Author

N82-11329# North Carolina State Univ. at Raleigh. School of Engineering.

EVALUATION OF BASE COURSES FOR FLEXIBLE PAVEMENTS Final Report

W. G. Mullen and B. D. Barnes Feb. 1981 100 p refs Prepared in cooperation with the North Carolina Dept. of Transportation and Highway Safety, and DOT-FHA
(PB81-218372; ERSD-100-67-5; FHWA/NC-81/002) Avail: NTIS HC A05/MF A01 CSCL 13B

Nineteen pavement sections monitored over a period of approximately ten years were evaluated to determine the influence of base course parameters on the performance of primary flexible pavement systems in Piedmont, North Carolina. The present serviceability rating concept was used as a measure of performance. The findings that indicate roughness measures are insensitive to changes in subjective performance and that present design procedures are adequate and probably conservative for the pavements studied. Bituminous concrete base courses are not necessarily structurally superior to coarse aggregate base courses, and Benkleman beam deflections are poor indicators of performance. Author

N82-11330# Oklahoma Dept. of Transportation, Oklahoma City. Research and Development Div.

BEARING CAPACITY AND CHARACTERIZATION OF COMPRESSIBLE CLAYEV AND SILTY FOUNDATION SOILS IN OKLAHOMA Final Report, 1 Jul. 1975 - Dec. 1980

Curtis J. Hayes Dec. 1980 81 p refs Prepared of FHA, Oklahoma City, Okla.
(Research Proj. 71-08-1)
(PB81-231607; FHWA/OK-81/3) Avail: NTIS HC A05/MF A01 CSCL 08M

A characterization of alluvial soils in two river systems from the surface down to bedrock is presented. Study sites were located in alluvial deposits where fill settlement is a problem. Continuous undisturbed soil samples were taken. Unconfined compression and consolidation tests were run on the soil layers. The field testing included the standard penetration test. Inclinometers were installed in an attempt to determine if creep existed in the weak soil layers of the alluvium. GRA

N82-11331# Sydney Univ. (Australia). Civil Engineering Labs.

A REVIEW OF THE BEHAVIOUR AND ENGINEERING PROPERTIES OF CARBONATE SOILS

H. G. Poulos Dec. 1980 50 p refs Sponsored in part by Australian Research Grants Committee
(PB81-226722; R-381) Avail: NTIS HC A03/MF A01 CSCL 08M

The nature and origins of carbonate soil deposits are reviewed and methods of classifying such soils are discussed. Data on their engineering behavior is then presented, including shear strength properties, compressibility and consolidation characteristics, and their response to cyclic loading. GRA

N82-11332# Virginia Highway and Transportation Research Council, Charlottesville.

JOINTLESS BRIDGES Final Report, 1 Jul. 1980 - 1 Jun. 1981

William Zuk Jun. 1981 47 p refs
(PB81-227738; FHWA/VA-81/48; VHTRC-81-R48) Avail: NTIS HC A03/MF A01 CSCL 13C

Various methods states are employing to reduce the number of joints in bridge decks are surveyed. The most common method is the use of integral abutments, where the superstructure is jointed to a flexible type of abutment. New methods of reducing the number of joints in a bridge are analyzed mathematically, and from the analysis conclusions are drawn as to the feasibility of these methods. GRA

N82-11333# Bureau of Mines, Boulder City, Nev. Metallurgy Engineering Lab.

MODIFIED-SULFUR CEMENTS FOR USE IN CONCRETES, FLEXIBLE PAVINGS, COATINGS, AND GROUTS

W. C. McBee, T. A. Sullivan, and B. W. Jong May 1981 30 p refs
(PB81-226870; BM-RI-8545) Avail: NTIS HC A03/MF A01 CSCL 13C

A family of modified-sulfur cements was developed for the preparation of construction materials with improved properties. Various types of sulfur cements were prepared by reacting sulfur with mixtures of dicyclopentadiene and oligomers of cyclopentadiene. Durable cements were prepared with structural characteristics ranging from rigid to flexible. These cements were used to prepare corrosion-resistant materials for use in a wide variety of industrial applications where resistance to acidic and salt conditions is needed. These materials were prepared as rigid concretes, flexible pavings, spray coatings, and grouts. Production of modified-sulfur cements in a commercial-size plant was demonstrated. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-11334 British Broadcasting Corp., Kingswood (England).
THE USE OF REMOTE ACTIVE DEFLECTORS FOR FEEDING UHF RELAY STATIONS
G. H. Millard Sep. 1981 15 p refs
(BBC-RD-1981/5) Avail: British Broadcasting Corp., Tadworth, Surrey, England

The role of active deflectors in providing program feeds to uhf television relay stations is discussed. Particular attention is given to the provision of power supplies at sites remote from electricity supplies. Author

N82-11335 Royal Aircraft Establishment, Bedford (England). Library.
DETERMINATION OF THE SPECTRA OF MODULATED PULSE TRAINS BY THE SPECTRAL FUNCTION METHOD
M. V. Laufer and V. G. Strogii Mar. 1981 9 p refs Transl. into ENGLISH from Ucheb. Zavid. SSSR - Radioekektronika (Lithuania), v. 15, no. 5, 1972 p 641-644
(RAE-LIB-Trans-2058; BR79865) Copyright. Avail: Issuing Activity

A means for determining the spectra of modulated pulse trains using the spectral function method is explained. By this method a spectrum of signals is determined with a ChIM-2 frequency pulse modulation for a rectangular train of pulses. Author

N82-11336* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CAVITY-BACKED, MICRO-STRIP DIPOLE ANTENNA ARRAY Patent
Haynes Ellis, Jr., inventor (to NASA) (Rockwell International Corp., Downey, Calif.) Issued 1 Sep. 1981 7 p Filed 30 Apr. 1980 Supersedes N80-24511 (18 - 15, p 1969) Sponsored by NASA
(NASA-Case-MSC-18606-1; US-Patent-4,287,518;
US-Patent-Appl-SN-145206; US-Patent-Class-343-700MS;
US-Patent-Class-343-708; US-Patent-Class-343-795;
US-Patent-Class-343-846; US-Patent-Class-343-727) Avail: US Patent and Trademark Office CSCL 20N

A flush-mounted antenna assembly includes a generally rectangular, conductive, box structure open along one face to form a cavity. Within the cavity a pair of mutually orthogonal dielectric plane surfaces in an 'egg crate' arrangement are mounted normal to the plane of the open face, each diagonally within the cavity. Each dielectric plane supports a pair of printed circuit dipoles typically each fed from the opposite side of the dielectric plane by a printed 'cone-shaped' feed line trace which also serve as an impedance matching device and functions as a balun connected from an unbalanced strip line external feed. The open face of the conductive cavity can be flush mounted with a randome thereover, the assembly thereby being flush with the skin of a aircraft or space vehicle.

Official Gazette of the U.S. Patent and Trademark Office

N82-11337# Communications Research Centre, Ottawa (Ontario). Information Technology Branch.
DESIGN METHODOLOGY AND DEVELOPMENT HISTORY OF AN ISO OSI LAYERED ARCHITECTURE FOR THE CANADIAN BROADCAST TELIDON SYSTEM
M. Sablatash and R. Fitzgerald Aug. 1981 24 p refs
(CRC-TN-708-E) Avail: NTIS HC A02/MF A01

To enable the Telidon System to be compatible with many other data communications devices, systems and networks, a layered protocol logically and conceptually consistent with the International Organization for Standardization's (ISO's) Reference Model for Open Systems Interconnection (OSI) was designed. The features and functions of the proposed design example are described. The protocol control information for each of the seven layers is described by giving specifications for services and functions provided in each layer, and additional descriptions and definitions as required. A general methodology for the design of ISO OSI layered information systems is briefly described. J.D.H.

N82-11338*# Systems and Applied Sciences Corp., Riverdale, Md.
ANTENNA PATTERN MODIFICATION FOR SINGLE REFLECTOR ANTENNAS Final Report
A. S. Milman Jan. 1981 51 p refs
(Contract NAS5-25993)
(NASA-CR-166711) Avail: NTIS HC A04/MF A01 CSCL 20N

The problem of correcting the antenna temperatures observed with a single reflector is addressed from two viewpoints with emphasis on decreasing the level of the side lobes without greatly amplifying the noise. One viewpoint is that of matrix operations where the elements of the matrix are integrals of the antenna pattern. This formulation is directly applicable to developing algorithms. The other is that of an analysis of the problem by treating the antenna as a spatial filter and using Fourier transforms of the antenna pattern. This approach leads to an understanding of the problem, but is not suitable for performing calculations. The method developed can be used to correct data from mechanically-scanned microwave instruments that view Earth from space. A.R.H.

N82-11339*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GENERAL AVIATION AIRCRAFT ANTENNAS FOR THE GLOBAL POSITIONING SYSTEM
Melvin C. Gilreath and J. S. Chatterjee Oct. 1981 37 p refs
(NASA-TM-83212) Avail: NTIS HC A03/MF A01 CSCL 17G

Several antenna designs that utilize the NAVSTAR Global Positioning System in a low-cost system for general aviation aircraft were evaluated. Experimental investigations were made of crossed-dipoles, various types of crossed-slots, and microstrip antennas with modifications to improve their coverage. Principal plane radiation patterns for several of these antennas were measured on a one-seventh scale model of a Gates Lear Jet. R.J.F.

N82-11340*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TELECOMMUNICATIONS IN COMETARY ENVIRONMENTS
Warren L. Flock 1 Jul. 1981 43 p refs
(NASA-CR-164956; JPL-Pub-81-84) Avail: NTIS HC A03/MF A01 CSCL 17B

Propagation effects on telecommunications in a cometary environment include those due to dust, the inhomogeneous plasma of the coma and tail, and ionization generated by impact of neutral molecules and dust on the spacecraft. Attenuation caused by dust particles is estimated to be on the order of 10 to the minus 5th power dB for the Halley Intercept Mission. Ionization generated by impact on the spacecraft is estimated to result in an electron content of 10 to the 12th power to 10 to the 13th power el/sq meters (3 eV electrons) along the telecommunications path. An estimate of the electron content due to Comet Halley itself is 10 to the 16th power to 10 to the 17th power el/sq meters, compared to a content of 10 to the 16th power to 10 to the 18th power el/sq meters for the Earth's ionosphere and 10 to the 17th power to 10 to the 18th power el/sq meters for the interplanetary medium. The electron content of the plasma near Comet Halley will cause excess range delay, and a Doppler shift of the signal from the spacecraft will occur in propagation to the rate of change of the path electron content. It is recommended that S and X down-link frequencies by employed to monitor the path electron content and amplitude scintillation and spectral broadening of the received signals. These measurements will provide a quantitative base of knowledge that will be valuable for radio science and telecommunications system design purposes. Author

N82-11341*# California Inst. of Tech., Pasadena.

MODULATION/DEMODULATION TECHNIQUES FOR SATELLITE COMMUNICATIONS. PART 4: APPENDICES

Jim K. Omura and Marvin K. Simon 1 Nov. 1981 94 p refs
(Contract NAS7-100)
(NASA-CR-164954; JPL-Pub-81-73) Avail: NTIS
HC A05/MF A01 CSCL 17B

The use of the Viterbi algorithm in a general context is examined. The generalized transfer function bounds are given which permit the following applications to be carried out: maximum likelihood demodulation of such bandwidth modulations as minimum-shift-keying and continuous phase frequency-shift-keying, demodulation of intersymbol interference and partial response signals, estimation and smoothing, and simultaneous phase synchronization, and data detection. Sufficient conditions are reviewed for tightening Chernoff and Rhattacharyya bounds. R.J.F.

N82-11342# Harvard Univ., Cambridge, Mass.

SCATTERING OF ELECTROMAGNETIC WAVES BY OBSTACLES IN THE PRESENCE OF THE EARTH'S SURFACE Final Report, 1 Jul. 1979 - 30 Jun. 1981

Hung-Mou Lee, Tai Tsun Wu, and Ronold W. P. King 31 Aug. 1981 32 p refs
(Contract DAAG29-79-C-0109)
(AD-A104242; ARO-16297.1-EL) Avail: NTIS
HC A03/MF A01 CSCL 20/14

The electromagnetic scattering from a geometrically fat tubular cylinder above a dissipative dielectric half-space has been investigated. Extensive experimental data were obtained and were found to be in agreement with theoretical results. The theory made use of an explicit analytical solution of the scattering from such a cylinder when in a single medium. Because the cylinder is a finite object with two variable geometrical parameters, it represents a very useful model for future experimental studies on the scattering from more complicated objects. Author (GRA)

N82-11343# Illinois Univ. at Urbana. Electromagnetics Lab.

STUDY OF MICROSTRIP ANTENNA ELEMENTS, ARRAYS, FEEDS, LOSSES, AND APPLICATIONS Final Technical Report

Y. T. Lo, W. F. Richards, P. S. Simon, J. E. Brewer, and C. P. Yuan Jun. 1981 86 p refs
(Contract F19628-78-C-0025; AF Proj. 2305)
(AD-A104493; UIEM-81-2; UILU-81-2539; RADC-TR-81-98)
Avail: NTIS HC A05/MF A01 CSCL 09/1

Since thin microstrip antennas are inherently narrow band, it is important to have a simple means for tuning the antenna over a wide range. Based on the cavity-model theory, one can expect that the antenna could be tuned like a cavity. Some workers have demonstrated experimentally the tuning with a shorting post in the patch. It is desirable to have a theory which can predict the exact post location for a given operating frequency. To this end, our multipost theory is extended so that a simple algorithm can be applied to a wide frequency range, covering the resonant frequencies of several modes. Using this extended theory, the operating frequencies for many post locations are computed and found to agree with the measured results within a fraction of one percent. In fact, it is believed that the theory can be improved even further. It is also shown that CP can also be obtained by placing a post in a square patch. Again, the theoretical and experimental results are in almost perfect agreement. GRA

N82-11344# Rome Air Development Center, Griffiss AFB, N.Y. Propagation Branch.

EFFECT OF ENERGETIC PARTICLE EVENTS ON VLF/LF PROPAGATION PARAMETERS, 1974 - 1977

John P. Turtle, John E. Rasmussen, and Wayne I. Klemetti Oct. 1980 61 p refs
(AF Proj. 4600)
(AD-A104508; RADC-TR-80-307) Avail: NTIS
HC A04/MF A01 CSCL 20/14

This report provides a summary of disturbance effects of energetic particle events on VLF/LF propagation parameters as observed by the USAF High Resolution VLF/LF Ionosounder in Northern Greenland. Disturbance effects on ionospheric reflectivity parameters, including reflection heights and coefficients, are presented along with data from a riometer, a magnetometer, and satellite particle detectors. Author (GRA)

N82-11345# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

RESEARCH ON NARROWBAND COMMUNICATIONS Quarterly Progress Report, 18 May - 17 Aug. 1981

John Makhoul, Salim Roukos, and Richard Schwartz Aug. 1981 37 p refs
(Contract F19628-80-C-0165; ARPA Order 3515)
(AD-A104296; BBN-4766; QPR-4) Avail: NTIS
HC A03/MF A01 CSCL 17/2

We report on research toward a very-low-rate vocoder. This quarter we continued investigation in two areas: the phonetic vocoder and an unsupervised method for vocoding. We introduced phoneme pair probabilities to improve the accuracy of phonetic recognition. We investigated the use of the phonetic vocoder as a tool for semi-automatic labeling of speech. We also experimented with several variations of the phonetic vocoder to improve the intelligibility of the vocoded speech with a moderate increase of the bit rate. Our work in the second area concentrated on developing a novel method of spectral quantization: We quantize a sequence of spectra simultaneously. We are also evaluating a new distance metric that does not require the dynamic programming time warping. Author (GRA)

N82-11346# Naval Research Lab., Washington, D. C. Radar Analysis Branch.

ESTIMATION OF RADAR RANGE BIASES AT MULTIPLE SITES Interim Report

D. D. Prather 15 Sep. 1981 18 p refs
(XF12151104)
(AD-A104306; NRL-8510) Avail: NTIS HC A02/MF A01
CSCL 17/9

An algorithm has been developed which estimates the range bias error from measurements made by radars on two platforms within a common detection area. The radars on the platforms each measure the position of two common targets and the difference vector between the measurements. Using a number of these measurements, a least square estimate of the range bias error is determined. Author (GRA)

N82-11347# EMTEC Engineering, Inc., Berkeley, Calif.

ELECTROMAGNETIC SCATTERING BY TARGETS OVER A REAL EARTH Final Report, Apr. 1979 - Apr. 1980

Shu-Kong Chang and Kenneth K. Mei Griffiss AFB, N.Y. RADC Apr. 1981 168 p refs
(Contract F19628-78-C-0090; AF Proj. 2305)
(AD-A104492; RADC-TR-80-313) Avail: NTIS
HC A09/MF A01 CSCL 17/9

The finite element method is applied to the boundary value problem of the scatterer. To account for the presence of a real Earth, multiple expansions are used to deal with the air-earth half spaces. The technique developed is applicable for metallic or dielectric targets. Computations have been made for scatterers in both free space and the presence of a real Earth. The accuracy and reliability have been checked by shifted sphere solutions, comparison with bistatic radar scattering experiments, and the reciprocity theorem. These comparisons have confirmed the validity of the method. Author (GRA)

N82-11348# Lincoln Lab., Mass. Inst. of Tech., Lexington.

PACKET SPEECH SYSTEMS TECHNOLOGY Semiannual Technical Summary Report, 1 Oct. 1980 - 31 Mar. 1981

Clifford J. Weinstein and Peter E. Blankenship 31 Mar. 1981

26 p
(Contract F19628-80-C-0002; ARPA Order 3673)
(AD-A104373; ESD-TR-81-87) Avail: NTIS
HC A03/MF A01 CSCL 17/2

The long-range objectives of the Packet Speech Systems Technology Program are to develop and demonstrate techniques for efficient digital speech communication on networks suitable for both voice and data, and to investigate and develop techniques for integrated voice and data communication in packetized networks, including wideband common-user satellite links. Specific areas of concern are: the concentration of statistically fluctuating volumes of voice traffic, the adaptation of communication strategies to varying conditions of network links and traffic volume, and the interconnection of wideband satellite networks to terrestrial systems. The current program has two major thrusts: i.e., the development and refinement of practical low-cost, robust, narrowband, and variable-rate speech algorithms and voice terminal structures; and the establishment of an experimental wideband satellite network to serve as a unique facility for the realistic investigation of voice/data networking strategies. This report covers work in the following areas: digital channel vocoder development; embedded CVSD-based speech waveform encoder design and implementation; development and experimental tests of modular packet voice terminals (PVTs) and local access area (LEXNET) facilities; development of a miniconcentrator facility to mediate the flow of traffic from the LEXNET onto the wideband satellite network, and execution of packet speech experiments using this facility; and definition and planning of, and participation in, experiments on the wideband integrated voice/data network. GRA

N82-11349# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

MULTIACCESS OF A SLOTTED CHANNEL BY FINITELY MANY USERS

Michael G. Hluckyj and Robert G. Gallager Aug. 1981 8 p refs
(Contract N00014-75-C-1183; NR Proj. 049-383)
(AD-A104417; LIDS-P-1131) Avail: NTIS HC A02/MF A01 CSCL 17/2

The multiaccess problem as characterized by a finite user population and a time-slotted channel with limited feedback is examined. Results pertaining to the relationship among commonly used performance measures are derived, and insight as to the nature of and difficulty in finding an optimal protocol is given. In addition, three restricted but reasonable classes of protocol are defined and examined. Author (GRA)

N82-11350# Effects Technology, Inc., Santa Barbara, Calif.

INVESTIGATION OF PROCEDURES FOR AUTOMATIC RESONANCE EXTRACTION FROM NOISY TRANSIENT ELECTROMAGNETICS DATA. VOLUME 1: INVESTIGATION OF RESONANCE EXTRACTION PROCEDURES Final Report, 1 Apr. 1980 - 1 Apr. 1981

Jon R. Auton and Michael L. VanBlaricum 17 Aug. 1981 98 p refs 3 Vol.
(Contract N00014-80-C-0299)
(AD-A104530; ETI-CR81-984-Vol-1) Avail: NTIS
HC A05/MF A01 CSCL 17/9

This volume presents major results and conclusions of research in resonance extraction techniques from transient electromagnetics data. Section 2 addresses the question of what the best methods of estimating the resonances for this application are. Among the estimation procedures studied are the conventional technique of using an inhomogeneous set of equations, eigenvalue decomposition techniques, Jain's method, and iterative techniques. Section 3 studies procedures for selecting the proper order and eliminating extraneous resonances. The maximum likelihood procedure for order selection is presented in Section 3. This procedure is capable of automatically determining the proper order without any prior knowledge of the noise level. Also, in Section 3, Henderson's procedure for eliminating extraneous resonances is tested by numerical example. The procedures presented in Section 3 allow an efficient, automatic procedure for order selection and resonance estimation to be constructured by using eigenvalue decomposition of the data. Section 4 discusses various practical problems that must be addressed before resonance extraction procedures for a practical radar target recognition system can be designed. GRA

N82-11351# Effects Technology, Inc., Santa Barbara, Calif.

INVESTIGATION OF PROCEDURES FOR AUTOMATIC RESONANCE EXTRACTION FROM NOISY TRANSIENT ELECTROMAGNETICS DATA. VOLUME 2: APPENDICES Final Report, 1 Apr. 1980 - 1 Apr. 1981

Jon R. Auton and Michael L. VanBlaricum 17 Aug. 1981 67 p refs 3 Vol.
(Contract N00014-80-C-0299)
(AD-A104531; ETI-CR81-984-Vol-2) Avail: NTIS
HC A04/MF A01 CSCL 17/9

This volume consists of a series of appendices whose contents could not be included in the body of Volume I without breaking the continuity. The appendices describe topics that were studied during the course of the current contract but are only tangentially related to the theme of Volume I. Several references were made in Volume I to appendices in this volume for the details of specific methods. Author (GRA)

N82-11352# Effects Technology, Inc., Santa Barbara, Calif.

INVESTIGATION OF PROCEDURES FOR AUTOMATIC RESONANCE EXTRACTION FROM NOISY TRANSIENT ELECTROMAGNETICS DATA. VOLUME 3: TRANSLATION OF PRONY'S METHOD Final Report, 1 Apr. 1980 - 1 Apr. 1981

Jon R. Auton and Michael L. VanBlaricum 17 Aug. 1981 80 p refs 3 Vol.
(Contract N00014-80-C-0299)
(AD-A104532; ETI-CR81-984-Vol-3) Avail: NTIS
HC A05/MF A01 CSCL 17/9

This document contains a bibliography of reports, papers and books that deal directly with Prony's method. Section 2.0 of this volume contains a translation from the French of Prony's original paper. Author (GRA)

N82-11353# Naval Postgraduate School, Monterey, Calif.

FOURIER ANALYSIS OF BROADBAND, LOW-LEVEL SIGNALS USING SWITCHED INPUTS M.S. Thesis

Gary L. Howarth Jun. 1981 79 p refs
(AD-A104588) Avail: NTIS HC A05/MF A01 CSCL 09/3

A new technique for estimation of the spectrum of an unknown signal is investigated. The technique combines a radiometric method of signal detection (modulating the receiver noise with the assumed signal by alternately connecting and disconnecting the input transducer) with a Fast Fourier Transform processor for spectral analysis. After obtaining averaged spectral estimates with the transducer (antenna) connected and disconnected, the difference is formed and statistical analyses applied to determine statistically significant terms. The significant components comprise the estimate of the spectrum of the signal. Analytical results are derived for sinusoidal signals and uncorrelated, Gaussian noise. Experimental results for both narrow and wideband signals and additive Gaussian noise are presented. Reasonable spectral estimates of a wideband signal are obtained with 16 averages when the composite signal-to-noise ratio is 0 dB. Author (GRA)

N82-11354# Edgerton, Germeshausen and Grier, Inc., Albuquerque, N. Mex.

SYSTEM SAFETY PROGRAM PLAN Final Report, 31 Mar. - 8 Aug. 180

A. J. Bonham 8 Aug. 1980 79 p refs
(Contract DNA001-80-C-0177)
(AD-A104557; AG-1446; DNA-5467F) Avail: NTIS
HC A05/MF A01 CSCL 12/12

This document, System Safety Program Plan, is the implementing document covering the safety aspects of performing an EMP Test on the A7E aircraft in the HPD (Horizontally Polarized Dipole), VPD (Vertically Polarized Dipole), and NWEF hangar facilities at Kirtland AFB, New Mexico. GRA

N82-11355# Sandia Labs., Livermore, Calif.

MICROCOMPUTER-CONTROLLED COMMUNICATION NETWORK FOR SANDIA NATIONAL LABORATORIES' ENVIRONMENTAL TEST CHAMBERS

L. C. Bennett Aug. 1981 15 p refs
(Contract DE-AC04-76DP-00789)

(DE81-030988; SAND-81-1782) Avail: NTIS HC A02/MF A01

A microcomputer-controlled communication system that links together in a network four data-acquisition computers and four low-level signal scanner/amplifiers is described. The scanner/amplifiers monitor transducers that are connected to specimens within environmental test chambers located in the high-bay area of Sandia's Building 860. The microcomputer hardware and its controlling program are described. DOE

N82-11356# National Telecommunications and Information Administration, Washington, D.C.
USER'S GUIDE: VOICE AND DATA COMMUNICATIONS PROTECTION
Roger Neighborgall and Robert Massey May 1981 155 p
(PB81-221509; NTIA-CR-80-9) Avail: NTIS HC A08/MF A01 CSCL 17B

Powerful, low cost computers, combined with increasingly sophisticated telecommunications systems, have created an environment in which voice and a communications transmissions are becoming more susceptible to unauthorized interception. Protection devices and terminals, with a variety of operational features, and principles, are described for the benefit of government telecommunications managers. The vendors offering 160 products are identified. Protection systems are explained, and an extensive glossary and bibliography are included. GRA

N82-11282*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DSN GROUND COMMUNICATION FACILITY
R. H. Evans *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 9-18 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17B

N82-11286*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
STRATEGIES FOR WEATHER-DEPENDENT DATA ACQUISITION
E. C. Posner *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 34-46 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

N82-11287*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VIRTUAL CENTER ARRAYING
L. J. Deutsch, R. G. Lipes, and R. L. Miller *In its* the Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 47-52 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

N82-11290*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RFI CHANNELS, 2
R. J. McEliece *In its* The Telecommun. and Data Acquisitions Rept. 15 Oct. 1981 p 75-80 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

N82-11291*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE R SUB 0 PARAMETER FOR THE GAUSSIAN CHANNEL
R. J. McEliece and E. R. Rodemich *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 81-85 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17B

N82-11292*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DESIGN OF THROAT SECTION OF CONICAL CORRUGATED HORNS
A. D. Olver *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 86-93 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

N82-11296*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DIGITAL SAR PROCESSING USING A FAST POLYNOMIAL TRANSFORM
S. Butman, R. Lipes, A. Rubin, and T. K. Truong *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 104-112 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17I

N82-11298*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REMOVAL OF DRIFT FROM FREQUENCY STABILITY MEASUREMENTS
C. A. Greenhall *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 127-132 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

N82-11308*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GOLDSTONE HIGH POWER RADIATION CONTROL
B. A. Gaudian and R. B. Cushman (Bendix Field Engineering Corp.) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 197-204 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20I

N82-11309*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PLANETARY RADAR
R. D. Shaffer, J. T. McCluskey, and G. S. Downs *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 205 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17I

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-11357* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
LOW TEMPERATURE LATCHING SOLENOID Patent
William S. Wang, inventor (to NASA) (Consolidated Controls Corp., El Segundo, Calif.) Issued 13 Oct. 1981 8 p Filed 29 Nov. 1979 Supersedes N80-14338 (18 - 05, p 0597) Sponsored by NASA
(NASA-Case-MSC-18106-1; US-Patent-4,295,111; US-Patent-Appl-SN-098568; US-Patent-Class-335-256; US-Patent-Class-335-266; US-Patent-Class-361-141) Avail: US Patent and Trademark Office CSCL 09A

A magnetically latching solenoid includes a pull-in coil and a delatching coil. Each of the coils is constructed with a combination of wire materials, including material of low temperature coefficient of resistivity to enable the solenoid to be operated at cryogenic temperatures while maintaining sufficient coil resistance. An armature is spring-based toward a first position, that may extend beyond the field of force of a permanent magnet. When voltage is temporarily applied across the pull-in magnet, the induced electromagnetic forces overcome the spring force and pulls the armature to a second position within the field of the permanent magnet, which laches the armature in the pulled-in position. Application of voltage across the delatching coil induces electromagnetic force which at least partially temporarily nullifies the field of the permanent magnet at the armature, thereby delatching the armature and allowing the spring to move the armature to the first position.

Official Gazette of the U.S. Patent and Trademark Office

N82-11358# National Aerospace Lab., Tokyo (Japan).
APPLICATION OF A RARE-EARTH COBALT MAGNET TO

SYNCHRONOUS MOTORS
Hiroshi Yamada 1981 11 p refs In JAPANESE; ENGLISH summary
(NAL-TR-656; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

An experimental hysteresis rotor structure was produced in which a ring made of radially oriented anisotropic magnet material, Alnico 5 which has a large magnetic hysteresis loop, and a yoke made of inner steel are utilized. The prototype hysteresis motor has a large ratio of output power to magnet volume and a large starting torque as compared with conventional hysteresis motors. The structure, torque analysis, torque characteristics and equivalent circuit of the synchronous condition of the prototype synchronous motors are discussed. A comparison of the hysteresis and the permanent-magnet-type synchronous motor is also given. B.W.

N82-11359*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LOW NOISE TUNED AMPLIFIER Patent Application
Leonard Klienberg, inventor (to NASA) Filed 12 Jun. 1981 15 p
(NASA-Case-GSC-12567-1; US-Patent-Appl-SN-272839) Avail: NTIS HC A02/MF A01 CSCL 09A

A bandpass amplifier first stage with a resistive load either a.c. or directly coupled to the non-inverting input of an operational amplifier second stage which is loaded in a Wien Bridge configuration. The bandpass amplifier may be operated with a signal injected into the gate terminal of the field effect transistor and the signal output taken from the output terminal of the operational amplifier. The operational amplifier stage appears as an inductive reactance, capacitive reactance and negative resistance at the non-inverting input of the operatinal amplifier, all of which appear in parallel with the resistive load of the field effect transistor. NASA

N82-11360*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MOTOR POWER FACTOR CONTROLLER WITH A REDUCED VOLTAGE STARTER Patent Application
Frank J. Nola, inventor (to NASA) Filed 13 Oct. 1981 17 p
(NASA-Case-MFS-25586-1; US-Patent-Appl-SN-310714) Avail: NTIS HC A02/MF A01 CSCL 09A

A power factor type motor controller is disclosed in which the conventional power factor constant voltage command signal is replaced during a starting interval with a graduated control voltage. This continuation-inpart of a pending patent application (Serial No. 199, 765: Three Phase Factor Controller) provides a means for modifying the operation of the system for a motor start-up interval of 5 to 30 second. Using a ramp generators, an initial ramp-like signal replaces a constant power factor signal supplied by a potentiometer. The ramp-like signal is applied to a 15 terminal where it is summed with an operating power factor signal from phase detectors in order to obtain a control signal for ultimately controlling SCR devices. The SCR devices are turned on at an advancing rate with time responsive to the combination signal described rather than simply a function of a ramp-like signal alone. NASA

N82-11361# California Univ., Berkeley. Dept. of Physics.
LARGE GAIN, NEGATIVE RESISTANCE, AND OSCILLATIONS IN SUPERCONDUCTING QUASIPARTICLE HETERODYNE MIXERS
W. R. McGrath, P. L. Richards, A. D. Smith, H. Van Kempen, R. A. Batchelor, D. Prober, and P. Santhanam 1981 14 p refs Prepared in cooperation with Yale Univ., New Haven Sponsored in part by Netherlands Organization for the Advancement of Pure Research
(Contract N00014-75-C-0496)
(AD-A104534) Avail: NTIS HC A02/MF A01 CSCL 09/5

We have measured the properties of a superconductor-insulator-superconductor (SIS) quasiparticle mixer which is operated in the quantum limit. Single sideband conversion gain larger than +4 dB was observed at 36 GHz with a mixer noise temperature T=9 + or - 6K, which is to be compared with the (Planck) quantum limit h-bar omega/(kln2) approx. 2.5K. Complete 3-port mixer calculations are presented which are in good agreement with the gain measurements. Negative resistance was observed which implies that arbitrarily large gain is available. GRA

N82-11362# Rome Air Development Center, Griffiss AFB, N.Y.
A COMPARISON OF WEIGHTING TECHNIQUES FOR SAW TRANSDUCERS AT UHF Report, May 1976 - Jan. 1981
A. J. Slobodnik, Jr., T. L. Szabo, E. Cohen, G. A. Roberts, and J. H. Silva Mar. 1981 19 p refs
(AF Proj. 2305)
(AD-A104510; RADC-TR-81-30) Avail: NTIS HC A02/MF A01 CSCL 09/5

A comparison is made of several constant-finger-overlap, interdigital transducer-weighting schemes for realizing low sidelobe, SAW, bandpass filters between 330 and 340 MHz. Withdrawal weighting yields slightly superior performance, but source weighting allows simpler design procedures. The neglect of near-neighbor interactions (all 1's design) yields relatively poor results. Source-weighting tables are provided in an Appendix. Author (GRA)

N82-11363# Texas Instruments, Inc., Dallas. System Components Lab.
BINARY/ANALOG CCD CORRELATOR DEVELOPMENT Final Technical Report, 1 Aug. 1978 - 31 Dec. 1980
R. A. Haken Jul. 1981 62 p refs
(Contract F19628-78-C-0122; AF Proj. 4600)
(AD-A104438; TI-08-79-10; RADC-TR-81-168) Avail: NTIS HC A04/MF A01 CSCL 09/5

The architecture, design and performance of a general purpose, 1,024-stage, programmable transversal filter implemented in CCD/NMOS technology is described. The device features programmability of the reference signal, the filter length and weighting coefficient resolution. Off-ship circuitry is minimized by incorporating both analog and digital support circuitry, on-chip. This results in a monolithic analog signal processing system that has the flexibility to be operated in nine programmable configurations, from 1,024-stages by 1-bit, to 128-stages by 8-bits. The versatility of the device makes it suitable for a wide range of applications, from matched filtering with chirp signals and very long binary sequences, to image correlation and adaptive filtering. Author (GRA)

N82-11364# Texas Research Inst., Inc., Austin.
INVESTIGATION OF THE STRENGTH OF SHIELDED AND UNSHIELDED UNDERWATER ELECTRICAL CABLES Final Report
D. E. Glowe and S. L. Arnett Washington NRL 16 Sep. 1981 35 p refs
(Contract N00173-79-C-0129)
(AD-A104314; Rept-7967-15-Deg; NRL-MR-4468) Avail: NTIS HC A03/MF A01 CSCL 09/1

The mechanical properties of shielded and unshielded submarine cables (MIL-C-915/8E) were investigated to determine the effect of shielding on cable life, performance, and reliability. Ten cables (five shielded and five unshielded) were selected for laboratory evaluation. A mission profile was developed to establish the mechanical stress limits that cables must endure in service and a test sequence designed to measure tensile strength, flexural abrasion endurance, crush resistance, creep under static tension, and performance in a hull-stuffing tube. The results of this program showed that: (1) DSS-2 cable does not have adequate tensile strength and should have a strength member added. DSS-3 and larger cables have adequate tensile strength with or without the shield; (2) Unshielded DSS-3 type cable does not perform satisfactorily in hull-stuffing tubes; (3) Shielding is not required to meet mission profile specifications for cable crush or flexural abrasion resistance; (4) Construction parameters other than shielding can significantly affect mechanical performance of cable; (5) Unshielded cable construction can result in increased reliability since it permits a thicker single-jacket construction; and (6) Unshielded cable construction can reduce the cost of cable by 8 to 20 percent. Author (GRA)

N82-11365# Honeywell, Inc., Clearwater, Fla. Avionics Div.
MANUFACTURING METHODS AND TECHNOLOGY ENGINEERING FOR TAPE CHIP CARRIER Final Report, 30 Jun. 1977 - 31 Aug. 1981
William R. RodriguesdeMiranda, Wilford O. Perry, and Paul H.

Shreve Aug. 1981 130 p
(Contract DAAB07-77-C-0526)
(AD-A104393: DELET-TR-77-0526F) Avail: NTIS HC A07/MF A01 CSCL 09/5

This contract was aimed at establishing the feasibility of an assembly line for manufacturing hybrid microcircuits using tape automated bonding (TAB). This report describes work performed during the pilot line phase of the contract. A purpose of the MM&T work was to demonstrate the viability of the manufacturing approaches with TAB and the determination of the associated yield and cost factors. This report includes an overview of these factors, the methods and equipment employed in the manufacture of approximately 1200 hybrid microcircuits with TAB, and the qualification test results of the circuits using the TAB mounted devices. Author (GRA)

N82-11366# Centre National de la Recherche Scientifique, Besancon (France).
LOW TEMPERATURE QUARTZ CRYSTAL OSCILLATOR FAST WARM-UP SAW OSCILLATOR Interim Report, 1 Feb. 1980 - 31 Jan. 1981
J. J. Gagnepain and D. Hauden Griffiss AFB, N.Y. RADC Jul. 1981 40 p refs
(Grant AF-AFOSR-0105-80; AF Proj. 2305)
(AD-A104403; RADC-TR-81-184) Avail: NTIS HC A03/MF A01 CSCL 14/2

The objectives of this program are to: evaluate the frequency instabilities of quartz crystal resonators as a function of temperature and Q-factors; show the feasibility of low temperature quartz oscillators; and determine the dynamic thermal behavior of SAW quartz oscillators and precise crystal orientation and wave propagation direction with minimized sensitivities. The measurements of the frequency noise of different quartz resonators at room temperature show a correlation between 1/f noise levels and Q-factors, following 1/Q to the 4th power law. This new property was confirmed by measuring the 1/f noise level of a pair of resonators at 300 K, 4.2 K and 1 K. A first theoretical study enables to explain the 1/Q to the 4th power law from the phonon-phonon interactions due to the crystal anharmonicities. Under fast temperature variations frequency shifts are observed in SAW delay lines, which are proportional to the time derivative of the temperature. This dynamic thermal behavior was evaluated for ST cut quartz and found comparable to that one of AT-cut quartz BAW resonators. Therefore such a thermal sensitivity is not admissible for fast warm-up oscillator applications and must be lowered. Author (GRA)

N82-11367# Texas Instruments, Inc., Dallas. Semiconductor Group.
R&D SERVICES TO DEVELOP AN IMPROVED ISOLATION TECHNOLOGY RADIATION HARDENED BIPOLAR INTEGRATED CIRCUITS (PEDIC) Final Technical Report, Aug. 1978 - May 1980
Edward N. Jeffrey Jun. 1981 21 p
(Contract F19628-78-C-0205; AF Proj. 4600)
(AD-A104657; TI-03-80-47; RADC-TR-81-66) Avail: NTIS HC A02/MF A01 CSCL 18/6

This report describes work performed in the development of a dielectrically isolated integrated circuit process for fabricating radiation hardened integrated circuits. The improved process, called PEDIC (Post Epitaxial Dielectrically Isolated Circuits), provides advantages over standard DI processes: radiation tolerant improvements, lower cost, faster turnaround time, better electrical performance, and greater packing density. Electrical test data from a 2-input NAND gate circuit fabricated in the PEDIC structure is also given. Author (GRA)

N82-11368# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
INVESTIGATION OF THE ZINC ELECTRODE REACTION Annual Report, 1 Oct. 1979 - 30 Sep. 1980
James McBreen Dec. 1980 138 p refs
(Contract DE-AC02-76CH-00016)
(DE81-030221; BNL-51370) Avail: NTIS HC A07/MF A01

In nickel-zinc batteries, with pasted zinc electrodes, zinc electrode shape change or redistribution of the active material from the edge of the electrodes toward the center is the major life-limiting factor. In batteries with soluble free electrolyte zinc electrodes, morphology changes, particularly under random cycling conditions, is a major operational problem. Insights and possible solutions to these two problems are considered. The areas covered include: (1) additive and substrate effects on zinc electrode morphology; (2) investigations of zinc electrodes of the second kind; (3) separator effects on zinc electrode shape change; and (4) investigation of the effect of modified charging methods on the morphology and behavior of both pasted and soluble free electrolyte zinc electrodes. DOE

N82-11369# Auburn Univ., Ala. Engineering Experiment Station.
CONDUCTOR FATIGUE-LIFE RESEARCH Final Report
G. E. Ramey Jul. 1981 142 p Sponsored by Electric Power Research Inst.
(EPRI Proj. 1278-1)
(DE81-904209; EPRI-EL-1946) Avail: NTIS HC A07/MF A01

The effects of reducing vibration amplitudes of conductors which had been minimally damaged by aeolian vibration were investigated. Conductors were vibrated at high amplitudes until a predetermined number of strand breaks occurred, after which the vibration was continued at reduced amplitudes. Three different conductors were tested: 795 KCM 26/7, 795 KCM 45/7, and 397.5 KCM 26/7. Two different amplitude reductions were used to establish a threshold value for a maximum reduced amplitude. The amplitude reduction values were determined and conductor sizes and strandings tested. For each set of parameters, four duplicative tests were performed to give statistical credence to the data. The results of the investigation indicated that amplitude reductions arrested fatigue strand breakage in each case. DOE

N82-11370# Sandia Labs., Albuquerque, N. Mex.
HIGH-VOLTAGE AIR-CORE PULSE TRANSFORMERS
G. J. Rohwein Aug. 1981 34 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030999; SAND-80-0451) Avail: NTIS HC A03/MF A01

Air core pulse transformers are best suited to applications outside the normal ranges of conventional magnetic core transformers. In general these include charge transfer at high power levels and fast pulse generation with comparatively low energy. When properly designed and constructed, they are capable of delivering high energy transfer efficiency and have demonstrated superior high voltage endurance. The general types designed for high voltage pulse generation and energy transfer applications are described. Special emphasis is given to pulse charging systems which operate up to the multi-megavolt range. DOE

N82-11371# Brookhaven National Lab., Upton, N. Y.
TEST RESULTS OF ac SUPERCONDUCTING CABLES
E. B. Forsyth 1981 8 p refs Presented at the IEEE/PES Conf., Minneapolis, 20-25 Sep. 1981
(Contract DE-AC02-76CH-00016)
(BNL-29291; CONF-810903-1) Avail: NTIS HC A02/MF A01

Results of testing ac superconducting cables during the development stages are given. A test facility designed to demonstrate and evaluate cables rated for 138 kV, 1000-MVA 3-phi service is described. Most of the equipment has been installed and tested; results are presented. DOE

N82-11372# Ames Lab., Iowa.
SUPERCONDUCTING PROXIMITY EFFECT FOR IN SITU AND MODEL LAYERED SYSTEMS
D. K. Finnemore 1980 19 p refs Presented at the NATO Advanced Study Inst. Superconducting Mater.-Sci. and Technol. Conf., Lisbon, 19 Aug. 1980 Submitted for publication
(Contract W-7405-eng-82)
(DE81-025530; IS-M-297; CONF-800839-2) Avail: NTIS HC A02/MF A01

The primary drawback for in situ composites is that the ac losses are higher than for mechanically produced multifilamentary wire. To develop an understanding of the proximity effect so that analytical expressions will be available for design, a model system is developed based on PbCd. Items discussed include boundary conditions at SN interface, phonon spectral function, supercurrents through normal barriers, flux entry fields, and implications for in situ composites. DOE

N82-11373# Los Alamos Scientific Lab., N. Mex.
ENERGY LOSSES IN CONDUCTORS CARRYING VERY HIGH CURRENTS
Sidney Singer and Robert O. Hunter (Western Research Corp.) 1981 8 p Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1-3 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025367; LA-UR-81-1928; CONF-810659-13) Avail: NTIS HC A02/MF A01

Losses of an electromagnetic and a shock compression nature were investigated. In experiments where electrical energy must be converged from a large pulsed power supply to a small load, these losses can account for half the original energy and limit the magnitude of the energy per unit volume in the load. These considerations may be important for the study of material properties at high energy density. DOE

N82-11374# California Univ., Livermore. Lawrence Livermore Lab.
PERFORMANCE OF A 100-kV, 78kJ ELECTRIC-GUN SYSTEM
H. Chau, G. Dittbenner, K. Mikkelsen, R. Weingart, K. Froschner (Martin, Froeschner and Associates), and R. Lee (Kansas State Univ., Manhattan) 15 Jun. 1981 7 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract W-7405-eng-48)
(DE81-025603; UCRL-86259; CONF-810684-24) Avail: NTIS HC A02/MF A01

An electric gun system was constructed for use in high-pressure equation of state studies. The system is powered by a 100 kV, 15.6 micron F capacitor bank. At 100 kV charging voltage the system inductance is 23 nH. This system has driven 0.3 mm-thick Kapton projectiles to > 20 km/s and 0.3 mm Kapton/30 micrometer Ta projectiles to approximately 10 km/s. Projectile velocity is modeled phenomenlogically by an electrical Gurney model. DOE

N82-11375# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Metallurgy and Materials Science.
EXPERIMENTS IN HIGH VOLTAGE ELECTRON MICROSCOPY Progress Report, 31 Oct. 1980 - Jun. 1981
T. E. Mitchell, L. W. Hobbs, T. Mukai, H. Liu, M. Pascucci, and R. A. Youngman Jun. 1981 25 p refs
(Contract DE-AS02-76ER-02119)
(DE81-025574; DOE/ER-02119/24; COO-2119-24) Avail: NTIS HC A02/MF A01

The direct observation of radiation damage in metals and ceramics using high voltage electron microscopy (HVEM) is described. The electron irradiation capabilities of the HVEM and its increased penetration capabilities are explored. Radiation induced segregation and phase instability, disordering, and secondary defect formation in various alloys was investigated. The response of ceramics to irradiation is categorized through the formation of stoichiometric defects, decomposition or precipitation of a second phase, and transition from the crystalline to the amorphous state. DOE

N82-11376# Department of Energy, Washington, D. C.
ELECTRIC POWER SUPPLY AND DEMAND FOR THE CONTIGUOUS UNITED STATES, 1981 - 1990
Jul. 1981 584 p refs
(DE81-027126; DOE/EP-0022) Avail: NTIS HC A25/MF A01

The outlook for electric power supply and demand in the United States decade 1981 to 1990 is reviewed from the perspective of reliability and adequacy of service. Electric power supply adequacy as projected for the nine Regional Reliability Council areas of the contiguous United States is reported as well as interruptible load data reported by the Councils. Coeneration is discussed. Each of the 27 electric regions (sub-areas of the nine Council areas) in the contiguous US are studied. A glossary of terms is given. Appendices describe the Council structure, and include a copy of the ERA-411 Manual, which contains all the items to which the Councils were asked to respond. The utilities with included data, the Staff Report, Estimated Electric Demand and Supply for Summer 1981, Contiguous United States dated May 1981 are included. DOE

N82-11377# Sandia Labs., Albuquerque, N. Mex.
MODELING AND ELIMINATION OF LATCH-UP IN BULK CMOS INTEGRATED CIRCUITS
A. Ochoa, Jr. and P. V. Dressendorfer 1981 3 p refs Presented at Symp. on VLSI Technol., Maui, Hawaii, 9 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DE81-017413; SAND-81-1087C; CONF-810908-1) Avail: NTIS HC A02/MF A01

Bulk CMOS ICs continues to be a competitive technology in the VLSI era of microelectronics, but may suffer from the problem of four-layer SCR paths which can become activated causing latch-up of the part. The fundamental understanding of this phenomenon is improved by analyzing the various modes of latch-up, the effects of contact and spreading resistance, and other distributed effects. Design and process solutions for the prevention of latch-up in VLSI structures are discussed. DOE

N82-11378# California Univ., Livermore. Lawrence Livermore Lab.
TESTING AND OPTIMIZING ACTIVE ROTARY FLUX COMPRESSORS
B. M. Carder, D. Eimerl, E. J. Goodwin, J. Trenholme, R. J. Foley, and W. L. Bird (Texas Univ., Austin) 1 Jun. 1981 5 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1-3 Jun. 1981
(Contract W-7405-eng-48)
(DE81-024376; UCRL-85760; CONF-810659-20) Avail: NTIS HC A02/MF A01

The test program for iron wave-wound, rotary flux compressor (ARFC: is described. Peak-current to startup-current ratios of 17 were produced with a rotor tip speed of 60 meters per second. Submillisecond pulse widths were also measured: the minimum, 590 microseconds was obtained at 5607 rpm with an 8-inch diameter, 4-pole rotor. The machine was operated without a high current output switch, proving the feasibility of a novel commutation scheme. A computational code was developed that calcultes the output waveshape of the model ARFC with reasonable accuracy. A second optimization code selects the best design for a given application. This code shows favorable cost effectiveness of large ARFC's over the conventional capacitors to driven flashlamps for large lasers. DOE

N82-11379# Air Force Weapons Lab., Kirtland AFB, N. Mex.
HIGH ENERGY DENSITY CAPACITOR TESTING FOR THE AFWL SHIVA
D. L. Smith and R. E. Reinovsky 1981 4 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023688; SAND-81-0617C; CONF-810659-18) Avail: NTIS HC A02/MF A01

Lifetime testing and analysis of small samples of high energy density (HED) discharge capacitors at the AFWL were conducted to find a component suitable for upgrading the SHIVA capacitor bank to a 6 MJ facility. Evaluation was performed with discharge conditions of approximately 250 kA per capacitor at 60 to 70% reversal and < 2 microsec quarter period. Dielectric systems including Kraft paper with caster oil impregnant and Kraft paper, polypropylene with DiOctyl Phthalate (DOP) impregnant were tested. DOE

N82-11380# Cherrywood Farms, Williamsburg, Mich.
PROJECT DEMONSTRATION OF WIND-TURBINE ELECTRICITY: INTERCONNECTING A NORTHERN MICHIGAN FRUIT FARM WITH A MAJOR UTILITY Interim Report, 2 Sep. 1980 - 27 Apr. 1981
David M. Amon 1981 66 p
(Contract DE-FG02-80R5-10226)
(DE81-030950; DOE/R5-10226/1) Avail: NTIS HC A05/MF A01

Progress is reviewed in a project to test the economic feasibility of wind turbine technology for generating electricity. The use of wind genrated electricity on a commercial fruit farm interconnecting a commercial fruit farm with a major utility to sell power are the find project goals. DOE

N82-11381# Westinghouse Research and Development Center, Pittsburgh, Pa.
ACOUSTIC WAVEGUIDE TECHNIQUE FOR SENSING INCIPIENT FAULTS IN UNDERGROUND POWER-TRANSMISSION CABLES: INCLUDING ACOUSTO-OPTIC TECHNIQUES Final Report
R. T. Harrold Sep. 1981 66 p refs
(Contracts DE-AC01-78ET-29335; ET-78-C-01-2867)
(DE81-029626; DOE/ET-29335/T1) Avail: NTIS HC A04/MF A01

Theoretical and practical studies were made of both the acoustic emission, spectrum signatures associated with underground cable incipient faults, and the attenuation of acoustic waves in waterfilled metal tubes used as waveguided. Based on critical data, it can be estimated that in favorable circumstances, the acoustic waveguide system would only be useful for sensing incipient faults in underground cables of approx. 800 meters of less in length. A system were investigated which acoustic emissions from cable incipient faults impinge on a fiber-optic lightguide and locally change its refractive index and modulate laser light transmitted along the light guide. Experiments based on this concept show that is is possible t sense acoustic emissions with energy levels below on micro-joule. A test of this system using a section of compressed gas-insulated cable with an internal flashover was successfully carried out. DOE

N82-11382# Pacific Gas and Electric Co., San Ramon, Calif.
RESEARCH TO DEVELOP GUIDELINES FOR CATHODIC PROTECTION OF CONCENTRIC NEUTRAL CABLES, VOLUME 1 Interim Report
J. A. Hanck and G. Nekoksa Aug. 1981 164 p refs Sponsored by Electric Power Research Inst. 2 Vol.
(EPRI Proj. 1049-1)
(DE81-904195; EPRI-EL-1970-Vol-1) Avail: NTIS HC A08/MF A01

Data associated with corrosion of concentric neutrals (CN) of direct buried cables from field tests conducted at 36 bellholes excavated in California, Oklahoma, and North Carolina are presented. The electrochemical, chemical, bacteriological, and sieve analyses of native soil and imported backfill samples are included. Up to 129 values were determined for each bellhole and stored on cards as a data bank. All values were statistically analyzed and correlated with corrosion found. The severity of corrosion correlated best with CN corrosion potentials, CN resistance measurements, coarseness of backfill, and soil resistivity. The guidelines for installation of cathodic protection on CN cables are to be based upon the evaluation of over 100 experimental cathodic protection systems and upon laboratory testing for protection criteria with and without ac effects. DOE

N82-11383# Pacific Gas and Electric Co., San Ramon, Calif.
RESEARCH TO DEVELOP GUIDELINES FOR CATHODIC PROTECTION OF CONCENTRIC NEUTRAL CABLES, VOLUME 2 Interim Report
J. A. Hanck and G. Nekoksa Aug. 1981 278 p Sponsored by Electric Power Research Inst. 2 Vol.
(EPRI Proj. 1049-1)
(DE81-904210; EPRI-EL-1970-Vol-2) Avail: NTIS HC A13/MF A01

Data from field tests and sieve analyses presented in support of an effort to develop guidelines for the installation of underground transmission primary calbes. Anodic and cathodic polarization curves and the surface and cable potential gradients from 36 bellholes. A.R.H.

N82-11384# National Bureau of Standards, Washington, D.C. National Engineering Lab.
SEMICONDUCTOR MEASUREMENT TECHNOLOGY ARPA/NBS WORKSHOP MOISTURE MEASUREMENT TECHNOLOGY FOR HERMETIC SEMICONDUCTOR DEVICES Final Report
Harry A. Shafft, ed., Stanley Ruthber, ed., and Elaine C. Cohen, ed. May 1981 206 p refs Workshop held at Gaithersburg, Md., 22-23 Mar. 1978 Sponsored in part by DARPA
(PB81-220733; NBS-SP-400-69) Avail: NTIS HC A10/MF A01 CSCL 09A

Measurement problems in integrated circuit processing and assembly served as a forum to examine present problems with the measurement of moisture in hermetic semiconductor devices. Manuscripts and summaries are provided of 19 talks, panel meetings, and group encounters on three major topics: mass spectrometer measurements of internal package moisture, moisture sensors, and package analysis and quality assurance. GRA

N82-11293*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CRYOGENIC FILTERS FOR RFI PROTECTION
J. J. Bautista and S. M. Petty *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 94-98 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

N82-11300*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SURFACE RESISTIVITY MEASUREMENTS OF CANDIDATE SUBREFLECTOR SURFACES
E. H. Thom and T. Y. Otoshi *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 142-150 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

N82-11385 California Univ., Los Angeles.
NON-LINEAR EVOLUTION OF AN OBLIQUELY PROPAGATING LANGMUIR WAVE Ph.D. Thesis
Curtis Robert Menyuk 1981 173 p
Avail: Univ. Microfilms Order No. 8121008

In the transition regime between regular and stochastic motion, the electron orbits are complicated and an analytic solution does not appear possible. The asymptotic total damping of the wave is determined using two different approaches. The two methods lead to asymptotic amplitudes which agree to within a factor of two, and the wave's total damping is found to increase significantly when a transition is made between the regular and stochastic regimes, i.e., when resonances overlap. The amplitude oscillations in the trapping regime disappear due to superphase mixing of the many bounce frequencies when the angle of propagation is increased past 14 deg. Dissert. Abstr.

N82-11386 Cornell Univ., Ithaca, N. Y.
THEORETICAL INVESTIGATION OF A PASSIVE SCALAR SUCH AS TEMPERATURE IN ISOTROPIC TURBULENCE Ph.D. Thesis
Robert McDougall Kerr 1981 142 p
Avail: Univ. Microfilms Order No. 8119528

The statistical properties of an isotropic scalar field in turbulence were investigated. It is demonstrated that the decay rate of temperature fluctuation depends on the initial temperature scale size. A simple dynamic model of the spectrum and phenomenological arguments are used to resolve these problems. We show that the observed dependence on initial scale size is in fact a transient and derive a formula which describes the crossover to asymptotic scalar decay. A three dimensional spectral code for the velocity and passive scalar are presented and used to calculate the higher order statistics which describe intermittency. Decaying turbulence at very low Reynolds numbers is investigated. The rapid decay rates observed are determined to be due to the absence of an inertial range at low Reynolds numbers. The way a coherent, anisotropic scalar field returns to isotropy is analyzed. Dissert. Abstr.

N82-11387 California Univ., Los Angeles.
THREE-DIMENSIONAL LEE WAVES IN A CONTINUOUSLY STRATIFIED FLUID Ph.D. Thesis
Robert Dale Sharman 1981 172 p
Avail: Univ. Microfilms Order No. 8121054

A stably stratified fluid flowing over an isolated obstacle produces waves in the lee which have many of the characteristics of ship waves in water of finite depth. Use of a model in which the mean wind increases exponentially with height minimizes the considerable mathematical difficulties involved and allows for approximate analytic solutions for the far field three dimensional trapped lee wave pattern. It is shown that the character of the wave pattern depends on the surface Richardson number. A large number of modes is excited in every case and the analysis breaks down for the higher modes. To determine wave amplitudes then, recourse had to be made to numerical simulations using a transient gravity wave model. Several simulations were carried out for different values of the Richardson number and the results support the analysis. Dissert. Abstr.

N82-11388 California Univ., Los Angeles.
SHEAR FLOW INSTABILITIES IN A ROTATING SYSTEM Ph.D. Thesis
Wei-Lee Chen 1981 176 p
Avail: Univ. Microfilms Order No. 8120930

Instabilities of viscous shear flows in a fluid layer rotating about a vertical axis were investigated. Two basic states were considered: (1) a baroclinic linear shear flow, which is associated with an imposed horizontal temperature gradient, and (2) double Ekman layers, which are produced by the relative motion of the two horizontal boundaries. Two instability mechanisms are present in this system, the inflection point mode and the symmetric mode. The linear theory of these instabilities is considered in the case baroclinic flow and Ekman layer flow. A Runge-Kutta shooting method was used in the numerical analysis. In special cases the nonlinear properties of the instabilites were studied. Finite amplitude disturbances in the form of rolls were investigated using the Galerkin technique. It was found that the existance of multiple solutions is a common feature. Moreover, finite amplitude disturbances can exist at Reynolds numbers lower than that predicted by the linear analysis. To test whether the finite amplitude rolls are realized, a stability analysis of the combined circulation was also performed. Dissert. Abstr.

N82-11389 Royal Aircraft Establishment, Bedford (England). Library.
SOME PROBLEMS IN THE CALCULATION OF FLOWS WITH TANGENTIAL DISCONTINUITIES
V. F. Molchanov Nov. 1980 17 p refs Transl. into ENGLISH from Uch. Zap. TsAGI (USSR), v. 6, no. 4, 1975 p 1-11
(RAE-LIB-Trans-2059; BR77975) Copyright. Avail: Issuing Activity

A scheme of a method of discrete vortices, applicable in calculations of plane flows with tangential discontinuities was investigated. It is shown that the dispersion of vortices usually found in calculations is the effect of the incorrect nature of the problem on the multitude of growing perturbations, and of the instability of the difference scheme on the multitude of decreasing perturbations. On the basis of the application of the theory of the solution of incorrectly set problems and of the theory of difference schemes, a method is developed which potentially offers the possibility of carrying out calculations with a given degree of accuracy. Results are illustrated taking the case, by way of example, of the calculation of the nonlinear characteristics of a rectangular wing of small aspect ratio. Author

N82-11390*# SHD Associates, Inc., Evanston, Ill.
SURFACE-TENSION INDUCED INSTABILITIES: EFFECTS OF LATERAL BOUNDARIES Final Report
S. Rosenblat, S. H. Davis, and G. M. Hornsy Jun. 1981 130 p refs
(Contract NAS3-22274)
(NASA-CR-165530) Avail: NTIS HC A07/MF A01 CSCL 20D

Convection in circular and rectangular cylinders is analyzed. The governing equations and boundary conditions are formulated, linear and nonlinear stability theory are considered, and the physical implications of the theory are discussed. J.D.H.

N82-11391*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AMPLIFIED CROSSFLOW DISTURBANCES IN THE LAMINAR BOUNDARY LAYER ON SWEPT WINGS WITH SUCTION
J. Ray Dagenhart Nov. 1981 90 p refs
(NASA-TP-1902; L-14423) Avail: NTIS HC A05/MF A01 CSCL 20D

Solution charts of the Orr-Sommerfeld equation for stationary crossflow disturbances are presented for 10 typical velocity profiles on a swept laminar flow control wing. The critical crossflow Reynolds number is shown to be a function of a boundary layer shape factor. Amplification rates for crosslow disturbaces are shown to be proportional to the maximum crossflow velocity. A computer stability program called MARIA, employing the amplification rate data for the 10 crossflow velocity profiles, is constructed. This code is shown to adequately approximate more involved computer stability codes using less than two percent as much computer time while retaining the essential physical disturbance growth model. Author

N82-11392*# Water and Power Resources Service, Denver, Colo. Engineering and Research Center.
IMPINGING JETS
Robert L. George Dec. 1980 20 p refs
(PB81-227902; REC-ERC-80-8) Avail: NTIS HC A02/MF A01 CSCL 13B

A literature review on free jets striking solid boundaries is presented. A small-scale tests that have been made with and without a water cushion are described. The pressure is related to the velocity of the jet or height of fall or both. Several estimates for rate of velocity decrease, or excess pressure on a solid boundary are developed. One method is recommended for use in design procedures, which compares favorably with hydraulic model test data is recommended for use in design procedures. Model tests are recommended whenever the geometry of the spillway causes the flow to converage. Author

N82-11393*# Stanford Univ., Calif. Thermosciences Div.
A THREE-DIMENSIONAL SIMULATION OF TRANSITION AND EARLY TURBULENCE IN A TIME-DEVELOPING MIXING LAYER
A. B. Cain, W. C. Reynolds, and J. H. Ferziger Aug. 1981 140 p refs
(Contract NCC2-15)
(NASA-CR-164942; SU-TF-14) Avail: NTIS HC A07/MF A01 CSCL 20D

The physics of the transition and early turbulence regimes in the time developing mixing layer was investigated. The sensitivity of the mixing layer to the disturbance field of the initial condition is considered. The growth of the momentum thickness, the mean velocity profile, the turbulence kinetic energy, the Reynolds stresses, the anistropy tensor, and particle track pictures of computations are all examined in an effort to better understand the physics of these regimes. The amplitude, spectrum shape, and random phases of the initial disturbance field were varied. A scheme of generating discrete orthogonal function expansions on some nonuniform grids was developed. All cases address the early or near field of the mixing layer. The most significant result shows that the secondary instability of the mixing layer is produced by spanwise variations in the straining field of the primary vortex structures. J.D.H.

N82-11394*# Stanford Univ., Calif. Thermosciences Div.
MIXING OF A PASSIVE SCALAR IN ISOTROPIC AND SHEARED HOMOGENEOUS TURBULENCE
E. Shirani, J. H. Ferziger, and W. C. Reynolds May 1981 175 p refs
(Contract NCC2-15; Grant NSF ENG-78-17619)
(NASA-CR-164938; SU-TF-15) Avail: NTIS HC A08/MF A01 CSCL 20D

In order to calculate the velocity and scalar fields, the three dimensional, time-dependent equations of motion and the diffusion equation were solved numerically. The following cases were treated: isotropic, homogeneous turbulence with decay of a passive scalar; and homogeneous turbulent shear flow with a passive scalar whose mean varies linearly in the spanwise direction. The solutions were obtained at relatively low Reynolds numbers so that all of the turbulent scales could be resolved without modeling. Turbulent statistics such as integral length scales, Taylor microscales, Kolmogorov length scale, one- and two-point correlations of velocity-velocity and velocity-scalar, turbulent Prandtl/Schmidt number, r.m.s. values of velocities, the scalar quantity and pressure, skewness, decay rates, and decay exponents were calculated. The results are compared with the available expermental results, and good agreement is obtained. T.M.

N82-11395*# Stanford Univ., Calif. Thermosciences Div.
HIGHER-LEVEL SIMULATIONS OF TURBULENT FLOWS
J. H. Ferziger Mar. 1981 152 p refs
(Grant NGR-2-15; Contract NCC2-15; Grant NSF ENG-78-17619)
(NASA-CR-164936; SU-TF-16) Avail: NTIS HC A08/MF A01 CSCL 20D

The fundamentals of large eddy simulation are considered and the approaches to it are compared. Subgrid scale models and the development of models for the Reynolds-averaged equations are discussed as well as the use of full simulation in testing these models. Numerical methods used in simulating large eddies, the simulation of homogeneous flows, and results from full and large scale eddy simulations of such flows are examined. Free shear flows are considered with emphasis on the mixing layer and wake simulation. Wall-bounded flow (channel flow) and recent work on the boundary layer are also discussed. Applications of large eddy simulation and full simulation in meteorological and environmental contexts are included along with a look at the direction in which work is proceeding and what can be expected from higher-level simulation in the future. A.R.H.

N82-11396*# Stanford Univ., Calif. Thermoscience Div.
NUMERICAL SIMULATION OF A COMPRESSIBLE HOMOGENEOUS, TURBULENT SHEAR FLOW Ph.D. Thesis
W. J. Feiereisen, W. C. Reynolds, and J. H. Ferziger Mar. 1981 195 p refs
(Contract NCC2-15)
(NASA-CR-164953; SU-TF-13) Avail: NTIS HC A09/MF A01 CSCL 20D

A direct, low Reynolds number, numerical simulation was performed on a homogeneous turbulent shear flow. The full compressible Navier-Stokes equations were used in a simulation on the ILLIAC IV computer with a 64,000 mesh. The flow fields generated by the code are used as an experimental data base, to examine the behavior of the Reynols stresses in this simple, compressible flow. The variation of the structure of the stresses and their dynamic equations as the character of the flow changed is emphasized. The structure of the tress tensor is more heavily dependent on the shear number and less on the fluctuating Mach number. The pressure-strain correlation tensor in the dynamic uations is directly calculated in this simulation. These correlations are decomposed into several parts, as contrasted with the traditional incompressible decomposition into two parts. The performance of existing models for the conventional terms is examined, and a model is proposed for the 'mean fluctuating' part. S.L.

N82-11397*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LEWIS RESEARCH CENTER'S COAL-FIRED, PRESSURIZED, FLUIDIZED-BED REACTOR TEST FACILITY
John A. Kobak and R. James Rollbuhler Oct. 1981 35 p refs
(NASA-TM-81616; E-621) Avail: NTIS HC A03/MF A01 CSCL 20D

A 200-kilowatt-thermal, pressurized, fluidized-bed (PFB) reactor, research test facility was designed, constructed, and operated as part of a NASA-funded project to assess and evaluate the effect of PFB hot-gas effluent on aircraft turbine engine materials that might have applications in stationary-power-plant turbogenerators. Some of the techniques and components developed for this PFB system are described. One of the more important items was the development of a two-in-one, gas-solids separator that removed 95+ percent of the solids in 1600 F to 1900 F gases. Another was a coal and sorbent feed and mixing system for injecting the fuel into the pressurized combustor. Also important were the controls and data-acquisition systems that enabled one person to operate the entire facility. The solid, liquid, and gas sub-systems all had problems that were solved over the 2-year operating time of the facility, which culminated in a 400-hour, hot-gas, turbine test. A.R.H.

N82-11398*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A COMPUTER SOLUTION TO THE STATIONARY NAVIER-STOKES EQUATIONS IN TWO DIMENSIONS WITH PROVEN CONVERGENCE
Ralph E. Gabrielsen Sep. 1981 11 p refs Prepared in cooperation with Army Research and Technology Labs., Moffett Field, Calif. Sponsored in part by Army Aviation Research and Development Command, St. Louis
(NASA-TM-81300; A-8604; USAAVRADCOM-TR-81-19-A) Avail: NTIS HC A02/MF A01 CSCL 20D

A general computer solution for the stationary Navier-Stokes equations is developed. It is explicity proved that this solution converges to the true solution as the grid size shrinks to zero. Author

N82-11399*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
HIGH THERMAL POWER DENSITY HEAT TRANSFER Patent Application
James F. Morris, inventor (to NASA) Filed 30 Oct. 1980 10 p
(NASA-Case-LEW-12950-1; US-Patent-Appl-SN-202228) Avail: NTIS HC A02/MF A01 CSCL 20D

Heat from a high temperature heat pipe is transferred through a vacuum or a gap filled with electrically nonconducting gas to a cooler heat pipe. The heat pipe is used to cool the nuclear reactor while the heat pipe is connected thermally and electrically to a thermionic converter. If the receiver requires greater thermal power density, geometries are used with larger heat pipe areas for transmitting and receiving energy than the area for conducting the heat to the thermionic converter. In this way the heat pipe capability for increasing thermal power densities compensates for the comparatively low thermal power densities through the electrically non-conducting gap between the two heat pipes. NASA

N82-11400# Coastal Engineering Research Center, Fort Belvoir, Va. Coastal Processes and Structures Branch.
CRITICAL WAVE CONDITIONS FOR SAND MOTION INITIATION
Robert J. Hallermeier Jul. 1981 18 p refs
(AD-A104376; CERC-CETA-81-10) Avail: NTIS HC A02/MF A01 CSCL 08/1

Sand and fluid characteristics together with the period of oscillatory flow determine the peak fluid velocity needed for sand motion initiation. With linear wave theory, this threshold peak near-bottom velocity can be used to calculate critical wave conditions for sand motion - either the minimum wave height in a given water depth, or the maximum water depth with a given wave height, for a given wave period. The procedure presented here permits prediction of the seaward extent of bed activity due to wave action in field and laboratory situations. Example calculations are provided. Author (GRA)

N82-11401# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
INVESTIGATION OF HEAT TRANSFER IN STRAIGHT AND CURVED RECTANGULAR DUCTS FOR LAMINAR AND TRANSITION FLOWS M.S. Thesis
Robert George Holihan, Jr. Jun. 1981 81 p refs
(AD-A104604) Avail: NTIS HC A05/MF A01 CSCL 20/13

An experimental investigation was conducted to examine convection heat transfer in a duct of rectangular cross-section, having both a straight and curved flow passage. One wall was kept at a constant temperature, with the opposite wall being adiabatic. Heating of the air flowing in the channel was accomplished through Joulean heating of a wall composed of Temsheet. The experiments were conducted for steady state in laminar and transition flows. Development and propagation of the Taylor-Gortler vortices was shown to enhance the heat transfer rate in the curved section as compared to the straight section. Author (GRA)

N82-11402# Pennsylvania State Univ., University Park. Applied Research Lab.

CORRECTING FOR THE SIDEWALL BOUNDARY LAYER IN SUBSONIC TWO-DIMENSIONAL AIRFOIL/HYDROFOIL TESTING

A. L. Treaster, P. P. Jacobs, and G. B. Gurney 25 Aug. 1981 40 p refs Proposed for presentation at the AIAA 12th Aerodyn. Testing Conf., Williamsburg, Va., Mar. 1982
(Contract N00024-79-C-6043)
(AD-A104562; ARL/PSU-TM-81-176) Avail: NTIS HC A03/MF A01 CSCL 20/4

Historically, two dimensional airfoil or hydrofoil section characteristics have been obtained by measuring individually the lift, drag and pitching moment by the most accurate technique available. The use of force balances to measure the three quantities simultaneously has met with only partial success. Although the lift and pitching moment data have usually been acceptable, the drag data have varied by as much as an order of magnitude from the accepted NACA reference data. To investigate the parameters which influence two dimensional force measurement and force balance design, an experimental program was conducted in the subsonic wind tunnel of the Applied Research Laboratory at the Pennsylvania State University (ARL/PSU). From the results of this test program the sidewall boundary layer was identified as the primary factor contributing to the erroneous drag measurements. A correction procedure which is based on the airfoil/hydrofoil geometry, the flow environment and the measured data was developed. Corrected data from the subject test program and from similar programs in other experimental facilities for both symmetrical and cambered sections are in good agreement with NACA data in all cases. Author (GRA)

N82-11403# United Technologies Research Center, East Hartford, Conn.

DEVELOPMENT OF PREDICTION METHOD FOR TRANSONIC SHOCK INDUCED SEPARATED FLOW Final Report, May 1980 - Mar. 1981

J. E. Carter Sep. 1981 38 p refs
(Contract N00014-80-C-0424)
(AD-A104566; UTRC/R80-915213-4) Avail: NTIS HC A03/MF A01 CSCL 20/4

In the present study it has been demonstrated that a finite difference technique for viscous-inviscid interaction, previously developed and demonstrated by the author for subsonic turbulent separated flows, is applicable to the problem of transonic shock induced separated flow. Converged solutions have been obtained and favorable comparisons with experimental data show that this method is capable of resolving the detailed features of this strongly interacting flow. These interaction calculations are aided by the use of a new shear layer coordinate system which is aligned with an estimated position of the shear layer in the large separated region. Author (GRA)

N82-11404# Denver Research Inst., Colo.

TWO-PHASE FLOW IN GEOTHERMAL ENERGY SOURCES Final Technical Report

Jul. 1981 240 p refs Prepared jointly with Coury and Associates, Lakewood, Colo. and Houston Univ.
(Contract De-AC02-76ET-28369)
(DE81-029037; DOE/ET-28369/T1) Avail: NTIS Hc A11/MF A01

A geothermal well consisting of single and two-phase flow sections was modeled in order to explore the variables important to the process. For this purpose a computer program was developed in a versatile form in order to be able to incorporate a variety of two phase flow void fraction and friction correlations. A parameteric study indicated that the most significant variables controlling the production rate are hydrostatic pressure drop or void fraction in the two-phase mixture and heat transfer from the wellbore to the surrounding earth. Downhole instrumentation was developed and applied in two flowing wells to provide experimental data for the computer program. The wells (East Mesa 8-1, and a private well) behaved differently. Well 8-1 did not flash and numerous shakedown problems in the probe were encountered. The private well did flash and the instrumentation detected the onset of flashing. A Users Manual was developed and presented in a workshop held in conjunction with the Geothermal Resources Council. DOE

N82-11405# Oak Ridge National Lab., Tenn. Energy Div.

CYCLE AND PERFORMANCE ANALYSIS OF ABSORPTION HEAT PUMPS FOR WASTE HEAT UTILIZATION

Horacio Perez-Blanco and Gershon Grossman Sep. 1981 56 p refs
(Contract W-7405-eng-26)
(DE81-030705; ORNL/TM-7852) Avail: NTIS HC A04/MF A01

A heat pump was designed to upgrade low-temperature waste heat by boosting its temperature typically from 600 C (1400 F) to 1200 C (2500 F). The system uses part of the low-temperature heat as its energy source and does not need outside power, except for running small auxiliary equipment. The heat pump employs a desorber/evaporator combination in which some hot water from the heat source is evaporated and the vapor is absorbed in a concentrated absorbent solution. The heat of absorption serves to raise the temperature of the rest of the hot water stream. Two stages of the system are used in series to provide the desired temperature boost. Both are served by one desorber which uses part of the waste heat to concentrate the solution. Both open- and closed-cycle regeneration of the solution was studied. The operation of the system is described and its performance criteria defined. Results of a computer study show the variation in performance with different design variables. Two working materials, LiBr-water and LiCl-water, are considered. DOE

N82-11406# Tower Systems, Inc., Tacoma, Wash.

MAGMA COOLING-TOWER PROCESS PILOT-PLANT DEMONSTRATION Final Report

W. G. Sanderson May 1981 159 p Sponsored by EPRI Prepared for Nevada Power Co., Las Vegas
(DE81-903783; EPRI-CS-1838; EPRI-TPS-79-740) Avail: NTIS HC A08/MF A01

A binary cooling process involves vertically oriented water-water-air falling film heat exchangers which are configured for indirect cooling of a primary fluid through evaporation of a secondary fluid into an air stream. The secondary fluid is contained in a circulating loop within the magma cooling tower (MCT) and is composed of treated plant waste water. The secondary fluid is exposed primarily to low temperature non-metallic surfaces and can be maintained at very high dissolved solids levels. The capability of the MCT to evaporate and concentrate waste water blowdown using low quality waste energy from the cooling water loop was evaluated as well as the control of scaling, fouling and corrosion in the high solids brine environment of the MCT secondary loop. Two modes of scale control were tested. Results were within the limits predicted prior to the test. DOE

N82-11407# Science Applications, Inc., McLean, Va. Solar Technology Div.

PARAMETRIC SENSITIVITY STUDY FOR SOLAR-ASSISTED HEAT-PUMP SYSTEMS Final Report

N. M. White and J. H. Morehouse Jul. 1981 110 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contracts DE-AC02-77CH-0017; EG-77-C-01-4042)
(DE81-030309; SERI/TR-98288-1) Avail: NTIS HC A06/MF A01

The engineering and economic parameters affecting life-cycle costs for solar-assisted heat pump systems are investigted. The change in energy usage resulting from each engineering parameter varied was developed from computer simulations, and is compared with results from a stand-alone heat pump system. Three geographical locations are considered: Washington, DC, Fort Worth, TX, and Madison, WI. Results indicate that most engineering changes to the systems studied do not provide significant energy savings. The most promising parameters to ary are the solar collector parameters tau (-) and U/sub L/ the heat pump capacity at design point, and the minimum utilizable evaporator temperature. Costs associated with each change are estimated, and life-cycle costs computed for both engineering parameters and economic variations in interest rate, discount rate, tax credits, fuel unit costs and fuel inflation rates. Results indicate that none of the feasibile engineering changes for the system configuration studied will make these systems economically competitive with the stand-alone heat pump without a considerable tax credit. DOE

N82-11408# Los Alamos Scientific Lab., N. Mex.
DIFFUSIVITY OF PARTICLES MOVING RAPIDLY THROUGH A TURBULENT FLUID
L. G. Margolin Aug. 1981 10 p refs
(Contract W-7405-eng-36)
(DE81-030414; LA-8875) Avail: NTIS HC A02/MF A01

The theoretical assumptions concerning the diffusion of small particles in a turbulent fluid are contrasted with experimental observations. Theoretical studies predict that particles will diffuse like passive scalars. Experimental measurements of the diffusion of small beads in turbulent air yield particle diffusivities much smaller than passive scalar diffusivity. One assumption, usually called the neighborhood hypothesis, is not justifiable when the particles have a large mean velocity relative to the fluid. A model, valid in these circumstances, and in good agreement with the experiment is constructed. DOE

N82-11409# Oak Ridge National Lab., Tenn. Dept. of Barrier Technology.
PORTABLE TRANSFER STANDARDS FOR PRESSURE AND GAS FLOW MEASUREMENTS
D. E. Fain and T. W. Selby Jan. 1981 27 p refs Presented at the 2nd Intern. Symp. on Flow, St. Louis, 6 Apr. 1981
(Contract W-7405-eng-26)
(DE81-024445; K/ET-5014-Rev-2; CONF-810434-6-Rev-2) Avail: NTIS HC A03/MF A01

A system of portable transfer standards for pressures and gas flow measurements developed to assure that different measurement systems at different locations are measuring relative to the same standards is described. The factors necessary to observe and control are discussed in addition to calibration procedures and operational results. The capability of maintaining a long term reproducibility of 0.1% for a flow system is demonstrated. A limited amount of data from a preliminary cross check shows agreement to better than 0.1% at the 95% confidence level. DOE

N82-11410# Oak Ridge National Lab., Tenn. Computer Sciences Div.
STEFAN PROBLEM WITH A CONVECTIVE BOUNDARY CONDITION
A. D. Solomon, V. Alexiades, and D. G. Wilson Aug. 1981 36 p refs
(Contract W-7405-eng-26)
(DE81-030424; ORNL/CSD-81) Avail: NTIS HC A03/MF A01

The one-phase Stefan problem on a semi-finite strip x greater than or equal to 0, with the convective boundary condition -KT/sub x/(0,t) = [T/sub L/-T (0,t)] is investigated.The behavior of the surface temperature T(0,t), asymptotic behavior as h (FEMALE) infinity, uniqueness, and bounds on the phase change front and total system energy are studied. DOE

N82-11411# Battelle Pacific Northwest Labs., Richland, Wash.
MEAN VALUES AND AN INVERSE PROBLEM FOR POROUS MEDIA FLOW
E. M. Arnold 1980 21 p refs Presented at the SIAM Meeting, Houston, Tex., 6 Nov. 1980
(Contract DE-AC06-76RL-01830)
(DE81-027210; PNL-SA-8768; CONF-801166-3) Avail: NTIS HC A02/MF A01

Connections between integral mean values of a function and partial differential equations satisfied by that function are used to establish an equivalent integral-geometric form of an inverse problem for porous media flow. Some sequences of this equivalence and global existence results are presented. DOE

N82-11412# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
DESIGN, OPERATION AND PERFORMANCE OF A GROUND COUPLED HEAT PUMP SYSTEM IN A COLD CLIMATE
P. D. Metz 1981 8 p refs Presented at the 16th Intersoc. Energy Conversion Eng. Conf., Atlanta, 9-14 Aug. 1981; sponsored by ASME
(Contract DE-AC02-76CH-00016)
(DE81-024257; BNL-29625; CONF-810812-25) Avail: NTIS HC A02/MF A01

An antifreeze filled serpentine earth coil was designed to just meet heating needs of a small, well insulated house with an average brine temperature never less than 7 C (20 F). The 155 m (507 ft) long, 1.2 m (4 ft) coil made from nominal size 1-1/2 in medium density polyethylene pipe was installed by a local plumbing contractor using two different chain driven trenchers. A commercially available water to air heat pump was used with minor modifications. System performance was monitored using kilowat hour meters, a Btu meter, and a datalogger microcomputer data acquisition system. The house temperature was kept between 21 and 23 C (70 and 74 F) all winter despite outdoor temperature as low as 24 C (-11 F). During a period when the outdoor temperature averaged -2 C (28 F), the system extracted approximately 10.2 x 10 to the 9th power 3 (9.7 x 10 to the 6th power Btu) from the ground with an almost constant heat pump COP (coefficient of performance) averaging about 2.3 and a system COP of 2.2. No resistance heating was used. DOE

N82-11413# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
DOE SOLAR-ASSISTED HEAT-PUMP PROGRAM: ITS EVOLUTION AND ITS POTENTIAL
J. W. Andrews 1981 5 p refs Presented at the Active Solar Contractors' Rev. Meeting, Washington, D.C. Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-026055; BNL-29677; CONF-810912-10) Avail: NTIS HC A02/MF A01

Progress in the solar assisted heat pump program is described in terms of the progressive modification of original assumptions on the basis of accumulating experience. The ways in which these modifications led to enhanced system potential are explained. A major impetus for progress is the assimilation and reconciliation of divergent systems analysis results. Technical accomplishments in the program are described, and needed future activities are listed. DOE

N82-11414# Brookhaven National Lab., Upton, N. Y. Energy Storage and Conversion Div.
CHEMICAL HEAT PUMP PROGRAM: AN OVERVIEW
Alessio Mezzina 1981 5 p Presented at the Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025086; BNL-29592; CONF-810672-22) Avail: NTIS HC A02/MF A01

Chemical heat pumps comprise reversible reactions which can be driven by low grade heat. Thermal energy is absorbed in one direction and liberated in the reverse direction; thus, serving as a basis for system designs applicable to space conditioning or process heat management and offering the capability for high density energy storage as an integral part of the system. The program background, rationale, technology, and research and development needs are described. DOE

N82-11415# Oak Ridge National Lab., Tenn.
COMPUTER-AIDED HEAT-PUMP DESIGN AND OPTIMIZATION
S. K. Fischer and C. K. Rice 1981 4 p refs Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024965; CONF-810672-1) Avail: NTIS HC A02/MF A01

Analytical methods to predict the performance of existing and proposed heat pumps and computer programs to serve as tools for the design and optimization of high efficiency heat pumps are described. A computer model of electric-motor-driven heat pumps was developed to provide detailed analyses of the performance of existing or proposed heat pumps. To the extent possible, the model is based on the physical principles underlying the processes and on basic correlations, with minimal use of empirical correlations. The computer program is oganized to facilitate its use by engineers who want to concentrate on a heat pump design, not a computer program. The heat pump model was connected to an optimization program. The heat pump design, not a computer program. The heat pump model was connected to an optimization program in order to maximize the predicted heating efficiency by simultaneously varying ten design parameters to find the combination giving the highest COP at a specified heating capacity. DOE

N82-11416# Oak Ridge National Lab., Tenn. Energy Div.
LABORATORY DETERMINATION OF FROSTING AND DEFROSTING LOSSES FOR A HIGH EFFICIENCY AIR-SOURCE HEAT PUMP
W. A. Miller and R. D. Ellison 1981 4 p refs Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981
(Contract W-7405-eng-26)
(DE81-023218; CONF-810672-2) Avail: NTIS HC A02/MF A01

Tests to detail system and component performance data, to quantify the dynamic losses, and to seek and evaluate methods for reducing these losses were performed. A high efficiency split-system heat pump was installed in two separate air loops, with one loop housng the indoor and the other housing the outdoor unit. Calculations of the heat pump's performance based on air-side measurements were within 3% of that based on refrigerant side measurements. Performance of the heat pump was measured under steady-state, dehumidification, and frosting-defrosting conditions with major emphasis placed on the dynamic frosting operation of the system. The system and component performance was evaluated for ambient temperature levels of 8.3, 4.4, 1.7, -1.1 and -8.3 C, and for discrete humidity levels ranging from 50 to 90%. DOE

N82-11417# Oak Ridge National Lab., Tenn. Energy Div.
ALTERNATIVE HEAT PUMP CYCLE STUDIES
F. A. Creswick 1981 4 p refs Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024983; CONF-810672-3) Avail: NTIS HC A02/MF A01

Alternative heat pump cycles for space conditioning applications that offer improved performance or the option to use a non-chlorofluorocarbon working fluid are considered. Various air-cycle systems, the Stirling cycle, and an ejector cycle were examined. The concept is discussed. Results of preliminary studies on the air cycles and the Stirling heat pump are discussed briefly. Ejector heat pump studies are at a very preliminary stage and no conclusions have been made. DOE

N82-11418# . E-Tech, Inc., Atlanta, Ga.
INVESTIGATION OF DIRECT EXPANSION IN GROUND SOURCE HEAT PUMPS
Mark D. Kalman 1981 6 p refs Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-024139; CONF-810672-5) Avail: NTIS HC A02/MF A01

A fully instrumented subscale ground coupled heat pump system was developed, and built, and used to test and obtain data on three different earth heat exchanger configurations under heating conditions (ground cooling). Various refrigerant flow control and compressor protection devices were tested for their applicability to the direct expansion system. Undistributed Earth temperature data were acquired at various depths. The problem of oil return at low evaporator temperatures and low refrigerant velocities was addressed. An analysis was performed to theoretically determine what evaporator temperature can be expected with an isolated ground pipe configuration with given length, pipe size, soil conditions and constant heat load. Technical accomplishments to date are summarized. DOE

N82-11419# Pittsburg Univ., Pa. Dept. of Mechanical Engineering.
WELL-WATER-SOURCE HEAT PUMP FIELD PERFORMANCE STUDY
R. S. Dougall 1981 5 p refs Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-024136; CONF-810672-7) Avail: NTIS HC A02/MF A01

Two well-water source heat pumps (WWSHPs) were instaled in two single-family residences in rural south-central Pennsylvania to supply heating in the winter and cooling during the summer. The heat pump installations are being instrumented with an automated data gathering system for evaluating the performance of the systems. The instrumentation and data acquisition system design was completed and a preliminary design of the control logic and data reduction software for the minicomputer to be located at the sites was obtained. DOE

N82-11420# Battelle Memorial Inst., Columbus, Ohio.
CONDUCT A STATE-OF-THE-ART SURVEY OF EXISTING KNOWLEDGE FOR THE DESIGN OF GROUND-SOURCE HEAT PUMPS Topical Report, Sep. 1980 - May 1981
David Ball 1981 6 p refs Presented at DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Prepared for Oak Ridge National Lab.
(Contract W-7405-eng-26)
(DE81-024084; CONF-810672-9) Avail: NTIS HC A02/MF A01

Historic and current methods for designing ground-coil heat pumps with emphasis on European and North American experiences are discussed. Approximately 27 individual design and performance evaluation method were studied with most of them employing computer techniques. Modeling categories include steady-state analytical and transient analytical lumped parameter finite difference and finite element in one, two, and three dimensions. A discussion of each is presented. DOE

N82-11421# Little (Arthur D.), Inc., Cambridge, Mass.
ASSESSMENT OF I.C. ENGINES AS DRIVERS FOR HEAT ACTUATED HEAT PUMPS
J. C. Burke, W. P. Teagan, and P. G. Goff 1981 6 p Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Prepared for ORNL
(Contract W-7405-eng-26)
(DE81-024086; CONF-810672-11) Avail: NTIS HC A02/MF A01

The present suitability and future potential of gas-fired and oil-fired internal combustion (IC) engines for use-in heat-actuated heat pumps for space conditioning applications are assessed. Drives for residential and light commercial machines up to 100 KW output or approximately 50 HP engine input are considered. A conceptual design identifying major generic elements was prepared to serve as a basis for estimating performance maintenance costs. A review of prior experiences with IC engines with heat pumps used in similar situations was conducted. Capital costs and maintenance costs were estimated and diesel and spark ignition engine efficiencies were determined. Institutional and operational considerations were identified. DOE

N82-11422# Oak Ridge National Lab., Tenn. Energy Div.
HEAT PUMP R AND D AT OAK RIDGE NATIONAL LABORATORY
R. D. Ellison and F. A. Creswick 1981 4 p refs Presented at DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024121; CONF-810672-13) Avail: NTIS HC A02/MF A01

Heat pump system and component performance evaluations at steady state and under frosting conditions are described. A computer model of electric motor driven heat pumps was developed to explore the practical limits of steady-state heating efficiency of conventional air-source heat pumps, and to demonstrate an approach to computer-aided heat pump design techniques. Scoping calculations of alternative heat pump systems, such as aircycle heat pumps and electric motor driven Stirling heat pumps are presented. Computer programs were written to model the expected performance of vertical-pipe ground-coupled heat exchangers, and for the detailed performance analysis of air-to-refrigerant heat exchangers with complex refrigerant circuiting by calculating the performance of each tube of the heat exchanger individually. Seasonal performance factors for air-source heat pumps using hour-by-hour calculations with empirical temperature dependant degradation factors were estimated. DOE

N82-11423# Mechanical Technology, Inc., Latham, N. Y.
DIAPHRAGM STIRLING ENGINE HEAT-ACTUATED HEAT PUMP DEVELOPMENT
Robert A. Ackermann and Paul Swenson (Consolidated Natural Gas Research Co.) 1981 5 p Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-024076; CONF-810672-14) Avail: NTIS HC A02/MF A01

A power module, consisting of a free displacer, resonant Stirling engine, hydraulic transmission, and resonant Rankine refrigerant (F-22) compressor, embodies several innovative concepts in free-piston Stirling engine heat pump design that will advance the state of the art of this technology. Progress is reported in three areas of the program. A compressor/engine matching analysis and a stability analysis show that the power module, which is representative of a two-degree-of-freedom resonant system, can operate stably over the full range of heat pump conditions. A compressor design evolved that has met criteria for performance and cost. Tests employing a hydraulic simulator test rig show that the transmission losses are less than had been predicted, and that properly designed and fabricated diaphragms can attain long life. DOE

N82-11424# Arkla Industries, Inc., Evansville, Ind.
DEVELOPMENT AND DEMONSTRATION OF AN AMMONIA-WATER ABSORPTION HEAT PUMP
Richard H. Merrick 1981 4 p Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Prepared for ORNL
(Contract W-7405-eng-26)
(DE81-024126; CONF-810672-20) Avail: NTIS HC A02/MF A01

Development of a residential air-source ammonia-water absorption heat pump designed to operate in the heating mode only and deliver its output as hot water is described. A prototype unit was developed and plans to operate three life test and three field test units in a northern climate during the winter are described. Prototype specifications are 50,000 Btu input, 125 F supply water, 105 F return water, and COP 1.25 at 47 F ambient and COP 1.12 at 17 F ambient. DOE

N82-11425# Colorado State Univ., Fort Collins. Dept. of Agricultural and Chemical Engineering.
STUDIES OF HEAT TRANSFER AND WATER MIGRATION IN SOILS Final Report, 1 May 1979 - 30 Sep. 1980
W. R. Walker, James D. Sabey, and Diane R. Hampton Apr. 1981 140 p refs
(Contract DE-AC02-79CS-30139)
(DE81-023951; DOE/CS-30139/T1) Avail: NTIS HC A07/MF A01

Simultaneous transfer of heat and water through partially saturated soils was described by both theoretical analyses and laboratory measurements. The theoretical efforts produced computer coded simulation models of coupled water and heat flux in soils and thermal conductivity as a function of water content, bulk density, mineralogical composition, and temperature. The laboratory data were used to calibrate and verify the simulation models. A prototype thermal storage reservoir using in-situ soil materials was constructed and evaluated. The feasibility of trans-seasonal heat storage was demonstrated. Efficient use of in-situ soil materials as a heat storage system requies that wet soil be used to store the heat while surrounding soils be as dry as possible. To accomplish this separation, various impermeable barriers were studied. DOE

N82-11426# Los Alamos Scientific Lab., N. Mex.
PERFORMANCE PREDICTIONS AND MEASUREMENTS FOR SPACE-POWER-SYSTEM HEAT PIPES
F. Coyne Prenger, Jr. 1981 16 p refs Presented at the 4th Intern. Heat Pipe Conf., London, 7-10 Sep. 1981
(Contract W-7405-eng-36)
(LA-UR-81-909; CONF-810902-1) Avail: NTIS HC A02/MF A01

High temperature liquid metal heat pipes designed for space power systems were analyzed and tested. Three wick designs are discussed and a design rationale for the heat pipe is provided. Test results on a molybdenum, annular wick heat pipe are presented. Performance limitations due to boiling and capillary limits are presented. There is evidence that the vapor flow in the adiabatic section is turbulent and that the transition Reynolds number is 4000. DOE

N82-11427# Los Alamos Scientific Lab., N. Mex.
PERFORMANCE LIMITS OF GRAVITY-ASSIST HEAT PIPES WITH SIMPLE WICK STRUCTURES
F. Coyne Prenger, Jr. and J. E. Kemme 1981 10 p refs Presented at 4th Intern. Heat Pipe Conf., London, 7 Sep. 1981
(Contract W-7405-eng-36)
(LA-UR-81-969; CONF-810902-3) Avail: NTIS HC A02/MF A01

The use of gravity-assist heat pipes with simple wick structures to establish performance limits due to entrainment of the liquid by the counterflowing vapor was investigated. A physical model is postulated which leads to a single correlation predicting entrainment limits for all data investigated. The characteristic length in the entrainment parameter is the depth of the wick structure and the model infers an upper bound on this parameter. DOE

N82-11428# Los Alamos Scientific Lab., N. Mex.
HEAT-PIPE DEVELOPMENT FOR HIGH-TEMPERATURE RECUPERATOR APPLICATION
M. Merrigan, W. Dunwoody, and L. Lundberg 1981 14 p refs Presented at Heat Pipe Conf., London, 7 Sep. 1981 Submitted for publication
(Contract W-7405-eng-36)
(LA-UR-81-1414; CONF-810902-4) Avail: NTIS HC A02/MF A01

The development of heat pipes for operation in oxidizing atmospheres at temperatures above 1100 K is described. The heat pipes comprise a metallic liner and wick stucture with a protective outer shell of an oxidation resistant material. The working fluids used in the heat pipes are alkali metals. A number of configurations were evaluated, ranging from pipes using a metallic inner liner of a chemically vapor deposited (CVD) refractory metal applied to ceramic tubing, to one utilizing ferrous materials with an outer layer of a developed oxide. A promising intermediate configuration consisting of free-standing refractory tubing covered with a layered structure of fine grain, equi-axed CVD silicon carbide was evaluated. The test heat pipe was fabricated using low-carbon, arccast molybdenum tubing and a wick composed of 150 mesh molybdenum screen. After coating, the pipe was operated in air and in combustion gases for performance evaluation. The use of iron-chromium-aluminum alloys as container materials for operating in high temperature oxidizing and sulfiding gas streams was investigated. DOE

N82-11429# Mechanical Technology, Inc., Latham, N. Y.
LIQUID-PARTICLE DYNAMICS AND RATE OF EVAPORATION IN THE ROTATING FIELD OF CENTRIFUGAL COMPRESSORS
Oscar Pinkus 1981 42 p refs Presented at the Symp. on Energy and Environment, Turbomachinery Technol., Patras, Greece, 22-26 Jun. 1981 Prepared in cooperation with Oak Ridge National Lab.
(Contract W-7405-eng-26)
(DE81-024075; CONF-8106101-1) Avail: NTIS HC A03/MF A01

A model is presented which consists of injecting a liquid coolant into the vapor of centrifugal compressors via slots in the rotating blades in order to achieve isothermal compression and thus minimal work input. The 3-dimensional analysis determines the relative velocities and trajectories of the liquid particles, and their rate of vaporization as a function of the prevailing flow field and inlet conditions. Inertia, viscous drag, centrifugal and Coriolis forces are all included. The computer-obtained results show that for optimum conditions and to avoid collision with the blades, it is desirable that injection occur at the suction side of the blades and close to the hub; that low rather than high initial particle velocities are preferred; and that small droplet sizes are required both to avoid blade erosion and to assure the highest rate of vaporization. The analysis also shows that vaporization levels will remain low unless the compressed vapor is at relatively high temperatures. DOE

N82-12022# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DIFFERENCE METHOD IN FLUID DYNAMICS. 1. NUMERICAL SOLUTION OF TWO DIMENSIONAL VORTICITY EQUATION
Guo Benyu *In its* Acta Mech. Sinica (Selected Articles) FTD-ID(RS)T-0705-81 15 Sep. 1981 p 1-34 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS CSCL 20/4

N82-12024# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON THE CAPACITY OF HOLOGRAPHIC PHASE-SHIFT INTERFEROMETRIC TECHNIQUE IN THE VISUALIZATION OF LOW DENSITY FLOWS
Hau Yu Li, Chao Yi Xu, Jizu Shu, and Jin Min Hu *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 51-63 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS CSCL 20/4

N82-12026# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NUMERICAL COMPUTATION AND ANALYSIS OF THE FLOW FIELD IN A LARGE SHOCK TUBE WITH A VARIABLE CROSS-SECTIONAL AREA
Wen Xuan Li and Jiajun Wang *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 75-83 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS CSCL 20/4

N82-11022# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PREDICTION OF TURBULENT BOUNDARY LAYER SEPARATION
Wu Guo-chuan *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 37-44 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 (For primary document see N82-11019 02-01)
Avail: NTIS CSCL 01/2

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-11430 California Univ., Los Angeles.
THE PIEZOMAGNETIC EFFECT: LIMITS ON DETECTABILITY USING A COMBINED VECTOR AND SCALAR MAGNETOMETER ARRAY Ph.D. Thesis
Craig Allen Searls 1981 309 p
Avail: Univ. Microfilms Order No. 8121053

The combined data from two types of magnetic observatories were used to determine the operational characteristics of the magnetometers in the remote observatory environment. The initial run of the magnetometers demonstrated that in addition to the normal magnetic variation associated with the disturbance of the magnetosphere there is also a component of the magnetic records associated with oceanic tides. Other factors contribution to the residual variation in the magnetic difference fields are local differnces in susceptibility, conductivity, and magnetic field orientation. These effects can be removed by linear prediction filtering techniques with vector field information as the input. The primary conclusion was that the instrumental noise level for both the proton precession and the vector fluxgate magnetometers are needed. Dissert. Abstr.

N82-11431* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SMALL CONDUCTIVE PARTICLE SENSOR Patent
Israel Taback, inventor (to NASA) (Bionetics Corp., Hampton, Va.) Issued 25 Aug. 1981 5 p Filed 28 Aug. 1979 Supersedes N80-11400 (18 - 02, p 0195) Sponsored by NASA
(NASA-Case-LAR-12552-1; US-Patent-4,286,209;
US-Patent-Appl-SN-070366; US-Patent-Class-324-71CP;
US-Patent-Class-235-92PC) Avail: US Patent and Trademark Office CSCL 14B

An electrostatic conductive fiber detector is disclosed for use in detecting, counting and measuring the length of fibers down to 0.1 mm and below with increased accuracy and reliability over prior art devices. It can be used for detection of fibers suspending in a flowing gas, in a nonflowing gas, or in a vacuum and its accumulated counts over a period of time is essentially unaffected by velocity of the fibers being detected.

Official Gazette of the U.S. Patent and Trademark Office

N82-11432* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
METHOD FOR RETARDING DYE FADING DURING ARCHIVAL STORAGE OF DEVELOPED COLOR PHOTOGRAPHIC FILM Patent
Richard B. Hoover and Charles M. Rhodes, inventors (to NASA) Issued 1 Sep. 1981 4 p Filed 7 Feb. 1980 Supersedes N80-18362 (18 - 09, 1139)
(NASA-Case-MFS-23250-1; US-Patent-4,287,152;
US-Patent-Appl-SN-119340; US-Patent-Class-422-40;
US-Patent-Class-430-17; US-Patent-Class-430-372) Avail: US Patent and Trademark Office CSCL 14E

Dye fading during archival storage of developed color photographic film is retarded by placing the film in a sealed, opaque vault, introducing a dry, pressurized inert gas into the vault while the latter is vented, and sealing the vault after the air within the vault has been purged and replaced by the inert gas. Preferably, the gas is nitrogen; and the vault is stored at a temperature below room temperature to preserve the color photographic emulsions on the film contained within the vault. For short-term storage, sodium thiocyanate pads charged with water are placed within the vault. For long term storage, the interior of the vault is kept at a low relative humidity.

Official Gazette of the U.S. Patent and Trademark Office

N82-11433# South African Bureau of Standards, Pretoria.
STANDARD SPECIFICATION FOR APPARATUS FOR GAMMA RADIOGRAPHY
5 Nov. 1980 21 p refs
(SABS-1317-1980; ISBN-0-626-05688-8; GR-8) Avail: NTIS HC A02/MF A01

The constructional requirements of portable, mobile, and fixed apparatus for gama radiography designed to allow the controlled use of radiation for industrial purposes are specified. Apparatus operated by removing the sealed source from the exposure container on a handlin device is not covered by this specification. The performance requirements which such apparatus should meet in order to safeguard people from radiation hazards during its normal operation are presented. J.D.H.

N82-11434*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DYNAMIC MOIRE METHODS FOR DETECTION OF LOOSENED SPACE SHUTTLE TILES
W. L. Snow, A. W. Burner, and W. K. Goad Sep. 1981 17 p refs
(NASA-TM-83205) Avail: NTIS HC A02/MF A01 CSCL 14B

Moire fringe methods for detecting loose space shuttle tiles were investigated with a test panel consisting of a loose tile surrounded by four securely bonded tiles. The test panel was excited from 20 to 150 Hz with in-plane sinusoidal acceleration of 2 g (peak). If the shuttle orbiter can be subjected to periodic excitation of 1 to 2 g (peak) and rigid-body periodic displacements do not mask the change in the Moire pattern due to tile

looseness, then the use of projected Moire fringes to detect out-of-plane rockin appears to be the most viable indicator of tile looseness since no modifications to the tiles are required.
Author

N82-11435*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LOW-COST SOLAR ARRAY PROJECT: FOUR ABSOLUTE CAVITY RADIOMETER (PYRHELIOMETER) INTERCOMPARISONS AT NEW RIVER, ARIZONA: RADIOMETER STANDARDS
Roger S. Estey and Clay H. Seaman Jul. 1981 207 p refs
(Contracts NAS7-100; EX-76-A-29-1012; DE-AI01-76ET-20356)
(NASA-CR-164950; JPL-Pub-81-60) Avail: NTIS HC A10/MF A01 CSCL 14B

Four detailed intercomparisons were made for a number of models of cavity-type self-calibrating radiometers (pyrheliometers). Each intercomparison consisted of simultaneous readings of pyrheliometers at 30-second intervals in runs of 10 minutes, with at least 15 runs per intercomparison. Twenty-seven instruments were in at least one intercomparison, and five were in all four. Summarized results and all raw data are provided from the intercomparisons.
Author

N82-11436*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
DIRECTIONAL FLOW SENSOR Patent Application
James M. Black, inventor (to NASA) Filed 7 Sep. 1981 13 p
(Contract NAS7-100)
(NASA-Case-FRC-11074-1; US-Patent-Appl-SN-291644) Avail: NTIS HC A02/MF A01 CSCL 14B

A bidirectional flow sensor comprises at least three axially aligned thermistors, each of which is connected in a normally balanced bridge circuit. The centermost thermistor serves as a heat source for fluid within a tubular body while thermal energy reversely is transferred between the outermost thermistors. Each bridge circuit includes an operational amplifier of a substantially common design with its reversing input connected to the first leg of the bridge circuit and its nonreversing input connected to the second leg. The first leg is characterized by series connected resistances and the thermistor of the roup for establishing a fixed voltage output ratio for the second leg. The output of voltage for the amplifier of each bridge circuit is indicative of the current required to maintain that temperature of the thermistor which is suitable for maintaining a constant voltage output ratio for the second leg of the bridge circuit. The output voltages of the pair of bridge circuits are applied to the inputs of another operational amplifier and provide for an output indicative of flow rate and direction for the fluid.
NASA

N82-11437# R and D Associates, Marina Del Rey, Calif.
A GROUND-MOTION DISPLACEMENT GAUGE Topical Report, 5 Jan. - 1 Aug. 1980
Jack E. Whitener 1 Aug. 1980 52 p refs
(Contract DNA001-80-C-0069)
(AD-A104325; RDA-TR-113204-004; DNA-5574T) Avail: NTIS HC A04/MF A01 CSCL 14/2

This report describes a ground-motion displacement gauge and its applications. The gauge concept is based upon the free-fall time of a mass released inside a gauge cannister prior to the onset of ground motion. The time-of-fall of the mass to the cannister bottom during ground displacement, together with the free-fall time for the gauge at rest, uniquely determines the vertical displacement at one time. Simulation of ground displacement by gauge drop tests demonstrated the operating principle.
Author (GRA)

N82-11438# Northeastern Univ., Boston, Mass. Dept. of Electrical Engineering.
CONTROL AND DATA TRANSMISSION SYSTEM FOR A BALLOON-BORNE ION MASS SPECTROMETER
Raimundas Sukys and J. Spencer Rochefort Oct. 1980 9 p Presented at the Intern. Telemetering Conf., San Diego, Calif., 14-16 Oct. 1980
(Contract F19628-78-C-0218; AF Proj. 2310)
(AD-A104512; SCIENTIFIC-3; AFGL-TR-81-0202) Avail: NTIS HC A02/MF A01 CSCL 14/2

A control system for a balloon-borne ion mass spectrometer is described in this report. The system provides the ground based experimenter with a control flexibility approaching laboratory environment. A programmable PCM encoder is used for data transmission.
Author (GRA)

N82-11439# Los Alamos Scientific Lab., N. Mex.
COMPUTER MODELING OF AN ALL-SECONDARY EXPLOSIVE HOT-WIRE DEVICE
D. T. Varley, III Aug. 1981 28 p refs
(Contract W-7405-eng-36)
(DE81-030438; LA-8930-MS) Avail: NTIS HC A03/MF A01

An all-secondary explosive hot-wire device was modeled. The model accounts for the ignition of the explosive by electrical heating of a wire and the shearing of a flying plate that is subsequently used to detonate a second explosive. The results are in excellent agreement with experimental data.
DOE

N82-11440# Sandia Labs., Albuquerque, N. Mex.
TRANSIENT TEMPERATURE RESPONSE OF STRAIN GAGES
P. H. Adams Aug. 1981 17 p refs
(Contract DE-AC04-76DP-00789)
(DE81-031922; SAND-80-2689) Avail: NTIS HC A02/MF A01

The use of electrical resistance strain gages for the measurements of strain under transient temperature conditions presents the problem of determining the thermal output or apparent strain of the strain gage with sufficient accuracy to achieve satisfactory results. Various circuit temperature compensation techniques have been used by other investigators in the past, but little data are available relative to the accuracy of those techniques under transient temperature conditions. In particular, published data has been limited to temperature changes not exceeding 300 F per second. thermal response of one model of a high temperature weldable strain gage was determined for a temperature rise rate of 1000 F per second.
DOE

N82-11441# Oak Ridge National Lab., Tenn. Barrier Technology Dept.
CALIBRATION OF A LAMINAR FLOWMETER: THE DATA AND CORRELATIONS
D. E. Fain May 1981 35 p ref Presented at the 2nd Intern. Symp. on Flow, St. Louis, 6 Apr. 1981
(Contract W-7405-eng-26)
(DE81-025227; K/ET-5013-Add-1; CONF-810434-5-Add-1) Avail: NTIS HC A03/MF A01

The experimental data employed for calibration of the laminar flowmeter, the regression analyses, and additonal graphic presentations are given.
DOE

N82-11442# Oak Ridge National Lab., Tenn. Barrier Technology Dept.
CALIBRATION OF A LAMINAR FLOWMETER
D. E. Fain Jan. 1981 19 p refs Presented at the 2nd Intern. Symp. on Flow, St. Louis, 6 Apr. 1981
(Contract W-7405-eng-26)
(DE81-024423; K/ET-5013-Rev-1; CONF-810434-4-Rev-1) Avail: NTIS HC A02/MF A01

The parameters needed to describe the flow rate through a laminar flowmeter were investigated. Development of a laminar flow element standard is described, and a theory of laminar flowmeters based on the Poiseuille-Hagan law presented. Application of the theory to the laminar flow element standard is demonstrated. Better than 0.1% precision can be achieved, for short periods (days or longer) of less than six months.
DOE

N82-11443# Wyoming Univ., Laramie. Water Resources Research Inst.
PERFORMANCE ASSESSMENTS OF PRECIPITATION GAGES FOR SNOW MEASUREMENT
Paul A. Rechard and Tsong C. Wei Sep. 1980 202 p refs Sponsored in part by Dept. of Commerce
(Contracts DI-14-31-0001-4051; DI-14-31-0001-5051)
(PB81-218547; SER-76; WB1-03727; OWRT-A-015-WYO(3)) Avail: NTIS HC A10/MF A01 CSCL 08L

Shields used to reduce the effects of snow proprties, air turbulence, and gage configuration, and to improve the catch performance of the gage are compared. In Hamon's proposed dual-gage approach was tested and the effects of wind speed and air temperature on the gage catch were analyzed. Precipitation measured by an Alter-sheilded gage in a forest opening was used as the standard catch. The catch by the Raised-Wyoming-sheilded gage was found to be free from wind effects and to correlate well with the standard catch. Author

N82-11444# National Physical Research Lab., Pretoria (South Africa). Applied Spectroscopy Div.
GUIDE TO THE EVALUATION AND USE OF AN ATOMIC ABSORPTION SPECTROPHOTOMETER
R. J. Watling and I. M. vanMaarseveen May 1980 117 p refs
(PB81-222853; CSIR-SR-FIS-209; ISBN-0-7988-1904-9) Avail: NTIS HC A06/MF A01 CSCL 14B

A method for assessing the capabilities of an atomic absorption spectrophotometer is described. Topics covered include preparing standard solutons, selecting the integration period, choosing points A and B on calibration graphs, and the optimum working range. Results obtained for various elements are listed. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-11445 Cornell Univ., Ithaca, N. Y.
THEORETICAL INVESTIGATIONS INTO POSSIBLE X-RAY AND GAMMA-RAY LASERS Ph.D. Thesis
Daniel Michael Heffernan 1981 167 p
Avail: Univ. Microfilms Order No. 8119454

Problems which arise in obtaining lasing in a dense recombining plasma were examined. The proliferation of, and the effect on, the energy levels during atom-atom collisions was studied by modeling such collisions in one dimension. A gamma ray laser which utilizes induced two-proton decay of positronium in a positronium plasma was studied. A complete theory of lasing in a dense recombining plasma in three dimensions was developed and the conditions necessary for a population inversion were obtained in terms of experimentally controllable parameters. Dissert. Abstr.

N82-11446# Joint Publications Research Service, Arlington, Va.
CHINA REPORT: SCIENCE AND TECHNOLOGY, NO. 125
9 Sep. 1981 75 p refs Transl. into ENGLISH from various Chinese publications
(JPRS-78932) Avail: NTIS HC A04/MF A01

The characteristics of laser outputs are discussed. Focus is placed on pulse duration. Lasers of particlar interost include gas lasers, pulsed lasers, and metal vapor lasers. For individual titles, see N82-11447 through N82-11451.

N82-11447# Joint Publications Research Service, Arlington, Va.
THEORETICAL ANALYSIS OF EFFECT OF LANGMUIR FLOW IN RING LASER
Jiang Yanan, Qu Zhimin, Liu Songhao, and He Guang *In its* China Rept.: Sci. and Technol., No. 125 (JPRS-78932) 9 Sep. 1981 p 1-16 refs Transl. into ENGLISH from Jiguang (China), v. 8, no. 4, Apr. 1981 p 1-8 (For primary document see N82-11446 02-36)
Avail: NTIS HC A04/MF A01

The flow of gas in a gain medium is an important source of error in laser gyros. The drift of the frequency difference of opposite carrier waves brought about by the flow of active and nonactive atoms in the gain medium is discussed. The theoretical formula and the computed values of Langmuir flow in the third order theory are given. The use of statistical methods to treat the drift of frequency difference when a Gaussian beam passes through the gain field and the flow velocity field is emphasized. The computational formules for various conditions are presented. T.M.

N82-11448# Joint Publications Research Service, Arlington, Va.
ANALYTICAL DESCRIPTION OF TIME CHARACTERISTICS OF HIGH POWER LASER PULSES
Yang Hanqian, Qu Zhimin, Liu Songhao, and He Guang-Sheng *In its* China Rept.: Sci. and Technol., No. 125 (JPRS-78932) 9 Sep. 1981 p 17-25 refs Transl. into ENGLISH from Jiguang (China), v. 8, no. 4, Apr. 1981 p 9-13 (For primary document see N82-11446 02-36)
Avail: NTIS HC A04/MF A01

The solution of the time parameters of high power laser pulses is presented. The mathematical relationship of the time a pulse is established is given. The effects of the section of the active medium upon the time a pulse is established, the single pulse condition, and the pulse width are discussed. T.M.

N82-11449# Joint Publications Research Service, Arlington, Va.
STRUCTURAL, OUTPUT CHARACTERISTICS OF PULSED XENON ION LASER
Wang Yuzhi, Xie Peiliang, Dong Jing-xing, and Feng Bingfang *In its* China Rept.: Sci. and Technol., No. 125 (JPRS-78932) 9 Sep. 1981 p 26-34 refs Transl. into ENGLISH from Jiguang (China), v. 8, no. 4, Apr. 1981 p 18-21 (For primary document see N82-11446 02-36)
Avail: NTIS HC A04/MF A01

The peak power of the laser is 150 watts. The oscillating spectral lines are found in the 4300 to 6300 angstrom range, and the pulse width of the laser is 0.2 to 1 microsecond. The discharge voltage is 4 to 12 kilovolts, and the gas pressure is 0.1 to 9 millitorr. T.M.

N82-11450# Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF PULSE GOLD VAPOR LASER OUTLINED
In its China Rept.: Sci. and Technol., No. 125 (JPRS-78932) 9 Sep. 1981 p 35-37 ref Transl. into ENGLISH from Jiguang (China), v. 8, no. 4, Apr. 1981 p 45-46 (For primary document see N82-11446 02-36)
Avail: NTIS HC A04/MF A01

Several dozen laser oscillating spectra lines were found within the very broad spectral wavelengths from infrared to ultraviolet. Laser studies of gold vapor were carried out and a pulsed laser of gold atoms of an operating wavelength of 6278 angstroms was obtained. T.M.

N82-11451# Joint Publications Research Service, Arlington, Va.
LASER TRIGGERED SPARK GAPS UNDER EXPERIMENTAL STUDY
Meng Shaoxian, Pu Chaoshun, Yang Yi, Sun Naigeng, and Xie Ziming *In its* China Rept.: Sci. and Technol., No. 125 (JPRS-78932) 9 Sep. 1981 p 38-44 refs Transl. into ENGLISH from Jiguang (China), v. 8, no. 4, Apr. 1981 p 46-47 (For primary document see N82-11446 02-36)
Avail: NTIS

Laser triggered spark gaps are an important component for the selection of singular ultrashort pulses from the locked mode pulsed laser and for shearing of laser waveforms by the photoelectric switch. The copper sphere gap was examined. It consists of two copper sphers. The multiple voltage rectified high voltage is passed through a 75 ohm electrical cable which is connected to the spheres. When the locked mode laser passes through the short focal distance lens and focuses on the gap between the copper spheres, an air puncture is formed producing initial electrons and ions. These electrons and ions move towards the two electrodes under the effects of the electrical field of the gap between the spheres, thus forming a puncture in the gap between the spheres. The discharge waveform in the gap between the spheres was measured. T.M.

N82-11452*# RCA Labs., Princeton, N. J.
InGaAsP/InP LASER DEVELOPMENT FOR SINGLE-MODE, HIGH-DATA-RATE COMMUNICATIONS Interim Report, 1 Jul. 1980 - 31 Mar. 1981
I. Ladany, E. R. Levin, C. W. Magee, and R. T. Smith Nov. 1981 59 p refs
(Contract NAS1-15962)

(NASA-CR-3477; PRRL-81-CR-12) Avail: NTIS HC A04/MF A01 CSCL 20E

Materials studies as well as general and specific device development were carried out in the InGaAsP system. A comparison was made of three standard methods of evaluating substrate quality by means of dislocation studies. A cause of reduced yield of good wafers, the pullover of melt from one bin to the next, has been analyzed. Difficulties with reproducible zinc acceptor doping have been traced to segregation of zinc in the In/Zn alloy used for the doping source. Using EBIC measurments, the pn junction was shown to drift in location depending on factors not always under control. An analysis of contact structures by SIMS showed that the depth to which the sintered Au/Zn contact penetrates into the structure is typically 0.13 microns, or well within the cap layer and out of the p-type cladding and thus not deleterious to laser prformance. The problem of single-mode laser development was investigated and it was shown to be related to the growth habit over four different possible substrate configurations. The fabrication of constricted double heterojunctions, mesa stripe buried heterostructures, and buried heterostructures was discussed, and measurements were presented on the device properties of single-mode buried heterostructure lasers. Results include single spectral line emission at 3 mW and a threshold current of 60 mA. B.W.

N82-11453*# Perkin-Elmer Corp., Danbury, Conn.

DEVELOPMENT OF MBE GROWN PB-SALT SEMICONDUCTOR LASERS FOR THE 8.0 TO 15.0 MICROMETER SPECTRAL REGION

Matthew D. Miller Mar. 1981 77 p refs

(Contract NAS1-14996)

(NASA-CR-165683) Avail: NTIS HC A05/MF A01 CSCL 20E

Diodes lasers are fibricated using multiple source molecular beam expitaxial growth of (PbSn)Te on BaF2 substrates. Methods for crystal growth, crystal transfer, and device fabrication by photolithographic techniques were developed. The lasers operate in the spectra range from 10 microns to 14 microns and at temperatures from 12K to 60K continuous wave and to 95 K pulsed. S.L.

N82-11454# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Plasma Physics Lab.

MASS SPECTROMETRY OF THE CO2 LASER PLASMA Final Report, Jul. 1975 - Sep. 1979

David E. Toodle Jun. 1981 74 p refs

(AF Proj. 2301)

(AD-A104344; AFWAL-TR-80-2029) Avail: NTIS HC A04/MF A01 CSCL 20/5

The neutral and ion chemistry of the CO2 laser mixture have been studied in detail by using a quadrupole mass spectrometer and a theoretical model. Experimentally, CO2 is observed to dissociate primarily by direct electron impact producing the dominant neutral species CO and O2. Little or no N2 dissociation occurs in a N2/Ar discharge; however, the dissociation of N2 increases when it is added to a mixture containing CO2. Consequently, the dominant nitrogen oxide in discharges containing CO2 and N2 is NO. The major positive ions are CO2(+), O2(+), CO(+), and N2(+); and the major negative ions are NO2(-), NO3(-), O2(-), O(-)and, CO3(-). CO2 dissociation is reduced by as much as 20% at a discharge current of 80mA with the addition of 2% H2. Techniques for using a mass spectrometer to sample from glow discharges are also discussed. Author (GRA)

N82-11455# Singer Co., Binghamton, N.Y.

RELIABILITY AND MAINTAINABILITY ASSESSMENT REPORT FOR LASER SCANNER IMAGE GENERATION SYSTEM, REVISION A Final Report

M. Edmondson 15 Jan. 1981 144 p

(Contract N61339-74-C-0039; DA Proj. 1F4-64204-D-275)

(AD-A104239; LR-1029-Rev-A) Avail: NTIS HC A07/MF A01 CSCL 14/5

This document sets forth the procedures, criteria and conclusions associated with the reliability and maintainability assessment for the Laser Scanner Image Generation System (LSIG). The objective of the 12 day assessment was to evaluate the reliability/maintainability potential of the LSIG, specifically with regard to operational availability. Data accrued on the breadboard system concerning those design characteristics influencing operational availability - reliability, stability, and maintainability - was to be combined with data from operation during the development period and vendor data to accomplish this objective. To the extent possible, parametric estimates were to be developed and compared to the design goals of the Link S.O.W. GRA

N82-11456# Defence Research Establishment Valcartier (Quebec).

DETERMINATION OF PULSED CO2 LASER DAMAGE THRESHOLDS OF OPTICAL SURFACES

J. C. Anctil and R. W. MacPherson Mar. 1981 45 p refs

(AD-A104424; DREV-R-4197/81) Avail: NTIS HC A03/MF A01 CSCL 20/6

An experimental technique is described for determining the damage thresholds of glass and plastic optical material surfaces, opaque to laser radiations, when irradiated with a pulsed TEA-CO2 laser. Use of a probit analysis to estimate the irradiance required for a 50% probability of damage gives threshold levels of 4.0 J/(sq cm) for fused silica, 2.1 J/(sq cm) for soda-lime glass, 2.3 J/(sq cm) for polycarbonate, 2.3 J/(sq cm) for acrylic and 1.7 J/(sq cm) for polystyrene plastics. The significance of the statistical distributions observed in attributing various mechanisms to the damage is discussed. Finally, some improvements are suggested to make the measurements more accurate. Author (GRA)

N82-11457# Boeing Co., Seattle, Wash.

PULSED DF LASER EFFECTS STUDY Final Report

R. B. Hall, W. E. Maher, and D. B. Nichols Jul. 1981 106 p refs

(Contract F29601-79-C-0003; AF Proj. 3326)

(AD-A104575; AFWL-TR-80-104) Avail: NTIS HC A06/MF A01 CSCL 20/5

This study of DF laser interaction with materials investigated the amount of energy coupled to targets. Large focal spot dimensions were obtained with the Boeing photo-initiated 50-1 pulsed chemical laser with a stable resonator. Effects experiments emphasized metallic targets, especially aluminum. The single pulse coupling results yielded absorbed fluence values greater than those obtained with comparable energies at 10.6 micrometer wavelength. Ambient pressure and angle of incidence were varied. Research results also showed multiple-pulse effect at DF wavelength. Multiple-pulse thermal coupling experiments with aluminum demonstrated that, after 10 shots on the same spot, the coupled fluence per pulse doubled. Because of target melting and vaporization, both the intrinsic absorptivity and the plasma enhanced coupled fluence of succeeding pulses is greatly increased. In general, the multiple pulse effect is intensity-dependent and is small at either low or high intensities. Energy deposition was tested for uniformity by measuring the rises in temperature at five locations within the focal spot with an array of thermocouples. GRA

N82-11458# Avco-Everett Research Lab., Mass.

CONCEPTUAL DESIGN OF AN ANGULAR MULTIPLEXED RARE GAS HALIDE LASER FUSION DRIVER Final Technical Report, 1 Aug. 1979 - 31 May 1980

Joel H. Parks Nov. 1980 338 p refs

(Contract DE-AC08-79DP-40113)

(DE81-029900; DOE/DP-40113/1) Avail: NTIS HC A15/MF A01

A conceptual definition for angular multiplexed rare gas halide drivers was formulated and several design examples analyzed. Angular multiplexed rare gas halide lasers can be designed to meet inertial confinement fusion requirements. These lasers are scalable, emit at short wavelengths (KiF 250 nm), and through the use of optical angular multiplexing, produce the required high energy (approx. 1 to 5 MJ) in a short plse (approx. 10 nsec) with projected overall efficiency in the range of 5 to 7%. DOE

N82-11459# McElroy (Ralph) Co., Austin, Tex.

REPORT OF LASER ACTIVITIES: 1978 - 1979

B. Sitt, E. Berthier, E. Buresi, and N. Wilke 1981 11 p refs Transl. into ENGLISH from Comm. de l'Energie Atomique, Villeneuve-St.-Georges, France, Sep. 1980 Prepared for Los

Alamos National Lab., N. Mex.
(Contract W-7405-eng-36)
(DE81-028997; LA-tr-81-22) Avail: NTIS HC A02/MF A01

The Lagrangian model of perturbation was extended to the magnetohydrodynamic case to permit study of the growth of spontaneous magnetic fields. Emphasis was placed on hydrodynamic instabilities on the implosion of targets. DOE

N82-11460# California Univ., Livermore. Lawrence Livermore Lab.
LASERS IN MATERIALS PROCESSING
J. I. Davis and E. B. Rockower 1981 44 p refs Presented at the Conf. on Lasers and Electro-Optics, Washington, D.C., 10-12 Jun. 1981
(Contract W-7405-eng-48)
(DE81-027657; UCRL-85175-Rev-1; CONF-810613-10-Rev-1) Avail: NTIS HC A03/MF A01

A status report on the uranium Laser Isotope Separation (LIS) Program is presented. Process economic analysis is presented so as to understand how the unique properties of laser photons can be best utilized in the production of materials and components despite the high cost of laser energy. The characteristics of potential applications that are necessary for success are identified, and those factors that have up to now frustrated attempts to find commercially viable laser induced chemical and physical process for the production of new or existing materials are pointed out. DOE

N82-11461# Los Alamos Scientific Lab., N. Mex. Applied Theoretical Physics Div.
TWO-DIMENSIONAL THEORY AND SIMULATION OF FREE ELECTRON LASERS
Thomas J. T. Kwan and John R. Cary 1981 9 p refs Presented at the 4th Intern. Topical Conf. on High-Power Electron and Ion-Beam Res. and Technol., Palaiseau, France, 29-30 Jun. 1981
(DE81-025365; LA-UR-81-1936; CONF-7405-eng-36) Avail: NTIS HC A02/MF A01

Two-dimensional homogeneous theory of free-electron lasers with a wiggler magnetic field of constrant wavelength was formulated. It was found that waves propagating obliquely with respect to the electron beam are always unstable with appreciable growth rates; therefore, mode competition among the on-axis and off-six modes is an important consideration in the design of the free-electron laser. Furthermore, electromagnetic waves with group velocities opposite to the direction of electron beam propagation are absoulutely unstable if k sub o, v sub o omega sub pe (1/gammace/2) + 1/gamma (1/2). Due to long nonlinear saturation levels of the low frequency absolute instability, the dynamics of the electron beam, and the generation of the high frequency electromagnetic radiation can be severely affected. Two-dimensional particle simulations show that efficiency of genration of the on-axis high-frequency of the off-axis modes. In addition, complete disruption of the electron beam and laser oscillation due to the onset of the absolute instability were observed in simulations. DOE

N82-11462# Princeton Univ., N. J. Plasma Physics Lab.
MAGNETO-OPTICALLY MODULATED CH3OH LASER FOR FARADAY ROTATION MEASUREMENTS IN TOKAMAKS
D. K. Mansfield and L. C. Johnston Jul. 1981 20 p refs
(Contract DE-AM02-76CH-03073)
(DE81-027298; PPPL-1801) Avail: NTIS HC A02/MF A01

Distortion-free intracavity polarization modulation of an optically pumped CH3OH laser is shown to be viable. The possible use of this modulation technique to make a multichannel Faraday rotation measurement on a Tokamak device is discussed. In addition, the CdTe Faraday modulator employed in this tudy is shown to have an anomalously large Verdet constant. DOE

N82-11463# Sandia Labs., Albuquerque, N. Mex.
STIMULATED RAMAN STUDIES OF CO2-LASER-EXCITED SF6
P. Esherick, A. Jay Grimley, and Adelbert Wyoung 1981 8 p refs Presented at the Intern. Conf. on Laser Spectroscopy, Alberta, Canada, 29 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025829; SAND-81-1589C) Avail: NTIS HC A02/MF A01

The use of Stimulated Raman Spectroscopy (SRS) for high resolution studies of transient species is reported. Specifically, SF6 molecules excited by a CO2 laser are used as a prototypical system for examining these capabilities. Stimulated Raman techniques are used to the desired spectral region with high temporal and spectral resolving power. The preliminary results reported demonstrate the applicability of SRS techniques to studying the dynamics of multi-photon excitation processes in molecular systems. These experiments illustrate the potential capability for obtaining time resolved spectral information with SRS, and may lead the way to eventual Raman probing of molecular photogragments or other transient species. DOE

N82-11294*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TRAVELING-WAVE MASER, CLOSED CYCLE REFRIGERATOR AUTOMATION
J. A. McNeil (Loyola Marymount Univ., Los Angeles) and S. M. Petty *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 99-103 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20E

N82-11297*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN ERROR BUDGET FOR THE JPL HYDROGEN MASER RECEIVER
C. A. Greenhall *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 118-126 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20E

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-11464# South African Bureau of Standards, Pretoria.
STANDARD SPECIFICATION FOR AIR-BRAKE RESERVOIRS
5 Nov. 1980 17 p In ENGLISH and AFRIKAANS
(SABS-1312-1980; ISBN-0-626-05679-9; GR-8) Avail: NTIS HC A02/MF A01

This specification covers the requirements for air-brake reservoirs of the single-compartment or the multi-compartment type, that have in both cases a capacity in the range 5-100 pounds and a maximum working pressure not exceeding 2,000 kPa. These reservoirs are not to be used for applications where the Factories, Machinery and Building Work Act or Mines and Works Act applies. T.M.

N82-11465*# Rocketdyne, Canoga Park, Calif.
ADVANCED SUPERPOSITION METHODS FOR HIGH SPEED TURBOPUMP VIBRATION ANALYSIS Interim Report
C. E. Nielson and A. D. Campany 19 May 1981 96 p refs
(Contract NAS3-22480)
(NASA-CR-165379; RI/RD81-149) Avail: NTIS HC A05/MF A01 CSCL 13I

The small, high pressure Mark 48 liquid hydrogen turbopump was analyzed and dynamically tested to determine the cause of high speed vibration at an operating speed of 92,400 rpm. This approaches the design point operating speed of 95,000 rpm. The initial dynamic analysis in the design stage and subsequent further analysis of the rotor only dynamics failed to predict the vibration characteristics found during testing. An advanced procedure for dynamics analysis was used in this investigation. The procedure involves developing accurate dynamic models of the rotor assembly and casing assembly by finite element analysis. The dynamically instrumented assemblies are independently rap tested to verify the analytical models. The verified models are then combined by modal superposition techniques to develop a completed turbopump model where dynamic characteristics are determined. The results of the dynamic testing and analysis obtained are presented and methods of moving the high speed vibration characteristics to speeds above the operating range are recommended. Recommendations for use of these advanced dynamic analysis procedures during initial design phases are given. Author

N82-11466*# Mechanical Technology, Inc., Latham, N. Y.
PRELIMINARY STUDY OF TEMPERATURE MEASUREMENT TECHNIQUES FOR STIRLING ENGINE RECIPROCATING SEALS Final Report
Donald F. Wilcock, Leo Hoogenboom, Maarten Meinders, and Ward O. Winer Aug. 1981 82 p Prepared in cooperation with Georgia Inst. of Tech.
(Contracts DEN3-227; DE-AI01-77CS-51040)
(NASA-CR-165479; DOE/NASA/0227-1; MTI82-TR-4) Avail: NTIS HC A05/MF A01 CSCL 11A

Methods of determining the contact surface temperature in reciprocating seals are investigated. Direct infrared measurement of surface temperatures of a rod exiting a loaded cap seal or simulated seal are compared with surface thermocouple measurements. Significant cooling of the surface requires several milliseconds so that exit temperatures may be considered representative of internal contact temperatures. S.L.

N82-11467*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
JT8D HIGH PRESSURE COMPRESSOR PERFORMANCE IMPROVEMENT Progress Report, Sep. 1978 - Apr. 1981
W. O. Gaffin 11 Nov. 1981 47 p ref
(Contract NAS3-20630)
(NASA-CR-165531; PWA-5515-162) Avail: NTIS HC A03/MF A01 CSCL 13I

An improved performance high pressure compressor with potential application to all models of the JT8D engine was designed. The concept consisted of a trenched abradable rubstrip which mates with the blade tips for each of the even rotor stages. This feature allows tip clearances to be set so blade tips run at or near the optimum radius relative to the flowpath wall, without the danger of damaging the blades during transients and maneuvers. The improved compressor demonstrated thrust specific fuel consumption and exhaust gas temperature improvements of 1.0 percent and at least 10 C over the takeoff and climb power range at sea level static conditions, compared to a bill-of-material high pressure compressor. Surge margin also improved 4 percentage points over the high power operating range. A thrust specific fuel consumption improvement of 0.7 percent at typical cruise conditions was calculated based on the sea level test results. B.W.

N82-11468*# Rocketdyne, Canoga Park, Calif.
LIQUID OXYGEN TURBOPUMP TECHNOLOGY Final Report
C. E. Nielson Nov. 1981 252 p refs
(Contract NAS3-21356)
(NASA-CR-165487; RI/RD81-199) Avail: NTIS HC A12/MF A01 CSCL 13I

A small, high-pressure, LOX turbopump was designed, fabricated and tested. The pump is a single-stage centrifugal type with power to the pump supplied by a single-stage partial-admission axial-impulse turbine. Design conditions included an operating speed of 7330 rad/s (70,000 rpm), pump discharge pressure of 2977 N/sqcm (4318 psia), and a pump flowrate of 16.4 Kg/s (36.21 lb/s). The turbopump contains a self-compensating axial thrust balance piston to eliminate axial thrust loads on the bearings during steady-state operation. Testing of the turbopump was achieved usng a gaseous hydrogen high-pressure flow to drive the turbine, which generally is propelled by LOX/LH2 combustion products, at 1041K (1874 R) inlet temperature and at a design pressure ratio of 1.424. Test data obtained with the turbopump are presented which include head-flow-efficiency performance, suction performance, balance piston performance and LOX seal performance. Mechanical performance of the turbopump is also discussed. Author

N82-11469*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SCRIBER FOR SILICON WAFERS Patent Application
Kazuo A. Yamakawa (JPL, California Inst. of Technology, Pasadena) and Edward P. Fortier, inventors (to NASA) (JPL, California Inst. of Technology, Pasadena) Filed 18 Sep. 1981 17 p
(Contract NAS7-100)
(NASA-Case-NPO-15539-1; US-Patent-Appl-SN-303670) Avail: NTIS HC A02/MF A01 CSCL 13I

A device for dividing silicon wafers into rectangular chips is characterized by a base including a horizontally oriented bed with a planar support surface, a vacuum chuck adapted to capture a silicon wafer seated on the support for translation in mutually perpendicular directions. A stylus support mounted on the bed includes a shaft disposed above and extended across the bed and a truck mounted on the shaft and supported thereby for linear translation along a path extended across the bed a vertically oriented scribe has a diamond tip supported by the truck also adapted as to engage a silicon wafer captured by the chuck and positioned beneath it in order to form score lines in the surface of the wafer as linear translation is imparted to the truck. A chuck positioning means is mounted on the base and is connected to the chuck for positioning the chuck relative to the stylus. NASA

N82-11470*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CLAMP-MOUNT DEVICE Patent Application
Keith H. Clark, inventor (to NASA) Filed 14 Aug. 1981 10 p
(NASA-Case-MFS-25510-1; US-Patent-Appl-SN-293414) Avail: NTIS HC A02/MF A01 CSCL 13I

Equipment can be mounted to an associated I-beam and the like structural member of the type having oppositely extending flanges using a clamp-mount device which comprises a base and a pair of oppositely facing clamping members carried diagonally on the base clamping flanges. Flanges receiving openings facing one another. Lock means are carried diagonally by the base opposite the clamping members to locking the flanges in the clamping members. A resilient hub is carried centrally of the base engaging and biasing a back side of the flanges maintaining same tightly clamped and facilitating use on vertical as well as horizontal members. The base turns about the hub to receive the flanges within the clamping members. Slidable gate latches secure the hinged locks in an upright locking position. The resilient hub includes a recess opening in the base in which a rubber-like pad is depressably and rotatably carried. NASA

N82-11471# Battelle Columbus Labs., Ohio.
THERMAL AND CHEMICAL EFFECTS IN HIGH PRESSURE ROLLING/SLIDING CONTACTS Final Report
J. W. Brasch, E. J. Druglis, R. J. Jakobsen, T. A. Dow, R. D. Stockwell, and J. W. Kannel 14 Sep. 1981 23 p refs
(Contract N00014-79-C-0241)
(AD-A104473; BATT-G7308-F) Avail: NTIS HC A02/MF A01 CSCL 20/11

In a previous report to the Office of Naval Research, several thermal and thermomechanical aspects of tribology pertinent to rolling/sliding contacts were described in some detail. In this final report, there is presented an account of related work on surface chemical reactions occurring at high pressures. A model lubricant system - lauric acid in dodecane - in contact with a simulated bearing surface - thin films of vacuum-deposited iron - was employed in these studies. Fourier transform infrared spectroscopy was used to detect the formation of species arising from chemical reactions occurring between the acid molecules and the substrate. Details of the experimental technique and its application to the present program are given. Author (GRA)

N82-11472# Naval Research Lab., Washington, D. C.
QUIET BEARING SURFACE CHARACTERIZATION Memorandum Report, 1 Oct. 1980 - 1 Aug. 1981
R. A. Jeffries, H. Ravner, and I. L. Singer 17 Sep. 1981 13 p refs
(AD-A104412; NRL-4625) Avail: NTIS HC A02/MF A01 CSCL 13/9

Surface chemical and topographical features of bearings which passed or failed Anderometer noise testing were correlated with their noise characteristics. No surface chemical differences existed between noisy or quiet bearings. The former did, however, exhibit bands of circular scratches on 'polar' ends of ball surfaces with an equatorially located narrow 'frost' band consisting of small (2-5 micrometers in diameter) pits of the type associated with contact fatigue. Quiet bearings also possessed frost bands which were always wider and sometimes multiple but did not possess the bands of scratches. The ability of the balls in a noisy bearing to roll freely are believed to be hindered; the resulting increase in contact-Hertz loads and sliding frictional forces result in the generation of noise. Interim solutions to the problem are also discussed. Author (GRA)

N82-11473# Kenner (Leo) Associates, Redwood City, Calif.
MAGNETIC BEARINGS
I. Yasuda 1981 10 p Transl. into ENGLISH of Japanese Patent No. 125544-1978 (1 Nov., 1978, Patent Appl. No. 40294-1977) Prepared for LASL, N. Mex.
(Contract W-7405-eng-36)
(DE81-024201; LA-Tr-81-19) Avail: NTIS HC A02/MF A01

The design and operation of a magnetic bearing are described. Noncontacting bearings with concentric cylindrical parts formed on rotating bodies and stationary bodies are discussed. The enhancement of the dampening effect for suppressing vibrations is emphasized. DOE

N82-11474# California Univ., Berkeley. Lawrence Berkeley Lab.
NOVEL DESIGN OF PRESSURE VESSELS AND THERMAL SHIELDS IN COAL GASIFIERS
B. W. Loo Jun. 1981 11 p refs Presented at the Symp. on Instr. and Control for Fossil Energy Processes, San Francisco, 7-10 Jun. 1981
(Contract W-7405-eng-48)
(DE81-025828; LBL-12807) Avail: NTIS HC A02/MF A01

Two outstanding problems in commercial sized coal gasifiers, namely, detecting and locating any deterioration in the refractory thermal barrier and the construction of a safe pressure vessel utilizing advanced carbon fiber composite technology are described. Design considerations are given for a typical gasifier some 30 feet in diameter by 150 feet tall with a maximum internal temperature and pressure of 2500 F and 1500 psi respectively. A system of computer controlled cooling circuits is deployed between the refractory barrier and the external lightweight pressure vessel. Multiple levels of redundancy are built in to guard against any component failure. Through the sensing of coolant temperature and the modulation of coolant flow, a map of heat flux distribution over the gasifier wall may be generated with a spatial resolution of about 5 feet. Results indicate that the coolant temperature rise can be maintained by no more than 90 F with only a modest amount of coolant flow. DOE

N82-11475# Bendix Corp., Kansas City, Mo.
TOOLING FOR ELECTROCHEMICAL DEBURRING
W. M. Moore Aug. 1981 59 p refs
(Contract DE-AC04-76DP-00613)
(DE81-030190; BDX-613-2644) Avail: NTIS HC A04/MF A01

The design and construction of electrochemical deburring tools were analyzed. Specific areas discussed are: tooling limitations, process limitations, characteristics of the electrode, insulation of critical areas, and basic concepts for preventing tooling problems. Forty applicatons on precision miniature mechanism components are discussed. DOE

N82-11476# Oak Ridge Y-12 Plant, Tenn. Fabrication Systems Dept.
DIGITAL CONTROL OF MACHINE TOOLS
R. R. Burleson Aug. 1981 30 p refs
(Contract W-7405-eng-26)
(DE81-029950; Y-2227) Avail: NTIS Hc A03/MF A01

The microcomputer is ideally suited for position-loop calculations and also to replace conventional control equipment. An evolution from the standard numerical-control positioning loop to a system of networked microprocessors is discussed. DOE

N82-11477# Environmental Protection Agency, Ann Arbor, Mich. Standards Development and Support Branch.
AN EVALUATION OF THREE-WAY CONTROL SINGLE AND DUAL BED CATALYSTS AS APPLIED TO HEAVY-DUTY GASOLINE ENGINES
Thomas Nugent Apr. 1981 30 p refs
(PB81-224982; EPA-AA-SDSB-81-4) Avail: NTIS HC A03/MF A01 CSCL 21G

A test program to evaluate the applicability of three-way control (TWC) and dual-bed catalysts (TWC and Oxidation Catalysts) in combination with a closed-loop control stoichiometric (feedback) carburetor on a production 1978 IHC 404 CID heavy duty gasoline engine was conducted. Testing was conducted according to the Federal test procedure for the heavy-duty transient cycle. The test program consisted of forty-six cold-start tests, fifty-eight confimatory hot-start tests run to insure accuracy and precision of the cold-start tests, and fourteen hot-start tests run to identify the effects of air/fuel ratio control points on NOx emissions. The effects of various combinations of catalysts, EGR, air/fuel control points, carburetor response times and air pump capacity on emissions, fuel economy and engine power were examined. GRA

N82-11478# AiResearch Mfg. Co., Torrance, Calif.
BRAYTON/RANKINE 10-TON GAS-FIRED SPACE CONDITIONING SYSTEM, PHASE 2 Annual Report
16 Mar. 1981 103 p refs
(Contracts GRI-5014-341-0114; W-7405-eng-26)
(PB81-223372; GRI-80/0053; ATR-1) Avail: NTIS HC A06/MF A01 CSCL 13I

The heat-actuated space conditioning system provides moe efficient use of natural gas and is intended as an all-gas alternative to the electric heat pump. The system employs a subatmospheric natural-gas-fired heat pump. A centrifugal R-12 refrigerant compressor is driven directly from the Brayton engine rotating group through a hermetically sealed coupling. Unique features that offer high life-cycle performance include a permanent magnet coupling, foil bearings, and atmospheric in-line combustor, and a high-temperature recuperator. Predicted overall engine efficiency is 27 percent and predicted overall coefficient of performane (COP) at the energy source is 1.0 in cooling and 1.2 to 1.4 in heating. GRA

N82-11479# Environmental Protection Agency, Ann Arbor, Mich. Office of Mobile Source Air Pollution Control.
EPA EVALUATION OF THE FUEL-MAX DEVICE UNDER SECTION 511 OF THE MOTOR VEHICLE INFORMATION AND COST SAVINGS ACT
Edward Anthony Barth Jun. 1981 140 p
(PB81-229866; EPA-AA-TEB-511-81-10A; EPA-AA-TEB-511-81-10B) Avail: NTIS HC A07/MF A01 CSCL 13F

The 'FUEL-MAX' device is an air bleed device that replaces the EGR valve. It is claimed to conserve fuel. The purpose of the EGR system is to control oxides of nitrogen (NOx). Removal of the EGR valve to install the 'FUEL-MAX' disables the EGR system and would be expected to result in a large increase in NOx emissions. Test data submitted by the applicant confirmed this prediction as well as indicating that 'FUEL-MAX' might improve fuel economy. Although the data did no adequately quatify the amount of this improvement, EPA chose to conduct confirmatory testing. GRA

N82-11480# Environmental Protection Agency, Ann Arbor, Mich. Test and Evaluation Branch.
EPA EVALUATION OF THE AUTOMOTIVE CYLINDER DEACTIVATOR SYSTEM (ACDS) UNDER SECTION 511 OF THE MOTOR VEHICLE INFORMATION AND COST SAVING ACT
Edward Anthony Barth May 1981 99 p
(PB81-228256; EPA-AA-TEB-511-81-7) Avail: NTIS HC A05/MF A01 CSCL 13F

The conclusions of the evaluation of the automotive cylinder deactivator sytem device under provisions of Section 511 of the Motor Vehicle Information and Cost Savings Act are announced. This device is designed to deactivate engine cylinders as a means of increasing a vehicle's fuel economy. GRA

N82-11301*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REHABILITATION OF 64-METER-ANTENNA RADIAL BEARING
H. McGinness and G. Gale *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 151-161 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 13I

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-11481# Cornell Univ., Ithaca, N. Y. Dept. of Structural Engineering.
EDDY CURRENT FLOWS AROUND CRACKS IN THIN PLATES FOR NONDESTRUCTIVE TESTING Topical Report, Aug. 1980 - Mar. 1981
S. Mukherjee, M. A. Morjaria, and Francis C. Moon 1 Mar. 1981 40 p refs
(Contract N00014-79-C-0224)
(AD-A104407) Avail: NTIS HC A03/MF A01 CSCL 20/3

The boundary element method is used to calculate the induced electric current flow around cracks in thin conducting plates. A low frequency approximation leads to a Poisson equation for the current density potential or stream function. A kernel is used which produces the correct singularity at the crack tip. The boundary condition on the crack, derived from Faraday's law, requires the line integral of the current density around the crack to be zero. Numerical results for induced currents due to a circular induction coil are given. These results show that hot spots, due to Joule heating, can occur at the tips of the crack. Comparison of numerical results with infrared scanning experiments of eddy currents in a cracked plate are given. It is hoped that the numerical method presented here will provide a tool to simulate both new and conventional nondestructive eddy current testing techniques. GRA

N82-11482# Wisconsin Univ. - Madison. Dept. of Statistics.
RECENT ADVANCES IN STATISTICAL METHODS FOR SYSTEM RELIABILITY USING BERNOULLI SAMPLING OF COMPONENTS
Bernard Harris and Andrew P. Soms, (Wisconsin Univ., Milwaukee) Jul. 1981 13 p refs
(Contract N00014-79-C-0321; DAAG29-80-C-0041)
(AD-A104436; TR-643) Avail: NTIS HC A02/MF A01 CSCL 12/1

The paper provides a survey of results in statistical inference in systems reliability using Bernoulli sampling of individual components. Particular attention is given to the notion of Buehler optimally and its implementation in such problems. Recent results of the authors on Buehler optimal confidence bounds on the reliability of series and parallel systems are discussed. For series systems, these results employ a generalization of an inequality of Sudakov. For parallel systems, Buehler optimal bounds are obtained for small numbers of failures using the notion of Schur concavity. Estimates of the optimal bounds are obtained in those cases for which the property of Schur concavity does not hold. Author (GRA)

N82-11483# Stanford Univ., Calif. Dept. of Statistics.
FEASIBLE OBJECTIVE CONFIDENCE BOUNDS FOR SYSTEM RELIABILITY
M. Vernon Johns, Jr. 20 Aug. 1981 50 p refs
(Contract DAAG29-79-C-0166)
(AD-A104260; TR-6; ARO-16668.4-M) Avail: NTIS HC A03/MF A01 CSCL 12/1

The basic problem of determining objective (frequentistic) confidence bounds for the reliability of a series system based on failure data from tests of the independent components is addressed. The notion of confidence bounds based on orderings imposed on the sample space is exploited, and certain optimality considerations are incorporated. Advantage is taken of the simplifications resulting from the use of the Poisson approximation for data from highly reliable components. Tables of exact confidence bounds are produced for the case of two-component systems. GRA

N82-11484# Little (Arthur D.), Inc., Cambridge, Mass.
RESEARCH AND DEVELOPMENT OF METHODS FOR ESTIMATING PHYSICOCHEMICAL PROPERTIES OF ORGANIC COMPOUNDS OF ENVIRONMENTAL CONCERN, PART 1, PHASE 2 Final Report, May 1979 - Jun. 1981
James D. Birkett, ed., Sara E. Bysshe, Cathy E. Campbell, Clark Grain, John H. Hagopian, Judith C. Harris, Michael J. Hayes, Leslie H. Nelken, Carl E. Rechsteiner, Jr. et al Jun. 1981 485 p refs 2 vol.
(Contract DAMD17-78-C-8073; DA Proj. 3E1-62720-A-835)
(AD-A104552; ADL-C-82426-Pt-1) Avail: NTIS HC A21/MF A01 CSCL 07/4

Selected, evaluated estimation methods are presented for 10 environmentally important physiocochemical properties of organic chemicals. The methods selected are applicable to a variety of chemical classes, are easy to use, require a minimum of input data, and are reasonably accurate. Each method has a descriptive text, step-by-step instructions, worked-out examples, and supplementary information allowing the user to estimate the likely uncerinty of an estimated value. Topics covered include octanol/water partition coefficient; solubility in water; solubility in various solvents; adsorption coefficient for soils and sediments; bioconcentration factor in aquatic organisms; acid dissociation constant; rate of hydrolysis; rate of aqueous photolysis; rate of biodegradation; and atmospheric residence time. Since the rates of aqueous photolysis and of biodegradation cannot be estimated, only qualitative or semiquantitative information is provided for these. GRA

N82-11485# Little (Arthur D.), Inc., Cambridge, Mass.
RESEARCH AND DEVELOPMENT OF METHODS FOR ESTIMATING PHYSICOCHEMICAL PROPERTIES OF ORGANIC COMPOUNDS OF ENVIRONMENTAL CONCERN, PART 2, PHASE 2 Final Report, May 1979 - Jun. 1981
Warren J. Lyman, ed., James D. Birkett, Sara E. Bysshe, Cathy E. Campbell, Clark Grain, John H. Hagopian, Judith C. Harris, Michael J. Hayes, Leslie H. Nelken, Carl E. Rechsteiner, Jr. et al Jun. 1981 510 p refs 2 Vol.
(Contract DAMD17-78-C-8073; DA Proj. 3E1-62720-A-835)
(AD-A104553; ADL-C-82426-Pt-2) Avail: NTIS HC A22/MF A01 CSCL 07/4

Instructions are given for estimating: (1) activity coefficient; (2) boiling point; (3) heat of vaporization; (4) vapor pressure; (5) volatilization from water; (6) volatilization from soil; (7) diffusion coefficients in air and water; (8) flash points of pure substances; (9) densities of vapors, liquids and solids; (10) surface tension; (11) interfacial tension with water; (12) liquid viscosity; (13) heat capacity; (14) thermal conductivity; (15) dipole moment; and (16) index of refraction. A bibliography of standard chemical property data sources is appended. Simple linear regression and evaluating propagated and total error in chemical property estimates are discussed. Recommendations for future research and development are included. GRA

N82-11296*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MINIMIZING THE TIME TO TROUBLESHOOT A FAILED SYSTEM
E. J. Subelman (California Univ., Los Angeles) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 113-117 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 14D

N82-11302*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE QUALITY ASSURANCE ROLE IN THE DEEP SPACE NETWORK
R. L. Sirpilla *In its* The Telecomm. and Data Acquisition Rept. 15 Oct. 1981 p 162-168 ref (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 14D

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N82-11486 Royal Aircraft Establishment, Bedford (England).
STRENGTH BEHAVIOUR OF FATIGUE CRACKED LUGS

Ph.D. Thesis
W. Geier Jan. 1981 101 p refs Transl. into ENGLISH of Festigkeitsverhalten von Rissbehafteten Augenstaeben, Munich, 1980
(RAE-Lib-Trans-2057; BR80140) Copyright. Avail: Issuing Activity

The stress intensity is described on the basis of the linear-elastic principles. Examination of various methods for determining the stress intensity shows that the crack propagation method is particularly appropriate for the lug. Due to a lack of suitable tests on cracked lugs, a gradual approach to the lug is made, starting with an infinite plate with a hole and continuing with a finite plate with and without pin loaded holes, since stress intensity solutions are already available in this case. An experimental investigation of the lug not only enables the stress intensity to be determined, but also shows the interrelationship between the essential lug parameters, the crack propagation behavior and the stress distribution in a non-cracked lug. It is possible to evolve a stress intensity solution for cracked lugs in the form of a semi-empirical approach, which takes into account the essential lug parameters. Author

N82-11487 Royal Aircraft Establishment, Bedford (England).
FATIGUE INITIATION AT A HIGH OR LOW NUMBER OF CYCLES
J.-L. Chaboche Nov. 1980 52 p refs Transl. into ENGLISH of "Amorcage en Fatigue a Faible ou Grand Nombre de Cycles" Rept. ONERA-TP-1979-134 ONERA, France
(RAE-Lib-Trans-2056; BR77986; ONERA-TP-1979-134) Copyright. Avail: Issuing Activity

This general framework is based on the thermodynamics of deformable and damageable solids, making possible the introduction of the concept of variable internal macroscopy, part of which is associated with variable damage more specifically related to fatigue problems. The different 'measurements' of this variable of state are discussed under the mechanical engineer's optics of continuous media, and the thermodynamic model makes it possible to justify certain basic hypotheses concerning the nature of the damage, its final value at rupture, its mode of evolution, its irreversibility, its effect on the behaviour of other material characteristics. The most practical aspects are approached by way of observations generally carried out during fatigue tests, namely in the domain of the fatigue limit, the endurance limit or in the domain of fatigue at a low number of cycles. The classical criteria are recalled, making it possible to interpret fatigue limits, the effect of the mean stress, the number of cycles at crack initiation, the accumulation of damage, and phenomenological models are proposed within the scope of isotropic damage. Problems associated with elevated temperatures, which can lead to effects of an interaction between the fatigue damage and flow damage are dealt with more briefly. Author

N82-11488*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN IMPROVED TRANSVERSE SHEAR DEFORMATION THEORY FOR LAMINATED ANTISOTROPIC PLATES
M. V. V. Murthy Nov. 1981 39 p refs
(NASA-TP-1903; L-14533) Avail: NTIS HC A03/MF A01 CSCL 20K

An improved transverse shear deformation theory for laminated anisotropic plates under bending is presented. The theory eliminates the need for an arbitrarily chosen shear correction factor. For a general laminate with coupled bending and stretching, the constitutive equations connecting resultants with average displacements and rotations are derived. Simplified forms of these relations are also obtained for the special case of a symmetric laminate with uncoupled bending. The governing equation for this special case is obtained as a sixth-order equation for the normal displacement requiring prescription of the three physically natural bounday conditions along each edge. For the limiting case of isotropy, the present theory reduces to an improved version of Mindlin's theory. Numerical results are obtained from the present theory for an example of a laminated plate under cylindrical bending. Comparison with results from exact three-dimensional analysis shows that the present theory is more accurate than other theories of equivalent order. Author

N82-11489*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESEARCH IN NONLINEAR STRUCTURAL AND SOLID MECHANICS
Harvey G. McComb, Jr., comp. and Ahmed K. Noor, comp. (Joint Inst. for Advancement of Flight Sciences) Jun. 1981 44 p refs Presented at Symp. held at Washington, D.C., 6-8 Oct. 1980; Sponsored by George Washington Univ., NSF, American Society of Civil Engineers and ASME
(NASA-CP-2147-Suppl; L-13950) Avail: NTIS HC A03/MF A01 CSCL 20K

Recent and projected advances in applied mechanics, numerical analysis, computer hardware and engineering software, and their impact on modeling and solution techniques in nonlinear structural and solid mechanics are discussed. The fields covered are rapidly changing and are strongly impacted by current and projected advances in computer hardware. To foster effective development of the technology perceptions on computing systems and nonlinear analysis software systems are presented. T.M.

N82-11490*# Texas Univ. at Arlington. Center for Aeronautical Research.
MODAL ANALYSIS USING A FOURIER ANALYZER, CURVE-FITTING, AND MODAL TUNING
Roy R. Craig, Jr. and Yung-Tseng Chung 1 Oct. 1981 41 p refs
(Contract NAS8-33980)
(NASA-CR-161886; CAR-81-1) Avail: NTIS HC A03/MF A01 CSCL 20K

The proposed modal test program differs from single-input methods in that preliminary data may be acquired using multiple inputs, and modal tuning procedures may be employed to define closely spaced frquency modes more accurately or to make use of frequency response functions (FRF's) which are based on several input locations. In some respects the proposed modal test proram resembles earlier sine-sweep and sine-dwell testing in that broadband FRF's are acquired using several input locations, and tuning is employed to refine the modal parameter estimates. The major tasks performed in the proposed modal test program are outlined. Data acquisition and FFT processing, curve fitting, and modal tuning phases are described and examples are given to illustrate and evaluate them. J.M.S.

N82-11491*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INTEGRATED ANALYSIS OF ENGINE
Christos C. Chamis 1981 24 p refs Presented at the Ann. Meeting of the ASME, Washington, D.C., 16-21 Nov. 1981
(NASA-TM-82713; E-995) Avail: NTIS HC A02/MF A01 CSCL 20K

The need for light, durable, fuel efficient, cost effective aircraft requires the development of engine structures which are flexible, made from advaced materials (including composites), resist higher temperatures, maintain tighter clearances and have lower maintenance costs. The formal quantification of any or several of these requires integrated computer programs (multi-level and/or interdisciplinary analysis programs interconnected) for engine structural analysis/design. Several integrated analysis computer prorams are under development at Lewis Reseach Center. These programs include: (1) COBSTRAN-Composite Blade Structural Analysis, (2) CODSTRAN-Composite Durability Structural Analysis, (3) CISTRAN-Composite Impact Structural Analysis, (4) STAEBL-StruTailoring of Engine Blades, and (5) ESMOSS-Engine Structures Modeling Software System. Three other related programs, developed under Lewis sponsorship, are described. Author

N82-11492*# JAYCOR, Woburn, Mass.
A REVIEW OF AN ATTEMPT TO CREATE SHATTER CONES WITH MAGNETIC FLYER PLATE TECHNOLOGY Final Report, 28 Nov. 1979 - 28 Nov. 1980
Harold J. Linnerud 8 Apr. 1981 73 p
(Contract NASw-3328)
(NASA-CR-164614; J206-81-005-FR) Avail: NTIS HC A04/MF A01 CSCL 20K

The feasibility of creating shatter cones in a controlled laboratory environment is discussed. Magnetic flyer plate technology, which generates high amplitude shock waves in test materials is discribed. Considerable sample shear and break up was observed, however, no shatter cones are found in the tested samples. E.A.K.

N82-11493*# Howard Univ., Washington, D. C.
STUDY OF FOLDABLE ELASTIC TUBES FOR LARGE SPACE STRUCTURE APPLICATIONS, PHASE 3 Final Report
Irving W. Jones and Steve O. Mitchell Sep. 1981 46 p refs
(Grant NsG-1320)
(NASA-CR-164929) Avail: NTIS HC A03/MF A01 CSCL 20K

A bi-convex foldable elastic tube, suitable for use in self deploying space structures, was subjected to a series of buckling tests to deterine initial buckling loads, collapse loads, and the buckling mode. The tube is cylindrical with a cross-section that is lenticular-like with flared edges. It is capable of being flattened in the center and folded compactly, storing up strain energy in the process. Upon removal of constraint, it springs back to its original straight configuration, releasing the stored strain energy. The tests showed that this type of tube has good resistance to buckling, with the initial buckling loads all falling within or above the range of those for comparable circular cylindrical tubes. M.G.

N82-11494# California Inst. of Tech., Pasadena. Graduate Aeronautical Labs.
DYNAMIC FRACTURE IN VISCOELASTIC SOLIDS Annual Report, 1 Jan. - 31 Aug. 1981
K. S. Kim and Wolfgang G. Knauss 2 Jul. 1981 87 p refs
(Contract N00014-78-C-0634)
(AD-A104687; GALCIT-SM-81-7) Avail: NTIS HC A05/MF A01 CSCL 11/9

Dynamic crack propagation in viscoelastic media is studied experimentally with a polyester known as Homalite 100 and a polyurethane known as Solithane 113 at various temperatures. Employing the optical method of caustics, high speed photography is used to determine the variation of the stress intensity factor and the velocity of a running crack initiated and driven by the dynamic step loading on the faces of an initial semi-infinite track in an infinite medium. The loading condition is simulated experimentally with the technique introduced by Smith and Knauss. In this work an application of the method of caustics is extended for the determination of the time dependent stress intensity factor of a running crack in a viscoelastic material. Also, the viscoelastic effects on the initiation of a running crack, the variation of the stress intensity factor, the speed of the crack and the branching of the running crack are discussed. In addition, a mechanism of branching is proposed based on the study of the fracture surfaces. Author (GRA)

N82-11495# Cornell Univ., Ithaca, N. Y. Dept. of Theoretical and Applied Mechanics.
DETECTION OF VIBRATIONS IN METALLIC STRUCTURES USING SMALL PASSIVE MAGNETIC FIELDS Topical Report, Jan. - Dec. 1980
F. C. Moon and K. Hara 1 Mar. 1981 24 p refs
(Contract N00014-79-C-0224)
(AD-A104405) Avail: NTIS HC A02/MF A01 CSCL 14/2

An experimental method is discussed for detecting vibrations of metal structure using magnetic fields. The theory assumes that the metallic structure acts as an antenna either through some small residual magnetization in ferromagnetic structures or through induced eddy currents. The detector consists of a noncontacting passive inductance coil. GRA

N82-11496# Dayton Univ., Ohio.
ESTIMATING THE STATISTICAL PROPERTIES OF CRACK GROWTH FOR SMALL CRACKS Final Report, Sep. 1979 - Sep. 1980
P. W. Hovey, J. P. Gallagher, and A. P. Berens Wright-Patterson AFB, Ohio AFWAL Mar. 1981 33 p refs
(Contract F33615-78-C-5184; AF Proj. 2418)
(AD-A104672; UDR-TR-80-123; AFWAL-TR-81-4016) Avail: NTIS HC A02/MF A01 CSCL 11/6

A series of statistical studies were conducted on two sets of fatigue crack growth data which were generated under variable amplitude loading from cracks that initiated in 7475-T7351 Aluminum down in the bore of typical aircraft quality prepared holes. The study considered fatigue crack growth (life) behavior and fatigue crack growth rate behavior. Generally, the study showed that small crack growth behavior was similar to that observed for larger cracks and that a stress intensity factor parameter could be used to describe the mean trend of the fatigue crack growth rate behavior via a power law relationship. Author (GRA)

N82-11497# Georgia Inst. of Tech., Atlanta. School of Chemical Engineering.
ELECTROCHEMICAL CONDITIONS WITHIN STRESS CORROSION CRACKS (EXPERIMENTAL TECHNIQUES) Final Report, 1 Apr. 1980 - 30 Jun. 1981
Miroslav Marek Sep. 1981 48 p refs
(Contract DAAG29-80-C-0098)
(AD-A104246; ARO-17082.1-MS) Avail: NTIS HC A03/MF A01 CSCL 20/11

The objective of this investigation was to determine the electrochemical conditions in propagating stress corrosion cracks. In the first phase of the project, which is the subject of this report, the aim was to develop improved techniques of the measurement of the solution chemistry and potential within the cracks. While many techniques were explored only the most promising ones were selected for actual analyses of conditions within cracks. Author (GRA)

N82-11498# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
STRUCTURAL ANALYSIS COMPUTER PROGRAMS FOR RIGID MULTICOMPONENT PAVEMENT STRUCTURES WITH DISCONTINUITIES, WESLIQID AND WESLAYER. REPORT 1: PROGRAM DEVELOPMENT AND NUMERICAL PRESENTATIONS Technical Report, 1 Oct. 1978 - 30 Sep. 1979
Yu T. Chou May 1981 150 p refs
(DA Proj. 4A7-62719-AT-40)
(AD-A104545; WES/TR/GL-81-6-1) Avail: NTIS HC A07/MF A01 CSCL 13/13

This study was conducted to develop finite element computer programs to calculate stresses and deflections in rigid pavements with cracks and joints subjected to loads and temperature warping, as well as in the supporting subgrade soil. The joints are connected by dowel bars or other load transfer devices. The slabs can have full or partial loss of subgrade support over designed regions of the slabs. Multiple-wheel loads can be handled and the number of wheels is not limited. Two programs were developed, one called WESLIQID and the other WESLAYER. The former is for pavements on liquid foundations and the latter is for linear layered elastic solids. Variable slab thicknesses and moduli of subgrade reaction are incorporated in the WESLIQID program, and any number of slabs arrayed in an arbitrary pattern can be handled. Because of larger computer storage requirement and computational complexity, the WESLAYER program is limited to two slabs. GRA

N82-11499# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
STRUCTURAL ANALYSIS COMPUTER PROGRAMS FOR RIGID MULTICOMPONENT PAVEMENT STRUCTURES WITH DISCONTINUITIES, WESLIQID AND WESLAYER. REPORT 2: MANUAL FOR THE WESLIQID FINITE ELEMENT PROGRAM
Yu T. Chou May 1981 144 p
(DA Proj. 4A7-62719-AT-40)
(AD-A104546; WES/TR/GL-81-6-2) Avail: NTIS HC A07/MF A01 CSCL 13/13

This study was conducted to develop finite element computer programs to calculate stresses and deflection in rigid pavements with cracks and joints subjected to loads and temperature warping, as well as in the supporting subgrade soil. This report is presented as a user's manual for the WESLIQID program, which deals with pavements on a liquid foundation. The program allows for analysis of pavements with full or partial loss of subgrade support over designated regions of the pavements. Variable slab thickness amd modulus of subgrade reaction k are incorporated and any number of slabs arranged in an arbitrary pattern can be handled. Also, mulitple-wheel loads can be used, and the number of wheels is not limited. The nature of the computer program and its programming logic are first delineated, followed by a general discussion on the efficient and correct usage of the programs, e.g., the efficient way of arranging nodal numbers to minimize the bandwidth. The input guide to the compter program is presented with a detailed explanation for each input variable. Five example problems with input data are presented and the computer printouts of three problems are included with detailed explanations. GRA

N82-11500# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.

STRUCTURAL ANALYSIS COMPUTER PROGRAMS FOR RIGID MULTICOMPONENT PAVEMENT STRUCTURES WITH DISCONTINUITIES, WESLIQID AND WESLAYER. REPORT 3: MANUAL FOR THE WESLAYER FINITE ELEMENT PROGRAM

Yu. T. Chou May 1981 66 p refs
(DA Proj. 4A7-62719-AT-40)
(AD-A104547; WES/Tr/GL-81-6-3) Avail: NTIS HC A04/MF A01 CSCL 13/13

This study was conducted to develop finite element computer programs to calculate stresses and deflections in rigid multicomponent pavements with cracks and joints, as well as in the supporting subgrade soil, subjected to loads and temperature warping. This report is presented as a user's manual for the WESLAYER program, which deals with pavements on layered elastic solids. The pavement can have full or partial loss of subgrade support over designated regions of the pavements. Multiple-wheel loads can be used in the computation and the number of wheels is not limited. Because of large storage space needed and long computer time required to obtain solutions, the program is limited to only a two-slab system. The nature of the computer program and its program logic are first delineated, followed by a general discussion on the efficient and correct use of the program. An input guide to the computer program is presented with a detailed explanation for each input variable. Example problems with input data and output printouts are presented. GRA

N82-11501# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Energy Systems Div.

LIGHTWEIGHT CONCRETE MATERIALS AND STRUCTURAL SYSTEMS FOR WATER TANKS FOR THERMAL STORAGE Final Report

R. W. Buckman, Jr., G. G. Elia, and Y. Ichikawa Dec. 1980 98 p refs
(Contracts DE-AC02-78CS-34703; EM-78-C-02-4703)
(COO-4703-26) Avail: NTIS HC A05/MF A01

Thermally efficient hot water storage tanks were designed, fabricated and evaluated. The tanks were made using cellular concrete at a nominal density of 100 lb/cu ft for the structural elements and at a 30 lb/cu ft density for the insulating elements. Thermal performance testing of the tanks was done using a static decay test. A series of composition modifications to the cellular concrete mix were investigated and the addition of alkaline resistant glass fibers was found to enhance the mechanical properties at no sacrifice in thermal behavior. Economic analysis indicated that cellular concrete provides a cost effective insulating material. The total portability of the plant for producing cellular concrete makes cellular concrete amenable to on-site fabrication and uniquely adaptable to retrofit applications. DOE

N82-11502# General Electric Co., Schenectady, N. Y. Corporate Research and Development Dept.

ENGINEERING APPROACH FOR ELASTIC-PLASTIC FRACTURE ANALYSIS

V. Kumar, M. D. German, and C. F. Shih Jul. 1981 226 p refs Sponsored by EPRI
(EPRI Proj. 1237-1)
(DE81-904218; EPRI-NP-1931) Avail: NTIS HC A11/MF A01

Formulas, charts, and background material that allow calculation of safety margins in ductile structures containing flaws are presented. The analysis procedures already available for brittle elastic materials to the tough and ductile steels used in the construction of pressure boundary components are presented. The elastic plastic methods describe the behavior of ductile materials. DOE

N82-11503# Los Alamos Scientific Lab., N. Mex.

FINITE ELEMENT ANALYSIS OF THE SPLIT HOPKINSON BAR

Mathew J. Kramer (Rochester Univ., N.Y.) Jul. 1981 30 p refs
(Contract W-7405-eng-36)
(DE81-030387; LA-8921-MS) Avail: NTIS HC A03/MF A01

The finite element method, its ability to analyze the split Hopkinson bar apparatus used in studying the dynamic properties of materials was investigated. An explicit isoparametric finite element computer code, HONDO, was investigated for its accuracy in solving stress wave propagation problems in cylindrical bars in one and two dimensions. HONDO was checked against a two dimensional finite difference wave code, TOODY, for solution accuracy and computational time in analyzing the split Hopkinson bar. It is concluded that HONDO is capable of using fewer mesh points than TOODY, and HONDO requires less storage. DOE

N82-11504# California Univ., Livermore. Lawrence Livermore Lab.

DYNAMIC MEASUREMENT OF POISSON'S RATIO IN GRANULAR MATERIALS AT 0.2 TO 0.8 GPa

C. W. Olsen Jul. 1981 20 p refs
(Contract W-7405-eng-48)
(DE81-027559; UCRL-85539) Avail: NTIS HC A02/MF A01

A technique for mesurement of Poisson's ratio for shock-loaded, granular material was developed. All tests were conducted in a 63.5 mm diameter gas-gun. A fixed knife-edge of three thicknesses of 0.3 mm stainless steel was instrumented with carbon stress gauges and Constantan strain gauges. A 0.13 mm stainless steel cover provided gauge protection. The knife-edge was mounted in the target material, dry sand, so as to measure the transverse pressure. By knowing the impact pressure and the orthogonal pressure, Poisson's ratio could be determined. Since the gauges were being loaded edge-on, they had to be kept small in the directon of shock propagation. Additonally, the effects of strain were measured with the Constantan gauges and subtraced. In the sand (1.70 Mg/cu m, approximately 37 vol % porosity) the apparent Poisson's ration increases with impact stress, going from approximately 0.20 at 0.2 GPa to approximately 0.34 at 0.73 GPa. DOE

N82-11505# California Univ., Livermore. Lawrence Livermore Lab.

ON-LINE FAILURE DETECTION OF VIBRATING STRUCTURES

S. G. Azevedo, J. V. Candy, and D. L. Lager 27 May 1981 26 p refs Presented at the ASME Conf. on Mech. Vibration and Noise, Hartford, 20-23 Sep. 1971
(Contract W-7405-eng-48)
(UCRL-86099; CONF-810918-1) Avail: NTIS HC A03/MF A01

Nondestructive evaluation of vibrating structures for failure detection is addressed. Recent advances in signal processing and analysis of vibrating structures are applied to this problem with promising results. The techniques used are recursive on-line algorithms which include stochastic models for noise sources. An experiment was designed to investigate the feasibility of signal processing procedures for failure detection. A given structure was excited and its shock response measured using an accelerometer. The response data was digitized and processed. This failure detection problem was approached from the stochastic estimation theory viewpoint. A nonlinear identification algorithm (using an extended Kalman filter) is utilized for estimating modal parameters from vibration data. The estimator is followed by a decision device to detect structural failures or anomalies. The results indicate reasonable performance of these techniques for model characterization and failure detection. Examples and graphical illustrations are presented. DOE

N82-11506# Sandia Labs., Albuquerque, N. Mex.

ANALYSES OF DUCTILE FLOW AND FRACTURE IN TWO DIMENSIONS

M. E. Kipp and Lee Davison 1981 8 p refs Presented at the Shock Compression of Solids Conf., Stanford, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)

(DE81-023651; SAND-81-0070C; CONF-8106125-1) Avail: NTIS HC A02/MF A01

Viscoplastic flow and spall fracture by ductile void growth is discussed. The method was extended to configuration of dimensional plane strain and axisymmetric deformation. Current work includes reduction of the general theory to a form applicable to these cases, and incorporation of the resulting equations into a Lagrangian finite difference code suitable for analyzing nonlinear wave propagation. Results of applying this code to study of symmetric axial impact of aluminum bars are presented. DOE

N82-11507# Rockwell International Corp., Canoga Park, Calif. Atomics International Div.

VIBRATION SIGNATURE ANALYSIS AND ACOUSTIC-EMISSION MONITORING AT BRAYTON POINT Final Report

P. J. Pekrul and S. Pennise Jul. 1981 268 p Sponsored by Electric Power Research Inst.

(EPRI Proj. 734-1)

(DE81-904232; EPRI-CS-1938) Avail: NTIS HC A12/MF A01

On-line monitoring techniques of vibration signature analysis and acoustic emission detection are discussed in light of a two-year monitoring program at the Brayton Point plant of New England Power Service Company. Included in the study are discussion relating to sensor selection and location, spectrum analysis techniques, computation equipment, and display devices. Specific plant equipment failures occurred during the monitoring period, and the appropriate vibration and acoustic emission data are analyzed to assess any deviations prior to failure. Vibration signature analysis is seen to be a well-developed technique which can be successfully implemented into a preventative maintenance system for fossil plants. Before being able to detect changes in vibration spectra due to malfunction, however, it is stressed that a full understanding of the effect of normal variations in plant parameters (load, speed, etc.) should be achieved. This implies a statistical base of information and derived correlation equations. Acoustic emissions may have application for detection of material failure, such as shaft cracking, and for detection of tube leaks from heat exchangers. These tests, however, were inconclusive and suggest that considerable characterization data are required before acoustic emissions can be successfully implemented as a diagnostic technique. DOE

N82-11508# National Physical Research Lab., Pretoria (South Africa).

FORMULAE FOR THE HOMOGENEOUS ISOTROPIC PERFECTLY LINEAR ELASTIC CONTINUUM

H. G. Denkhaus Jul. 1980 83 p refs

(PB81-222846; CSIR-ME-1665; ISBN-0-7988-169-1) Avail: NTIS HC A05/MF A01 CSCL 20K

A collection of formulae which provide a reference manual of the basic equations of the classical theory of elasticity was compiled. General and special cases of Hooke's law and the basic equations for plane stress and plane strain are included. GRA

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N82-11509 Washington Univ., Seattle.

IDENTIFICATION OF LITHOLOGIC UNITS USING MULTI-CHANNEL IMAGING SYSTEMS Ph.D. Thesis

Diane Louise Evans 1981 129 p

Avail: Univ. Microfilms Order No. 8121194

It is shown that is possible to compare laboratory reflectance spectra directly with multispectral images. The signal that would be produced if a particular laboratory sample were in a detector's field of view was calculated and converted into a digital number of DN value. Stacks of spatially registered multispectral images were then searched for materials that had spectral characteristics similar to the laboratory samples. When laboratory reflectance spectra of a suite of Hawaiian samples were compared to Viking Lander images of Mars, a weathered basaltic tephra from a Hawaiian cinder cone was found to have spectral characteristics that were similar in all bandpasses to surficial deposit at the Viking 1 site. When the reflectance spectra of the suite of samples were compared to Viking Orbiter images, the same Hawaiian tephra was found to correspons to a regional spectral unit in the low latitudes of Mars. It was also possible to compare laboratory reflectance spectra to Landsat images of the Earth. Comparison of laboratory reflectance spectra with multispectral images make it possible to derive compositional information from the images. Dissert. Abstr.

N82-11510*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.

A MODEL DESCRIBING THE MICROWAVE EMISSION FROM A MULTI-LAYER SNOWPACK AT 37 GHZ

M. Abdelrazik, F. Ulaby, and H. Stiles Feb. 1981 136 p refs

(Grant NsG-5335)

(NASA-CR-166708; RSL-TR-410-2) Avail: NTIS HC A07/MF A01 CSCL 08L

A multilayer emission model is described and applied to emission measurements obtained at 37 GHz and H polarization using a microwave radiometer attached to a truck-mounted boom in Steamboat Springs, Colorado in 1977. Estimated absorption and scattering coefficients and their dependence on wetness were obtained using calculated values of the dielectric constant at 37 GHz along with the model. It was found that the scattering coefficient is comparable in value to the absorption coefficient for dry snow however, the absorption coefficient increases linearly with increasing snow wetness while the scattering coefficient decreases linearly with increasing wetness. The emission from each layer of the snowpack was also calculated using the estimated coefficients. It is shown that for dry snow, the ground underneath the snowpack contributes about 45% of all measured emission while the rest is due to emission from all the layers within the snowpack. When the wetness of the top 5 cm layer of snowpack increases to about 2% by volume, this top 5 cm snowlayer contributes more than 90% of all the measured emission. A.R.H.

N82-11511*# Ball Aerospace Systems Div., Boulder, Colo.

DEVELOPMENT OF THE COASTAL ZONE COLOR SCANNER FOR NIMBUS 7. VOLUME 1: MISSION OBJECTIVES AND INSTRUMENT DESCRIPTION Final Report

May 1979 76 p refs

(Contract NAS5-20900)

(NASA-CR-166720-Vol-1; F78-11-Rev-A) Avail: NTIS HC A05/MF A01 CSCL 14B

An Earth scanning six channel (detector) radiometer using a classical Cassegrain telescope and a Wadsworth type grating spectrometer was launched aboard Nimbus 7 in order to determine the abundance or density of chlorophyll at or near the sea surface in coastal waters. The instrument also measures the sediment or gelbstroffe (yellow stuff) in coastal waters, detects surface vegetation, and measures sea surface temperature. Block diagrams and schematics are presented, design features are discussed and each subsystem of the instrument is described. A mission overview is included. A.R.H.

N82-11512*# Research and Data Systems, Inc., Lanham, Md.

SMMR DATA SET DEVELOPMENT FOR GARP

John Kogut May 1981 60 p

(Contract NAS5-25781)

(NASA-CR-166721) Avail: NTIS HC A04/MF A01 CSCL 05B

The NIMBUS 7 Scanning Multichannel Microwave Radiometer (SMMR) data are analyzed. The impact of cross polarization and Faraday rotation on SMMR derived brightness temperatures is evaluated. The algorithms used to retrieve the geophysical parameters are tested, refined, and compared with values derived by other techniques. The technical approach taken is described and the results presented. S.L.

N82-11513*# Environmental Research and Technology, Inc., Concord, Mass.
AN EVALUATION OF THE SPATIAL RESOLUTION OF SOIL MOISTURE INFORMATION Final Report
Kenneth R. Hardy, Stephen H. Cohen, Linda Koshio Rogers, Hsiao-hua K. Burke, Robert C. Leupold, and Michael D. Smallwood Mar. 1981 83 p refs
(Contract NAS5-25527)
(NASA-CR-166724; ERT-P-7505-F) Avail: NTIS HC A05/MF A01 CSCL 08M

Rainfall-amount patterns in the central regions of the U.S. were assessed. The spatial scales of surface features and their corresponding microwave responses in the mid western U.S. were investigated. The usefulness for U.S. government agencies of soil moisture information at scales of 10 km and 1 km. was ascertained. From an investigation of 494 storms, it was found that the rainfall resulting from the passage of most types of storms produces patterns which can be resolved on a 10 km scale. The land features causing the greatest problem in the sensing of soil moisture over large agricultural areas with a radiometer are bodies of water. Over the mid-western portions of the U.S., water occupies less than 2% of the total area, the consequently, the water bodies will not have a significant impact on the mapping of soil moisture. Over most of the areas, measurements at a 10-km resolution would adequately define the distribution of soil moisture. Crop yield models and hydrological models would give improved results if soil moisture information at scales of 10 km was available. A.R.H.

N82-11514*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RADAR MAPPING, ARCHAEOLOGY, AND ANCIENT LAND USE IN THE MAYA LOWLANDS
R. E. W. Adams (Cambridge Univ.), W. E. Brown, Jr., and T. Patrick Culbert (Arizona Univ.) 31 Mar. 1981 27 p refs
(Contract NAS7-100)
(NASA-CR-164931) Avail: NTIS HC A03/MF A01 CSCL 08B

Data from the use of synthetic aperture radar in aerial survey of the southern Maya lowlands suggest the presence of very large areas drained by ancient canals for the purpose of intensive cultivation. Preliminary ground checks in several very limited areas confirm the existence of canals and raised fields. Excavations and ground surveys by several scholars provide valuable comparative information. Taken together, the new data suggest that Late Classic period Maya civilization was firmly grounded in large-scale and intensive cultivation of swampy zones. A.R.H.

N82-11515*# OAO Corp., Hampton, Va.
TECHNOLOGY TRANSFER OF NASA MICROWAVE REMOTE SENSING SYSTEM Final Report
N. D. Akey Oct. 1981 38 p refs
(Contract NAS1-16380)
(NASA-CR-165791) Avail: NTIS HC A03/MF A01 CSCL 14B

Viable techniques for effecting the transfer from NASA to a user agency of state-of-the-art airborne microwave remote sensing technology for oceanographic applications were studied. A detailed analysis of potential users, their needs and priorities; platform options; airborne microwave instrument candidates; ancillary instrumentation; and other, less obvious factors that must be considered were studied. Conclusions and recommendations for the development of an orderly and effective technology transfer of an airborne microwave system that could meet the specific needs of the selected user agencies are reported. R.J.F.

N82-11516*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GEOLOGIC CONSIDERATIONS IN UNDERGROUND COAL MINING SYSTEM DESIGN
Frank A. Camilli, David P. Maynard, Arnis Mangolds, and Jack Harris 1 Oct. 1981 52 p refs
(Contracts NAS7-100; DE-AI01-76ET-12548)
(NASA-CR-164981; JPL-Pub-81-74; DOE/ET-12548/9) Avail: NTIS HC A04/MF A01 CSCL 08I

Geologic characteristics of coal resources which may impact new extraction technologies are identified and described to aid system designers and planners in their task of designing advanced coal extraction systems for the central Appalachian region. These geologic conditions are then organized into a matrix identified as the baseline mine concept. A sample region, eastern Kentucy is analyzed using both the developed baseline mine concept and the traditional geologic investigative approach. A.R.H.

N82-11517# Anacapa Sciences, Inc., Santa Barbara, Calif. Military Programs Dept.
CONCEPTUAL DESIGN OF A COMPUTER-GENERATED TOPOGRAPHIC DISPLAY SYSTEM TO AID MISSION PLANNING AND MISSION CONDUCT BY ARMY AVIATORS Final Technical Report, Mar. 1980 - Jun. 1981
Steven P. Rogers Jun. 1981 136 p refs
(Contract DAHC-78-C-0012)
(AD-A104388; Rept-365-81; USAAVRADCOM-TR-78-0012-F) Avail: NTIS HC A07/MF A01 CSCL 15/7

This report describes the requirements for a computer-generated topographic display for use by Army aviators during performance of mission-planning and in-flight tasks, and presents a conceptual design for a system. Section I of the report describes the background leading up to the conduct of the project, the project objective, the project approach, and the organization of the report. Section II of the report provides a background in the missions, organization, and procedures of Army aviation units for readers not thoroughly familiar with these topics. Much of the information in this section is based on data from in-depth interviews with aviators of the 101st Airborne Division. Section III of the report describes the configuration and operation of the recommended computer-generated topographic display system. The general philosophy guiding the conceptual design is discussed, followed by a description of the system components and their functions. Extensive descriptions of the interactive, multi-function, control-display units are provided, accompanied by summaries of the aviator requirements, present deficiencies, and computer capabilities that led to the incorporation of the various special features of the system. Author (GRA)

N82-11518# Argonne National Lab., Ill. Energy and Environmental Systems Div.
PETROLEUM GEOLOGY AND RESOURCE ASSESSMENT OF THE MIDDLE CASPIAN BASIN, USSR, WITH SPECIAL EMPHASIS ON THE UZEN FIELD
G. Ulmishek and W. Harrison May 1981 157 p refs
(Contract W-31-109-eng-38)
(DE81-029951; ANL/ES-116) Avail: NTIS HC A08/MF A01

The Middle Caspian Basin contains up to 12,000 m (40,000 ft) of sedimentary rocks ranging in age from late Paleozoic to Quaternary and has over 100 oil and gas fields varying in size from small to supergiant. The Soviet literature reviewed covers: (1) tectonic zones of the basin, including details of the lower, intermediate, and upper structural complexes; (2) paleogeography, facies distribution, and conditions of organic matter accumulation in the major petroleum source rocks; (3) stages of oil and gas generation; (4) major hydrogeological features; and (5) producing regions of the basin. Total initial petroleum resources of the basin are estimated at 22.5 x 10(9) t (166 x 10(9) bbl), of which 16.00 x 10(9) t (118 x 10 (9) bbl) are yet to be discovered. Resources of the Offshore Caspian Sea area are estimated to be 12.1, 10(9) t (89.5 x 10(8) bbl). DOE

N82-11519# Rhode Island Univ., Kingston.
PLANNING A COMPREHENSIVE PROGRAM FOR EXPLORATION OF THE ANTHRACITE DEPOSITS OF THE NARRAGANSETT BASIN OF MASSACHUSETTS AND RHODE ISLAND, PHASE 1 AND 2 Final Report
J. W. Skehan Feb. 1981 131 p refs
(Contract DE-AC01-79RA-2036)
(DE81-028490; DOE/FE-20036/1) Avail: NTIS HC A07/MF A01

Coal deposits occur in a sporadic fashion throughout the Basin with little continuity as to the type of deposit and the quality of coal thus making it difficult, perhaps very expensive and risky, to base a drilling program soley on stepping out from known outcrops and coal occurrences. The combination of understanding the original depositional environment, its subsequent deformation to stepping out from known coal occurrences, is believed to be the most efficient basis for developing a comprehensive drilling program plan for the Basin. This limited exploration program produced resource estimates of 11.35 million tons of anthracite material in the eastern and 4.73 in the western part of Portsmouth, Rhode islands, area and 4.2 million tons in Plainville, Machusetts. These estimates are based on USGS recommended methods for resource determination. The cost of finding this material, based on the cost of the contracts, comes out to be approximately 1.5 cents per ton. DOE

N82-11520# Royal Norwegian Council for Scientific and Industrial Research, Oslo.

PLAN FOR TECHNOLOGICAL RESEARCH AND DEVELOPMENT RELATED TO THE PETROLEUM ACTIVITIES ON THE NORWEGIAN CONTINENTAL SHELF, 1981-1985: APPENDIXES: 1. TECHNICAL CHALLENGES. 2. RESEARCH REQUIREMENTS. 3. HIGH PRIORITY PROGRAMS

10 May 1980 171 p
(DE81-904014; NP-1904014) Avail: NTIS HC A08/MF A01

The environmental and geographical conditions on the Norwegian Continental Shelf (NCS) which may effect field exploration and development philosophy or the choice of technological solutions are identified. Research requirements are described in the areas of physical environment; petroleum exploration; petroleum technology; production technology; sub-sea production systems; platforms and supporting equipment; storage and offshore loading; pipelines; underwater support functons; above-water support functions; automation in offshore production and transportation; communications and positioning; materials and corrosion protection; quality assurance; and regulations. High priority programs were defined based on the general objectives of the national petroleum policy, resource management, safety, industrial development, and cost reduction. DOE

N82-11521# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

RAFT RIVER GEOTHERMAL PROJECT GROUNDWATER MONITORING PROGRAM Progress Report

Piotr Skiba, Dennis Goldman, Susan Spencer, and Laurence Hull
Jul. 1981 42 p
(Contract DE-AC07-76ID-01570)
(DE81-030202; EGG-2119) Avail: NTIS HC A03/MF A01

The Raft River 5 MWe geothermal power plant requires 150 L/s of geothermal fluid at 1400 C, with an estimated 130 L/s being discharged to intermediate depth injection wells during normal plant operation. A monitoring program was established to investigate the effects of geothermal fluid disposal on shallow irrigation wells at Raft River. This data collected from seven monitor wells during 1980 (including the first quarter of FY 1981) are summarized and the potential effects on shallow aquifers of the production and injection of geothermal fluids are discussed. DOE

N82-11522# Science Applications, Inc., McLean, Va.

IDENTIFICATION OF GEOPRESSURED OCCURRENCES OUTSIDE OF THE GULF COAST

Oscar Strongin 1981 6 p refs Presented at IECEC Conf., Atlanta, 9 Aug. 1981
(Contract DE-AC08-80NV-10133)
(DE81-025511; CONF-810812-28) Avail: NTIS HC A02/MF A01

Methane dissolved in saline formation waters under abnormally high pressure (geopressure) is one of several unconventional gas sources that is under intensive investigation by the Department of Energy. The most well known and studied region of geopressure in the US is the Gulf Coast geosyncline. Recent studies, however, indicate that the phenomenon is displayed in many other sedimentary basins encompassing lithologies and sedimentary environments unlike those of the Gulf Coast. These include various Rocky Mountain and Mid-Continent basins, onshore and offshore Californian, Alaskan and Pacific Coast basins, and other isolated occurrences. Of this group, two prime target areas, based on the indicated methane content of geopressured formation waters, would include the Cambrian sands of the Rome trough in West Virginia and selected Miocene sediments along the west side of the San Joaquin Valley in California. DOE

N82-11523# Boston Coll., Weston, Mass. Dept. of Geology and Geophysics.

EXPLORATION OF COAL AND ANTHRACITIC CARBONACEOUS SHALE RESOURCES, NARRAGANSETT BASIN, MASSACHUSETTS, AND RHODE ISLAND Final Report, 1 Oct. 1979 - 30 Arp. 1981

James W. Skehan, Greta E. Gill, Jonathan D. Raben, Norman Schapiro, and Daniel P. Murray May 1981 86 p refs
(Contract DE-AC01-79RA-20029)
(DE81-030895; DOE/RA-20029/T1) Avail: NTIS HC A05/MF A01

Results of continuous core drilling primarily in two contiquous fields to evaluate the carbonaceous resource are presented. Geological and analytical results, resource calculations, and evaluations of potential mining methods and conditions are included. Results of fieldwork and drilling in the Portsmouth, Rhode Island area defined the coal-bearing structure as being a southerly plunging fold, with the western limb and the eastern holes penetrating the axial portion of the fold. In the Plainville, Massachusetts area, an E-W trending anticline was defined by fieldwork and exploratory drilling. The anthracitic carbonaceous shale seam folded by this structure varies in thickness and ash content along strike. T.M.

N82-11524# Water Resources Council, Washington, D.C.

GREAT PLAINS GASIFICATION PROJECT, MERCER COUNTY, NORTH DAKOTA; WATER ASSESSMENT REPORT SECTION 13(C)

Dec. 1980 46 p refs Prepared in cooperation with Missouri River Basin Study Group
(PB81-216111) Avail: NTIS HC A03/MF A01 CSCL 08H

The features and location of a project to produce synthetic fuels from a coal gasification plant are described as well as the design of the plant and the support activities, such as mining and reclamation. The availability of the water supply is discussed including competing uses and water rights. The impacts of plant operations on water quantity and quality are assessed for the Missouri and Knife Rivers and for ground water levels. Changes to wetlands are also considered. GRA

N82-11525# Water Resources Council, Washington, D.C.

GREAT PLAINS GASIFICATION PROJECT, MERCER COUNTY, NORTH DAKOTA; WATER ASSESSMENT REPORT

4 Aug. 1980 14 p refs Prepared in cooperation with Missouri River Basin Study Group
(PB81-216129) Avail: NTIS HC A02/MF A01 CSCL 08H

A water assessment of synfuels development in the Upper Missouri River Basin was conducted. Findings assessment show that water supplies are physically available within the mainstream of the Missouri River in North Dakota to supply the requirements of the gasifiction facilities and the supporting activities -- mining and reclamation, electricity, and project-induced population increases. GRA

N82-11526# Geological Survey, Louisville, Ky. Water Resources Div.

WATER RESOURCES DATA FOR KENTUCKY, WATER YEAR 1980

Apr. 1981 819 p refs
(PB81-223612; USGS/WRD/HD-80/044; USGS-WRD-KY-80-1) Avail: NTIS HC A99/MF A01 CSCL 08H

This report contains discharge records from 116 gaging stations; stage and contents for 15 lakes; suspended-sediment data for 43 stations (28 daily); daily temperature records for 35 stations; daily specific conductance for 24 stations; ground-water level for 74 recording, 85 partial; waterquality data from 232 coal hydrology sites (28 partial, 204 miscellaneous) 3 springs and 311 wells; and miscellaneous temperature and specific conductance from the 116 gaging stations. Data for 123 partial-record crest-stage and 102 partial-record low-flow sites are included as well as those data collected at various miscellaneous sites. GRA

N82-11527# Geological Survey, Lansing, Mich. Water Resources Div.
WATER RESOURCES DATA FOR MICHIGAN, WATER YEAR 1980 Annual Water-Data Report, 1 Oct. 1979 - 30 Sep. 1980
Apr. 1981 632 p refs
(PB81-224180; USGS/WRD/HD-80/037;
USGS-WRD-MI-80-1) Avail: NTIS HC A99/MF A01 CSCL 08H

Water resources data for the 1980 water year for Michigan consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels, water quality, and water temperature of ground-water wells. Data presented include discharge records for 180 gaging stations; stage only records for 4 gaging stations; stage and contents for 5 lakes and reservoirs; water quality for 62 continuous-record stations; and water levels for 52 observation wells. Information from 87 crest-stage partial-record stations and 62 low-flow partial-record stations is included. GRA

N82-11528# Geological Survey, Columbus, Ohio. Water Resources Div.
WATER RESOURCES DATA FOR OHIO, WATER YEAR 1980. VOLUME 2: ST. LAWRENCE RIVER BASIN Annual Water-Data Report, 1 Oct. 1979 - 30 Sep. 1980
Apr. 1981 268 p refs
(PB81-217077; USGS-WRD-OH-80-2;
USGS/WRD/HD-81/038) Avail: NTIS HC A12/MF A01 CSCL 08H

Records are presented for water discharge at 169 gaging stations; stage and contents at 39 lakes and reservoirs; water quality at 57 gaging stations and 83 wells; and water levels at 183 observation wells. Data are included from 84 crest-stage partial-record stations; 91 low-flow partial-record stations, and 537 coal hydrology synoptic sites. Additional water data collected at various sites not involved in the systematic data-collection program are published as miscellaneous measurements and analyses. GRA

N82-11529# Geological Survey, Tallahassee, Fla. Water Resources Div.
GROUND-WATER HYDROLOGY OF THE DADE CITY AREA, PASCO COUNTY, FLORIDA, WITH EMPHASIS ON THE HYDROLOGIC EFFECTS OF PUMPING FROM THE FORIDIAN AQUIFER
C. H. Tibbals, Warren Anderson, and C. P. Laughlin 1980 73 p refs Prepared jointly with the Southwest Florida Water Management District, Brooksville
(PB81-225518; USGS/WRD/WRI/81-058; USGS/WRI-80-33)
Avail: NTIS HC A04/MF A01 CSCL 08H

Of the approximation 32 million gallons per day pumped from the Floridan aquifer in the area in 1975, about 16 million gallons per day were pumped from an area of about 0.25 square miles by Lykes-Pasco Packing Company, a citrus processing plant. There are essentially two producing zones in the Floridan aquifer in the Dade City area. The upper zone is from about 10 feet above to about 150 feet below National Geodetic Vertical Datum of 1929, and the lower zone from about 300 to about 500 feet below NGVD of 1929. There is evidence of hyraulic interconnection of the upper and lower zones of the Floridan aquifer. This appears to be highly significant in terms of the geohydrology of the Floridan aquifer in the area, particularly with regard to its ground-water flow pattern, water quality, and aquifer hydraulic characteristics. GRA

N82-11530# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
A SYSTEMS APPROACH TO THE REAL-TIME RUNOFF ANALYSIS WITH A DETERMINISTIC RAINFALL-RUNOFF MODEL
Robert J. C. Burnash and R. Larry Ferral Apr. 1981 24 p refs
(PB81-224495; NOAA-TM-NWS-WR-162; NOAA-81050703)
Avail: NTIS HC A02/MF A01 CSCL 08H

The responsibility for providing the U.S. with warnings of river conditions was assigned to the National Weather Service in 1890. This requirement led to the development of a systems approach to hydrologic data collection, runoff computation, and forecast production. This system is focused on producing information on the future distribution of water in time and space which affects the safety, welfare, and economic well being of the nation and its inhabitats. A principal element of any hydrologic warning system is an effective rainfall-runoff model. GRA

N82-11531# Geological Survey, Cheyenne, Wyo. Water Resources Div.
WATER RESOURCES OF UPPER SEPARATION CREEK BASIN, SOUTH-CENTRAL WYOMING Final Report
L. R. Larson and Everett A. Zimmerman Apr. 1981 77 p refs
(PB81-224263; USGS/WRD/WRI/81-060; USGS/WRI-80-85)
Avail: NTIS HC A05/MF A01 CSCL 08H

The water resources of the small basin (85 square miles) were examined before the expected start of large-scale coal mining. Streamflow was intermittent, resulting primarily from snowmelt and rainstorms. Average annual runoff was estimated at 2,500 acre feet. The 1976 runoff was 2,040 acre feet. The near absence of snowpack in 1977 resulted in greatly reduced runoff, less than 300 acre feet. Ground water is obtainable from the Mesaverde Formation, the Lance and Fort Union Formations, and from alluvium. Yields from most wells and springs are less than 10 gallons per minute. Dissolved-solids concentrations in Separation Creek ranged from less than 100 to more than 1,500 milligrams per liter during 1976. Daily mean sediment concentration ranged from 34 to 11,900 milligrams per liter. GRA

N82-11532# Geological Survey, Anchorage, Alaska. Water Resources Div.
HYDROLOGIC RECONNAISSANCE NEAR FOURTH OF JULY CREEK, SEWARD, ALASKA Final Report
Gordon L. Nelson Apr. 1981 14 p refs Prepared in cooperation with the Kenai Peninsula Borough, Alaska
(PB81-223752; USGS/WRI-81-21; AK-06250;
USGS/WRD/WRI/81-056) Avail: NTIS HC A02/MF A01 CSCL 08H

The 1.3-square-mile alluvial fan of Fourth of July Creek is being developed as an industrial area and port. Fourth of July Creek is a glacier-fed stream that occupies a braided channel near the middle of the fan. The presence of glacial flour during the summer and low discharge during the winter make streamflow a poor source of water for municipal and industrial use. Water infiltrates the fan from streams and precipitation and recharges an unconfined alluvial aquifer. Average recharge is 40-50 cubic feet per second, and ground water flows toward the coast where it discharges in springs and a 0.3-mile gaining reach of the creek. Properties and concentrations of all measured chemical constituents of water samples from two wells were less than the maximum amounts recommended for drinking water. Both the aquifer and the overlying unsaturated materials are coarse grained. GRA

N82-11533# Geological Survey, Albuquerque, N. Mex.
FLOW ROUTING IN THE SUSQUEHANNA RIVER BASIN: PART 4 - ROUTING RESERVOIR RELEASES IN THE EASTERN SUSQUEHANNA RIVER BASIN IN NEW YORK STATE Final Report, 1942 - 1977
Thomas J. Zembruzuski, Jr. 1981 38 p refs Prepared in cooperation with the Susquehanna River Basin Commission
(PB81-221533; USGS/WRI-80-117;
USGS/WRD/WRI-81-054) Avail: NTIS HC A03/MF A01 CSCL 08H

Flow-routing models were developed for six reaches of major streams in the eastern Susquehanna River basin in New York State and were used to trace releases of water from East Sidney Lake and Whitney Point Lake to gaged points downstream. Daily streamflow from 1942-77 was modeled for the following reaches: Susquehanna River--Unadilla to Conklin, Conklin to Vestal, and Vestal to Waverly; Chenango River--Sherburne to Greene and Greene to Chenango Forks; Tioughnioga River--Cortland to Itaska. The models were developed with convolution techniqes and were based on the unit-response method of flow routing, assuming the diffusion analogy and usin multilinearization. Overall accuracy of the models, as measured by the average difference between observed and simulated daily flos oer the base period was within the stated accuracy of published gaging-station records used. GRA

N82-11534# Geological Survey, Lansing, Mich. Water Resources Div.

GEOLOGY AND HYDROLOGY FOR ENVIRONMENTAL PLANNING IN MARQUETTE COUNTY, MICHIGAN Final Report

F. R. Twenter Feb. 1981 53 p refs Prepared in cooperation with Michigan Dept. of Natural Resources
(PB81-221467; USGS/WRI-80-90; USGS/WRD/WRI-81-053)
Avail: NTIS HC A04/MF A01 CSCL 08H

Marquette County, in the glaciated area of the upper peninsula of Michigan, includes 1,878 square miles. Precipitation averages 32 inches per year. Bedrock and glacial deposits contain materials that are good aquifers. Sedimentary bedrock units generaly yield sufficient water for domestic supply and, in places, may yield more than 100 gallons per minute to large diameter wells. In the glacial deposits, sand and gravel beds are the principal aquifers; yields to wells range from less than 10 to 200 gallons per minute. Iqneous and metamorphic rocks yield little or no water to wells. GRA

N82-11535# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

ENERGY PROGRAMS AT THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY Quarterly Progress Report, Jan. - Mar. 1981

R. vonBriesen, J. E. Tillman, F. C. Paddison, C. S. Leffel, Jr., and S. Kane Apr. 1981 44 p refs
(Contracts DOE-EX-76-A-36-1008; DE-A101-79ET-27025)
(PB81-218141; JHU/APL/EQR/81-1) Avail: NTIS HC A03/MF A01 CSCL 08G

The laboratory is engaged in developing energy resources, utilization concepts, and monitoring and storage methods. The report is divided into three sections. The first, geothermal energy development planning and technical assistance, contains reports on the progress of geothermal related tasks on which effort was concentrated during the quarter. The second section, siting of critical facilities, contains reports on geologic investigations in western Connecticut and areas in adjacent New york, development of seismotectonic domains, and fracture permeability in siting hazardous waste repositories. The third section, energy conservation and storage techniques, reports on institutional barriers to landfill methane recovery and the need for state legislation. T.M.

N82-11536# Hawaii Univ., Honolulu. Dept. of Planning and Economic Development.

A METHOD FOR USING AERIAL PHOTOS IN DELINEATING HISTORIC PATTERNS OF BEACH ACCRETION AND RETREAT

Dennis Hwang Dec. 1980 50 p refs
(Contract NA79AA-D-00085)
(PB81-223836; UNIHI-SG-CR-81-04; NOAA-81042706) Avail: NTIS HC A03/MF A01 CSCL 08C

A method is presented with a maximum estimated error of about 12 feet for measuring beach changes. This is believed to be an accurate estimate, as indicated by a comparison of field and photographic measurements and by the consistent distances obtained for nearby sections of the beach in the Kailua pilot study. The methods described in this report were applied for a pilot study of Kailua Beach. GRA

N82-11537# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.

ICE CONDITIONS IN THE EASTERN BERING SEA FROM NOAA AND LANDSAT IMAGERY: WINTER CONDITIONS 1974, 1976, 1977, 1979

Lyn McNutt Feb. 1981 186 p refs Prepared in cooperation with Science Applications, Inc., Bellevue, Wash.
(PB81-220188; NOAA-TM-ERL-PMEL-24; CONTRIB-500;
NOAA-81043005) Avail: NTIS HC A09/MF A01 CSCL 08L

The LANDSAT and NOAA satellite images from the University of Alaska LANDSAT library were used to make maps of ice conditions in the eastern Bering Sea. The analyses included daily charts of the ice, polynya locations, floe trajectories, and comparisons between data taken from the two sources. A zoom transfer scope (ZTS) was used to transfer the data from an image to a map base for later winter condition in 1974, 1976, 1977, and 1979. GRA

N82-11538# ENSCO, Inc., Springfield, Va.

COAL MINE HAZARD DETECTION USING SYNTHETIC PULSE RADAR Open File Report, 7 Jun. 1979 - 4 Dec. 1980

James C. Fowler, Steven D. Hale, and Richard T. Houck Jan. 1981 87 p refs
(Contract DI-BM-H0-292025)
(PB81-224412; BM-OFR-79-81) Avail: NTIS HC A05/MF A01 CSCL 08I

The work was conducted in three phases. The first was an analysis of the type of errors that might cause problems, the second was to build a breadboard radar, and the third was to conduct a field test with the system. The work from each phase is discussed and the results of the field tests are presented. The results show propagation of the radar signal through 200 feet of coal along with reflections from 50 feet away. The final section contains recommendations of future development. GRA

N82-11539# Geological Survey, Nashville, Tenn. Water Resources Div.

WATER RESOURCES DATA FOR TENNESSEE, WATER YEAR 1979 Annual Water-Data Report, 1 Oct. 1978 - 30 Sep. 1979

Jan. 1981 513 p Prepared in cooperation with Tennessee Dept. of Conservation and the Tennessee Valley Authority, Knoxville
(PB81-228249; USGS/WRD/HD-80/008;
USGS-WRD-TN-79-1) Avail: NTIS HC A22/MF A01 CSCL 08H

The data consist of records of stage, discharge, and water quality of streams and springs; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of wells. This report contains discharge records for 110 gaging stations; stage only records for one lake gaging station; elevation and contents for 27 lakes and reservoirs; water quality for 67 stations and 27 wells; and water levels for 27 observation wells. Also included are 105 crest-stage partial record stations, 48 low-flow partial-record stations, and 80 coal-hydrology partialrecord stations. Additional water data were collected at various stream and spring sites not involved in the systematic data collection program and are published as miscellaneous measurements and analyses, or a seepage investigations of discharge and water quality. T.M.

N82-11540# Geological Survey, Lakewood, Colo. Water Resources Div.

WASTE-ASSIMILATION CAPACITY OF THE ARKANSAS RIVER IN PUEBLO COUNTY, COLORADO, AS IT RELATES TO WATER-QUALITY GUIDELINES AND STREAM CLASSIFICATION Final Report

Doug Cain, Dusina Baldridge (Pueblo Area Council of Governments), and Patrick Edelmann 1980 118 p refs
(PB81-227340; USGS/WRD/WRI/81-063; USGS/WRI-80-82)
Avail: NTIS HC A06/MF A01 CSCL 08H

The capacity of a 42-mile reach of the was evaluated using a one-dimensional steady-state water-quality model calibrated and verified using hydraulic and water-quality data collected in 1976 and 1979. The water-quality constituents modeled were 5-day carbonaceous biochemical oxygen demand, total organic nitrogen, total ammonia, total nitrite, total nitrate, and dissolved water-quality effects of 63 combinations of wastewater treatment, based on a 7-day low flow with a 10-year recurrence interval that occurs between August 15 and October 15 and on a winter low-flow period that occurs as a result of upstream storage of water. GRA

N82-11541# Geological Survey, Augusta, Maine. Water Resources Div.

WATER RESOURCES DATA FOR MAINE, WATER YEAR 1980 Annual Water-Data Report, 1 Oct. 1979 - 30 Sep. 1980

Jun. 1981 238 p refs
(PB81-226789; USGS/WRD/HD-81/042;
USGS-WRD-ME-80-1) Avail: NTIS HC A11/MF A01 CSCL 08H

Water resources data consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of wells. This report contains discharge records for 61 gaging stations; stage only for 2 gaging stations; contents for 17 lakes and reservoirs; water quality for 14 gaging stations and 12 wells; and water levels for 23 observation wells. Additional water data were collected at various sites, not part of the systematic data collection program, and are published as miscellaneous measurements. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies. GRA

N82-11542# Geological Survey, Portland, Oreg. Water Resources Div.
WATER RESOURCES DATA FOR OREGON, WATER YEAR 1979 Annual Water-Data Report, 1 Oct. 1978 - 30 Sep. 1979
1981 763 p refs
(PB81-226771; USGS/WRD/HD-80/001;
USGS-WRD-OR-79-1) Avail: NTIS HC A99/MF A01 CSCL 08H

Data consist of records of stage, contents, and water quality of lakes and reservoirs; and water levels and water quality in wells and springs. This report contains discharge records for 278 gaging stations; stage only records for 10 gaging stations; stage and contents for 43 lakes and reservoirs; water quality for 85 gaging stations, and water levels for 81 observation wells. Also included are 95 crest-stage partial-record stations. Additional water data were collected at various sites, not part of the systematic data collection program, and are published as miscellaneous measurements. GRA

N82-11543# Geological Survey, Bay Saint Louis, Miss. Gulf Coast Hydroscience Center.
TEMPERATURE AND SOLUTE-TRANSPORT SIMULATION IN STREAMFLOW USING A LAGRANGIAN REFERENCE FRAME
Harvey E. Jobson Mar. 1981 187 p refs
(PB81-225757; USGS/WRI-81-2; USGS/WRD/WRI/81-066)
Avail: NTIS HC A09/MF A01 CSCL 08H

The solution approach to the convective-diffusion equation uses a moving reference frame (Lagrangian) which greatly simplifies the mathematics of the solution procedure and dramatically reduces errors caused by numerical dispersion. The model documentation is presented as a series of four programs of increasing complexity. the conservative transport model can be used to route a single conservative substance, such as dye through a reach of a river. The simplified temperature model predicts water temperature in rivers using only equilibrium temperature and windspeed as meteorological input. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *85 Urban Technology and Transportation.*

N82-11544*# Teledyne Brown Engineering, Huntsville, Ala. Engineering Services Div.
INVESTIGATION OF DIRECT SOLAR-TO-MICROWAVE ENERGY CONVERSION TECHNIQUES Final Report
N. E. Chatterton, T. K. Mookherji, and P. K. Wunsch Jan. 1978 107 p refs
(Contract NAS8-32643)
(NASA-CR-161883; ESD-78-MSFC-2174) Avail: NTIS HC A06/MF A01 CSCL 10A

Identification of alternative methods of producing microwave energy from solar radiation for purposes of directing power to the Earth from space is investigated. Specifically, methods of conversion of optical radiation into microwave radiation by the most direct means are investigated. Approaches based on demonstrated device functioning and basic phenomenologies are developed. There is no system concept developed, that is competitive with current baseline concepts. The most direct methods of conversion appear to require an initial step of production of coherent laser radiation. Other methods generally require production of electron streams for use in solid-state or cavity-oscillator systems. Further development is suggested to be worthwhile for suggested devices and on concepts utilizing a free-electron stream for the intraspace station power transport mechanism. S.L.

N82-11545*# Stonehart Associates, Inc., Madison, Conn.
SURVEY ON AGING ON ELECTRODES AND ELECTROCATALYSTS IN PHOSPHORIC ACID FUEL CELLS Progress Report
Paul Stonehart and John Hochmuth Oct. 1981 73 p refs
(Contract DEN3-176)
(NASA-CR-165505; DOE/NASA/0176-81/3) Avail: NTIS HC A04/MF A01 CSCL 10A

The processes which contribute to the decay in performance of electrodes used in phosphoric acid fuel cell systems are discussed. Loss of catalytic surface area, corrosion of the carbon support, electrode structure degradation, electrolyte degradation, and impurities in the reactant streams are identified as the major areas for concern. J.M.S.

N82-11546*# Spire Corp., Bedford, Mass.
PROCESSING OF SILICON SOLAR CELLS BY ION IMPLANTATION AND LASER ANNEALING Final Report
J. A. Minnucci, K. W. Matthei, and A. C. Greenwald Feb. 1981 78 p refs
(Contract NAS3-21276)
(NASA-CR-165283; FR-10066) Avail: NTIS HC A05/MF A01 CSCL 10A

Methods to improve the radiation tolerance of silicon cells for spacecraft use are described. The major emphasis of the program was to reduce the process-induced carbon and oxygen impurities in the junction and base regions of the solar cell, and to measure the effect of reduced impurity levels on the radiation tolerance of cells. Substrates of 0.1, 1.0 and 10.0 ohm-cm float-zone material were used as starting material in the process sequence. High-dose, low-energy ion implantation was used to form the junction in n+p structures. Implant annealing was performed by conventional furnace techniques and by pulsed laser and pulsed electron beam annealing. Cells were tested for radiation tolerance at Spire and NASA-LeRC. After irradiation by 1 MeV electrons to a fluence of 10 to the 16th power per sq cm, the cells tested at Spire showed no significant process induced variations in radiation tolerance. However, for cells tested at Lewis to a fluence of 10 to the 15th power per sq cm, ion-implanted cells annealed in vacuum by pulsed electron beam consistently showed the best radiation tolerance for all cell resistivities. Author

N82-11547*# Munising Paper Div., Neenah, Wis.
DEVELOPMENT OF BATTERY SEPARATOR COMPOSITES Final Report, Oct. 1976 - Nov. 1981
George F. Schmidt and Robert E. Weber Nov. 1981 56 p refs
(Contract NAS3-20583)
(NASA-CR-165508) Avail: NTIS Hc A04/MF A01 CSCL 10C

Improved inorganic-organic separators developed by NASA were commercially prepared. A single-ply asbestos substrate was developed, as well as alternative substrates based on cellulose and on polypropylene fibers. The single-ply asbestos was bound with butyl rubber and was functionally superior to the formerly used polyphenylene oxide saturated sheet. Commercially prepared separators exhibited better measured separator properties than the NASA standard. Cycle life in Ni/Zn and Ag/Zn cells was related to substrate, decreasing in the order: asbestos > cellulose paper > nonwoven polypropylene. The cycle life of solvent-coated separators was better than aqueous in Ni/Zn cells, while aqueous coatings were better in Ag/Zn cells. T.M.

N82-11548*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE EFFECTS OF IMPURITIES ON THE PERFORMANCE OF SILICON SOLAR CELLS
K. A. Yamakawa 1 Sep. 1981 75 p refs
(Contracts NAS7-100; EX-76-A-29-1012;
DE-AI01-76ET-20356)
(NASA-CR-164945; JPL-Pub-81-76; DOE/JPL-1012-57) Avail: NTIS HC A04/MF A01 CSCL 10A

The major factors that determine the tolerable concentrations of impurities in silicon feedstock for solar cells used in power generation are discussed in this report. It is concluded that a solar-grade silicon can be defined only for a specific manufacturing process. It is also concluded that it is the electrical effects, efficiency and resistivity, that are dominant in determining tolerable concentrations of impurities in the silicon feedstock. Crystal growth effects may become important when faster growth rates and larger crystal diameters are developed and used. Author

N82-11549*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
IRRIGATION MARKET FOR SOLAR THERMAL PARABOLIC DISH SYSTEMS
Hamid Habib-agahi and Sue Campbell Jones 1 Sep. 1981 40 p refs
(Contracts NAS7-100; DE-AT04-81AL-16228)
(NASA-CR-164955; JPL-Pub-81-85; DOE/JPL-1060-49) Avail: NTIS HC A03/MF A01 CSCL 10A

The potential size of the onfarm-pumped irrigation market for solar thermal parabolic dish systems in seven high-insolation states is estimated. The study is restricted to the displacement of three specific fuels: gasoline, diesel and natural gas. The model was developed to estimate the optimal number of parabolic dish modules per farm based on the minimum cost mix of conventional and solar thermal energy required to meet irrigation needs. The study concludes that the potential market size for onfarm-pumped irrigation applications ranges from 101,000 modules when a 14 percent real discount rate is assumed to 220,000 modules when the real discount rate drops to 8 percent. Arizona, Kansas, Nebraska, New Mexico and Texas account for 98 percent of the total demand for this application, with the natural gas replacement market accounting for the largest segment (71 percent) of the total market. Author

N82-11550*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SECONDARY AND COMPOUND CONCENTRATORS FOR PARABOLIC DISH SOLAR THERMAL POWER SYSTEMS
L. D. Jaffe and P. T. Poon 15 Apr. 1981 47 p refs Sponsored in part by DOE
(Contract NAS7-100)
(NASA-CR-164960; JPL-Pub-81-27; DOE/JPL-1060-43) Avail: NTIS HC A03/MF A01 CSCL 10A

A secondary optical element may be added to a parabolic dish solar concentrator to increase the geometric concentration ratio attainable at a given intercept factor. This secondary may be a Fresnel lens or a mirror, such as a compound elliptic concentrator or a hyperbolic trumpet. At a fixed intecept factor, higher overall geometric concentration may be obtainable with a long focal length primary and a suitable secondary matched to it. Use of a secondary to increase the geometric concentration ratio is more likely to e worthwhile if the receiver temperature is high and if errors in the primary are large. Folding the optical path with a secondary may reduce cost by locating the receiver and power conversion equipment closer to the ground and by eliminating the heavy structure needed to support this equipment at the primary focus. Promising folded-path configurations inclue the Ritchey-Chretien and perhaps some three element geometries. Folding the optical path may be most useful in systems that provide process heat. Author

N82-11551*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SOLAR CELL DEVELOPMENT FOR THE POWER EXTENSION PACKAGE
Cosmo R. Baraona and James L. Cioni (NASA, Johnson Space Center) 1981 8 p refs Presented at the 16th Intersoc. Energy Conversion Conf., Atlanta, 9-14 Aug. 1981
(NASA-TM-82685; E-922) Avail: NTIS HC A02/MF A01 CSCL 10A

The PEP is a 32 kilowatt flexible substrate, retrievable, solar array system for use on the Space Shuttle. Solar cell costs will be reduced by increasing cell area and simplifying cell and coverglass fabrication processes and specifications. The cost goal is to produce cells below $30 per watt. Two and ten ohm-cm silicon cells were investigated. In phase I of the cell development program a few thousand candidate cells will be produced and evaluated for utility and quality. In phase II a large number of cells will be fabricated to verify production readiness and cell yields and costs. This schedule is compatible with PEP initial operational capability in 1984. Approximately 140,000 large area (5.9 x 5.9 cm) cells will be required for two PEP solar arrays. The status of the cell development and testing, including a radiation damage test and side-by-side comparison of candidate cell types with pre- and post-irradiation airplane calibration of outer space short-circuit current, is reported. T.M.

N82-11552# EIC, Inc., Newton, Mass.
INVESTIGATION OF LITHIUM SULFUR DIOXIDE (LI/SO2) BATTERY SAFETY HAZARD Quarterly Report, 24 Dec. 1980 - 23 Mar. 1981
M. W. Rupich and K. M. Abraham May 1981 26 p refs
(Contract N60921-81-C-0084)
(AD-A104326) Avail: NTIS HC A03/MF A01 CSCL 10/3

The lithium/sulfur dioxide primary electrochemical cell has received considerable attention as a high energy power source in the last decade. However, during the same time a number of safety hazards have been associated with its use. This report is the initial part of a research-oriented investigation intended to identify and document present Li/SO2 safety hazards, then to identify the chemical reactions responsible for these hazards, and finally to investigate methods of controlling them. This report presents the results of a survey of the safety hazards associated with Li/SO2 cells. The report documents specific safety incidents experienced with Li/SO2 cells, presents some of the causes identified or postulated for the incidents, and identifies general aspects of Li/SO2 use presently believed to be potentially hazardous. The survey was carried out by reviewing safety studies and reports of safety incidents appearing in the literature and by gathering unpublished information of the experiences of users of Li/SO2 cells in both government and industry. The results of the report can serve as basis for deciding which aspects of the Li/SO2 safety hazard at present need further investigation. GRA

N82-11553# Midwest Research Inst., Golden, Colo.
CADMIUM SULFIDE/COPPER SULFIDE HETEROJUNCTION CELL RESEARCH BY SPUTTER DEPOSITION Quarterly Technical Progress Report, 1 Dec. 1980 - 28 Feb. 1981
J. A. Thornton, W. W. Anderson (Lockheed Palo Alto Research Lab.), and John D. Meakin (Delaware Univ., Newark) 3 Apr. 1981 50 p refs
(Contract DE-AC02-77CH-00178)
(DE81-026219; SERI/PR-9296-T1) Avail: NTIS HC A03/MF A01

Photoluminescence spectral measurements on 6000 nm thick reactive sputtered CdS coatings yielded exciton and green edge emission spectra which are similar in their general character to those recorded from the evaporated CdS that yields high performance cells. All-sputter-deposited cells with composite doped and undoped CdS layers yielded J/sub sc/ approx. 3 mA/cm(2). This Cu2S reactive sputtering experiments further elucidated the influence of cathode and wall conditioning on the deposition process. The resistivities of CdS coatings deposited using the planar magnetron are typically a factor of from three to ten lower than for coatings deposited using the cylindrical magnetrons. DOE

N82-11554# Arkansas Univ., Fayetteville.
MISSISSIPPI COUNTY COMMUNITY COLLEGE SOLAR PHOTOVOLTAIC PROJECT Final Report
F. K. Deaver, M. M. Johnson, Tom Pugh, Ray Snowden, W. D. Turner, J. D. Wall, J. G. Williams, and J. R. Yeargan Nov. 1980 256 p refs
(Contract DE-FG05-77CS-20347; Grant EG-77-G-05-5565)
(DE81-030669; DOE/ET-20347/T1) Avail: NTIS

HC A12/MF A01

A weather station was maintained from April 1978 to April 1980. Daily totals of direct normal and global insolation are given, and an hour-by-hour printout of direct normal, global, and diffuse solar radiation for the entire two year period is included. A number of studies were conducted, including daylighting, energy conservation and management, design tradeoffs, and landscaping. The collector selection process included the writing of specifications, providing design data, reviewing the various collector designs, inspecting potential vendor facilities, monitoring on-site tests, and the final selection. A simulation was made of the entire system, including both an electrical and thermal simulation of the photovoltaic array and a thermal simulation of the various buildings. Example printouts of the simulations are included. DOE

N82-11555# Oak Ridge National Lab., Tenn. Energy Div.
DATA COLLECTION AND PROCESSING FOR THE ACES
J. L. Bledsoe and D. R. Miller Aug. 1981 167 p refs
(Contract W-7405-eng-26)
(DE81-030630; ORNL/CON-59) Avail: NTIS
HC A08/MF A01

The computer codes used for processing and analyses were designed to display collected data; to summarize the performance (mechanical) of the house for each week; to give representation of external influences such as temperature, humidity ratio, and wind speed; and to aid in the dissemination of data to other users. Revisions and adjustments were made to the codes to accommodate improvements made at the demonstration facility. The codes are written in either FORTRAN IV or PL/I programming languages. All programs in the system run on the IBM 360 systems. DOE

N82-11556# Sandia Labs., Albuquerque, N. Mex.
HELIOSTAT OPERATION AT THE CENTRAL RECEIVER TEST FACILITY (1978 - 1980)
J. T. Holmes Jul. 1981 25 p refs
(Contract DE-AC04-76DP-00789)
(DE81-031926; SAND-81-0275-Rev) Avail: NTIS
HC A02/MF A01

The CRTP beam produces a total power of 5.5 MWth and a peak intensity of 2250 kW/sq m near solar noon. A safe operating strategy was implemented. Improvements in the targeting accuracy were made. The mirror reflectivity is maintained near 80% by cleaning with natural rains or snow. The CRTF heliostats logged almost 300,000 operating hours by the end of 1980. DOE

N82-11557# RCA Labs., Princeton, N. J.
AMORPHOUS BORON-SILICON-HYDROGEN ALLOYS FOR THIN-FILM HETEROJUNCTION SOLAR CELLS Quarterly Technical Progress Report, 1 Sep. - 30 Nov. 1980
A. R. Moore, D. E. Carlson, and R. W. Smith May 1981 18 p refs
(Contract DE-AC02-77CH-00178)
(DE81-027234; SERI/PR-0-9010-2; QTPR-2) Avail: NTIS
HC A02/MF A01

The conductivity of a-B:Si:H films increases with substrates temperature and annealing temperature for temperatures up to 5000 C (highest investigated). However, increasing the conductivity causes the optical gap to decrease. Preliminary results on a-B:Si:H/a-Si:H heterojunction devices are not encouraging as interface states appear to limit the conversion efficiency to approx. 1.5%. DOE

N82-11558# RCA Labs., Princeton, N. J.
AMORPHOUS BORON-SILICON-HYDROGEN ALLOYS FOR THIN-FILM HETEROJUNCTION SOLAR CELLS Quarterly Technical Progress Report, 1 Dec. 1980 - 28 Feb. 1981
A. R. Moore, D. E. Carlson, and R. W. Smith Jun. 1981 18 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contract DE-AC02-77CH-00178)
(DE81-027254; SERI/PR-0-9010-3; QTPR-3) Avail: NTIS
HC A02/MF A01

Amorphous boron-silicon-hydrogn (a-B:Si:H) alloys were used to make heterojunction contacts to hydrogenated amorphous silicon (a-Si:H) films. The performance of a-B:Si:H/a-Si:H heterojunction cells are limited mainly by a large density of interface states. Another p-type, wide bandgap material, microcrystalline silicon-carbon-hydrogen (M-Si:C:H) was investigated. Three techniques are explored for production of m-Si:C:H films: glow discharge deposition, thermal annealing of a-Si:C:H films, and laser annealing of a-Si:C:H: films. DOE

N82-11559# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
OPTICAL TRANSPARENCY OF INEXPENSIVE SALT SOLUTIONS FOR CONSTRUCTION OF DENSITY-GRADIENT PONDS
John D. Webb Jul. 1981 54 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-030832; SERI/RR-641-615) Avail: NTIS
HC A04/MF A01

A laboratory testing protocol was developed that will permit a comparative evaluation of the optical performance of candidate salts for use in stabilizing solar ponds. Extinction coefficients measured for the salts and for water in dual-beam spectrophotometer fitted with 10-cm quartz sample cells were input to a digital model that convolutes a solar spectrum with an assumed salt/water concentration gradient similar to that to be established in the solar pond. The model determined the fraction of available solar energy transmitted to the pond storage layer. This information was used to estimate the size of the pond needed to meet a given set of thermal demands if the candidate salt were to be used. DOE

N82-11560# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
SOLAR ENERGY SYSTEM PERFORMANCE EVALUATION: FOREST CITY DILLON, WASHINGTON, D.C., JANUARY 1980 - DECEMBER 1980
D. W. Missal 1980 82 p refs
(Contract DE-AC02-79CS-30027)
(DE81-028174; SOLAR/1041-81/14) Avail: NTIS
HC A05/MF A01

An active solar energy system consisting of single glazed flat plate collectors, 3200 gallons of storage liquid, and an auxiliary oil fired boiler, was designed to supply 59% of the hot water demand for a high rise apartment building. The annual solar fraction predicted by the f chart simulation was 37%, and the solar fraction measured was 32%. Other measures of performance, including solar system coefficient of performance, are given. The performance of the collector, storage, and domestic hot water subsystems is discussed. DOE

N82-11561# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
SOLAR ENERGY SYSTEM PERFORMANCE EVALUATION: MONTECITO PINES, SANTA ROSA, CALIFORNIA, NOVEMBER 1979 - APRIL 1980
E. N. Ashman 1980 80 p refs
(Contract DE-AC01-79CS-30027)
(DE81-028175; SOLAR/1045-80/14) Avail: NTIS
HC A05/MF A01

An active solar energy system consisting of 950 square feet of flat plate collectos, gas fired auxiliary boilers, and 2000 gallons of storage was designed. The solar fractions actually achieved were 11% for heating and 44% for hot water. Measures of performance are given, including: solar savings ratio, conventional fuel savings, system performance factor, and solar system coefficient of performance. The performance of the collector, storage, space heating and domestic hot water subsystems are discussed. DOE

N82-11562# Teledyne Energy Systems, Timonium, Md.
ADVANCED SELENIDE THERMOELECTRIC DEVELOPMENT PROGRAM Final Report
W. R. Seetoo 20 Jul. 1981 40 p
(Contract DE-AC01-80ET-32075)
(DE81-027823; TES-32075-107) Avail: NTIS
HC A03/MF A01

The segmentation of copper silver selenide and TAGS production of CuAgSe powder by rapid solidification was demonstrated. The hot junction temperature was 7250C with the segmentation temperature of 4000C, both temperatures were selected to prevent excessive sublimation from the hot ends of the segments, respectively. The CuAgSe that was used to fabricate the test hardware was synthesized. Both the CuAgSe and TAGS were hot pressed in an argon atmosphere then the segments were furnacebonded to each other. DOE

N82-11563# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
THERMAL AND ELECTROCHEMICAL BIOMASS CONVERSION AT SERI
T. B. Reed, T. Milne, R. Desrosiers, J. Diebold, and H. Chum May 1981 22 p refs
(Contracts EG-77-C-01-3042; DE-AC02-77CH-00178)
(DE81-030507; SERI/TP-622-1174) Avail: NTIS HC A02/MF A01

Biomass of the world which occurs in a relatively dry form and is most accessible to nonbiological methods of conversion to various energy forms is discussed. The biomass thermal conversion by various conversion processes is evaluated. New processes for the conversion of biomass to fuels and chemicals are developed. DOE

N82-11564# McDonnell-Douglas Corp., Huntington Beach, Calif.
SECOND GENERATION HELIOSTAT, VOLUME 1 Final Report
D. A. Steinmeyer Apr. 1981 428 p Prepared for Sandia Labs., Livermore, Calif. 2 Vol.
(Contract DE-AC04-76DP-00789)
(DE81-029618; SAND-81-8177-Vol-1) Avail: NTIS HC A19/MF A01

The heliostat subsystem design is described. The test program is summarized, including component testing, subsystem operation and the shipment and installation. The production heliostat description, the manufacturing process definitions, and the manufacturing facility definition are summarized. The installation, operations, and maintenance requirements for the 50 MWe field are reviewed. Future development activities aimed at further cost reduction are discussed. DOE

N82-11565# McDonnell-Douglas Corp., Huntington Beach, Calif.
SECOND GENERATION HELIOSTAT. VOLUME 2: DEFINITION OF A HELIOSTAT MANUFACTURING FACILITY Final Report
Apr. 1981 183 p Prepared in cooperation with General Motors Technical Center and Lamb (F. Joseph) Co., Warren, Mich. Prepared for Sandia Labs., Livermore, Calif. 2 Vol.
(Contract DE-AC04-76DP-00789)
(DE81-029824; SAND-81-8177-Vol-2; MDC-G9490) Avail: NTIS HC A09/MF A01

The heliostat design is described an the definition of a heliostat manufacturing facility capable of producing 50,000 heliostats per year and to generate the manufacturing costs associated with that level of production was studied. The heliostat plant site, plant layout, and cost of the plant are discussed. The manufacture of heliostats, including special requirements for the heliostat mirror, and production costs are given. DOE

N82-11566# Sandia Labs., Livermore, Calif.
STUDY OF PHOTOVOLTAIC COST ELEMENTS. VOLUME 1: EXECUTIVE REPORT. VOLUME 2: PROJECT BACKGROUND Final Report
James B. Ayers Jul. 1981 269 p Prepared in cooperation with Barry (Theodore) and Associates, Los Angeles 5 Vol.
(Contract DE-AC04-76DP-00789)
(DE81-030982; SAND-81-7014-Vol-1; SAND-81-7014-Vol-2) Avail: NTIS HC A12/MF A01

Two models used for estimating installation costs for residential and intermediate photovoltaic energy systems are summarized. The modeling rationale is reviewed, and the results obtained when the models were applied to 10 residential and 10 intermediate PV systems are listed. Output reports for each of the test cases are appended. DOE

N82-11567# Sandia Labs., Livermore, Calif.
STUDY OF PHOTOVOLTAIC COST ELEMENTS. VOLUME 3: SANDIA NATIONAL LABORATORIES PHOTOVOLTAIC SYSTEMS DESIGN CATALOG Final Report
James B. Ayers Jul. 1981 207 p Prepared in cooperation with Barry (Theodore) and Associates, Los Angeles
(Contract DE-AC04-76DP-00789)
(DE81-030986; SAND-81-7014-Vol-3) Avail: NTIS HC A10/MF A01

Basic system data sheets, which include project title and location, prime contractor, PV system general description, and energy storage capacity, are shown for 29 intermediate PV systems and 19 residential PV systems. In addition, cost data and output reports generated by TB and A's PV installation cost models are included for 10 intermediate systems and 10 residential systems. DOE

N82-11568# Sandia Labs., Livermore, Calif.
STUDY OF PHOTOVOLTAIC COST ELEMENTS. VOLUME 4: INSTALLATION COST MODEL FOR RESIDENTIAL PV SYSTEMS: USERS MANUAL Final Report
James B. Ayers Jul. 1981 89 p Prepared in cooperation with Barry (Theodore) and Associates, Los Angeles 5 Vol.
(Contract DE-AC04-76DP-00789)
(DE81-031921; SAND-81-7014-Vol-4) Avail: NTIS HC A05/MF A01

A quantitative methodology is presented for estimating installation costs of residential photovoltaic systems. The installation cost model for residential PV systems is comprised of 144 estimating equations selectively exercised, based on user definition of the system. At the input stage, residential PV systems can be fully described by 9 design option categories and 9 system specification categories. All assumptions were validated with installers of solar thermal systems. A discussion of the model is included as well as an example of its use with an 8 KW PV system for a Southwest all-electric residential design. DOE

N82-11569# Sandia Labs., Livermore, Calif.
STUDY OF PHOTOVOLTAIC COST ELEMENTS. VOLUME 5: INSTALLATION COST MODEL FOR INTERMEDIATE PV SYSTEMS: USERS MANUAL Final Report
James B. Ayers Jul. 1981 137 p Prepared in cooperation with Barry (Theodore) and Associates, Los Angeles 5 Vol.
(Contract DE-AC04-76DP-00789)
(DE81-030981; SAND-81-7014-Vol-5) Avail: NTIS HC A07/MF A01

A cost modeling methodology is presented for estimating installation costs associated with intermediate photovoltaic (PV) systems. With only a parametric description of an intermediate power system, the model can be used to develop an installation cost estimate for that system. The model is based on conventional cost-estimating procedures widely used by the construction industry and was validated by comparing estimates for the same 10 systems made independently by a cost engineering firm. A description of the model is included as well as an example of its use with a 200 KW solar breeder plant design to be located in Rockville, Maryland. DOE

N82-11570# Sandia Labs., Albuquerque, N. Mex.
SECOND GENERATION HELIOSTAT PROGRAM, SEPTEMBER 1979-MARCH 1981
Apr. 1981 15 p Prepared for Sandia Labs., Livermore, Calif.
(Contract DE-AC04-76DP-00789)
(DE81-029752; SAND-81-8177-Exec-Summ) Avail: NTIS HC A02/MF A01

A production design and production plans for the MDAC heliostat are summarized, testing, maintenance, the production facility, volume heliostat price, and possible future cost reduction. DOE

N82-11571# Aerojet Energy Conservation Co., Sacramento, Calif.
FLUID-BED HEAT-EXCHANGER OPTIMIZATION AND BED MATERIALS SELECTION Final Report
Feb. 1981 127 p refs
(Contracts DE-AC22-78ET-11343; DE-AC03-79ET-11343; ET-78-C-03-2039)
(DOE/ET-11343/T2; Rept-8100-FB-0003) Avail: NTIS HC A07/MF A01

The effect of material properties on heat exchanger costs for waste gas streams from 500 to 3000OF was evaluated. The cost of the major heat exchanger components was identified and related directly to bed material properties. Two hundred materials were reviewed: metals, alloys, oxides, minerals, carbides, borides, intermetallics, and cermets. It is shown that the oxides and minerals were the most cost effective at the lower bed temperatures and the metallic bed materials at the higher bed temperature. DOE

N82-11572# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
REVIEW OF THERMALLY REGENERATIVE ELECTROCHEMICAL SYSTEMS, VOLUME 2
Helena I. Chum and Robert A. Osteryoung (State Univ. of New York at Buffalo) Apr. 1981 223 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-029624; SERI/TR-332-416-Vol-2) Avail: NTIS HC A10/MF A01

Thermally regenerative electrochemical systems(TRES) are reviewed and classified according to the type of energy input required to regenerate the electrochemical cell reactants; either thermal input alone or the coupling of thermal and electrolytic energy inputs. These two broad categories are further divided into seven types of TRES according to significant differences either the electrochemical cells or in the regenerators. DOE

N82-11573# Argonne National Lab., Ill. Energy and Environmental Systems Div.
PRELIMINARY EVALUATION OF ADVANCED COAL-BASED ELECTRICITY-GENERATING TECHNOLOGIES BY MEANS OF SYSTEM-INTEGRATION ANALYSIS
J. L. Gillette and K. Hub Apr. 1981 41 p refs
(Contract W-31-109-eng-38)
(DE81-029989; ANL/EES-TM-144) Avail: NTIS HC A03/MF A01

The potential effects of coal fired cogeneration on production requirements were examined. Two types of cogeneration designs, a backpressure turbine and an extraction turbine were studied. It is found that some savings of oil can be realized with coal based cogeneration, and that the quantity of such is dependent on the purchase option, the demand growth rate, and the cogenerator design. It is concluded that of the two designs the backpressure turbine type has an advantage due to its significantly lower heat rate. DOE

N82-11574# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
ENERGY ANALYSIS OF HUMAN ECOSYSTEMS IN AN APPALACHIAN COAL COUNTY
A. P. Watson 1980 31 p refs Presented at the Intern. Symp. on the Human Side of Energy, Laramie, Wyo., 7-9 Jul. 1981
(Contract W-7405-eng-26)
(DE81-025177; CONF-8007107-2) Avail: NTIS HC A03/MF A01

Preliminary results from a energy analysis of the coal fuel cycle in an Appalachian coal county has provided systematic assessment of hidden energy subsidies in extraction, transport, processing, and combustion. Current results indicate a major loss due to depletion of the coal resource base by use of inefficient mining techniques. Although of smaller magnitude, reductions in work force and community productivity from occupational accidents and disease and road maintenance requirements for transport also appear to be significant. DOE

N82-11575# Brookhaven National Lab., Upton, N. Y.
IMPURITY EFFECTS IN a-Si:H SOLAR CELLS
A. E. Delahoy and R. W. Griffith 1981 10 p refs Presented at 15th IEEE Photovoltaic Specialists Conf., Orlando, Fla., 12-15 May 1981
(Contract DE-AC02-76CH-00016)
(DE81-025069; BNL-29668; CONF-810526-38) Avail: NTIS HC A02/MF A01

The deleterious effects on device performance of phosphine and monochlorosilane are discussed. Solar cells fabricated using plasma deposited a-Si:H alloys can be degraded by the incorporation of certain impurities during deposition of the a-Si:H materials. Nominally intrinsic layers are adversely affected by the addition to the plasma of air, N2 + O2 mixtures, PH3 or SiH3Cl (monochlorosilane). Modification of the a-Si:H gap state density owing to synergistic effects of oxygen and nitrogen in the plasma leads to a collapse of the space charge region and the reduction of the micro tau product for holes. DOE

N82-11576# Sandia Labs., Livermore, Calif.
DESIGN, COST AND PERFORMANCE COMPARISONS OF SEVERAL SOLAR THERMAL SYSTEMS FOR PROCESS HEAT. VOLUME 1: EXECUTIVE SUMMARY
Patrick J. Eicker, Ernest D. Eason, Joe D. Hankins, Larry D. Hostetler, Joseph J. Iannucci, and James B. Woodward Mar. 1981 24 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029881; SAND-79-8279-Vol-1) Avail: NTIS HC A02/MF A01

Conceptual designs of central receiver, parabolic dish, and parabolic trough systems for several process heat applications were analyzed. Cost and performance estimates are made for each of these designs and used to calculate levelized delivered process heat costs. This indicated that central receiver systems will provide energy costs competitive with that afforded by the parabolic trough and parabolic dish systems over the range of demand sizes and temperatures studies. DOE

N82-11577# Delaware Univ., Newark. Inst. of Energy Conversion.
Zn3P2 AS AN IMPROVED SEMICONDUCTOR FOR PHOTOVOLTAIC SOLAR CELLS **Quarterly Report, 1 Dec. 1980 - 28 Feb. 1981**
1981 49 p refs Prepared of Midwest Research Inst.
(DE81-025587; SERI/PR-8062-1-T12; QR-10) Avail: NTIS HC A03/MF A01

Zinc oxide zinc solar cells heterojunction devices were studied to establish the origin of the low open circuit voltage. Activation energy determination from JO vs. T-measurements, dark current voltage characteristics, and diffusion volage determination by high frequency capacitance voltage measurements are investigated development oriented Zn3P2 crystals is reported. The optical absorption and photoluminescence spectra of Mg3P2 was measured, and the diffusion by coefficient of magnesium in Zn3P2 was measured at 750C and 1500C by spectral response method. Diffusion of aluminum is also measured. The diffusion voltage of p/n junction devices to improving the fill factor is reported. DOE

N82-11578# Argonne National Lab., Ill. Chemical Engineering Div.
CALCIUM/METAL SULFIDE BATTERY DEVELOPMENT PROGRAM **Progress Report, Oct. 1979 - Sep. 1980**
D. L. Barney, M. F. Roche, S. K. Preto, L. E. Ross, N. C. Otto, and F. J. Martino Mar. 1981 24 p refs Prepared for California Univ., Lawrence Berkeley Lab.
(Contract W-31-109-eng-38)
(ANL-81-14) Avail: NTIS HC A02/MF A01

Components needed to fabricate a high performance calcium cell were identified. The components are: (1) Ca-Al-Si negative electrode; (2) Fe sub 0.93 Co sub 0.075 sub 2 positive electrode; (3) Bn felt separator; (4) iron negative and molybdenum positive current collectors; and (5) LiCl-NaCl-CaCl2-BaCl2 electrolyte. E.A.K.

N82-11579# Argonne National Lab., Ill. Integrated Assessments and Policy Evaluation Group.
ANALYSIS OF THE FUEL AND COST EFFECTS OF INTERFACING UTILITIES AND SMALL-POWER COGENERATORS
K. Hub, J. VanKuiken, and W. Marr Dec. 1980 32 p refs
(Contract W-31-109-eng-38)
(DE81-028495; ANL/CNSV-TM-77) Avail: NTIS HC A03/MF A01

Small coal- and oil-fueled cogenerators were evaluated for their performance in coal- and oil-based utility systems. The impact of interconnected cogenerators on utility systems' fuel use, reliability, and costs was studied. Potential benefits from cogeneration were strongly influenced by cogenerator design options and by characteristics of the utility systems. DOE

N82-11580# Varta Batterie A.G., Kelkheim (West Germany).
RECENT ADVANCES IN LEAD-ACID CELL RESEARCH AND DEVELOPMENT

Ernst Voss 1980 38 p refs Presented at the EVA Conf., Adelia, Australia, 25-29 Aug. 1980 Sponsored in part by Bundesministerium fuer Forschung und Technologie Prepared for Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE81-023104; CONF-8008118-1) Avail: NTIS HC A03/MF A01

During the last decade it was demonstate that the lead-acid system is capable of proving an attractive energy source of sufficient energy and power per unit weight and volume which allows its sucessful application for electric vehicle propulsion. This is shown by a number of typical examples, such as the relationship between active-material properties and capacity at high rates of discharge the effect of acid stratification and others. Simultaneously, the expenditure for the maintenance of lead-acid batteries was minimized by the development of peripheric equipment, as there are means for central-automatic water refill and recombination devices. It is shown that there is still a considerable potential for further improvement which might again strengthen the unique position of the lead-acid system in the market in comparison to competitive systems. T.M.

N82-11581# Ames Lab., Iowa.
HODGES RESIDENCE: PERFORMANCE OF A DIRECT GAIN PASSIVE SOLAR HOME IN IOWA
L. Hodges 1980 3 p refs Presented at the 5th Natl. Passive Solar Conf., Amherst, Mass., 19-26 Oct. 1980
(Contract W-7405-eng-82)
(DE81-025528; IS-M-352; CONF-801016-25) Avail: NTIS HC A02/MF A01

No night insulation was used on its 500 square feet of double-pane glass. Total auxiliary heat required was 43 GJ (41 MBTU) gross and 26 GJ (25 MBTU) net, amounting, respectively, to 60 and 36 kJ/C-day-sq m. The heating season was unusually cloudy and included the cloudiest January in the 21 years of Ames insolation measurements. Results are also presented for the performance of the hollow-core floor which serves as the main storage mass and for the comfort range in the house. DOE

N82-11582# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
OXYGEN REDUCTION ON CARBON-SUPPORTED PLATINUM FUEL-CELL ELECTRODES IN H SUB 3 PO SUB 4
J. McBreen, H. Lender, and S. Srinvasan 1981 11 p refs Presented at the Symp. on Electrocatalysts, Minneapolis, 10-15 May 1981; sponsored by Electrochemical Society, Inc.
(Contract DE-AC02-76CH-00016)
(DE81-027303; BNL-29788; CONF-8105105-2) Avail: NTIS HC A02/MF A01

The reduction of oxygen on carbon supported fuel cell electrodes was investigated in phosphoric acid electrolytes in the concentration range of 85% to 101% and at temperatures from 25 to 180 C. In purified acid the Tafel slope in the potential region of 0.7 to 0.9 V RHE is approx. 120 mV/decade and is invariant with temperature. The activation energy for oxgyen reduction is between 8 kcal and 13 kcal/mole. In impure 101% electrolyte the Tafel slope increases from a value of 85 mV/decade at 80 C to 105 mV/decade at 180 C and the activation energy is 18.29 kcal/mole. The major discrepancies in the literature can be rationalized on the basis of impurity effects. In pure electrolytes, the kinetic parameters on smooth platinum and high area carbon supported platinum are the same. DOE

N82-11583# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
SOLAR HEAT PUMP SIMULATOR
M. A. Catan 1981 5 p refs Presented at the Active Solar Contractors' Rev. Meeting, Washington, D.C., Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-024368; BNL-29678; CONF-810912-3) Avail: NTIS HC A02/MF A01

A simulator was utilized to provide controlled-temperature sources and sinks to an experimental water-to-water laboratory heat pump test bed. This combination was used to demonstrate and explore the potential of the vapor-compression cycle to deliver high COP's at SAHP source temperatures. Results from the simulator were used in computer simulations of complete systems performed by BNL, by the SAHP contractors, and by others. A two-speed compressor was first tested at high source temperatures on the BNL simulator. In view of the decision by both contractors to construct water-to-air (rather than water-to-water) heat pumps, the BNL simulator was fitted with an air-side test loop. The prototype heat pump was tested under steady-state conditions on the BNL simulator. DOE

N82-11584# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
LOW-COST SOLAR FLAT-PLATE-COLLECTOR DEVELOPMENT
W. G. Wilhelm 1981 5 p Presented at the Active solar Contractors' Rev. Meeting, Washington, D.C., Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025081; BNL-29680; CONF-810912-4) Avail: NTIS HC A02/MF A01

Cost goals were developed for the collector which led to the rejection of conventional approaches and to the exploration of thin film technology. A thin film solar absorber suited for high speed continous-roll manufacture at low cost was designed. The absorber comprises two sheets of aluminum-foil/polymeric-material laminate bonded together at intervals to form channels with water as the heat transfer fluid. Several flat-plate panels were fabricated and tested. DOE

N82-11585# Brown Univ., Providence, R. I.
ANALYSIS OF THERMAL/MECHANICAL ENERGY-CONVERSION CONCEPTS Final Report
R. DiPippo, J. Kestin, and P. F. Maeder Jun. 1981 15 p refs
(Contract DE-AS02-76ET-28320)
(DE81-027854; DOE/ET-28320/48) Avail: NTIS HC A02/MF A01

A list of project activities, meetings, and publications is presented. DOE

N82-11586# AiResearch Mfg. Co., Torrance, Calif.
LIGHT-COMMERCIAL BRAYTON/RANKINE SPACE-CONDITIONING SYSTEM
David Friedman, Kenneth Trester, and Wiley Cowell 1981 7 p ref Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-024137; CONF-810672-6) Avail: NTIS HC A02/MF A01

A heat-actuated space conditioning system that provides more efficient use of natural gas developed for 26.4- to 87.8-kW-(7.5- to 25-ton) commercial applications is described. The system consists of a subatmospheric naturalgas-fired, Brayton-cycle engine that drives a Rankine-cycle heat pump. A centrifugal Freon compressor is driven directly from the Brayton engine rotating group thorugh a permanent-magnet coupling. Unique features that offer high life-cycle performance include a hermetically sealed magnetic coupling, air foil bearings, an atmospheric in-line combuster, and a high-temperature recuperator. Predicted overall engine efficiency is 27% and predicted overall coefficient of performance (COP) at he energy source is 1.0 in cooling and 1.2 heating. Cycle description system performance predictions, energy savings and payback cost analysis, hardware development, and the program status are discussed. DOE

N82-11587# Oak Ridge National Lab., Tenn. Energy Div.
GEOTHERMAL HEAT TRANSFER, DISTRICT HEATING AND COOLING
J. W. Michel 1981 4 p refs Presented at the Heat Transfer and Heat Exchangers Workshop, Vail, Colo., 18 Jun. 1981
(Contract W-7405-eng-26)
(DE81-023195; CONF-810679-1) Avail: NTIS HC A02/MF A01

The types of geothermal systems are defined. Heat rejection and scaling problems in power cycles are mentioned and other heat transfer areas of interest in geothermal applications are indicated. DOE

N82-11588# Princeton Univ., N. J.
IS GEOTHERMAL SIMULATION A CATASTROPHE?
V. V. Nguyen and George F. Pinder 1980 5 p refs Presented

at 6th Ann. Workshop on Geothermal Reservoir Engr., Stanford, Calif., 16-18 Dec. 1980
(DE81-026750; CONF-801233-10) Avail: NTIS HC A02/MF A01

All numerical simulators of geothermal reservoirs depend upon an accurate representation of the thermodynamics of steam-water systems. These relationships are required to render tractable the system of balance equations derived from the physics of flow through porous media. While it is generally recognized that steam-water system (i.e., two phase) is not thermodynamic equilibrium, equilibrium thermodynamics are employed in its description. An alternative view based on non-equilibrium thermodynamics is presented. The underpinnings of this approach are found in a branch of topology generally referred to as catastrophe theory. DOE

N82-11589# Brookhaven National Lab., Upton, N. Y. National Center for Analysis of Energy Systems.
MODELING ENERGY-CONSERVATION POTENTIALS OF COMMUNITY ENERGY-SYSTEM TECHNOLOGIES
Peter I. Kleeman 1981 8 p refs Presented at 12th Ann. Pittsburg Conf. on Modeling and Simulation, 30 Apr. - 1 May 1981
(Contract DE-AC02-76CH-00016)
(DE81-026059; BNL-29720; CONF-810477-2) Avail: NTIS HC A02/MF A01

A mathematical model is presented for estimating energy-conservation potentials of community-energy-system technologies in meeting community energy service demands. The model is formulated to identify optimal community composition, technology choices, and fuel use under various fuel price, energy service demand, and other system-parameter assumptions. DOE

N82-11590# Franklin Associates, Prairie Village, Kans.
PRELIMINARY DEVELOPMENT OF A TECHNIQUE FOR ESTIMATING MUNICIPAL-SOLID-WASTE GENERATION
Jun. 1981 84 p refs
(Contract DE-AC01-78CE-24390)
(DE81-024152; DOE/CE-24390/1) Avail: NTIS HC A05/MF A01

The data obtained revealed detailed generation quantities by collection route for defined areas of the cities. These data were then used to test various predictive factors. The end result of the analysis is a provisional method for estimating residential solid-waste generation by relating it to income data readily available from government documents, and a provisional method for estimating commercial solid waste generation by relating it to readily available retail sales data. The analysis of the data obtained has resulted in a residential solid-waste estimation technique that can be applied to virtualy any city or region of interest. The general approach consisted of: data collection from selected solid waste jurisdictions, the determination of devographic and socioeconomic data for each solid waste jurisdiction, and data analysis. Each stage is discussed. DOE

N82-11591# Los Alamos Scientific Lab., N. Mex.
ADVANCED DEVELOPMENT OF ELECTRICAL-ENERGY-STORAGE COMPONENTS FOR HIGH RELIABILITY APPLICATIONS
K. J. Bickford, G. H. Mauldin, and W. J. Sarjeant 1981 5 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025384; LA-UR-81-1671; CONF-810659-15) Avail: NTIS HC A02/MF A01

This program was undertaken in order to study the following: design and fabrication of prototype test capacitors; dc partial discharge analysis; repetitive charge-discharge life testing; theoretical and experimental analysis; and computer modeling. A brief overview of each of these program elements is presented. DOE

N82-11592# California Univ., Berkeley. Energy and Environment Div.
INTERNATIONAL COMPARISON OF RESIDENTIAL ENERGY USE: INDICATORS OF RESIDENTIAL ENERGY USE AND EFFICIENCY. PART 1: THE DATA BASE
Lee Schipper, Andrea Ketoff, and Stephen Meyers May 1981 129 p refs
(Contract W-7405-eng-48)
(DE81-028550; LBL-11703) Avail: NTIS HC A07/MF A01

Information is presented on the end-uses of energy in the residential sector of seven major OECD countries over the period 1960-1978. Data are presented on energy consumption by energy type and end-use for three to five different years for each country. Each year table is complemented by a set of indicators, which are assembled for the entire 20-year period at the end of each country listing. Finally, a set of key indicators from each country is displayed together in a table, allowing comparison for three periods: early (1960-63), pre-embargo (1970-73), and recent (1975-78). DOE

N82-11593# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
CONTROLS FOR SOLAR HEATING AND COOLING
M. Warren, Steven Schiller, and Michael Wahlig Jun. 1981 4 p refs Presented at the Active Solar Contractors' Rev. Meeting, Washington, D.C., Sep. 1981
(Contract W-7405-eng-48)
(DE81-025209; LBL-12751; CONF-810912-8) Avail: NTIS HC A02/MF A01

Solar heating system operation with two different operating strategies were run: direct collector to load heating and storage coupled heating. No significant improvement in system performance was found for the direct heating strategy. Simulation analysis of the interaction of the solar heating system with the building load and thermostat was completed. It is indicated that using a conventional room thermostat, large temperature swings can be expected when the storage tank is charged to a high temperature. DOE

N82-11594# California Univ., Berkeley. Lawrence Berkeley Lab.
OVERVIEW OF THE APPLIED BATTERY AND ELECTROCHEMICAL RESEARCH PROGRAM
F. McLarnon Jun. 1981 15 p Presented at the 4th DOE Battery and Electrochem. Contractors' Conf., Washington, D.C., 2 Jun. 1981
(DE81-027397; LBL-12690; CONF-810642-5) Avail: NTIS HC A02/MF A01

This purpose of this program is to provide the applied research base which supports all of DOE's electrochemical systems missions, and the general objective is to help provide batteries and electrochemical systems that can satisfy economic, performance and schedule requirements. The specific goal is to identify the most promising electrochemical technologies and transfer them to industry and/or another DOE program for further development and scale-up. DOE

N82-11595# California Univ., Berkeley. Lawrence Berkeley Lab.
RECHARGEABLE MOLTEN-SALT CELLS
Elton J. Cairns Oct. 1980 23 p refs Presented at the 158th Meeting of the Electrochem. Soc., 3rd Intern. Symp. on Molten Salts, Phys. Electrochem. Div., Hollywood, Fla., 5-10 Oct. 1980
(Contract W-7405-eng-48)
(DE81-027091; LBL-11090; CONF-8010159-12) Avail: NTIS HC A02/MF A01

Rechargeable molten-salt cells offer the opportunity for achieving higher specific energy than is available from ambient temperature cells (200 W-h/kg), and a specific power in excess of 100 W/kg. Two main of rechargeable cells employing molten salts are statistical those with a molten salt as the sole electrolyte, and those with a combination of a solid electrolyte and a molten salt electroylte. The status, recent research, and current problems for each of several systems in the above two categories are discussed. DOE

N82-11596# California Univ., Livermore. Lawrence Livermore Lab.
MECHANICAL ENERGY STORAGE TECHNOLOGY (MEST) DEVELOPMENT
Thomas M. Barlow 22 Jun. 1981 8 p refs Presented at the Mech., Magnetic, and Underground Energy Storage Ann. Contractors' Rev., Washington, D.C., 24-26 Aug. 1981
(Contract W-7405-eng-48)

(DE81-026800; UCRL-86297) Avail: NTIS HC A02/MF A01

The objectives, approaches, structure, and principal accomplishments of the flywheel technology program during FY 1981 are summarized. International flywheel-related technology and complementary efforts in the United States are reviewed. DOE

N82-11597# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
INTERFACE REACTIONS IN Mg/Zn3P2 SOLAR CELLS
L. L. Kazmerski, P. J. Ireland, and A. Catalano (Inst. of Energy Conversion) May 1981 5 p refs Presented at the 15th IEEE PV Spec. Conf., Orlando, Fla., 11 May 1981
(Contract DE-AC02-77CH-00178)
(DE81-025773; SERI/TP-611-1226; CONF-810526-30) Avail: NTIS HC A02/MF A01

The composition and chemistry of the Mg/Zn3P2 interface was studied using surface analysis techniques. For higher carrier concentrations (p> 10 to the 17th power/cu cm), a heterojunction occurs by the chemical interaction of the Mg with Zn3P2 to form Mg3P2. For lower carrier concentrations this reaction does not take place, and Mg diffuses into the Zn3P2. Diffusion coefficients of Mg in Zn3P2 are determined. Grain (crystalline) and grain boundary components of the diffusion coefficient are evaluated. These data compare very well with that reported using electron beam induced currents and spectral response measurements. DOE

N82-11598# Los Alamos Scientific Lab., N. Mex.
CORRELATION METHODS
J. D. Balcomb 1981 6 p refs Presented at 6th Natl. Passive Conf., Portland, Oreg., 8-12 Sep. 1981
(Contract W-7405-eng-36)
(DE81-025379; LA-UR-81-2003; CONF-810925-1) Avail: NTIS HC A02/MF A01

Correlation methods were developed to provide a quick and relatively simple technique for estimating the performance of passive solar systems. The correlations are done with respect to data generated from simulation models. The techniques and accuracies are described. Both the Solar Load Ratio and Un-Utilizability methods are described. The advantages and limitations of correlation methods as design tools are discussed. DOE

N82-11599# Los Alamos Scientific Lab., N. Mex.
TEST RESULTS AND ANALYSIS OF A CONVECTIVE LOOP SOLAR AIR COLLECTOR
Franz A. Biehl 1981 6 p refs Presented at the 6th Natl. Passive Solar Conf., Portland, Oreg., 8-12 Sep. 1981
(Contract W-7405-eng-36)
(DE81-028151; LA-UR-81-2252; CONF-810925-3) Avail: NTIS HC A02/MF A01

The purpose of the test program is to validate simulation model that can also be extended to other collector arrangements and to a variety of weather patterns. Details of the collector configurations, typical test results, simulation model, and comparison between test and analysis results are discussed. The good agreement between test and analysis suggests that the analytical model can be employed for sensitivity studies. A range of desirable collector lengths, based upon efficiency considerations, was determined employing the analytical model. DOE

N82-11600# Los Alamos Scientific Lab., N. Mex.
LONG-TERM PERFORMANCE OF THE HUNN PASSIVE SOLAR RESIDENCE
B. D. Hunn 1981 6 p refs Presented at 6th Natl. Passive Conf., Portland, Oreg., 8-12 Sep. 1981
(Contract W-7405-eng-36)
(DE81-028735; LA-UR-81-2251; CONF-810925-6) Avail: NTIS HC A02/MF A01

Detailed performance and annual energy consumption data are reported, as well as occupant observations and conclusions, for three heating seasons in the Hunn hybrid passive/active solar residenced located in Los Alamos, New Mexico. The performance data were gathered by the Los Alamos National Laboratory and include hourly storage wall and interior temperature data for a midwinter period, an interior air-temperature histogram, and measured auxiliary energy consumption and solar heating fraction for each heating season. Also, energy and cost savings over the three-year period are estimated. DOE

N82-11601# Los Alamos Scientific Lab., N. Mex.
ATTACHED SUNSPACE DESIGN ANALYSIS
Robert W. Jones and Robert D. McFarland 1981 6 p refs Presented at the 6th Natl. Passive Solar Conf., Portland, Oreg., 8-12 Sep. 1981
(Contract W-7405-eng-36)
(DE81-028738; LA-UR-81-2206; CONF-810925-2) Avail: NTIS HC A02/MF A01

The 28 sunspace reference designs are described. Note is taken of those designs (the semi-enclosed geometries) analyzed more recently than the previously published reports. The role of sensitivity studies is discussed, and some sample plots of sunspace performance sensitivity to key design parameters are presented. The monthly solar load ratio (SLR) correlations were reviewed with emphasis on the modified SLR used in the sunspace analysis. The application of the sunspace SLR correlations to monthly design analysis is outlined. DOE

N82-11602# Los Alamos Scientific Lab., N. Mex.
HEAT STORAGE DURATION
J. Douglas Balcomb 1981 6 p refs Presented at 6th Natl. Passive Conf., Portland, Oreg., 8 Sep. 1981
(Contract W-7405-eng-36)
(DE81-026635; LA-UR-81-2186; CONF-810925-4) Avail: NTIS HC A02/MF A01

Both the amount and duration of heat storage in massive elements of a passive building are investigated. Data taken or one full winter in a solar home are analzyed with the aid of subsystem simulation models. Heat storage duration is tallied into day intervals. Heat storage location is discussed and related to overall energy flows. DOE

N82-11603# Lincoln Lab., Mass. Inst. of Tech., Lexington.
PHOTOVOLTAIC OPERATIONS MANUAL RADIO STATION WBNO
D. N. Klein Mar. 1981 124 p refs
(Contract DE-AC02-76ET-20279)
(DE81-027439; DOE/ET-20279/110) Avail: NTIS HC A06/MF A01

The photovoltaic system operator is provided with the information needed to return to normal operation if the system has shut down and to maintain it in good operating condition. Appropriate safety information is provided for personal and equipment safeguarding. The site and equipment are briefly described. DOE

N82-11604# Sandia Labs., Albuquerque, N. Mex.
NON-SOLAR POWER TESTS AT THE CENTRAL RECEIVER TEST FACILITY (CRTF)
J. T. Holmes 1981 22 p refs Presented at Solar Thermal Test Facilities Users Assoc. Ann. Business and Tech. Meeting, Pasadena, Calif., 20 Apr. 1981
(DE81-026955; SAND-81-1546C) Avail: NTIS HC A02/MF A01

In addition to programs to develop central receiver technology components, r of other tests are summarized that use some of the unique capabilities of the CRTF. The three major noncentral receiver component tests have been a Navy/Applied Physics Laboratory simulation of aerodynamics heating of a missile nose-cone, a Sandia-Rockwell International gallium arsenide photovoltaic array, and a DNA/Science Applications development of a secondary beam concentrator. DOE

N82-11605# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
GROWTH OF SILICON SHEETS FROM METALLURGICAL-GRADE SILICON
T. F. Ciszek, M. Schietzelt, L. L. Kazmerski, J. L. Hurd, and B. Fernelius May 1981 9 p refs Presented at 15th IEEE Photovoltaic Specialists Conf., Orlando, Fla., 12-15 May 1981
(Contract DE-AC02-77CH-00178)
(DE81-025703; SERI/TP-611-1231; CONF-810526-32) Avail: NTIS HC A02/MF A01

Impure silicon is difficult to solidify in sheet form because of morphological proturberances which may result from constitutional supercooling. Sheet growth methods which require a spcific crystallographic orientation or which are characterized by a narrow melt meniscus are most affected by this problem. The edge-supported pulling technique was applied to sheet growth of metallurgical grade silicon and DAR (Direct Arc Reactor) silicon. The 7 mm meniscus height associated with this technique allowed the growth of 5 cm wide sheets from both materials. In each case, the sheets were p-type. DOE

N82-11606# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

USE OF SOLAR THERMAL ENERGY TO GENERATE ELECTRICITY

L. M. Murphy Jul. 1981 22 p refs Presented at Energy in the Man-built Environ.: The Next Decade Specialty Conf., Vail, Colo., 3-5 Aug. 1981; sponsored by ASME
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-028797; SERI/TP-632-1287; CONF-810808-9) Avail: NTIS HC A02/MF A01

Solar thermal electric technology is reviewed. Technical approaches which result in net solar to electric conversion efficiencies ranging from less than 1 percent to more than 20 percent are discussed. The status of the various solar thermal electric concepts and the principal areas of research for each respective concept are resited. Cost issues and prospects for the economic competitiveness of solar thermal electric systems with conventional systems are outlined. DOE

N82-11607# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

BIOLOGICALLY ASSISTED PHOTOELECTROCHEMICAL CELL

M. Seibert and Michael Kendall-Tobias Apr. 1981 5 p refs Presented at 15th AS/ISES Meeting, 26-30 May 1981
(DE81-025905; SERI/TP-623-1164) Avail: NTIS HC A02/MF A01

Chromatophore vesicles isolated from the photosynthetic bacterium Rhodospeudomonas sphaeroides were absorbed as a film on SnO2 Electrodes and examined in a photoelectrochemical cell. The photovoltage and photocurrents generated by the cell under steady-state red light irradiation were dependent on the state of the chromatophores as modified by the chemical properties of the cell electrolyte including pH, salt concentration, redox couple, and redox potential. The cell was operable in the redox range where to c2 cytochrome was reduced and the quinone pool was oxidized. Both these components are carries, in the cyclic electron transport system of bacterial photosynthesis and must control electron transport between the chromatophore membrane and the electrodes. DOE

N82-11608# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

THIN-FILM POLYCRYSTALINE SILICON SOLAR CELLS: PROGRESS AND PROBLEMS

T. Surek, A. P. Ariotedjo, G. C. Cheek, R. W. Hardy, J. B. Milstein, and Y. S. Tsuo May 1981 11 p refs Presented at 15th Photovoltaic Specialists Conf., 12-15 May 1981, Orlando, Fla.
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-025704; SERI/TP-614-1235; CONF-810526-37) Avail: NTIS HC A02/MF A01

The progress in cell research in the basic understanding of the effects of grain boundaries and the passivation of these effects was reviewed. Current concerns in this area include the scalability of the more promising approaches, the reliability and stability of the cells and modules, and an assessment of the low-cost potential of the technologies. T.M.

N82-11609# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

NATIONAL PHOTOVOLTAIC PROGRAM IN AMORPHOUS MATERIALS

Jack Stone, Ed Sabisky, Harry Mahan, Tom McMahon, and Frank Jeffrey May 1981 6 p refs Presented at the 15th Photovoltaic Specialists Conf., Orlando, Fla. 12-15 May 1981
(Contracts DE-AC02-77CH-00178; EG-77-CH-01-4042)
(DE81-025906; SERI/TP-614-1216) Avail: NTIS HC A02/MF A01

The development of high efficiency (10% goal), cost effective (15-40 cents per peak watt goal), thin film solar cells is investigated. The status of this program, other research activities, and expected near term performance improvements are summarized. DOE

N82-11610# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

ANALYSIS OF INDIUM-PHOSPHIDE/INDIUM TIN OXIDE SOLAR CELLS

T. J. Coutts (Newcastle upon Tyne Polytechnic, England), N. M. Pearsall (Newcastle upon Tyne Polytechnic, England), R. Nottenburg, P. J. Ireland, and L. L. Kazmerski May 1981 7 p refs Presented at 15th Photovoltaic Specialists Conf., Orlando, Fla., 12-15 May 1981
(Contracts DE-AC02-77CH-00178)
(DE81-025907; SERI/TP-613-1225; CONF-810526-36) Avail: NTIS HC A02/MF A01

The mechanisms that underlie the operation of p-InP/N-ITO solar cells fabricated by depositing thin films of ITO onto InP substrates by both RF sputtering and ion-beam sputtering were investigated. The RF sputtered devices behave like SIS or heterojunction cells. The ion-beam sputtered cells behave more like buried homojunction devices. It is sown that the properties of these cells depend not only on the method of fabrication, but also on several other complicating effects which occur before, during and after deposition of the ITO. DOE

N82-11611# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

OCEAN ENERGY-WAVES, CURRENTS, AND TIDES

J. Miles and B. Shelpuk May 1981 11 p refs Presented at Energy in the Man-Built Environ. Urban Planning and Develop. Div. Spec. Conf., Vail, Colo., 3-5 Aug. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-025708; SERI/TP-634-1195; CONF-81080808) Avail: NTIS HC A02/MF A01

An overview is presented on the mechanical forms of ocean energy; i.e., waves, currents, and tides. Following an introductory section on wave mechanics, each of the three forms of ocean energy is considered under the headings of the resource, device types for energy extraction, and prognosis for practical implementation. DOE

N82-11612# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

ANALYSIS OF SOLAR DESICCANT SYSTEMS AND CONCEPTS

R. Barlow May 1981 5 p refs Presented at the Active Contractor's Rev. Meeting, Washington, D.C., Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-023027; SERI/TP-631-1254; CONF-810912-6) Avail: NTIS HC A02/MF A01

The modeling of desiccant systems is described. Computer programs for predicting the performance of silica gel beds in single-blow situations and in cyclically operating desiccant cooling systems (DESSIM) are presented. The single-blow model has been validated and shows excellent agreement with experimental data. Experimental data published by Koh are shown along with the corresponding prediction using DESSIM. DOE

N82-11613# Department of Energy, Washington, D. C. Office of Policy, Planning and Analysis.

INTERRELATIONSHIPS OF ENERGY AND THE ECONOMY: A SUPPLEMENT TO THE NATIONAL ENERGY POLICY PLAN REQUIRED BY TITLE VIII OF THE US DEPARTMENT OF ENERGY ORGANIZATION ACT (PUBLIC LAW 95-91)

Jul. 1981 70 p refs
(DE81-027526; DOE/PE-0030) Avail: NTIS HC A04/MF A01

This study developed a fairly wide range of estimates for the impact of energy prices on such key variables as real gross national product, inflation, and the US trade balance. The retrospective analysis suggests that potential economic output in the near future is being affected adversely by such energy price results from the recent past as lower investment, reduced labor force participation, slower growth in labor productivity, and reduced access to real energy resources. Policies that seek to stimulate the supply side of the economy (including policies that seek to stimulate the specific development of energy resources) are directed at offsetting such past effects. 1981-90 projections are presented of the impacts upon the economy in the three energy price scenarios developed in the document Energy Projections to the Year 2000. DOE

N82-11614# Wisconsin Center for Public Policy, Madison.
SOLPLAN REPORT: AN ASSESSMENT OF BARRIERS AND INCENTIVES TO CONSERVATION AND ALTERNATIVE-ENERGY USE IN THE RESIDENTIAL SECTOR IN WISCONSIN
C. K. Fulenwider, Lonnie S. Weiss, Carol Pfefferkorn, Don E. Wiener, and Stephen E. Feldmam Mar. 1981 453 p
(Contract DE-FG02-79CS-30292)
(DOE/CS-30292/3) Avail: NTIS HC A20/MF A01

The Alternative Energy Policy Project of the Wisconsin Center for Public Policy focused upon two principle objectives: gathering the heating industry generally, the alternative-energy industry commercialization; and building consensus around alternative energy policy to develop guidelines for alternative energy policy for the state. Particular attention was paid to public involvement in the policy process and to assessing barriers and incentives from as many key sectors of the energy field as possible. Data were gathered from the general public, alternative energy users, the heating industry generally, the alternative-energy industry specifically, and key decision makers. T.M.

N82-11615# Old North Mfg. Co., Inc., Lenoir, N.C.
SOL-CYCLE: A SOLAR-ASSISTED SOLVENT-RECYCLING PROCESS FOR ASPHALT-IMPREGNATION OF FIBER BOARD
Ben E. Edwards 1 Apr. 1981 12 p
(DE81-903377; NCEI-0031) Avail: NTIS HC A02/MF A01

To conserve resources and energy in the production of Flex-Joint, an asphalt-impregnated fiber board, a manufacturing process was developed. The Sol-Cycle process provides for: (1) recycle of the solvent used in the saturation step; (2) conversion of raw to finished board in 24 hours; (3) better control of the saturation step; and (4) the use of solar energy for a part of the driving force to accomplish (1) and (2). DOE

N82-11616# South Carolina Energy Research Inst., Columbia.
RESIDUAL-ENERGY-APPLICATIONS PROGRAM: EAST-FACILITY REQUIREMENTS DOCUMENT
P. W. Yngve and F. H. Zander 31 Jul. 1981 237 p refs
(Contract DE-AC09-77ET-12866)
(DE81-027489; DOE/ET-12866/8-Vol-2) Avail: NTIS HC A11/MF A01

The objectives of the EAST facility are to perform research and development on heat energy recovery and conversion equipment; establish high confidence in system performance, system availability, and system operating, maintenance, and material costs; and provide a national competence in technologies required for the installation and operation of heat recovery systems. Detailed descriptions of seven potential test articles which represent a wide range of types and sizes of heat recovery systems were contained. EAST operations, including test planning, test policies, systems testing, and facility organization and staffing were discussed. Additionally, information is included on a preliminary site analysis for the EAST Facility and other test support system requirements are described. T.M.

N82-11617# Sandia Labs., Albuquerque, N. Mex.
PERFORMANCE TESTING OF THE TOLTEC TI-410 CONCENTRATING SOLAR COLLECTOR
V. E. Dudley (Edgerton, Germeshausen and Grier, Inc.) and R. M. Workhoven Jul. 1981 55 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029994; SAND-81-0369) Avail: NTIS HC A04/MF A01

Results of tests conducted on the collector are summarized. Collector efficiency, thermal loss, and receiver differential pressure were measured at fluid temperatures from 20 C to 200 C. The collector was evaluated with a glass mirror and with an acrylic/polyester film reflector surface. Four different receiver designs were tested. DOE

N82-11618# Nevada Univ., Boulder City. Desert Research Inst.
ANALYSIS OF SATURATED SOLAR POND CHARACTERISTICS, VOLUME 1 Final Report, 1 Oct. 1979 - 30 Apr. 1981
T. Ochs, C. G. Stojanoff, Don L. Day, Eric Eckert, Jim Langeliers, and David Wruck May 1981 98 p refs
(Contract DE-AS04-79CS-30174)
(DE81-030820; DOE/CS-30174/T2-Vol-1) Avail: NTIS HC A05/MF A01

The actual phenomena taking place in a saturated solar pond are studied. Experimental procedures for solar ponds are presented. In an attempt to summarize the physical properties of salt solutions an exhaustive literature search was conducted. The basic definitions of terms and a summary of the properties of pure water are included. Data are tabulated on a number of binary aqueous solutions (one salt and water). DOE

N82-11619# Oak Ridge National Lab., Tenn. Engineering Technology Div.
OCEAN THERMAL ENERGY CONVERSION GAS-DESORPTION STUDIES. VOLUME 2: DEAERATION IN A PACKED COLUMN AND A BAROMETRIC INTAKE SYSTEM
A. Golshani and F. C. Chen Sep. 1981 64 p refs
(Contract W-7405-eng-26)
(DE81-030469; ORNL/TM-7438-Vol-2) Avail: NTIS HC A04/MF A01

After a review of previous relevant studies, the design of a gas desorption test loop and a barometric intake system are described. The results of vacuum deaeration in a packed column and a barometric intake system are presented, and the savings that can be achieved when the packed column and barometric intake system are combined are discussed. Vacuum deaeration laboratory experiments using three different kinds of packings in a packed column test section and a series of barometric intake deaeration experiments are reported. A conceptual OTEC deaeration subsystem design, based on these results, and its implications on an OTEC-open cycle power system are presented. DOE

N82-11620# Potomac Electric Power Co., Washington, D.C.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 8: DESIGN APPROACHES: UPH Final Report
Jun. 1981 297 p Prepared in cooperation with Acres American, Inc., Buffalo, N.Y. Sponsored in part by Electric Power Research Inst.
(Contract DE-AC02-77ET-28013; EPRI Proj. 1081-1)
(DE81-030673; EPRI-EM-1589-Vol-8) Avail: NTIS HC A11/MF A01

The development of the design approaches used to determine the plant and overall layout for a underground pumped hydroelectric (UPH) storage facility having a maximum generating capacity of 2000 MW and a storage capacity of 20,000 MWh is discussed. Key factors were the selection of the high head pump-turbine equipment and the geotechnical considerations relevant to the underground cavern designs. The comparison of pump-turbine alternatives is described leading to the selection for detailed study of both a single-step configurations, using multistage reversible pump-turbines, and a two-step configuration, with single-stage reversible pump-turbines. DOE

N82-11621# Potomac Electric Power Co., Washington, D.C.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 9: DESIGN APPROACHES: CAES, APPENDIX C. MAJOR MECHANICAL EQUIPMENT Final Report
Apr. 1981 108 p refs Prepared in cooperation with Acres American, Inc., Columbia, Md. Sponsored in part by Electric Power Research Inst.
(Contract DE-AC02-77ET-28013; EPRI Proj. 1081-1)
(DE81-030672; EPRI-EM-1589-Vol-9-App-C) Avail: NTIS HC A06/MF A01

The major mechanical equipment includes the turbine-motor/generator, compressor train, intercooler/aftercooler system, and exhaust gas recuperator. The design criteria for each of these components is interrelated with, and dependent upon, each of the other components within the major mechanical equipment group. Careful consideration of this dependency has resulted in an overall design approach which satisfies the requirements of the CAES operational cycle while providing for a conservative component design. DOE

N82-11622# Lincoln Lab., Mass. Inst. of Tech., Lexington.
CARLISLE HOUSE: AN ALL-SOLAR ELECTRIC RESIDENCE
Burt E. Nichols and Steven J. Strong (Solar Design Associates, Lincoln, Mass.) 1981 4 p Presented at the 15th IEEE Photovoltaic Specialist Conf., Orlando, Fla., 11-15 May 1981 Sponsored by DOE
(DOE/ET-20279/133; CONF-810526-16) Avail: NTIS HC A02/MF A01

A solar photovoltaic array on the roof produces electricity, passive solar features provide much of the space heating, thermal collectors provide domestic hot water, and energy conservation measures reduce electrical and thermal energy requirements to a minimum. The overall performance of the system was reviewed. T.M.

N82-11623# Georgia Inst. of Tech., Atlanta. School of Social Sciences.
AN ASSESSMENT OF SELECTED SOLAR ENERGY INDUSTRY ACTIVITIES
J. David Roessner Nov. 1980 129 p refs
(PB81-222424; NSF/PRA-80-SP-1187) Avail: NTIS HC A07/MF A01 CSCL 05C

The past, present, and near-term conditions of four industries based on solar energy technologies are examined-solar heating; photovoltaics; concentrating solar collectors for process heat and electric power applications; and passive components such as skylights and greenhouses. The report identifies key, unresolved issues for government policies intended to influence future solar industrial development; assesses the past and current federal role in these industries; and draws tentative conclusions about how government policies have affected their evolution. This evolution is compared to the evolution of typical, innovation-based industries. For each of the four solar industries researched, the collected data are discussed as follows: characteristics of sales; the government role; investment strategies and R & D activities; near-term trends; and comparisons with other industries. GRA

N82-11624# State Univ. of New York at Albany.
SITE SELECTION FOR SMALL WIND ENERGY CONVERSION SYSTEMS FOR US DEPARTMENT OF ENERGY FIELD EVALUATION PROGRAM
Bruce H. Bailey Oct. 1980 67 p Sponsored by New York State Energy Research and Development Authority
(PB81-226862; NYSERDA-81-2) Avail: NTIS HC A04/MF A01 CSCL 10A

The site selection procedure followed to locate two qualified sites for the installed and monitoring of two commercially available small wind energy conversion systems as part of the U.S. Department of Energy's Field Evaluation Program is described. The aim of the evaluation program is to gain operating experience with wind systems in actual locations and to identify the siting and operational issues involving wind energy conversion systems. The two sites selected were approved as test sites for the program. GRA

N82-11625# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mechanical Engineering, Aeronautical Engineering and Mechanics.
THE ROGERS FOCUSING HELIOSTAT EXPERIMENTAL PROGRAM AT RENSSELAER POLYTECHNIC INSTITUTE
W. E. Rogers, D. N. Borton, and M. P. Rice Dec. 1980 39 p Sponsored by New York State Energy Research and Development Authority
(PB81-226813; Rept-80-24; NYSERDA-80-24) Avail: NTIS HC A03/MF A01 CSCL 10A

A research effort to develop a solar collector package designed specifically with the needs and solar resources of the Northeast in mind is described. The heliostat is a concentrating solar collector which is 30 feet high, 34 feet wide and has 864 square feet of mirror concentrator. Electric controls move the structure so it tracks the path of the Sun as it rises and sets and moves across the sky. When the Sun is not shinning, the mirrors turn down, shielding them from the dirt, ice and snow. However, when it rains the mirrors turn up for cleaning, helping to keep them in peak operating condition. The heliostat's design incorporates a concentrating capability which takes the diffuse energy of the Sun and focuses it, creating temperatures of more than 3,600 F and producing enough steam as a result to displace 70 kW of electricity at peak operation. The unit tested in this demonstration was used for space heating, and domestic hot water as well as to fire an absorption air conditioner. GRA

N82-11626# Mitre Corp., McLean, Va. Energy and Resources Div.
US ENERGY STRATEGIES: SOME OPTIONS FOR ELIMINATING OIL IMPORTS BY THE YEAR 2000
Edward G. Sharp, Elaine G. Carlson, Daniel J. Entingh, John J. Fearnsides, Robert P. Foreman, Willard E. Fraize, David Gray, Rodney K. Lay, John G. Leigh, Milton Lytton et al Apr. 1981 23 p refs
(PB81-226052; MTP-81W0002) Avail: NTIS HC A02/MF A01 CSCL 10A

Topic areas discussed include: reasonable choices which eliminate the need for oil imports; potential domestic liquid fuel supplies; capital requirements for increased domestic liquid fuel supplies; potential for reducing liquid fuels demand; and domestic natural gas. Other domestic energy resources and future domestic energy demands are discussed. GRA

N82-11627# National Highway Traffic Safety Administration, Washington, D. C. Technology Assessment Div.
THIRD AUTOMOTIVE FUEL ECONOMY RESEARCH CONTRACTORS COORDINATION MEETING
Charles L. Gauthier, ed. Dec. 1980 777 p refs Proceedings of Conf. held in Washington, D.C., 1-2 Dec. 1980
(PB81-222754) Avail: NTIS HC A99/MF A01 CSCL 10A

Topic areas covered include: industry analyses; driver energy conservation; heavy duty trucks; consumer research and market demand; vehicle weight reduction; and diesel engine studies are presented. Spark ignition engine and drivetrain improvements. GRA

N82-11628# Bureau of Mines, Spokane, Wash. Research Center.
PREVENTING LARGE-BATTERY EXPLOSIONS
D. Cummins and S. F. Pangeri Aug. 1980 17 p refs
(PB81-227373; BM-IC-8842) Avail: NTIS HC A02/MF A01 CSCL 08I

This information circular presents a brief history of the lead-acid battery and describes ways to prevent serious injury from battery explosions when servicing and charging lead-acid batteries, particularly in the surface mining industry. The Mining Safety and Health Administration (MSHA), U.S. Consumer Product Safety Commission, battery maufacturers, and the mining industry have all contributed information as well as recommendations for injury-free handling for this report. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-11629 California Inst. of Tech., Pasadena.
MATHEMATICAL MODELING OF PHOTOCHEMICAL AIR POLLUTION Ph.D. Thesis
Gregory John McRae 1981 796 p
Avail: Univ. Microfilms Order No. 8121063

Air pollution is an environmental problem that is both pervasive and difficult to control. An important element of any rational control approach is a reliable means for evaluating the air quality impact of alternative abatement measures. Such a capability is presented in the form of a mathematical description of the production and transport of photochemical oxidants within an urban airshed. The combined influences of advection, turbulent diffusion, chemical reaction, emissions and surface removal processes are all incorporated into a series of models that are based on the species continuity equations. A delineation of the essential assumptions underlying the formulation of a three-dimensional, a Lagrangian trajectory, a vertically integrated and single cell air quality model is presented. Since Each model employs common components and input data the simpler forms can be used for rapid screening calculations and the move complex ones for detailed evaluations. Dissert. Abstr.

N82-11630 California Univ., Los Angeles.

BEACH FORESHORE SEDIMENTATION BY ORGANIC AND INORGANIC PROCESSES Ph.D. Thesis

Robert Walter Anderhalt 1981 208 p refs

Avail: Univ. Microfilms Order No. 8129016

Inorganic processes of sedimentation are studied using the small-scale sedimentary sequence. Small-scale sedimentary sequences are the trends observed in the sediment characteristics from closely-spaced, mm-scale, stratigraphic intervals. Swash-zone deposition processes may be inferred from the type of sequence observed. Some of the trends correspond to recognizable layers or laminae in the sediment but in places these sequences are not visually obvious. The type of bedding which can be discerned only in small-scale sedimentary sequences or other special treatments (peels, X-radiographs), is referred to of latent bedding. Organic processes of sedimentation were studied using sediment samples collected from various positions within the sandy beach environment. These samples were analyed for total organic carbon (TOC), percent carbonate, percent water, percent gravel, percent sand, percent mud, and grain size for the purpose of determining the controls on TOC in this environment. Dissert. Abstr.

N82-11631 Princeton Univ., N. J.

GEOCHEMICAL CONTROLS ON TRACE METAL TRANSPORT IN AQUEOUS ENVIRONMENTAL SYSTEMS Ph.D. Thesis

Jeffrey Lynn Means 1981 260 p

Avail: Univ. Microfilms Order No. 8121473

Geochemical controls on the mobility of selected trace metals in two different environmental systems are examined. Geochemical processes that are promoting or retarding the leakage of radionuclides from waste disposal pits and trenches and natural controls on trace metal geochemistry in ground, surface, and estuary water are evaluated. Initially, organic controls on trace element transport and the removal mechanisms of trace elements were the principal subjects of interest. Later, inorganic controls on iron and aluminum solubility, bacterial mechanisms of bog iron deposition, and the trace element and organic geochemistry of the estuaries were also investigated. The results of the bog iron deposition study suggest that iron oxidizing bacteria are catalyzing the precipitation of bog iron. Results of both the study areas lead to the generalization that some of the important geochemical controls on trace element transport in aqueous environmental systems are very selective reactions between only trace amounts of reactants. Dissert. Abstr.

N82-11632 Rutgers - The State Univ., New Brunswick, N. J.

NITROGEN DYNAMICS IN A LAGOON DEVELOPMENT AND AN ADJACENT SALT MARSH Ph.D. Thesis

Teruo Sugihara 1981 367 p

Avail: Univ. Microfilms Order No. 8122131

Aquatic nitrogen standing stocks, factors affecting these stocks, and various nitrogen cycle processes were studied at a lagoon housing development and an adjacent salt marsh near Manahawkin, New Jersey. Inorganic (ammonia, nitrate, and nitrite) and total organic nitrogen were measured at a number of stations in both the altered and natural marsh systems. Other factors measured concurrently were water temperature, salinity, dissolved oxygen, and depth among others. During the latter portion of the study, nitrogen fixation activities fo several commmunities in both types of systems were determined using the acetylene reduction methods. The nitrogen inputs due to ammonification, excretion, and precipitation/runoff were also monitored in part at this time. Dissert. Abstr.

N82-11633 California Univ., Los Angeles.

ENVIRONMENTAL PROTECTION AS AN ONGOING COMPONENT OF LARGE FACILITIES ENGINEERING PROJECTS Ph.D. Thesis

Paul Edward Smokler 1981 242 p

Avail: Univ. Microfilms Order No. 8122847

An Environmental Protection System (EPS) was developed. The purpose of the system is to ensure that environmental protection begins at the project conceptual stage, and continues through design, construction, and implementation of construction surveillance. This system, initiated in rudimentary form for the Space Shuttle (West Coast) Space Transportation System was expanded upon and refined in the application of EPS to the Missile X (MX) project. The stages of a large facilities engineering project include systems requirements definition, system design, definition of facility requirements, development of facility criteria, generation of facility designs, facility construction, and facility activation and operation. The EPS is composed to environmental parameters such as endangered species, archaeology, etc. However, the key to its implementation is in the endeavors to translate this scientific intent into the tangible engineering criteria. Dissert. Abstr.

N82-11634* National Aeronautics and Space Administration. Pasadena Office, Calif.

SEWAGE SLUDGE ADDITIVE Patent

John J. Kalvinskas (JPL, California Inst. of Tech., Pasadena), William A. Mueller (JPL, California Inst. of Tech., Pasadena), and John D. Ingham, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 24 Jun. 1980 5 p Filed 28 Jan. 1976 Sponsored by NASA

(NASA-Case-NPO-13877-1; US-Patent-4,209,393;
US-Patent-Appl-SN-652979; US-Patent-Class-210-40;
US-Patent-Class-252-422) Avail: US Patent and Trademark Office CSCL 13B

The additive is for a raw sewage treatment process of the type where settling tanks are used for the purpose of permitting the suspended matter in the raw sewage to be settled as well as to permit adsorption of the dissolved contaminants in the water of the sewage. The sludge, which settles down to the bottom of the settling tank is extracted, pyrolyzed and activated to form activated carbon and ash which is mixed with the sewage prior to its introduction into the settling tank. The sludge does not provide all of the activated carbon and ash required for adequate treatment of the raw sewage. It is necessary to add carbon to the process and instead of expensive commercial carbon, coal is used to provide the carbon supplement. T.M.

N82-11635*# Mitre Corp., McLean, Va. Metrek Div.

SHUTTLE APPLICATIONS IN TROPOSPHERIC AIR QUALITY OBSERVATIONS Final Report

E. Friedman, J. Gupta, and J. Carmichael Aug. 1978 122 p refs Sponsored by NASA

(Contract F19628-78-C-001)

(NASA-CR-145374) Avail: NTIS HC A06/MF A01 CSCL 13B

The role which might be played by the space shuttle in obtaining data which describes the air quality of the north-eastern United States was investigated. The data requirements of users, a model for statistical interpretation of the observations, the influence of orbit parameters on the spatial and temporal sampling and an example of application of the the model were considered. R.J.F.

N82-11636*# National Aeronautics and Space Administration, Washington, D. C.

EFFECTS OF AIRCRAFT NOISE ON THE EQUILIBRIUM OF AIRPORT RESIDENTS: TESTING AND UTILIZATION OF A NEW METHODOLOGY

Jacques Francois Sep. 1981 34 p Transl. into ENGLISH of "Repercussion du Bruit des Avions sur l'Equilibre des Riverains des Aeroports: Test et Mise au Point d'une Methodologie Nouvelle" Paris, Aug. 1977 p 1-134 Transl. was announced as N81-27692 Transl. Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by IFOP/ETMAR

(Contract NASw-3542)

(NASA-TM-76628) Avail: NTIS HC A03/MF A01 CSCL 13B

The focus of the investigation is centered around two main themes: an analysis of the effects of aircraft noise on the psychological and physiological equilibrium of airport residents;

and an analysis of the sources of variability of sensitivity to noise. The methodology used is presented. Nine statistical tables are included, along with a set of conclusions. T.M.

N82-11637# Scripps Institution of Oceanography, La Jolla, Calif. Visability Lab.
MEASUREMENTS OF AEROSOL SIZE DISTRIBUTION IN THE LOWER TROPOSPHERE OVER NORTHERN EUROPE Interim Report
Bruce W. Fitch and Ted S. Cress Jun. 1981 15 p refs
(Contract F19628-78-C-0200; AF Proj. 7670)
(AD-A104272; SIO-REF-81-18; SCIENTIFIC-14; AFGL-TR-80-0192) Avail: NTIS HC A02/MF A01 CSCL 04/1

Airborne measurements of particle size distributions were made at several altitudes within and above the mixing layer at sites near Ahlhorn and Meppen (W. Germany), Rodby (Denmark) and Bruz (France). The distributions were measured over the range 0.2 to 5.9 micrometers in particle radius using a Royco model 220 particle counter. The experimental data gathered at the sites were analyzed in terms of volume-size distributions instead of the commonly used particle number distributions. The volume distribution plots were found to be bimodal with the accumulation mode centered at a mean particle radius in the range 0.26 to 0.49 microns and the coarse particle mode existing beyond 1.0 micron. The data show the accumulation mode is well defined by a log-normal distribution. The values of the measured volume scattering coefficient and mean particle radius of the accumulation mode increase as the maximum particle volume of the mode increases. The existence of an accumulation mode was almost always confined to the mixing layer. It is interesting that haze layers above the mixing layer were found to have a distinct coarse particle mode but, generally, no distinct accumulation mode. The total concentration of particles in each of the two modes appear related for larger values of concentration in the coarse particle mode. Author (GRA)

N82-11638# Bedford Research Associates, Mass.
CHEBYSHEV POLYNOMIAL APPROXIMATION IN THE OPAQUE PROGRAM
P. Tsipouras and T. Costello 30 Jan. 1981 14 p
(AD-A104317; SCIENTIFIC-4; AFGL-TR-81-0056) Avail: NTIS HC A02/MF A01 CSCL 04/1

The use of expansions in Chebyshev polynomials is investigated for determining the size distribution function of aerosol particles. Three different models of size distribution in aerosols, Junge's, a unimodel lognormal model, and the haze L model are considered in this context, and the advantages of the techniques are indicated. Author (GRA)

N82-11639# Atmospheric Radiation Consultants, Action, Mass.
PROOF OF CONCEPT STUDY
A. S. Zachor, F. P. DelGreco, and M. Ahmadjian (AFGL) Hanscom AFB, Mass. AFGL 23 Mar. 1981 42 p refs Prepared for Utah State Univ., Logan
(Contract F19628-77-C-0203; AF Proj. 2310)
(AD-A104338; AFGL-TR-81-0134; SR-6) Avail: NTIS HC A03/MF A01 CSCL 17/5

Field test data were analyzed and computer simulations performed to validate the predictions of an earlier study, which calculated the minimum detectable quantities (MDQ's) of trace gases that can be detected remotely using high-resolution spectroscopy. The study demonstrates convincingly that reliable detection can be achieved near the MDQ level in a benign real-world environment. Author (GRA)

N82-11640# Oak Ridge National Lab., Tenn.
METEOROLOGICAL EFFECTS OF THERMAL ENERGY RELEASES (METER) PROGRAM Annual Progress Report, Oct. 1979 - Sep. 1980
H. W. Hoffman and A. A. N. Patrinos Sep. 1981 87 p refs
(DE81-030431; ORNL/TM-7744) Avail: NTIS HC A05/MF A01

The program was initiated to determine the potential for weather modification arising from the heat and moisture introduced to the atmosphere by the evaporative cooling towers at electric generating plants. The principal program focus was precipitation modification with concentration on the acquisition of rainfall data at the coal fueled Bowen Electric Generating Plant in northwestern Georgia. DOE

N82-11641# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.
KINETICS OF NO/ SUB X FORMATION DURING EARLY STAGES OF PULVERIZED-COAL COMBUSTION Quarterly Report, 4 Apr. - 30 Jun. 1981
W. V. Krill, E. K. Chu, G. C. Snow, S. Pessagno, and H. Tong 31 Jul. 1981 54 p refs
(Contract DE-AC22-80PC-30295)
(DE81-029071; DOE/PC-30295/3; QR-3) Avail: NTIS HC A04/MF A01

Kinetics of NO/sub x/ formation during early stages of pulverized coal combustion, are reported. The well stirred nature of the reactor gas phase region and coal transport air are verified in cold flow and combustion tests. A single pass trajectory of coal paticles through the stirred region was achieved. Preliminary thermal NO/sub x/ formation characteristics of the gas phase and the reactor temperature environment are measured for use with the kinetic model. DOE

N82-11642# Acurex Corp., Mountain View, Calif.
SURVEY OF PARTICULATE EMISSION MACRO- AND MICRO-SAMPLING AND SIZING METHODS
William O. Lipscomb Feb. 1981 116 p refs
(Contract DE-AC18-80FC-10193)
(DE81-028348; DOE/FC-10193/T1; Acurex-TR-81-01/SR) Avail: NTIS HC A06/MF A01

Methods for sampling and fractionating flue gas particulates were developed. The survey was composed of three parts: (1) macro methods; (2) micro methods; and (3) real time-monitoring/sizing methods. A survey and cursory evaluation of commercially available macro, micro, and real time measurement systems is presented. It is concluded that macro and micro methods utilizing impactors and cyclones are available. DOE

N82-11643# Oak Ridge National Lab., Tenn.
TRACE-ELEMENT AND PHASE RELATIONS IN FLY ASH Final Report
L. D. Hulett, A. J. Weinberger, N. M. Ferguson, K. J. Northcutt, and W. S. Lyon Electric Power Research Inst. May 1981 70 p refs Sponsored in part by Electric Power Research Inst.
(Contract W-7405-eng-26; EPRI Proj. 1061)
(DE81-028555; EPRI-EA-1822) Avail: NTIS HC A04/MF A01

Matrix components were isolated and individually analyzed to determine trace element distributions. After particle sizing and extraction of magnetic components, the aluminosilicate phases were etched in 1 percent HF to remove glasses comingled with mullite and quartz. Neutron activation and atomic absorption analyses showed tha most of the +1- and +2-valent elements, rare earths, and certain transition metals were concentrated in the glass phases. Cr, V, Ti, Fe, Ga, and Zr, which are trivalent and tetravalent, were concentrated in the crystal phases. X-ray diffraction and elemental analyses show that the main components of the magnetic phase are ferrite compounds with compositions of approximately Fe23AlO7O4. First-row transition elements, V, Cr, Mn, Co, Cu, Ni, and Zn are concentrated by factors as high as 50 in the magnetic phases. DOE

N82-11644# Argonne National Lab., Ill. Energy and Environmental Systems Div.
SOLID AND HAZARDOUS ENERGY WASTES: SYNFUELS. 1: REVIEW OF RESEARCH ACTIVITIES
L. Fradkin, T. Surles, and W. DeCarlo May 1981 164 p refs Sponsored in part by EPA
(Contract W-31-109-eng-38)
(DE81-028503; ANL/EES-TM-142) Avail: NTIS HC A08/MF A01

Chemical and biological research on solid, liquid, and gaseous waste streams from coal conversion and oil shale technologies is summarized. Brief descriptions, the objectives, current activities, and future plans, of ongoing projects were obtained. References to publications that resulted from the various research projects are included. References to work on hazardous and solid synfuel waste are included in the appendixes. DOE

N82-11645# California Univ., Berkeley. Earth Sciences Div.
OTEC ENVIRONMENTAL BIOLOGICAL OCEANOGRAPHIC PROGRAM
E. O. Hartwig Jul. 1981 14 p Presented at the US Dept. of Energy/Marine Technol. Soc. 8th Ocean Energy Conf., Washington, D.C., 7-11 Jun. 1981
(Contract W-7405-eng-48)
(DE81-027402; LBL-12963; CONF-810622-7) Avail: NTIS HC A02/MF A01

The effect of OTEC operations on the environment are discussed. The spatial and temporal patterns of the plankton community in terms of absolute number, biomass and species composition were investigated at potential OTEC sites. The changes with depth of all three measurements are documented. Diel fluctuations in number and species composition was studied at one site. Horizontal and seasonal patterns of variability exist at all sites. The overall trophic structure of the plankton community at these sites using these data, gut content analysis, and information already in the literature is determined. DOE

N82-11646# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
INTERGRATED ASSESSMENT FOR ENERGY-RELATED ENVIRONMENTAL STANDARDS: A SUMMARY OF ISSUES AND FINDINGS
John P. Holdren Oct. 1980 60 p refs
(Contract W-7405-eng-48)
(DE81-028552; LBL-12779) Avail: NTIS HC A04/MF A01

Environmental impacts of energy technologies arise from many stages in the flow of an energy source from discovery to end-use, propagate via disruptions in many media, and manifest themselves as many different undesirable effects. The aim of the investigation is to understand the capacities and limitations of the assessment mechanisms available for use in the formulation of environmental standards applied to energy technologies. T.M.

N82-11647# California Univ., Livermore. Lawrence Livermore Lab.
REPORT OF LAWRENCE LIVERMORE NATIONAL LABORATORY TO THE FEDERAL AVIATION AGENCY ON THE HIGH-ALTITUDE POLLUTION PROGRAM, 1980 Annual Report, 1980
F. M. Luther Dec. 1980 99 p refs
(Contract W-7405-eng-48)
(DE81-028264; UCRL-50042-80) Avail: NTIS HC A05/MF A01

The primary research emphases are numerical modeling of the atmospheric response to stratospheric perturbations and processing and analysis of satellite infrared radiance data to determine global distributions of stratospheric ozone. The modeling effort covers three major research areas: photochemical kinetics, coupled kinetics and transport, and radiative transfer. Tasks completed include: comparison of model simulations of potential changes resulting from aircraft engine emissions and other perturbations, ozone trend analyses, and assessments of coupled perturbations. T.M.

N82-11648# Maine Univ., Orono. Land and Resources Inst.
EFFECTS OF ACID PRECIPITATION ON CATION TRANSPORT IN NEW HAMPSHIRE FOREST SOILS
C. S. Cronan Jul. 1981 51 p refs Prepared for Dartmouth Coll.
(Contract DE-AS02-77EV-04498)
(DE81-027494; DOE/EV-04498/1) Avail: NTIS HC A04/MF A01

The effects of regional acid precipitation on forest soils and watershed biogeochemistry were studied. The following findings are described: (1) acid precipitation causes increased aluminum mobilization and leaching from soils to sensitive aquatic systems; (2) acid deposition shifts the historic carbonic acid/organic acid leaching regime in forest soils to one dominated by atmospheric H_2SO_4; (3) acid precipitation accelerates nutrient cation leaching from forest soils and posses a threat to the potassium resources of northeastern forested ecosystems; (4) while acid rain may pass through some coniferous canopies without being neutralized, similar inputs of acid rainfall to hardwood canopies are neutralized by Bronsted base leaching and by leaf surface ion exchange mechanisms; and (5) progressive acid dissolution of soils in the laboratory provides tool for predicting the patterns of aluminum leaching from soils exposed to acid deposition. DOE

N82-11649# Sandia Labs., Albuquerque, N. Mex.
ENVIRONMENTAL MONITORING REPORT, SANDIA NATIONAL LABS., ALBUQUERQUE, NEW MEXICO, 180
Gloria Chavez Millard, Theodore N. Simmons, Charles E. Gray, and Bill L. ONeal Apr. 1981 27 p refs
(Contract DE-AC04-76DP-00789)
(DE81-027839; SAND-81-0566) Avail: NTIS HC A03/MF A01

Radionuclides are potentially released from five technical areas from the laboratories research activities. The program searches for cesium-137, tritium, uranum, alpha emitters, and beta emitters in water, soil, air, and vegetation. No activity was found in public areas in excess of that found in local background in 1980. The Albuquerque population receives only 0.11 person-rem (estimated) from airborne radioactive releases. While national security research is the laboratories major responsibility, energy research is a major area of activity. Both these research areas cause radioactive releases. T.M.

N82-11650# Ames Lab., Iowa. Dept. of Chemistry.
LIQUID-LIQUID CHROMATOGRAPHY FRACTIONATION OF ORGANIC COMPOUNDS IN COMPLEX MIXTURES: APPLICATION TO AUTOMOBILE EXHAUST Ph.D. Thesis
Steven Gray Colgrove 1980 304 p refs
(Contract W-7405-eng-82)
(DE81-030743; IS-T-914) Avail: NTIS HC A12/MF A01

With the use of the fractionation method, a mixture of organic compounds can be separated into strong acid, weak acid, base, aldehyde, ketone, polar, and nonpolar fractions. Organic compounds, representing several chemical classes, were used to determine how much material would be lost during the fractionation and to determine how well the various compound types could be separated from each other. Most of the compounds tested were recovered in yields which were sufficient to provide good qualitative and quantitative data. Problems relating to impurities introduced into samples by solvents and reagents were examined. In addition, some reactions which led to the formation of artifacts were investigated. DOE

N82-11651# Lovelace Biomedical and Environmental Research Inst., Albuquerque, N. Mex. Inhalation Toxicology Research Inst.
LOW-BTU-GASIFIER EMISSIONS TOXICOLOGY Status Report, Dec. 1980
R. F. Henderson, ed. Apr. 1981 67 p refs
(Contract DE-AC04-76EV-01013)
(DE81-031000; LMF-85) Avail: NTIS HC A04/MF A01

Inhalation hazards to plant workers and the general population that may be associated with low Btu coal gasification were assessed. To achieve this goal, it is necessary to characterize the potential toxicants in liquid and solid process and waste streams. The experimental low Btu gasifier at METC was sampled to determine aerosol components in gaseous process streams and to assess potential toxicants in liquid and solid effluent streams. T.M.

N82-11652# Arizona Univ., Tucson. Dept. of Mining and Geological Engineering.
SULFUR POLLUTION CONTROL. PHASE 1: THE DISPOSAL PROGRAM Final Report, Sep. 1978 - Jun. 1980
Michael Rieber, Benjamin Okech, and Roger Fuller Jan. 1981 263 p refs
(Contract DI-BM-JO-88144)
(PB81-222612; BM-OFR-94(3)-81) Avail: NTIS HC A12/MF A01; also available in set of 4 reports HC E99 CSCL 07A

Sulfuric acid production from sulfur based acid plants and smelters is analyzed and industry competition, with particular emphasis on voluntary versus abatement acid, is reviewed. Production costs for both acid plants and smelters are estimated. Large scale users prefer sulfur based acid production if the heat value of the reaction is utilized as a steam credit. Voluntary acid is a more stable supply source than smelter acid. Voluntary acid output is a reaction to price and demand conditions. An output forecast is made based on APC regulations, implementation, and estimated metals production. GRA

N82-11653# Arizona Univ., Tucson. Dept. of Mining and Geological Engineering.
SULFUR POLLUTION CONTROL. PHASE 2: THE IMPACT OF STACK GAS CLEANUP ON THE SULFUR MINING INDUSTRY OF TEXAS AND LOUISIANA Final Report, Sep. 1978 - Nov. 1980
Michael Rieber, James M. Barker, and Michael Worrall Jan. 1981 116 p refs
(Contract D1-BM-J0-188144)
(PB81-222820; BM-OFR-94(4)-81) Avail: NTIS HC A06/MF A01 CSCL 07A

The analytic time basis is 1979. Industry labor and output characteristics were developed on a company and mines basis. State and local impacts (to the level of independent school districts) were developed on a scenario basis. The measures include income, unemployment, and taxes. Some data are presented on energy and water use. GRA

N82-11654# Exxon Research and Engineering Co., Florham Park, N.J.
CONTROL OF UTILITY BOILER AND GAS TURBINE POLLUTANT EMISSIONS BY COMBUSTION MODIFICATION, PHASE 2 Final Report, Jun. 1976 - Jun. 1979
E. H. Manny and A. R. Crawford Mar. 1981 178 p refs
(Contract EPA-68-02-1415)
(PB81-222267; EPA-600/7-81-039; EE.5E.81) Avail: NTIS HC A09/MF A01 CSCL 13B

The applicability of combustion modification (CM) techniques to control NOx and other pollutant emissions from utility boilers and gas turbines without causing deleterious side effects was studied. Comprehensive, statistically designed tests were used to evaluate the effect of CM. In staged low excess air tests of low-NOx, dual-fired utility boilers, special attention was paid to the determination of potentially adverse side effects; increased combustible emissions, unwanted changes in particulate mass loading and size distribution, reduced boiler efficiency, increased furnace slagging, and tube wall corrosion may be applied to coal fired utility boilers. The extent of furnace tube wall corrosion and slagging could not be determined conclusive. GRA

N82-11655# Arizona Univ., Tucson. Dept. of Mining and Geological Engineering.
SULFUR POLLUTION CONTROL. PHASE 1: THE DISPOSAL PROGRAM (SECTIONS 5 THROUGH 7) Final Report
Michael Rieber, Roger Fuller, and Osmario Dellaretti Jan. 1981 190 p refs
(Contract DI-BM-JO-188144)
(PB81-222804; BM-OFR-94(2)-81) Avail: [illegible]S HC A09/MF A01 CSCL 13B

Sulfur recovery from domestic sour natural gas and petroleum refining on a current basis and projected to the mid-1990's on a regional basis was estimated. The current basis depends importantly on gas production projection for the Overthrust Belt and the associated H2S. The regional basis depends on projected increases in the sulfur content and weight of imported crude oils, total crude oil imports, and anticipated refinery response. GRA

N82-11656# Research Triangle Inst., Research Triangle Park, N. C.
ASSESSMENT OF HAZARD POTENTIAL FROM COMBUSTION OF WASTES IN INDUSTRIAL BOILERS Final Report, Jun. 1980 - Apr. 1981
J. W. Harrison, J. B. White, and W. J. King Jul. 1981 122 p refs
(Contract EPA-68-02-3170)
(PB81-221889; EPA-600/7-81-108) Avail: NTIS HC A06/MF A01 CSCL 21D

Results of a study to determine the extent of the present onsite use of waste fuel in industrial boilers and related process equipment, the nature and quantities of the materials so disposed of, and current regulations concerning such use are presented. Based on contacts with federal, state, and local environmental protection officials, industry personnel, and the open literature, the study concludes that: a wide variety of materials are burned as fuel in standard or appropriately modified combustion equipment: the practice can be exposed to expand due to the economic pressures of hazardous waste disposal and rising fossil fuel costs: and virtually no emission data on waste fuel combustion (except through incineration) is available. GRA

N82-11657# TRW, Inc., McLean, Va. Energy Systems Group.
ENVIRONMENTAL RESEARCH PLAN FOR GAS SUPPLY TECHNOLOGIES. VOLUME 1: EXECUTIVE SUMMARY Final Report
L. M. Tipton and P. D. Junkin 29 May 1981 78 p refs 2 Vol.
(Contract GR1-5080-351-0316)
(PB81-222309; GRI-80/0013.1) Avail: NTIS HC A05/MF A01 CSCL 21D

The environmental impacts and constraints associated with gas supply technologies are summarized. Specific environmental research needs based on state of the art technology and current environmental knowledge are identical. Technologies considered include those producing: unconventiel natural gas (tight gas sands, Devoian shale, coalbed methane, and geopressured methane), SNG from coal and peat and SNG from biomass (land based, water based and waste. GRA

N82-11658# Pacific Environmental Services, Inc., Elmhurst, Ill.
INDUSTRIAL PROCESS FUGITIVE EMISSIONS INVENTORY FOR THE REGION V GREAT LAKES SHORELINE Final Report
Charles Mackus and Eddy Lin 1980 261 p refs
(Contract EPA-68-01-4140)
(PB81-212037) Avail: NTIS HC A12/MF A01 CSCL 13B

The study revealed that approximately 229,000 to 531,000 tons of fugitive particulates were deposited into the Great Lakes during 1978. Large industrial cities such as Chicago, Gary, Cleveland, Toledo, Detroit, and Milwaukee were found to have the largest concentration of major fugitive emission sources. Iron and steel industries were found to be the largest fugitive emission sources bordering the lakes. T.M.

N82-11659# Office of Radiation Programs, Las Vegas, Nev.
AIRBORNE RADIOLOGICAL SAMPLING OF MOUNT ST. HELENS PLUMES
Vernon E. Andrews Apr. 1981 20 p refs
(PB81-213795; ORP-LVF-81-2) Avail: NTIS HC A02/MF A01 CSCL 13B

The samples were analyzed for uranium and thorium isotopes, radium -226, lead-210, polonium-210, and radon-222. Other laboratories analyzed samples to determine particle size distribution and elemental composition. The only samples containing radioactivity above normal ambient levels were collected on May 20. Polonium-210 concentrations in the plume, determined from a sample collected between 5 and 30 km from the crater, were approximately an order of magnitude above background. Radon-222 concentrations in samples collected from the plume centerline at a distance of 15 km averaged approximately four times the average surface concentrations. The small increases in radioactivity would cause no observable adverse health effects. GRA

N82-11660# Washington Univ., Seattle. Dept. of Civil Engineering.
EFFECTS OF PLANFORM GEOMETRY ON TIDAL FLUSHING AND MIXING IN MARINAS Final Report, Oct. 1978 - Sep. 1979
R. E. Nece, E. P. Richey, J. Rhee, and H. M. Smith Jun. 1981 84 p refs
(Grant EPA-R-806146)
(PB81-219537; EPA-600/3-81/039) Avail: NTIS HC A05/MF A01 CSCL 13B

Parameters investigated were: planform geometry aspect ratio; ratio of entrance cross-sectional area to basin planform area; effect of rounding of corners in the basin interior; orientation and of two entrances versus a single entrance. It is concluded that for rectangular planform basins, optimum exchange is achieved when the basin length to width (aspect) ratio lies between 0.5 and 2.0, the interior corners are rounded and the single

entrance centrally located on the seaward side of the harbor.
T.M.

N82-11661# Research Triangle Inst., Research Triangle Park, N. C.
VAPOR-PHASE CRACKING AND WET OXIDATION AS POTENTIAL POLLUTANT CONTROL TECHNIQUES FOR COAL GASIFICATION Final Report, Nov. 1976 - Apr. 1981
W. J. McMichael, S. K. Gangwal, D. A. Green, and F. O. Mixon Jun. 1981 56 p refs
(PB81-219594; RTI/1934/00-01F; EPA-600/7-81-096) Avail: NTIS HC A04/MF A01 CSCL 13B

Bench-scale experiments were used to deterimine rates of hydrocracking and wet oxidation as a function of process conditions and catalyst used. A microreactor system, capable of holding 1.0 cc of material to be screened for catalytic activity, was used in the hydrocracking studies. Benzene and alkylated benzene compounds were used as model compounds in determining the potential of various materials fo cracking rates. Thiophene was used as a model compound for catalyst poisoning studies. Cracking rates were determined for coal-derived materials produced from bituminous and subbituminous coals and materials containing iron and nickel compounds. T.M.

N82-11662# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air Quality Planning and Standards.
CONTROL TECHNIQUES FOR SULFUR OXIDE EMISSIONS FROM STATIONARY SOURCES, SECOND EDITION
Apr. 1981 560 p refs
(Contract EPA-68-02-3173)
(PB81-220048; EPA-450/3-81-004) Avail: NTIS HC A24/MF A01 CSCL 13B

Available data on characterization and sampling methods for sulfur oxides, descriptions of stationary sources of sulfur oxides and control techniques used to reduce sulfur oxide emissions are presented. Control costs and energy and environmental impact of controlling sulfur oxide emissions are also discussed. T.M.

N82-11663# Arizona Univ., Tucson. Agricultural Experiment Station.
LINERS OF NATURAL POROUS MATERIALS TO MINIMIZE POLLUTANT MIGRATION Final Report, Oct. 1975 - Sep. 1977
Wallace H. Fuller Jul. 1981 86 p refs
(Grant EPA-R-803988)
(PB81-221863; EPA-600/2-81-122) Avail: NTIS HC A05/MF A01 CSCL 13B

The use of natural low-cost materials as barriers for minimizing pollution migration out of landfills by retaining contaminants from liquids was investigated. The relative effectiveness of natural low-cost liners of crushed limestone, clayey soil, hydrous oxides of iron, and crushed pecan hulls for minimizing the migration of Be, Cd, Cr, Fe, Ni, Zn, and total organic carbon constituents of municipal solid waste landfill leachates was evaluated. Several leachate variables such as aqueous dilution, aeration, pH, and flux were also studied for their effect on movement of metals through 11 representative U.S. soils. Laboratory investigations using soil columns as a first step in screening for potential liners and manipulation practices are described. Limestone and hydrous iron oxide were found to be potentially useful as porous liners for retention of metallic leachate constituents. The amounts of these materials in natural soil were also found to be useful predictors of contaminant removal. Author

N82-11664# Performance Development Inst., Washington, D.C.
INCENTIVES FOR TECHNOLOGICAL INNOVATION IN AIR POLLUTION REDUCTION: AN ETIP POLICY RESEARCH SERIES. VOLUME 6: INNOVATION BY REGULATION: THE ADMINISTRATION OF CONTROL TECHNOLOGY REQUIREMENTS UNDER THE CLEAN AIR ACT Interim Report
William H. Foskett, Adrienne Jamieson, and Jay Evans Mar. 1981 148 p refs
(Contract NBS-78-3603)
(PB81-221616; NBS-GCR-ETIP-81-93-Vol-6) Avail: NTIS HC A07/MF A01 CSCL 13B

Case histories and analysis regarding the impact on innovation and technology of certain provisions of the Clean Air Act are presented. Since new reforms are built on these requirements, their future is dependent on how they work. The report finds problems in the linkage between the Clean Air Act and industrial innovation. GRA

N82-11665# Performance Development Inst., Washington, D.C.
INCENTIVES FOR TECHNOLOGICAL INNOVATION IN AIR POLLUTION REDUCTION: AN ETIP POLICY RESEARCH SERIES. VOLUME 7: PERIODIC REVIEW AND TECHNOLOGICAL ESCALATION OF PERFORMANCE STANDARDS: NEW SOURCE PERFORMANCE STANDARDS REVIEW PROCESS
William H. Foskett and Terry Olesen Dec. 1980 43 p refs
(Contract NBS-78-3603)
(PB81-218117; NBS-GCR-ETIP-81-94-Vol-7) Avail: NTIS HC A03/MF A01 CSCL 13B

The review was mandated in order to incorporate technological advances that take place since the standards' original formulation. It is shown that revisions are seldom made raising the question as to whether technological advances are overlooked or are non-existent. T.M.

N82-11666# Performance Development Inst., Washington, D.C.
INCENTIVES FOR TECHNOLOGICAL INNOVATION IN AIR POLLUTION REDUCTION: AN ETIP POLICY RESEARCH SERIES. VOLUME 8: CONTROLLED TRADING AND SITE-SPECIFIC SIP REVISIONS: COMPETING FOR ATTENTION IN A CROWDED ADMINISTRATIVE ROUTE Interim Report
Jay Evans Dec. 1980 108 p refs
(Contract NBS-78-3603)
(PB81-218273; NBS-GCR-ETIP-81-95) Avail: NTIS HC A06/MF A01 CSCL 13B

Factors regarding the impacts on innovation of regulatory incentives were studied. The report presents case studies and analysis showing how the success of these reforms is endangered by the slowness of the administrative route for approval in a state implementation plan (SIP). T.M.

N82-11667# Geological Survey, Lakewood, Colo. Water Resources Div.
RAINFALL-RUNOFF MODELING AND PRELIMINARY REGIONAL FLOOD CHARACTERISTICS OF SMALL RURAL WATERSHEDS IN THE ARKANSAS RIVER BASIN IN COLORADO Final Water-Resources Investigation
Russell K. Livingston 1981 49 p refs Prepared in cooperation with the Colorado Div. of Highways and the Federal Highways Administration, Washington, D.C.
(PB81-224313; USGS/WRD/WRI/81-059; USGS/WRI-80-112) Avail: NTIS HC A03/MF A01 CSCL 13B

Both observed and synthetic rainfall-runoff and annual peak-discharge data for 17 rural watersheds were analyzed to evaluate the magnitude, frequency, and volume of floods in the plains region of the Arkansas River basin in Colorado. The results from analysis of observed data were weighted or averaged with results from analysis of synthetic data to provide improved estimates of predicted flood characteristics. The 10-, 25-, 50-, and 100-year peak discharges were regionalized using multiple-regression and station-year methods. Relations were developed to determine peak discharge from contributing drainage area (standard error of estimate 30 to 50 percent) and flood volume from peak discharge (standard error of estimate 62 percent) for ungaged basins between 0.5 and 15 square miles in size. GRA

N82-11668# Clemson Univ., S.C. Water Resources Research Inst.
STABILIZATION CHARACTERISTICS OF DEPOSITS OF BIOLOGIC SOLIDS GENERATED IN AERATED LAGOONS
Linvil G. Rich Mar. 1981 39 p refs
(Contract DE-14-34-0001-9131)
(PB81-224297; WRRI-92; W81-03951; OWRT-B-123-SC(1)) Avail: NTIS HC A03/MF A01 CSCL 13B

Properly-designed dual-power-level multicellular lagoon systems should discharge effluents low both in suspended solids and biochemical oxygen demand. Solids that settle form deposits in which bio-degradable materials decompose in a benthal environment. The rates of benthal stabilization were studied. A deposit formed at the bottom of an aerated water column that was primarily organic under conditions in which aerated lagoon solids were added on a semi-continuous basis was examined. Criteria for the sizing of lagoon cells and the specification of aeration equipment were developed. GRA

N82-11669# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
A GEOCHEMICAL AND SEDIMENTOLOGICAL STUDY OF THE DREDGED MATERIAL DEPOSIT IN THE NEW YORK BIGHT
R. Dayal, M. G. Heaton, M. Fuhrmann, and I. W. Duedall Feb. 1981 188 p refs Prepared in cooperation with State Univ. of New York at Stony Brook
(PB81-224107; NOAA-TM-OMPA-3; NOAA-81042701) Avail: NTIS HC A09/MF A01 CSCL 13B

Investigations of the dredged material deposit reveal that the sediments are composed of a wide variety of sediment types which can be classified as quartz and glauconitic sands, muds, sandy muds, gravel intermixed with muds, and artifact material such as coal and fly ash, wood, slag, metal flakes, glass, etc. Fine grained, black sandy mud is characteristic of dredged material. Glauconitic sand and gravelly quartzose sand are typical of the natural seiment underlying the deposit and in surrounding areas. The spatial distributions of heavy metals such as Pb, Cu, Ag, Hg, Cd, Fe, and Mn in the dredged material deposit exhibit highly variable and considerably elevated concentrations over those observed in sediment outside the deposit and in underlying natural sediment. GRA

N82-11670# University of Southern California, Los Angeles. Inst. for Marine and Coastal Studies.
THE PLANNING AND MANAGEMENT OF CALIFORNIA'S COASTAL RESOURCES Annual Report, 1979 - 1980
1981 132 p
(PB81-224057; NOAA-81042201) Avail: NTIS HC A07/MF A01 CSCL 13B

A report of the University of Southern California's tenth year of participation in the national Sea Grant program is given. Each year the USC Sea Grant program supports one or more projects in each of the following areas: socio-economic systems, living marine resources, non-living marine resources, coastal engineering, marine education, and advisory services. In 1979-80, the USC program supported the following projects: Heterotrophic metabolism of marine dinoflagellates; The role of natural populations of microheterotrophs in carbon cycling in Southern California; Ecology of small tidal lagoon under the influence of urban recreational use; Southern California's nearshore environment: A significant fish nursery; Sediment accumulation and the history of pollution accumulation in San Francisco Bay; Offshore sand and gravel resources, Orange County, California; The port authority as a public enterprise; Problems of harbor modeling. GRA

N82-11671# Environmental Protection Agency, Las Vegas, Nev. Exposure Assessment Research Div.
GEOTHERMAL ENVIRONMENTAL ASSESSMENT: BEHAVIOR OF SELECTED GEOTHERMAL BRINE CONTAMINANTS IN PLANTS AND SOILS Final Report
K. W. Brown Jun. 1981 36 p refs
(PB81-222333; EPA-600/4-81-052) Avail: NTIS HC A03/MF A01 CSCL 13B

The behavior of selected elements found in the Roosevelt Hot Springs KGRA geothermal fluids was investigated in both plant and soil systems. The kinetics of these potential environmental containments were studied by using soil columns and selected cultivated and native plant species. GRA

N82-11672# GCA Corp., Bedford, Mass. Technology Div.
NEW HAMPSHIRE AND VERMONT POINT SOURCE INVENTORY UPDATE FOR NECRMP Final Report
Mahesh C. Shah, Sue Ellen Haupt, and John N. McHenry Apr. 1981 32 p refs
(Contract EPA-68-02-3510)
(PB81-219339; GCA-TR-80-126-G; EPA-450/4-81-017) Avail: NTIS HC A03/MF A01 CSCL 13B

The inventories are for subsequent use in the northeast corridor regional modeling project (NECRMP). Sources meeting the prescribed criteria were identified. Updated data were obtained from the state agencies and processed into NEDS. GRA

N82-11673# National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Div. of Physical Sciences and Engineering.
EVALUATION OF EXHAUST EMISSIONS DATA FOR DIESEL ENGINES USED IN UNDERGROUND MINES
John W. Sheehy Sep. 1980 50 p refs
(PB81-225377; DHHS/PUB/80-146) Avail: NTIS HC A03/MF A01 CSCL 06J

Diesel exhaust pollutants evaluated were nitrogen oxide (10102439) (NO), carbon nonoxide (630080) (CO), and carbon dioxide(124389) (CO2). The pollutants were collected from 4,6 8, and 12 cylinder indirect injection engines prior to installation of any emission control device. NO emissions ranged from 3.8 to 6.0 grams per brake horsepower hour (gm/bhphr). The lowest NO emissions were from the 6 cylinder engine, and highest emissions were produced by the 8 cylinder engine. CO2 exhaust emissions ranged from 580 to 812 gm/bhphr. Average CO2 emissions from the turbocharged aftercooled (TA) engines were 21 percent lower than from the naturally aspirated (NA) engines, and the methane 74828) atmosphere slightly reduced CO2 emissions. CO emissions ranged from 0.8 to 2.4 gm/bhphr. CO emissions from the TA engine were much lower than CO emissions from any of the NA engines. T.M.

N82-11674# Kentucky Univ., Lexington.
USE OF A VEGETATIVE FILTER ZONE TO CONTROL FINE-GRAINED SEDIMENTS FROM SURFACE MINES Final Report
Steven C. Albrecht (Hittman Associates, Inc., Lexington, Ky.) and Billy J. Barfield Mar. 1981 171 p refs Prepared in cooperation with Kentucky Dept. of Natural Resources and Environmental Protection
(PB81-226110) Avail: NTIS HC A08/MF A01 CSCL 08M

This project was initiated with the specific purpose of conducting a field test on vegetation as a viable sediment trapping medium. The project was designed for a field evaluation under typical mining conditions. The filter area was constructed directly below an abandoned surface mine bench, on typical soil types found in mined areas of Eastern Kentucky. The outslope located above the filter was the primary area from which sediment-laden drainage was to be diverted to the inlet monitoring station. Sediment-laden water samples were collected at the inlet flume for comparison with samples collected at the outlet flume to permit evaluation of the sediment removal capability of the vegetative filter. GRA

N82-11675# General Accounting Office, Washington, D. C.
BETTER MONITORING TECHNIQUES ARE NEEDED TO ASSESS THE QUALITY OF RIVERS AND STREAMS, VOLUME 1 Report to the Congress
30 Apr. 1981 135 p refs 2 Vol.
(PB81-225286; CED-81-30-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 13B

The Environmental Protection Agency and the Geological Survey use sampling networks to assess the quality of the Nation's rivers and streams. The Council on Environmental Quality strongly endorses this approach and uses the water quality data from the networks in its annual environmental reports. Water quality is far too complex to be monitored by these networks. Small samples, generally taken monthly cannot account for water quality at individual sites and cannot accurately represent other locations on the same river. Nationwide reports based on data from the networks are not reliable. Special studies of individual rives of river segments would yield more scientifically sound and useful information on water quality. GRA

N82-11676# General Accounting Office, Washington, D. C.
BETTER MONITORING TECHNIQUES ARE NEEDED TO ASSESS THE QUALITY OF RIVERS AND STREAMS, VOLUME 2 Report to the Congress
30 Apr. 1981 212 p 2 Vol.
(PB81-225294; CED-81-30-Vol-2) Avail: NTIS HC A10/MF A01 CSCL 13B

Detailed agency comments are presented. The evaluation by GAO and its consultant of monitoring methods is provided. T.M.

N82-11677# National Bureau of Standards, Washington, D.C. National Measurement Lab.
TECHNICAL ACTIVITIES OF THE OFFICE OF ENVIRONMENTAL MEASUREMENTS - 1980
William K. Kirchhoff May 1981 195 p
(PB81-227860; NBSIR-81-2280) Avail: NTIS HC A09/MF A01 CSCL 13B

Water and air measurements are summarized. The measurements were reviewed for standards development and methods development. T.M.

N82-11678# Cramer (H.E.) Co., Inc., Salt Lake City, Utah.
CALCULATIONS FROM COMPLIANCE EMISSIONS OF LONG AND SHORT TERM SO2 CONCENTRATIONS IN THE SOUTHWEST PENNSYLVANIA AIR QUALITY CONTROL REGION Final Report, 1979 - 1980
May 1981 235 p refs
(Contract EPA-68-02-2547)
(PB81-226078; TR-81-136-01; EPA-903/9-81-001) Avail: NTIS HC A11/MF A01 CSCL 13B

The results of dispersion model calculations of maximum annual, 24 hour and 3 hour average ground level SO2 concentrations for selected areas in the region (AQOR) is described. The primary purpose of the model calculations was to assist EPA Region III and the Pennsylvania Department of Environmental Resources in determining the attainment of nonattainment of the National Ambient Air Quality Standards (NAAQS) for SO2 in the Beaver Valley and Monongahela Valley Air Basins exclusive of Allegheny County. all of the dispersion model calculations were made using the LONGZ and SHORTZ dispersion models with 1980 compliance emissions inventories containing 492 major SO2 sources located within the AQOR and in Ohio and West Virginia near the western border of the AQOR. T.M.

N82-11679# PEDCo-Environmental, Inc., Cincinnati, Ohio.
EPA UTILITY FGD (FLUE GAS DESULFURIZATION) SURVEY Quarterly Report, Jan. - Mar. 1981
M. Smith, M. Melia, N. Gregory, and K. Scalf Aug. 1981 308 p refs
(Contract EPA-68-01-6310)
(PB81-225773; EPA-600/7-81-012C) Avail: NTIS HC A14/MF A01 CSCL 13B

Information contributed by the utility industry, process suppliers, regulatory agencies, and consulting engineering firms is summarized. Domestic FGD systems are tabulated alphabetically by development status (operational, under construction, or in planning stages), utility company, process supplier, process and waste disposal practice. Data on boiler design, FGD system design, fuel characteristics, and actual performance are presented. Unit by unit dependendability parameters, and problems and solutions associated with the boiler and FGD systems are discussed. Process flow diagrams and FGD system economic data are also presented. T.M.

N82-11680 Maryland Univ., College Park.
SELECTED STUDIES OF FOUR HIGH-TEMPERATURE AIR-POLLUTION SOURCES Ph.D. Thesis
Mark Steven Germani 1980 406 p
Avail: Univ. Microfilms Order No. 8121096

The atmospheric emissions of five copper smelters, a coal-fired power plant, a municipal incinerator and the Mt. Erebus volcano in Antarctica were examined. Many chalcophilic elements, e.g., As, Se, Pb, Cd, Zn, W and in, are strongly enriched with respect to the Earth's crustal abundance pattern in particulate material emitted from copper smelters. Vapor-phase concentrations of several elements in a high temperature gas stream and tested at a coal-fired power plant were determined and compared with those from a municipal incinerator. The results from the coal-fired power plant and incinerator indicate that 5-10 times more Hq is emitted from the power plant. Particulate and vapor-Erebus show large enrichments for many elements, most notably the volatile chalcophilic elements, As, Se, In, Cd and Sb, and the halogens, F, Cl and Br. About 95% of the Cl, 24% of the As and > 90% of the F are present in the vapor phase. High concentrations of F are present in the lava lake as evidenced by the ratio of Cl to F found in the vapor-phase samples. Dissert. Abstr.

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation*.

N82-11681 California Univ., Los Angeles.
MONTE CARLO CALCULATIONS OF THE MELTING POINT OF IRON AT CORE PRESSURES Ph.D. Thesis
Robert Stephen Abelson 1981 188 p
Avail: Univ. Microfilms Order No. 8120914

The melting point of iron at pressures in the Earth's core places strong constraints on the temperature in the Earth's core. The melting point was determined from its thermodynamic definition, that the Gibb's free energies of the solid and liquid phases are equal. The Monte Carlo simulations can generate accurate equations of state (EOS) of solids and liquids if the forces between the atoms are understood as evident by their successful modeling of the EOS argon and other rare gases. These computer simulations were successful in locating the melting transitions by elaborate techniques of determining the Gibb's free energies from the equations of state of the solid and liquid phases. This justifies the use of the Monte Carlo method. Dissert. Abstr.

N82-11682 Colorado Univ. at Boulder.
THE QUANTITATIVE RECOGNITION AND EVALUATION OF SEISMIC QUIESCENCE: APPLICATIONS TO EARTHQUAKE PREDICTION AND SUBDUCTION ZONE TECTONICS Ph.D. Thesis
Ray Edward Habermann 1981 276 p refs
Avail: Univ. Microfilms Order No. 8122288

Teleseismically recorded earthquake hypocenters are the only geophysical data related to earthquake occurrence continuously available for many regions of the world. The recognition of patterns in these data which may indicate that preparation for a great event has begun, if they exist, is essential for earthquake prediction in these regions. Techniques for quantitatively recognizing such rate decreases and evaluating their spatial and temporal uniqueness were developed and applied to several seismically active regions of the world. Dissert. Abstr.

N82-11683 Colorado Univ. at Boulder.
GEOLOGY OF THE NAHCOLITE DEPOSITS AND ASSOCIATED OIL SHALES OF THE GREEN RIVER FORMATION IN THE PICEANCE CREEK BASIN, COLORADO Ph.D. Thesis
John Richard Dyni 1981 182 p
Avail: Univ. Microfilms Order No. 8122279

Stratigraphic and lithologic studies of drill cores from 10 exploratory holes reveal that five eights of the nahcolite resource, occurs as crystalline aggregates in marlstone. The remainder of the resource consists of laterally continuous zones of disseminated nahcolite in marlstone and beds of mixed nahcolite and halite. Sedimentologic data indicate that the marlstones and associated sodium minerals were deposited by pelagic, turbiditic, and evaporitic processes in a permanent alkaline lake. Lower lake waters and sediments favored high rates of bacterial reduction of sulfate and hydrolysis of fine grained detrital silicate minerals. These processes resulted in production of bicarbonate and the formation of an authigenic suite of carbonate and silicate minerals devoid of clay and sulfate minerals. Cyclic probably seasonal, stratification is recorded by the laminated marlstones and in some units of disseminated and bedded nahcolite and halite. The vertical distribution of total sulfur in the marlstones is also cyclic and may be related to evaporative phases of the lake. Dissert. Abstr.

N82-11684 Cornell Univ., Ithaca, N. Y.
COCORP TRAVERSES IN WYOMING AND OKLAHOMA Ph.D. Thesis
Jonathan Andrew Brewer 1981 153 p

Avail: Univ. Microfilms Order No. 8119544

Deep crustal seismic reflection data recorded by the Consortium for Continental Reflection Profiling (COCORP) project are processed and interpreted to study the deep structure of continental crust in Wyoming and Oklahoma. The Wyoming data were recorded across the Wind River and Laramie Mountains, two of a series of massive basement uplifts formed during the Laramide orogeny. The COCORP traverse across the Wind River Mountains recorded reflections from a moderately dipping thrust fault that can be traced to middle and possibly lower crustal depths. The mountains were uplifted along this thrust by compression and shortening of the Earth's crust. Numerous other events were recorded on the seismic profiles and these data provide some of the detailed crustal sections yet obtained by COCORP. These COCORP profiles, recorded across mountain ranges lying within the North American craton, demonstrate the utility of deep seismic reflection profiling in delineating the deep structure of continental crust, its mode of deformation and geological history. Dissert. Abstr.

N82-11685 Cornell Univ., Ithaca, N. Y.

STUDIES OF CONTINENTAL AND OCEANIC CRUST FROM SEISMIC, GEODETIC AND MAGNETIC OBSERVATIONS Ph.D. Thesis

Frank Steve Schilt 1981 206 p refs
Avail: Univ. Microfilms Order No. 8119516

Geophysical data were used to infer geological conclusions related to the evolution and tectonics of the earth's crust. A study of plate kinematics based on oceanic magnetic anomalies was conducted. Leveling observations were used to investigate recent vertical crustal movements. Deep crustal seismic reflection profiles are presented. Dissert. Abstr.

N82-11686 Cornell Univ., Ithaca, N. Y.

ELECTRICAL CONDUCTIVITY STRUCTURE OF THE SAN ANDREAS FAULT IN CENTRAL CALIFORNIA Ph.D. Thesis

Wayne Jude Phillips 1981 119 p
Avail: Univ. Microfilms Order No. 8119465

The electrical conductivity structure of a section of the San Andreas fault is investigated by means of an electromagnetic induction experiment utilizing a grounded electric dipole source. The results indicate a sharp contrast in conductivity across the fault zone. The resistivity of the sediments on the northeast side of the fault is approx. 20 ohm-m compared to 1000 ohm-m for the Gabilan granites on the southwest side. There is evidence for a zone of high conductivity beneath the Gabilans. A gravity survey in the areas indicates the presence of a pocket of low density rocks located approx. 1 to 9 Km beneath the Gabilans and 2 Km southwest of the surface trace of the fault. The depth to the conducting layer there correlates resonably well with the upper bound of these rocks. Further away from the fault there is a discontinuity in seismic velocity at 12 Km. The depth to the conducting layer in this area is 13 Km. Farther from the fault zone the seismic velocities and electrical conductivity at depth are consistent with the hypothesis that the Gabilans are underlain by a slab of oceanic crust. Dissert. Abstr.

N82-11687 California Univ., Los Angeles.

LOCAL EARTHQUAKE TRAVEL TIMES AND SPATIAL VARIATIONS OF CRUSTAL VELOCITY IN SOUTHERN CALIFORNIA Ph.D. Thesis

Raymond Andrew Erges 1981 130 p
Avail: Univ. Microfilms Order No. 8120944

Measurements of P-wave arrival times from local earthquakes contain information about differences in crustal velocity within a region. Using 32,000 arrival times recorded by a seismic array in southern California, these spatial variations in velocity were estimated. A statistical model of the behavior of travel time residuals derived from a laterally homogeneous velocity model accounts for the major sources of error in the recording and hypocenter location processes, and leads to a set of editing procedures to remove aberrant data. Edited data were inverted under a variety of assumptions to estimate a laterally varying veocity model using a variation on a method originally developed for teleseismic data. The improvement in the residuals due to the new velocity models is statistically significant. The inversion method appears to underestimate the size of the velocity contrasts, but the results are generally consistent with those obtained using other types of data. A major result is that the Peninsular Ranges have substantially higher average velocity than nearby regions, probably due to differences in crustal tickness and composition. Dissert. Abstr.

N82-11688*# SRI International Corp., Menlo Park, Calif.

IMPROVED SIMULATION OF AEROSOL, CLOUD, AND DENSITY MEASUREMENTS BY SHUTTLE LIDAR Final Report

Philip B. Russell, Bruce M. Morley, John M. Livingston, Gerald W. Grams (Georgia Inst. of Tech.), and Edward W. Patterson Washington NASA Nov. 1981 165 p refs
(Contract NAS1-16052)
(NASA-CR-3473) Avail: NTIS HC A08/MF A01 CSCL 04A

Data retrievals are simulated for a Nd:YAG lidar suitable for early flight on the space shuttle. Maximum assumed vertical and horizontal resolutions are 0.1 and 100 km, respectively, in the boundary layer, increasing to 2 and 2000 km in the mesosphere. Aerosol and cloud retrievals are simulated using 1.06 and 0.53 microns wavelengths independently. Error sources include signal measurement, conventional density information, atmospheric transmission, and lidar calibration. By day, tenuous clouds and Saharan and boundary layer aerosols are retrieved at both wavelengths. By night, these constituents are retrieved, plus upper tropospheric, stratospheric, and mesospheric aerosols and noctilucent clouds. Density, temperature, and improved aerosol and cloud retrievals are simulated by combining signals at 0.35, 1.06, and 0.53 microns. Particlate contamination limits the technique to the cloud free upper troposphere and above. Error bars automatically show effect of this contamination, as well as errors in absolute density nonmalization, reference temperature or pressure, and the sources listed above. For nonvolcanic conditions, relative density profiles have rms errors of 0.54 to 2% in the upper troposphere and stratosphere. Temperature profiles have rms errors of 1.2 to 2.5 K and can define the tropopause to 0.5 km and higher wave structures to 1 or 2 km. Author

N82-11689# Air Force Geophysics Lab., Hanscom AFB, Mass.

STRATOSPHERIC TRACE GAS COMPOSITION STUDIES UTILIZING IN SITU CRYOGENIC, WHOLE-AIR SAMPLING METHODS

Charles C. Gallagher, Charles A. Forsberg, Robert V. Pieri, and Gerald A. Faucher 10 Mar. 1981 50 p refs
(AF Proj. 6687)
(AD-A104375; AFGL-TR-81-0071; AFGL-ERP-732) Avail: NTIS HC A03/MF A01 CSCL 04/1

A balloon borne cryogenic whole air sampler (tri-sampler) is used to obtain one-mole sample quantities at each of three altitudes on a single flight. Samples have been obtained at six altitudes from 12 to 30 km at each of five latitudes from 9 deg N to 64 deg N. The samples are maintained frozen until just prior to analysis; chemiluminescence and gas chromatography techniques are used to determine mixing ratios of NO, NO2, N2O, CFC13 and CF2C12. Variations in mixing ratios with altitude and latitude have been noted, but no variations with time within the stratosphere have been detected over the five-year duration of the flights. Gas calibration procedures include two dynamic dilution methods and one permeation tube method, with close agreement among the methods being noted. Author (GRA)

N82-11690*# Environmental Research and Technology, Inc., Concord, Mass.

VARIATIONS IN ATMOSPHERIC ANGULAR MOMENTUM Technical Report, 1 Jan. 1976 - 31 Dec. 1980

Richard D. Rosen and David A. Salstein Jun. 1981 50 p refs
(Contract NAS5-25870)
(NASA-CR-166712; ERT-TR-A345-T1) Avail: NTIS HC A03/MF A01 CSCL 04A

Twice-daily values of the atmosphere's angular momentum about the polar axis during the five years from 1976 through 1980 are presented in graphs and a table. The compilation is based on a global data set, incorporating 90 perent of the mass of the atmosphere. The relationship between changes in the angular momentum of the atmosphere and changes in the length of day is described, as are the main sources of error in the data. The variability in angular momentum is revealed in a preliminary fashion by means of a spectral decomposition. The data presented shoul stimulate comparisons with other measures of the length of day and so provide a basis for greater understanding of Earth-atmosphere interactions. J.M.S.

N82-11691*# Lunar and Planetary Inst., Houston, Tex.
WORKSHOP ON EARLY CRUSTAL GENESIS: IMPLICATIONS FROM EARTH
William C. Phinney, comp. 1981 48 p refs Workshop held at Houston, Tex., 3-5 Nov. 1980
(Contract NASw-3389)
(NASA-CR-164944; LPI-TR-81-04) Avail: NTIS HC A03/MF A01 CSCL 08G

Ways to foster increased study of the early evolution of the Earth, considering the planet as a whole, were explored and recommendations were made to NASA with the intent of exploring optimal ways for integrating Archean studies with problems of planetary evolution. Major themes addressed include: (1) Archean contribution to constraints for modeling planetary evolution; (2) Archean surface conditions and processes as clues to early planetary history; and (3) Archean evidence for physical, chemical and isotopic transfer processes in early planetary crusts. Ten early crustal evolution problems are outlined. A.R.H.

N82-11692# National Center for Atmospheric Research, Boulder, Colo.
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH Annual Report, fiscal year 1980
Mar. 1981 90 p
(NCAR/AR-80) Avail: NTIS HC A05/MF A01

Research and development highlights of the Advanced Study Program, the Atmospheric Analysis and Prediction Division, the Atmospheric Chemistry and Aeronomy Division, the Convective Storms Division, and the Monsoon Experiment are presented. Administrative support for the projects is discussed. A financial summary for the center is provided. A list of publications for the calendar year 1979 is given. T.M.

N82-11693# Indian Inst. of Geomagnetism, Bombay.
GEOMAGNETIC OBSERVATIONS Annual Report, 1979 - 1980
Nanabhai Moos Marg 1980 70 p
Avail: NTIS HC A04/MF A01

Results are summarized for the following areas of investigation: (1) quiet and disturbed day variation in the low and equatorial latitudes; (2) electromagnetic induction; (3) magnetosphere and solar wind; (4) aeronomy; (5) effects of the interplanetary magnetic field; (6) solar terrestrial relationships; (7) geomagnetic lunar daily variations; and (8) sola eclipse effects on HF radio propagation. Data processing, analysis, and dissemination activities are discussed as well as national and international cooperation in various projects including the International Magnetospheric study, the World Magnetic Archives Project, and MAGSAT. A.R.H.

N82-11694*# California Inst. of Tech., Pasadena. Seismological Lab.
HOTSPOTS, POLAR WANDER, MESOZOIC CONVECTION AND THE GEOID
Don L. Anderson 10 Nov. 1981 19 p refs Revised
(Grant NsG-7610)
(NASA-CR-164943) Avail: NTIS HC A02/MF A01 CSCL 08K

The geoid bears little relation to present tectonic features of the earth other than trenches. The Mesozoic supercontinent of Pangea, however, apparently occupied a central position in the Atlantic-African geoid high. This and the equatorial Pacific geoid high contain most of the world's hotspots. The plateaus and rises in the western Pacific formed in the Pacific geoid high and this may have been the early Mesozoic position of Pacifica, the fragments of which are now the Pacific rim portions of the continents. Geoid highs which are unrelated to present subduction zones may be the former sites of continental aggregations and mantle insulation and, therefore, hotter than normal mantle. The pent-up heat causes rifts and hotspots and results in extensive uplift, magmatism, fragmentation and dispersal of the continents and the subsequent formation of plateaus, aseismic ridges and seamount chains. Convection in the uppermantle would then be due to lateral temperature gradients as well as heating from below and would be intrinsically episodic. Author

N82-11695*# Texas Univ. at Arlington. Inst. for Geophysics.
CRUSTAL DEFORMATION AND SEISMIC MEASUREMENTS IN THE REGION OF MCDONALD OBSERVATORY, WEST TEXAS Final Technical Report
H. James Dorman 30 Jun. 1981 134 p refs
(Grant NsG-7159)
(NASA-CR-164964) Avail: NTIS HC A07/MF A01 CSCL 08K

The arrival times of regional and local earthquakes and located earthquakes in the Basin and Range province of Texas and in the adjacent areas of Chihuahua, Mexico from January 1976 to August 1980 at the UT'NASA seismic array are summarized. The August 1931 Texas earthquake is reevaluated and the seismicity and crustal structure of West Texas is examined. A table of seismic stations is included. A.R.H.

N82-11696*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
STUDY OF THE TIME EVOLUTION OF THE LITHOSPHERE Semiannual Progress Report, 1 Mar. - 31 Aug. 1981
Micheline C. Roufosse Nov. 1981 7 p
(Grant NAG5-150)
(NASA-CR-164968; SAPR-1) Avail: NTIS HC A02/MF A01 CSCL 08G

A three dimensional geoid of all oceanic regions was obtained using a data set derived from the GEOS-3 radar altimeter. The editing and organization of the complete SEASAT geophysical data set are described. The geographical area located between 25 and 35 degrees south, and between 320 and 335 degrees east, around the Rio Grande Rise in the south Atlantic, was selected for continued study. T.M.

N82-11697*# National Aeronautics and Space Administration, Washington, D. C.
MERIDIONAL HEAT TRANSPORT AT THE ONSET OF WINTER STRATOSPHERIC WARMING
Michele Conte Sep. 1981 10 p refs Transl. into ENGLISH from Rev. di Meterol. Aeron., v. 40, Oct. - Dec., 1980 p 303-307 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by National Aeronautical Meteorology and Climatology Center, Rome
(Contract NASw-3541)
(NASA-TM-76614) Avail: NTIS HC A02/MF A01 CSCL 04A

A continuous vertical flow of energy toward high altitude was verified. This process produced a dynamic instability of the stratospheric polar vortex. A meridional heat transport was primed toward the north, which generated a warming trend. S.L.

N82-11698*# Oregon Univ., Eugene.
FAR-INFRARED MEASUREMENTS OF TRACE GASES Final Technical Report
I. G. Nolt and J. V. Radostitz Sep. 1980 6 p refs
(Grant NsG-7360)
(NASA-CR-164965) Avail: NTIS HC A02/MF A01 CSCL 04A

A better detector system was developed for far infrared spectroscopy by usng cryogenic technology to cool bolometric detectors to approximately 0.4K. Technical assistance was provided to two submillimeter infrared balloon experiment (SIBEX) flights which demonstrated the diagnostic capability of far IR emission spectroscopy. It is estimated that more than a hundred spectral emission features were detected which are not due to the main emitting gases O3, O2, and H2O. The trace species sources for many features still remain unidentified and the spectra obtained during the SIBEX flights present a new source of information on stratospheric composition. A.R.H.

N82-11699# Alaska Univ., Fairbanks. Geophysical Inst.
IMPERFECT MAGNETOSPHERE-IONOSPHERE COUPLING AND DISCRETE AURORAS Final Report, 1 Jan. 1979 - 31 Dec. 1980
J. R. Kan Hanscom AFB, Mass. AFGL Apr. 1981 31 p refs
(Contract F19628-79-C-0046; AF Proj. 2311)

(AD-A104509; AFGL-TR-81-0222) Avail: NTIS HC A03/MF A01 CSCL 04/1

Recent theoretical developments on the formation of discrete auroras are reviewed to assess the progress of our understanding of discrete auroral phenomenon. In spite of the great complexity involved, a unified physical picture begins to emerge in which the roles of various auroral acceleration processes can be identified in the context of magnetosphere-ionosphere coupling. Potential drops for the formation of inverted V precipitations are supported predominantly by a combination of double layer and pitch angle anisotropy processes. Additional electron energizations for the formation of thin auroral arcs are most likely due to filamentations of electrostatic ion cyclotron turbulence along the inverted V field lines. The discrete auroras can be understood as a manifestation of the imperfect coupling state of the magnetosphere-ionosphere interaction due to enhanced magnetospheric convection. Author (GRA)

N82-11700# Hawaii Univ., Honolulu.

PLASMASPHERIC, FARADAY AND TOTAL ELECTRON CONTENTS, 1977 AND 1978 Final Report, Oct. 1977 - Nov. 1980

Thomas H. Roelofs Hanscom AFB, Mass. AFGL Dec. 1980 843 p

(Contract F19628-78-C-0050; AF Proj. 4643)

(AD-A104362; AFGL-TR-81-0143) Avail: NTIS HC A99/MF A01 CSCL 04/1

These volumes contain the experimental results of monitoring the Faraday rotation and group delay of VHF and UHF signals transmitted from the ATS-6 geostationary satellite at a station located at Palehua, Hawaii. The Faraday rotation data represents the electron content measured out to a vertical height of approximately 2000-3000 kilometers, while the group delay is a measure of the total electron content along the entire path from station to the ATS-6 satellite. The difference between these two measures of electron content has been defined as the plasmaspheric electron content along the slant path from heights above 2000-3000 kilometers to the ATS-6 satellite. Also included in the data tables are values of the equivalent vertical slab thickness defined as the ratio of vertical electron content obtained by the Faraday rotation measurement divided by the density at the peak of the ionospheric F region obtained from measurements of fOF2 from the Maui Ionosonde. Author (GRA)

N82-11701# Air Force Geophysics Lab., Hanscom AFB, Mass. Space Physics Div.

HIGH LATITUDE ELECTRON DETECTORS ON SATELLITE P78-1: PRELIMINARY DATA RESULTS Final Report

Roger P. Vancour 4 May 1981 30 p

(AF Proj. 7601)

(AD-A104518; AFGL-TR-81-0131; AFGL-ERP-744) Avail: NTIS HC A03/MF A01 CSCL 04/1

Air Force satellite P78-1 carries several experiments investigating solar activity and charged particle and electromagnetic radiation measurements. One of these experiments consists of a set of electrostatic analyzers to collect electrons from 50 eV to 20 KeV in 16 channels. The sensors are exactly the same as the SSJ/3 sensor on DMSP satellites. Since the satellite is spinning at a rate of 11 + or - 1 rpm, complete pitch angle information is obtained in about 5.45 sec by each of the two sensors which are 90 degrees apart. Three passes are reported, showing where each pass is during a different intensity of magnetic activity. Oval boundaries, spectral shapes, and total energy fluxes are determined and compared to the results of others. Results from the two sensors are compared to each other. Author (GRA)

N82-11702# Air Force Geophysics Lab., Hanscom AFB, Mass.

A SIMPLIFIED PROCEDURE FOR DIRECT DETERMINATION OF REAL HEIGHTS FROM VIRTUAL HEIGHT DATA

Milton M. Klein 6 Mar. 1981 26 p refs

(AF Proj. 2310)

(AD-A104374; AFGL-TR-81-0070; AFGL-ERP-731) Avail: NTIS HC A03/MF A01 CSCL 04/1

As part of an effort to determine electron density profiles in the auroral region of the ionosphere, a method was developed for directly calculating real height from ionosonde data obtained at high latitudes. The method has been modified and simplified by representing the entire dispersion curve by a single power-law curve with only one parameter. The resulting real height-virtual height relation can now be solved in a simple way for the real height. To test the accuracy of the method, virtual heights were computed for two parabolic models of the ionosphere, and the corresponding real height values were then obtained by the present method. The results obtained showed that the calculated values of real height were in very good agreement with the exact values of real height. To indicate the improvement obtainable with the introduction of additional parameters, a two-parameter function, which gives a somewhat more accurate representation of the dispersion curve than does the one-parameter function, was obtained for one case. However, the amount of computational labor required is considerably greater than that required for the present method. In view of its simplicity and accuracy, it is felt that the one-parameter method is a useful analytic tool for determining real height from ionosonde data. Author (GRA)

N82-11703# Air Force Geophysics Lab., Hanscom AFB, Mass. Aeronomy div.

ROCKET DATA OF SOLAR EUV FLUX, THERMOSPHERIC ELECTRON FLUX AND N2 SECOND-POSITIVE AIRGLOW EMISSION Interim Scientific Report

R. A. VanTassel, W. J. McMahon, and L. Heroux 17 Apr. 1981 52 p refs

(AF Proj. 6690)

(AD-A104384; AFGL-TR-81-0111; AFGL-ERP-737) Avail: NTIS HC A04/MF A01 CSCL 04/1

This report presents simultaneous measurements of solar EUV flux, thermospheric photoelectron energy flux, and airglow radiation from the nitrogen second positive band system made from an Aerobee 170 rocket launched from White Sands Missile Range on 14 August 1979 at 2020 UT. The solar EUV data are combined with flux measurements obtained by H. E. Hinteregger with the solar EUV spectrometer on the Atmospheric Explorer-E satellite to provide flux measurements over the complete range of 51 to 1026 A. The energy range of the electron flux extends from 2.4 to 5.7 eV and from 14 to 34 eV. The airglow emission from the 0, 0 band of the nitrogen second positive system is presented as both volume and column rates. The volume emission rate shows a major broad peak near 150 km and a less intense peak at 108 km. Author (GRA)

N82-11704# Air Force Geophysics Lab., Hanscom AFB, Mass.

REPORT ON RESEARCH AT AFGL Interim Report, Jul. 1976 - Dec. 1978

John F. Dempsey, ed. Nov. 1980 224 p refs

(AF Proj. 9993)

(AD-A104513; AFGL-TR-80-0365; AFGL-SR-227) Avail: NTIS HC A10/MF A01 CSCL 14/2

This report continues a series of eight reports on Research at the Air Force Geophysics Laboratory. This report covers a two-and-one-half-year interval. It was written primarily for Air Force and DOD managers of research and development and more particularly for officials in Headquarters Air Force Systems Command, for the Director of Laboratories (DL), and for the Commanders of and the Laboratories within DL. It is intended that the report will have interest to an even broader audience. Author (GRA)

N82-11705# Wentworth Inst., Boston, Mass.

DESIGN AND FABRICATION OF QUADRUPOLE ION MASS SPECTROMETER FOR UPPER ATMOSPHERE Scientific Report, Oct. 1979 - Sep. 1980

Edgar J. LeBlanc Jul. 1981 9 p

(Contract F19628-78-C-0017; AF Proj. 6687)

(AD-A104319; AFGL-TR-81-0223; SCIENTIFIC-3) Avail: NTIS HC A02/MF A01 CSCL 14/2

This report describes, in a quasi-historical format, the design and fabrication of component parts and assemblies used in an Upper Atmosphere Composition Research Program conducted by the Composition Branch of the Aeronomy Laboratory, for AFGL. GRA

N82-11706# Lockheed Missiles and Space Co., Palo Alto, Calif. Electro-Optics Lab.

APPLICATION OF VISIBLE MONOCHROMATIC AURORAL IMAGING DATA FOR MODELING INFRARED EARTH-LIMB

MORPHOLOGY Final Report, Sep. 1978 - Jan. 1981
J. B. Kumer, R. D. Sears, J. E. Evans, S. E. Harris, and R. M. Nadile 26 Jan. 1981 58 p refs
(Contract F19628-78-C-0217; AF Proj. 2310)
(AD-A104343; LMSC-D802558; AFGL-TR-81-0025) Avail: NTIS HC A04/MF A01 CSCL 04/1

A statistically comprehensive first-order auroral earth-limb data base at 2.7 and 4.3 microns is constructed from an existing 4278 and 6300 A, ground-based, all-sky TV data base, which includes approximately 200 hours of all-sky auroral data that are stored on video tape. Methods of modeling 2.7- and 4.3-micro auroral emissions on the basis of measurements of the aurora in the spectral regions (4278 A) and (6300 A) have been developed and verified against infrared data. 2.7-micron emission is modeled by the N(D2) + O2 yields NO + O mechanism. The 4.3-micron emission is modeled by two mechanisms, a relatively slower (5 to 25 min response time) mechanism due to emission by CO2, and a weaker but fast (1 to 10 s) mechanism that is indicated by the auroral data obtained 26 October 1978. In this effort, approximately 30 min of real-time auroral all-sky video data from each of the events 3/23/73 and 3/27/73 were digitized. The digitized data from the 3/23/73 event were used to construct a dynamic 2-dimensional model of auroral 2.7 and 4.3 micron earth-limb radiance over the 30 min observation period. It is seen that structure is more prominent for the relatively fast 2.7- and 4.3-micron mechanisms than for the slower CO2 4.3-micron mechanism. Author (GRA)

N82-11707# Photometrics, Inc., Woburn, Mass.
THE USE OF DMSP DIGITAL DATA FOR AURORAL MEASUREMENTS Final Report, 15 Jan. 1979 - 15 Jan. 1981
Gilbert Davidson 15 Feb. 1981 36 p
(Contract F19628-79-C-0066; AF Proj. 2310)
(AD-A104392; PHM-01-81; AFGL-TR-81-0105) Avail: NTIS HC A03/MF A01 CSCL 04/1

Using measurements of aurora made by ground and aircraft based photometers and correlated in space and time with DMSP observations, two DMSP night time sensors have been calibrated. A procedure has been developed for computer reduction and analysis of the calibrated DMSP digital tape data. Author (GRA)

N82-11708# Bedford Research Associates, Mass.
TWO VARIABLE MODELLING OF EQUATORWARD BOUNDARY OF AURORAL PRECIPITATION
P. Tsipouras and N. Scotti 9 Jun. 1981 17 p refs
(Contract F19628-80-C-0124; AF Proj. 9993)
(AD-A104378; SCIENTIFIC-2; AFGL-TR-80-0371) Avail: NTIS HC A02/MF A01 CSCL 04/1

This report summarizes a procedure for two variable fitting of the equatorward boundary of electron precipitation. A least squares minimization approach is used. The SSJ/3 detector consists of a set of two curved plate electrostatic analyzers designed to measure the flux of precipitating electrons in the energy range from 50 eV to 20 KeV. The detectors are flown routinely on the satellites of the Defense Meteorological Satellite Program (DMSP). The data returned from the detectors have been used to conduct an extensive study of the systematics of the shape and motion of the equatorward boundary of auroral precipitation. The equatorward extent of auroral precipitation is a key boundary condition on the state of the Earth's magnetosphere. Each pass of the satellite over the auroral oval provides two boundary determinations. One technique for studying the boundary is to tag each pair of boundary determination with the magnetic local times in which they occur and to consider each pair of two crossings to have been made simultaneously. These pairs of points can then be seperated into classes according to the magnetic local time zones associated with each boundary location. Since the orbit of the satellite is nearly sun synchronous the same pairs of magnetic local time zones are passed through each day such that the number of local time zone classes is limited. GRA

N82-11709# Bedford Research Associates, Mass.
DATA BASE SPECIFICATIONS FOR THE OPAQUE PROGRAM
E. Cronin (AFGL, Hanscom AFB) and H. Cohn 1 Jul. 1981 34 p
(Contract F19628-79-C-0163; AF Proj. 9993)
(AD-A104340; SCIENTIFIC-5; AFGL-TR-81-0057) Avail: NTIS HC A03/MF A01 CSCL 04/1

A complete and current identification of the data and its format as used in the OPAQUE research program is presented. OPAQUE is a measurement program on optical atmospheric quantities in Europe. The ultimate objective for the research program is to develop a data base of atmospheric optical and infrared (IR) parameters which affect military systems. GRA

N82-11710# SRI International Corp., Menlo Park, Calif.
ALTAIR RADAR STUDY OF EQUATORIAL SPREAD F Final Report, 11 Jan. 1979 - 30 Nov. 1980
Roland T. Tsunoda 1 Feb. 1981 54 p refs
(Contract DNA001-79-C-0153)
(AD-A104554; DNA-5689F) Avail: NTIS HC A04/MF A01 CSCL 04/1

The results of research on equatorial spread-F (ESF) phenomena obtained by using two backscatter radars, ALTAIR and TRADEX, are summarized. The radar measurements were made in support of three rocket campaigns conducted from the Kwajalein Atoll during the summers of 1977 through 1979. Backscatter data from ESF irregularities and incoherent-scatter (IS) data from thermal plasma fluctuations were used to show that the structuring of the equatorial F-region plasma is initiated by large-scale (tens to a few hundred kilometers in the east-west direction) plasma-density modulations in the bottomside F layer. The modulation, best described by wavelike altitude variations in constant electron-density contours, appears to be imposed on the bottomside F layer around E-region sunset by a yet-to--be-identified source (although atmospheric gravity waves are a likely candidate). The amplification of the wavelike modulation, in the form of upwellings from the crests of the modulation, is consistent with the amplification expected from the collisional Rayleigh-Taylor instability. Once the upwellings begin to grow in altitude extent, the west walls become unstable via the gradient-drift instability, driven by an eastward neutral wind blowing through the walls of the upwellings. The enhanced structuring of the west wall at low F-region altitudes is made possible by the presence of a velocity shear in eastward plasma drift. Author (GRA)

N82-11711# Analytic Sciences Corp., Reading, Mass.
MILITARY GEODESY AND GEOSPACE SCIENCE, UNIT THREE
Warren G. Heller and A. Richard LeSchack Feb. 1981 172 p refs
(Contract F19628-77-C-0152; AF Proj. 3204)
(AD-A105072; SCIENTIFIC-7; AFGL-TR-81-0030) Avail: NTIS HC A08/MF A01 CSCL 04/1

This lecture course provides a full-year introduction to Military Geodesy and Geospace Science. Throughout the presentation a military perspective is maintained which links Mapping, Charting, and Geodesy (MC&G) issues with modern defense requirements. Elementary preparation is assumed in the subjects of general physics, mechanics, chemistry, astronautics, and linear system theory. The student should also be familiar with differential equations, analytic geometry, and linear algebra. Some acquaintance with vector calculus is useful but not essential. The topics covered herein are intended to provide conceptual rather than working knowledge. Ideally, the student completing this course will have attained a broad understanding of the MC&G field and will be able to develop specialized expertise quickly when required. The organizational flow of the lectures is from concepts in the initial sections, particularly in Unit One, to applications and specific systems later on. As a result the student is often referred ahead to provide motivation in regard to relevancy. In later chapters, however, the situation is reversed with the student referred back to review important conceptual material as necessary. GRA

N82-11712# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTER MODELS TO SUPPORT INVESTIGATIONS OF SURFACE SUBSIDENCE AND ASSOCIATED GROUND MOTION INDUCED BY UNDERGROUND COAL GASIFICATION
R. T. Langland and B. C. Trent (Science Applications, Inc., Steamboat Springs, Colo.) 1981 14 p refs Presented at the

7th Ann. Underground Coal Conversion Symp., Fallen Leaf Lake, Calif., 8-11 Sep. 1981
(Contract W-7405-eng-48)
(DE81-027131; UCRL-86437; CONF-810923-1) Avail: NTIS HC A02/MF A01

Two computer codes compare surface subsidence induced by underground coal gasification at Hoe Creek, Wyoming, and Centralia, Washington. Calculations with the STEALTH explicit finite-difference code are shown to match equivalent implicit finite-elemet method solutions or the removal of underground material. Effects of removing roof material, varying elastic constants, investigating thermal shrinkage, and burning multiple coal seams are studied. A coupled finite-difference continuum rigid-block caving code is used to model underground opening behavior. Numerical techniques agree qualitatively with empiricial studies but, so far, underpredict ground surface displacement. The two methods, numerical and empirical, are most effective when used together. It is recommended that the thermal charecteristics of coal measure rock be investigated and that additional calculations be carried out to longer times so that cooling influences can be modeled. DOE

N82-11713# Sandia Labs., Albuquerque, N. Mex.
RECOVERY OF SEISMIC SIGNALS IN NOISE BY ADAPTIVE PROCESSING
Glenn R. Elliott 1981 9 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029469; SAND-81-1079) Avail: NTIS HC A02/MF A01

Techaiques are described for use in improving the signal-to-noise ratio of electrical signals buried in noise from seismic sensors. Often not enough information is available about the characteristics of either the signal or the noise to permit the use of more classical detection methods, i.e., matched filtering, likelihood detectors, array averaging, etc. Adaptive processing can be of benefit in these cases. Examples of work to improve performance of perimeter intrusion detection systems is presented DOE

N82-11714# Sandia Labs., Albuquerque, N. Mex.
EVALUATION OF UNCERTAINTIES IN GEOLOGIC INFORMATION
J. T. Neal 1981 10 p refs Presented at the Symp. on Uncertainties Assoc. with the Regulation of the Geol. Disposal of High-Level Radioactive Waste, Gatlinburg, Tenn., 9 Mar. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025997; SAND-80-2690C; CONF-810372-5) Avail: NTIS HC A02/MF A01

Most geologic information is interpretive as opposed to factual; however, in either case conclusions commonly are derived from data having unequal reliability. Decisions can take such disparity into account by using information hierarchies, by incorporating more realism into mapping, and by more rigorous quantification of models and maps. Information hierarchies can rank direct measurement (from outcrops, boreholes, etc.) as having greater confidence than indirect measurement (from geophysics, etc.). Mapping realism can be enhanced by showing individual outcrops and by more precisely defining attributes of map units. Recognizing the evolving nature of geologic truth appears to undermine confidence, as does acknowledging the inherent subjectivity in our information base. On the other hand, facing and systematically treating uncertainty ultimately can lead to greater confidence in final decisions. DOE

N82-11715# Los Alamos Scientific Lab., N. Mex.
RELAXATION OF GEOTHERMAL-RESERVOIR STRESSES INDUCED BY HEAT PRODUCTION
H. Murphy, ed., R. Aamodt, H. Fisher, T. Grant, C. Grigsby, R. Hendron, H. Keppler, C. Pearson, R. Potter, and G. Suhr Aug. 1981 34 p refs
(Contract W-7405-eng-36)
(DE81-032024; LA-8954-MS) Avail. NTIS HC A03/MF A01

Fifteen million kWh of thermal energy were produced during 281 days of operation of the hot dry rock (HDR) geothermal reservoir at Fenton Hill, New Mexico. Following this heat production the thermal stresses and strains so were partially released by a shot, 7-h pressurization of the reservoir above the local tectonic confining stress. Following the partial stress release, it was found that the resistance to water flow through the reservoir was decreased by 37 percent, and that the reservoir volume, as measured by tracer studies, increased by 43 percent. Microseismic events recorded with geophones in two deep wells at positions within a few hundred meters of the reservoir were concentrated in those regions of the reservoir most affected by thermal depletion. These events define a reservoir region and size in qualitative agreement with estimates based upon heat production modeling. DOE

N82-11716# Geological Survey, Menlo Park, Calif.
PRINCIPAL FACTS, ACCURACIES, SOURCES, BASE STATION DESCRIPTIONS, AND PLOTS FOR 1380 GRAVITY STATIONS IN THE TONOPAH 1 DEG BY 2 DEG QUADRANGLE, NEVADA *Final Report*
R. W. Saltus, D. B. Snyder, and C. R. Karish 1981 89 p refs
Prepared in cooperation with DOE, Las Vegas, Nev.
(PB81-219081; USGS/GD-81/004) Avail: NTIS HC A05/MF A01 CSCL 08E

Base station descriptions, location plots, and observed gravity base station values describe these staions. All the stations were reduced to complete Bouguer anomalis. Three sources provided original field measurements: the U.S. Geological Survey, Menlo Park; the Defense Mapping Agency/Topographic Center/Geodetic Survey Squadron; and the U.S. Geologica Survey, Denver. Each source is documented as to meters used, calibration, and field terrain correction method. GRA

N82-11717# Environmental Protection Agency, Las Vegas, Nev. Exposure Assessment Research Div.
GEOTHERMAL ENVIRONMENTAL ASSESSMENT BASE-LINE STUDY: VEGETATION AND SOILS OF THE ROOSEVELT HOT SPRINGS GEOTHERMAL RESOURCE AREA
K. W. Brown and G. B. Wiersma Jul. 1981 109 p refs
(PB81-223299; EPA-600/4-81-060) Avail: NTIS HC A06/MF A01 CSCL 08G

Identification and elemental concentrations of indigenous soil and plant systems found on the Roosevelt Hot Spring KGRA are described. Twenty-three different soils and five separate plant communities are geographically mapped and identified. One hundred forty-seven plant species were identified. Forbs, shrubs, and grasses are represented by 58, 53, and 36 species respectively. Three sites each measuring 25 hectares were selected for long-term vegetative assessment. At these locations a permanent enclosure measuring 24.4 meters x 24.4 meters was constructed to assess long-term effects livestock grazing. Biomass plant species, percentage composition, ground cover and livetock carrying capacities were determined at each site. Surface soils and Artemisia tridentata leaf tissue were collected for elemental analysis. GRA

N82-11718 Washington Univ., Seattle.
ADAPTATION OF LAND USE TO SURFICIAL GEOLOGY IN METROPOLITAN WASHINGTON, D.C. Ph.D. Thesis
Robert Houston Alexander 1981 236 p
Avail: Univ. Microfilms Order No. 8121177

Implicit in the investigation is a process of communicating geologic information, and incorporating such information into land-use decisions. Land-use data were derived from high-altitude color infrared aerial photography, and the information on geologic suitability was obtained from a U.S. Geological Survey map of landforms and surface materials compiled to aid non-geologists in land use planning decisions. The new map was further interpreted and subdivided into those areas geologically suitable and unsuitable for residential and agricultural uses, respectively. The study found significant relationships among land uses and geologic map units, and significant differences in land-use and geologic suitability regimes in subregions based on distance from city center. More recently-developed areas near the urban core have higher proportional associations of residential and agricultural land use with appropriate surficial geologic characteristics than do the outlying areas on the metropolitan fringe. Dissert. Abstr.

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-11719 Cornell Univ., Ithaca, N. Y.
A NUMERICAL DYNAMICAL INVESTIGATION OF THE ROLE OF SUBSYNOPTIC INERTIAL AN ISALLOBARIC ADJUSTMENTS IN ORGANIZING SEVERE LOCAL STORM ENSEMBLES Ph.D. Thesis
John William Zack 1981 330 p
Avail: Univ. Microfilms Order No. 8119543

The physical components of the severe local convection storm environment are compiled from previous investigators. It is summarized that significant convection is favored when upward vertical motion occurs in an atmosphere which has a high degree of potential hydrostatic instability. In addition, the severest storms, such as tornadoes, are favored when there is a large degree of vertical wind shear and a significant low level temperature inversion exists prior to convection storm formation. Dissert. Abstr.

N82-11720 Iowa State Univ. of Science and Technology, Ames.
THE 4-DAY TEMPERATURE WAVE IN THE WINTER POLAR STRATOSPHERE Ph.D. Thesis
David Eugene Venne 1981 135 p
Avail: Univ. Microfilms Order No. 8122571

Additional observational evidence is presented which suggests that the wave represents a normal mode oscillation of the atmosphere. A polar-plane approximation to the earth's sphericity at high latitudes is described and applied to the equations of air parcel motion, yielding solutions the zonal mean wind is taken to be in solid rotation with no vertical shear, conditions which are typical in the region of largest 4-day wave amplitudes. The substantial changes in the mean zonal wind caused by stratospheric sudden warmings are shown to modify the 4-day wave. Dissert. Abstr.

N82-11721 Pennsylvania State Univ., University Park.
FRONTOGENESIS IN THE PLANETARY BOUNDARY LAYER OF AN AMPLIFYING, TWO-DIMENSIONAL BAROCLINIC WAVE Ph.D. Thesis
Daniel Keyser 1981 314 p
Avail: Univ. Microfilms Order No. 8120445

In order to explore the hypothesis that the absence of fine structure is related to the neglect of nonconservative processes such as the vertical turbulent transports by heat and momentum in the planetary boundary layer (PBL), a series of analytic and numerical experiments with the Hoskins-Bretherton horizontal shear model of frontogenesis in an amplifying, two dimensional baroclinic was were performed. The results of this investigation suggest two hypotheses: the first relates the orientation of cloud bands associated with low-level frontal zones to the frontogenetical mechanisms of horizontal shear and confluence. The second is concerned with explaining the structure and evolution of several atmospheric circulation systems in terms of adjustment processes toward equilibrium configurations between the mass and wind fields. Dissert. Abstr.

N82-11722 Washington Univ., Seattle.
NUMERICAL SIMULATION OF THE DYNAMICS, CLOUD MICROPHYSICS AND RADAR ECHO STRUCTURES OF TROPICAL AND MID-LATITUDE CONVECTION Ph.D. Thesis
Chee Pong Cheng 1981 229 p
Avail: Univ. Microfilms Order No. 8121187

Tropical convective cells have radar echo patterns that are distinctly different from many mid-latitude convective cells. Also, tropical convection develops associated regions of rain falling from thick anvil clouds. This anvil rain is stratiform and its radar reflectivity pattern contrasts sharply with the adar echoes of the cells. Numerical modeling is used to achieve a better understanding of the dynamical-microphysical interactions that result in the radar echo patterns of tropical and mid-latitude convective cells and of tropical anvil precipitation. Dissert. Abstr.

N82-11723*# Michigan Univ., Ann Arbor.
TIME-VARIABLE EARTH'S ALBEDO MODEL CHARACTERISTICS AND APPLICATIONS TO SATELLITE SAMPLING ERRORS Final Report
Fred L. Bartman Sep. 1981 78 p refs
(Grant NAG1-87)
(NASA-CR-165781; Rept-018921S-1-F) Avail: NTIS HC A05/MF A01 CSCL 04B

Characteristics of the time variable Earth albedo model are described. With the cloud cover mulitplying factor adjusted to produce a global annual average albedo of 30.3, the global annual average cloud cover is 45.5 percent. Global annual average sunlit cloud cover is 48.5 percent; nighttime cloud cover is 42.7 percent. Month-to-month global average albedo is almost sinusoidal with maxima in June and December and minima in April and October. Month-to-month variation of sunlit cloud cover is similar, but not in all details. The diurnal variation of global albedo is greatest from November to March; the corresponding variation of sunlit cloud cover is greatest from May to October. Annual average zonal albedos and monthly average zonal albedos are in good agreement with satellite-measured values, with notable differences in the polar regions in some months and at 15 S. The albedo of some 10 deg by 10 deg. areas of the Earth versus zenith angle are described. Satellite albedo measurement sampling effects are described in local time and in Greenwich mean time. Author

N82-11724*# Howard Univ., Washington, D. C. Dept. of Mathematics.
SOME ANALYSIS ON THE DIURNAL VARIATION OF RAINFALL OVER THE ATLANTIC OCEAN
Tepper Gill, Shien Perng, and Arthur Hughes Aug. 1981 55 p refs
(Grant NsG-5295)
(NASA-CR-164937) Avail: NTIS HC A04/MF A01 CSCL 04B

Data collected from the GARP Atlantic Tropical Experiment (GATE) was examined. The data were collected from 10,000 grid points arranged as a 100 x 100 array; each grid covered a 4 square km area. The amount of rainfall was measured every 15 minutes during the experiment periods using c-band radars. Two types of analyses were performed on the data: analysis of diurnal variation was done on each of grid points based on the rainfall averages at noon and at midnight, and time series analysis on selected grid points based on the hourly averages of rainfall. Since there are no known distribution model which best describes the rainfall amount, nonparametric methods were used to examine the diurnal variation. Kolmogorov-Smirnov test was used to test if the rainfalls at noon and at midnight have the same statistical distribution. Wilcoxon signed-rank test was used to test if the noon rainfall is heavier than, equal to, or lighter than the midnight rainfall. These tests were done on each of the 10,000 grid points at which the data are available. T.M.

N82-11725*# National Aeronautics and Space Administration, Washington, D. C.
EVALUATION OF PHOTOGRAMMETRIC FLIGHT UNDER ICING CONDITIONS ON MARCH 23, 1978
Werner Fuchs and Josef Kaluza Sep. 1981 43 p refs Transl. into ENGLISH of Ber. fuer den Geophysikalischen Beratungsdienst der Bundeswehr, Traben-Trarbach (West Germany), no. 28, 1980 p 1-50 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76617) Avail: NTIS HC A03/MF A01 CSCL 04B

In a double passage through a route laid out in a stagnation zone of the Bavarian forest, it was found that the stagnation and attendant elevation increases the danger of icing. Conversely, it turned out that formation of precipitation reduces the icing intensity. A comparison of both factors showed: the reduction of ice formation through precipitation equals the increase due to stagnation, or even exceeds it. T.M.

N82-11726# Air Force Geophysics Lab., Hanscom AFB, Mass.
AN ASSESSMENT OF DETECTING MESOSCALE RAINFALL FROM MID-LATITUDE CYCLONES USING GOES IMAGERY DATA Interim Scientific Report

Ronald F. Fournier 25 Mar. 1981 40 p refs
(AF Proj. 6670)
(AD-A104377; AFGL-TR-81-0089; AFGL-ERP-735) Avail: NTIS HC A03/MF A01 CSCL 04/2

This study examined the capability of current geostationary satellite sensors in resolving and monitoring important mesoscale rain areas. Shallow mesoscale precipitation patterns were analyzed with radar and recording rain gage data associated with mid-latitude cyclones in New England. These cyclones were characterized by relatively little stratiform cloudiness in the upper troposphere. Radar thresholding was used to determine the spatial and temporal scales of small mesoscale areas (SMSAs), large mesoscale areas (LMSAs), and major echoes. Radar rainfall estimates were used to determine the relative amount of rainfall contributed by the mesoscale features. Radar analysis of the three cases showed that the spatial scale of major echoes, LMSAs, and SMSAs were large enough for detection by GOES sensors. Major echoes and the LMSAs contained within them were found to have lifetimes that are long relative to the half-hour interval between GOES transmissions. The duration of some SMSAs and all cells, however, was on the same order as the time interval between GOES transmissions. In addition, radar rainfall estimates showed that the major echoes, LMSAs, and SMSAs were the major contributors to mesoscale rainfall. For the cases examined in this study, GOES sensors were not capable of distinguishing the individual mesoscale precipitation areas detected by radar. Therefore, GOES sensors do not appear adequate for developing satellite rainfall estimation techniques to specify shallow mesoscale precipitation. GRA

N82-11727# Naval Postgraduate School, Monterey, Calif.
RELATIONSHIPS BETWEEN SYNOPTIC STORM ACTIVITY AND SEA SURFACE TEMPERATURE ANOMALIES OVER THE NORTH PACIFIC OCEAN M.S. Thesis
Bauke H. Houtman Jun. 1981 83 p refs
(AD-A104590) Avail: NTIS HC A05/MF A01 CSCL 04/2

The significance of year-round relationships between synoptic storm activity and sea-surface temperature (SST) over the North Pacific Ocean for the period January 1969 through December 1978, were examined using cross-correlation analysis. The possible existence of a seasonal dependence in the SST-wind relationships was examined using sub-sample record cross-correlation analysis and model tests with both a constant and a variable mixed-layer depth, respectively. Wind forcing data was represented by (U-3*), friction velocity cubed, and wind stress curl (CURL sub Z tau), as computed from: (a) High-pass filtered wind components only (periods less than ten days), (b) High- and Low-pass filtered wind components which includes the interaction terms and (c) the unfiltered (total) wind components. GRA

N82-11728# Naval Postgraduate School, Monterey, Calif.
TROPICAL STORM MOVEMENT BASED ON SYNOPTIC MAP TYPING USING EMPIRICAL ORTHOGONAL FUNCTIONS M.S. Thesis
Danley W. Brown Jun. 1981 81 p refs
(AD-A104591) Avail: NTIS HC A05/MF A01 CSCL 04/2

This initial study investigates the feasibility of using weather map types to forecast tropical storm/typhoon movement in the Western North Pacific Ocean. Fleet Numerical Oceanographic Center's hemispheric D-value analysis fields at 850, 700 and 500 mb are interpolated to a standard grid oriented relative to the present surface tropical storm position. Empirical Orthogonal Function (EOF) analysis is used to represent the fields in terms of only 10 coefficients in an effort to separate true synoptic map features from random noise. A least squares approach is then applied to determine characteristic synoptic patterns relative to the tropical storm, and to relate each individual cast to a 'map type'. An analog type approach is used to forecast the 30-, 36-, 54-, 60-, 78- and 84-hour positions. All storms determined to be of the same map type as the candidate storm were considered to be analogs, and their storm tracks were rotated to have the same past 12-hour movement. Forecast errors ranged from 135 n.mi. at 30 hours to 490 n.mi. at 84 hours. Although no independent cases were tested, and the techniques employed have not been optimized, the mean vector errors indicate that the basic technique warrants further investigation. Author (GRA)

N82-11729# Naval Postgraduate School, Monterey, Calif. Dept. of Oceanography.
AN OPEN-OCEAN MARINE FOG DEVELOPMENT AND FORECAST MODEL FOR OCEAN WEATHER STATION PAPA M.S. Thesis
Robert Louis Clark Jun. 1981 131 p refs
(AD-A104595; NPS68-81-005) Avail: NTIS HC A07/MF A01 CSCL 04/2

Marine fog forecasts during the summer period in the North Pacific are not made presently with any acceptable degree of accuracy. Objective fog development models exist and are used with some success for localized coastal regions of the western U.S.; scarcity of accurate data has hindered creation of a reliable open-ocean model. The Eulerian single-station approach, utilizing a segment of the complete accurate data of Ocean Weather Station Papa (50N, 145W) is applied in this study to an objective marine fog forecasting model. The time-series study of significant atmospheric variables at OWS Papa, when coupled with a chronological synoptic overview, delineates accurately fog/no fog sequences in the summer months of 1973 and 1977. Actual observed fog situations are evaluated by the general model and presented in relation to open-ocean fog indices, NOAA 5 satellite coverage and synoptic history. The open-ocean forecast model is tested on an independent data set for the month of July 1975 at OWS Papa, with favorable results. The research delineates four required indices that must all be positive to forecast fog. These indices, when plotted daily in the region of OWS Papa allow a single station to predict, with some confidence out to twenty-four hours, the occurrence of advection fog. Author (GRA)

N82-11730# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
ESTIMATES FOR THE PROBABILITIES OF SURFACE-TO-AIR CLOUD-FREE LINES-OF-SIGHT AND LOW CLOUD STATISTICS FROM SHIP OBSERVATIONS. PART 1: FIFTEEN MARINE LOCATIONS Progress Report, 1964 - 1971
B. S. Katz, F. C. DeBold, and J. J. Perez-Esandi 24 Nov. 1980 169 p refs
(ZF59551002)
(AD-A104633; NSWC/TR-78-143) Avail: NTIS HC A08/MF A01 CSCL 04/2

Estimates of the probability of cloud-free lines of sight (PCFLOS) were calculated for a set of nine angles using a modification of Lund and Shanklin's universal method from lower cloud weather data taken at fifteen marine locations. The data compilation covers periods from five to seven years (1964-1971) and provides statistics for seasonal variations of lower cloud base heights and cover and low cloud type and cover. Both the seasonal weather data (winter, spring, and summer) and the PCFLOS are tabulated for each location for nine different elevation angles from 10 to 90 degrees above the horizontal and for the heights for which lower cloud base data were available. The main assumption of the unmodified method, which is fully described in the text, is that the universal method can be applied successfully to the statistics for individual low cloud base height recording cells. Intermediate computational results corresponding to base height cells and the values of PCFLOS through all clouds, calculated by the unmodified method. Data from four selected locations were plotted for illustration and comparison purposes. PCFLOS statistics for various angles and cloud base heights were related to ability to visually detect targets at various ranges, altitudes, and elevation angles, by means of graphs that precalculated the slant range. A summary of the weather statistics and PCFLOS for all stations is also included. Author (GRA)

N82-11731# Massachusetts Inst. of Tech., Cambridge.
OCEANS AND OCEAN CURRENTS: THEIR INFLUENCE ON CLIMATE
Reginald E. Newell, Long S. Chiu, Wesley Ebisuzaki, Alfredo Navato, and Henry B. Selkirk 1980 56 p refs Presented at the Conf. on Climate and Offshore Energy Resources, London, 21 Oct. 1980 Sponsored in part by the National Science Foundation, Washington, D.C.
(Contract DE-AS02-76EV-12195)
(DE81-027263; DOE/EV-12195/41; CONF-8010198-2) Avail: NTIS HC A04/MF A01

Particular attention is given to influences that may be related to offshore energy generation. The role of the ocean currents and seasonal, as well as nonseasonal variations, are discussed. The effects of the Southern Oscillation, a non-seasonal signal in the climate system second only to the Ice Ages, are emphasized. T.M.

N82-11732# National Center for Atmospheric Research, Boulder, Colo.

AN ANALYSIS OF CLOUD PROPERTY RETRIEVAL USING INFRARED SOUNDER DATA Ph.D. Thesis - California Univ.

Bruce A. Wielicki 1980 139 p refs
(Grant NSF ATM-77-23757)
(PB81-221608; NCAR-CT-61) Avail: NTIS HC A07/MF A01 CSCL 04A

The cloud properties considered are effective cloud amount (emissivity times cloud fractional coverage in the satellite field of view), cloud top pressure, and the ratio of cloud emissivities in different spectral regions of the infrared. The cloud amount errors and cloud top pressure errors caused by instrument noise and by uncertainties in estimated clear-sky radiances due to temp. profile and water vapor profile uncertainties were examined. The retrieval errors appropriated for a cloud climatology of average cloud amount within 1 km cloud height intervals were studied. GRA

N82-11733# National Oceanic and Atmospheric Administration, Silver Spring, Md. Air Resources Labs.

THE WIND CLIMATOLOGY OF AMERICAN SAMOA

John C. Bortniak (Geophysical Monitoring for Climatic Change) Mar. 1981 72 p refs
(PB81-221012; NOAA-TM-ERL-ARL-98; NOAA-81050611) Avail: NTIS HC A04/MF A01 CSCL 04B

From an investigation of the tropical Pacific winds using previous work done in this area, three major sources of Samoa air were identified. The easterly trade winds are the most frequent source, and southerly air from the east of Australia occurs a large percentage of the time. The third source, occurring only a few percent of the time in the austral summer, is direct Northern Hemisphere air, which is normally blocked by the intertropical Convergence Zone. General features of tropical Pacific winds are also discussed. GRA

N82-11734# Geological Survey, Lakewood, Colo. Water Resources Div.

VARIATIONS IN CLIMATIC CHARACTERISTICS AS RELATED TO EVAPOTRANSPIRATION IN SOUTH PARK, CENTRAL PARK COUNTY, COLORADO Final Report

Norman E. Spahr 1981 161 p refs Prepared in cooperation with City of Denver
(PB81-219610; USGS/WRI-80-86; USGS/WRD/WRI/81-047) Avail: NTIS HC A08/MF A01 CSCL 04B

Data collected during May through September in 1977, 1978, and 1979 at three stations were analyzed using an analysis of variance technique to determine variations in climatic characteristics in South Park. Knowledge of these climatic characteristics will aid in determining the amount of water that may be transferred from agricultural use in South Park to municipal use in the Denver metropolitan area. Daily minimum air temperature, daily average air temperature, cumulative wind, daily relative humidity, and daily solar radiation were statistically different between the three stations at the 1-percent level of significance. Daily maximum air temperature and daily pan evaporation were not significantly different between the three stations. GRA

N82-11735# National Weather Service, Washington, D.C. Climate Analysis Center.

CLIMATE DIAGNOSTICS WORKSHOP (5TH) ANNUAL PROCEEDINGS

Jay S. Winston, ed. Mar. 1981 402 p refs Proceedings of Conf. held at Seattle, 22-24 Oct. 1980
(PB81-222200; NOAA-81050604) Avail: NTIS HC A18/MF A01 CSCL 04B

The past year's climate fluctuations were reviewed. General studies of variations in the large scale circulation are presented. Data and methods for monitoring snow and ice, water vapor, and volcanic aerosols are discussed. Large scale sea-air interactions are reported with emphasis on the equatorial Pacific, Southern Oscillation, El Nino, and related phenomena. T.M.

N82-11736# National Center for Atmospheric Research, Boulder, Colo.

US MONSOON EXPERIMENT MONEX RAWINSONDE/RADIOMETERSONDE SYSTEM

Gerald A. Meehl, Robert B. McBeth, William C. Bolhofer, and Sushil Unninayar Nov. 1980 54 p refs
(Grant NSF ATM-77-23757)
(PB81-222937; NCAR/TN-164+EDD) Avail: NTIS HC A04/MF A01 CSCL 04B

A procedure to convert rawinsonde and radiometersonde observations from raw data into the standard message format in the field with the use of two inexpensive programmable calculators and a miniaturized wind-plotting board is described. The combination of elements of an automatic processing system concept and aspects of the more conventional graphical analysis method makes the system economical, portable, and easy to operate by supporting personnel with a minimum of training, especially in locations with difficult logistical requirements. This method was developed for use with portable rawinsonde and radiometersonde systems at remote field sites in Southeast Asia and Nepal in support of the upper air observational program of the International Monsoon Experiment (MONEX). GRA

N82-11737# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.

THE ESTIMATION OF CONVECTIVE, SUMMERTIME RAINFALL IN THE UNITED STATES HIGH PLAINS FROM THERMAL INFRARED, GEOSTATIONARY SATELLITE IMAGERY, VOLUME 1 Final Report, Oct. 1977 - Dec. 1979

Cecilia G. Griffith, William L. Woodley, and John A. Augustine Oct. 1980 172 p refs 2 Vol.
(Contract DI-8-07-83-V0016)
(PB81-222762) Avail: NTIS HC A08/MF A01 CSCL 04B

Estimates of summertime, convective rainfall for 15 cases over three United States High Plains sites have been computed from geosynchronous, thermal infrared imagery. The satellite technique (derived in south Florida) overestimated High Plains rainfalls by a factor of approximately 5 (that is, approximately 500 percent difference). Three modifications to the technique to account for environmental differences were tested. GRA

N82-11738# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.

THE ESTIMATION OF CONVECTIVE, SUMMERTIME RAINFALL IN THE UNITED STATES HIGH PLAINS FROM THERMAL INFRARED, GEOSTATIONARY SATELLITE IMAGERY, VOLUME 2 Final Report, Oct. 1977 - Dec. 1979

Cecilia G. Griffith, William L. Woodley, and John A. Augustine Oct. 1980 79 p refs 2 Vol.
(Contract DI-8-07-83-V0016)
(PB81-222770) Avail: NTIS HC A05/MF A01 CSCL 04B

A series of four computer programs which analyze digital geostationary satellite data for convective rainfall estimation are described. The programs: (1) navigate, (2) isolate and track clouds, (3) compute rainfall per cloud and (4) map the inferred rainfall. GRA

N82-11739# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Technoloy Div.

THE MEASUREMENT OF HEIGHT AND SLOPE OF ISOBARIC SURFACES WITH AN AIRBORNE RADAR ALTIMETER

E. N. Brown, C. A. Friehe, M. A. Shapiro, and P. J. Kennedy Dec. 1980 22 p refs
(Grant NSF ATM-77-23757)
(PB81-221632; NCAR/TN-160) Avail: NTIS HC A02/MF A01 CSCL 04B

The aeronautical use of electronic altimeters is to measure the absolute clearance of an aircraft above the Earth's surface. In support of atmospheric research, accurate high-range altimeters, in conjunction with accurate static pressure and navigation data can also provide a means for measuring the heights of constant-pressure surfaces. From the derivatives of the measurements, surface slopes and dynamical quantities such as the geostrophic wind may be obtained. The operational and research use of a high pulse-type radar altimeter system installed on the NCAB Sabreliner for jet stream research is described. GRA

N82-11740# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
INSTRUMENT INTERCOMPARISONS AT THE BOULDER ATMOSPHERIC OBSERVATORY DURING 1980
J. E. Gaynor and J. A. Korrell Mar. 1981 45 p refs
(PB81-220139; NOAA-TM-ERL-WPL-69; NOAA-81050610)
Avail: NTIS HC A03/MF A01 CSCL 04B

The three-axis Doppler bistatic sodar discussed in this report was a redesign of the system used in the BLIE. The tethersonde, essentially identical with that used in the BLIE, provided averages of about 5 min at nearly fixed levels corresponding to the BAO tower levels. Similar averages for the tower data were used for comparisons. The monostatic Doppler sodar also discussed in this report, was not previously tested at the BAO. The testing procedures followed those used in the BLIE, and the results from the three instruments are presented in similar format to the BLIE report, but in more detail. Added to the results is a brief discussion of the capabilities of a Doppler sodar in measuring vertical wind speed standard deviation using a limited set of data. GRA

N82-11741# Pennsylvania State Univ., University Park. Dept. of Meteorology.
NUMERICAL STUDIES OF HURRICANE-OCEAN INTERACTIONS Final Report
Richard A. Anthes Apr. 1981 54 p refs
(Grant NOAA-04-4-022-26)
(PB81-225575; NOAA-81050810) Avail: NTIS HC A04/MF A01 CSCL 04B

An axisymmetric, interacting model of the ocean and the atmosphere was developed to study the mutual response of the tropical cyclone and the ocean. The hurricane model with the high-resolution PBL model was coupled with an axisymmetric version of the mixed-layer ocean model. The combined model was integrated simultaneously for 24 h to investigate the mutual response of the two systems. The results suggest that appreciable weakening of a hurricane due to the cooling of the oceanic surface will not occur if it is translating at typical speed. GRA

N82-11742# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
DOPPLER RADAR DATA ANALYSIS DURING FISCAL YEAR 1980 Final Report
W. R. Moninger, R. Dineen, and T. Becker Mar. 1981 46 p refs
(PB81-225476; NOAA-TM-ERL-WPL-70; NOAA-81051409)
Avail: NTIS HC A03/MF A01 CSCL 04B

Two triple Doppler radar case studies are discussed. The first is of a post frontal band observed as it moved up the foothills of the Sierra Nevada mountains. The band structure was primarily helical, with inflow from the right front of the band at low levels, an updraft slightly behind the reflectivity core of the band, and outflow toward the left front. The band structure was similar to but smaller in scale than bands observed in the Sacramento valley. The second case is of a weak frontal passage followed by a strong squall line passage. The squall was intense enough to have an associated tornado, but was quite shallow. Reflectivity in the squall line was a maximum of 52 dBZ at 0.6 km msl, dropping to below 20 dBZ above 5.1 km msl. GRA

N82-11743# National Oceanic and Atmospheric Administration, Miami, Fla.
THE DETERMINATION OF NAVIGATIONAL AND METEOROLOGICAL VARIABLES MEASURED BY NOAA/RFC WP3D AIRCRAFT
Francis J. Merceret and Harlan W. Davis Apr. 1981 28 p refs
(PB81-225468; NOAA-TM-ERL-RFC-7; NOAA-81051503)
Avail: NTIS HC A03/MF A01 CSCL 04B

For each variable, the sensor inputs and equations used are described and an estimate of the error in the result is provided. The report is divided into two sections: quantities displayed on-board in real-time and additional quantities computed and available to the user on request in the final data set. The aircraft and much of the instrumentation are described. T.M.

N82-11744# National Geodetic Survey, Rockville, Md.
A MODEL OF TEMPERATURE STRATIFICATION FOR CORRECTION OF LEVELING REFRACTION
Sandford R. Holdahl Apr. 1981 35 p refs
(PB81-225435; NOAA-TM-NOS-NGS-31; NOAA-81051111)
Avail: NTIS HC A03/MF A01 CSCL 04B

Refraction causes leveled height differences to be too small. It is usually considered to be the largest known systematic error in leveling measurements amounting to as much as a cm/km. In 1937, long before refraction was widely accepted as a significant error source, a correction was developed. Few countries adopted the correction, but it is now realized that the correction is necessary, especially in the middle and lower latitudes. Removing refraction bias from old leveling measurements requires a temperature stratification model. The model described is based on historical records of solar radiation, sky cover, precipitation, and ground albedo from many locations in the conterminous United States. This modeling method can be adopted by any country with records of solar radiation. GRA

N82-11745# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environment Lab.
COMPARISON OF OCEAN AND ISLAND RAINFALL IN THE TROPICAL SOUTH PACIFIC, ATLANTIC, AND INDIAN OCEANS
Cathleen Wright and R. K. Reed Apr. 1981 22 p refs
(PB81-225401; NOAA-TM-ERL-PMEL-25; NOAA-81051504)
Avail: NTIS HC A02/MF A01 CSCL 04B

Mean annual rainfall and maximum elevation were compiled from a variety of sources. Estimated annual ocean rainfall in the vicinity of each island was taken from a map of annual precipitation over the world ocean. Island rainfall was compared with ocean rainfall, and these island/ocean rainfall ratios were examined in terms of ocean location and island elevation. GRA

N82-11746# National Weather Service, Salt Lake City, Utah.
A COMPARISON OF TWO METHODS FOR FORECASTING THUNDERSTORMS AT LUKE AIR FORCE BASE, ARIZONA
Keith R. Cooley (Luke AFB, Ariz.) Apr. 1981 17 p refs
(PB81-225393; NOAA-TM-NWS-WR-163; NOAA-81051402)
Avail: NTIS HC A02/MF A01 CSCL 04B

A summary is presented of two studies for forecasting the occurrence of air-mass thunderstorms for the period 1 June through 30 September. The first is based on twelve years of upper-air data from Tucson and is referred to as the RAOB study. The second is based on three years of trajectory model data and is called the Trajectory study. At the present time the RAOB method does provide the forecaster an aid to forecasting thunderstorm activity at Luke Air Force Base, and is especially helpful to new forecasters assigned to the base. GRA

N82-11747# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
HAWAII MESOSCALE ENERGY AND CLIMATE PROJECT (HAMEC). 2: P-3 AIRCRAFT DATA SETS
M. A. Dias, comp., I. G. Nolt, comp., E. C. Nickerson, comp., and D. C. Welsh, comp. Mar. 1981 327 p refs
(PB81-224198; NOAA-81051408) Avail: NTIS HC A15/MF A01 CSCL 04B

Four types of in-flight meteorological data were recorded by research systems aboard the NOAA P-3 aircraft. They are: research aircraft measurements system (RAMS), a HP 2100 based computerized data system which records approximately seventy aircraft and meteorological variables on digital tape; omega dropwindsonde soundings (ODW); cloud data from aircraft cameras; and particle measuring systems (PMS) particle size data. GRA

N82-11748# National Oceanic and Atmospheric Administration, Silver Spring, Md. Air Resources Labs.
WORKBOOK FOR ESTIMATING THE CLIMATOLOGY OF REGIONAL CONTINENTAL SCALE ATMOSPHERIC DISPERSION AND DEPOSITION OVER THE UNITED STATES

Roland R. Draxler and Jerome L. Heffter Feb. 1981 210 p refs Sponsored by DOE
(PB81-224172; NOAA-TM-ERL-ARL-96; NOAA-81042704)
Avail: NTIS HC A10/MF A01 CSCL 04B

A version of the Air Resource Laboratories' (ARL) regional trajectory model was developed to permit simultaneous calculation of trajectories from 70 hypothetical sources of very long periods. Five years of data were used to develop a climatology of atmospheric dispersion. Air concentrations were calculated at receptors coincident with the 70 source locations. Each source and receptor was treated independently to develop a source/receptor matrix that can be used to produce air concentration patterns over the U.S. for any combination of sources or to evaluate the impact of different sources on any receptor. Five-year averages of seasonal and annual air concentrations are given for various combinations of wet and dry deposition. Example calculations are shown. GRA

N82-11749# National Weather Service, Silver Spring, Md.
EQUIPMENT FOR FLOOD AND FLASH FLOOD WARNING SYSTEMS
1981 416 p refs Sponsored in part by Army Prepared in cooperation with Arizona Dept. of Water Resources, Phoenix
(PB81-224131; NOAA-81042801) Avail: NTIS HC A18/MF A01 CSCL 04B

Entries in the publication are primary components from which an equipment system can be assembled. The National Weather Service plans to encourage to development of integrated equipment for various purposes. GRA

N82-11750# Intermountain Forest and Range Experiment Station, Ogden, Utah.
PRECIPITATION CHARACTERISTICS OF SUMMER STORMS AT STRAIGHT CANYON BAROMETER, WATERSHED, UTAH
Joel E. Fletcher, A. Leon Huber, Eugene E. Farmer, Keith R. McLaughlin, John Rector, and Larry J. Schmidt May 1981 15 p refs
(PB81-223950; FSRP/INT-274) Avail: NTIS HC A02/MF A01 CSCL 04B

Straight Canyon barometer watershed was divided into three similar precipitation intensity zones. The 50-year precipitation intensity (2-minute duration) increased from about 4 in per hour on zone 1, to about 13 in per hour on zone 3. Daily precipitation depths were revised, with zone 3 receiving 91.97 in and zone 1, 2.08 in. Rainfall erosivity increased from 12.5 hundreds of foot tons per acre-inch in zone 3. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-11751# New Hampshire Univ., Durham. Ocean Process Analysis Lab.
CONDITIONAL SAMPLING OF OCEANIC TEMPERATURE AND PRESSURE
James D. Irish, Wendell S. Brown, and Mark P. Woodbury 29 Jun. 1981 48 p
(Contract N00014-80-C-0351; Grant NSF OCE-78-26229)
(AD-A104539; TR-8101; UNH-SG-172) Avail: NTIS HC A03/MF A01 CSCL 08/1

In the ocean, as in the atmosphere, energy transfer processes exhibit a distinct intermittency. Important energy transfer events occur rarely in space and time but their contribution is likely to be greater than those from all others combined. For example, the most severe storms during a particular year are likely to be associated with a larger momentum and heat flux between the atmosphere and the ocean than the winds during the rest of the year. The breaking of an internal wave can lead to a greater vertical mixing of heat and salt than other diffusion processes. The presence of intermittency places severe demands on geophysical data acquisition. Routine sampling at fixed rates provide redundant data nearly all of the time and inadequate data during the rare times of an interesting event. A fixed program of intermittent rapid sampling superimposed on a standard low sampling rate (commonly referred to as burst sampling) is an improvement, but is not entirely satisfactory either. What is needed is a high rate of sampling conditioned by the occurrence of the rare important events or what will be referred here as conditional sampling. GRA

N82-11752# University of Southern California, Los Angeles. Dept. of Civil Engineering.
WAVE PROPAGATION OVER RECTANGULAR TRENCH
J. J. Lee and R. M. Ayer Dec. 1980 17 p refs
(Grant NSF ENV-77-01599)
(PB81-220782; NSF/RA-800544) Avail: NTIS HC A02/MF A01 CSCL 08C

Two dimensional, linearized potential flow was assumed. The fluid domain was divided into two regions along the mouth of the trench. Solutions in each region are expressed in terms of the unknown normal derivative of the potential function along this common boundary with the final solution obtained by matching. Reflection and transmission coefficients were found for various submarine geometries. The result shows that for a particular flow configuration, there exists an infinite number of discrete wave frequencies at which waves are completely transmitted. The validity of the solution in the infinite constant water depth region is shown by comparing with the results using a boundary integral method for given velocity distributions along the mouth of the trench. GRA

N82-11753# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
INDEX TO OBSERVATIONS OF CURRENTS IN PUGET SOUND, WASHINGTON, FROM 1908-1980
Jeffrey M. Cox, Curtis C. Ebbesmeyer, Carol A. Coomes, Laurence R. Hinchey, Jonathan M. Helseth, Glenn A. Cannon, and Clifford A. Barnes (Washington Univ., Seattle) Mar. 1981 62 p refs Prepared in cooperation with Evans-Hamilton, Inc.
(PB81-224115; NOAA-TM-OMPA-5; NOAA-81042703) Avail: NTIS HC A04/MF A01 CSCL 08C

In order to describe the characteristics of the circulation in two major basins of Puget Sound, Washington, a synthesis of historical current measurements are being undertaken. Nearly all the current observations taken throughout the Sound were collected. This report indexes 48.8 recorded years of Eulerian current observations generally one day or longer taken at nearly 300 sites from 1908-1980. The three major organizations taking measurements during this period were the National Ocean Survey, the University of Washington, and the Pacific Marine Environmental Laboratory. GRA

N82-11754# Washington Univ., Seattle. Div. of Marine Resources.
ON THE COMPUTATION OF BAROTROPIC TIDES IN DEEP ESTUARIES WITH APPLICATION TO KNIGHT INLET, BRITISH COLUMBIA
Bruno M. Jamart Oct. 1980 75 p refs
(Grant NA79AA-D-00054)
(PB81-220147; WSG-80-6; NOAA-81042910) Avail: NTIS HC A04/MF A01 CSCL 08C

Tidal motion in semi-enclosed basins is essentially periodic. Hence, the solution of the shallow water wave equations in Fourier space (or in terms of harmonic constituents) can be efficient alternative to the conventional time-stepping procedures. A numerical method based on that premise is described; the method combines variational calculus, an iterative scheme, and the finite element method to determine the spatial variations of the Fourier coefficients of water height and depth-averaged horizontal velocities. Computer results for the semidiurnal barotropic tidal flow agree fairly well with all available observations. GRA

N82-11755 Washington Univ., Seattle.
TIME DEPENDENT MIXING IN A SALT WEDGE ESTUARY Ph.D. Thesis
Eric Newell Partch 1981 181 p
Avail: Univ. Microfilms Order No. 8121232

Measurements of the profiles of salinity and velocity at anchored stations in the Duwamish River estuary at both high and low river stages indicate that the turbulent mixing through the density interface is highly time dependent with the most intense mixing occurring at the maximum current speed during the ebb. Additional measurements of the turbulent kinetic energy and the turbulent flux of salt by the eddy correlation technique during low river discharge verify the interpretation. A lateral sampling experiment found that the intense mixing was concentrated in the center of the channel away from the flow boundaries. Echograms visualizing the interface showed it to be disturbed by waves with wavelengths of O(10m) and heights of O(1m) near maximum ebb. The interface was examined visually and found to be a thin(20-30cm) layer coinciding with a sharp thermocline. Dissert. Abstr.

N82-11756 Washington Univ., Seattle.
AN INVERSE TECHNIQUE FOR DETERMINATION OF MEAN OCEAN CIRCULATION Ph.D. Thesis
Karl Chris Stengel 1981 274 p
Avail: Univ. Microfilms Order No. 8121248

A number of widely differing solutions can be obtained by minimization of the rms value of some linear function of the velocity. In this type of solution, the calculated velocity is shown to be a convolution of the true velocity with a so-called resolution function, which can be calculated and is ideally a delta function. Those solutions found include the minimum total (baroclinic plus barotropic) velocity and the minimum derivative velocity. The resolution functions that are associated with each solution, however, are very poor approximations to delta functions. It is much more fruitful to calculate bounds on parameters such as the average velocity. With this technique, the velocity is expected as a series in a set of expansion functions. The convolution of each function with the velocity produces, in turn, each desired parameter. From an estimate of the rms difference between the expansion and the true velocity, the parameters can be bound. Dissert. Abstr.

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-11757*# National Aeronautics and Space Administration, Washington, D. C.
CYCLIC NUCLEOTIDES IN TISSUES DURING LONG-TERM HYPOKINESIA
V. F. Makeyeva, G. S. Komolova, I. A. Yegorov, L. V. Serova, and N. A. Chelnaya Oct. 1981 6 p refs Transl. into ENGLISH from "Tsiklicheskiye Nukleotidy v Tkanyakh Pri Dlitelnoy Gipokinezii", Voprosy Meditsinskoy Khimii (USSR), Vol. 27, No. 1, 1981 p 59-61 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Bakh Inst. of Biochemistry, USSR
(Contract NASw-3541)
(NASA-TM-76726) Copyright. Avail: NTIS HC A02/MF A01 CSCL 06C

Male Wistar rates were kept hypokinetic by placing them in small containers for 22 days. Blood plasma cAMP content was subsequently found increased, and cGMP content decreased, in the experimental animals. Liver and thymus cAMP content was similar in the control and experimental animals. There was a 20 and 36% decrease of cAMP content in the kidneys and spleen, respectively. Hypokinesia's reduction of cyclic nucleotides seems to inhibit RNA and protein synthesis. Author

N82-11758*# National Aeronautics and Space Administration, Washington, D. C.
LASER INDUCED FLUOROESCENCE FROM ALGAE: RESULTS OF A SHIP-BORNE FIELD TEST
Britt Hartmann, Ove Steinvall, and Anders Widen Sep. 1981 44 p refs Transl. into ENGLISH of "Laserinducerad Fluorescens from Alger: Resultat fraan ett Baatburet Faeltfoersoek" Rept. FOA-C-30171-EL, Stockholm, Jul. 1979 p 1-51 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by National Defense
(Contract NASw-3541)
(NASA-TM-76626; FOA-C-30171-EL) Avail: NTIS HC A03/MF A01 CSCL 06C

A basis is provided for the feasibility of air-borne laser fluorosensing not only of chlorophyll but also of pollutants such as oils and chemicals. There was a satisfactory correlation between the laser data and those obtained manually. The absolute determination of the chlorophyll concentration is discussed. T.M.

N82-11759*# National Aeronautics and Space Administration, Washington, D. C.
ELECTRON MICROSCOPICAL AND HISTOCHEMICAL STUDIES ON THE TRANSVERSE STRIATED MUSCLES OF BIRDS AFTER PROLONGED HYPOKINESIS
M. Balak, J. Kocisova, J. Marcanik, K. Boda, and R. Skarda Aug. 1981 14 p refs Transl. into ENGLISH from Arch. Exp. Veterinarmed. (E. Germany) v. 33, no. 1, 1979 p 37-46 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-76717) Avail: NTIS HC A02/MF A01 CSCL 06C

Studies of the gastrocnemius muscle were carried out in 4 month old cockerels of the laying hybrid after hypokinesis lasting 15 and 30 days. It was found that restricted movement resulted in dystrophic changes of myotibrils, enlargement of the sarcoplasmic reticulum and oedem of interfibrillar spaces. Histochemical studies revealed focuses of increased activity of non-specific esterase, decreased activity of dehydrogenase of lactic acid and a positive reaction of acid phosphatase. T.M.

N82-11760*# National Aeronautics and Space Administration, Washington, D. C.
PARTICIPATION OF THE HYPOPHYSEAL-ADRENAL CORTEX SYSTEM IN THROMBIN CLEARANCE DURING IMMOBILIZATION STRESS
B. A. Kudryashov, A. M. Uljanov, F. B. Shapiro, and G. G. Bazazyan Oct. 1981 15 p refs Transl. into ENGLISH from Folia Maematol. (Leipzig), v. 106, no. 2, 1979 p 244-253 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by State Univ. of Moscow
(Contract NASw-3542)
(NASA-TM-76729) Avail: NTIS HC A02/MF A01 CSCL 06C

Thrombin marked with I-131 resulted in a considerable increase of the thrombined clearance rate in healthy male rats during stress caused by an immobilization lasting 30 minutes, and in an increase of thrombin clearance occurred by a combination of immobilization and administration of adrenocorticotropin (ACTH). Contrary to ACTH, the thrombin clearance is not stimulated in healthy animals by hydrocortisone. The results of the examination are presented. S.L.

N82-11761# General Accounting Office, Washington, D. C. Community and Economic Development Div.
INFORMATION OF MISSION AND FUNCTIONS OF THE NATIONAL BUREAU OF STANDARDS
22 Apr. 1981 96 p
(PB81-228207; CED-81-39) Avail: NTIS HC A05/MF A01 CSCL 05A

The Subcommittee on Science, Research and Technology, House Committee on Science and Technology, was concerned that the Bureau of Standards appeared divided in carrying out its functions under enabling legislation and subsequent legislative mandates and saw a need to hold hearings on the organic act, the law establishing the Bureau. GAO identified several matters which the subcommittee may wish to explore during hearings that may help the Bureau carry out its current and future responsibilities. GRA

N82-11762 Joint Publications Research Service, Arlington, Va.
USSR REPORT. LIFE SCIENCES BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 12
30 Oct. 1981 62 p refs Transl. into ENGLISH from various Russian publications
(JPRS-79336) Copyright. Avail: JPRS, Arlington, Va.

A mathematical model of the human memory depository is presented, the investigation of the otolithic reflex and the space perception functions of cosmonauts is described, and requirements for an automated measuring and computing complex for studies in human factors engineering are described. For individual titles, see N82-11763 through N82-11765.

N82-11763# Joint Publications Research Service, Arlington, Va.

TIME AND INFORMATION MODEL OF HUMAN MEMORY ORGANIZATION c53

V. A. Ganzen and D. A. Igonin *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 23-33 refs Transl. into ENGLISH from Vestn. Leningr. Univ.: Ekon., Filosofiya, Pravo (USSR), no. 5, issue 1, Mar. 1981 p 47-56 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

A dimensional and structural model of the human memory depository is presented. Quantitative estimates of the size of the memory depository are made and the organization of the system of memory traces in a hypothetical functional space of the memory is described in psychological terms. In the model, the volume (capacity) of the depository refers to the number of storage units in it, while the concept of structure characterizing the distribution of traces in the depository is interpreted as the structure of order. Only those parts of the depository that are responsible for fixing traces of various forms of symbolic material, such as meaningless syllables, words, or the graphic signs of a written language, are considered. J.D.H.

N82-11764# Joint Publications Research Service, Arlington, Va.

OTOLITHIC REFLEX AND SPACE PERCEPTION FUNCTION OF COSMONAUTS c52

I. Ya. Yakovleva and L. N. Kornilova *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 34-38 refs Transl. into ENGLISH from Vestn. Otorino-Laringol. (USSR), no. 4, Jul. - Aug. 1981 p 3-6 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

The reactions of the vestibular system and the space perception function to space flight are described. Data from preflight and postflight examinations of 24 cosmonauts following ten short term (4-19 days) and five long term (30-175 days) flights was analyzed. The otolithic reflex was investigated according to the intensity of the reaction of eyeball counterrotation, using a visual successive image representation in a transition from vertical to horizontal position to the right and left side. The function of spatial coordinate perception was investigated in the sitting position and in a horizontal position on the right side. J.D.H.

N82-11765# Joint Publications Research Service, Arlington, Va.

MEASURING/COMPUTING COMPLEX FOR AUTOMATION OF ERGONOMIC EXPERIMENTS c54

O. V. Afanasyev, R. P. Burusuzov, and B. V. Yelatomtsev *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 41-47 refs Transl. into ENGLISH from Tekh. Estetika (USSR), no. 1, Jan. 1981 p 27-29 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

Hardware and software requirements for an automated measuring and computing complex for studies in human factors engineering are considered. A complex consisting of a YeS-1010 computer, a Plurimat-S signal analyzer, an experimental camera, and a test bunch consisting of a KL 104A LED indicator, subject console, tachistoscope, and EEG-111 electroencephalograph is described. The software for the computer and signal analyzer is described. J.D.H.

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-11766 Royal Aircraft Establishment, Bedford (England). Library.

ON THE ACTIVE PART PLAYED BY THE HEART IN THE VENOUS RETURN OF THE BLOOD

W. Bohme Jun. 1980 104 p refs Transl. into ENGLISH from Ergeb. Physiol. (West Germany), v. 38, 1936 p 251-338 (RAE-Lib-Trans-2017; BR79520)

Evidence from X-ray experiments supporting the idea that the heart sucks blood into the atria during systole is reviewed. Both X-ray cinematography and kymography were used in studies on animals and humans with and without contrast media. When the volume of the ventricles decreases during systole, the volume of the atria increases markedly as the valve plane descends towards the apex, the calibre of the venae cavae decreases, and as shown by experiments involving injection of droplets of iodine containing oil, the blood accelerates towards the heart. Various pathological conditions, including respiratory and cardiac failure, pneumothorax, air and oil emboli, and the effects of some pharmacological agents are also discussed. A.R.H.

N82-11767 Royal Aircraft Establishment, Bedford (England) Library.

MECHANICAL IMPEDANCE OF THE HUMAN OUTER EAR

H. Eis and J. Schroeter Feb. 1981 21 p refs Transl. into ENGLISH from Forschungsber. (West Germany), no. 238, 1980 (RAE-Lib-Trans-2065; BR80139) Copyright. Avail: Issuing Activity

The lack of a quick, cheap and accurate method of measuring the attenuation provided by hearing protectors hampered the development of these devices. Many efforts to provide such a method involved the design of an objective test apparatus or 'artificial head'. A major drawback to this solution was the lack of detailed information about the mechanical characteristics of the skin/flesh layer at the point of contact between the protector and the head of a wearer. The measurement of the mechanical impedance of the skin/flesh layer of 100 subjects at four points in the circumaural region and at a point in the outer ear canal is described. The application of these data to the design of an artificial skin/flesh layer for use on an 'artificial head' is discussed. T.M.

N82-11768 Pennsylvania State Univ., University Park.

AIRWAY GAS MIXING DURING REST AND BICYCLE EXERCISE Ph.D. Thesis

Deborah Marie Drechsler 1981 96 p
Avail: Univ. Microfilms Order No. 8120419

The increase in dispersion of an inert tracer bolus of helium or sulfur hexafluoride was used as a direct, non-invasive measure of longitudinal gas mixing in the conducting airways. Three types of experiments were performed. Firstly, inspiratory flow rate was varied between 0.2 and 1.8 l/s while the expiratory flow rate was held constant at 0.4 l/s. Measurements were made at penetration volumes (V) of 30, 90, and 150 ml, and tidal volume was 600 ml. The negative correlation of mixing with inspiratory flow rate at all three values of V suggests that airway gas mixing during inspiration is by turbulence. During the second group of experiments expiratory flow rate was varied from 0.2 to 2.5 l/s, and inspiratory flow rate was held constant at 0.4 l/s. The positive correlation of mixing with expiratory flow rate at all three values of V leads to the conclusion that airway gas mixing during expiration is by Taylor diffusion. The third group of experiments investigated the extent of cardiogenic gas mixing by comparing inert gas dispersion during bicycle ergometer exercise at 35 prcent V sub O2 max to that dispersion occurring with matched respiratory maneuvers at rest.
Dissert. Abstr.

N82-11769 Rochester Univ., N. Y.

HUMAN LYMPHOCYTE CALCIUM METABOLISM Ph.D. Thesis

Andrew Harry Lichtman 1981 207 p
Avail: Univ. Microfilms Order No. 8122380

A technique was developed for measuring the calcium content of a small number of cells using a graphite furnace atomic absorption spectrophotometer. The sensitivity of the graphite furnace technique was 60 times higher and the detection limit was 1500 times lower than a conventional flame atomic absorption technique. The low detection limit of the graphite furnace technique permitted studies of calcium metabolism in the available numbers of human lymphocytes. In the absence of serum, the lymphocyte calcium content doubled as the medium calcium concentration was increased from 1 micro mol/l 0.5 mmol/l. At medium calcium concentrations of 0.5 mmol/l and above, the lymphocyte calcium content was 1.0 mmol/l cells. In medium adjusted 2 mmol/l calcium, the lymphocyte calcium content doubled as the medium serum concentration was increased from 0 to 2 percent. At medium serum concentrations of 2 percent and above, lymphocyte calcium content was 2 mmol/l cells. Dissert. Abstr.

N82-11770* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

LOGIC-CONTROLLED OCCLUSIVE CUFF SYSTEM Patent

Joseph T. Baker (Technology, Inc., Houston, Tex.), George W. Hoffler, Inventors (to NASA) (Technology, Inc., Houston, Tex.), and William N. Hursta Issued 13 Oct. 1981 6 p Filed 1 Jun. 1976 Supersedes N76-27839 (14 - 18, p 2369)
(NASA-Case-MSC-14836-1; US-Patent-4,294,261;
US-Patent-Appl-SN-691647; US-Patent-Class-128-691;
US-Patent-Class-128-327; US-Patent-Class-128-686) Avail: US Patent and Trademark Office CSCL 06B

An occlusive cuff system comprises a pressure cuff and a source of regulated compressed gas feeding the cuff through an electrically operated fill valve. An electrically operated vent valve vents the cuff to the ambient pressure. The fill valve is normally closed and the vent valve is normally open. In response to an external start signal, a logic network opens the fill valve and closes the vent valve, thereby starting the pressurization cycle and a timer. A pressure transducer continuously monitors the pressure in the cuff. When the transducer's output equals a selected reference voltage, a comparator causes the logic network to close the fill valve. The timer, after a selected time delay, opens the vent valve to the ambient pressure, thereby ending the pressurization cycle.

Official Gazette of the U.S. Patent and Trademark Office

N82-11771*# National Aeronautics and Space Administration, Washington, D. C.

EFFECTS OF CURATIVE TREATMENT EMPHASIZING ENDURANCE TRAINING ON THE PERFORMANCE AND BLOOD PRESSURE OF HYPERTENSIVE AND NORMOTENSIVES

F. Worms (Sanitarium of the Governmental Hospital) Jun. 1981 20 p refs Transl. into ENGLISH from Dtsche. Gesundheitswesen, v. 35, no. 31, 1980 p 1207-1212 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76520) Avail: NTIS HC A02/MF A01 CSCL 06P

The problem of normal values of blood pressure after exercise taking into account the blood pressure at the end of the exercise test is discussed. Hypertensives showed a lower working capacity than normotensives. In normotensives, however, systolic blood pressure at the end of an exercise correlated well with the working capacity. After the endurance cure submaximal blood pressure was markedly lower in hypertensives with a striking dependence on the level of initial values. Systolic blood pressure at the end of an exercise test was not changed significantly. Most probably it is not possible to overcome this malregulation in hypertensives by endurance training alone. T.M.

N82-11772# Naval Ocean Systems Center, San Diego, Calif. Bureau of Medicine and Surgery.

REMOTE MEDICAL DIAGNOSIS SYSTEM RMDS DESIGN REVIEW MEETING MINUTES Technical Report, Aug. - Oct. 1980

W. T. Rasmussen and I. Stevens Aug. 1981 86 p refs Conf. held at Washington, D.C., 27-28 Aug. 1980
(AD-A104555; NOSC/TD-464) Avail: NTIS HC A05/MF A01 CSCL 06/5

Contains the minutes of a design review meeting for the Remote Medical Diagnosis System (RMDS) held 27-28 August, 1980, at the Bureau of Medicine and Surgery (Department of the Navy), Washington, DC. These minutes reflect the discussions held and information exchanged at this review meeting. They paraphrase various discussions, and are not intended as complete verbatim minutes. This document also contains background and reference material on the RMDS project.

Author (GRA)

N82-11773# Brookhaven National Lab., Upton, N. Y. Medical Research Center.

INTERCOMPARISON OF TECHNIQUES FOR THE NON-INVASIVE MEASUREMENT OF BONE MASS

S. H. Cohn 1981 14 p ref Presented at the 18th European Symp. on Calcified Tissue, Knokke, Belgium, 1981
(Contract DE-AC02-76CH-00016)
(DE81-029921; BNL-29958) Avail: NTIS HC A02/MF A01

A variety of methods are presently available for the measurement of both normal individuals and patients with metabolic disorders. Chief among these methods are radiographic techniques such as radiogrammetry, photon absorptiometry, computer tomography, Compton scattering and neutron activation analysis. In this review, the salient features of the bone measurement techniques are discussed along with their accuracy and precision. The advantages of the various techniques for measuring bone mass are summarized. Where possible, intercomparisons are made of the various techniques. DOE

N82-11774# Oak Ridge National Lab., Tenn. Health and Safety Research Div.

DARTAB: A PROGRAM TO COMBINE AIRBORNE RADIONUCLIDE ENVIRONMENTAL EXPOSURE DATA WITH DOSIMETRIC AND HEALTH EFFECTS DATA TO GENERATE TABULATIONS OF PREDICTED HEALTH IMPACTS

C. L. Begovich, K. F. Eckerman, E. C. Schlatter, S. Y. Ohr, and R. O. Chester Aug. 1981 79 p refs
(Contract W-7405-eng-26)
(DE81-030434; ORNL-5692) Avail: NTIS HC A05/MF A01

The DARTAB computer code which combines radionuclide environmental exposure data with dodimetric and health effects data to generate tabulations of the predicted impact of radioactive airborne effluents is discussed. DARTAB is independent of the environmental transport code used to generate the environmental exposure data and the codes used to produce the dosimetric and health effects data. The human dose and risk calculations need not be added to every environmental transport code. Options are included in DARTAB to permit the user to request tabulation by various topics. DOE

N82-11775# Brookhaven National Lab., Upton, N. Y. Medical Research Center.

USE OF NUCLEAR RESONANT SCATTERING OF GAMMA RAYS FOR IN VIVO MEASUREMENT OF IRON

David Vartsky, Lucian Wielopolski, Kenneth J. Ellis, and Stanton H. Cohn 1981 20 p refs Presented at the Conf. on X- and Gamma-Ray Sources and Appl., Ann Arbor, Mich., 10 Jun. 1981
(Contract DE-AC02-76CH-00016; Grant PHS-R01-HL-24177)
(DE81-026051; BNL-29737; CONF-810647-8) Avail: NTIS HC A02/MF A01

A technique for determination of elements in human body in vivo, utilizing nuclear resonant scattering of Gamma rays was developd with this technique 847 keV photons emitted from a gaseous 55MnCl sub 2 source are resonantly scattered from 56Fe present in the body. The detection of these Gamma rays is used to estimate the iron content of the liver or heart of patients. Details of the calibration procedure and potential molecular effects are described. DOE

N82-11776# Massachusetts General Hospital, Boston. Radiology Research Lab.

MOLECULAR EVENTS BASIC TO CELLULAR RADIATION RESPONSE

G. M. Kolodny [1981] 23 p refs Prepared in cooperation with Beth Israel Hospital, Boston
(Contracts DE-AS02-76EV-03335; EY-76-S-02-3335)
(DE81-027898; DOE/EV-03335/T1; COO-3335-28) Avail: NTIS HC A02/MF A01

The initiation and control of the division process in normal cells to gain insight into changes caused by x-irradiation and neolasia was discussed. It is suggested that small molecular weight RNA acts as primer for new RNA synthesis by hybridizing with DNA and there initiating the transcription of a new RNA chain. It is indicated that small molecular weight RNA will induce the production of new proteins. It is demonstrated RNA taken up from the media by cells in culture and induce in vitro the production of differential cell products. DOE

N82-11777# Oak Ridge National Lab., Tenn.

ALTERED TISSUE REACTIVITY AND INTERACTIONS BETWEEN CHEMICALS

H. P. Witschi 1981 33 p refs Presented at NRC Workshop on Multichem. Contamination, Milan, 27 Apr. 1981
(Contract W-7405-eng-26)
(DE81-023189; CONF-810481-1) Avail: NTIS
HC A03/MF A01

The interaction between chemicals which modify the biological response if exposure is simultaneous or sequential was explored. Two different situations are distinguished where interactions are caused by sequential exposure: (1) a first agent acts as an inducer or inhibitor of mixed function oxidases, this alters the response to a second, challenging agent and the nature of the biological response, is dicated by the second agent; and (2) a first agent produces slight or undetected or undetectable changes in a tissue, exposure to a second agent enhances or allows expression of the biological response determined by the first agent. Both types of interactions require an ordered sequence of exposure to two chemicals and complex dose effect and time effect relationships. DOE

N82-11778# North Carolina Univ. at Chapel Hill. School of Medicine.
NEW APPROACHES TO QUANTITATING THE PULMONARY EFFECTS ON INHALED POLLUTANTS Final Report, 25 Jul. 1977 - 24 Jul. 1980
Philip A. Bromberg, R. C. Boucher, M. Friedman, M. J. Hazucha, and R. L. Pimmell Jul. 1981 33 p refs
(Grant EPA-R-805184)
(PB81-222382; EPA-600/1-81-052) Avail: NTIS
HC A03/MF A01 CSCL 06T

The following techniques described make continuous measurements of large airways caliber rapid methods for invasively measuring respiratory mechanics using forced random noise excitation at the mouth; a nontraumatic technique to measure transepithelial potential difference across respiratory (nasal and airways) epithelium; tracheal epithelial permeability in vivo, demonstrating increased permeability and decreased permselectivity; a rapid noninvasive multigas rebreathing technique to measure lung water and O3 induced pulmonary. GRA

N82-11779# Creighton Univ., Omaha, Nebr.
OZONE EXPOSURE AND PULMONARY METABOLIC EFFECTS OF MEDIATORS AND HORMONES Final Report, 20 Nov. 1976 - 31 Aug. 1980
Ibert C. Wells Jul. 1981 25 p
(Grant EPA-R-804585)
(PB81-222408; EPA-600/1-81-051) Avail: NTIS
HC A02/MF A01 CSCL 06T

Several physiological effects of ozone exposure involving smooth muscle contracting substances were studied. The exposure of rats to ozone concentrations of 0.5 or 1.0 ppm for 4.0 hours produced the following effects in their lungs: (1) the release of prostaglandin F2 alpha and thromboxane A2 (2) increased the angiotensin converting enzyme activity, and (3) decreased the uptake of serotonin from the blood. Histamine and slow reacting substance of anaphylaxis were not released nor was the histamine forming capacity of the lung altered. Succinoxidase activity decreased by short exposure to ozone and increased by long exposure. GRA

N82-11780# National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Div. of Surveillance, Hazard Evaluations and Field Studies.
CARBON/GRAPHITE FIBERS: ENVIRONMENTAL EXPOSURES AND POTENTIAL HEALTH IMPLICATIONS
Ralph D. Zumwalde and Lowell T. Harmison 12 Dec. 1980 21 p refs
(PB81-229692; IWS-52.3) Avail: NTIS HC A02/MF A01 CSCL 06J

Health effects related to carbon (7449440), and graphite (7782425) fiber exposure are discussed. Industrial production of the fibers is reviewed. Data on fiber release and particle size is included. The results of epidemiological and animal toxicologic studies with fibrous glass (14808607), rock wool wollastonite (13983170), fibrous clay, asbestos (1332214) and carbon fibers are described. Animal toxicity tests based on fiber size, deposition pattern and cause of death are recommended. The synergistic effect between carbon/graphite fiber exposure and cigarette smoke also should be studied. Worker exposures to these fibers should be kept as low as possible and managed in the same way as exposure to fibrous glass. GRA

N82-11764# Joint Publications Research Service, Arlington, Va.
OTOLITHIC REFLEX AND SPACE PERCEPTION FUNCTION OF COSMONAUTS
I. Ya. Yakovleva and L. N. Kornilova *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 34-38 refs Transl. into ENGLISH from Vestn. Otorino-Laringol. (USSR), no. 4, Jul. - Aug. 1981 p 3-6 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-11763# Joint Publications Research Service, Arlington, Va.
TIME AND INFORMATION MODEL OF HUMAN MEMORY ORGANIZATION
V. A. Ganzen and D. A. Igonin *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 23-33 refs Transl. into ENGLISH from Vestn. Leningr. Univ.: Ekon., Filosofiya, Pravo (USSR), no. 5, issue 1, Mar. 1981 p 47-56 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-11781# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Directorate of Equipment Engineering.
INVESTIGATION OF SPATIAL DISORIENTATION OF F-15 EAGLE PILOTS Final Report, 15 Jan. - Aug. 1980
Dennis W. Jarvi Aug. 1981 72 p refs
(AD-A104684; ASD-TR-81-5016) Avail: NTIS
HC A04/MF A01 CSCL 05/8

An extensive investigation, including F-15 pilot interviews at Eglin AFB FL, and Langley AFB VA, into the characteristics and operation of the F-15 Eagle was conducted over a seven month period. In addition, F-16 pilots at Hill AFB UT, were interviewed. The following conclusions were drawn from the information acquired: The F-15 does not possess any unusual flight handling characteristics that could lead to pilot spatial disorientation. The large bubble canopy and the pilot's sitting height in the cockpit generally do not appear to significantly contribute to spatial disorientation. The asymmetrical exterior lighting strips on the F-15 can cause confusion on the part of the wing man regarding his formation position relative to the lead aircraft or the bank angle of the lead aircraft. Night formation join-ups, particularly from the stern, are rather difficult for the F-15 pilot due to the absence of adequate exterior lighting to provide the necessary depth perception cues for ascertaining the range and attitude of the lead aircraft. The layout of the F-15 cockpit generally manifests adherence to good human factors design principles. The F-15 Spatial Disorientation Team also uncovered some areas of potential pilot distraction. These areas, uncovered during pilot interviews, do not necessarily affect the incidence of spatial disorientation, but may add to the F-15 pilot's workload. The report includes these areas, and also makes a number of recommendations based on the results of the study. GRA

N82-11782# Foster-Miller Associates, Inc., Waltham, Mass. Mining Div.
RECOMMENDED GUIDELINES FOR OXYGEN SELF-

RESCUERS. VOLUME 1: UNDERGROUND COAL MINING Progress Report, Aug. 1979 - Dec. 1980
D. Randolph Berry and Donald W. Mitchell Jun. 1981 52 p 2 Vol.
(Contract DI-BM-J0199118)
(PB81-225872; BM-OFR-86(1)-81-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 08I

The Bureau of Mines awarded a contract for the provision of recommendations on the safest, most practical methods for complying with new regulations requiring that all underground coal miners have a self-contained, self rescuer (SCSR) -- a device capable of supplying, in an emergency, 1 hour of self-contained oxygen (no breathing of mine air). Information and recommendations that could be used during the early stages of nationwide compliance, especially in the areas of inspection, testing, and underground storage os SCSR's, are presented. An executive summary, introduction, definitions, recommended guidelines for district managers and mine operators, and a storage plan checklist and sample form are provided. GRA

N82-11783# Foster-Miller Associates, Inc., Waltham, Mass. Mining Div.
RECOMMENDED GUIDELINES FOR OXYGEN SELF-RESCUERS. VOLUME 2: APPENDICES Progress Report, Aug. 1979 - Dec. 1980
D. Randolph Berry and Donald W. Mitchell Jun. 1981 265 p refs 2 Vol.
(Contract DI-BM-J0199118)
(PB81-225880; BM-OFR-86(2)-81-Vol-2) Avail: NTIS HC A12/MF A01 CSCL 08I

The report covers a discussion of the recommended guidelines, worldwide use of oxygen self-rescuers, hypothetical use of oxygen self-rescuers in post-1972 coal mine explosions and fires, vibration testing of self-contained, self-rescuers (SCSR's), and testing of in-service SCSR's. Discussions with representatives of underground coal mining, recommendations for SCSR storage containers, example of SCSR storage plans, testing of in-service compressed oxygen SCSR's, and 30 CFR 75.1714, 30 regulations pertaining to self-rescuers are presented. GRA

N82-11765# Joint Publications Research Service, Arlington, Va.
MEASURING/COMPUTING COMPLEX FOR AUTOMATION OF ERGONOMIC EXPERIMENTS
O. V. Afanasyev, R. P. Burusuzov, and B. V. Yelstomtsev *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 41-47 refs Transl. into ENGLISH from Tekh. Estetika (USSR), no. 1, Jan. 1981 p 27-29 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N82-11784*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Data Systems Lab.
SPACE SHUTTLE MAIN ENGINE CONTROLLER
Russell M. Mattox and J. B. White Nov. 1981 40 p refs
(NASA-TP-1932; M-360) Avail: NTIS HC A03/MF A01 CSCL 09B

A technical description of the space shuttle main engine controller, which provides engine checkout prior to launch, engine control and monitoring during launch, and engine safety and monitoring in orbit, is presented. Each of the major controller subassemblies, the central processing unit, the computer interface electronics, the input electronics, the output electronics, and the power supplies are described and discussed in detail along with engine and orbiter interfaces and operational requirements. The controller represents a unique application of digital concepts, techniques, and technology in monitoring, managing, and controlling a high performance rocket engine propulsion system. The operational requirements placed on the controller, the extremely harsh operating environment to which it is exposed, and the reliability demanded, result in the most complex and rugged digital system ever designed, fabricated, and flown. Author

N82-11785*# National Aeronautics and Space Administration. Pasadena Office, Calif.
AUTOMATIC MULTI-BANKING OF MEMORY FOR MICROPROCESSORS Patent Application
Gordon A. Wiker, Inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 7 Aug. 1981 19 p
(Contract NAS7-100)
(NASA-Case-NPO-15295-1; US-Patent-Appl-SN-291646) Avail: NTIS HC A02/MF A01 CSCL 09B

A microprocessor system is provided with added memories to expand its address word length capacity by using indirect addressing instructions of a type having a detectable operations code and dedicating designated address spaces of memory to each of the added memories, one space to a memory. By decoding each operations code of instructions read from main memory into a decoder to identify indirect addressing instructions of the specified type, and then decoding the address that follows in a decoder to determine which added memory is selectively enabled to permit the instruction to be executed on the location to which the effective address of the indirect address instruction points, either before the indirect address is read from main memory or afterwards, depending on how the system is arranged by a switch. NASA

N82-11786# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
FIDELITY OPTIMIZATION OF MICROPROCESSOR SYSTEM SIMULATIONS M.S. Thesis Auburn Univ.
Earnest Taylor-Landrum, Jr. Mar. 1981 119 p refs
(AD-A104679; AFIT-CI-81-3T) Avail: NTIS HC A06/MF A01 CSCL 09/2

The development of a microprocessor system simulation that would accurately portray the operation of the system at a very fine level of detail was studied. This optimization in the area of fidelity was broken into three tasks. A preprocessor program was written to improve the operator interface to an existing simulation driver program. An existing microprocessor simulation, designed to run under the simulation driver program, was extensively modified to reflect actual machine level operations rather than abstract level functions. A simulation of a programmable parallel interface was developed and mated to the microprocessor simulation. Examples and possibilities for system level simulation are discussed and analyzed. Author (GRA)

N82-11787# Naval Research Lab., Washington, D. C.
ARCHITECTURE TUNING OF A REAL-TIME SIGNAL

SORTER IN A DENSE ENVIRONMENT Interim Report
T. R. Husson, R. H. Evans, L. H. Moffett, and A. M. Abdalla
11 Sep. 1981 34 p
(AD-A104524; NRL-8495) Avail: NTIS HC A03/MF A01
CSCL 09/2

This report describes the results of a study of the architecture of a real-time signal sorting system. The purpose of the signal sorter is to process and identify the outputs of a radar receiver. The problems of high data rates and uncertain environment characteristics require an adaptive system. The study began with a previously designed signal sorting architecture and the effects of various dynamic architecture tuning schemes on that system were analyzed.
Author (GRA)

N82-11788# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
THE CROSSTIE RANDOM ACCESS MEMORY (CRAM). PART 1: THE CONCEPT AND INITIAL STUDIES
Leonard J. Schwee, Paul E. Hunter, Kathleen A. Restorff, and Mary T. Shephard 8 Jun. 1981 40 p refs
(WF62582000)
(AD-A104543; NSWC/TR-81-213-Pt-1) Avail: NTIS
HC A03/MF A01 CSCL 09/2

This is the first annual technical report of progress toward a crosstie random access memory. This marks a recent change in direction from the previously studied serial access memory. The more pertinent information learned from the serial memory approach which applies to the CRAM is repeated here. However, previous reports contain much additional important information and can be obtained by writing to the authors. It was realized at NSWC that the crosstie memory elements could be reorganized into a random access memory and that this approach would eliminate some propagation problems which resisted easy resolution. At the same time, a much higher performance memory would result with higher expected reliability. Consequently, efforts at NSWC are being concentrated on the CRAM.
GRA

N82-11789# Denelcor, Inc., Denver, Colo.
MULTIPLE-INSTRUCTION, MULTIPLE-DATA PATH COMPUTERS: PARALLEL PROCESSING IMPACT ON FLIGHT SIMULATION SOFTWARE Final Report
Robert E. Lord, Swarn Kumar, and Rodney A. Schmidt Aug. 1981 101 p refs Prepared in cooperation with Washington State Univ., Pullman
(Contract F33615-79-C-0009 AF Proj. 6114)
(AD-A104506; AFHRL-TR-80-64) Avail: NTIS
HC A06/MF A01 CSCL 09/2

The purpose of this study was to evaluate the parallel processing impact of MIMD (Multiple-Instruction Multiple-Data Path) computers on Flight Simulation Software. Basic mathematical functions and arithmetic expressions from typical Flight Simulation Software were selected and run on a MIMD computer to evaluate the improvement in execution time that results from the parallel architecture of this type of computer. Recommendations as to the types of tasks which are optimally suitable for this computer architecture are made, together with the improvement in execution speed to be expected.
Author (GRA)

N82-11790# Ohio State Univ., Columbus. Computer and Information Science Research Center.
DESIGN AND ANALYSIS OF A MULTI-BACKEND DATABASE SYSTEM FOR PERFORMANCE IMPROVEMENT, FUNCTIONALITY EXPANSION AND CAPACITY GROWTH, PART 2
David K. Hsiao and M. Jaishankar Menon Aug. 1981 119 p refs
(Contract N00014-75-C-0573)
(AD-A104445; OSU-CISRC-TR-81-8) Avail: NTIS
HC A06/MF A01 CSCL 09/2

This is Part II of the design and analysis of a multiple back-end database management system, known as MDBS. This part consists of the remaining of four chapters of the design and analysis details. The first four chapters were issued a month ago as Part I. For an abstract of the entire work, the reader is to refer to the abstract of Part I. An implementation team is pursuing the instrumentation of MDBS as designed and analyzed in Parts I and II. It is hoped that studies and testings of the experimental MDBS may be used to verify our analytic and simulation findings on the MDBS design and performance.
Author (GRA)

N82-11791# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
DISTRIBUTED COMPUTATION OF FIXED POINTS
Dimitri P. Bertsekas Aug. 1981 18 p refs
(Contract N00014-75-C-1183; NR Proj. 049-383)
(AD-A104418; LIDS-P-1135) Avail: NTIS HC A02/MF A01
CSCL 09/2

We present an algorithmic model for distributed computation of fixed points whereby several processors participate simultaneously in the calculations while exchanging information via communication links. We place essentially no assumptions on the ordering of computation and communication between processors thereby allowing for completely uncoordinated execution. We provide a general convergence theorem for algorithms of this type, and demonstrate its applicability to several classes of problems including the calculation of fixed points of contraction and monotone mappings arising in linear and nonlinear systems of equations, shortest path problems, and dynamic programming.
Author (GRA)

N82-11792# Naval Postgraduate School, Monterey, Calif.
COMPUTER PERFORMANCE PREDICTION OF A DATA FLOW ARCHITECTURE M.S. Thesis
David John Hogen Jun. 1981 92 p refs
(AD-A104587) Avail: NTIS HC A05/MF A01 CSCL 09/2

Supercomputers capable of performing extremely high speed computation have been proposed which are based on an architecture known as data flow. Application of a Petri net-based methodology is used to evaluate the performance attainable by such an architecture. The architecture evaluated is MIT's cell block data flow architecture which is being developed to execute the applicative programming language VAL. Results show that for the data flow architecture to achieve its goal of high speed computation, intelligent multiprogamming schemes need to be developed. One such scheme, based on the notion of a 'concurrency vector', is introduced.
Author (GRA)

N82-11793# Naval Postgraduate School, Monterey, Calif.
A MICROPROCESSOR DEVELOPMENT SYSTEM FOR THE ALTOS SERIES MICROCOMPUTERS M.S. Thesis
Stephen Michael Hughes Jun. 1981 150 p refs
(AD-A104624) Avail: NTIS HC A07/MF A01 CSCL 09/2

An ALTOS series microcomputer is being used as the host computer in a microprocessor development system (MDS). The MDS hardware, consisting of the PRO-LOG STD bus, a Z80 cpu card, 2K bytes EPROM and 36K bytes random access memory, is controlled by the host via a single serial I/O port. The system provides the capability to develop and test both software and hardware in the combined CP/M (MP/M) and MDS environments.
Author (GRA)

N82-11794# Naval Ship Research and Development Center, Bethesda, Md.
A BACK-END DATA MANAGEMENT EXPERIMENT Final Report
Michael A. Wallace Sep. 1981 75 p refs
(TF5351019)
(AD-A104579; DTNSRDC-81/067) Avail: NTIS
HC A04/MF A01 CSCL 09/2

A test system was developed under contract to demonstrate the feasibility of the back-end processor approach. This system was installed on the PDP 11/70 (back-end processor) and tested for validity and performance. This test effort, sponsored primarily by NAVSUP, was to determine whether the originally perceived benefits could be realized and the disadvantages minimized. The perceived benefits were: reduced disk space; reduced main memory for application programs; reduced CPU time for application programs; increased data security; increased host utilization by linking several hosts to one back-end processor; independence of the DBMS from the host processor; and extend the useful life cycle of the host by freeing system resources. The known disadvantages are: an additional computer to operate and maintain; a communications link to maintain, and a development, implementation, and maintenance software effort on two machines. The system implementation, testing methodology, analysis of results, and conclusions/recommendations are discussed in this report. GRA

N82-11795# California Univ., Berkeley. Lawrence Berkeley Lab. Physics, Computer Science and Mathematics Div.
EFFICIENT METHODS FOR CALCULATING THE SUCCESS FUNCTION OF FIXED-SPACE REPLACEMENT POLICIES M.S. Thesis
Frank Olken May 1981 30 p refs
(Contract W-7405-eng-48)
(DE81-029847; LBL-12370) Avail: NTIS HC A03/MF A01

Efficient methods are discussed for calculating the success function of replacement policies used to manage very large fixed size caches. Such problems arise in studying the caching of files on disk. A class of replacement policies is characterized which makes it possible to evaluate the success function for a single cache size in time O(n(*)log(s)), where n is the number of memory references in the trace and s is the size of cache. An algorithm is constructed to evaluate the success function for the least recently used replacement policy in time O(n(*)log(s)), for cache sizes smaller than s. This algorithm runs in bounded memory, O(s). It is also shown how to modify Bennett and Kruskal's algorithm to run in bounded space. The two algorithms have the same asymptotic running times (within a constant factor). Measured running times for the classic least recently used algorithm, (Bennett and Kruskal's algorithm) and the new algorithm are compared. The impace of variable size segments (files, rather than fixed size pages), and deletions on algorithms for calculating success functions is considered. DOE

N82-11796# Los Alamos Scientific Lab., N. Mex.
PHILOSOPHY OF SUPERCOMPUTING
J. Worlton Jun. 1981 32 p refs Presented at the Conf. on High-Speed Computing., Glenenden Beach, Ore., 30 Mar. 1981; sponsored in part by Calif. Univ., Lawrence Livermore Lab.
(Contract W-7405-eng-36)
(DE81-028586; LA-8849-MS) Avail: NTIS HC A03/MF A01

A critical examination of some of the commonly held beliefs about supercomputing is preennted. Basic problems, principles, and motivating concepts are included. L.F.M.

N82-11797# Sandia Labs., Albuquerque, N. Mex. Aerodynamics Simulation Div.
USE OF A HYBRID COMPUTER FOR THE FLIGHT SIMULATION OF A BOMB/PARACHUTE SYSTEM
J. K. Cole 1981 26 p refs Presented at the User Soc. Meeting for the Appl. Dyn. System 10, Pacific Grove, Calif., 9 May 1981
(Contract De-AC04-76DP-00789)
(DE81-025141; SAND-81-1041C; CONF-810521-2) Avail: NTIS HC A03/MF A01

The use of a flight simulation laboratory for a 12 degree of freedom simulation of a bomb/parachute system is described. The simulation results are compared with data from flight tests. DOE

N82-11798# Federal Compiler Testing Center, Falls Church, Va.
COBOL COMPILER: MOHAWK DATA SCIENCES MDS COBOL RELEASE 12 ANSI 74, SERIES 21-MODELS 40, 50, SERIES 21 OPERATING SYSTEM 2
29 Jun. 1981 52 p
(PB81-226425; CCVS74-VSR800) Avail: NTIS HC A04/MF A01 CSCL 09B

The validation Summary Report (VSR) for the Mohawk Data Sciences COBOL Compiler Version 12 ANSI 74 (Series 21 Version 2) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-11799# Federal Compiler Testing Center, Washington, D.C.
PERKIN-ELMER COBOL R06 PERKIN-ELMER MODEL 3240 OS/32 REV 05.02
17 Jun. 1981 47 p
(PB81-223885; CCVSR750) Avail: NTIS HC A03/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Perkin-Elmer COBOL Compiler Version R06 (OS/32 Version 05.02) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-11306*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GOLDSTONE (GDSCC) ADMINISTRATIVE COMPUTING
H. Martin *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 182-191 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09B

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-11800*# Research and Data Systems, Inc., Lanham, Md.
THERMAL ALGORITHMS ANALYSIS Final Report
Tina Lien May 1981 10 p
(Contract NAS5-25786)
(NASA-CR-166716) Avail: NTIS HC A02/MF A01 CSCL 09B

The programming and analysis methods to support the development of a thermal model of the Earth's surface from detailed analysis of day/night registered data sets from the Heat Capacity Mapping Mission satellite are briefly described. M.G.

N82-11801*# Goodyear Aerospace Corp., Akron, Ohio.
SAR PROCESSING ON THE MPP Final Report, 9 Jan. - 31 Aug. 1981
K. E. Batcher, E. E. Eddey, R. O. Faiss, and P. A. Gilmore Aug 1981 88 p refs
(Contract NAS5-26430)
(NASA-CR-166726; GER-17020) Avail: NTIS HC A05/MF A01 CSCL 09B

The processing of synthetic aperture radar (SAR) signals using the massively parallel processor (MPP) is discussed. The fast Fourier transform convolution procedures employed in the algorithms are described. The MPP architecture comprises an array unit (ARU) which processes arrays of data; an array control unit which coptrols the operation of the ARU and performs scalar arithmetic; a program and data management unit which controls the flow of data; and a unique staging memory (SM) which buffers and permutes data. The ARU contains a 128 by 128 array of bit-serial processing elements (PE). Two-by-four surarrays of PE's are packaged in a custom VLSI HCMOS chip. The staging memory is a large multidimensional-access memory which buffers and permutes data flowing with the system. Efficient SAR processing is achieved via ARU communication paths and SM data manipulation. Real time processing capability can be realized via a multiple ARU, multiple SM configuration. M.G.

N82-11802# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
MECHANICAL TRANSFORMATION OF TASK HEURISTICS INTO OPERATIONAL PROCEDURES Ph.D. Thesis
David J. Mostow 14 Apr. 1981 511 p refs
(Contract F33615-78-C-1551; Grant NSF MCS-77-03273; ARPA Order 3597)

(AD-A104674; CMU-CS-81-113) Copyright. Avail: Issuing Activity CSCL 09/2

This dissertation characterizes the operationalization of advice as a series of problem transformations leading from the advice statement to a procedure for achieving a specified goal (avoid taking points) or evaluating a specified quantity (decide whether an opponent is void). It describes some general operators for performing such transformations. These operators have been implemented in a program called FOO as domain-independent transformation rules that access a knowledge base of task domain concepts. They have been used to operationalize advice for the card game Hearts and a music composition task. Some of FOO's transformation rules represent high-level strategies for operationalizing advice. Additional rules represent reasoning methods used to reformulate advice in terms of these operationalization strategies, solve the subproblems they generate, and translate their results into a usable form. Although FOO lacks a problem-solving component for choosing which of these transformation rules to apply, the dissertation shows how means-end analysis could be used to guide the search through the problem space. The dissertation formalizes the notion of reformulating one concept in terms of another, for example, reformulating 'take points' in terms of 'playing the highest card in the suit led.' It describes mechanical techniques for mapping domain-specific problems onto general methods. In particular, it examines in detail the process of formulating a problem as a heuristic search, and presents domain-independent rules that improve a search procedure by deriving new heuristics based on analysis of the problem and knowledge about the task domain. GRA

N82-11803# SRI International Corp., Menlo Park, Calif. Computer Science Lab.

OBJ-1: A STUDY IN EXECUTABLE ALGEBRAIC FORMAL SPECIFICATION Final Report

Joseph A. Goguen and Jose Meseguer Jul. 1981 66 p refs
(Contract N00014-80-C-0296; NR Proj. 049-466; SRI Proj. 1350-100)
(AD-A104468) Avail: NTIS HC A04/MF A01 CSCL 09/2

The goal of this research has been to develop a formal and executable algebraic specification language which can be used to specify a variety of application programs, such as database systems, compilers and interpreters for programming languages, and business systems. An advantage of formality in this context is that each specification has a unique unambiguous meaning, so that it is actually meaningful to ask whether or not a given program in fact satisfies a given specification. An advantage of executability is that test cases can be run directly on the specification, to examine properties of programs before they are written, and to help in debugging specifications. The latter is important because large specifications, like large programs, are usually wrong as first written. We have been investigating the utility of a number of potential advantages of the algebraic approach, including the following: Achievement of a high level of modularity in a natural way; Achievement of a high level of abstraction in a natural way; The possibility of executing test cases; User definition of data types and control structures, using any desired syntax, including pre-fix, post-fix, and 'mix-fix' operators, as well as coercions; The specification of error and exception conditions, as well as their handling, and recovery; The use of parameterized abstract modules as a method for structuring specifications; Algorithms for checking consistency and other desirable properties of specifications (e.g., the Knuth-Bendix algorithm); and Provision of a completely rigorous semantics for all these features. GRA

N82-11804# Logicon, Inc., San Pedro, Calif.

ANALYSIS OF 4&5 DATA Final Technical Report, 1 Apr. 1980 - 31 Mar. 1981

Jane W. Radatz Griffiss AFB, N.Y. RADC Jun. 1981 138 p refs
(Contract F30602-80-C-0115; AF Proj. 2528)
(AD-A104249; RSED-81319) Avail: NTIS HC A07/MF A01 CSCL 09/2

This report presents the results of a one-year study of Independent Verification and Validation (IV&V) results. Five large IV&V projects are examined to determine the effects of IV&V on software reliability, maintainability, and development cost/productivity. Current literature relevant to these topics is surveyed. IV&V-detected anomalies are categorized as to location, error category, effect, severity, acceptance, and resolution. Differences in project results are used to formulate recommendations for improving IV&V effectiveness. Author (GRA)

N82-11805# Naval Postgraduate School, Monterey, Calif.

ELEMENTS OF PROGRAMMING LINGUISTICS. PART 1: THE LAMBDA CALCULUS AND ITS IMPLEMENTATION

Bruce J. MacLennan 13 Aug. 1981 95 p
(Contract N00014-81-WR-10034; RR0000110)
(AD-A104345; NPS52-81-012-Pt-1) Avail: NTIS HC A05/MF A01 CSCL 09/2

The lambda calculus is used as an introduction to programming language concepts, particularly the concepts of functional programming. Both interpreted and compiled implementations of an extended lambda calculus are discussed. They can be adopted to implementations of Pascal and Lisp. It is shown that traditional stack-based run-time structures can be directly derived from the reduction rules of the lambda calculus. Author (GRA)

N82-11806# General Electric Co., Arlington, Va. Information Systems Programs Dept.

THE EFFECTS OF THE SYMBOLOGY AND SPATIAL ARRANGEMENT OF SOFTWARE SPECIFICATIONS IN A DEBUGGING TASK

Sylvia B. Sheppard, John W. Bailey, and Elizabeth Kruesi Aug. 1981 47 p refs
(Contract N00014-79-C-0595; NR Proj. 196-190)
(AD-A104541; TR-81-388200-4) Avail: NTIS HC A03/MF A01

This report describes the third in a series of experiments to evaluate the effects of the format of software specifications on programmer performance. The current experiment examined performance on a debugging task. Thirty-six professional programmers were presented with specifications for each of three modular-sized programs. Nine different specification formats were prepared for each program. These formats varied along two dimensions: type of symbology and spatial arrangement. The type of symbology included natural language, constrained language (PDL), and ideograms (flowchart symbols). The spatial arrangement included sequential (vertical flow), branching (flowchart), and hierarchical (tree-like). The participants compared correct specifications to error-seeded program listings. Their task was to locate the several errors per program and to correct the errors using a text editor. The program output was checked automatically and a message informed the participants whether the output was correct or incorrect. The participants were asked to continue debugging until all errors had been located and corrected. The difficulty of the debugging task was measured by the time required to detect and correct the errors and by the number of submissions required for a correct run. GRA

N82-11807# Air Force Human Resources Lab., Brooks AFB, Tex.

SECOND IMAGE GENERATION/DISPLAY CONFERENCE: CLOSING COMMENTS Final Report

Earl A. Alluisi Jul. 1981 62 p refs Conf. held at Phoenix, Ariz., 10-12 Jun. 1981
(AF Proj. 9983)
(AD-A104676; AFHRL-TP-81-28) Avail: NTIS HC A04/MF A01 CSCL 09/2

The paper briefly outlines the objectives and accomplishments of the conference and acknowledges the contributions of some specific individuals. The paper then addresses the state-of-the-art in image generation/display for flight simulation, which was the substantive area of the conference. In this regard, the paper discusses the AFHRL Advanced Simulator for Pilot Training (ASPT), its history, and its application to specific training areas such as conventional dive bomb tasks and low-angle strafe, using the A-10 configuration of the ASPT. Some experimental results are reported. Research and development (R and D) on the ASPT is now advancing to air combat mission training (CMT). The paper describes what is involved in realizing state-of-the-art CMT; namely, (1) a data base collection system, (2) an image generation system, and (3) a crew interface/display system. The status of AFHRL R and D in each of these areas is presented. Finally, the need for addressing real and potential impacts of successful R and D in credible, quantitative terms is emphasized. A 'notional' CMT impact analysis is provided to show how R and D organizations can present options to Air Force management-options through which they can increase the ease and probability of air combat success. GRA

N82-11808# Naval Postgraduate School, Monterey, Calif.
CONDITION RECOGNITION FOR A PROGRAM SYNTHESIZER M.S. Thesis
Joseph Shawn Lape and Charles Wayne Miller Jun. 1981 147 p refs
(AD-A104586) Avail: NTIS HC A07/MF A01 CSCL 09/2

An enumeration algorithm which synthesizes programs from example computations is presented. The algorithm, originally proposed by Alan W. Biermann of Duke University, assigns a labelling of the instructions contained in an example trace consistent with producing minimum state Moore machine representations for the synthesized programs. Techniques for processing the information to reduce enumeration are given. Biermann's algorithm is extended by trace preprocessing techniques which identify and generalize conditions on instruction sequencing in the synthesized programs without the user's assistance. The techniques are presented using text editing as the domain, but are general enough to be extendable into other domains. Author (GRA)

N82-11809# Naval Postgraduate School, Monterey, Calif.
PROGRAMMING WITH A RELATIONAL CALCULUS
Bruce J. MacLennan 3 Sep. 1981 45 p refs
(RR0000110)
(AD-A104650; NPS52-81-013) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report describes the concept of programming in a relational calculus. This is a style of programming in which entire relations are manipulated rather then individual data, and in which the program itself is represented as a relation. Thus relational programming is more general than functional programming in three respects. First, it is more general because relations subsume functions. Second, it is more general because the same objects, viz. relations are used to represent both the program and the data. Finally, since complex data structures are easily represented as relations, relational programming can manipulate with facility a much wider class of structures that other very-high-level languages. Author (GRA)

N82-11810# California Univ., Livermore. Lawrence Livermore Lab.
SOFTWARE DESIGN OF A GENERAL PURPOSE DATA ACQUISITION AND CONTROL EXECUTIVE
William G. Labiak and Earl G. Minor 22 May 1981 5 p refs
Presented at Topical Conf. on Computerized Data Acquisition in Particle and Nucl. Phys., Oak Ridge, Tenn., 28-30 May 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-026573; UCRL-85669; CONF-810523-9) Avail: NTIS HC A02/MF A01

The software design of an executive which performs general purpose data acquisition, monitoring, and control is presented. The executive runs on a memory-based mini- or micro-computer and communicates with a disk-based computer where data analysis and display are done. The executive design stresses reliability and versatility, and yields software which can provide control and monitoring for widely different hardware systems. Applications of this software on two major fusion energy experiments are described. DOE

N82-11811# California Univ., Berkeley. Lawrence Berkeley Lab. National Resource for Computation in Chemistry Office.
GRAMPS: A GRAPHICS LANGUAGE INTERPRETER FOR REAL TIME, INTERACTIVE, THREE DIMENSIONAL PICTURE EDITING AND ANIMATION
T. J. ODonnell and Arthur J. Olson Aug. 1981 11 p refs
Presented at the SIGGRAPH 81 Meeting, Dallas, 3-7 Aug. 1981
(Contract W-7405-eng-48; Grant NSF CHE-77-21305)
(DE81-027398; LBL-12492; CONF-810805-6) Avail: NTIS HC A02/MF A01

An overview of the GRAMPS command structure is given and several examples of application of the language to molecular modeling and animation are presented. The GRAMPS language syntax allows natural interaction with scene elements, interactive assignment of graphics input devices, as well as facilitates the creation, manipulation and copying of complex nested picture structures. The language has a powerful macro feature that enables graphics commands to be developed and incorporated interactively. Animation is achieved in GRAMPS by two different, yet mutually compatible means. Picture structures may contain framed data, which consist of a sequence of fixed objects. These structures may be displayed sequentially to give a traditional frame animation effect. In addition, transformation information on picture structures may be saved at any time in the form of macro commands that transform these structures from one saved state to another in a specified number of steps, yielding an interpolated transformation animation effect. DOE

N82-11812# California Univ., Livermore. Lawrence Livermore Lab.
RATFIT: A RATIONAL EQUATION-OF-STATE FITTING PROGRAM
F. N. Fritsch Mar. 1981 40 p refs
(Contract W-7405-eng-48)
(DE81-027273; UCID-19087) Avail: NTIS HC A03/MF A01

The rational equation of state fitting program (RATFIT) fits an eleven-parameter equation of state of the form P(mu, epsilon) = A (mu) + B (mu) epsilon + C (mu) epsilon(2), /1+(D sub o) epsilon where A and B are cubic polynomials and C is quadratic, to (mu,P)-data given along the Hugoniot and/or the principal adiabat. It can also include data for gamma=(delta P/delta epsilon)/(mu + 1) along the abiabat. The user may weight individual points arbitrarily and fix any (or all) of the parameters at specified values. Printed and plotted output is available along the Hugoniot and adiabat associated with the equation of state. DOE

N82-11813# General Atomic Co., San Diego, Calif.
GUIDE TO THE DATA-ACQUISITION SOFTWARE OF THE DOUBLET III COMPUTER SYSTEM
B. B. McHarg Dec. 1980 73 p refs
(Contract DE-AT03-76ET-51011; Gen. Atomic Proj. 3344)
(DE81-026616; GA-A-16134) Avail: NTIS HC A04/MF A01

A guide to the software of the Doublet 3 data acquisition system is presented and the interactions of the computer codes with each other as well as with data base files, data files, and global tables, are discussed. Detailed descriptions of these files and tables are given along with methods of modification. The Doublet 3 Tokamak fusion experiment acquires, processes and archives over two megabytes of experimental data from each Tokamak shot, which occurs every five to seven minutes. The computer codes that accomplish this acquisition begin execution immediately on reboot of the computer system and continue throughout the preacquisition stage before a Tokamak shot, the actual acquisition stage when the shot is fired, and the post acquisition or analysis stage. DOE

N82-11814# Los Alamos Scientific Lab., N. Mex.
H-O PRECESSOR COMPUTER CODE
Olin B. vanDyck and Richard A. Floyd May 1981 43 p refs
(Contract W-7405-eng-36)
(DE81-026669; LA-8904-MS) Avail: NTIS HC A03/MF A01

The computer program used to predict the system performance of a prototype spin precessor using H(-) to H(0) stripping, followed by small precession magnets is described. Starting with a user-defined input beam and magnet system, the program calculates and graphs the beam polarization along the beam axis. Alternatively, the program can plot the polarization at fixed position as a function of the magnet field strength. The performance of the system was studied using the code. The fundamental physics of a system of spins with hyperfine coupling in a magnetic field are described along with many examples of beam behavior as calculated by the program. DOE

N82-11815 Pennsylvania State Univ., University Park.
COMPUTER PROCESSING OF PERIODIC ELECTRON MICROGRAPHS Ph.D. Thesis
Kirk Harvy Shelley 1981 245 p

Avail: Univ. Microfilms Order No. 8120464

Real image manipulation and harmonic analysis were combined in an attempt to extract the information contained in an electron micrograph. This type of analysis both simplified the image and quantified it to allow for easier interpretation. All the images studied were obtained from molecular aggregations with high degrees of intermolecular symmetry. Initially, electron micrographs produced from protein microcrystals were studied. These proteins included pig pancreas alpha-amylase, B. subtilis alpha-amylase, canavalin, and abrin. A series of low resolution (2.0 to 1.5 nm) electron density projections of the protein moleculs were produced. These projections allowed for the unambiguous placement of the molecules within the unit cell. From the projections, molecular dimensions and volumes could also be estimated. The application of computer image processing techniques to the electron micrographs of cellular crystalline inclusions is discussed. Dissert. Abstr.

62 COMPUTER SYSTEMS

Includes computer networks.

N82-11816*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPAR DATA SET CONTENTS
Sally W. Cunningham Oct. 1981 41 p refs
(NASA-TM-83181) Avail: NTIS HC A03/MF A01 CSCL 09B

The contents of the stored data sets of the SPAR (space processing applications rocket) finite element structural analysis system are documented. The data generated by each of the system's processors are stored in a data file organized as a library. Each data set, containing a two-dimensional table or matrix, is identified by a four-word name listed in a table of contents. The creating SPAR processor, number of rows and columns, and definitions of each of the data items are listed for each data set. An example SPAR problem using these data sets is also presented. M.G.

N82-11817*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPARISONS OF SOME LARGE SCIENTIFIC COMPUTERS
Karen R. Credeur Oct. 1981 38 p refs
(NASA-TM-81928) Avail: NTIS HC A03/MF A01 CSCL 09B

In 1975, the National Aeronautics and Space Administration (NASA) began studies to assess the technical and economic feasibility of developing a computer having sustained computational speed of one billion floating point operations per second and a working memory of at least 240 million words. Such a powerful computer woild allow computational aerodynamics to play a major role in aeronautical design and advanced fluid dynamics research. Based on favorable results from these studies, NASA proceeded with developmental plans. The computer was named the Numerical Aerodynamic Simulator (NAS). To help insure that the estimated cost, schedule, and technical scope were realistic, a brief study was made of past large scientific computers. Large discrepencies between inception and operation in scope, cost, or schedule were studied so that they could be minimized with NASA's proposed new compter. The main computers studied were the ILLIAC IV, STAR 100, Parallel Element Processor Ensemble (PEPE), and Shuttle Mission Simulator (SMS) computer. Comparison data on memory and speed were also obtained on the IBM 650, 704, 7090, 360-50, 360-67, 360-91, and 370-195; the CDC 6400, 6600, 7600, CYBER 203, and CYBER 205; CRAY 1; and the Advanced Scientific Computer (ASC). A few lessons learned conclude the report. Author

N82-11818# California Univ., Livermore. Lawrence Livermore Lab.
SOME NOTES ON OPERATING-SYSTEM PRINCIPLES
D. M. Nessett 22 Jul. 1981 262 p refs
(Contract W-7405-eng-48)
(DE81-030675; UCID-19076) Avail: NTIS HC A12/MF A01

The basic concepts governing the design of operating systems are discussed in detail. Architecture, memory management, process scheduling and synchronization, deadlocks, and access control are examined. DOE

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N82-11819 Clarkson Coll. of Technology, Potsdam, N.Y.
MATHEMATICAL INVESTIGATION OF LINEAR CONTROL SYSTEMS CONTAINING INPUT DERIVATIVES Ph.D. Thesis
Nazar Al-Nasr 1981 88 p
Avail: Univ. Microfilms Order No. 8121679

The simplest type of generalized inverses of matrices known as the (1)-inverse is used to investigate two problems in linear time-invariant multivariable systems that contain input derivatives. The first is the zero-in problem. This problem of finding zeros and zero directions of the system boils down to solving a generalized eigenvalue problem which under certain conditions can be reduced to an ordinary eigenvalue problem or to a simpler generalized eigenvalue problem by the aid of three theorems given in the second chapter. The other is the eigenvalue assignment problem. This is concerned with finding a constant feedback matrix that will result in a closed loop system having a prescribed set of desired eigenvalues. Dissert. Abstr.

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-11820 California Univ., Los Angeles.
UPWIND DIFFERENCE SCHEMES FOR HYPERBOLIC SYSTEMS OF CONSERVATION LAWS Ph.D. Thesis
Frederick William Solomon 1981 90 p
Avail: Univ. Microfilms Order No. 8122848

An extension of a shock capturing scheme is applied to well known systems found in fluid mechanics. Further as the scalar scheme possesses many desirable properties among them stability, monotinicity, and sharp profiles for steady shocks numerical experiments were performed to see how well these properties carry over to this extension for systems. Indeed numerical results were generated with the emphasis on viewing scheme stability and sharpness of shock profiles. Also for the scheme applied to the two dimensional isentropic Euler equations, there was great interest in the schemes performance with respect to oblique steady shocks (oblique w.r.t. the grid). Thus steady shock sharpness as a function of shock angle was viewed. The results indicate stability and profile sharpness for steady shocks for the one dimensional versions of the scheme. Further, the two dimensional results indicate that oblique steady shocks maintain sharp profiles in time regardless of the shock angle. Dissert. Abstr.

N82-11821 Rutgers - The State Univ., New Brunswick, N. J.
CHARACTERS OF RANK TWO HYPERBOLIC LIE ALGEBRAS AS FUNCTIONS AT QUASIREGULAR CUSPS Ph.D. Thesis
Arne Erik Meurman 1981 132 p
Avail: Univ. Microfilms Order No. 8122102

Using the Weyl-Kac character formula and the process of principal specialization, it is shown that the characters have poles when extended to meromorphic functions. Thus the expansion in terms of characters is genuinely local. The result that the rank two hyperbolic Lie algebras have exponential growth is also derived in the process. Dissert. Abstr.

N82-11822 Kentucky Univ., Lexington.
PARTIAL DIFFERENTIAL EQUATIONS FROM DYNAMIC PROGRAMMING EQUATIONS Ph.D. Thesis

Suzanne Marie Lenhart 1981 126 p
Avail: Univ. Microfilms Order No. 8121611

Equations which arise in stochastic optimal control theory were examined. The goal was to investigate these problems by analytic p.d.e. methods. The differential and integral operators satisfy the maximum principle in various forms, which enable pointwise estimates on the solution and its derivatives to be obtained. Variants of the Bellman Equation of dynamic programming were solved by approximating by a semilinear system of equations. Dissert. Abstr.

N82-11823 Pennsylvania State Univ., University Park.
NONCLASSICAL ORTHOGONAL POLYNOMIALS AND DIFFERENTIAL EQUATIONS Ph.D. Thesis
Lance Lee Littlejohn 1981 129 p
Avail: Univ. Microfilms Order No. 8120450

A class of orthogonal polynomials that are solutions to a sixth order formally self adjoint differential equation is discussed. These polynomials generalize the Legendre type polynomials. Many properties that these polynomials have in common with the classical orthogonal polynomials of Jacobi, Hermite, and Laguerre are also addressed. Dissert. Abstr.

N82-11824 California Univ., San Diego.
SPECIAL FUNCTIONS AND HARMONIC ANALYSIS ON P SUB N Ph.D. Thesis
Thomas Earl Bengtson 1981 109 p
Avail: Univ. Microfilms Order No. 8120518

The K-βessel function is defined as an integral over P sub n, the Riemannian symmetric space of positive definite symmetric n x n matrices over R. The K-Bessel function is defined as an integral over Euclidean space. A 'complete the square' argument is used to relate the K-Bessel and K-Bessel functions. This is then used to derive other properties of these functions. An exposition of special functions on P sub n is given, including explicit calculations using invariant differential operators on P sub n. Since P sub n can be identified with the space of positive definite quadratic forms, an explicit formulation of harmonic analysis on P sub n should prove useful to number theorists. By translating the work of Harish-Chandra and Helgason into this special case, an exposition of harmonic analysis in geodesic polar coordinates on P sub n is given. Dissert. Abstr.

N82-11825 Washington Univ., Seattle.
MULTILINEAR PSEUDODIFFERENTIAL OPERATORS AND PARAPRODUCTS Ph.D. Thesis
Julian Aguirre 1981 155 p
Avail: Univ. Microfilms Order No. 8122722

Certain multilinear operators which commute with simultaneous translations and their action on different classes of functions were studied. The goal is a understanding of multilinear operator and their use in nonlinear analysis. Series of multilinear operators are the correct substitute for power series when studying non-linear functions that appear naturally in mathematics. The introduction of multilinear operators permits the use of Fourier methods that at first sight might appear unsuitable for the treatment of such problems. Non-isotropic dilations and independent dilations in each variable are considered and ultimately all dilation structure is eliminated by considering spaces of homogeneous type. Dissert. Abstr.

N82-11826# National Aerospace Lab., Tokyo (Japan).
A SECOND-ORDER ACCURATE PROCEDURE FOR SOLVING THE BOUNDARY LAYER EQUATIONS BASED ON THE PREDICTOR-CORRECTOR FORM OF THE CRANK-NICOLSON SCHEME
Kenichi Matsuno 1981 10 p refs In JAPANESE; ENGLISH summary
(NAL-TR-655; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

The numerical accuracy of a predictor corrector form of the Crank-Nicolson scheme for solving boundary layer equations was investigated. A predictor corrector form of the Crank-Nicolson Scheme, based on a coupled algorithm for the continuity and the momentum equations, is presented for both the incompressible and the compressible flows. This scheme was subjected to a computer experiment by use of the problem of the laminar boundary layer development in a linearly retarded edge velocity field, and compared with another coupled scheme. It is shown that the present scheme possesses second-order accuracy and is very efficient. M.G.

N82-11827# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Civil Engineering.
A TWO-STEP APPROACH TO FINITE ELEMENT ORDERING
Steven J. Fenves and Kincho H. Law Aug. 1981 46 p refs
(Contract N00014-76-C-0354)
(AD-A104320; R-81-130) Avail: NTIS HC A03/MF A01 CSCL 12/1

A two-step approach to finite element ordering is introduced. The scheme involves ordering of the finite elements first, based on their adjacency, followed by a local numbering of the nodal variables. The ordering of the elements is performed by the Cuthill-Mckee algorithm. This approach takes into consideration the underlying structure of the finite element mesh, and may be regarded as a natural finite element ordering scheme. The experimental results show that this two-step scheme is more efficient than the reverse Cuthill-McKee algorithm applied directly to the nodes, in terms of both execution time and the number of fill-in entries, particularly when higher order finite elements are used. In addition to its efficiency, the two-step approach increases modularity and flexibility in finite element programs, and possesses potential application to a number of finite element solution methods. Author (GRA)

N82-11828# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.
A GENERAL MOMENT INEQUALITY FOR THE MAXIMUM OF RECTANGULAR PARTIAL SUMS OF MULTIPLE SERIES
F. Moricz (Szeged Univ., Hungary) May 1981 10 p refs
(Contract N00014-79-C-0801)
(AD-A104475; TR-430; TR-81-3-ONR) Avail: NTIS HC A02/MF A01 CSCL 12/1

In a recent paper (7) we presented a general method of how to obtain an upper estimate for a fixed moment of the maximum of partial sums of a single series in terms of the given 'a priori' upper estimate for the same moment of the partial sums. Now we extend this method from single series to multiple series. GRA

N82-11829# Maryland Univ. Baltimore County, Catonsville.
BOUNDARY OBSERVABILITY AND CONTROLLABILITY FOR DIFFUSION EQUATIONS Final Report, 10 Dec. 1976 - 30 Jun. 1980
Thomas I. Seidman Sep. 1981 15 p refs
(Grant DAAG29-77-G-0061)
(AD-A104293; ARO-14092.20-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

Investigation has focused on problems of observation and control for parabolic equations, primarily with interaction limited to the boundary of the region. Abstracts and bibliography presented herein may be classified under six headings: (a) Basic theoretical questions on control of parabolic equations; (b) Problems of observation and identification for parabolic equations; (c) Other system-theoretic problems; (d) Problems and considerations (algorithms, regularity, etc.) related to approximation and numerical computation; (e) Ill-posed problems; and (f) Problems involving nonlinear partial differential equations. Author (GRA)

N82-11830# Naval Postgraduate School, Monterey, Calif.
CONSTRAINED ADAPTIVE LEAST MEAN SQUARED FILTERS M.S. Thesis
Michael H. Davis Jun. 1981 130 p refs
(AD-A104625) Avail: NTIS HC A07/MF A01 CSCL 12/1

The possibility of designing constrained adaptive finite impulse response digital filters is investigated as motivated by a study of adaptive noise cancellation. The first constraint considered consists of a fixed angle between filter zeros and is implemented in a master-slave approach in which one of the zeros is adjusted adaptively and the others follow subject to the constraint. The second constraint considered is a linear constraint on the filter weights and is implemented by augmenting the error equation with Lagrangian multipliers. Simulations indicate that the approach is feasible. Author (GRA)

N82-11831# Ballistic Research Labs., Aberdeen Proving Ground, Md.
NUMERICAL DIFFERENTIATION OF NOISY DATA Final Report
C. Masaitis and G. Francis Aug. 1981 62 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A104631; ARBRL-MR-03126) Avail: NTIS HC A04/MF A01 CSCL 12/1

An algorithm has been developed based on the assumption that a given set of data is representable by a function that is a product of algebraic, trigonometric, and exponential polynomials. The degrees of the underlying polynomials, the optimal data spacing (optimal multiple of stepsize in tabular data), and the parameters of the approximating function are all selected by the algorithm to minimize an objective function that depends on the variance of the deviation between the data and the fitted function and on the degree of ill-conditioning of the problem. The algorithm permits choosing global or local fits. Derivatives of any order are obtained either by differentiating the fitted function or by a closed form relation between te model parameters and coefficients of linear combinations that express derivatives in terms of the observed values of the variable. Thus, the algorithm provides local differentiation formulas using parameters derived from global analysis of the data but in terms of the local values of the function. An appendix compares the accuracy of derivatives obtained for synthetic data with the accuracy of other methods.
Author (GRA)

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-11832 Illinois Univ. at Chicago Circle, Chicago.
ON PERMANENTS AND DIAGONAL PRODUCTS OF DOUBLY STOCHASTIC MATRICES Ph.D. Thesis
Ravindra Bhalchandra Bapat 1981 45 p
Avail: Univ. Microfilms Order No. 8120557

The duality theorem of linear programming is used to study the diagonal products of nonnegative matrices. It is shown that if the diagonal products of a nonnegative matrix are all bounded above by a known constant, then the entries of the matrix themselves must be bounded in a certain sense. As an application it is shown that if there are two distinct doubly stochastic matrices then there must be a diagonal product of the first which exceeds the corresponding product of the other. If A is an n x n nonnegative matrix with per A > 0, denote by f(A) the n x n matrix with f sub iJ (A) equal to a sub iJ/per A. A sub iJ is the submatrix of A obtained by deleting its i-TH row and J-TH column. A toplogical argument is used to show that f maps the set of doubly stochastic matrices as well as certain subpolytops of it onto themselves. Certain analogues of this are proved. It is shown that J sub N, the n x n matrix with all entries equal to 1/n, is the only positive fixed pont of f if n < or = 5. For n > 5 result remains unproved. A certain generalization of the above conjecture is proposed and proved for n < or = 5. It is shown that J sub N is an isolated fixed point of f.
Dissert. Abstr.

N82-11833*# Myers (Raymond H.), Blacksburg, Va.
METHODS FOR PRESENTATION AND DISPLAY OF MULTIVARIATE DATA
Raymond H. Myers Sep. 1981 18 p ref
(NASA Order L-72497-A)
(NASA-CR-165788) Avail: NTIS HC A02/MF A01 CSCL 12A

Methods for the presentation and display of multivariate data are discussed with emphasis placed on the multivariate analysis of variance problems and the Hotelling T(2) solution in the two-sample case. The methods utilize the concepts of stepwise discrimination analysis and the computation of partial correlation coefficients.
R.J.F.

N82-11834*# Myers (Raymond H.), Blacksburg, Va.
APPLICATIONS OF NON-PARAMETRIC STATISTICS AND ANALYSIS OF VARIANCE ON SAMPLE VARIANCES
Raymond H. Myers Sep. 1981 98 p
(NASA Order L-72497-A)
(NASA-CR-165789) Avail: NTIS HC A05/MF A01 CSCL 12A

Nonparametric methods that are available for NASA-type applications are discussed. An attempt will be made here to survey what can be used, to attempt recommendations as to when each would be applicable, and to compare the methods, when possible, with the usual normal-theory procedures that are available for the Gaussian analog. It is important here to point out the hypotheses that are being tested, the assumptions that are being made, and limitations of the nonparametric procedures. The appropriateness of doing analysis of variance on sample variances are also discussed and studied. This procedure is followed in several NASA simulation projects. On the surface this would appear to be reasonably sound procedure. However, difficulties involved center around the normality problem and the basic homogeneous variance assumption that is mase in usual analysis of variance problems. These difficulties discussed and guidelines given for using the methods.
Author

N82-11835# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.
GENERALIZED L-, M- AND R-STATISTICS
Robert J. Serfling Aug. 1981 12 p refs
(Contract N00014-79-C-0801)
(AD-A104480; TR-349; TR-81-8-ONR) Avail: NTIS HC A02/MF A01 CSCL 12/1

A class of statistics generalizing U-statistics and L-statistics, and containing other varieties of statistics as well, such as trimmed U-statistics, is studied. Using the differentiable statistical function approach, differential approximations are obtained and the influence curves of these generalized L-statistics are derived. These results are employed to establish asymptotic normality for such statistics. Parallel generalizations of M- and R-statistics are noted. Strong convergence, Berry-Esseen rates, and computational aspects are discussed.
GRA

N82-11836# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.
A NOTE ON A NONPARAMETRIC MAXIMUM PENALIZED LIKELIHOOD ESTIMATOR OF THE PROBABILITY DENSITY FUNCTION OF A POSITIVE RANDOM VARIABLE. AMPLE WITH POSITIVE SUPPORT
V. K. Klonias Apr. 1981 9 p refs
(Contract N00014-79-C-0801)
(AD-A104476; TR-337; TR-81-2-ONR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The 'first nonparametric maximum penalized likelihood density estimator of Good and Gaskins', corresponding to a penalty proportional to the Fisher information, is derived in the case that the density function has its support on the half-line. The computational feasibility as well as the consistency properties of the estimator are indicated.
Author (GRA)

N82-11837# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.
AN UPPER BOUND ON THE PROBABILITY DENSITY FUNCTION IN TERMS OF FISHER INFORMATION. A BOUND TO THE DENSITY FUNCTION
V. K. Klonias Apr. 1981 9 p refs
(Contract N00014-79-C-0801)
(AD-A104474; TR-336; TR-81-1-ONR) Avail: NTIS HC A02/MF A01 CSCL 12/1

An inequality for members of a Sobolev space of order one is demonstrated and as a corollary an upper bound, in terms of the Fisher information, is derived for a density function. Also two characterizations of the Laplace and the exponential distribution are indicated.
Author (GRA)

N82-11838# Naval Research Lab., Washington, D. C. Space Systems Div.
VALIDATION OF A MONTE CARLO SIMULATION OF BINARY TIME SERIES Final Report
R. E. Johnson (Army Concepts Analysis Agency, Bethesda, Md.), H. L. Wiener, and D. Roque 18 Sep. 1981 19 p refs
(RR0140241)
(AD-A104525; NRL-8517) Avail: NTIS HC A02/MF A01

CSCL 12/1

This report presents a statistical technique appropriate for the validation of a Monte Carlo simulation of a detection process whose results can be reduced to a finite time sequence of equally spaced events with dichotomous outcomes. The technique may be applied to other similar processes where there is not stationarity or steady state in the behavior of the process simulated. It is particularly useful in the case where multiple replications of the simulation have been obtained but only one observation of the real-world process is available. The Bahadur-Lazarsfeld representation of the probability distribution of the population consisting of all binary vectors having a given number of elements is generated from the sample of such vectors produced by several independent replications of the Monte Carlo simulation. Then the validity of the simulation is determined to within a specified significance level, by comparison with a single realization of the actual process simulated. This validation technique admits correlation between events occurring at different times.
Author (GRA)

N82-11839# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.
PROPERTIES OF BATCH MEANS FROM STATIONARY ARMA (1, 1) TIME SERIES
Bruce Schmeiser and Keebom Kang Aug. 1981 19 p refs
(Contract N00014-79-C-0832; NR Proj. 277236)
(AD-A104245; RM-81-3) Avail: NTIS HC A02/MF A01 CSCL 12/1

For stationary first order autoregressive and autoregressive moving average processes with normally distributed errors, the corresponding stationary process of batch means is shown to be an autoregressive moving average process. The batch means process resulting from a moving average process, however, is shown to be a moving average process. The parameters of the batch means process are closed form functions of the batch size and parameters of the original process. GRA

N82-11840# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
A SIMULATION ANALYSIS OF THE EFFECTIVENESS OF MARKOVIAN CONTROL AND BAYESIAN CONTROL M.S. Thesis
Soo Sup Song Jun. 1981 81 p refs
(AD-A104635) Avail: NTIS HC A05/MF A01 CSCL 12/1

Statistical cost control decisions may be based on two competing decision models. The Markovian Control model controls a process by investigating the process whenever the reported cost exceeds a fixed critical limit. The Bayesian Control model controls a process by using the reported cost to update the probability of the process being in-control and investigate the process whenever such posterior probability is less than a fixed critical value. This paper compares the relative effectiveness of the two models by a simulation analysis. It is observed that the Markovian Control model performs as well as or better than the Bayesian Control model unless the cost distribution of the in-control state is more dispersed than that of the out-of-control state. It is also observed that the relative effectiveness of the Markovian Control model compared to the Bayesian Control increases as the savings from an investigation increases when the cost distribution of the in-control state is less dispersed than that of the out-of-control state. Author (GRA)

N82-11841# Oak Ridge National Lab., Tenn. Mathematics and Statistics Research Dept.
ESTIMATION PROBLEMS ASSOCIATED WITH THE WEIBULL DISTRIBUTION
K. O. Bowman and L. R. Shenton (Georgia Univ., Athens) Sep. 1981 125 p refs
(Contract W-7405-eng-26)
(DE81-030466; ORNL/CSD-79) Avail: NTIS HC A06/MF A01

Series in descending powers of the sample size are developed for the moments of the coefficient of variation v(*) for the Weibull distribution F(t) = 1 -exp(- (t/b) sup c). A similar series for the moments of the estimator c(*) of the shape parameter c are derived from these. Comparisons are made with basic asymptotic assessments for the means and variances. From the first four moments, approximations are given to the distribution of v(*) and c(*). In addition, an almost unbiased estimator of c is given when a sample is provided with the value of v(*). Comments are given on the validity of the asymptotically normal assessments of the distributions. DOE

N82-11842# Stanford Linear Accelerator Center, Calif.
PROJECTION PURSUIT METHODS FOR DATA ANALYSIS
Jerome H. Friedman and Werner Stuetzle Jun. 1981 24 p refs
(Contract DE-AC03-76SF-00515)
(DE81-027493; SLAC-PUB-2768) Avail: NTIS HC A02/MF A01

The detection and description of multivariate structure using projection of the data is described. It is noted that projection of the data generally implies loss of information. As a consequence, multivariate structure does not usually show up in all projections, and no single projection might contain all the information. It is therefore important to judiciously choose the set of projections on which the model of the structure is to be based. DOE

N82-11299*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CLOSED FORM EVALUATION OF SYMMETRIC TWO-SIDED COMPLEX INTEGRALS
R. Winkelstein *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 133-141 refs (For primary document see N82-11279 02-31)
Avail; NTIS HC A11/MF A01 CSCL 12A

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-11843# Chicago Univ., Ill. Center for Decision Research.
PREDICTION, DIAGNOSIS, AND CAUSAL THINKING IN FORECASTING Interim Technical Report
Hillel J. Einhorn and Robin M. Hogarth 3 Sep. 1981 40 p refs Submitted for publication
(Contract N00014-18-K-0314; NR Proj. 197-071)
(AD-A104372) Avail: NTIS HC A03/MF A01 CSCL 05/10

While forecasting involves forward/predictive thinking, it depends crucially on prior diagnosis for suggesting a model of the phenomenon, for defining 'relevant' variables, and for evaluating forecast accuracy via the model. The nature of diagnostic thinking is examined with respect to these activities. We first consider the difficulties of evaluating forecast accuracy without a causal model of what generates outcomes. We then discuss the development of models by considering how attention is directed to variables via analogy and metaphor as well as by what is unusual or abnormal. The causal relevance of variables is then assessed by reference to probabilistic signs called 'cues to casuality'. These are: temporal order, constant conjunction, contiguity in time and space, number of alternative explanations, similarity, predictive validity, and robustness. The probabilistic nature of the cues is emphasized by discussing the concept of spurious correlation and how causation does not necessarily imply correlation. Implications for improving forecasting are considered with respect to the above issues. Author (GRA)

N82-11844# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
PROJECTED NEWTON METHODS AND OPTIMIZATION OF MULTICOMMODITY FLOWS
Dimitri P. Bertsekas and Eli M. Gafni Aug. 1981 30 p refs
(Contract N00014-75-C-1183; Grant NSF ECS-79-20834; NR Proj. 049-383)
(AD-A104419; LIDS-P-1140) Avail: NTIS HC A03/MF A01 CSCL 12/2

A superlinearly convergent Newton-like method for linearly constrained optimization problems is adapted for solution of multicommodity network flow problems of the type arising in communication and transportation networks. We show that the method can be implemented approximately by making use of conjugate gradient iterations without the need to compute explicitly the Hessian matrix. Preliminary computational results suggest that this type of method is capable of yielding highly accurate solutions of nonlinear multicommodity flow problems far more efficiently than any of the methods available at present. Author (GRA)

N82-11845# Oak Ridge National Lab., Tenn. Engineering Physics Div.
SENSITIVITY THEORY FOR NONLINEAR SYSTEMS. 2: EXTENSIONS TO ADDITIONAL CLASSES OF RESPONSES
Dan G. Cacuci Aug. 1981 37 p refs Sponsored in part by Electric Power Research Inst.
(Contract W-7405-eng-26)
(DE81-030258; ORNL/TM-7511; EPRI-RP-1441-1; EPRI-NP-81-10-LD) Avail: NTIS HC A03/MF A01

A functional analytic formulation of sensitivity theory is extended to include treatment of additional types of responses. There are physical systems where a critical point of a function that depends on the system's state vector and parameters defines the location in phase space where the response functional is evaluated. The Gateaux-differentials giving the sensitivities of both the functional and the critical point to changes in the system's parameters are obtained by alternative formalisms. The forward sensitivity formalism is the simpler and more general, but may be prohibitively expensive for problems with large data bases. The adjoint sensitivity formalism, although less generally applicable and requiring several adjoint calculations, is likely to be the only practical approach. Sensitivity theory is also extended to include treatment of general operators, acting on the system's state vector and parameters, as responses. DOE

N82-11846# Edgerton, Germeshausen and Grier, Inc., Las Vegas, Nev. Energy Measurements Group.
ENGINEERING ANALYSIS SYSTEM (EASY)
Steven D. Rebentisch 4 Jul. 1981 68 p refs
(DE81-027508; EGG-1183-1804) Avail: NTIS HC A04/MF A01

The software for the Engineering Analysis System (EASY) is described. Operating instructions for sub-systems are included. The EASY system was originally set up for the purpose of calibrating and keeping track of the transducer inventory. Its capabilities have grown to include the channel listings. These capabilities have increased the amount of software on this system by more than double the original design. The EASY system is linked directly to the processor in Los Alamos (WX-10) and the Fronr End Systems (trailers) in the forward area. The EASY computer is a PDP 11/34 running on an RSX-11M operating system. DOE

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-11847 Nebraska Univ. - Lincoln.
VECTOR INTEGRALS AND PRODUCTS OF VECTOR MEASURES Ph.D. Thesis
Sastry A. Sivasankara 1981 105 p
Avail: Univ. Microfilms Order No. 8122603

The existence of the product of two LCTVS-Valued (countably additive) measures in various cases was proved. The product was expressed as an 'integral', as in the classical case of nonnegative measures. T.M.

N82-11848 Vanderbilt Univ., Nashville, Tenn.
HOMEOMORPHISMS OF SOME DIRECT LIMIT SPACES Ph.D. Thesis
Margaret Anne Hale 1981 111 p
Avail: Univ. Microfilms Order No. 8120200

The topology of some infinite dimensional direct limit spaces is investigated. The closed, locally compact subsets of a connected F-manifold are precisely the closed metrizable subsets. In addition, among the closed subsets of an F-manifold, first countability is equivalent to metrizability. Let H(M) denote the homeomorphism group of an F-manifold M. It is shown that in the limitation topology, the path components of H(M) are points. We prove here that in compact-open topology, H(M) is regular, Lindelof, paracompact, F-stable, and non-first countable. (These properties are shared by M.) We further show that, unlike M, H(M) with this topology is not a k-space. Homeomorphisms of a space onto itself are studied through group actions. Group actions are used to develop a factoring technique for homeomorphism groups. Dissert. Abstr.

N82-11849 Cornell Univ., Ithaca, N. Y.
RECURSIVE ASPECTS OF THE THEORY OF REAL CLOSED FIELDS Ph.D. Thesis
Stephen Brady 1981 50 p
Avail: Univ. Microfilms Order No. 8119493

The classical Artin-Schreier theory of real closed fields is reviewed for effective content. The main existence theorems of that theory are translated into effective forms and proven either true or false. The structure of real closed extensions of recursively ordered fields is then investigated, and theorems analogous to those of Melakides and Nerode for the algebraic case are proved. In addition, some of the limitations on the intrinsic relationships between recursively presented fields and their extensions or subfields are considered. The question of the conditions under which there must be a recursively presented real closed field lying between a recursively presented, formally real field and any presentation of its algebraic closure is addressed. This leads to a number of examples which illustrate the relationship between a formally real field's having a splitting algorithm and having certain spaces of orderings. Dissert. Abstr.

N82-11850 Illinois Univ. at Chicago Circle, Chicago.
LINEAR EVOLUTION EQUATIONS OF HYPERBOLIC TYPE IN A LOCALLY CONVEX SPACE PH.D. Thesis
Young Han Choe 1981 92 p
Avail: Univ. Microfilms Order No. 8120562

The Cauchy problem for a linear evolution equation of hyperbolic type in a sequentially complete locally convex space X is studied. A set of sufficient conditions are sought for the operator-valued function and the vector-valued function so that the equation (L) has a unique solution and to construct the solution from given data. Various new concepts and methods are necessary for the theory of evolution equation in locally convex spaces. Calibrations, indexed calibrations and vector-valued integration are studied. Suitably chosen calibrations and indexed-calibrations replace the norms and then the corresponding expression by members of these calibrations or indexed-calibrations are obtained. The concept of Bocher-integrals is extended to the functions whose values lie in locally convex spaces. Dissert. Abstr.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-11851# Cornell Univ., Ithaca, N. Y. Dept. of Structural Engineering.
FINITE ELEMENT ANALYSIS OF COUPLED MAGNETO-MECHANICAL PROBLEMS OF CONDUCTING PLATES Topical Report, Dec. - Apr. 1981
Kuan-Ya Yuan, Francis C. Moon, and John F. Abel 1 May 1981 17 p refs Presented at Intern. Conf. on Numerical Methods for Coupled Probl., Swansea, Wales, 7-11 Sep. 1981 Submitted for publication
(Contract N00014-79-C-0224)
(AD-A104406; Rept-81-10) Avail: NTIS HC A02/MF A01 CSCL 18/9

In design problems for fusion reactor structures and other magnetically loaded devices, the field and the magnetic forces are usually calculated for static conditions only. The structural analysis is then handled as a separate problem. Recently, more attention is being given to the transient field problems, but little work has been done in understanding the nature of the dynamic magnetic forces and the mutual interactions between the field and the structure. This paper presents a study of the magnetic forces, the mutual interaction between fields, and the induced vibrations of long conducting plates. The finite element method

is used for analysis. Some numerical results are presented.
Author (GRA)

N82-11852# California Univ., Berkeley. Lawrence Berkeley Lab.
STABILITY OF PERMANENT-MAGNET PARAMETERS
V. I. Ilyushchenko 1981 6 p refs Transl. into ENGLISH from JINR Report 9-11618 (Dubna), 1981 In ENGLISH and RUSSIAN
(Contract W-7405-eng-48)
(DE81-027013; UCRL-tr-1596) Avail: NTIS HC A02/MF A01

Data are presented on the time, temperature, and radiation-stability characteristics of permanent magnets composed of barium ferrite, ALNICO alloys, and SmCo5. Magnetic characteristics are constant over a period of 10(4) to 10(5) h. Results are given on reversible and irreversible flux losses. It is concluded that these magnetic materials have a radiation stability similar to that of aluminum and stainless steel. DOE

N82-11853# Brookhaven National Lab., Upton, N. Y. Physics Dept.
PHYSICS IN FEW DIMENSIONS
V. J. Emery Mar. 1981 10 p refs Presented at the Conf. on Non-Linear Probl.: Present and Future, Los Alamos, N. Mex., Mar. 1981
(Contract DE-AC02-76CH-00016)
(DE81-026054; BNL-29719; CONF-810385-1) Avail: NTIS HC A02/MF A01

Some aspects of physics in few dimensions are discussed and its relationship to nonlinear field theories. After a survey of materials and some of the models that are used to describe them, the various methods of solution are compared and contrasted. The roles of exact results, operator representations and the renormalization group transformation are described, and a uniform picture of the behavior of low dimensional systems is presented. DOE

N82-11854# Sandia Labs., Albuquerque, N. Mex.
CONSTITUTIVE MODELLING FOR THE SHOCK PHYSICIST
W. Herrmann 1981 14 p refs Presented at APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024063; SAND-81-1194C; CONF-810684-36) Avail: NTIS HC A02/MF A01

Despite the fact that the theory of constitutive equations is developed with constitutive equations fabricated from many ad hoc assumptions some of which may be inconsistent or implicit, and are often very restricted in the types of motion to which they are applicable. Many of these constitutive equations in fact are special cases of general constitutive theories which have been studied in detail, and for which many general properties are known. The methodology of continuum constitutive theory is reviewed, with some examples drawn from viscous, viscoelastic, viscoplastic and mixture theories which have recently been applied to describing certain features of shock wave propagation. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution.*

N82-11855 British Broadcasting Corp., Kingswood (England).
ACOUSTIC SCALING: A REVIEW OF PROGRESS TO DATE, AND OF POSSIBLE FUTURE DEVELOPMENT
C. D. Mathers Sep. 1981 10 p refs
(BBC-RD-1981/6) Avail: British Broadcasting Corp., Tadworth, Surrey, England

The techniques of acoustic modelling have developed to a degree which enables a realistic subjective assessment to be made of at least the major features of a music studio. The successes of the work are reviewed, its limitations are discussed, and the ways in which advancing technology might enable some of these limitations to be overcome in the future are considered. A.R.H.

N82-11856 Pennsylvania State Univ., University Park.
A NEW METHOD FOR MEASURING THE ACOUSTIC IMPEDANCE OF THE GROUND Ph.D. Thesis
Constantine Glaretas 1981 134 p
Avail: Univ. Microfilms Order No. 8120429

A method for measuring the acoustic impedance of the ground was developed. The free field two microphone method, as it is called consists of measuring the sound pressure field, radiating from a loudspeaker source and propagating parallel to the ground by two microphones located on the same vertical axis. The transfer function between these two microphone signals is shown to be, for total coherence, equal to the ratio of velocity potentials, predicted by the appropriate point to point propagation theory over a plane boundary. A numerical search with a digital computer provides the value of ground impedance which satisfies the transfer function relationship stated above. Three ground models were a locally reacting, an extended reacting, and a layered ground model. From the close agreement of local and extended reaction models in predicting ground impedance, it is concluded that the grass covered surfaces tested here can be considered as locally reacting, without significant error. Dissert. Abstr.

N82-11857 Pennsylvania State Univ., University Park.
AN EXPERIMENTAL INVESTIGATION OF OCEAN SEDIMENT EFFECTS UPON LONG RANGE TRANSMISSION LOSS IN SHALLOW WATER Ph.D. Thesis
John Harold Beebe 1981 191 p
Avail: Univ. Microfilms Order No. 8120400

Volume absorption was determined experimentally from mode attenuation coefficients measured using explosive sources at sites having varied sediment types. Absorption was predicted using the sediment models of Biot and Hamilton, and compared with the experimental absorption data. Comparisons between experimental and predicted absorption showed good agreement for three sites having medium to coarse sediments. The best agreement was obtained for a site having a mud bottom where the Biot model gave slightly better results than that of Hamilton over a frequency range of 25 to 250 Hz. Transmission loss was predicted for a site on the Scotian Shelf with a sloping bottom using values of sediment absorption predicted with the sediment models. Comparisons of transmission loss measured in one third octave bands over a frequency range of 25 to 800 Hz showed excellent agreement below 250 Hz with the loss predicted using an adiabatic normal mode propagation loss model whose sediment absorption inputs were obtained using the Biot model.
Dissert. Abstr.

N82-11858*# Bionetics Corp., Hampton, Va.
HANDBOOK FOR INDUSTRIAL NOISE CONTROL
1981 139 p refs
(Contract NAS1-15721)
(NASA-SP-5108) Avail: NTIS HC $7.50/MF A01 CSCL 20A

The basic principles of sound, measuring techniques, and instrumentation associated with general purpose noise control are discussed. Means for identifying and characterizing a noise problem so that subsequent work may provide the most efficient and cost effective solution are outlined. A methodology for choosing appropriate noise control materials and the proper implementation of control procedures is detailed. The most significant NASA sponsored contributions to the state of the art development of optimum noise control technologies are described including cases in which aeroacoustics and related research have shed some light on ways of reducing noise generation at its source. A.R.H.

N82-11859*# United Technologies Research Center, East Hartford, Conn.
HELICOPTER ROTOR TRAILING EDGE NOISE Final Report
Robert H. Schlinker and Roy K. Amiet Washington NASA Nov. 1981 150 p refs
(Contract NAS1-15730)
(NASA-CR-3470) Avail: NTIS HC A07/MF A01 CSCL 20A

A two dimensional section of a helicopter main rotor blade was tested in an acoustic wind tunnel at close to full-scale Reynolds numbers to obtain boundary layer data and acoustic data for use in developing an acoustic scaling law and testing a first principles trailing edge noise theory. Results were extended to the rotating frame coordinate system to develop a helicopter rotor trailing edge noise prediction. Comparisons of the calculated noise levels with helicopter flyover spectra demonstrate that trailing edge noise contributes significantly to the total helicopter noise spectrum at high frequencies. This noise mechanism is expected to control the minimum rotor noise. In the case of noise radiation from a local blade segment, the acoustic directivity pattern is predicted by the first principles trailing edge noise theory. Acoustic spectra are predicted by a scaling law which includes Mach number, boundary layer thickness and observer position. Spectrum shape and sound pressure level are also predicted by the first principles theory but the analysis does not predict the Strouhal value identifying the spectrum peak. A.R.H.

N82-11860*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SEL AND EPNL NOISE DURATION COEFFICIENTS FOR THE 747 AND T-38 AIRCRAFT
William L. Willshire, Jr. Sep. 1981 12 p refs
(NASA-TM-83214) Avail: NTIS HC A02/MF A01 CSCL 20A

Duration coefficient were calculated for Boeing 747 and T-38 airplanes for sound exposure level (SEL) and effective perceived noise level (EPNL) scales. The measured SEL duration coefficients were 8.4 for the Boeing 747 and 5.5 for the T-38 result was in good agreement with a previous result for a similar F-5 airplane. In EPNL, the duration coefficients were 7.2 for the Boeing 747 and 5.7 for the T-38. The difference in the results between the two airplanes is believed to be due to their different engine noise source spectra. The difference in the Boeing 747 results in the two different metric was due to the different frequency weighting of A-weighted sound pressure level, used in SEL, and tone-corrected perceived noise level, used in EPNL, when applied to the 747 spectra. B.W.

N82-11861*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SYSTEM FOR CONTROLLED ACOUSTIC ROTATION OF OBJECTS Patent Application
Martin B. Barmatz, Inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 18 Sep. 1981 15 p
(Contract NAS7-100)
(NASA-Case-NPO-15522-1; US-Patent-Appl-SN-303672) Avail: NTIS HC A02/MF A01 CSCL 20A

A system is described for use with acoustically levitated objects, which enables close control of rotation of the object. One system includes transducers that propagate acoustic waves along the three dimensions (X, Y, Z) of a chamber of rectangular cross section. Each transducer generates a first wave which is resonant to a corresponding chamber dimension to acoustically levitate an object, and additional higher frequency resonant wavelengths for controlling rotation of the object. The three chamber dimensions and the corresponding three levitation modes (resonant wavelengths) are all different, to avoid degeneracy, or interference, of waves with one another, that could have an effect on object rotation. Only the higher frequencies, with pairs of them having the same wavelength, are utilized to control rotation, so that rotation is controlled independently of levitation and about any arbitrarily chosen axis. NASA

N82-11862*# Intergraph Corp., Huntsville, Ala.
DIGITAL ULTRASONICS SIGNAL PROCESSING: FLAW DATA POST PROCESSING USE AND DESCRIPTION Final Report
Victor E. Buel 30 Sep. 1981 141 p
(Contract NAS8-33100)
(NASA-CR-161882) Avail: NTIS HC A07/MF A01 CSCL 20A

A modular system composed of two sets of tasks which interprets the flaw data and alows compensation of the data due to transducer characteristics is described. The hardware configuration consists of two main units. A DEC LSI-11 processor running under the RT-11 sngle job, version 2C-02 operating system, controls the scanner hardware and the ultrasonic unit. A DEC PDP-11/45 processor also running under the RT-11, version 2C-02, operating system, stores, processes and displays the flaw data. The software developed the Ultrasonics Evaluation System, is divided into two catagories: transducer characterization and flaw classification. Each category is divided further into two functional tasks: a data acquisition and a postprocessor ask. The flaw characterization collects data, compresses its, and writes it to a disk file. The data is then processed by the flaw classification postprocessing task. The use and operation of a flaw data postprocessor is described. S.L.

N82-11863# Mississippi Univ., University. Dept. of Physics and Astronomy.
ACOUSTIC CAVITATION STUDIES Final Report
Lawrence A. Crum 1 Sep. 1981 23 p refs
(Contract N00014-79-C-0404)
(AD-A104409; Rept-811) Avail: NTIS HC A02/MF A01 CSCL 13/10

The primary thrust of this study was toward a more complete understanding of general aspects of acoustic cavitation. The effect of long-chain polymer additives on the cavitation threshold was investigated to determine if they reduced the acoustic cavitation threshold in a similar manner to the observed reduction in the cavitation index in hydrodynamic cavitation. Measurements were made of the acoustic cavitation threshold as a function of polymer concentration for additives such as guar gum and polyethelene oxide. The measurements were also made as a function of dissolved gas concentration, surface tension and viscosity. It was determined that there was a significant increase in the acoustic cavitation threshold for increased concentrations of the polymer additives (measurable effects could be obtained for concentrations as low as a few parts per million). One would normally expect that an additive that reduces surface tension to decrease the pressure required to cause a cavity to grow and thus these additives, at first thought, should reduce the threshold. However, even in the hydrodynamic case, the threshold was increased. In both of the hydrodynamic cases considered, the explanation for the increased threshold was given in terms of changed fluid dynamics rather than changed physical properties of the fluid. GRA

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-11864 Rutgers - The State Univ., New Brunswick, N. J.
IONIZATION FLUCTUATIONS IN COLLISIONAL IONIZING SHOCK WAVES Ph.D. Thesis
Lin I 1981 141 p
Avail: Univ. Microfilms Order No. 8122082

Large amplitude density fluctuations were studied in the argon plasma behind collisional ionizing shock fronts. Chaotic post-shock density fluctuations were observed. They were two dimensional, almost frozen with the post-shock fow, and had particle-like dynamical behaviors. Amplitudes were greater at the shock front and slowly damped away to reach the post-shock equilibrium. Power spectra were composed of many discrete modes and followed S(K sub z) alpha with 1.2 < alpha < 2.2 for 71 > M > 15. The typical fluctuation scales were in the order of 1 cm. Rayleigh-Taylor instability and hydrodynamic rotational convective turbulence fail to explain the observed phenomena. An ionization reaction diffusion turbulene model is proposed, in which post-shock chaotic patterning can be induced by the ioniztion and diffusion effect and driven by the highly ordered pre-shock gas flow. The expectations from the use of this kind of open nonequilibrium system give good qualitative agreement with the experimental results. Dissert. Abstr.

N82-11865 Cornell Univ., Ithaca, N. Y.
NONLINEAR WAVES ON CHARGED PARTICLE BEAMS Ph.D. Thesis
Thomas Patrick Hughes 1981 141 p
Avail: Univ. Microfilms Order No. 8119469

A two dimensional particle simulation of the resistive filamentation instability on a charge and current neutralized particle beam was performed. The nonlinear development of the instability is analyzed with reference to the focusing requirements of heavy ion beams acting as drivers for pellet fusion. It is found that magnetically pinched current filaments form for all values of the dimensionless parameter. The combined area of the filaments decreases significantly as the filaments coalesce. This leads to a speculation that adequate fccusing of the beam may be possible in spite of the development of this instability. Nonlinear space-charge waves in a strongly magnetized cylindrical plasma were also investigated. Soliton and periodic wave solutions were obtained. For the case of an intense unneutralized electron beam, a significant decrease in the phase velocity of the slow spce charge wave is found at large amplitudes. The importance of this result for some collective ion acceleration schemes is discussed. Dissert. Abstr.

N82-11866 Nebraska Univ. - Lincoln.
THE HYDROGEN ATOM IN A STRONG UNIFORM MAGNETIC FIELD Ph.D. Thesis
Gary Leigh Webster 1981 122 p
Avail: Univ. Microfilms Order No. 8122605

The wave function for an electron in combined Coulomb and uniform magnetic fields is expanded in oblate speroidal angle functions. The resulting Schodinger equation for the racial functions is solved in two regions of energy and magnetic field strength. First, for large astrophysical field strengths, two adiabatic methods are employed which yield rigorous upper and lower bounds on the lowest exact energy levels for each symmetry of the system. Results are presented for energies of hydrogenic ls and 2p levels in magnetic fields in the range 10 to the 7th power < or = B < or = 10 to the 11th power Gauss. These results indicate that the present adiabatic methods employing spherical symmetry may be expected to give reliable results for energies of low lying hydrogenic levels for magnetic fields in the range 0 < or = B < or = 10 to the 9th power G. Second, these adiabatic methods are used. to obtain basis states for a calculation including nonadiabatic coupling. Properties of the oblate spheroidal eigenvalues and angle functions are presented, as are the properties of the matrix elements that couple the adiabatic channels. Dissert. Abstr.

N82-11867 Harvard Univ., Cambridge, Mass.
MOLECULAR SPECTROSCOPY AND RELAXATION IN SUPERSONIC BEAMS Ph.D. Thesis
Katherine Lynn Saenger 1981 156 p
Avail: Univ. Microfilms Order No. 8120554

The results of laser induced fluorescence studies which explore various aspects of relaxation and spectroscopy in supersonic molecular beams are reported. The blue shifted absorption band in I2-solvent complexes formed in a supersonic expansion and the rotational and vibrational temperature of I2 as a function of pressure and diluent gas are examined. The utility of 12 fluorescence as a diagnostic to characterize the shape and cooling profile of the gas pulses is demonstrated for a pulsed nozzle. The electron spectrum of jet cooled biacetyl-d6 and the red bands in the electronic spectrum of biacetyl-h6 are also reported. Dissert. Abstr.

N82-11868 Cornell Univ., Ithaca, N. Y.
DIRECT OBSERVATION OF EXCITED OXYGEN ATOM PRODUCTION AND DEACTIVATION Ph.D. Thesis
Alan Peter Force 1981 160 p
Avail: Univ. Microfilms Order No. 8110418

The photodissociation of O3 in the gas phase at 248 nm was studied following photolysis with a KrF excimer laser. Oxygen atoms in the ground O(3Pj) state were detected through the use of time resolved atomic resonance absorption spectroscopy. The production of the ground state oxygen atoms in the photolysis process was monitored photoelectrically by their absorbance of the rsonance triplet at 130 nm, produsad in a microwave powered atomic resonance lamp. Optically metastable O(1D2) atoms were monitored by following the increase in O(3Pj) concentration following deactivation of O(1D2) by O3. A comparison of the yield of O(3Pj) following O(1D2) deactivation by O3 and N2 shows that the rmoval of one excited oxygen atom is associated with the production of one ground state atom (1.05 + or - 0.05), suggesting the possible importance of physical quenching and concommitant energy transfer in the deactivation process. A quantitative estimate of the quantum yield of O(1D2) production at 248 nm of 0.85 + or - 0.02 can be made from the relative yields of O(1D2) and O(3Pj). Dissert. Abstr.

N82-11869 Iowa State Univ. of Science and Technology, Ames.
AN ELECTROSTATIC MODEL FOR ENERGIES OF MOLECULES IN SOLUTION Ph.D. Thesis
Clifford Eric Felder 1981 118 p
Avail: Univ. Microfilms Order No. 8122511

A model for solute solvent interactions is considered, in which the solute molecule is placed in a cavity surrounded by a dielectric. Each atom of the solute molecule is assigned a polarizability and a fixed partial chage, determined by semiempirical methods. These charges induce dipole moments at the atoms and polarize the dielectric. Each induced dipole is calculated by a rigorous treatment of its interactions with the charges and dipoles of the other atoms and with the dielectric. The electrostatic free energy for the molecule is determined as the reversible work to polarize the atoms and the surrounding dielectric and to assemble the charges and induced dipoles in their final positions within the cavity. In turn, molecular dipole moments and free energies of proton and electron transfer among related molecules may be calculated. Explicit formulas are derived for the case of a spherical cavity. Dissert. Abstr.

N82-11870# Boston Coll., Chestnut Hill, Mass. Dept. of Physics.
PARTICLE TRAJECTORIES IN A MODEL ELECTRIC FIELD 1
Yaakov Shima, Gabor Kalman, and Paul Carini 5 Jun. 1981 16 p
(Contract F19628-79-C-0031; AF Proj. 7661)
(AD-A104507; SCIENTIFIC-1; AFGL-TR-81-0167) Avail: NTIS HC A02/MF A01 CSCL 20/8

The work reported in this note was done for the purpose of determining the feasibility of neutralizing the potential difference that occurs on a spacecraft. It has been proposed that neutralization can be accomplished by emitting ions from the positively charged surface region of the spacecraft and by letting this current impact on the negatively charged surface region. In order to investigate the main features of the proposed scheme, we made some simplifying assumptions about the geometry of the problem. GRA

N82-11871# Naval Research Lab., Washington, D. C.
ON ELECTRON BEAM IONIZATION OF AIR AND CHEMICAL REACTIONS FOR DISTURBED AIR DEIONIZATION Interim Report
A. W. Ali 22 Sep. 1981 43 p refs
(AD-A104517; NRL-MR-4619) Avail: NTIS HC A03/MF A01 CSCL 20/7

An overview of the electron beam ionization and deionization of the dry and wet air is presented. Ionization calculation schemes are discussed and the pertinent reaction rates for the relaxation of disturbed air are reviewed. The review gives the magnitudes and the temperature range over which the coefficients are measured. Recommendations are made to extend rate coefficient measurements to higher temperatures for some specific reactions. Author (GRA)

N82-11872# California Univ., Berkeley. Lawrence Berkeley Lab.
MOLECULAR-BEAM SYSTEM FOR THE STUDY OF TRANSIENT COMBUSTICN PROCESSES
F. C. Hurlbut, A. K. Oppenheim, P. Coico, and R. Peterson Aug. 1981 39 p refs
(Contract W-7405-eng-48)
(DE81-030663; LBL-13178) Avail: NTIS HC A03/MF A01

Construction of a direct sampling molecular beam apparatus for the measurement of concentration histories of short-lived species, in particular active radicals serving as chain carriers in the course of ignition in a hdrocarbon-air mixture, is described, including some prominent features of its design analysis. Whereas the system is not yet finished in all peripheral details, central elements have reached a sufficient degree of completion and level of function to warrant its documentation in the form of a preliminary report, incorporating the results of preliminary performance evaluation. The latter includes the measurement of the shutter function, showing the modulation of the beam monitored by a chopper to check its quality, and a time of arrival record from which it was established that the beam is fully supersonic at a Mach number of 2.34. DOE

N82-11873# California Univ., Livermore. Lawrence Livermore Lab.

USE OF MOLECULAR BEAMS TO SUPPORT MICROSPHERES DURING PLASMA COATING

J. K. Crane, R. D. Smith, W. L. Johnson, C. W. Jordan, S. A. Letts, G. R. Korbel, and R. M. Krenik 26 Aug. 1980 20 p refs Presented at the Am. Vac. Soc. Conf., Detroit, 13 Oct. 1980
(Contract W-7405-eng-48)
(DE81-025601; UCRL-84488-Rev-1; CONF-801037-9-Rev-1) Avail: NTIS HC A02/MF A01

Spherical targets can be levitated on beams of Ar or other gas atoms. This is an especially useful technique for supporting microspheres during plasma coating and processing. Measurements of gas flow and pressure indicate that the levitation device operates in the regime of Knudsen's flow. This device is currently being used in the development of future generation laser targets. DOE

N82-11874# Brookhaven National Lab., Upton, N. Y.

WORKSHOP ON ATOMIC PHYSICS AT THE NATIONAL SYNCHROTRON LIGHT SOURCE

K. W. Jones, ed., B. M. Johnson, ed., and D. C. Gregory, ed. Jan. 1981 210 p refs Workshop held at Upton, N.Y., 15-17 Sep. 1980
(Contract DE-AC02-76CH-00016)
(DE81-023507; BNL-28832; CONF-8009157) Avail: NTIS HC A10/MF A01

The range of experimental capabilities of the national synchrotron light source includes applications in photoelectron spectroscopy, photon scattering, X-ray absorption spectroscopy, time resolved measurements, resonance spectroscopy, and threshold excitation. The photoionization of excited states, ions, and open shell atoms; atomic structure and electron correlations; and photoelectron spectroscopy and photoionization experiments on atoms and free molecules (gases) are discussed. A.R.H.

N82-11875# Brookhaven National Lab., Upton, N. Y.

USE OF MICROPROCESSORS IN A NEUTRINO EXPERIMENT

P. L. Connolly and D. Cutts (Brown Univ., Providence, R.I.) 1981 6 p Presented at the Conf. on the Appl. of Microprocessors to High Energy Phys. Expt., Geneva, 4-6 May 1981
(Contract DE-AC02-76CH-00016)
(DE81-026057; BNL-29675; CONF-810539-8) Avail: NTIS HC A02/MF A01

A fundamental part of the neutrino detector, four DEC LSI-11s are interfaced each to 1/4 of the detector apparatus via programmable scan controllers and to the central DEC 11-34 via separate DMA links. These microprocessors act in parallel to collect and reformat data from neutrino events; further, they can act independently, orchestrating an elaborate variety of calibrations asynchronously in different regions of the apparatus. It is much easier to manage a large detector in separate pieces. Each LSI-11 can run in stand-alone mode, allowing independent installation or checkout of different parts of the detector. When operational, the apparatus must be continuously calibrated; with a very large number of separate detector elements, distributed intelligence is most useful. DOE

N82-11876# Rensselaer Polytechnic Inst., Troy, N. Y.

MECHANISTIC ANALYSIS OF LOFT PULSED NEUTRON ACTIVATION DATA

M. L. Perez-Griffo, R. C. Block, and R. T. Lahey, Jr. 1981 7 p refs Presented at the 1981 Ann. Meeting of the Am. Nucl. Soc., Miami Beach, Fla., 7-12 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-027124; CONF-810606-84) Avail: NTIS HC A02/MF A01

A technique for measuring mass weighted flow velocities without perturbing the flow is described. Monte Carlo PNA tagging and Monte Carlo detection calculations of the irradiated fluid with the transport of the irradiated fluid are used to predict the time spectrum in a PNA measurement. This mechanistic method is used to analyze recent LOFT PNA measurements of single phase water flowing in a 14 in. (0.35 m) schedule 160 steel pipe. DOE

N82-11877# California Univ., Berkeley. Lawrence Berkeley Lab. Physics, Computer Science and Mathematics Div.

ELASTIC AND INELASTIC PSI PRODUCTION BY MUONS

Stewart C. Loken Jun. 1981 10 p refs Presented at 16th Rencontre de Moriond, Elementary Particle Phys. Meetings, Les Arcs, France, 15-27 Mar. 1981
(Contract W-7405-eng-48)
(DE81-025326; LBL-12814) Avail: NTIS HC A02/MF A01

Results are presented on the elastic and inelastic production of psi(3.1). The elastic data are qualitative agreement with the predictions of photo-gluon fusion but have a steeper dependence on sq Q than the model predicts. A QCD calculation accounts well for the shape of the inelastic data in inelasticity, sq A and E/sub gamma/, but fails to account for the absolute cross section. At 209 GeV, the cross-section for elastic psi production is 0.36 + or - 0.07 nb; for inelastic 0.28 + or - 0.06 nb. DOE

N82-11878# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.

PROTON INDUCTION LINACS AS HIGH-INTENSITY NEUTRON SOURCES

Denis Keefe and Egon Hoyer Jun. 1981 12 p refs Presented at the 5th meeting of the Intern. Collaboration and Advanced Neutron Sources, Julich, West Germany, 22-26 Jun. 1981
(Contract W-7405-eng-48)
(DE81-025825; LBL-12855) Avail: NTIS HC A02/MF A01

Proton induction linacs were explored as high intensity neutron sources. The induction linac and its limitations for accelerating ions were reviewed. A number of proton induction linac designs were examined and general conclusions were given. Results suggest that a proton induction accelerator of the lowest voltage, consistent with good neutron flux, is preferred and could well be cost competitive with the usual RF linac/storage ring designs. DOE

N82-11879# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

REACTION OF OXYGEN ATOMS WITH ETHYLENE AND VINYLBROMIDE

Richard J. Buss, Robert J. Baseman, Guozhong He, and Y. T. Lee May 1981 23 p refs Presented at the 10th Intern. Conf. on Photochem., Iraklion, Crete, 6-12 Sep. 1981
(Contract W-7405-eng-48)
(DE81-025206; LBL-12801) Avail: NTIS HC A02/MF A01

Identification of the primary products in the reaction of O(3P) atoms with ethylene and vinyl bromide was accomplished by measurement of the angular and velocity distributions of the products in a crossed beam apparatus under single collision conditions. The atomic elimination processes are found to be the major channels while molecular elimination is not observed. The 1,2 migration of H atom in the intermediate complex is not observed to occur. DOE

N82-11880# California Univ., Livermore. Lawrence Livermore Lab.

STATISTICAL VERSUS VALENCE NEUTRON NEUTRON CAPTURE IN Mo-98

D. G. Gardner 19 Jun. 1981 5 p refs Presented at 4th Intern. Symp. on Neutron-Capture-Gamma-Ray Spectry. and Related Topics, Grenoble, 7-11 Sep. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-023943; UCRL-86267; CONF-810920-1) Avail: NTIS HC A02/MF A01

In mass regions corresponding to peaks in the neutron strength function, nonstatistical mechanisms contribute a significant or even major portion of the average radiation width in the beginning of the resonance region. This could severely limit the possibility of calculating capture cross sections for targets where experimental data are lacking, because such direct effects are sensitive to the detailed nuclear level structure in the daughter nucleus. The reaction Mo-98 +n was examined for neutrons in the 1 keV to 3 MeV energy range, because this case is often cited as one of the clearest examples of valence neutron capture effects. Preliminary calculations are presented which suggest that these nonstatistical effects rapidly disappear when measurements from even a small number of resonances are averaged. DOE

N82-11881# Argonne National Lab., Ill.

ROLE OF EXCITED STATES OF MOLECULAR IONS IN STRUCTURE STUDIES WITH HIGH-ENERGY COLLISIONS

E. P. Kanter 1980 82 p refs Presented at NATO Intern. Advanced Study Inst. on Molecular Ions: Geometric and Electron. Structures, Kos, Greece, 30 Sep. - 10 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023898; CONF-8009131-2) Avail: NTIS HC A05/MF A01

The main features of the Coulomb explosion of fast-moving molecular-ions and the manner in which Coulomb-explosion techniques are being applied to the problem of determining stereochemical structures of light polyatomic ions are described. Examples of such experiments are presented for several ions. DOE

N82-11882# Carnegie-Mellon Univ., Pittsburgh, Pa.

DETECTION AND STUDY OF NEW HEAVY PARTICLES THROUGH JET IDENTIFICATION

John B. Babcock 1981 17 p refs Presented at Conf. on Perturbative Quantum Chromodynam., Tallahassee, Fla., 25 Mar. 1981
(Contract DE-AC02-76ER-03066)
(DE81-025151; CONF-810368-3; COO-3066-169) Avail: NTIS HC A02/MF A01

A solution to the problem of the identification of an arbitrary number of jets in high energy collisions is reviewed. Some of the applications of this solution to the study of the electroweak interactions are illustrated through two examples: the detection and analysis of top quarks, and the detection of charged Higgs or pseudo Goldstone bosons, in e(+)e(-) reactions. Although these two examples involve e(+)e(-) initial states, the jet identification method described could be used in the analysis of any reaction involving jets. DOE

N82-11883# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

BOUNDED LIMIT FOR THE MONTE CARLO POINT-FLUX-ESTIMATOR

R. A. Grimesey 1981 6 p refs Presented at the Am. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-026526; CONF-810606-78) Avail: NTIS HC A02/MF A01

In a Monte Carlo random walk the kernel K(R,E) is used as an expected value estimator at every collision for the collided flux phi sub c r vector E) at the detector point. A limiting value for the kernel is derived from a diffusion approximation for the probability current at a radius R sub 1 from the detector point. The variance of the collided flux at the detector point is thus bounded using this asymptotic form for K(R,E). The bounded point flux estimator is derived. DOE

N82-11884# Los Alamos Scientific Lab., N. Mex.

ELECTRON - TEMPERATURE REQUIREMENTS FOR NEUTRALIZED INERTIAL-CONFINEMENT-FUSION LIGHT-ION BEAMS

D. S. Lemons 1981 12 p refs Presented at the 4th Intern. Topical Conf. on High-Power Electron and Ion-Beam Res. and Technol., Palaiseau, France, 29 Jun. - 3 Jul. 1981
(Contract W-7405-eng-36)
(DE81-025352; LA-UR-81-1873; CONF-810620-9) Avail: NTIS HC A02/MF A01

Because of their large self-space-charge fields, light ion beam drivers of energy and power sufficient to achieve inertial confinement fusion (ICF) cannot be focused on a small fuel pellet unless neutralized. Even if initially neutralized with comoving electrons, these beams will not stay neutralized and focus during propagation through a vacuum chamber unless the initial thermal-energy of the neutralizing electrons is sufficiently small. The effects which contribute to the effective initial temperature of the neutralizing electron are discussed including compressional shock heating. A simple heuristic model is used to construct envelope equations which govern axial as well as radial beam compression and use them to predict the largest initial electron temperature consistent with the required beam compression. This temperature for typical light ion beam systems is about ten eV - a temperature which may be possible to achieve. DOE

N82-11885# Los Alamos Scientific Lab., N. Mex.

IMPROVED CALCULATIONS OF ENERGY DEPOSITION FROM FAST NEUTRONS

D. J. Brenner, R. E. Prael, J. F. Dicello, and M. Zaider 1981 11 p refs Presented at 4th Symp. on Neutron Dosimetry, Neuherberg/Munich, West Germany, 1 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025385; LA-UR-81-1694; CONF-810673-2) Avail: NTIS HC A02/MF A01

A firmer basis for neutron cross-sectional calculations was established which results in improved calculations of dose and energy deposition in small sites from high energy neutrons. Secondary particle production spectra due to neutrons indicent on carbon and oxygen are calculated sing an intranuclear cascade code which takes into account specific nucler properties of carbon and oxygen (in particular, alpha-particle clustering). It also allows excited nuclei to de-excite by Fermi breakup rather than the more frequently used statistical evaporation mechanism, which is not applicable to low-mass nuclei. The code yields double-differential secondary particle spectra in energy angle which show good agreement with experimental data. DOE

N82-11886# Oak Ridge National Lab., Tenn. Solid State Div.

ION-REVERSIBILITY STUDIES IN AMORPHOUS SOLIDS USING THE TWO-ATOM SCATTERING MODEL

O. S. Oen Jun. 1981 28 p refs Presented at the Seminar of Recent Theoret. Computational Develop. in Atomic Collisions in Solids, Strasbourg, 14 Jul. 1981
(Contract W-7405-eng-26)
(DE81-025188; CONF-810732-1) Avail: NTIS HC A03/MF A01

An analytical two-atom scattering model was developed to treat the recent discovery of the enhancement near 180 of Rutherford backscattering yields from disordered solids. The model includes the interaction of a second atom lying between the target surface and the backscattering plane. The projectile ion makes a glancing collision with this second atom both before and after it is backscattered. The model predicts an enhancement effect whose physical origin arises from the tolerance of path for those ions whose inward and outward trajectories lie in the vicinity of the critical impact parameter. Results using Moliere scattering show how the yield enhancement depends on ion energy, backscattering depth, exit angle, scattering potential, atomic numbers of the projectile and target, and target density. It is shown that these quantities depend on a single dimensionless parameter and analytical expressions for them are given which are accurate to better than 1%. DOE

N82-11887# Sandia Labs., Albuquerque, N. Mex.

MODULAR ACCELERATOR INTERCONNECTING AND OPERATING SYSTEMS FOR PBFA-1

Robert A. White 1981 4 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025397; SAND-81-0755C; CONF-810659-24) Avail: NTIS HC A02/MF A01

Some systems used to operate the first particle beam fusion accelerator are discussed with emphasis on the (PBFA-1) high voltage electrical systems for charging and firing the energy storage section and for simultaneously triggering 36 separate, 2.5 megavolt spark gaps in the pulse forming section are described. DOE

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N82-11888 California Univ., Los Angeles.
HOLLOW CATHODE, MAGNETIC MULTIPOLE ION SOURCES FOR NEUTRAL BEAM INJECTION Ph.D. Thesis
Dan Michael Goebel 1981 144 p
Avail: Univ. Microfilms Order No. 8120955

A model of the plasma in the ion source is presented by examining the plasma loss mechanisms and calculating the plasma potential as a function of the plasma generator geometry and discharge parameters. The plasma potential is related to the ionization efficiency and stability of the source discharge against mode shifts. The analysis correctly predicts the neutral gas pressure and discharge voltage dependence observed in the plasma generators. A relationship is generated for the evaluation of source parameters such as maximum anode area which are required for discharge stability at given operation point. The model is extended to the quasi-uniform plasmas of the hollow cathode discharge and is utilized in discussing the potential distribution, stability and performance of that configuration. Dissert. Abstr.

N82-11889*# Boeing Aerospace Co., Seattle, Wash.
ANALYSIS OF SPACE SYSTEMS STUDY FOR THE SPACE DISPOSAL OF NUCLEAR WASTE STUDY REPORT. VOLUME 2: TECHNICAL REPORT Final Report
1981 360 p refs
(Contract NAS8-33847)
(NASA-CR-161888; D180-26426-2-Vol-2; DPD-590; DR-4)
Avail: NTIS HC A16/MF A01 CSCL 18G

Reasonable space systems concepts were systematically identified and defined and a total system was evaluated for the space disposal of nuclear wastes. Areas studied include space destinations, space transportation options, launch site options payload protection approaches, and payload rescue techniques. Systems level cost and performance trades defined four alternative space systems which deliver payloads to the selected 0.85 AU heliocentric orbit destination at least as economically as the reference system without requiring removal of the protective radiation shield container. No concepts significantly less costly than the reference concept were identified. A.R.H.

N82-11890# Argonne National Lab., Ill. Chemical Engineering Div.
COMPARISON OF COSTS FOR SOLIDIFICATION OF HIGH-LEVEL RADIOACTIVE WASTE SOLUTIONS: GLASS MONOLITHS VS. METAL MATRICES
L. J. Jardine, R. E. Carlton (TERA Corp.), and M. J. Steindler May 1981 155 p refs
(Contract W-31-109-eng-38)
(ANL-80-121) Avail: NTIS HC A08/MF A01

A comparative economic analysis was made of four solidification processes for liquid high-level radioactive waste. Two processes produced borosilicate glass monoliths and two others produced metal matric composites of lead and borosilicate glass beads and lead and supercalcine pellets. Within the uncertainties of the cost (1979 dollars) estimates, the cost of the four processes was about the same, with the major cost component being the cost of the primary building structure. Equipment costs and operating and maintenance costs formed only a small portion of the building structure costs for all processes. DOE

N82-11891# Los Alamos Scientific Lab., N. Mex.
SPACE NUCLEAR SAFETY AND FUELS PROGRAM Progress Report
S. E. Bronisz, comp. Jun. 1981 17 p refs
(Contract W-7405-eng-36)
(DE81-030501; LA-8904-PR) Avail: NTIS HC A02/MF A01

The development of a radioisotopic power system is discussed. In particular, the impact and thermal response tests of components of a general purpose heat source are addressed. DOE

N82-11892# Oak Ridge National Lab., Tenn.
INTERNATIONAL SAFEGUARDS FOR SPENT FUEL STORAGE Final Report
Myron Kratzer, Edward Wonder, William Immerman, and Frederick Crane Aug. 1981 73 p refs
(Contract W-7405-eng-26)
(DE81-029896; ORNL/SUB-7605-12-2) Avail: NTIS HC A04/MF A01

The nonproliferation effectiveness and political and economic acceptability of prospective improvements in international safeguard techniques for LWR spent fuel storage were analyzed. Although the applicability of item accounting considerably eases the safeguarding of stored spent fuel, the problem of verification is potentially serious. A number of simple gamma and neutron nondestructive assay techniques were found to offer considerable improvements, of a qualitative rather than quantiative nature, in verification-related data and information, and possess the major advantage of intruding very littel on facility operations. A number of improved seals and monitors appear feasible as well, but improvements in the timeliness of detection will not occur unless the frequency of inspection is increased or a remote monitoring capability is established. Limitations on IAEA Safeguards resources and on the integration of results from material accounting and containment and surveillance remain problems. DOE

N82-11893# Sandia Labs., Albuquerque, N. Mex.
UNCERTAINTY ANALYSIS FOR GEOLOGIC DISPOSAL OF RADIOACTIVE WASTE
Robert. N. Cranwell and Jon C. Helton (Arizona State Univ.) 1981 13 p refs Presented at Symp. on Uncertainties Assoc. with the Regulation of the Geol. Disposal of High-Level Radioactive Waste, Gatlinburg, Tenn., 9 Mar. 1981
(Contract DE-AC04-76DP-00789)
(DE81-027206; SAND-81-1718C; CONF-810372-3) Avail: NTIS HC A02/MF A01

The incorporation and representation of uncertainty in the analysis of the consequences and risk associated with the geologic disposal of high-level radioactive waste are discussed. Such uncertainty has three primary components: process modeling uncertainty, model input data uncertainty, and scenario uncertainty. The following topics are considered in connection with the preceding components: propagation of uncertainty in the modeling of a disposal site, sampling of input data for models, and uncertainty associated with model output. DOE

N82-11894# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
MATERIALS CONSIDERATIONS RELATIVE TO MULTIBARRIER WASTE ISOLATION
H. E. McCoy and J. C. Griess Jul. 1981 34 p refs
(DE81-029104; ORNL/TM-7770) Avail: NTIS HC A03/MF A01

The environmental conditions associated with the storage of radioactive wastes are reviewed, and the corrosion of potential waste containment materials under these conditions is evaluated. The desired service life of about 1000 years is beyond the time period for which existing corrosion data can be extrapolated with certainty; however, titanium aloys seem to offer the most promise. The mechanical requirements for canisters and overpacks are considered and several candidate materials are selected. Designs for a canister and an overpack have been developed, and these are used to estimate the costs or the three possible materials of construction. DOE

N82-11895# South Carolina Univ., Columbia. Coll. of Engineering.
USE OF POLYETHERS IN THE TREATMENT OF ACIDIC HIGH-ACTIVITY NUCLEAR WASTES Final Report, 31 May 1976 - 31 Aug. 1980
M. W. Davis, Jr. 21 May 1981 62 p refs
(Contract DE-AS09-76ER-00884)
(DE81-027087; DOE/ER-00884/4) Avail: NTIS HC A04/MF A01

A solvent extraction system was developed which reversibly extracts C from 3M $HNO3$. The organic phase consists of a matrix solution of 27 vol % TBP, and 68 vol % kerosene. The complexing agents consist of (076M) 5 vol % di-dodecyinaphthalene sulfonic acid (DNS) and 02M Bis (4.4(5')

(1-hydroxyhepty) benzo) 18 crown 6. This is a synergistic system since both complexing agents are necessary to extract the cesium. The data indicate that one crown molecule is involved in the organic complex while the number of DNS molecules is at least one to satisfy the valence requirements but may be more since surfactants of the DNS type tend to form small aggregates in the organic phase. This lack of extraction is probably due to steric effects around the extracted metal atom when two or three ionized DNS molecules are required for valence adjustment. Radiation stability of the process is also discussed. DOE

N82-11896# Hanford Engineering Development Lab., Richland, Wash.

ZIRCALOY CLADDING: TOUGH CONTAINMENT FOR SPENT FUEL STORAGE

R. E. Einziger, D. M. Bosi, and A. K. Miller (Stanford Univ.) 1981 7 p ref Presented at the AM. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7-12 Jun. 1981
(Contract DE-AC14-76FF-02170)
(DE81-024105; HEDL-SA-2325-FP; CONF-810606-57) Avail: NTIS HC A02/MF A01

The potential Zircaloy cladding degradation mechanisms are examined. It is concluded that in a limited air atmosphere, only stress rupture, stress corrosion cracking (SSC), and fatigue fracture could possibly compromise the cladding with stress-rupture of the pressurized fuel rods appearing to be the most likely mode of breach. Due to uncertainties in Blackburn's calculations, an experimental and theoretical study of stress rupture, stress corrosion cracking and the fatigue-fracture behavior of the cladding under postulated dynamic loads was conducted. Results presented may equally apply to dry storage. J.M.

N82-11897# Brookhaven National Lab., Upton, N. Y.

BROOKHAVEN NATIONAL LABORATORY TANDEM ACCELERATOR UPGRADING PROGRAM

P. Thieberger, M. A. Manni, R. Lindgren, M. McKeown, C. Carlson, and H. E. Wegner 1981 4 p refs Presented at the 3rd Intern. Conf. on Electrostatic Accelerator Technol., Oak Ridge, Tenn., 13 Apr. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025093; BNL-29612; CONF-810468-9) Avail: NTIS HC A02/MF A01

The original 10 MV waranteed MP Van de Graff accelerator of 1970 now operates in excess of 14 MV because of many improvements over the years. The most recent improvements completed and those that are presently under construction and being implemented described include tube extension, insulated power shift drive, sorting cable and rod system for individual tube section voltage conditioning, and improved terminal design. DOE

N82-11898# California Univ., Livermore. Lawrence Livermore Lab.

NOVA PULSE POWER SYSTEM DESCRIPTION AND STATUS

R. W. Holloway, K. Whitman, B. T. Merritt, D. G. Gritton, and J. A. Oicles 1 Jun. 1981 5 p refs Presented at 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1-3 Jun. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-025600; UCRL-85720) Avail: NTIS HC A02/MF A01

The Nova laser system, designed to produce critical data in the nation's inertial confinement fusion effort, is the world's largest peak power laser and presents various unique pulse power problems. Pulse power systems for this laser are described, the evolutionary points from prior systems are pointed out, and the current status of the hardware is given. DOE

N82-11899# California Univ., Livermore. Lawrence Livermore Lab.

MICROSTRUCTURES FOR HIGH-ENERGY X-RAY AND PARTICLE-IMAGING APPLICATIONS

N. M. Ceglio, G. F. Stone, and A. M. Hawryluk May 1981 18 p refs Presented at the 16th Symp. on Electron Ion and Photo Beam Technol., Dallas, 26 May 1981
(Contract W-7405-eng-48)
(DE81-026531; UCRL-85506; CONF-8105103-1) Avail: NTIS HC A02/MF A01

Coded imaging techniques using thick, micro-Fresnel zone plates as coded apertures were used to image X-ray emissions (2-20 keV) and 3.5 MeV Alpha particle emissions from laser driven micro-implosions. Image resolution in these experiments was 3-8 micrometers. Extension of this coded imaging capability to higher energy X-rays (approximately 100 keV) and more penetrating charged particles (e.g. approximately 15 MeV protons) requires the fabrication of very thick (50-200 mirometers), high aspect ratio (10:1), gold Fresnel zone plates with narrow linewidths (5-25 micrometers) for use as coded aperatures. A reactive ion etch technique in oxygen was used to produce thick zone plate patterns in polymer films. The polymer patterns serve as electroplating molds for the subsequent fabrication of the free-standing gold zone plate structures. DOE

N82-11900# California Univ., Livermore. Lawrence Livermore Lab.

ANALYSIS OF STANDARD REFERENCE MATERIALS BY ABSOLUTE INAA

Robert E. Heft and Rebecca F. Koszykowski Jul. 1981 18 p refs Presented at 6th Intern. Conf.: Mod. Trends in Activation Analysis, Toronto, 15-19 Jun. 1981 Submitted for publication
(DE81-025925; UCRL-85365; CONF-810682-7) Avail: NTIS HC A02/MF A01

Three standard reference materials: flyash, soil, and ASI 4340 steel, are analyzed by a method of absolute instrumental neutron activation analysis. Two different light water pool-type reactors were used to produce equivalent analytical results even though the epithermal to thermal flux ratio in one reactor was higher than that in the other by a factor of two. DOE

N82-11901# Argonne National Lab., Ill.

STORAGE RING INJECTION

R. Burke 1980 11 p refs Presented at the Heavy Ion Fusion Workshop, Berkeley, Calif., 29 Oct. - 9 Nov. 1980
(Contract W-31-109-eng-38)
(DE81-023846; CONF-8010203-2) Avail: NTIS HC A02/MF A01

Basic issues involved in injecting the beam into storage rings were considered. The main conclusion is that straightforward adjustments of the storage ring parameters makes injection easy. The adjustments also result in lower bending magnet fields, and high field superconducting magnets (e.g., 5 Tesla) are not necessary. The design changes do not necessarily affect the Keil-Schnell criterion for stability of the longitudinal microwave instability. Because the beams are expected to be unstable, but with slow growth rates, the vacuum chamber impedances required to give equal risetimes for the various designs are compared for systems posing various degrees of difficulty for injection. DOE

N82-11902# Argonne National Lab., Ill.

HEAVY ION FUSION PROGRAM AT ARGONNE

R. L. Martin, R. Arnold, R. Burke, and J. Watson 1980 10 p refs Presented at the 7th All-Union Natl. Conf. on Particle Acceleration, Dubna, USSR, 14-16 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023905; CONF-8010206-1) Avail: NTIS HC A02/MF A01

The heavy ion preaccelerator and low beta linac are developed. The preaccelerator and the initial linac cavities are operational. The preaccelerator has achieved pulsed 50 mA Xe(+1) beams at 1.3 MeV. A 100 mA low emittance xenon (or mercury) source, a Penning discharge Pierce extraction source with a single 3 cm diameter aperture, was developed. Xenon currents of 100 mA were extracted with no indication of plasma sheath instability. The high voltage power supply is a dynamitron which was extensively modified for maximum pulsed current operation of 1.3 MV. The oscillator supports more than 40 mA of beam associated current with less than 0.25% voltage droop in 100 microns. DOE

N82-11903# Brookhaven National Lab., Upton, N. Y.

HEAVY ION BEAM INTERACTION AND ENERGY PARTITION IN THE INITIAL STAGES OF ICF TARGET IRRADIATION

Paul Suh, Henry Makowitz, Mike Stauber, George H. Miley, and D. Harris Nov. 1980 30 p refs Presented at the Intern. Conf. on Plasma Sci., Santa Fe, N. Mex., 18 May 1981 Prepared

in cooperation with Grumman Aerospace Corp., Bethpage, N.Y. and Illinois Univ., Urbana
(Contract DE-AC02-76CH-00016)
(DE81-025296; BNL-29512; CONF-810527-6) Avail: NTIS HC A03/MF A01

An order of magnitude analysis of the effect of 20 GeV U-ion beam impact on an idealized inertial confinement fusion target, Be or Au ablator region was made, and the beam interaction and energy partition were studied for the initial stages of target irradiation. Uniform heating and an expansion perserving uniform density of the ablator medium was assumed for the initial stage of beam interaction. Significant differences in the partition of energy occur between Be and Au ablators. For Au, the main channels for the heavy-ion beam energy output are the escaping radiation energy (10 to 20% of the energy input, based on an extrapolation) and the thermal energy. For Be the ablator thermal energy and ionization channels dominate. DOE

N82-11904# General Atomic Co., San Diego, Calif.
KUGEL: A THERMAL, HYDRAULIC, FUEL PERFORMANCE AND GASEOUS FISSION PRODUCT RELEASE CODE FOR PEBBLE BED REACTOR CORE ANALYSIS
B. I. Shamasundar and M. E. Fehrenbach May 1981 273 p refs
(Contract DE-AT03-76ET-35300; GA Proj. 6400)
(DE81-026561; GA-A-16222) Avail: NTIS HC A12/MF A01

A computer code developed to analyze the thermal, hydraulic and fuel particle performance characteristics of axisymmetric pebble bed reactors is presented. This FORTRAN 5 program is overlayed into three main segments to minimize core storage. Variable dimensioning was introduced so that storage allocation is based on the user-specified problem size, thus allowing the code to handle any problem with uniform mesh interval. This provides the flexibility to choose thermal problem mesh sizes different from those used in the physics analyses. The code can also handle a non-uniform void fraction distribution. DOE

N82-11905# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
TRAJECTORY ANALYSIS OF THE ELECTRONS IN A MAGNETRON-TYPE GUN Progress Report
A. Ezzeddine and L. D. Smullin Sep. 1980 26 p refs
(Contract DE-AS02-78ET-51002)
(DE81-027860; DOE/ET-51002/1; PRR-80/21; PFC/RR-80-17) Avail: NTIS HC A03/MF A01

The Herrmannsfeldt electron trajectory code was modified to analyze the trajectories in magnetron injection guns with perveances I/V (3/2) in the range of 0.00001 Perv. When tested on a particular magnetron gun, the computed perveance agreed well with experimental data for values V/B (2) less that or equal to 0.006, the flo was nearly laminar with V sub perpendicular /V sub parallel values reaching 12 percent. For larger voltages, both experiment and calculations indicate a turbulent electron flow. DOE

N82-11906# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
THEORY OF ELECTRON CYCLOTRON HEATING IN THE CONSTANCE 2 EXPERIMENT
M. E. Mauel Mar. 1981 30 p refs
(Contract DE-AC02-78EG-51013)
(DE81-028269; DOE/ET-51013/4; PFC/RR-81-2R) Avail: NTIS HC A03/MF A01

The bounce-averaged quasi-linear equation for a non-relativistic mirror-confined plasma interacting with electromagnetic waves is derived for use in the study of ECRH of the Constance II mirror experiment. The derivations follows the more formal examples given by Berk for electrostatic waves and Bernstein and Baxter for relativistic plasmas. The validity of the theory is discussed by examining individual particle orbits in an EM field. The local dispersion relation is found while deriving a self-consistent WKB theory which can be used to estimate the power transferred from the launching horn to the plasma. DOE

N82-11907# Oak Ridge National Lab., Tenn.
ENGINEERING CHALLENGES OF FUSION-REACTOR DEVELOPMENT
Jan B. Talbot 1981 10 p refs Presented at the Soc. of Women Eng. 1981 Natl. Conv., Anaheim, Calif., 24-28 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024129; CONF-810699-1) Avail: NTIS HC A02/MF A01

A brief review of the fusion research program and some problems to be faced in the near future and described. DOE

N82-11908# Sandia Labs., Albuquerque, N. Mex.
CONSIDERATIONS FOR THE DESIGN, IMPLEMENTATION, AND EFFECTIVE OPERATION OF SANDIA'S SUPER-POWER GENERATORS
Steven A. Goldstein, G. W. Barr, J. P. VanDevender, and T. H. Martin 1981 4 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025404; SAND-81-1553C; CONF-810659-25) Avail: NTIS HC A02/MF A01

After firing its first full power, 36-module shot on schedule and on budget, the particle beam fusion accelerator-1 (PBFA) progressed from an output parameter characterization phase through a stable operating point optimization phase and into an operational phase for conducting advanced power flow studies and ion beam driven inertial confinement fusion experiments. The development of the PBFA Facility is described from the viewpoints of facility and accelerator design criteria, implementation of these designs, and effective operation. DOE

N82-11909# Department of Energy, Washington, D. C. Office of Nuclear Waste Management.
EVALUATION AND REVIEW OF ALTERNATIVE WASTE FORMS FOR IMMOBILIZATION OF HIGH-LEVEL RADIOACTIVE WASTES
1 Jul. 1981 42 p
(DE81-026323; DOE/TIC-11472; Rept-3) Avail: NTIS HC A03/MF A01

The relative strengths and weaknesses of the alternative forms are considered. Topics covered include uncoated waste forms, and the need for adopting additional standardized tests, standard reference materials, common units and standardized methods of data presentation. It was found that comparative data on leach rates in waters equilibrated with candidate rocks and potential geologic environments are almost nonexistent and are essential to establish relevant long term extrapolation of waste form performance. Understanding radiation damage effects on the microstructure and leaching mechanisms of polycrystalline ceramics is still insufficient to judge long term reliability of this class of waste forms. More extensive data on rates and mechanisms of leaching of all waste forms under radiation and repository conditions are needed. Additional studies of fundamental mechanisms controlling long term reliability of glass and alternative waste forms are strongly encouraged. DOE

74 OPTICS

Includes light phenomena.

N82-11910# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Environmental Lab.
INCLUSION OF A SIMPLE VEGETATION LAYER IN TERRAIN TEMPERATURE MODELS FOR THERMAL INFRARED (IR) SIGNATURE PREDICTION Final Report, 1 Oct. 1979 - 1 Oct. 1980
Lee K. Balick, Randy K. Scoggins, and Lewis E. Link, Jr. Aug. 1981 44 p refs
(DA Proj. 4A7-62730-AT-42; DA Proj. 4A7-62719-AT-40)
(AD-A104469; WES/MP/EL-81-4) Avail: NTIS HC A03/MF A01 CSCL 17/5

Thermal infrared signatures of natural and cultural features are dynamic, varying with time and weather conditions. Prediction of thermal signatures for specific conditions requires first that the actual temperature of the features be determined; for vegetation canopies this involves the average temperatures of canopy components and for planar (nonvegetated) surfaces the temperature of the surface. Models have been developed to handle layered vegetation canopies and layered ground surfaces; however, efforts have only begun to formulate a comparable capability for intermediate conditions such as grass covered surfaces where both the terrain surface and vegetation influence the average surface temperature. This report presents a procedure, named VEGIE, that predicts the temperature of terrain surfaces which contain a simple layer of vegetation. VEGIE is designed as an interim procedure for immediate application in lieu of more sophisticated and theoretical treatments of this problem. Operational flexibility and simplicity are preserved by using VEGIE as a submodel to the Terrain Surface Temperature Model (TSTM) developed previously at the U.S. Army Engineer Waterways Experiment Station. The TSTM predicts the surface temperature of nonvegetated layer and planar features using material thermophysical properties and meteorological conditions. These models are applied to a deciduous and a coniferous canopy where the CSU model is valid but VEGIE is not. VEGIE is applied to the problem of estimating thermal signatures for terrain surfaces with less than total foliage cover, the consequences of changes in foliage cover, differing emissivities for the soil and vegetation, and reflected sky radiation. GRA

N82-11911# GTE Systems Group, Needham, Mass. Communication Systems Div.
LOCAL DISTRIBUTION FIBER OPTIC CABLE COMMUNICATION SYSTEM Final Report, Feb. 1979 - Sep. 1980
A. Morelli, James Splaine, and F. J. Savell Fort Monmouth, N.J. Army Communications Research and Development Command 20 Mar. 1981 165 p
(Contract DAAK80-79-C-0508; DA Proj. 1E4-63707-D-246)
(AD-A104491; CORADCOM-79-0508-F) Avail: NTIS HC A08/MF A01 CSCL 17/2

This report contains the final description of the electrical, electrooptical and mechanical design of the fiber optic communication link interconnecting the MS and CI shelters of the message switch (AN/TYC-39). A summary of test results and tests performed at the contractor's facility is provided. Author (GRA)

N82-11912# Washington State Univ., Pullman. Dept. of Physics.
LIGHT SCATTERING BY BUBBLES IN LIQUIDS OR IN GLASS Interim Technical Report, 1 Jul. 1980 - 31 Aug. 1981
Philip L. Marston, Dean S. Langley, and Dwight L. Kingsbury 1 Sep. 1981 92 p refs
(Contract N00014-80-C-0838)
(AD-A104241; ITR-1) Avail: NTIS HC A05/MF A01 CSCL 20/6

This technical report consists of publications, manuscripts, and supplemental information related to the scattering of light by bubbles in liquids and in glass. The emphasis of the report is on the scattering by air bubbles in water into the angular regions where diffraction makes essential corrections to elementary ray optics. For bubbles these regions are backward, forward and critical angle scattering. Most of the previous literature on light scattering is concerned with drop-like objects where the refractive index of the scatterer exceeds that of the surroundings. The present results should be useful for the optical characterization of microbubbles at sea and in water tunnels, or for the prediction of the optical properties of bubbly media. They should also be useful for laser-Doppler anemometry with microbubbles and the detection of microbubbles in glass. Certain phenomena described here should be present for other spherical or nearly spherical scatterers where the refractive index is less than that of the surroundings, for example: air bubbles in ice, water inclusions in fused quartz (such as those present in varieties of opal glass), ice spheres in water, and superheated drops in a host liquid. The coarse structure in the critical scattering region can be present even if the scatterer is not spherical. GRA

N82-11913# Corning Glass Works, N.Y.
SINGLE MODE OPTICAL WAVEGUIDE DESIGN INVESTIGATION Progress Report
V. A. Bhagavatula, R. A. Westwig, and D. B. Keck 10 Jul. 1981 13 p
(Contract N00173-80-C-0563)
(AD-A104584; PR-3) Avail: NTIS HC A02/MF A01 CSCL 20/6

A total of six fibers have been fabricated with parameters fitting the design matrix; Microbend sensitivity measurements have been made on five of the fibers; The data collection procedure for the angular offset sensitivity measurements has been modified and automated in order to improve measurement reliability; and Lateral offset measurements have been made on two fibers as a function of V-value and the data fitted to the equation given in Progress Report 2. Author (GRA)

N82-11914# Harry Diamond Labs., Adelphi, Md.
THE DECONVOLUTION OF AEROSOL BACKSCATTERED OPTICAL PULSES TO OBTAIN SYSTEM-INDEPENDENT AEROSOL SIGNATURES
Dennis McGuire and Michael Conner Jun. 1981 66 p refs
(AD-A104578; HDL-TR-1944) Avail: NTIS HC A04/MF A01 CSCL 20/6

Means are discussed for extracting system-independent aerosol signatures from aerosol backscatter measurements obtained with a specific pencil beam active optical detection system. Such signatures are required before the backscatter data can be applied to various proposed optical fuze designs for determining their aerosol vulnerability and to the investigation of aerosol discrimination schemes. The measurement system, which has been used in numerous experiments to probe such aerosols as weather clouds and military smokes, is a short pulse GaAs laser probe (pulse width + or - 10 nanoseconds whose range sensitivity extends from near the system to beyond 10 meters. A computationally fast numerical deconvolution algorithm is devised together with a comprehensive supporting analysis. Both indicate that severe signal-to-noise ratio constraints apply fo the achievement of meaningful superresolution. While the signal-to-noise ratios typical of recent measurements are likely to satisfy the severe constraints discovered, many of the earlier data are too noisy and thus require other signature determination methods. GRA

N82-11915# Owens-Illinois, Inc., Toledo, Ohio. Corporate Technology Div.
ANTIREFLECTING FILM DEVELOPMENT Final Report
Thomas S. Hahs 11 May 1981 13 p ref
(Contract W-7405-eng-48)
(DE81-030010; UCRL-15373) Avail: NTIS HC A02/MF A01

A metal-organic precursor was formulated that is converted by heating on surfaces of ordinary glass to a phase-separated metal-organic-derived glass coating, without exceeding 3750 C. This phase-separated layer is quickly and easily leached by nitric acid to leave a graded index, antireflective coating on ordinary glass that protects it against damage by high fluence of laser light at 1060 nm and shorter wavelengths. The metal-organic precursor is relatively inexpensive, and the thickness applied to the glass surface is not very critical for the achievement of protection for the glass surface from 1 ns pulses of laser energy. Laser damage testing at 248 nm with this coating on silica discs was thought to show separation of the coating from the substrate at fluences as low as 1.2 J/sq cm with fracture damage at 4.9 J/sq cm. DOE

N82-11916# California Univ., Livermore. Lawrence Livermore Lab.
REFLECTION/TRANSMISSION PHASE SHIFT INTERFEROMETER AND VIEWING OPTICS
J. A. Monjes, B. W. Weinstein, and D. L. Willenborg 15 Jun. 1981 25 p refs Presented at the Conf. on Lasers and Electro-Optics, Washington, D.C., 10-12 Jun. 1981
(Contract W-7405-eng-48)
(DE81-027658; UCRL-85281; CONF-810613-9) Avail: NTIS HC A02/MF A01

The interferometer and viewing optics that are the main optical components of an automated surface mapping system (ASM) used to characterize the surface topography and the wall thickness uniformity of opaque and transparent spherical shells is described. To characterize surface finish or wall thickness of spherical shells with an accuracy of 10 nm and a resolution of 1 micron the differential phase shift between two beams of orthogonal polarizations is measured, before and after the probe beam has interacted with the test object. DOE

N82-11917# California Univ., Livermore. Lawrence Livermore Lab.

POLISHING-TO-FIGURING TRANSITION IN TURNED OPTICS
Norman J. Brown, Phillip C. Baker, and Robert E. Parks (Arizona Univ., Tucson) 29 Jul. 1981 8 p refs Presented at 25th Ann. Intern. Tech. Symp., San Diego, Calif., 24-28 Aug. 1981
(DE81-028691; UCRL-86513) Avail: NTIS HC A02/MF A01

The spatial frequency response of elastic backed flexible lapping belts is examined. The transition from planning off to propagating sinusoidal ripple is shown to be extremely sensitive to ripple frequency. DOE

N82-11918# Illinois Univ., Urbana. School of Chemical Sciences.
HIGH-PRESSURE OPTICAL STUDIES
H. G. Drickamer 1981 11 p refs Presented at the Conf. on High Pressure Phys., Bad Honnef, West Germany, Aug. 1981
(Contract DE-AC02-76ER-01198)
(DE81-025577; DOE/ER-01198/1359; CONF-810828-1) Avail: NTIS HC A02/MF A01

In rare earth chelates, the efficiency of 4f-4f emission of the rare earth is controlled by the feeding from the singlet and triplet levels of the organic ligand. These ligand levels can be strongly shifted by pressure. Photochromic crystals change color upon irradiation due to occupation of a metastable ground state. In thermochromic crystals, raising the temperature accomplishes the same results. For a group of molecular crystals (anils) at high pressure, the metastable state can be occupied at room temperature. The relative displacement of the energy levels at high pressure also inhibits the optical process. Effects on luminescence intensity are shown to be consistent. In the area of microscopic - molecular relationships, the effect of viscosity and dielectric properties on rates of nonradiative (thermal) and radiative emission, and on peak energy for luminescence is demonstrated. DOE

N82-11919# Los Alamos Scientific Lab., N. Mex.
IMPROVEMENTS TO A HIGH-FREQUENCY FIBER-OPTIC SYSTEM FOR PLASMA DIAGNOSTICS
J. W. Ogle, P. B. Lyons, L. Looney, L. Hocker, M. A. Nelson, P. A. Zagarino, T. J. Davies, R. D. Simmons, R. Selk, and B. Hopkins 1981 7 p refs Presented at the SPIE Intern. Symp., San Diego, Calif., 24-28 Aug. 1981 Prepared in cooperation with Edgerton, Germeshausen and Grier, Inc. Santa Barbara, Calif., and Edgerton, Germeshausen and Grier, Inc., Las Vegas, Nev.
(Contract W-7405-eng-36)
(DE81-028741; LA-UR-81-2136; CONF-810810-18) Avail: NTIS HC A02/MF A01

Improvements in the system response, dynamic range, and calibration of the diagnostic system are described. Plastic-clad silica fiber is used as a radiation-to-light converter using the Cerenkov process. A spectral equalizer device is used to compensate for the material dispersion in the fiber, increasing the frequency response and the dynamic range. The calibration system uses a pulsed injection laser diode injected into the fiber at the radiation end of the fiber and detected by a microchannel plate photomultiplier tube on the recording end. The injection laser diode is triggered by a synchronous trigger delay unit, which also triggers a sampling or real time scope after as much as 10 microseconds delay with < 50 ps jitter. The system improvements are described in detail and the utility of these components in other plasma diagnostic systems is discussed. DOE

N82-11920# National Bureau of Standards, Boulder, Colo.
REFRACTED-RAY SCANNING (REFRACTED NEAR-FIELD SCANNING) FOR MEASURING INDEX PROFILES OF OPTICAL FIBERS
M. Young May 1981 61 p refs
(PB81-224610; NBS-TN-1038) Avail: NTIS HC A04/MF A01 CSCL 20F

An elementary description and tutorial overview of the refracted-ray method of measuring fiber-index profiles is given. Results concerning the theoretical foundation, the linearity and precision, resolution limit and edge response, and other aspects of the method are presented. In particular it was found that index differences may be measured to five percent or better and spatial resolution is diffraction limited. The author concludes by showing about 3 percent agreement with another laboratory and good agreement with numerical aperture measurements performed by participants in a round-robin experiment. GRA

N82-11288*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DEEP SPACE OPTICAL CHANNEL. 2: WAVE PROPAGATION EFFECTS
J. Katz *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 53-58 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-11921 State Univ. of New York at Buffalo.
TEMPERATURE MEASUREMENT IN TURBULENT ARCS Ph.D. Thesis
Yun-ko Nickey Chien 1981 170 p
Avail: Univ. Microfilms Order No. 8122163

A technique using spectroscopic measurement to determine the temperature distribution in a turbulent arc was developed. The time-averaged radial distributions of temperature and the mean square fluctuations of temperature were obtained for a cascade D.C. argon arc in a 1 cm diameter channel having laminar flow (in approx. 0.1 g/s) at 100 A And 65 A, and for turbulent flow (in approx. 7.7 g/s) at 65 A. With laminar arcs fluctuations proceeded inward from the outer edge; in the present case temperature fluctuations were about 1 percent and 4 percent at the centerline and outer edge, respectively. Relatively large fluctuations in temperature, about 5 percent, were found across the entire column where the arc was turbulent. Centerline temperature were 11500 K and 10500 K for the laminar 100 A and 65 A arcs and 10650 K for the turbulent 65 A arc. The results obtained for the laminar arcs were in good agreement with published values; those for the turbulent arc were also in general agreement with more qualitative experiment results, and with theory. Dissert. Abstr.

N82-11922 Cornell Univ., Ithaca, N. Y.
THE EFFECTS OF TOROIDAL GEOMETRY AND SCATTERING BY DENSITY FLUCTUATIONS ON THE ACCESSIBILITY AND ENERGY DEPOSITION OF LOWER HYBRID WAVES Ph.D. Thesis
Paul Thaddeus Bonoli 1981 136 p
Avail: Univ. Microfilms Order No. 8119492

The effects of toroidicity and density fluctuations on the propagation of lower hybrid waves were studied. These effects result mainly from changes in k double bar as the wave propagates (k double bar is the wave number parallel to the applied magnetic field). With respect to toroidal effects, k double bar changes due to the nonconstancy of the poloidal mode number in toroidal geometry. Using ray tracing techniques, an assessment of this toroidal effect was made. It is found that waves, which on the basis of the cylindrical geometry theory would be inaccessible, may actually propagate to the plasma center and damp. The result is related to the onset of ray ergodicity. Further, it is shown that for accessible waves the optimal poloidal launch point is near the top or bottom of the torus. In order to include the effects of density fluctuations, an electromagnetic wave kinetic equation is derived, and solved by a Monte Carlo technique. It is found that scattering can further enhance accessibility. Dissert. Abstr.

N82-11923 California Univ., Los Angeles.
FINITE TEMPERATURE RELATIVISTIC MAGNETOHYDRODYNAMIC WINDS Ph.D. Thesis
Fumichika Stanley Fujimura 1981 158 p
Avail: Univ. Microfilms Order No. 8120949

The cold relativistic magnetohydrodynamic (MHD) wind analysis of Michel is generalized to finite temperatures. In the monopole geometry, the MHD differential equations integrate to algebraic equations even for finite temperatures. Critical solutions are sought, i.e., wind solutions that start from a specified initial point, go through the intermediate (Affven) critical point, and through a fast MHD critical point. The analytical analysis is unable to find explicit solutions for the finite temperature relativistic MHD winds. However, the analysis is able to indicate certain conditions that must be sctisfied for the critical solutions to exist as well as some approximate solutions to the wind. The problem is solved numerically and the results verify the analytical analysis. Furthermore, the numerical calculations reveal a uniform parametric characterization of the asymptotic wind solution in terms of the initial parameters. The finite temperature asymptotic wind solutions differ considerably from the cold wind minimum torque solutions of Michel. Dissert. Abstr.

N82-11924# Nagoya Univ. (Japan). Inst. of Plasma Physics.
THEORY OF DRIFT INSTABILITIES AND THE ASSOCIATED ANOMALOUS TRANSPORT
K. Nishikawa (Hiroshima Univ.), M. Wakatani (Kyoto Univ., Gokasho, Japan), T. Tuda (Japan Atomic Energy Research Inst., Tokai), T. Tange (Hiroshima Univ.), and T. Hatori Jul. 1981 134 p refs
(IPPJ-Rev-1) Avail: NTIS HC A07/MF A01

Drift waves, which are inherent in inhomogeneous magnetized plasmas, are considered the most promising candidate for explaining anomalous particle and electron heat transport in toroidal plasmas. The linear and nonlinear theories of drift instability are examined. Anomalous transport in Tokamaks is examined from a phenomenological viewpoint as well as in to relation to kinetic theory. Saturation levels and modes are discussed as well as the effect of magnetic shear and of the torus. A.R.H.

N82-11925# Nagoya Univ. (Japan). Inst. of Plasma Physics.
LEAST SQUARES AUTOREGRESSIVE (MAXIMUM ENTROPY) SPECTRAL ESTIMATION FOR FOURIER SPECTROSCOPY AND ITS APPLICATION TO THE ELECTRON CYCLOTRON EMISSION FROM PLASMA
N. Iwama, A. Inoue, T. Tsukishima, M. Sato, K. Kawahata, and K. Sakai (Osaka Univ.) Jul. 1981 47 p refs Presented at the 5th Intern. Conf. on Infrared and Millimeter Waves, Wuerzburg, West Germany, 6-10 Oct. 1980
(IPPJ-530) Avail: NTIS HC A03/MF A01

A procedure for the maximum entropy spectral estimation is studied for the purpose of data processing in Fourier transform spectroscopy. The autoregressive model fitting is examined under a least squares criterion based on the Yule-Walker equations. An AIC-like criterion is suggested for selecting the model order. The principal advantage of the new procedure lies in the enhanced frequency resolution particularly for small values of the maximum optical path-difference of the interferogram. The usefulness of the procesure is ascertained by some numerical simulations and further by experiments with respect to a highly coherent submillimeter wave and the electron cyclotron emission from a stellarator plasma. Author

N82-11926# Nagoya Univ. (Japan). Inst. of Plasma Physics.
AN ENERGY INTEGRAL AND VARIATIONAL PRINCIPLE FOR PLASMA KINETIC MODES
Sanae-Inoue Itoh (Hiroshima Univ.), Kimitaka Itoh (Japan Atomi Energy Research Inst., Tokai), and Yoshinosuke Terashima Aug. 1981 15 p refs
(IPPJ-531) Avail: NTIS HC A02/MF A01

An energy principle is extended to include kinetic processes, finite gyroradius effects and wave-particle interactions, in electromagnetic instabilities in a toroidal plasma. The present arguments are based on the energy integrals which are derived from the eigenmode equations for electromagnetic perturbations. Inclusion of the finite gyroradius effects in the energy integral shows that this integral can be used for eigenmode by minimizing the excess energy of the perturbed state. The extended stability conditions for kink-like mode and ballooning mode are obtained by use of this improved energy principle. For the case where wave-particle interaction is important, the energy integral becomes a rate equation of energy exchange, and a variational form can independently be constructed for the mode analysis. A.R.H.

N82-11927# Nagoya Univ. (Japan). Inst. of Plasma Physics.
CHARGE TRANSFER IN COLLISIONS OF Li-3(+) AND Be-4(+) IONS WITH ATOMIC HYDROGEN AT LOW IMPACT ENERGY
T. Ohyama and Y. Itikawa Aug. 1981 22 p refs
(IPPJ-532) Avail: NTIS HC A02/MF A01

Total charge transfer cross sections are calculated for the collisons of Li-3(+) and Be-4(+)ions with H (ls) atoms in th low energy region (E< 25 keV/amu). The perturbed-stationary-state method in the impact parameter approximation is used with a basis set of adiabatic one-electron two-center molecular orbitals. For the Li-3(+)-H system, a reasonable is found between the present calculation and the recent experiment. Author

N82-11928# Nagoya Univ. (Japan). Inst. of Plasma Physics.
OBLIQUE PROPAGATION OF ELECTRON THERMAL MODES BELOW THE ELECTRON PLASMA FREQUENCY WITHOUT BOUNDARY EFFECTS
T. Ohnuma (Tohoku Univ.), T. Watanabe (Hiroshima Univ.), and H. Sanuki Aug. 1981 17 p refs
(IPPJ-533) Avail: NTIS HC A02/MF A01

The propagation characteristics and refractive effects of an oblique electron thermal mode without boundary effects below the electron plasma frequency were studied experimentally and theoretically in an inhomogeneous magnetized plasma. The behavior of this mode observed experimentally was confirmed by the theoretical analysis based on a type of ray theory. Author

N82-11929# Nagoya Univ. (Japan). Inst. of Plasma Physics.
BOOSTING UP OF NEUTRAL BEAM HEATING POWER BY SLOWLY RISING TOROIDAL FIELD
R. Y. Lin (Academia Sinica, Peking), K. Hirano, M. Okamoto, K. Shimizu, and T. Amano Aug. 1981 33 p refs
(IPPJ-534) Avail: NTIS HC A03/MF A01

A system of 1-D transport codes combined with Fokker-Planck codes was used to simulate plasmas undergoing compression with beam injection for the 'R-Project Tokamak'. The impurity radiation is not included. The numerical model contains the neoclassical transport including the Ware pinch, empirical anomalous particle and electron heat transports based on the Alcator scaling, and neutral particle transport. The combination results are very encouraging. They show that by sinusoidally increasing the toroidal magnetic field and the plasma current simultaneously, it is possible to significantly increase the temperature with a very slow compression. The final ion temperature is very weakly dependent on the compression time from 0.5 sec to 1 sec for the 'R-Project Tokamak'. If the 'R-Project Tokamak' plasma is compressed by sinusoidally increasing the magnetic field and plasma current simultaneously, then the beam power which is necessary to obtain an average ion temperature of keV without compression 15 MW can be decreased to 8.5 MW. Author

N82-11930# ARO, Inc., Arnold Air Force Station, Tenn.
ANALYTICAL STUDIES OF HIGH-PRESSURE MHD ACCELERATORS Final Report, 1 Oct. 1977 - 30 Sep. 1978
G. L. Whitehead AEDC Sep. 1981 81 p refs
(AD-A104686; AEDC-TR-81-18) Avail: NTIS HC A05/MF A01 CSCL 20/7

An analytical study was made of the feasibility of using an MHD-augmented arc as the primary component of a large reentry vehicle test facility. Computer studies of the performance of MHD accelerator channels were made for systems having channel input power of 50 MW to 1,700 MW. It was determined that complete simulation of reentry conditions is not possible in a single extended-flow facility. The studies showed, however, that very large increases in performance over existing arc facilities could be attained by use of MHD augmentation, provided, however, that several very difficult design problems could be solved. The most critical problem area was identified as that of maintaining the design integrity of the magnetic-field walls of the channel, which requires that a high level of electrical insulation be retained under a heating load of up to 10 sq cm. Only a marked increase in high-temperature materials technology would permit the use of uncooled refractories for these walls. The possibility of using film cooling for these walls was explored and it was found that, in addition to a substantial increase in complexity, such an approach would result in significant reductions in performance and efficiency of the MHD channel. Author (GRA)

N82-11931# Harry Diamond Labs., Adelphi, Md.
SYMMETRIES OF THE NONLINEAR CONDUCTIVITY FOR A RELATIVISTIC TURBULENT PLASMA
Howard E. Brandt Mar. 1981 58 p refs
(DA Proj. 1L1-61101-A9-1A)
(AD-A104544; HDL-TR-1927) Avail: NTIS HC A04/MF A01 CSCL 20/9

The nonlinear conductivity tensor for a relativistic plasma has an important symmetry property which can be related to the nondissipative nature of the nonlinear current. This property is useful in establishing relationships in the theory of plasma turbulence. Following a review of the nonlinear conductivity, its definition is used explicitly to obtain the symmetry property. The latter is then related to the nondissipative property, and is shown to be reducible to the well-known nonrelativistic longitudinal case. Author (GRA)

N82-11932# Texas Univ. at Austin. Fusion Research Center.
ION THERMAL CONDUCTIVITY FOR A PURE TOKAMAK PLASMA Ph.D. Thesis
Curtis William Bolton, III Jun. 1981 117 p refs
(Contract DE-AC05-76ET-53036)
(DE81-029710; DOE/ET-53036/28) Avail: NTIS HC A06/MF A01

The ion thermal conductivity is calculated for a wide range of aspect ratios and collision frequencies. The calculation is done by solving the drift kinetic equation, with a model collision operator, using a finite element method, and then calculating the energy weighted friction force to determine the heat flux. The thermal conductivity, determined from the heat flux, is then curve fitted to analytic formulas. These formulas allow the conductivity to be calculated at all collision frequencies and aspect ratios down to about 3. DOE

N82-11933# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
ANTENNA-PLASMA COUPLING THEORY FOR ICRF HEATING OF LARGE TOKAMAKS
A. Bers, L. P. Harten, and A. Ram Feb. 1981 7 p refs
(Contract DE-AC02-78ET-51013)
(DE81-029815; DOE/ET-51013/9) Avail: NTIS HC A02/MF A01

The radiation impedance of, and field excitation by, current sheets external to a large (minor radius) plasma are calculated. The finite-size antenna current modeled by these current sheets is screened from the plasma by a sheath of anisoptropic conductivity which shorts out locally the toroidal radio frequency electric field but does not affect the poloidal radio frequency electric field. The plasma near the antenna is modeled by its cold dielectric tensor having an inhomogeneous density and applied magnetic field. The field analysis for the coupling and power flow is carried out in a slab geometry. DOE

N82-11934# Mississippi State Univ., Mississippi State. Energy Center.
MAGNETOHYDRODYNAMIC RESEARCH PROGRAM OF THE MHD ENERGY CENTER AT MISSISSIPPI STATE UNIVERSITY AND STRUCTURAL FEATURES OF MHD RADIANT BOILERS
W. S. Shepard 1981 53 p Lectures presented to MHD/HRSR Sci. and Engr. of the Peoples Republic of China, 10-31 Jul. 1981
(Contract DE-AC02-80ET-15601)
(DE81-029901; DOE/ET-15601/T3; TR-3) Avail: NTIS HC A04/MF A01

Magnetohydrodynamic is conducted largely through use of test stand which simulates conditions in the MHD gas stream. Continual modification of the test stand to reflect experimental results produced a test stand capable of test runs of 100 hours; runs of more than 500 hours are planned. The test stand is described, and experimental results are discussed. The design and construction of MHD radiant boiler are described. The radiant furnance serves several functions in a heat recovery and seed recovery system; it cools flue gases to a temperature suitable for entrance to the secondary superheater; it generates steam; it provides for the removal of molten ash at high temperatures; and it provides access for intrusive and nonintrusive instrumentation to the gas-side environment. DOE

N82-11935# Massachusetts Inst. of Tech., Cambridge. Plasmas Fusion Center.
RF-DRIVEN TOKAMAK REACTOR WITH SUB-IGNITED, THERMALLY STABLE OPERATION
L. P. Harten, A. Bers, V. Fuchs, (IREQ, Varennes, Canada), and M. M. Shoucri, (IREQ, Varennes, Canada) Feb. 1981 9 p refs Presented at the 4th Topical Conf. on RF Heating of Plasma, Austin, Tex., Feb. 1981
(Contract DE-AC02-76ET-51013)
(DE81-029437; DOE/ET-51013/8; PFC/RR-81-6) Avail: NTIS HC A02/MF A01

A Radio-Frequency Driven Tokamak Reactor (RFDTR) can use RF-Power, programmed by a delayed temperature measurement, to thermally stabilize a power equilibrium below ignition, and to drive a steady state current. We propose the parameters for such a device generating approx. = 1600 MW thermal power and operating with Q approx. = 40 (= power out/power in). A one temperature zero-dimensional model allows simple analytical formulation of the problem. The relevance of injected impurities for locating the equilibrium is discussed. We present the results of a one-dimensional (radial) code which includes the deposition of the supplementary power, and compare with out zero-dimensional model. DOE

N82-11936# KMS Fusion, Inc., Ann Arbor, Mich.
TRITIUM INDUCED X-RAY EMISSION FROM GLASS SHELL INERTIAL FUSION TARGETS
Susan M. Alexander, Richard J. Simms, and Paul R. Anderson 1981 15 p refs Presented at the Conf. on X- and Gamma-ray Sources and Appl., Ann Arbor, Mich., 10 Jun. 1981
(Contract DE-AC08-78DP-40030)
(DE81-025599; KMSF-U-1097; CONF-810647-7) Avail: NTIS HC A02/MF A01

Spherical glass shells filled with fuel mixtures of deuterium, tritium, and occasionally additional gases are required as targets for the inertial fuson program. Accurate knowledge of the amount of tritium and other gases contained in the shell is necessary. The X ray spectrum resulting from the interaction of beta particles with the constituents of the glass shell and gas fill is analyzed. A method is presented to reduce the effort required to relate X-ray yield to tritium content. DOE

N82-11937# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
PRODUCTION AND CHARACTERIZATION OF PURE CRYOGENIC INERTIAL FUSION TARGETS
B. A. Boyd (General Research Corp., Fort Walton Beach, Fla.) and Gary W. Kamerman 1981 6 p refs Presented at the IECEC Conf., Atlanta, 9 Aug. 1981
(Contract DE-AC08-79DP-40083)
(DE81-025920; DOE/DP-40083/9; CONF-810812-30) Avail: NTIS HC A02/MF A01

An experimental cryogenic inertial fusion target generator and two optical techniques for automated target inspection are described. The generator produces 100 microns diameter solid hydrogen spheres at a rate compatible with fueling requirements of conceptual inertial fusion power plants. A jet of liquified hydrogen is disrupted into droplets by an ultrasonically excited nozzle. The droplets solidify into microspheres while falling through a chamber maintained below the hydrogen triple point pressure. Stable operation of the generator has been demonstrated for up to three hours. The optical inspection techniques are computer aided photomicrography and coarse diffraction pattern analysis (CDPA). The photomicrography system uses a conventional microscope coupled to a computer by a solid state camera and digital image memory. The computer enhances the stored image and performs feature extraction to determine pellet parameters. The CDPA technique uses Fourier transform optics and a special detector array to perform optical processing of a target image. DOE

N82-11938# California Univ., Livermore. Lawrence Livermore Lab.
STIMULATED RAMAN SCATTERING IN LARGE PLASMAS

Donald W. Phillion and David L. Banner 6 Nov. 1980 45 p refs Presented at 22nd Ann. Meeting of the Div. of Plasma Phys. of the Am. Phys. Soc., San Diego, Calif., 10-14 Nov. 1980 Submitted for publication
(Contract W-7405-eng-48)
(DE81-026589; UCRL-84854; CONF-801119-7) Avail: NTIS HC A03/MF A01

Stimulated Raman scattering is of concern to laser fusion since it can create a hot electron environment which can increase the difficulty of achieving high final fuel densities. In earlier experiments with one micron laser light, the energy measured in Raman-scattered light has been insignificant. But these experiments were done with, at most, about 100 joules of laser energy. The Raman instability has a high threshold which also requires a large plasma to be irradiated with a larger diameter spot. Only with a long interaction length can the Raman-scattered light wave convectively grow to a large amplitude, and only in recent long pulse, high energy experiments (4000 joules in 2 ns) at the Shiva laser facility have we observed as much as several percent of the laser light to be Raman-scattered. We find that the Raman instability has a much lower intensity threshold for longer laser pulselength and larger laser spot size on a solid target. DOE

N82-11939# California Univ., Livermore. Lawrence Livermore Lab.

PLASMA CONFINEMENT IN THE TMX TANDEM MIRROR

E. B. Hooper, Jr., S. L. Allen, T. A. Casper, J. F. Clauser, P. Coakley, F. H. Coensgen, D. L. Correll, W. F. Cummins, J. C. Davis, and R. P. Drake 29 Apr. 1981 5 p refs Presented at the 10th European Conf. on Controlled Fusion and Plasma Phys., Moscow, 14-18 Sep. 1981
(Contract W-7405-eng-48)
(UCRL-85883; CONF-810906-2) Avail: NTIS HC A02/MF A01

Axially confining potentials are shown to exist throughout the central 20-cm core of the tandem mirror experiment. Axial electron-confinement time is up to 100 times that of single-cell mirror machines. Radial transport of ions is smaller than axial transport near the axis. It has two parts at large radii: nonambipolar, in rough agreement with predictions from resonant-neoclassical transport theory, and ambipolar, observed near the plasma edge under certain conditions, accompanied by a low-frequency, m = 1 instability or strong turbulence. DOE

N82-11940# California Univ., Livermore. Lawrence Livermore Lab.

ONE-DIMENSIONAL MAGNETOHYDRODYNAMIC CALCULATIONS OF A HYDROGEN-GAS PUFF

S. Maxon and P. D. Nieldsen 20 Apr. 1981 5 p refs Presented at the 10th European Conf. on Controlled Fusion and Plasma Phys., Moscow, 14-19 Sep. 1981
(Contract W-7405-eng-48)
(UCRL-85867; CONF-810906-1) Avail: NTIS HC A02/MF A01

A one-dimensional Lagrangian calculation of the implosion of a hydrogen gas puff is presented. At maximum compression, 60% of the mass is located in a density spike .5 mm off the axis with a half width of 40 micrometers. The temperature on axis reaches 200 eV. DOE

N82-11941# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

SOURCE-TO-INCIDENT-FLUX RELATION IN A TOKAMAK BLANKET MODULE

G. R. Imel 1981 4 p refs Presented at the Am. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7-12 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-026524; CONF-810606-82) Avail: NTIS HC A02/MF A01

The next-generation Tokamak experiments, including the Tokamak fusion test reactor (TFTR), will utilize small blanket modules to measure performance parameters such as tritium breeding profiles, power deposition profiles, and neutron flux profiles. Specifically, a neutron calorimeter (simply a neutron moderating blanket module) which permits inferring the incident 14 MeV flux based on measured temperature profiles was proposed for TFTR. The problem of how to relate this total scalar flux to the fusion neutron source is addressed. This relation is necessary since the calorimeter is proposed as a total fusion energy monitor. The methods and assumptions presented was valid for the TFTR Lithium Breeding Module (LBM), as well as other modules on larger Tokamak reactors. DOE

N82-11942# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

PRELIMINARY ACTIVATION CALCULATIONS FOR THE POLOIDAL DIVERTOR EXPERIMENT

J. L. Judd, A. J. Scott, D. W. Higg, and T. S. Bohn 1981 6 p refs Presented at the Am. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7-12 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-026525; CONF-810606-80) Avail: NTIS HC A02/MF A01

The poloidal divertor experiment (PDX) Tokamak is being operated to study plasma cross section shaping, high power neutral beam heating, and divertor control of plasma impurities in Tokamaks. Experiments to date were performed at relatively low power, but with 6 MW of neutral beam power eventually available, high D-D plasma reaction rates are expected that will yield up to 10 to the 15th power 2.45-MeV neutrons per pulse. This neutron emission level is high enough to cause significant neutron-induced machine activation that must limit the occupancy time of personnel entering the room to repair or change parts. The dose rate depends on the location in the room and, of course, the pulsing history prior to entry. One dimensional activation calculations are described that were done for PDX to provide preliminary dose rate information for various times after shutdown following one week of high power operation. DOE

N82-11943# KMS Fusion, Inc., Ann Arbor, Mich.

GAS-JET LASER-PLASMA INTERACTION EXPERIMENTS

Frederick J. Mayer, Mark A. Buoniconto, Garland E. Busch, Gary C. Castella, George Charatis, Mark Herbst, Daniel K. Jarrell, Dennis L. Matthews, Barrett Ripin, Robert J. Schroeder et al 1981 3 p ref Presented at the Conf. on Lasers and Electro-Optics, Washington, D.C., 10 Jun. 1981 Submitted for publication
(Contract DE-AC08-78DP-40030)
(DE81-027169; KMSF-U-1087) Avail: NTIS HC A02/MF A01

Preliminary results of laser-plasma interaction studies at 1.06 and 0.53 microns with gas-jet targets are presented. Stimulated Brillouin backscatter is strong in the 100 microns scale-length plasmas, but sidescatter is weak. Temperature, transport, and absorption measurements are discussed. DOE

N82-11944# Los Alamos Scientific Lab., N. Mex.

UNCERTAINTIES ASSOCIATED WITH INERTIAL-FUSION IGNITION

Gene H. McCall 1981 10 p refs Presented at the Conf. on Optics, Santa Fe, N. Mex., Apr. 1981
(Contract W-7405-eng-36)
(DE81-025408; LA-UR-81-1750; CONF-81-429-34) Avail: NTIS HC A02/MF A01

An estimate is made of a worst case driving energy which is derived from analytic and computer calculations. The uncertainty can be reduced by a factor of 10 to 100 if certain physical effects are understood. That is not to say that the energy requirement can necessarily be reduced below that of the worst case, but it is possible to reduce the uncertainty associated with ignition energy. With laser costs in the $0.5 to 1 billion per MJ range, it can be seen that such an exercise is worthwhile. DOE

N82-11945# Los Alamos Scientific Lab., N. Mex.

HEATING OF A DENSE PLASMA WITH AN INTENSE RELATIVISTIC ELECTRON BEAM: INITIAL OBSERVATIONS

M. D. Montgomery, J. V. Parker, K. B. Riepe, and R. L. Sheffield 1981 9 p refs Presented at the 4th Intern. Topical Conf. on High-Power Electron and Ion-Beam Res. and Technol., Palaiseau, France, 29 Jun. - 3 Jul. 1981
(Contract W-7405-eng-36)
(DE81-025348; LA-UR-81-1860; CONF-810620-8) Avail: NTIS HC A02/MF A01

A dense (approximately 0 to the 17th power/cu cm) plasma

was heated via the relativistic two-stream instability using a 3 MeV, intense (5 x 10 to the 5th power A/sq cm) electron beam. Evidence for heating was obtained with diamagnetic loops, thin-foil witness plates, and a 2-channel, broad-band soft X-ray detector. Measurements of energy loss from the beam using calorimetry techniques were attempted. The measured strong dependence of heating on beam transverse temperature and the very short interaction length (< 4 cm) are consistent with beam-plasma coupling due to the relativistic electron-electron two-stream instability. Soft X-ray measurements made > 100 ns after the beam pulse are consistent with a plasma temperature < 150 eV and line emission near 80 to 90 eV.
DOE

N82-11946# Los Alamos Scientific Lab., N. Mex.

MAXIMAL ENTROPY IN FLUID AND PLASMA TURBULENCE: A REVIEW

David Montgomery 1981 21 p refs Presented at the Workshop on Maximum Entropy Estimation and Data Analysis, Laramie, Wyo., 8 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025388; LA-UR-81-1697; CONF-8106116-1) Avail: NTIS HC A02/MF A01

Three applications of maximal entropy procedures to models of turbulence in plasmas are described. They are: (1) the calculation of most probable states in guiding-center plasmas and vortex fluids; (2) the calculation of most probable magnetohydrodynamic equilibrium profiles; and (3) the prediction of absolute equilibrium Gibbs ensemble spectra for Navier-Stokes fluids. Further conjectures on the role of entropies in turbulence theories are offered.
DOE

N82-11947# Westinghouse Electric Corp., Pittsburgh, Pa. Research and Development Center.

DEVELOPMENT, TESTING, AND EVALUATION OF MHD MATERIALS AND COMPONENT DESIGNS. VOLUME 1: EXECUTIVE SUMMARY Final Report, 15 Oct. 1973 - 31 Dec. 1975

W. E. Young Nov. 1980 44 p refs
(Contract DE-AC01-76ET-10805)
(DE81-026203; DOE/ET-10805/T1-Vol-1; FE-1540-29-Vol-1) Avail: NTIS HC A03/MF A01

Results of studies on gas electrical properties, coal combustion, and MHD materials intended to support the Waltz Mill channel experiments are presented. Materials testing indicated that stabilized zirconia should be an acceptable electrode material. Cyclone coal combustors were studied and designs developed for a Waltz Mill size unit and a 25,000 lb/h prototype. The Waltz Mill facility performed in a highly satisfactory manner. Six non generating and 16 load tests were made on three channels. Following a failure of the air heater tests were run essentially on materials and structure. The system was dismantled and reconstruction started to enable testing at the proposed Component Development Integrated Facility. A very successful 127-hour run was made on a pair of US designed and constructed MHD electrode modules in the Soviet Union's U-02 facility.
DOE

N82-11948# Oak Ridge National Lab., Tenn.

PLASMA ASSESSMENTS FOR THE FUSION ENGINEERING DEVICE (FED)

Y. K. M. Peng, P. H. Rutherford (Princeton Univ.), J. F. Lyon, D. Blackfield (MIT), S. K. Borowski (Michigan Univ.), D. R. Cohn (MIT), L. M. Hively (General Electric Co.), J. A. Holmes, W. A. Houlberg, H. C. Howe et al 1981 13 p refs Presented at the Symp. of Phys. Probl. of Fusion Reactors, Trieste, Italy, 2 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024254; CONF-810680-2) Avail: NTIS HC A02/MF A01

An initial range of plasma assumptions and scenarios for the US Tokamak FED concept is examined. The results suggest that the current FED baseline parameters are appropriate for achieving its nominal goals of P(fusion) approx. = 180 MW and a plasma Q > or = to 5 for a pulse length greater than 100 s. However, large uncertainty still exists in the areas of current startup, ion-cyclotron wave launching, influence of plasma shape on achievable beta, impurity control, plasma edge transport, and plasma disruption. Various options and remedies to alleviate the impact of the uncertainty on the FED design concept are suggested.
DOE

N82-11949# Oak Ridge National Lab., Tenn. Engineering Physics Div.

CALCULATION PROCEDURES FOR THE ANALYSIS OF INTEGRAL EXPERIMENTS FOR FUSION-REACTOR DESIGN

R. T. Santoro, J. M. Barnes, R. G. Alsmiller, Jr., and E. M. Oblow Jul. 1981 48 p refs
(DE81-027626; ORNL-5777) Avail: NTIS HC A03/MF A01

The calculational models, nuclear data, and radiation transport codes that are used in the analysis of integral measurements of the transport of approximately 14 MeV neutrons through laminated slabs of materials typical of those found in fusion reactor shields are described. The two dimensional discrete ordinates calculations to optimize the experimental configuration of reducing the neutron and gamma ray background levels and for obtaining and equivalent, reduced geometry of the calculational model to reduce computer core storage and running times are also presented. The equations and data to determine the energy-angle relations to neutrons produced in the reactions of 250 keV deuterons in a titanium tritide target are given. The procedures used to callapse the 171n 36gamma VATAMIN C cross section library to a 53n 21 gamma broad group library are described
DOE

N82-11950# Oak Ridge National Lab., Tenn. Fusion Energy Div.

PHYSICS CONSIDERATIONS FOR THE FED LIMITER

H. C. Howe Jul. 1981 36 p refs
(Contract W-7405-eng-26)
(DE81-027596; ORNL/TM-7803) Avail: NTIS HC A03/MF A01

The scrapeoff plasma and its interaction with a pumping limiter is reviewed. The governing equations for heat and particle transport in the scrapeoff are solved analytically with several simplifying assumptions. The assumed scrapeoff model is presented. A shape for the limiter, which has a uniform heat loading on the front surface is derived. The assumed crossfield transport coefficient is varied to examine the sensitivity of the heat looding to variations in plasma scrapeoff thickness. The heat flux to the limiter leading edge is an extremely sensitive function of variations in scrapeoff thickness. Uncertainties in the plasma crossfield transport preclude derivation of a believable limiter shape. Problems involved with an edgeless, perforated limiter and with a global limiter are discussed. A flat-plate limiter with the heat flux to the leading edge controlled by major radius motion of the plasma is proposed.
DOE

N82-11951# Sandia Labs., Albuquerque, N. Mex.

COATED-LIMITER TESTING IN TOKAMAKS

J. B. Whitley, A. W. Mullendore, D. M. Mattox, P. W. Trester (General Atomic Co.), and L. C. Emerson (Oak Ridge National Lab.) 1981 7 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-027665; SAND-81-0270C; CONF-810831-5) Avail: NTIS HC A02/MF A01

Over the past year, extensive operating experience was gained with coated graphite limiters in the ISX-B and Doubler III Tokamaks. A total of approximately 20,000 Tokamak discharge were performed with TiC coated limiters, and the plasma performance and capability with these limiters improved over that obtained with metallic limiters. While none of the limiters failed in service, the TiC coating and in some cases the graphite substrate experienced damage. This damage consists of grooves formed in the coating and an area of coating melt and graphite cracking. The groove damage is believed to have been caused by disruptions and the melt region by the high heat loads during neutral beam heated discharges.
DOE

N82-11952# Sandia Labs., Albuquerque, N. Mex.

SHOCK EFFECTS IN PARTICLE-BEAM FUSION TARGETS

M. A. Sweeney, F. C. Perry, J. R. Asay, and M. M. Widner 1981 5 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)

(DE81-027806; SAND-80-2870C; CONF-810684-41) Avail: NTIS HC A02/MF A01

The response of fusion target materials to shock loading is assessed. The particle beam accelerators HYDRA and PROTO I and the gas gun facility were utilized. Nonlinear shock-accelerated unstable growth of fabrication irregularities were demonstrated, and jetting was found to occur in imploding targets because of asymmetric beam deposition. Cylindrical ion targets display an instability due either to beam or target nonuniformity. However, the data suggest targets with aspect ratios of 30 may implode stably. The first time- and space-resolved measurments of shock-induced vaporization were made. A homogeneous mixed phase EOS model cannot adequately explain the results because of the kinetic effects of vapor formation and expansion. DOE

N82-11953# Sandia Labs., Albuquerque, N. Mex.

SCALABILITY OF LIGHT ION BEAMS TO REACH FUSION CONDITIONS

G. W. Kuswa, J. P. Quintenz, D. B. Seidel, D. J. Johnson, C. W. Mendel, Jr., E. J. T. Burns, D. Fehl, R. J. Leeper, F. C. Perry, and P. A. Miller 1981 26 p refs Presented at the 4th Intern. Topical Conf. on High-Power Electron and Ion-Beam Res. and Technol., Palaiseau, France, 29 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024443; SAND-81-0672C; CONF-810620-12) Avail: NTIS HC A03/MF A01

Two variations of an intense ion beam diode having magnetic insulation generated either by an external capacitor bank (radial ion diode) or by diode current passing through coil-like vanes, (AMPFION) are described. Advantages in energy delivery and focusability make AMPFION the best candidate for attaining ignition. DOE

N82-11954# Wisconsin Univ., Madison. Dept. of Nuclear Engineering.

MAGNETS FOR THE TANDEM MIRROR FUSION POWER REACTOR WITAMIR-I

W. Maurer, (Kernforschungszentrum, Karlsruhe), D. C. Larbalestier, and I. N. Sviatoslavsky Mar. 1981 7 p refs Presented at the 7th Intern. Conf. on Magnet Technol., Karlsruhe, West Germany, 30 Mar. - 3 Apr. 1981 Submitted for publication
(Contract DE-AS02-78ET-52048)
(DE81-025568; UWFDM-408; CONF-810340-14; DOE/ET-52048/17) Avail: NTIS HC A02/MF A01

The design of the magnet system for the Tandem Mirror Fusion Power Reactor WITAMIR-I is presented. The central cell of this reactor consists of 34 dc solenoid magnets with a diameter of about 8 m, spaced over a length of 165 m; the central cell magnetic field is 3.6 T. The design of these magnets is relatively simple. The requirements of the end plug magnets are more stringent. In our concept each end plug consists of one barrier mirror solenoid coil, of 3.4 m inner diameter, producing an on axis field of 14 T, two transition coils and a yin-yang pair with a maximum plug field of 6 T and a plug mirror ratio of 1.5. NbTi can be used for all coils except the high field plug solenoid for which Nb3Sn is needed. DOE

N82-11955# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.

MAGNETIC FUSION ENERGY PROGRAM, VOLUME 1 Annual Report, 1 Oct. 1979 - 30 Sep. 1980

R. E. Aamodt, P. J. Catto, D. A. DIppolito, X. S. Lee, J. R. Myra, P. H. Diamond, J. M. Ogden, W. M. Tang, D. C. Baxter, R. N. Byrne et al Dec. 1980 261 p refs 2 Vol.
(Contract DE-AC03-79ET-53057)
(SAI-254-80-656-LJ-Vol-1; PRI-20-Vol-1) Avail: NTIS HC A12/MF A01

Results of theoretical studies of instabilities in magnetic mirror configurations are reported. Emphasis is placed on equilibrium and stability investigations. The loss rate for the electrostatically confined species in mirrors is also addressed. DOE

N82-11956# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.

MAGNETIC FUSION ENERGY PROGRAM, VOLUME 2 Annual Report

R. E. Aamodt, P. J. Catto, D. A. DIppolito, X. S. Lee, J. R. Myra, P. H. Diamond, J. M. Ogden, W. M. Tang, D. C. Baxter, R. N. Byrne et al Dec. 1980 265 p refs 2 Vol.
(Contract DE-AC03-79ET-53057)
(SAI-254-80-656-LJ-Vol-2) Avail: NTIS HC A12/MF A01

Tokamak stability, EBT transport, and FRX equilibria were investigated. Results are summarized. DOE

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N82-11957 Washington Univ., Seattle.

VIBRATIONAL SPECTRA AND ATOM-ATOM POTENTIALS IN THE CRYSTALLINE STATE. 1: A COMPARISON OF HEXASULFUR, OCTASULFUR AND DODECASULFUR. 2: A STUDY OF SOLID ALLENE Ph.D. Thesis

Frederick Joseph Silbereis 1981 229 p
Avail: Univ. Microfilms Order No. 8121244

The potentials between atoms of different molecules in a crystal are studied. They are taken to be of the 8 exp form, with a coulombic term added in some cases. An atom-atom potential developed for octasulfur is used to predict the molecular vibrations of hexasulfur, octasulfur, and dodecasulfur in the crystalline state. The fit for hexasulfur is unsatisfactory so that a different potential (but of the same form) is proposed which fits much better, however, neither potential is clearly favored in its application to dodecasulfur. In all calculations, both internal vibrations and lattice vibrations are included and can interact. This interaction, or mixing, is seen to be negligible for hexasulfur and minor for octasulfur, but quite significantly for dodecasulfur. The complete infrared and Raman spectra (down to about 30 wave numbers) of solid allene at 77 K are presented. Dissert. Abstr.

N82-11958*# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.

GROWTH OF SOLID SOLUTION SINGLE CRYSTALS Final Report

August F. Witt Oct. 1981 12 p refs
(Contract NAS8-32984)
(NASA-CR-161891) Avail: NTIS HC A02/MF A01 CSCL 20B

The bulk growth of HgCdTe crystals by modified Bridgman techniques and by quenching anneal recrystallization yields deficient material. The primary complication for growth arises from a pronounced tendency for constitutional supercooling caused by the characteristics of the phase diagram and from the high vapor pressure of Hg. Unseeded and seeded Bridgman growth are considered from the viewpoints of: (1) backmelting of a solid charge; (2) equilibration prior to regrowth; and (3) the growth process. A growth system developed to restrict the thermal gradient region in the melt is described which is based on differentially operated heat pipes (isothermal regions) separated by an (adiabatic) gradient region, this permits maximized radial thermal gradient control, which is desirable for the establishment of a planer solidification isotherm. A.R.H.

N82-11959*# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Electrical Computer and Systems Engineering.

LOW TEMPERATURE GROWTH AND ELECTRICAL CHARACTERIZATION OF INSULATORS FOR GAAS MISFETS Semiannual Status Report, 1 May - 31 Oct. 1981

J. M. Borrego and S. K. Ghandhi 31 Oct. 1981 11 p
(Contract NAG3-175)
(NASA-CR-164972) Avail: NTIS HC A02/MF A01 CSCL 20B

Progress in the low temperature growth of oxides and layers on GaAs and the detailed electrical characterization of these oxides is reported. A plasma anodization system was designed, assembled, and put into operation. A measurement system was assembled for determining capacitance and conductance as a function of gate voltage for frequencies in the range from 1 Hz to 1 MHz. Initial measurements were carried out in Si-SiO2 capacitors in order to test the system and in GaAs MIS capacitors abricated using liquid anodization. J.M.S.

N82-11960# Ben Gurion Univ. of the Negev, Beersheva (Israel). Dept. of Physics.
DISLOCATION INDUCED NOISES IN SEMICONDUCTORS AT LOW AND HIGH TEMPERATURES Annual Technical Report, 1 Apr. 1980 - 1 Apr. 1981
Samson Milshtein May 1981 21 p refs
(Contract DAJA37-80-C-0067)
(AD-A104449; ATR-1) Avail: NTIS HC A02/MF A01 CSCL 20/12

This investigation was concentrated on better understanding of the dislocation structure involved in noise generation process. It is shown that noise power depends on unhomogeneities of dislocation structure especially on randomly distributed dislocation electrical barriers. The annealing of dislocation-point defect complexes does not influence the noise spectrum. It is difficult to find a proper explanation for this surprising result. GRA

N82-11961# Rockwell International Science Center, Thousand Oaks, Calif. Science Center.
THEORETICAL AND EXPERIMENTAL STUDIES OF THE ELECTRO-OPTIC EFFECT: TOWARD A MICROSCOPIC UNDERSTANDING Final Report, 1 Jun. 1980 - 31 May 1981
M. D. Ewbank and P. R. Newman Aug. 1981 92 p refs
(Contract N00014-80-C-0498; NR Proj. 372-909)
(AD-A104363; SC5266.1FR) Avail: NTIS HC A05/MF A01 CSCL 07/4

The electro-optic effect is investigated both theoretically and experimentally. The theoretical approach is based upon W.A. Harrison's 'Bond-Orbital Model'. The separate electronic and lattice contributions to the second-order, electro-optic susceptibility are examined within the context of this model and formulae which can accommodate any crystal structure are presented. In addition, a method for estimating the lattice response to a low frequency (dc) electric field is outlined. Finally, experimental measurements of the electro-optic effects in TeO2 and Tl3AsSe3 have been performed and the results of these measurements are presented. Author (GRA)

N82-11962# Army Electronics Research and Development Command, Fort Monmouth, N. J. Electronics Technology Devices Lab.
EVALUATION OF ALPHA ALUMINUM PHOSPHATE FOR ADVANCED ACOUSTIC WAVE DEVICES
John Gualtieri and Arthur Ballato Aug. 1981 51 p refs
(DA Proj. 1L1-62705-AH-94)
(AD-A104685; DELET-TR-81-15) Avail: NTIS HC A04/MF A01 CSCL 20/3

Alpha aluminum phosphate (berlinite) has been investigated as a highly piezoelectric material potentially suitable for use in advanced bulk and surface acoustic wave devices. Areas of investigation include: (1) crystal structure, (2) methods of crystal growth, (3) defects in structure, (4) the presence of water impurities, (5) piezoelectric resonators, and (6) the equivalent electrical circuit. Calculations have been carried out for frequency constant, piezoelectric coupling factor, and linear temperature coefficient as functions of orientation for general, doubly rotated plate orientations, and disclose quartz-like properties with coupling factors appreciably larger than quartz. Measurements indicate larger than expected losses, indicative of incorporation of impurities during growth; suggestions for further work are given. Author (GRA)

N82-11963# Hughes Aircraft Co., Torrance, Calif.
FAILURE MECHANISM STUDY OF GaAs TECHNOLOGY Final Technical Report, 31 Aug. 1978 - 31 Aug. 1980
Lawrence S. Bowman and W. Tarn Griffiss AFB, N.Y. RADC Jul. 1981 202 p refs
(Contract F30602-78-C-0326; AF Proj. 2338)
(AD-A104440; W-43424; RADC-TR-81-180) Avail: NTIS HC A10/MF A01 CSCL 09/1

In this report we have discussed the characterization of the power FETs procured for this program and failure analysis of low noise devices, including wire bonding failures and environmental stress test failures. A method of etching gold while leaving the underlying refractory metals relatively unaffected was explained. An analysis of the Type A-6 low noise FET was given, in which a failure mode was discussed that involved possible channel doping compensation. Results were then presented on device failures from high and medium temperature stress tests on low noise FETs. A number of medium power devices were received from RADC for analysis. These were packaged FETs that had been subjected to various stresses at Texas Instruments on a RADC/TI reliability contract. Typically, the devices had failed during deliberate stressing to the maximum electrical limits or in temperature stress tests. Failure mechanism studies of two different ohmic contact metallizations showed that both fabrication procedures produced reliable contacts. Constant elevated temperature tests of gold-based gate diode FETs from two different manufacturers showed that one device type was considerably less prone to gate diode failure than the other, indicating the necessity of additional work on the gold gate versus aluminum gate reliability question. Failures were investigated that involve problems associated with gold contact pads overlaying aluminum gate pads with a refractory metal interface. Finally, temperature-accelerated studies of the resistance of aluminum gates were carried out. Author (GRA)

N82-11964# Rochester Univ., N. Y. Dept. of Chemistry.
LASER EXCITATION OF SURFACE ELECTRONIC STATES FOR A ONE-DIMENSIONAL SEMICONDUCTOR
William C. Murphy and Thomas F. George Sep. 1981 21 p refs Submitted for publication
(Contract N00014-80-C-0472; NR Proj. 056-749)
(AD-A104522; TR-13) Avail: NTIS HC A02/MF A01 CSCL 20/12

The electronic band structure of a finite one-dimensional semiconductor is examined. The surface states are identified and the absorption cross-section for transitions to these states is calculated. The use of a laser to enhance surface charge density is discussed. Author (GRA)

N82-11965# Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
A STUDY OF METAL-SEMICONDUCTOR CONTACTS ON INDIUM PHOSPHIDE Final Technical Report, 1 Oct. 1979 - 30 Sep. 1980
G. Y. Robinson Jul. 1981 46 p refs
(Contract F19628-79-C-0016; AF Proj. 2306)
(AD-A104439; RADC-TR-81-169) Avail: NTIS HC A03/MF A01 CSCL 20/12

This report describes the research accomplished during the last twelve months of a 20-month program of research on metal contacts to the semiconductor indium phosphide (InP). The Schottky barrier energy phi sub B and the contact resistance r(c) were measured for several metal-InP structures and the electrical properties were correlated to the metallurgical properties obtained with Auger electron spectroscopy (AES). Separate measurement of phi sub B on both n-type and p-type InP was carried out using Al as the metal Electrode. Control samples of Al/GaAs and Al/Si diodes were fabricated simultaneously in order to evaluate fabrication procedures. The Al/InP diodes were rectifying and phi sub B(n) less than phi sub B(p), in agreement with our earlier work on Pd/InP diodes. Ohmic contacts to p-type InP were also investigated. The results of a study of a multilayered metal film consisting of Au and Be alloyed to the InP surface, are given. In was found that the Au/Be/p-InP structure when properly heat treated would produce ohmic behavior with r(c) = 0.001 ohm sq cm at a net doping of about 1.0 x 10 to the 17th power per cu cm and r(c) = 0.0002 ohm sq cm at 1.4 x 10 to the 18th power per cu cm. The Au/Be contact was relatively easy to apply but tight control over the Au/Be thickness ratio and heat-treatment cycle was found to be necessary. Author (GRA)

N82-11966# Lehigh Univ., Bethlehem, Pa. Dept. of Physics.
NEGATIVE-U FOR POINT DEFECTS IN SILICON
G. D. Watkins, A. P. Chatterjee, and R. D. Harris Sep. 1980 7 p refs Presented at the Intern. Conf. on Defects and Radiation Damage in Semiconductors, Oiso, Japan, Sep. 1980
(Contract N00014-76-C-1097)
(AD-A104482) Avail: NTIS HC A02/MF A01 CSCL 20/2

New evidence is presented that the lattice vacancy and

interstitial boron in silicon are negative-U systems: (1) the equilibrium charge state for the vacancy in low resistivity p-type material is confirmed to be V++. (2) The metastable donor level for interstitial boron at Ec-0.12 eV is detected in a novel photo-DLTS experiment confirming its negative-U properties.
Author (GRA)

N82-11967# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Physics.
SURFACE-ENHANCED NONLINEAR OPTICAL EFFECTS AND DETECTION OF ADSORBED MOLECULAR MONOLAYERS
Y. R. Shen, C. K. Chen, T. F. Heinz, and D. Richard 1981 9 p refs Presented at 5th Intern. Conf. on Laser Spectry., Alberta, British Columbia, 29 Jun. 1981
(Contract W-7405-eng-48)
(DE81-027097; LBL-12930; CONF-8106100-3) Avail: NTIS HC A02/MF A01

The observed of a number of surface enhanced nonlinear optical effects is discussed. The feasibility of using second harmonic generation to detect the absorption of molecular monolayers on a metal surface in an electrolytic solution is shown.
DOE

N82-11968# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
SPECTRUM OF FOUR-TIMES IONIZED NIOBIUM, INCLUDING ZEEMAN STUDIES OF SELECTED LINES AND LASER MODIFICATION OF THE POPULATION OF CERTAIN LEVELS IN A SLIDING SPARK SOURCE
David T. Kagan Jun. 1981 93 p refs
(Contract W-7405-eng-48)
(DE81-027554; LBL-12822) Avail: NTIS HC A05/MF A01

The 4p6nl spectrum of Nb(4+) was measured and analyzed. The spectrum was excited in a vacuum sliding spark source with a peak current of 800 amperes and a pulse width of 70 microseconds. The analysis of the spectrum has extended the 13 known lines to 84 and the 10 known levels to 30. The ionzation energy was estimated to be 407897 cm/l. There is strong evidence that the 4p5 4d2 configuration interacts strongly with the 4p6 nf configuration. In addition, the hyperfine splitting of the 4p6 6s level has been observed and measured to be 1.1 cm/l. An attempt was made to examine the Zeeman spectrum of selected lines of Nb(4+). However, the Doppler broadening of the lines prevented the acquisition of good results. A complete discussion of the Zeeman effect in the Nb(4+) spectrum is contained in the test. In addition, the ability of a laser to modify the population of certain atomic levels in the sliding spark source was investigated.
DOE

N82-11969# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.
CLASSICAL FIELD THEORY WITH Z(3) SYMMETRY
Herbert M. Ruck Jun. 1981 9 p refs Presented at the Center for Nonlinear Studies Conf., Nonlinear Probl.: Present and Future, Los Alamos, N. Mex., 2-6 Mar. 1981
(Contract W-7405-eng-48)
(DE81-027089; LBL-12852; CONF-810385-2) Avail: NTIS HC A02/MF A01

Solutions and some of their properties of a classical vector field model in two-dimensional Minkowski space with internal symmetry Z(3)- the cyclic group of order three are presented.
DOE

N82-11970# Argonne National Lab., Ill.
ELECTRONIC STRUCTURE AND MANY-BODY EFFECTS IN Pd
G. W. Crabtree, D. H. Dye, S. A. Campbell, J. B. Ketterson (Northwestern Univ.), J. J. Vuillemin (Arizona Univ., Tuscon), and N. B. Sandesara (Arizona Univ., Tucson) 1980 6 p refs Presented at Intern. Conf. on Phys. of Transition Metals, Leeds, England, 18-22 Aug. 1980
(Contract W-31-109-eng-38)
(DE81-023110; CONF-800864-3) Avail: NTIS HC A02/MF A01

Phase shift parametrization for the Fermi surface properties of Pd was constructed using extremal orbital areas and cyclotron masses measured with the de Haas-van Alphen effect.
DOE

N82-11971# Los Alamos Scientific Lab., N. Mex.
QUASI-ELASTIC HIGH-PRESSURE WAVES IN 2024 Al AND Cu
C. E. Morris, J. N. Fritz, and B. L. Holian 1981 6 p refs Presented at the Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23-25 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025334; LA-UR-81-1897; CONF-810684-29) Avail: NTIS HC A02/MF A01

Release waves from the back of a plate slap experiment are used to estimate the longitudinal modulus, bulk modulus, and shear strength of the metal in the state produced by a symmetric collision. The velocity of the interface between the metal target and a window material is measured by the axially symmetric magnetic probe. Wave Profiles for initial states up to 90 GPa for 2024 Al and up to 150 GPa for Cu have been obtained. Elastic perfectly-plastic theory cannot account for the results. A relatively simple quasi-elastic plastic model can. DOE

N82-11972# Stanford Linear Accelerator Center, Calif.
OXIDE EFFECTS ON PHOTOEMISSION FROM HIGH CURRENT GaAs PHOTOCATHODES
E. L. Garwin, R. E. Kirby, and A. Roder Mar. 1981 18 p refs Presented at the Interdisciplinary Surface Sci. Conf., Liverpool, 6-9 Apr. 1981
(Contract DE-AC03-76SF-00515)
(DE81-025129; SLAC-Pub-2715; CONF-810495-2) Avail: NTIS HC A02/MF A01

The failure modes of the GaAs (100) photocathodes (PC's) are characterized. Gradual decreases in electron polarization and intensity are attributed to the physisorption of CO2 on the PC's during running at LN2 temperatures. Such PC's can be rejuvenated by warming to 90 K, i.e., above the CO2 desorption temperature. These PC's recover 90% of their original intensity. A second well characterized failure mode results from overheating the PC during in situ heat cleaning prior to activation. In this mode, AS is preferentially evaporated from the GaAs, leaving a Ga2O2 layer on the surface. This effect has been studied by Auger electrico spectrometry sputter profiling which indicates that the substantial thickness of the oxide layer blocks photoemission. These PC's may only be recovered by chemically removing the oxide layer. A third mode which is not as well characterized appears for thin Ga oxide layers. Properties of these PC's include reduced emission and the presence of a cutoff bias level. Such PC's are also not recoverable in situ.
DOE

N82-11973# Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.
MOLECULAR DYNAMICS SIMULATION OF GRAIN-BOUNDARY DIFFUSION OF VACANCIES IN bcc IRON
Thomas Kwok, P. S. Ho (IBM Watson Research Center), S. Yip, R. Balluffi, A. W. Brokman, and P. D. Bristowe Jun. 1981 14 p refs
(Contract DE-AS02-78ER-05002)
(DE81-025540; DOE/ER-05002/T2; COO-5002-22) Avail: NTIS HC A02/MF A01

The jumping of vacancies in a bcc iron sigma = 5 tilt boundary was simulated by computer molecular dynamics. The data yielded a reasonable value of the activation energy for migration and showed that the jump processes are highly structure dependent. The use of a temperature dependent transition probability matrix to describe the diffusion of the vacancies in the grain boundary is suggested. Formation of one type of boundary interstitial was observed which was found to be immobile. DOE

N82-11974# Sandia Labs., Albuquerque, N. Mex.
TRAPPING AND RELEASE OF IMPLANTED D/H IONS IN FUSED SILICA
G. W. Arnold and B. L. Doyle 1981 16 p refs Presented at the 9th Intern. Conf. on Atomic Collisions in Solids, Lyon, 6 Jul. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024441; SAND-81-0850C; CONF-810728-1) Avail: NTIS HC A02/MF A01

Elastic recoil detection techniques were used to measure hydrogen isotope profiles in fused silica implanted with 20 keV H and/or D ions. Saturation for both H and D implantations at concentrations of 2.1 x 10 to the 21st power ions/cu cm in good agreement with results of gas loading experiments. ETIR measurements indicate that most of the implanted H bonds are in the form of OH. Theoretical analyses using the local mixing model of H trapping provide a good fit to the saturation behavior and subsequent H movement toward the surface. Isochronal annealing shows that both H and D are released in a single stage centered about 550 C. The best theoretical fit is for a 1.9 eV H trap activation energy. DOE

N82-11975# National Bureau of Standards, Washington, D.C.
SEMICONDUCTOR MEASUREMENT TECHNOLOGY: THE RELATIONSHIP BETWEEN RESISTIVITY AND DOPANT DENSITY FOR PHOSPHORUS AND BORON DOPED SILICON Final Report
W. R. Thurber, R. L. Mattis, Y. M. Liu, and J. J. Filliben May 1981 58 p refs
(ARPA Order 2397)
(PB81-221327; NBS-SP-400-64; LC-81-600052) Avail: NTIS HC A04/MF A01 CSCL 20L

Data have been obtained for the resistivity dopant density relationship for silicon doped with phosphorus or boron for dopant densities in the range 10 to the 13th power to 10 to the 20th power/cu cm. For dopant densities less than 10 to the 18th power/cu cm, results were calculated from resistivity and junction capacitance voltage measurements on processed waters. For more heavily doped material, data were obtained from Hall effect and resistivity measurements on specimens cut from bulk silicon slices. GRA

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

N82-11976# Language Services, Knoxville, Tenn.
DECAY HEAT CURVE EVALUATION TEST
M. Akiyama, K. Doda, T. Ida, H. Hashidura, M. Oka, and N. Yasu Mar. 1981 62 p refs Transl. into ENGLISH of Rept. UTNL-R-0103 Tokyo Univ., Japan, Mar. 1981 60 p Sponsored by DOE Prepared for ORNL
(DE81-027181; ORNL-tr-4764; UTNL-R-0103) Avail: NTIS HC A04/MF A01

Fission-product decay energy release rates were measured for fast neutron fissions of U-235, Pu-239, U-238, Th-232 and natural uranium for gamma-ray, and U-235 and Pu-239 for beta-ray. Gamma-ray energy spectra were measured using a NaI scintillation detector and beta ray energy spectra were obtained using a plastic scintillation detector combined with a transmission type proportional counter to eliminate gamma-ray effects. The measuremens were made covering times following irradiations from 19 to 24,000 seconds. The spectra data were integrated to provide total energy release rates as a function of time after fission. The present data of beta ray energy release rates are preliminary due to current carrying out of the data analyses. Typical uncertainties in the present data are approximately 5 percent (1 sigma) except for Th-232, and approximately 8 percent for Th-232. The present results were compared with the results of summation calculations using the TASAKA, ENDF/B-IV and JNDC decay data files. DOE

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-11977# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
THE INDIVIDUAL VERSUS THE COMPUTER: AN EXAMINATION OF ATTITUDE PROBLEMS AND THEIR IMPACT ON SYSTEM DEVELOPMENT M.S. Thesis
Gayle Jean Plato Jun. 1981 94 p refs
(AD-A104636) Avail: NTIS HC A05/MF A01 CSCL 05/1

Whether rational or irrational in nature, negative feelings toward computer based systems have been a persistent problem for computer implementors and systems managers for many years. People may sometimes fear for the future of their employment, feel intimidated by a technology they do not understand, resent the invasion of privacy associated with indiscriminate data collection, or exhibit a wide variety of other emotional responses. In order to better anticipate, understand and cope with the multitude of emotional reactions and interface problems that potentially may develop among non-technical computer system users, current literature pertaining to such negative attitudes has been explored. With a greater understanding of possible human-computer interface problems, it is believed that managers, computer professionals, system users and social institutions alike can all assume important roles in helping to promote more universally positive interactions and attitudes in the future. GRA

N82-11978# National Training and Development Service for State and Local Government, Washington, D.C.
APPLYING SCIENCE AND TECHNOLOGY TO IMPROVE LOCAL GOVERNMENT PRODUCTIVITY
K. Janka, Kenneth D. Rainey, Fred Knight, and Thomas Urban Dec. 1980 110 p refs Prepared in cooperation with International City Management Association
(Grant NSF ISP-77-19055)
(PB81-217986; NSF/RA-800488) Avail: NTIS HC A06/MF A01 CSCL 05A

Some insights are outlined for ways to improve productivity and decrease the cost of local government service by making more effective use of science and technology (S&T). Results of a survey of 205 cities indicated the high priority items to be: predict ramifications and weight consequences; work with other departments; train personnel; employee and labor relations; and human relations. Steps involved in the process include preparation, or understanding the problems of the organization; formulation, or clarifying the issues; designing solutions; making plans and taking action; and evaluating the changes resulting from the actions taken. Early involvement of workers in identifying problems and implementing solutions is stressed. GRA

N82-11979# General Accounting Office, Washington, D. C. Federal Personnel and Compensation Div.
CIVIL SERVANTS AND CONTRACT EMPLOYEES: WHO SHOULD DO WHAT FOR THE FEDERAL GOVERNMENT
19 Jun. 1981 50 p refs
(PB81-219966; FPCD-81-43) Avail: NTIS HC A03/MF A01 CSCL 05I

The various contract reform bills introduced in the 96th Congress are analyzed in relation to those areas identified as needing improvement. The status of executive branch implementation of management controls of reform agency contract practices is determined and changes in the size of the Federal indirect contract work force are compared with the direct work force. Prior reports involving contractors used to do work that should have been done by Government employees and the extent to which Government employees perform commercial services are also addressed. DOE

N82-11980# National Science Foundation, Washington, D. C. Div. of Science Resource Studies.
UNIQUE CHARACTERISTICS OF FINANCING SCIENCE IN THE USSR
E. I. Valuev, L. S. Glyazer, V. L. Groshev, V. I. Kushlin, M. R. Kokonina, G. A. Lakhtin, V. G. Lebedev, Yu. K. Petrov, S. V. Pirogov, and S. M. Ryumin 12 Jun. 1981 69 p Transl. into ENGLISH of the mono. "Osobennosti Finansirovaniya Nauki v SSSR" Moscow, 1976 p 1-107 Sponsored in part by JPRS
(PB81-212243) Avail: NTIS HC A04/MF A01 CSCL 05A

The general principles of Soviet scientific policy, the mechanism of the planning and financing of science on various levels of administration, the ways and forms of the realization of the expenditures allocated for the maintenance and development of scientific organizations are examined. GRA

N82-11284*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DSN MODEL FOR USE IN STRATEGIC PLANNING
K. C. Kelly, C. Y. Lin, and M. McKenzie *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 25-31 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 05A

N82-11310*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN OPTIMIZATION MODEL FOR ENERGY GENERATION AND DISTRIBUTION IN A DYNAMIC FACILITY
F. L. Lansing *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 206-222 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 05A

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software*.

N82-11981* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY, SECTION 1, ABSTRACTS. SUPPLEMENT 19
Jul. 1981 53 p
(NASA-SP-7039(19)-Sec-1) Avail: NTIS HC A04/MF A01 CSCL 05B

Abstracts are cited for 130 patents and patent applications introduced into the NASA scientific and technical information system during the period of January 1981 through July 1981. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or application for patent. A.R.H.

N82-11982* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY, SECTION 2, INDEXES. SUPPLEMENT 19
Jul. 1981 684 p
(NASA-SP-7039(19)-Sec-2) Avail: NTIS HC A99/MF A01 CSCL 05B

Citations of approximately 4,000 patents and patent applications for the period May 1969 through July 1981 are indexed according to subject, invention, source, number, and accession number. A.R.H.

N82-11983# National Inst. for Transport and Road Research, Pretoria (South Africa).
WRITING EFFECTIVE REPORTS
B. M. Davies, J. M. Roche, H. Duffey, and J. M. Clifford Mar. 1980 100 p refs
(PB81-214645; RI/1/80) Avail: NTIS HC A05/MF A01 CSCL 05B

The Research Application and Information (RA & I) Group's course on report writing is designed to help NITRR's authors become better writers by giving them straight forward rules for better style, and by encouraging them to criticize and revise their own work. Topics dealt with include audiences, structuring, grammar and references. Also covered are certain NITRR and CSIR in-house rules which have been developed over the years. GRA

N82-11984# Sheffield Univ. (England). Postgraduate School of Librarianship and Information Science.
CONTENT REPRESENTATION FOR RETRIEVAL
A. Harding and M. F. Lynch Oct. 1980 17 p refs Sponsored in part by British Library
(PB81-170672; BLR/D-5607) Avail: NTIS HC A02/MF A01 CSCL 05B

Progress made in research into the use of reduced vocabularies for information retrieval, using the shortest discriminant string technique, is reported. Evaluative experiments using linear associative retrieval and cluster oriented retrieval are described. T.M.

N82-11985# PEDCo-Environmental, Inc., Cincinnati, Ohio.
FGDIS PRIMER: MAJOR EQUIPMENT/COMPONENT CLASSIFICATIONS, PROBLEM/SOLUTION ACCESS CODES, AND DEFINITIONS RELATED TO FGD SYSTEMS AS CONTAINED IN THE FLUE GAS DESULFURIZATION INFORMATION SYSTEM (FGDIS)
May 1981 135 p
(Contract EPA-68-02-3173)
(PB81-225948) Avail: NTIS HC A07/MF A01 CSCL 05B

The major equipment and component classification used in the Flue Gas Desulfurization Information system is presented. Such things as the problem and solution codes used in conjunction with the FGD system performance data, as well as definitions of common terminology used to describe FGD systems and power plants in geneal are included. Along with the classifications of the various complex equipment items and components that comprise FGD systems, brief functional descriptions and illustrations are provided. GRA

N82-11986# National Technical Information Service, Springfield, Va.
MICROFICHE AS A VEHICLE FOR TECHNICAL REPORTS Final Report
George W. Reinhart Feb. 1981 40 p refs
(Contract LEAA-79-NI-R-004)
(PB81-228009) Avail: NTIS HC A03/MF A01 CSCL 05B

The possibility of improving the cost effectiveness of an information dissemination program by making a larger part of the dissemination in microfiche instead of paper copy is examined. Most of the advantages of microfiche accrue to the producer, and most of the disadvantages to the user. There is likely to be considerable resistance to broadening the use of fiche for the intended audience of criminal justice professionals. Several alternatives are presented for lessening this problem, including emphasis on the role of libraries, promoting the availability of fiche-to-paper copiers, and using microfiche itself in innovative ways to facilitate information transfer, rather than as an attempt to duplicate the features of a paper publication in a reduced size. GRA

N82-11987# Stanford Univ., Calif. Dept. of Computer Science.
INTEGRATING MEDICAL KNOWLEDGE AND CLINICAL DATA BANKS: DISCOVERY AND REPRESENTATION OF CAUSAL RELATIONSHIPS FROM A LARGE TIME-ORIENTED CLINICAL DATABASE. THE RX PROJECT Final Executive Summary, 1 May 1980 - 30 Apr. 1981
Gio C. Wiederhold and Robert L. Blum 18 Jun. 1981 43 p
(Grants HS-3650; LM-03370; RR00785)
(PB81-227233; NCHSR-81-144) Avail: NTIS HC A03/MF A01 CSCL 05B

The objective of the RX Project is to develop methods for:

increasing the validity of medical knowledge derived from large time-oriented databases containing routine, non-randomized clinical data; providing knowledgeable assistance to a research investigator in studying medical hypotheses on large databases; and fully automating the process of hypothesis generation and exploratory analysis. The RX computer program consists of a knowledge base (KB), a discovery module, a study module, and a clinical database. Utilizing techniques from the field of artificial intelligence, the KB contains medical and statistical knowledge hierarchically organized, and is used to assist in the discovery and study of new hypotheses. Confirmed results from the database are automatically encoded into the KB. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N82-11988# Los Alamos Scientific Lab., N. Mex.
NATIONAL COAL-MARKET CONDITIONS FOR THE YEAR 2000: REGIONAL-ISSUE IDENTIFICATION AND ANALYSIS, HIGH SCENARIO
Frank Wolak Jul. 1981 18 p refs
(Contract W-7405-eng-36)
(DE81-026425; LA-8906-MS) Avail: NTIS HC A02/MF A01

Coal market data inputs necessary to operate the model used for the solid-waste impacts of coal-fired electricity production are described. The ROCKY3 model generated minemouth prices and quantities produced for each coal type from each coal supply region and the delivered price and quantity to each coal consumption region of each coal type from all of the coal supply regions. DOE

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-11989*# National Aeronautics and Space Administration, Washington, D. C.
AGREEMENT GOVERNING THE ACTIVITIES OF STATES ON THE MOON AND OTHER CELESTIAL BODIES
E. D. Gaggero and R. Puceiro Ripoll Sep. 1981 35 p refs Transl. into ENGLISH from McGill Univ. Ann. of Air and Space Law (Canada), v. 5, 1980 p 449-480 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Montevideo Univ., Uruguay
(Contract NASw-3541)
(NASA-TM-76730) Avail: NTIS HC A03/MF A01 CSCL 05D

The treaty on the Moon is not revolutionary but it embodies the legal rule for future activities of man on the Moon as opposed to the Space Treaty of 1967 which was too general. The new text is conservative but still allows some room for the developing States as in the law of the sea. The Moon is declared the 'Common Heritage of Mankind' but the regime of exploitation of its resources is still blurred with imprecise guidelines still needing to be developed. The two superpowers cannot as in the past, ignore the rest of the world in the conquest of space and the fact that the U.N. is the depositary for ratifications, and not the two superpowers as in previous treaties, is the first sign of wider participation in the creation of Space Law. Author

N82-11990# Air Force Academy, Colo. Dept. of Astronautics and Computer Science.
MILITARY SPACE DOCTRINE: THE GREAT FRONTIER Final Report
Paul Viotti, ed., Peter A. Swan, ed., and Charles D. Friedenstein, ed. 3 Apr. 1981 168 p Proceedings of the Conf. at the USAFA Mil. Space Doctrine Symp., 1-3 Apr. 1981
(AD-A104574) Avail: NTIS HC A08/MF A01 CSCL 15/3

The report presents the consensus of 246 leaders of the Air Force space program to questions posed to them in three areas: United States space operations doctrine, United States space organization doctrine, and International/USSR space operations and organization doctrine. Within each of these areas, discussion is divided between the past, the present (1975-1985) and the future (post 1985). Author (GRA)

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation*, and *44 Energy Production and Conversion.*

N82-11991*# Boeing Co., Houston, Tex.
AUTOMATED WATER MONITOR SYSTEM FIELD DEMONSTRATION TEST REPORT. VOLUME 1: EXECUTIVE SUMMARY
Richard L. Brooks, Eldon L. Jeffers, Jim Perreira, Jerry D. Poel, David Nibley, and Robert H. Nuss 30 Sep. 1981 48 p refs 2 Vol.
(Contract NAS2-9885)
(NASA-CR-166228) Avail: NTIS HC A03/MF A01 CSCL 13B

A system that performs water quality monitoring on-line and in real time much as it would be done in a spacecraft, was developed and demonstrated. The system has the capability to determine conformance to high effluent quality standards and to increase the potential for reclamation and reuse of water. J.M.S.

N82-11992*# Boeing Co., Houston, Tex.
AUTOMATED WATER MONITOR SYSTEM FIELD DEMONSTRATION TEST REPORT. VOLUME 2: TECHNICAL SUMMARY
Richard L. Brooks, Eldon L. Jeffers, Jim Perreira, Jerry D. Poel, David Nibley, and Robert H. Nuss 30 Sep. 1981 313 p refs 2 Vol.
(Contract NAS2-9885)
(NASA-CR-166229) Avail: NTIS HC A14/MF A01 CSCL 13B

The NASA Automatic Water Monitor System was installed in a water reclamation facility to evaluate the technical and cost feasibility of producing high quality reclaimed water. Data gathered during this field demonstration test are reported. J.M.S.

N82-11993*# Rasor Associates, Inc., Sunnyvale, Calif.
JET IMPINGEMENT HEAT TRANSFER ENHANCEMENT FOR THE GPU-3 STIRLING ENGINE
Douglas C. Johnson, Craig W. Congdon, Lester L. Begg, Edward J. Britt, and Lanny G. Thieme Oct. 1981 28 p refs
(NASA-TM-82727; DOE/NASA/51040/33) Avail: NTIS HC A03/MF A01 CSCL 13F

A computer model of the combustion-gas-side heat transfer was developed to predict the effects of a jet impingement system and the possible range of improvements available. Using low temperature (315 C (600 F)) pretest data in an updated model, a high temperature silicon carbide jet impingement heat transfer system was designed and fabricated. The system model predicted that at the theoretical maximum limit, jet impingement enhanced heat transfer can: (1) reduce the flame temperature by 275 C (500 F); (2) reduce the exhaust temperature by 110 C (200 F); and (3) increase the overall heat into the working fluid by 10%, all for an increase in required pumping power of less than 0.5% of the engine power output. Initial tests on the GPU-3 Stirling engine at NASA-Lewis demonstrated that the jet impingement system increased the engine output power and efficiency by 5% - 8% with no measurable increase in pumping power. The overall heat transfer coefficient was increased by 65% for the maximum power point of the tests. A.R.H.

N82-11994*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
EVALUATION OF THE MICRO-CARBURETOR

Merkel F. Weiss, Robert A. Hall, and Steven D. Mazur Aug. 1981 83 p refs
(Contracts NAS7-100; DE-AI01-79CS-50080)
(NASA-CR-164958; JPL-Pub-81-75) Avail: NTIS HC A05/MF A01 CSCL 13F

A prototype sonic, variable-venturi automotive carburetor was evaluated for its effects on vehicle performance, fuel economy, and exhaust emissions. A 350 CID Chevrolet Impala vehicle was tested on a chassis dynamometer over the 1975 Federal Test Procedure, urban driving cycle. The Micro-carburetor was tested and compared with stock and modified-stock engine configurations. Subsequently, the test vehicle's performance characteristics were examined with the stock carburetor and again with the Micro-carburetor in a series of on-road driveability tests. The test engine was then removed from the vehicle and installed on an engine dynamometer. Engine tests were conducted to compare the fuel economy, thermal efficiency, and cylinder-to-cylinder mixture distribution of the Micro-carburetor to that of the stock configuration. Test results show increases in thermal efficiency and improvements in fuel economy at all test conditions. Improve fuel/air mixture preparation is implied from the information presented. Further improvements in fuel economy and exhaust emissions are possible through a detailed recalibration of the Micro-carburetor. Author

N82-11995# California Univ., Berkeley. Lawrence Berkeley Lab.
URBAN ECOSYSTEM AND RESOURCE-CONSERVING URBANISM IN THIRD WORLD CITIES
R. L. Meier, Sam Berman, Tim Campbell, and Chris Fitzgerald Mar. 1981 195 p refs
(Contract W-7405-eng-48)
(DE81-029854; LBL-12640) Avail: NTIS HC A09/MF A01

A comprehensive overview based on urban ecosystems was employed in field studies of representative cities in developing regions. The rising overall demand of cities in the developing regions was examined with emphasis on petroleum and caloric foodstuffs. Policies necessary to conserve energy and to adapt to increased costs and the possibility of food and water shortages are addressed. DOE

N82-11996# Argonne National Lab., Ill.
LITHIUM/IRON SULFIDE CELL DEVELOPMENT FOR ELECTRIC-VEHICLE PROPULSION
E. C. Gay, W. E. Miller, V. M. Kolba, and H. Shimotake 1980 15 p refs Presented at 29th Power Sources Conf., Atlantic City, N. J., 9-12 Jun. 1980
(DE81-023570; CONF-800612-5) Avail: NTIS HC A02/MF A01

The development of high-performance, secondary batteries for electric vehicle propulsion is described. The program on the electric-vehicle battery involves the development, design, and fabrication of a series of full-scale lithium/metal sulfide batteries, designated Mark IA, II, and III. A status report on the cell development for this program is given. These cells consist of a lithium-aluminum (Li-Al) negative electrode, an FeS positive electrode and molten LiCl-KCl electrolyte. The melting point of the electrolyte requires a cell operating temperature in the range of 400-500 C. Test results are presented and discussed. DOE

N82-11997# Aerospace Corp., Los Angeles, Calif.
ASSESSMENT OF FLYWHEEL SYSTEM BENEFITS IN SELECTED VEHICLE APPLICATIONS
L. H. Kubo and L. Forrest 1981 7 p refs Presented at IECEC Conf., 9 Aug. 1981
(Contract DE-AC08-79ET-26306)
(DE81-025976; CONF-810812-31) Avail: NTIS HC A02/MF A01

The performance of vehicle systems incorporating energy storage flywheels was investigated. The effort involved an indept assessment of flywheel system benefits in two vehicle applications: a four-passenger commuter car with electric drive (flywheel range extension application) and a six-passenger family car with conventional heat engine drive (flywheel fuel conservation application). The special case of the six-passenger vehicle as used in taxicab service was also investigated. A number of possible component design/selection alternatives for flywheel rotors, continuously variable transmissions, batteries, motors, and other propulsion elements were examined. Results of the assessment are provided for the case of a series-configuration heat engine/flywheel drive train as used in the passenger car and urban taxi vehicle missions. DOE

N82-11998# Food and Drug Administration, Rockville, Md. Office of Planning and Evaluation.
FORECAST OF EMERGING TECHNOLOGIES Final Report
Jun. 1981 119 p
(PB81-227290; FDA/ACPE-81/95) Avail: NTIS HC A06/MF A01 CSCL 08E

A compilation and analysis of information collected during a study of emerging technologies that may affect, or be affected by, FDA within the next 5-15 years are presented. A total of 168 distinct new technologies and/or substantially different aspects of single technologies were identified by scientific experts inside and outside of FDA. Study participants were also asked to estimate the approximate time of arrival and barriers (cost risk, technical problems) that may affect the technologies arrival. About 25 pecent of the technologiezs identified were related to the areas of genetic engineering or advances in computer technology. According to study participants, each of the ten most frequently mentioned new technologies may arrive within the next five years. T.M.

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-11999 Rensselaer Polytechnic Inst., Troy, N. Y.
OBSERVATIONS OF MOLECULAR CLOUDS CONTAINING REFLECTION NEBULAE Ph.D. Thesis
Dennis Edward Machnik 1981 210 p
Avail: Univ. Microfilms Order No. 8121154

The rotational transition of the linear molecule CO, and the less abundant species C13O, in about 130 molecular clouds associated with reflection nebulae are observed. Contour maps of the 2.6 mm wavelength emission are presented for a number of regions mapped in reflection nebulae where enhanced CO emission was observed. While the CO emission enhancement was noted to lie in the vicinity of the moderately early type star illuminating the reflection nebula, there is a tendency for the CO peak to be slightly displaced from the star. The observations of two species of this molecule allow a rough classification of the emission enhancements as enhancements of either density or temperature. Both types were observed. Tables are given of parameters for the illuminating stars, along with parameters describing the CO and C13O emission towards the star and emission peaks. A number of cloud parameters and star parameters are compared for the whole group of nebulae in the survey, in order to search for possible correlations between parameters. Part of the purpose of this program was the study of regions near young stars, and the interactions between the star and the young stars, and the interactions between the star and the surrounding medium. The possibility that the star was recently created out of the material observed in the region is discussed. Dissert. Abstr.

N82-12000 California Univ., San Diego.
X-RAY AND GAMMA-RAY OBSERVATIONS OF PULSED EMISSION FROM RADIO PULSARS Ph.D. Thesis
Frederick Keck Knight 1981 147 p
Avail: Univ. Microfilms Order No. 8120532

A search for pulsed emission from radio pulsars in the energy range 15 keV to 10 MeV was conducted using the hard X-ray and low energy gamma-ray instrument on the HEAO-1 spacecraft. From a sample of twelve candidate radio pulsars, only the Crab pulsar was detected, and upper limits to the intensity of emission from the other candidates indicate that the majority (7 to 10) do not emit more than a few percent of their rotational energy loss in hard X-rays. Observations of the 18-200 keV pulsed emission from the Crab pulsar show that the systematic variation of spectral slope as a function of pulse phase, discovered at lower energies (4-60 keV), continues up to approximately 200 keV, strengthening the case for the existence of at least two pulsed emission components: the emission from the two main pulse peaks and a separate interpulse emission connecting the two peaks. Dissert. Abstr.

N82-12001 California Univ., Los Angeles.
H-ALPHA EMISSION FROM A DISK IN THE CLOSE BINARY U CEPHEI: A MONTE CARLO SIMULATION Ph.D. Thesis
Richard Clayton Crawford 1981 177 p
Avail: Univ. Microfilms Order No. 8120936

Twenty-four H alpha spectrograms of the eclipsing binary U Cephei were obtained during its 1974-1976 outburst. The line profiles on the ten of those obtained during total eclipse display prominent emission from matter in a ring or disk surrounding the hotter component. The emission is analyzed under the assumption of low optical depth, and this assumption is then verified by a Monte Carlo synthesis on the line profiles. The Monte Carlo simulation is useful for the calculation of line profiles from regions with optical depths less than unity. The velocity structure of the emitting region is composed of two components--rotation and 'turbulence'. The rotational velocity is inversely proportional to the radius, although it is approximately Keplerian circular near the star. The width of the emission profiles leads to disordered velocities (herein called 'turbulence') on the order of 100 km/sec, with no strong radial dependence. This turbulence includes deviations from axial symmetry in the rotational velocity as well as eddies and/or other motions. Dissert. Abstr.

N82-12002 Toledo Univ., Ohio.
PHOTOELECTRIC SURFACE BRIGHTNESS OBSERVATIONS AND THE GEOMETRY OF REFLECTION NEBULAE Ph.D. Thesis
Matthew James Cottrell 1981 179 p
Avail: Univ. Microfilms Order No. 8121650

Photoelectric surface brightness measurements of three reflection nebulae: IC 5076, NGC 1432, and the nebulosity are illuminated by 17 Tauri are reported. These observations are corrected for instrumentally scattered light and for variable sky background contamination. Similar observations of a fourth nebula Cederblad 201, are also discussed. Techniques for modelling the surface brightness distributions of nebulae are discussed, including two models for the nebula IC 5076. Using relatively well known grain properties at visible wavelengths, the geometry of each object and its ultraviolet brightness distributions are investigated. Dissert. Abstr.

N82-12003 Harvard Univ., Cambridge, Mass.
OPTICAL AND ULTRAVIOLET STUDIES OF STELLAR CHROMOSPHERES OF LAMBDA ANDROMEDAE AND OTHER LATE-TYPE STARS Ph.D. Thesis
Sallie Louise Baliunas 1980 236 p
Avail: Univ. Microfilms Order No. 8120243

Chromospheric studies of the outer atmospheres of several late type stars are preseted along with a comprehensive study of lambda Andromedae, an active chromosphere star. Investigations were made of the chromospheric features of Ca II H and K, Mg II h and k, and other, high temperature emissions accessible to the Copernicus and international ultraviolet satellites. Analogues to solar activity are consistent with the spectral behavior of the chromospheric indicators. The chromospheric activity and variability in Ca II H and K in lambda and are similar to sunspot and solar flare activity. In addition, a search was begun for short-timescale (few minutes) fluctuations in the H and K cores in several late-type stars. Calibrated spectrophotometry for the Ca II K profiles and additional constraints provided by H alpha and the ultraviolet observations of Mg II and the high temperature transition-region emissions were employed in the construction of semi-empirical chromospheric models of lambda And, alpha Aur, and alpha Boo. A prescription is given for models of active chromosphere stars, which may also be useful for other late type stars. Dissert. Abstr.

N82-12004*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
THEORETICAL STUDIES OF CHROMOSPHERES AND WINDS IN COOL STARS Semiannual Report, 1 Apr. - 30 Sep. 1981
A. K. Dupree Nov. 1981 8 p
(Grant NAGw-100)
(NASA-CR-164969; SAR-2) Avail: NTIS HC A02/MF A01 CSCL 03A

Calculated radiative losses from H, H-, Ca II, and Mg II show that cooling for the chromosphere of the supergiant epsilon Gem do not differ greatly from the solar law, although there are differences at approximately 6000K due to ionization effects. With a rough standard law for computation of stellar winds using the Hartmann-MacGregor theory and standard stellar evolutionary calculations, the wind velocities and temperatures in the HR diagram were systematically explored. Results show that cool winds with tempratures < 1,000,00K are not possible for log g > or = 2. Predicted wind velocities are approximately 1.5 to 2 x larger than observed, particularly for the most luminous cool stars. The ionization balance for the wind of alpha ORI and the hydrogen profile lines for T Tauri stars were computed using the PANDORA computer program. A.R.H.

N82-12005# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
NONRADIAL PULSATIONS OF UPSILON ORIONIS AND SUPERGIANTS
A. N. Cox 1981 4 p refs Presented at Workshop on Pulsating B Stars, Nice, 1-5 Jun. 1981 Submitted for publication
(Contract W-7405-eng-36)
(DE81-025338; LA-UR-81-1908; CONF-8106112-2) Avail: NTIS HC A02/MF A01

The overshooting nonradial mode driving for a pulsating star very close to the main sequence (upsilon Orionis) and for the nonradial pulsations of an A supergiant not too unlike alpha Cygnus types are discussed. A 15 solar mass 30,000 K model of less than on million years was constructed for upsilion Orionis, and a 25 m, 10,000 k model was constructed for the supergiants. Overshooting from a convective core or a convective shell was found to be a likely cause of pulsations in near sequence B stars and in supergiants. DOE

N82-12006# Los Alamos Scientific Lab., N. Mex.
LINEAR AND NONLINEAR THEORY STUDY OF ALPHA VIRGINIS
Arthur N. Cox, Stephen W. Hodson, and Sean P. Clancy 1981 11 p refs Presented at the Workshop on Pulsating B Stars, Nice, 1-5 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025335; LA-UR-81-1907; CONF-8106112-1) Avail: NTIS HC A02/MF A01

Nonlinear radiation hydrodynamic calculations using a model for Alpha Virginis, a beta Cephei star, were made to see if the cause of the recurrent radial pulsation epochs can be discovered. The basic observed characteristics of beta Cephei variables are presented. Various proposals reviewed to make these stars pulsate concludes that the excitation mechanism must be in the central convective core or variable composition regions. The envelope damps radial fundamental mode pulsations in 4 years and in even shorter periods for radial overtones. It is proposed that the mixing of envelope hydrogen into the hydrogen depleted (or even exhausted) core can produce periodic pressure pulses which drive the pulsation amplitude up to the observed value. During the decay of the pulsations, evolution toward higher luminosities enables further episodes of mixing and driving to occur. It is predicted that rapid amplitude increases when mixing occurs and a slow decay of radial (and nonradial modes for other beta Cephei variables) between mixing episodes. DOE

N82-11280*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RADIO ASTRONOMY
R. D. Shaffer, J. T. McCluskey, S. Gulkis, M. Klein, and T. Kuiper *In its* The Telecommun. and Data Acquisition Rept. 15 Oct.

1981 p 1-3 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 03A

N82-11281*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A DEDICATED 26-m SETI SKY SURVEY INSTRUMENT FACILITY: A FEASIBILITY STUDY
A. L. Berman and R. D. Shaffer *In its* The Telecommun. and Data Acquisiton Rept. 15 Oct. 1981 p 4-8 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 03A

90 ASTROPHYSICS

Includes cosmology: and interstellar and interplanetary gases and dust.

N82-12007 Iowa State Univ. of Science and Technology, Ames.
THEORETICAL AND OBSERVATIONAL ASPECTS OF STELLAR VARIABILITY Ph.D. Thesis
Daniel William Peterson 1981 143 p
Avail: Univ. Microfilms Order No. 8122554

Hot spots on accreting white dwarfs with magnetic fields are investigated. It is found that various loss mechanisms do not destroy the accretion spots and that pulsed ultraviolet radiation will be emitted as the dwarf rotates. This pulsed radiation should be observable from dwarf companions near giant stars undergoing mass loss by a stellar wind and from slowly moving dwarfs accreting from the interstellar medium. A search for variability in three Hyades white dwarfs, GB-7, G7-41, and G7-255 is described. Data analysis by the maximum entropy method shows all three stars to be nonvariable. The use of the O-C diagram as a diagnostic tool in doubly periodic stars is investigated. A test is developed to distinguish between short and long secondary periods by using the amplitude of the O-C diagram. Application of this test to the RRs variable VZ Cnc establishes that this star is a multiple mode variable, and these results are confirmed by phase dispersion minimization analysis. Dissert. Abstr.

N82-12008 Cornell Univ., Ithaca, N. Y.
A SELF-CONSISTENT LINEAR-MODE ANALYSIS OF A STELLAR CONVECTION ZONE Ph.D. Thesis
Joel Mirick MacAuslan 1981 131 p
Avail: Univ. Microfilms Order No. 8119542

It is shown that a normal-mode expansion of the linearized fluid equations in terms of a subset of spherical harmonics can provide the basis for a self-consistent description of a solar-like convection zone. The linear modes growing from a static background, are assumed inviscid and adiabatic for self-consistency, they, together with radiation, carry exactly the constant flux required by the model. When the resulting equations are simplified according to physically motivated prescriptions, with the amplitude of the modes set by a shear criterion related to the Kelvin-Helmholtz instability, the equations contain a single free parameter, related to the persistence of linearity. Numerical solution of the equations for a simplified solar envelope and a simple spectrum of modes produces a variety of models of different persistences; it also leads to identification of the amplitude parameter with the efficiency of convection. The models show wide variation in power at various horizontal wavenumbers, in both peak luminosity and surface velocity spectra. Dissert. Abstr.

N82-12009 Washington Univ., Seattle.
THE BOGOLIUBOV TRANSFORMATION AND ITS APPLICATION TO COSMOLOGICAL PARTICLE PRODUCTION Ph.D. Thesis
Terry Lee Dannehold 1981 86 p
Avail: Univ. Microfilms Order No. 8122730

The Bogoliubov transformation, which is a linear combination of creation and annihilation operators, is discussed. The invariance of the commutation relations is examined. The Bogoliubov transformation is applied to the problem of particle production in curved space. In particular, it is shown the conseration laws constrain particles produced by gravitational fields to be created in pairs, with a thermal spectrum, when the initial state is the vacuum. Initial states containing n particles are also treated. The creation and detection of particle is then examined in terms of information theory. The nonexistance of a time-like Killing vector in Robertson-Walker universe implies a 'noise' term in the equations governing conservation of energy and this term is responsible for particle creation. An equation for the particle production rate is deduced. It is then shown that cosmological particle production theories may be tested by calculating the gamma ray spectrum due to the decay of short-lived particles which are produced. Dissert. Abstr.

N82-12010*# District of Columbia Univ., Washington, D. C. Dept. of Computer Information System Sciences.
COMPUTATION OF AVERAGED MONTHLY ZONAL ALBEDO UTILIZING THE SOLAR ZENITH ANGLE, PROPERTIES OF CLEAR AND CLOUDY ATMOSPHERES
Harbans Dhuria Aug. 1981 93 p refs
(Grant NAG5-75)
(NASA-CR-164930) Avail: NTIS HC A05/MF A01 CSCL 03B

The zonal temporal averages of albedos at the top of the atmosphere were considered as a function of the length of the day. The length of the day were used to determine the average daily values of mu sub 0(= Cos of the solar zenith angle, theta sub 0). Polynominal fits of the slope and intercept functions of A sub s (cloud-free albedo) and A sub c(cloud albedo) as function of Cos theta sub 0 were obtained by using the sample values of albedo corresponding to solar zenith angles from 0 to 90 deg with interval of 5 deg. The daily zonal values of mu sub 0 and the surface albedos were used to compute the daily zonal values of albedos at the top of the clear and cloudy atmosphere. The monthly zonal cloud fractions were used to compute planetary albedo A at the top of the atmosphere. The global values of monthly albedos A sub s, A sub c and A were computed by using the weighting function defined as the difference of the sins of zonal values of latitudes. The computer program implementation is also described. B.W.

N82-12011# Oxford Univ. (England). Nuclear Physics Lab.
A MODEL OF THE NORMAL AND NULL STATES OF PULSARS
P. B. Jones 1981 25 p refs
(PB81-215907; Rept-24/81) Avail: NTIS HC A02/MF A01 CSCL 03B

A solvable three dimensional polar cap model of pair creation and charged particle acceleration is derived. There are no free parameters of significance apart from the polar surface magnetic flux density. The parameter CO determining the acceleration potential difference was obtained by calculation of elementary nuclear and electromagnetic processes. Solutions of the model exist for both normal and null states of a pulsar, and the instability in the normal state leading to the normal to null transition is identified. The predicted necessary condition for the transition is entirely consistent with observation. Author

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology: and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles.*

N82-12012 Cornell Univ., Ithaca, N. Y.
A THEORETICAL AND EXPERIMENTAL INVESTIGATION OF THE PHOTOMETRIC FUNCTIONS OF PARTICULATE SURFACES Ph.D. Thesis
Jay David Goguen 1981 234 p
Avail: Univ. Microfilms Order No. 8119442

Photometric functions of particlate materials are measured and modelled to infer physical characteristics and planetary surfaces from photometry. Model photometric functions are based on the solution of the radiative transfer equation (RTE) for a specified single particle phase function phi and the modification of the RTE solution for interparticle shadowing S adopted from

Irvine (1966). A survey of phase functions due to Fresnel reflection from large, opaque, smooth spheres with optical constants in the range of most common rocks and minerals reveals a systematic trend in the Bond albedo A sub B and asymmetry parameter g with composition: low indices of refraction correspond to low albedos and strong forward scattering; high indices of refraction correspond to high albedos and nearly isotropic scattering. Adding roughness on a scale compared to a wavelength reduces A sub B up to 25%; the albedos of darker particles are parameter shown an approximately linear decrease of 0.12 from 0 to 45 deg. rms slope independent of composition. Dissert. Abstr.

N82-12013 Cornell Univ., Ithaca, N. Y.
THE MORPHOLOGY AND EVOLUTION OF GANYMEDE AND CALLISTO Ph.D. Thesis
Steven Weldon Squyres 1981 353 p
Avail: Univ. Microfilms Order No. 8119466

High quality images of Ganymede and Callisto, obtained by the two Voyager spacecraft are used to investigate the surface characteritics, geologic processes, and internal evolution of Ganymede and Callisto. Ganymede shows two principal types of terrain. One is dark, old, and heavily cratered ('cratered terrain'); the other is brighter, younger, and characterized by complex patterns of grooves ('grooved terrain'). The surface of Callisto is uniformly dark, heavily cratered, nearly free of bright ray craters, and shows no evidence of tectonic activity. Voyager images are used to determine photometric properties of surface features on both bodies at phase angles up to 120. Surface temperatures are calculated for the major terrain types. Callisto is found to be somewhat warmer than Ganymede. The temperature difference between grooved and cratered terrain on Ganymede is small. Dissert. Abstr.

N82-12014 California Univ., Los Angeles.
THE OPPOSITION EFFECT OF PARTICULATE MINERAL SURFACES AND CONDENSATES: APPLICATIONS TO SATURN'S RINGS Ph.D. Thesis
Larry Kenneth Pleskot 1981 210 p
Avail: Univ. Microfilms Order No. 8121032

It is established that opposition brightening is common in bright materials. Thus, bright and dark surfaces commonly exhibit the phenomenon, but the nature of retroreflection in bright and dark laboratory samples is found to be significantly different. Some of the differences between retroreflective properties of bright and dark samples are consistent with albedo dependences of individual mechanisms; other differences suggest that prevalent mechanisms in bright and dark samples are distinct. Condensates possess retroreflection parameters similar to the rings'. Yet, opposition brightening in typical laboratory condensates is only about a third as strong as in the rings. Two conclusions result. First, intraparticle retroreflection probably occurs in the rings, and ring observations should not be directly used in multilayer ring models. Second, interparticle retroreflection in the rings also appears necessary to reconcile ring data with typical laboratory observations. However, variations of independed parameters such as surface roughness or mixing can produce enahanced retroreflection in laboratory condensates. Thus, the observed opposition effect of the rings may be entirely attributable to an intraparticle mechanism. Observational support for the classical ring model is thereby weakened. Dissert. Abstr.

N82-12015*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RADIATIVE TRANSFER IN COMETARY DUST ATMOSPHERES: CRITIQUE OF RECENT DEVELOPMENTS
Oldwig vonRoos 1 Oct. 1981 20 p refs
(Contract NAS7-100)
(NASA-CR-164946; JPL-Pub-81-80) Avail: NTIS HC A02/MF A01 CSCL 03B

The gas and dust production rates of comets near the sun are intimately linked to the fate of the solar radiation as it is scattered and partially absorbed by the cometary dust envelope or halo surrounding the comet's nucleus. The radiation of nuclear matter (mostly water ice) and the release of dust particles embedded in the ice which are entrained by the escaping gas and subsequently form a dust atmosphere or halo. On the other hand, the interaction of the dust cloud with the solar radiation is in turn responsible for the amount of radiative energy received by the nucleus and thus determines the evaporation rate. It is shown that recent attempts to formulate this problem quantitatively are in error. The correct formulation is given and it is pointed out that negative extinction (enhancement of the primary radiation received by the nucleus due to multiple scattering) may not be as large as predicted. J.D.H.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-12016*# National Aeronautics and Space Administration, Washington, D. C.
RADIATION BALANCES AND THE SOLAR CONSTANT
D. Crommelynck Jul. 1981 21 p refs Transl. into ENGLISH from Proceedings of the ESA Tech. Conf. (France), 1979 p 137-143 Conf. held in Lannion, France, 17-21 Sep. 1979 Translation was announced as N80-21812 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-76612; ESA-SP-143) Avail: NTIS HC A02/MF A01 CSCL 03B

The radiometric concepts are defined in order to consider various types of radiation balances and relate them to the diabetic form of the energy balance. Variability in space and time of the components of the radiation field are presented. A specific concept for sweeping which is tailored to the requirements is proposed. Finally, after establishing the truncated character of the present knowledge of the radiation balance. The results of the last observations of the solar constant are given. Ground and satellite measurement techniques are discussed. S.L.

N82-12017# National Center for Atmospheric Research, Boulder, Colo. High Altitude Observatory.
SEARCH FOR OPTIMAL THREE-DIMENSIONAL MAPPING OF THE SOLAR CORONA FROM K-CORONAMETER DATA
R. Michael Perry and Martin D. Altschuler Apr. 1981 102 p refs
(Grant NSF ATM-77-23757)
(PB81-222903; NCAR/TN-170) Avail: NTIS HC A06/MF A01 CSCL 03B

An iterative technique was devised in which an approximation of the unknown solar electron density distribution is successively modified to reduce discrepancies with the original data. With the technique the corona can be mapped to a much finer resolution than shown in their previous papers without greatly increasing the computational cost. The series representation of density may now contain more than 23,000 terms compared with the previous limit of 128. This results in a fourfold increase in linear resolution, so that features about a tenth of a solar radius in width are now separate. The iteration algorithm can be adjusted to apply a mathematically optimal correction to a given approximation of the density. Although this correction minimizes noise levels, a cheaper version of the algorithm yields a better result. GRA

N82-12018# National Center for Atmospheric Research, Boulder, Colo.
COMPRESSIBLE CONVECTION IN A ROTATING SPHERICAL SHELL
Gary A. Glatzmaier 1980 200 p refs
(Grant NSF ATM-77-23757)
(PB81-222895; NCAR-CT-60) Avail: NTIS HC A09/MF A01 CSCL 03B

A hydrodynamical model of giant cell convection is used to gain further understanding of how differential rotation is maintained on the Sun. Anelastic fluid equations are derived for a compressible, rotating, spherical fluid shell. Then first order numerical solutions of these equations are found which describe the stability and structure of the giant cell convection in many different regions of parameter space. First order analytic solutions provide simple, physical explanations for the longitudinal phase propagation manifested in the numerical solutions. Second order numerical solutions are then calculated which describe the mean differential rotation and meridional ciculation induced by the first order solutions. GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-12019*# California Univ., Berkeley. Space Sciences Lab.

THE ISOTOPIC COMPOSITION OF THE ELEMENTS CARBON, OXYGEN, NEON, MAGNESIUM AND SILICON IN THE GALACTIC COSMIC RAYS

M. E. Wiedenbeck and D. E. Greiner (California Univ., Berkeley. Lawrence Berkeley Lab.) Mar. 1981 5 p refs Presented at 17th Intern. Cosmic Ray Conf., Paris, 13-25 Jul. 1981
(Contract NAS5-20995)
(NASA-CR-166715) Avail: NTIS HC A02/MF A01 CSCL 03B

High resolution observations of the isotopic composition of C, O, Ne, Mg, and Si in the galactic cosmic rays (GCR) are used to derive the isotopic compositions of these elements in the GCR source. It is found that the source is enhanced in the neutron-rich isotopes of Ne, Mg, and Si (relative to solar system composition). The significance and possible interpretations of these enhancements are discussed. J.D.H.

N82-12020*# California Univ., Berkeley.

A REVIEW AND INTERPRETATION OF RECENT COSMIC RAY BERYLLIUM ISOTOPE MEASUREMENTS

Andrew Buffington 26 Apr. 1978 28 p refs Presented at a Symp., Washington, D.C., 26 Apr. 1978; sponsored by the Am. Phys. Soc. Submitted for publication
(Grant NGR-05-003-553; Contract W-7405-eng-48)
(NASA-CR-164967) Avail: NTIS HC A03/MF A01 CSCL 03B

Beryllium-10 is of interest for cosmic ray propagation, because its radioactive decay half-life is well matched to the expected cosmic ray age. Recent beryllium isotope measurements from satellites and balloon covered an energy range from about 30 to 300 MeV/nucleon. At the lowest energies, most of the Be-10 is absent, indicating a cosmic ray lifetime of order 2 x 10 to the 7th power years and the rather low average density of 0.2 atoms/cc traversed by the cosmic rays. At higher energies, a greater propagation of Be-10 is observed, indicating a somewhat shorter lifetime. These experiments will be reviewed and then compared with a new experiment covering from 100 to 1000 MeV/nucleon. Although improved experiments will be necessary to realize the full potential of cosmic ray beryllium isotope measurements, these first results are already disclosing interesting and unexpected facts about cosmic ray acceleration and propagation. Author

99 GENERAL

N82-12021# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ACTA MECHANIA SINICA

15 Sep. 1981 96 p refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 Original language document was announced as AD-A105635 Transl. by SCITRAN, Santa Barbara, Calif.
(AD-A105635; FTD-ID(RS)T-0705-81) Avail: NTIS HC A05/MF A01 CSCL 20/4

Numerical analyses of flow calculations are presented, phase shift interferometry applied to low density flows, and a design technique for internal burning star grains of solid propellants described. For individual titles, see N82-12022 through N82-12026.

N82-12022# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

DIFFERENCE METHOD IN FLUID DYNAMICS. 1. NUMERICAL SOLUTION OF TWO DIMENSIONAL VORTICITY EQUATION c34

Guo Benyu *In its* Acta Mech. Sinica (Selected Articles) FTD-ID(RS)T-0705-81 15 Sep. 1981 p 1-34 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

With the two dimensional vorticity equation as an example, the theoretical problem of difference equations in fluid dynamics is discussed. Schemes based on the conservation laws and transport properties are constructed. Generalized stability is introduced. The error of periodic solutions is rigorously estimated. The effect of error in boundary values on the stability of computation and the boundary shape, boundary conditions and its treatment in the initial/boundary problems are analyzed. The computational problem of nonviscous flow and large gradient solution is treated according to the conservation laws. The convergence of dynamic relaxation and the existence of solutions of steady flow computational schemes are studied. Examples are used to illustrate the applications of these results in fluid dynamic computations and numerical weather forecast. J.D.H.

N82-12023# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ON THE KERNEL FUNCTION COLLOCATION METHOD IN STEADY SUBSONIC FLOW FOR WING WITH CONTROL SURFACES c02

Chen Jing Song *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 35-50 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

The forms of the lift distribution function for wings with control surfaces in steady subsonic flow are analyzed. Methods for treating kernel singularities of linear integral equations and singularities of the lift distribution function are discussed and the numerical solution to the integral equation is given. These methods may be used to calculate the lift distribution of the wing by itself or of the wing with partial or full control surfaces on both the leading and trailing edges. The numerical values agree well with experimental data and have the same accuracy as those given by other theories. As compared with the vortex lattice method, the computational storage requirement for this method is smaller and the computational time is less. The numerical computation may be carried out on smaller computers.

N82-12024# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ON THE CAPACITY OF HOLOGRAPHIC PHASE-SHIFT INTERFEROMETRIC TECHNIQUE IN THE VISUALIZATION OF LOW DENSITY FLOWS c34

Hsu Yu Li, Chao Yi Xu, Jizu Shu, and Jin Min Hu *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 51-63 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

A detailed analysis of the phase shift interferometric technique is presented. It is determined that when the phase shift value is pi/2, a resolution limit about lambda/1000 can be achieved. This is 25.4 times higher than the common double exposure holographic method provides. When the phase shift value increases from pi/2 to pi, the sensitivity also increases monotonously. The experimental application of phase shift interferometry to low density flows is described, and some problems in applications of the technique discussed. J.D.H.

N82-12025# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ANALYTICAL DESIGN FOR INTERNAL BURNING STAR GRAINS OF SOLID ROCKETS c28

Changtang Lu *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 64-74 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979

(For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

The various geometric parameters of the internal burning star grain, the characteristic parameters of solid propellant, and the technical specifications of the rocket motor are combined, the set of design equations established according to the best principle of grain design, and the set of equations solved quickly by incorporating simple equations and curves. This method not only involves less computational work than geometric methods and guarantees the required technical specifications but also yields a design that approaches the optimal, improves the characteristics of the rocket motor, saves materials, and requires less computer time. J.D.H.

N82-12026# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

NUMERICAL COMPUTATION AND ANALYSIS OF THE FLOW FIELD IN A LARGE SHOCK TUBE WITH A VARIABLE CROSS-SECTIONAL AREA c34

Wen Xuan Li and Jiajun Wang *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 75-83 refs
Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

Certain flow characteristics of the new shock wave that exists in shock tubes with violently varying cross section are analyzed. The state equation of the explosive gas produced by the combustion of the explosive in the high pressure section and the contact discontinuity between the explosive gas and air are taken into consideration. In order to treat many strong discontinuities, the difference method with artificial viscosity term q is adopted. The Lagrangian coordinates are used so that the contact discontinuities can be easily treated. The head of the major shock wave has little vibration, occupying only 2-3 grid spacings. J.D.H.

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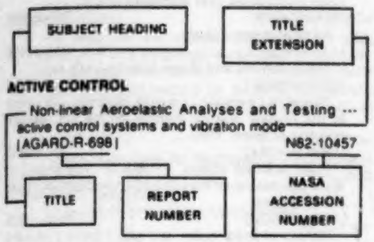

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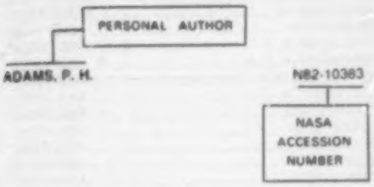

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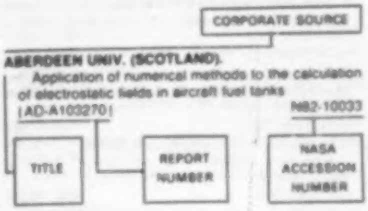
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LAMB (F. JOSEPH) CO., WARREN, MICH.
Second generation heliostat. Volume 2: Definition of a heliostat manufacturing facility [DE81-029824] N82-11565

LANGUAGE SERVICES, KNOXVILLE, TENN.
Decay heat curve evaluation test [DE81-027181] N82-11976

LAQUE CENTER FOR CORROSION TECHNOLOGY, INC., WRIGHTSVILLE BEACH, N.C.
Effect of mechanical cleaning on seawater corrosion of candidate OTEC heat exchanger materials. Part 2: Tests with Amertap sponge rubber balls [DE81-029953] N82-11190

LEAR SIEGLER, INC., GRAND RAPIDS, MICH.
Flight trajectory control investigation [AD-A104542] N82-11046

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[AD-A104553] N82-11485

LOCKHEED-CALIFORNIA CO., BURBANK.
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
Application of visible monochromatic auroral imaging data for modeling infrared Earth-limb morphology
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Low-Btu-gasifier emissions toxicology
[DE81-031000] N82-11651

LUNAR AND PLANETARY INST., HOUSTON, TEX.
Workshop on Early Crustal Genesis: Implications from Earth
[NASA-CR-164944] N82-11691

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MAINE UNIV., ORONO.
Effects of acid precipitation on cation transport in New Hampshire forest soils
[DE81-027494] N82-11648

MANLABS, INC., CAMBRIDGE, MASS.
Physical characterization of electronic materials
[AD-A104494] N82-11135

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Selected studies of four high-temperature air-pollution sources N82-11680

MARYLAND UNIV. BALTIMORE COUNTY, CATONSVILLE.
Boundary observability and controllability for diffusion equations
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Molecular events basic to cellular radiation response
[DE81-027898] N82-11776

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Aeroacoustic theory for noncompact wing-gust interaction
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[DE81-025540] N82-11973

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[DE81-027675] N82-11154

MCDONNELL AIRCRAFT CO., ST. LOUIS, MO.
Chemorheology and quality control for an adhesive
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MCDONNELL-DOUGLAS ASTRONAUTICS CO., HUNTINGTON BEACH, CALIF.
Production and characterization of pure cryogenic inertial fusion targets
[DE81-025920] N82-11937

MCDONNELL-DOUGLAS CORP., HUNTINGTON BEACH, CALIF.
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[DE81-029618] N82-11564
Second generation heliostat. Volume 2: Definition of a heliostat manufacturing facility
[DE81-029624] N82-11565

MCELROY (RALPH) CO., AUSTIN, TEX.
Report of laser activities: 1978 - 1979
[DE81-026997] N82-11459

MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.
Diaphragm Stirling engine heat-actuated heat pump development
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Liquid-particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[DE81-024075] N82-11429
Preliminary study of temperature measurement techniques for Stirling engine reciprocating seals
[NASA-CR-165479] N82-11466

MIAMI UNIV., FLA.
The volumes and heat capacities of nonelectrolytes and organic electrolytes in methanol at 25 C N82-11142

MICHIGAN DEPT. OF NATURAL RESOURCES, LANSING.
Geology and hydrology for environmental planning in Marquette County, Michigan
[PB81-221467] N82-11534

MICHIGAN UNIV., ANN ARBOR.
Time-variable Earth's albedo model characteristics and applications to satellite sampling errors
[NASA-CR-165761] N82-11723

MID-AMERICAN SOLAR ENERGY COMPLEX, BLOOMINGTON, MINN.
MASEC SOLAR 80 home designs
[DE81-026344] N82-11316

MIDWEST RESEARCH INST., GOLDEN, COLO.
User needs for solar decision-making tools: The homebuilding industry
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[DE81-030309] N82-11407
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[DE81-030507] N82-11563

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[DE81-025704] N82-11608
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[DE81-025906] N82-11609
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[DE81-025907] N82-11610
Ocean energy-waves, currents, and tides
[DE81-025706] N82-11611
Analysis of solar desiccant systems and concepts
[DE81-023027] N82-11612

MINNESOTA GAS CO., MINNEAPOLIS.
Peat biogasification development program
[DE81-028299] N82-11243

MINNESOTA UNIV., MINNEAPOLIS.
A study of metal-semiconductor contacts on indium phosphide
[AD-A104439] N82-11965

MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
Magnetohydrodynamic research program of the MHD Energy center at Mississippi State University and structural features of MHD radiant boilers
[DE81-029901] N82-11934

MISSISSIPPI UNIV., UNIVERSITY.
Acoustic cavitation studies
[AD-A104409] N82-11863

MISSOURI RIVER BASIN COMMISSION, OMAHA, NEBR.
Synthetic fuel development for the Upper Missouri River Basin. Section 13: Water assessment report
[PB81-224537] N82-11276
Great Plains gasification project, Mercer County, North Dakota; water assessment report
[PB81-216129] N82-11525

MITRE CORP., MCLEAN, VA.
US energy strategies: Some options for eliminating oil imports by the year 2000
[PB81-226052] N82-11626
Shuttle applications in tropospheric air quality observations
[NASA-CR-145374] N82-11635

MOUND LAB., MIAMISBURG, OHIO.
Manganese glass-molybdenum metallized and copper brazed 99.5% alumina ceramics
[DE81-030423] N82-11218

MUNISING PAPER DIV., NEENAH, WIS.
Development of battery seperator composites
[NASA-CR-165508] N82-11547

MYERS (RAYMOND H.), BLACKSBURG, VA.
Methods for presentation and display of multivariate data
[NASA-CR-165788] N82-11833
Applications of non-parametric statistics and analysis of variance on sample variances
[NASA-CR-165789] N82-11834

N

NAGOYA UNIV. (JAPAN).
Theory of drift instabilities and the associated anomalous transport
[IPPJ-REV-1] N82-11924
Least squares autoregressive (maximum entropy) spectral estimation for Fourier spectroscopy and its application to the electron cyclotron emission from plasma
[IPPJ-530] N82-11925
An energy integral and variational principle for plasma kinetic modes
[IPPJ-531] N82-11926
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[IPPJ-532] N82-11927
Oblique propagation of electron thermal modes below the electron plasma frequency without boundary effects
[IPPJ-533] N82-11928
Boosting up of neutral beam heating power by slowly rising toroidal field
[IPPJ-534] N82-11929

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Technology for large space systems: A special bibliography
[NASA-SP-7046(05)] N82-11093
Where are we in the space war?
[NASA-TM-76604] N82-11096
Hungarian cosmonaut in space
[NASA-TM-76719] N82-11097
Mission operation report: RCA-D/Delta launch
[NASA-TM-84063] N82-11102
The industrial processing of unidirectional fiber prepregs
[NASA-TM-76599] N82-11119
Silicon carbide as an oxidation-resistant high-temperature material. 1: Oxidation and heat corrosion behavior
[NASA-TM-76606] N82-11120
Study of certain features of the electronic structure of the ternary alloys Ni2(Mn, Fe) and Ni3(Mn, Co)
[NASA-TM-76620] N82-11160
Certain physical properties of cobalt and nickel borides
[NASA-TM-76623] N82-11185
Effects of alloying on aging and hardening processes of steel with 20% nickel
[NASA-TM-76624] N82-11186
Technical and economic aspects of hydrogen storage in metal hydrides
[NASA-TM-76610] N82-11223
The storage of hydrogen in the form of metal hydrides: An application to thermal engines
[NASA-TM-76609] N82-11225
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology
[NASA-TM-76628] N82-11636
Meridional heat transport at the onset of winter stratospheric warming
[NASA-TM-76614] N82-11697
Evaluation of photogrammetric flight under icing conditions on March 23, 1978
[NASA-TM-76617] N82-11725
Cyclic nucleotides in tissues during long-term hypokinesia
[NASA-TM-76726] N82-11757
Laser induced fluorescence from algae: Results of a ship-borne field test
[NASA-TM-76626] N82-11758
Electron microscopical and histochemical studies on the transverse striated muscles of birds after prolonged hypokinesia
[NASA-TM-76717] N82-11759
Participation of the hypophyseal-adrenal cortex system in thrombin clearance during immobilization stress
[NASA-TM-76729] N82-11760
Effects of curative treatment emphasizing endurance training on the performance and blood pressure of hypertensive and normotensives
[NASA-TM-76520] N82-11771
NASA Patent Abstracts bibliography: A continuing bibliography, section 1, abstracts. Supplement 19
[NASA-SP-7039(19)-SEC-1] N82-11981
NASA Patent Abstracts Bibliography: A continuing bibliography, section 2, indexes. Supplement 19
[NASA-SP-7039(19)-SEC-2] N82-11982
Agreement governing the activities of states on the Moon and other celestial bodies
[NASA-TM-76730] N82-11989
Radiation balances and the solar constant
[NASA-TM-76612] N82-12016

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Algorithm for fuel conservative horizontal capture trajectories
[NASA-TM-81334] N82-11018
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054
Optimum climb and descent trajectories for airline missions N82-11062
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations N82-11063
A computer solution to the stationary Navier-Stokes equations in two dimensions with proven convergence
[NASA-TM-81300] N82-11398

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. HUGH L. DRYDEN FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
Directional flow sensor
[NASA-CASE-FRC-11074-1] N82-11436

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Stirling cycle cryogenic cooler
[NASA-CASE-GSC-12697-1] N82-11312
Low noise tuned amplifier
[NASA-CASE-GSC-12567-1] N82-11359

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Cavity-backed, micro-strip dipole antenna array
[NASA-CASE-MSC-18606-1] N82-11336
Low temperature latching solenoid
[NASA-CASE-MSC-18106-1] N82-11357
Logic-controlled occlusive cuff system
[NASA-CASE-MSC-14836-1] N82-11770

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
Some observations on a new numerical method for solving Navier-Stokes equations
[NASA-TP-1934] N82-11032
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050
The effects of lateral aerodynamic uncertainties on the handling qualities of the space shuttle orbiter at Mach numbers of 1.5 and .6
[NASA-TM-83193] N82-11051
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Wind tunnel supplementary Mach number minimum section insert
[NASA-CASE-LAR-12532-1] N82-11088
An algorithm for minimum-cost set-point ordering in a cryogenic wind tunnel
[NASA-TP-1923] N82-11090
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[NASA-TM-83212] N82-11339
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[NASA-TP-1902] N82-11391
Small conductive particle sensor
[NASA-CASE-LAR-12552-1] N82-11431
Dynamic Moire methods for detection of loosened space shuttle tiles
[NASA-TM-83205] N82-11434
An improved transverse shear deformation theory for laminated antisotropic plates
[NASA-TP-1903] N82-11488
Research in nonlinear structural and solid mechanics
[NASA-CP-2147-SUPPL] N82-11489

SPAR data set contents
[NASA-TM-83181] N82-11816

Comparisons of some large scientific computers
[NASA-TM-81923] N82-11817

SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.

Low speed testing of the inlets designed for a tamden-fan V/STOL nacelle
[NASA-TM-82728] N82-11042

A summary of V/STOL inlet analysis methods
[NASA-TM-82725] N82-11043

Selected bibliography of NACA-NASA aircraft icing publications
[NASA-TM-81651] N82-11053

Testing of a spacecraft model in a combined environment simulator
[NASA-TM-82723] N82-11106

Voltage gradients in solar array cavities as possible breakdown sites in spacecraft-charging-induced discharges
[NASA-TM-82710] N82-11107

Novel improved PMR polyimides
[NASA-TM-82733] N82-11117

Trends in high temperature gas turbine materials
[NASA-TM-82715] N82-11182

Universal binding energy relations in metallic adhesion
[NASA-TM-82706] N82-11183

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[NASA-TM-82758] N82-11184

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[NASA-CASE-LEW-13080-2] N82-11210

Fabrication and wear test of a continuous fiber/particulate composite total surface hip replacement
[NASA-TM-81746] N82-11211

Lewis Research Center's coal-fired, pressurized, fluidized-bed reactor test facility
[NASA-TM-81616] N82-11397

High thermal power density heat transfer
[NASA-CASE-LEW-12950-1] N82-11399

Integrated analysis of engine
[NASA-TM-82713] N82-11491

Solar cell development for the power extension package
[NASA-TM-82665] N82-11551

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

Concept for a power system controller for large space electrical power systems
[NASA-TP-1939] N82-11109

Thermal control coatings based on trialkoxysilane hydrolysate binders
[NASA-CASE-MFS-25620-1] N82-11118

Static continuous electrophoresis device
[NASA-CASE-MFS-25306-1] N82-11147

Firefighting module development
[NASA-TM-82444] N82-11311

Motor power factor controller with a reduced voltage starter
[NASA-CASE-MFS-25586-1] N82-11360

Method for retarding dye fading during archival storage of developed color photographic film
[NASA-CASE-MFS-23250-1] N82-11432

Clamp-mount device
[NASA-CASE-MFS-25510-1] N82-11470

Space shuttle main engine controller
[NASA-TP-1932] N82-11784

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.

Fluidized bed coal combustion reactor
[NASA-CASE-NPO-14273-1] N82-11144

Scriber for silicon wafers
[NASA-CASE-NPO-15539-1] N82-11469

Sewage sludge additive
[NASA-CASE-NPO-13677-1] N82-11634

Automatic multi-banking of memory for microprocessors
[NASA-CASE-NPO-15295-1] N82-11785

System for controlled acoustic rotataion of objects
[NASA-CASE-NPO-15522-1] N82-11861

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).

New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034

A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035

New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067

Application of a rare-earth cobalt magnet to synchronous motors
[NAL-TR-656] N82-11356

A second-order accurate procedure for solving the boundary layer equations based on the predictor-corrector form of the Crank-Nicolson Scheme
[NAL-TR-655] N82-11826

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

Refracted-ray scanning (refracted near-field scanning) for measuring index profiles of optical fibers
[PB81-224610] N82-11920

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.

Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170

A compilation of thermodynamic and transport properties of aqueous sulfuric acid
[PB81-229171] N82-11172

Mass spectrometric studies of MHD slag thermochemistry
[PB81-221434] N82-11173

Energy dispersive X-ray spectrometry: Proceedings of a Workshop on Energy Dispersive X-Ray Spectrometry
[PB81-226334] N82-11177

Application of solidification theory to rapid solidification processing
[AD-A104561] N82-11214

Energy analysis for a sample building by the proposed ASHRAE simplified method
[DE81-027189] N82-11323

Semiconductor measurement technology ARPA/NBS Workshop Moisture Measurement Technology for Hermetic Semiconductor Devices
[PB81-220733] N82-11384

Technical activities of the Office of Environmental Measurements - 1980
[PB81-227660] N82-11677

Semiconductor measurement technology: The relationship between resistivity and dopant density for phosphorus and boron doped silicon
[PB81-221327] N82-11975

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.

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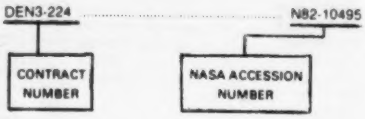

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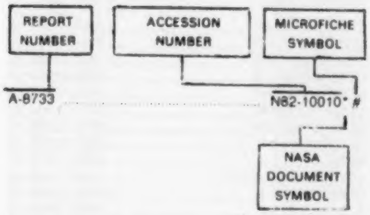

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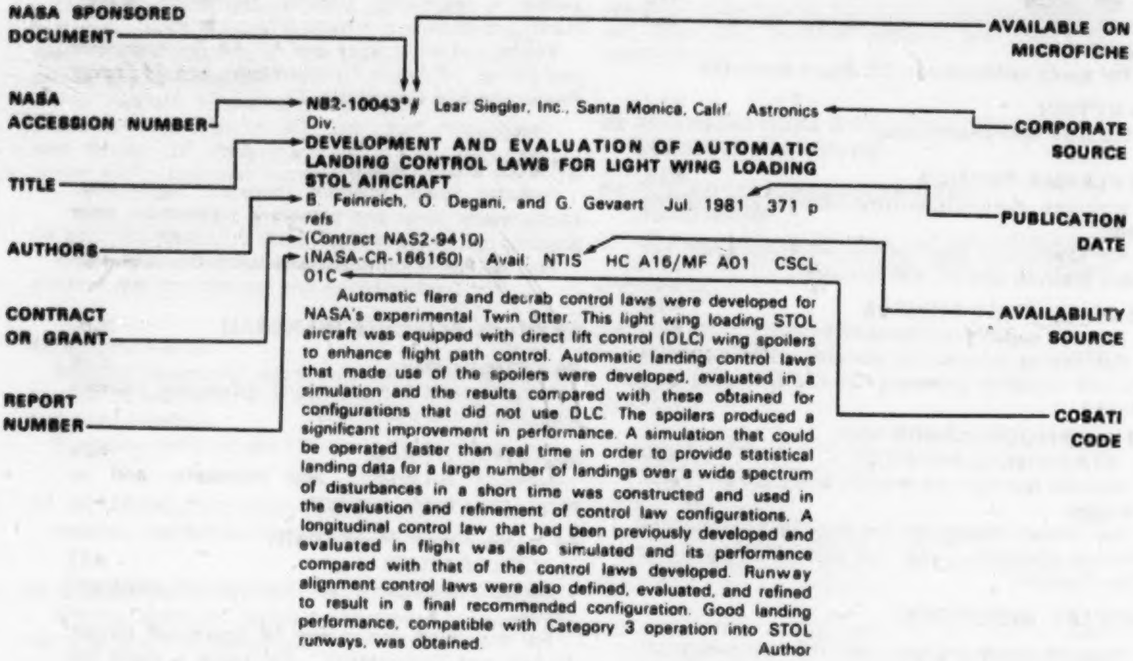
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DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT

B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs

(Contract NAS2-9410)

(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

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Scientific and Technical Aerospace Reports

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01 AERONAUTICS (GENERAL)

No abstracts in this category.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-12027 Royal Aircraft Establishment, Bedford (England).
LOW-SPEED MEASUREMENTS OF THE STATIC PRESSURE DISTRIBUTION AND OVERALL FORCES ON A CAMBERED AND A SYMMETRIC MILD GOTHIC WING OF ASPECT RATIO 1.4
P. J. Butterworth and D. G. Dobney May 1980 86 p refs
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A cambered wing of aspect of ratio 1.4 was tested in a low speed wind tunnel to determine its surface static pressure distribution at its designed, attached-flow incidence for comparison with the theoretical loading. In order to enable the effects of camber on the separated-flow characteristics of this planform to be isolated, the corresponding symmetric wing was also included in the test program and the results for the two wings are compared and empirical relationships found. The lift, drag, and pitching moment characteristics of each wing were measured over a range of Reynolds number for comparison with the results of the earlier force tests and those derived by integration of the measured pressure distributions. J.M.S.

N82-12028 City Univ. of New York, N. Y.
WAKE BOUNDARY LAYER INTERACTION IN TURBOMACHINERY Ph.D. Thesis
Satya Pal 1981 314 p
Avail: Univ. Microfilms Order No. 8120764

The wake developed from the trailing edge of a thin and smooth flat plate including the effect of free stream turbulence was studied analytically as well experimentally. The experimental measurements were taken in a low speed wind tunnel using crosswire anemometry for three levels of free stream turbulence. Experimental results are presented on mean velocity profile, wake center line velocity, half with width, displacement thickness, momentum thickness, energy thickness, shape factor, components of turbulence intensity increases the wake recovery and growth rates. The analytical investigation also lead to the establishment of two turbulence parameters. These parameters simulate the effect of free stream turbulence on the wake velocity and length scales. Free stream turbulence increases the turbulence intensity and Reynolds stress in the wake. Correlations are developed to predict the decay behavior of turbulence quantities. These correlations depend upon the trailing edge conditions, free stream turbulence level, drag coefficient and distance downstream from the trailing edge. A self-preservation of wake has been taken as the basic for obtaining the correlations for turbulence quantities. Dissert. Abstr.

N82-12029 Cornell Univ., Ithaca, N. Y.
UNSTEADY BOUNDARY LAYER SEPARATION Ph.D. Thesis
Leonard Louis vanDommelen 1981 261 p
Avail: Univ. Microfilms Order No. 8119518

Some clarity is brought into the subject of boundary layer separation. In particular it is shown that the boundary layer about the impulsively started circular cylinder starts to separate from the surface after about .75 diameter movement. This is achieved by numerical integration of the initial value problem and independently by matched asymptotic expansion of the solution. Other results include a viscous-inviscid interaction solution for upstream slipping separation, a proposal for downstream slipping separation, derivation of the most general form of the semi-similar solutions, the physics behind the boundary layer singularities of Banks and Zaturska and Bodonyi and Stewartson, and the Kelvin-Helmholtz instability mechanisms of rapidly expanding vortex sheets. Dissert. Abstr.

N82-12030 Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
THE NUMERICAL SOLUTION OF INCOMPRESSIBLE TURBULENT FLOW OVER AIRFOILS Ph.D. Thesis
Harwood Allan Hegna 1981 168 p
Avail: Univ. Microfilms Order No. 8119139

An algebraic eddy viscosity turbulence model based on Prandtl's mixing length theory was modified for separated adverse pressure gradient flows. Finite difference methods for solving the inviscid stream function equation and the incompressible laminar Navier-Stokes equations were used. A finite difference method for solving the Reynolds averaged incompressible turbulent two-dimensional Navier-Stokes equations were employed. Solutions for a NACA 0012 airfoil at angles of attack varying from five to 11.5 degrees at a chord Reynolds number of 170,000 were obtained. Velocity profiles near the airfoil surface and surface pressure distributions are presented and compared with experimental data. Lift and drag coefficients agree well with experimental values. Dissert. Abstr.

N82-12031 Arizona Univ., Tucson.
SUBCRITICAL AND SUPERCRITICAL AIRFOILS FOR GIVEN PRESSURE DISTRIBUTION Ph.D. Thesis
Ahmed Abdelatif HassanEissa 1981 82 p
Avail: Univ. Microfilms Order No. 8121930

An effective method, based on hodograph theory, was developed for the aerodynamic design of subcritical and shock-free supercritical airfoil sections. In addition to the free-stream conditions, the input to the design procedure includes a prescription of the subsonic part of a target pressure distribution and, for supercritical airfoils, of a presumed stream function on the sonic line. A computer program carries out a number of sequential steps that result in an airfoil with a pressure distribution close to that desired at little computational cost. Thus, the airfoil designer can alter the input if design goals are not met and quickly produce another candidate airfoil. This is aided by appropriate graphic display of the airfoil and its pressure distribution. Dissert. Abstr.

N82-12032 California Inst. of Tech., Pasadena.

AN EXPERIMENTAL STUDY OF A TURBULENT VORTEX RING Ph.D. Thesis

Ari Glezer 1981 120 p
Avail: Univ. Microfilms Order No. 8121060

An apparatus was constructed to study the formation and dynamics of vortex rings. The rings were formed in water by a momentary jet discharge downward into a glass tank from an orifice in a submerged plate. The necessary impulse was provided by a pressurized reservoir and is controlled by a fast programmable solenoid valve. A particular turbulent vortex ring with a relatively thin core was chosen for detailed study. The velocity field of this ring was measured at numerous locations in the tank, using a two-channel laser-Doppler velocimeter with digital tracking electronics. Beam splitting and frequency shifting were accomplished by two partially-overlapping radial phase gratings driven by hysteresis-synchronous motors. The aim was to verify the similarity properties of the turbulent vortex ring and to determine mean particle paths and mean vorticity contours in the appropriate non-steady similarity coordinates x/(1/4),r/t(1/4). Some novel pattern-recognition techniques were developed to overcome the problem of dispersion in the trajectories of individual vortices. Dissert. Abstr.

N82-12033 California Inst. of Tech., Pasadena.

THE COHERENT STRUCTURE OF TURBULENT MIXING LAYERS. 1: SIMILARITY OF THE PRIMARY VORTEX STRUCUTURE. 2: SECONDARY STREAMWISE VORTEX STRUCTURE Ph.D. Thesis

Luis Paulino Bernal 1981 106 p
Avail: Univ. Microfilms Order No. 8121056

The primary spanwise organized vortex structure and the secondary streamwise vortex structure of turbulent mixing layers were investigated. Flow visualization motion pictures of a constant density mixing layer were used to measure the properties of the large scale vortices. It was found that after an initial transition region mean of the large scale vortices reach the expected linear growth with downstream distance required by similarity. In the self-similar region, the vortex core area and visual thickness increase continuously during its life-span. A theoretical model of probability distribution function for the large-scale vortex circulation was developed. From this model the mean life-span of the vortices could also be obtained. The streamwise streak pattern observed in plan-view pictures of the mixing layer was investigated, using flow visualization and spanwise concentration measurements. It was confirmed that this pattern is the result of a secondary vortex structure dominated by streamwise, counter-rotating vortices. A detailed description of its spatial relation to the primary, spanwise vortex structure is presented. Dissert. Abstr.

N82-12034*# Raman Aeronautics Research and Engineering, Inc., Palo Alto, Calif.

AERODYNAMIC MEASUREMENTS CONCERNED WITH A TURRET MODEL

K. R. Raman May 1981 44 p refs
(Contract NAS2-10579)
(NASA-CR-166264) Avail: NTIS HC A03/MF A01 CSCL 01A

An experimental investigation was carried out in the 14 by 14 ft Ames transonic wind tunnel on a turret model. The aerodynamic parameters measured were steady and unsteady pressures (static and total fluid pressures), local mean velocities, and local mean densities at selected locations along the optical beam path for the azimuth look angles of 90, 120, and 150 degrees from the turret. The test stream Mach numbers considered are 0.55, 0.65 and 0.75, and the Reynolds number per meter is in the range of 10 million. The results indicate that severe optical degradation can be expected at aft look azimuth, angles, this degradation in optical performance increases as the azimuth angle is increased. The ratio of rms static pressure to the local mean static pressure peaks in the range of 0.07 to 0.12 and the ratio of rms total pressure to the local mean total pressure peaks in the range of 0.02 to 0.04. These values depend on the Mach number and the aft look azimuth angle. The scale lengths obtained from correlation considerations are also presented. J.M.S.

N82-12035*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DESCRIPTION AND CALIBRATION OF THE LANGLEY UNITARY PLAN WIND TUNNEL

Charlie M. Jackson, Jr., William A. Corlett, and William J. Monta Nov. 1981 104 p refs
(NASA-TP-1905; L-14024) Avail: NTIS HC A06/MF A01 CSCL 01A

The two test sections of the Langley Unitary Plan Wind Tunnel were calibrated over the operating Mach number range from 1.47 to 4.63. The results of the calibration are presented along with a a description of the facility and its operational capability. The calibrations include Mach number and flow angularity distributions in both test sections at selected Mach numbers and tunnel stagnation pressures. Calibration data are also presented on turbulence, test-section boundary layer characteristics, moisture effects, blockage, and stagnation-temperature distributions. The facility is described in detail including dimensions and capacities where appropriate, and example of special test capabilities are presented. The operating parameters are fully defined and the power consumption characteristics are discussed. B.W.

N82-12036*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

A PULSE-FORMING NETWORK FOR PARTICLE PATH VISUALIZATION

Kenneth W. McAlister Nov. 1981 18 p refs Prepared in cooperation with Army Research and Technology Labs., Moffett Field, Calif.
(NASA-TM-81311; A-8671; AVRADCOM-TR-81-A-21) Avail: NTIS HC A02/MF A01 CSCL 01A

A procedure is described for visualizing nonsteady fluid flow patterns over a wide velocity range using discrete nonluminous particles. The paramount element responsible for this capability is a pulse-forming network with variable inductance that is used to modulate the discharge of a fixed amount of electrical energy through a xenon flashtube. The selectable duration of the resultant light emission functions as a variable shutter so that particle path images of constant length can be recorded. The particles employed as flow markers are hydrogen bubbles that are generated by electrolysis in a water tunnel. Data are presented which document the characteristics of the electrical circuit and establish the relation of particle velocity to both section inductance and film exposure. Author

N82-12037# National Aerospace Lab., Tokyo (Japan).

WIND-TUNNEL INVESTIGATION OF THE SIDE-FORCE OF RECTANGULAR WINGLETS ON THE TIP OF A RECTANGULAR WING

Naoto Takizawa, Nagakatsu Kawahata, Noriaki Okada, and Akihito Iwasaki 1981 39 p refs Partly in JAPANESE; partly in ENGLISH
(NAL-TR-669; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

Wind tunnel tests were conducted on a rectangular wind of aspect ratio 6 with a NACA0012 section to investigate side-force characteristics of a vertical rectangular winglet A or B mounted on the left wing tip. Winglet A has 1/10 the area of the wing. Winglet B has half the span of A. The installation angle of the winglets to the wind chord was variable up to 20 and the angle of the 1/3-chord flap up to 30 deg. Low speed data were obtained over angles of attack of approximately 15 deg and at angles of sideslip of 0 deg to 10 deg. The results indicate that winglets produce favorable side-force characteristics applicable to direct side-force control devices of aircraft in landing approaches particularly in cross-wind landings. In order to check the results, a simple formula is proposed to calculate the induced side-force of a winglet by the lift of the main wing on the basis of the lifting line theory. It is shown from the results that the differences of side-forces between upper left and low right winglets of between normal and some variant winglets depend on the sign of pressure over the wing, the winglet, and the plate on the top of the winglet. J.M.S.

N82-12038# National Aerospace Lab., Tokyo (Japan).

TRANSONIC AIRFOIL DESIGN OF FULL POTENTIAL FLOW. 1: NUMERICAL PROCEDURE AND ITS COMPUTATIONAL EXAMPLES

Tomiko Ishiguro, Nobuhiko Kamiya, and Nobuhiro Kawai 1981 46 p refs In JAPANESE; ENGLISH summary
(NAL-TR-672; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

A computational inverse procedure for transonic airfoils, in which geometries are determined from prescribed target pressure distributions, is presented. This is an interactivé direct-inverse approach. The following two calculations are iterated until a target pressure distribution coincides with a direct solution on a temporary surface. One is the direct solution, which is calculated using the successive line over-relaxation method which solves the full inviscid compressible potential flow equation in the Neuman problem. The other is a modification of the temporary airfoil geometry, which is determined from the conservation law of mass flux using the normal velocity at the contour, which is obtained by solving the equation in the Dirichlet problem where the target pressure distribution is specified at the temporary contour. Futhermore, a boudary layer calculation is made and a displacement thickness is substracted to yield an actual airfoil geometry. Several examples illustrating this method are presented for flows with and without shock waves. Author

N82-12039*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.

A VORTEX-FILAMENT AND CORE MODEL FOR WINGS WITH EDGE VORTEX SEPARATION

Jenn-Louh Pao and C. Edward Lan Nov. 1981 132 p refs
(Contract NCC1-18)
(NASA-CR-164980; CRINC-FRL-424-1) Avail: NTIS HC A07/MF A01 CSCL 01A

A method for predicting aerodynamic characteristics of slender wings with edge vortex separation was developed. Semiempirical but simple methods were used to determine the initial positions of the free sheet and vortex core. Comparison with available data indicates that: the present method is generally accurate in predicting the lift and induced drag coefficients but the predicted pitching moment is too positive; the spanwise lifting pressure distributions estimated by the one vortex core solution of the present method are significantly better than the results of Mehrotra's method relative to the pressure peak values for the flat delta; the two vortex core system applied to the double delta and strake wing produce overall aerodynamic characteristics which have good agreement with data except for the pitching moment; and the computer time for the present method is about two thirds of that of Mehrotra's method. T.M.

N82-12040*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

PERFORMANCE AND LOADS DATA FROM A WIND TUNNEL TEST OF A FULL-SCALE, COAXIAL, HINGELESS ROTOR HELICOPTER

Fort F. Felker, III Oct. 1981 350 p Prepared in cooperation with Army Aviation Research and Development Command, Moffett Field, Calif.
(NASA-TM-81329; A-8732; USAAVRADCOM-TR-81-A-27) Avail: NTIS HC A15/MF A01 CSCL 01A

A full-scale XH-59A advancing blade concept helicopter was tested in Ames Research Center's 40 by 80 foot wind tunnel. The helicopter was tested with the rotor on and off, rotor hub fairings on and off, interrotor shaft fairing on and off, rotor instrumentation module on and off, and auxiliary propulsion thrust on and off. An advance ratio range of 0.25 and 0.45 with the rotor on and from 60 to 180 knots with the rotor off was investigated. Data on aerodynamic forces and moments, rotor loads, rotor control positions and viration for the XH-59A as well as the aerodynamic performance of the isolated rotor are presented. S.L.

N82-12041*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AEROELASTICITY MATTERS: SOME REFLECTIONS ON TWO DECADES OF TESTING IN THE NASA LANGLEY TRANSONIC DYNAMICS TUNNEL

Wilmer H. Reed, III Sep. 1981 19 p refs Presented at the Intern. Symp. on Aeroelasticity, Nuremberg, West Germany, 5-7 Oct. 1980 - 1 Oct. 1981
(NASA-TM-83210) Avail: NTIS HC A02/MF A01 CSCL 01A

Testing of wind-tunnel aeroelastic models is a well established, widely used means of studying flutter trends, validating theory and investigating flutter margins of safety of new vehicle designs. The Langley Transonic Dynamics Tunnel was designed specifically for work on dynamics and aeroelastic problems of aircraft and space vehicles. A cross section of aeroelastic research and testing in the facility since it became operational more than two decades ago is presented. Examples selected from a large store of experience illustrate the nature and purpose of some major areas of work performed in the tunnel. These areas include: specialized experimental techniques; development testing of new aircraft and launch vehicle designs; evaluation of proposed 'fixes' to solve aeroelastic problems uncovered during development testing; study of unexpected aeroelastic phenomena (i.e., 'surprises'); control of aeroelastic effects by active and passive means; and, finally, fundamental research involving measurement of unsteady pressures on oscillating wings and control surface. A.R.H.

N82-12042*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

EXPERIMENTAL AND ANALYTICAL STUDIES OF A MODEL HELICOPTER ROTOR IN HOVER

F. X. Caradonna and C. Tung Sep. 1981 61 p refs Presented at the 6th European Rotorcraft and Powered Lift Aircraft Forum, Bristol, England, 16-19 Sep. 1980 Prepared jointly with Army Aviation Research and Development Command
(NASA-TM-81232; A-8332; USAAVRADCOM-TR-81-A-23) Avail: NTIS HC A04/MF A01 CSCL 01A

A benchmark test to aid the development of various rotor performance codes was conducted. Simultaneous blade pressure measurements and tip vortex surveys were made for a wide range of tip Mach numbers including the transonic flow regime. The measured tip vortex strength and geometry permit effective blade loading predictions when used as input to a prescribed wake lifting surface code. It is also shown that with proper inflow and boundary layer modeling, the supercritical flow regime can be accurately predicted. J.M.S.

N82-12043*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

INTERACTION OF UPSTREAM FLOW DISTORTIONS WITH HIGH MACH NUMBER CASCADES

Gerald W. Englert 1981 21 p refs Proposed for presentation at the 27th Ann. Gas Turbine Conf., London, 18-22 Apr. 1982; sponsored by ASME
(NASA-TM-82759; E-1078) Avail: NTIS HC A02/MF A01 CSCL 01A

Features of the interaction of flow distortions, such as gusts and wakes with blade rows of advance type fans and compressors having high tip Mach numbers are modeled. A typical disturbance was assumed to have harmonic time dependence and was described, at a far upstream location, in three orthogonal spatial coordinates by a double Fourier series. It was convected at supersonic relative to a linear cascade described as an unrolled annulus. Conditions were selected so that the component of this velocity parallel to the axis of the turbomachine was subsonic, permitting interaction between blades through the upstream as well as downstream flow media. A strong, nearly normal shock was considered in the blade passages which was allowed curvature and displacement. The flows before and after the shock were linearized relative to uniform mean velocities in their respective regions. Solution of the descriptive equations was by adaption of the Wiener-Hopf technique, enabling a determination of distortion patterns through and downstream of the cascade as well as pressure distributions on the blade and surfaces. Details of interaction of the disturbance with the in-passage shock were discussed. Infuences of amplitude, wave length, and phase of the disturbance on lifts and moments of cascade configurations are presented. Numerical results are clarified by reference to an especially orderly pattern of upstream vertical motion in relation to the cascade parameters. R.J.F.

N82-12044# Nielsen Engineering and Research, Inc., Mountain View, Calif.

A SYMPOSIUM ON TRANSONIC FLOW RESEARCH

David Nixon Sep. 1981 25 p refs Symp. held at Amer. Res. Center, 19-20 Feb. 1981
(Contract N00017-80-C-0803)
(AD-A104871; NEAR-TR-255) Avail: NTIS HC A02/MF A01 CSCL 20/4

This report documents the organization and operation of the 'Transonic Perspective' conference held at NASA/Ames Research Center, February 19-20, 1981. After a period of decline in the 1960's transonic flow research has made rapid progress in the last decade. This is partly due to a renewed interest in the transonic regime for both military and civil aircraft and partly to the availability of large computers, which gave considerable impetus to the development of numerical prediction methods for realistic flows. However, not all the significant research of the decade is in the field of predictive methods; other topics such as experimental techniques for unsteady transonic flows and the super-critical wind technology, are also of importance. Much of the work in the various sub-topics of transonic flow research is done by small groups and sometimes these groups operate in relative isolation to other work in other topics. It is suggested, sometimes, that research workers concentrate on their own speciality so much that they consider their achievements as ends in themselves, rather than relating their results to the dominant problem of understanding and prediction of real, practical, transonic flow problems. GRA

N82-12045# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

A SOURCE-DOUBLET APPROACH TO MODELING TRIPLE EJECTOR RACK STORE CONFIGURATIONS AND FORCE CALCULATIONS Final Report, Feb. 1979 - Jul. 1980

Calvin L. Dyer and Charles B. Heath Jul. 1981 95 p refs
(AF Proj. 2403)
(AD-A105427; AFWAL-TR-81-3059) Avail: NTIS HC A05/MF A01 CSCL 20/4

The method presented in this report extends the FDL Subsonic Store Separation Program to include the aerodynamic modeling of the separating store as well as adjacent stores and the ejector rack. In the work presented in AFFDL-TR-74-130 only the volume effects of the stores and ejector rack are accounted for and Slender Body theory is used to calculate forces and moments on the separating store. In this report, doublets are used to model the upwash and sidewash of adjacent stores and the ejector rack. The induced flow-field portion of the total aircraft flow-field is included in the boundary conditions. Once the non-uniform flow-field has been modeled, three-dimensional point sources and doublets along the separating store axis are used to calculate loadings. Store loadings using Slender Body theory and the Source-Doublet method are compared to wind tunnel data. It is hoped that this method might offer a viable alternative to a complete mutual interference solution such as a paneling approach. Author (GRA)

N82-12046# Ballistic Research Labs., Aberdeen Proving Ground, Md. Ballistic Research Lab.

AUTOMATIC PLOTTING ROUTINES FOR ESTIMATING STATIC AERODYNAMIC PROPERTIES OF LONG ROD FINNED PROJECTILES FOR 2,M,5

William F. Donovan, Michael J. Nusca, and Susan A. Wood Aug. 1981 80 p refs
(DA Proj. 1L1-62617-AH-19)
(AD-A104900; ARBRL-MR-03123) Avail: NTIS HC A05/MF A01 CSCL 19/4

A predictive program for the estimation of static aerodynamic coefficients for long rod projectiles at 2<M5 is presented in desk top (Tektronix 4051) computer context. The technique is demonstrated by application to a typical projectile for which range data is available for comparison. Author (GRA)

N82-12047# ARO, Inc., Arnold Air Force Station, Tenn.

EVALUATION AND WIND TUNNEL TESTS OF THE 4,000 LB (NORMAL-FORCE) PITCH/YAW AND ROLL DYNAMIC STABILITY BALANCE SYSTEMS FOR MEASURING DIRECT, CROSS, AND CROSS-COUPLING DERIVATIVES Final Report, 5 Jun. 1978 - 25 May 1979

T. D. Buchanan, S. M. Coulter, and E. J. Marquart Sep. 1981 79 p refs
(AD-A105122; AEDC-TR-80-12) Avail: NTIS HC A05/MF A01 CSCL 20/4

Early in the 1970's, the personnel at the Arnold Engineering Development Center (AEDC) recognized the need for a set of new dynamic test mechanisms for testing aircraft models at high angles of attack. At these angles of attack cross and cross-coupling derivatives may be significant in determining the aircraft's stability. Dynamic balances were fabricated to perform pitch, yaw, and roll dynamic stability tests of aircraft or large missile models at AEDC. The balances were designed to measure not only the direct derivatives but also cross and cross-coupling derivatives. The set of balances comprises a 4,000-lb (normal-force) roll and a 4,000-lb pitch/yaw forced-oscillation balance to measure the direct damping derivatives and a five-component can-type balance to measure the cross and cross-coupling derivatives attributable to pitch or yaw. Extensive laboratory investigations of the balances' static and dynamic response characteristics were performed before wind tunnel tests of a 1/9-scale F-16A model in the AEDC Propulsion Wind Tunnel (16T) at Mach numbers from 0.2 to 1.4. GRA

N82-12048# Southeastern Center for Electrical Engineering Education, Inc., St. Cloud, Fla.

ON VORTEX BREAKDOWN AND INSTABILITY Final Technical Report, 18 May - 25 Jul. 1980

Shiva N. Singh and Wilbur L. Hankey Wright-Patterson AFB, Ohio AFWAL Mar. 1981 32 p refs
(Contract F49620-79-C-0038; AF Proj. 2307)
(AD-A104980; AFWAL-TR-81-3021) Avail: NTIS HC A03/MF A01 CSCL 20/4

A literature survey on the vortex breakdown phenomenon is presented. Several theoretical and numerical models which have been proposed and applied to explain the experimental observations concerning vortex bursting are reviewed. Required parameters to perform the related stability analysis have been identified. Appropriate criteria where possible are cited to assist engineers in estimating occurrence of vortex bursting. A numerical scheme to compute and verify some of the results for incompressible inviscid unstable modes is programmed on the computer at WPAFB. It is suggested that the influence of adverse pressure gradient on the vortex breakdown be investigated in detail and results thus obtained be compared with experiments under appropriate conditions. Author (GRA)

N82-12049# Hamburg Univ. (West Germany). Inst. fuer Schiffbau.

CALCULATION OF STATIONARY TRANSONIC FLOWS USING THE INTEGRAL EQUATION METHOD Final Report [INTEGRALGLEICHUNGSVERFAHREN FUER STATIONAERE TRANSSONISCHE STROEMUNGEN]

R. Voss Jan. 1979 50 p refs In GERMAN
(Contract DFG-IS-10/27)
(Rept-374) Avail: NTIS HC A03/MF A01

The suitability of the integral equation method for solving complex transonic flow problems is examined. In order to take into account compression shocks occurring in transonic rotor flows, it is necessary to formulate the integral flow equations so that the contribution of the shock emerges explicitly, rendering these equations substantially more complex. The method was developed, taking as examples plane potential flow and the homogeneous stream along an airfoil. In spite of the complexity of the method, a rough approximation of the solution is obtained, serving as a starting point for a numerical difference method and representing a considerable saving of time for this computer intensive difference method. Author (ESA)

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N82-12050

APPLICATION OF SINGULAR PERTUBATION THEORY TO ONBOARD AIRCRAFT TRAJECTORY OPTIMIZATION Ph.D Thesis

Abhijit J. M. Chakravarty 1981 139 p

Avail: Univ. Microfilms Order No. 8121183

The problem of minimizing direct operating cost in dollars (combined cost per hour and cost of fuel per hour) for a typical commercial jet transport model is formulated via the Pontryagin minimum principle. Singular perturbation theory is applied to reduce the computational burden of solving the resulting optimal control problem. The work of previous investigators is extended to include the aircraft weight variation in the state equations and the resulting seven-state model is analyzed for time scale separation. It is shown that a realistic time scale separation involves only two scales. The resulting model is then used to develop the inner and outer solutions as dictated by singular perturbation theory. Both the free terminal time problem and the time controlled 4-D problem are considered. A comprehensive model for the aerodynamic and fuel flow terms appearing in the equations is developed for use in optimal trajectory computation. Numerical results are presented that illustrate the nature of the optimal trajectory and the control variables. Dissert. Abstr.

N82-12051*# Virginia Univ., Charlottesville. School of Engineering and Applied Science.

TRANSPORTATION SYSTEMS EVALUATION METHODOLOGY DEVELOPMENT AND APPLICATIONS, PHASE 3 Final Report

A. Robert Kuhlthau, I. D. Jacobson, and L. C. Richards Jun. 1981 82 p

(Contract NAS1-14908)

(NASA-CR-164999; UVA/528175/MAE-CE81/101) Avail: NTIS HC A05/MF A01 CSCL 01B

Transportation systems or proposed changes in current systems are evaluated. Four principal evaluation criteria are incorporated in the process, operating performance characteristics as viewed by potential users, decisions based on the perceived impacts of the system, estimating what is required to reduce the system to practice; and predicting the ability of the concept to attract financial support. A series of matrix multiplications in which the various matrices represent evaluations in a logical sequence of the various discrete steps in a management decision process is used. One or more alternatives are compared with the current situation, and the result provides a numerical rating which determines the desirability of each alternative relative to the norm and to each other. The steps in the decision process are isolated so that contributions of each to the final result are readily analyzed. The ability to protect against bias on the part of the evaluators, and the fact that system parameters which are basically qualitative in nature can be easily included are advantageous. S.L.

N82-12052*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

INVESTIGATION OF SEVERE LIGHTNING STRIKE INCIDENTS TO TWO USAF F-106A AIRCRAFT

J. Anderson Plumer Hampton, Va. NASA. Langley Research Center Sep. 1981 19 p

(Contract NAS1-15884)

(NASA-CR-165794; LT-80-56) Avail: NTIS HC A02/MF A01 CSCL 01C

The results of the inspection and analysis of two F-106A aircraft that were struck by separate lightning strikes within a few minutes of each other are presented. Each aircraft sustained severe lightning strikes to the pitot booms, resulting in extensive damage to the pitot heater power harness, number 8 ground wire, and lightning suppressors, but there was no damage to either aircraft's electrical or avionic systems. A simulated lightning current of 226 kA and 3.8 million A(2)*S was required to reproduce the damage to the ground wires in the radomes. Photographs and detailed assessments of the damage are included. R.J.F.

N82-12053# Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.

AN ANALYSIS OF CIVIL AVIATION PROPELLER-TO-PERSON ACCIDENTS: 1965-1979

William E. Collins, Angelo R. Mastrullo, William R. Kirkham, Deborah K. Taylor, and Paula M. Grape May 1981 13 p refs

(AD-A105365; FAA-AM-81-15) Avail: NTIS HC A02/MF A01 CSCL 01/2

The interest of manufacturing, governmental, and safety personnel using paint schemes on propeller and rotor blades is based on improving the visual conspicuity of those blades when they are rotating. While propeller and rotor paint schemes may serve to reduce the number of fatalities and injuries due to contact with a rotating blade there is little information available regarding analyses of the circumstances surrounding such accidents. Brief reports provided by the National Transportation Safety Board of all 'propeller-to-person' accidents from 1965 through 1979 were examined and analyzed in terms of airport lighting conditions, actions of pilots, actions of passengers and ground crew, phase of flight operation, weather conditions, and others. Analyses based on a total of 319 accidents showed a marked drop in the frequency of 'propeller-to-person' accidents from 1975 through 1978. Several types of educational efforts directed toward pilots and ground crew, both prior to and during that 4-year period, were examined as possible factors contributing to the accident rate decline. Accident patterns provide a basis for assessing the probable efficacy of various recommendations (including propeller conspicuity) for further reducing 'propeller-to-person' accidents. Author (GRA)

N82-12054# Federal Aviation Administration, Washington, D.C. Office of Aviation Safety.

COMPUTER AIR CARRIER SYMPOSIUM

16 Jan. 1981 248 p refs Symp. held at Washington, D.C., 15-16 Jan. 1981

(AD-A104894; FAA-ASF-300-81-6) Avail: NTIS HC A11/MF A01 CSCL 01/2

Partial Contents: Working Session I -- Simulation, Fitness, and Safety Analysis; Working Session II -- Airports and Airways; and Working Session III -- Human Factors. GRA

N82-12055# Federal Aviation Administration, Washington, D.C. Office of Aviation Safety.

SUMMARY OF FEDERAL AVIATION ADMINISTRATION RESPONSES TO NATIONAL TRANSPORTATION SAFETY BOARD SAFETY RECOMMENDATIONS Quarterly Report, Jan. - Mar. 1981

R. E. Livingston and C. A. Carpenter Apr. 1981 243 p refs

(AD-A104922; FAA-ASF-81-3) Avail: NTIS HC A11/MF A01 CSCL 01/2

This report contains NTSB recommendations and all FAA responses to Board recommendations that were delivered to the Board during the applicable quarter. In addition, the report includes NTSB requests and FAA responses concerning reconsiderations, status reports, and followup actions. The Table of Contents for this report reflects only those NTSB recommendations which are still open pending FAA action (i.e., those that have not been designated as 'Closed' by the NTSB as a result of acceptable action). Accordingly, the Table of Contents may reflect a number of multiple recommendations (example: A-79-21 through 24), but background material is included only for those recommendations which remain in an 'Open' status. Background information for those recommendations which have been closed is available in FAA Headquarters files. Author (GRA)

N82-12056# Federal Aviation Administration, Atlantic City, N.J. Technical Center.

INDEX OF NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER TECHNICAL REPORTS 1972 - 1977 Final Report, 1972 - 1977

Ruth J. Farrell, comp. and Nancy G. Boylan, comp. May 1981 201 p

(FAA Proj. 999-113-000)

(AD-A104759; FAA-CT-81-54) Avail: NTIS HC A10/MF A01 CSCL 01/3

This report is an index of all technical reports which were assigned NA numbers and published by NAFEC during the period 1972 through 1977. Entries are arranged by NA number and include titles, authors and full abstracts. Separate sections contain indexes by subject, author, and RD number. Author (GRA)

N82-12057# Textron Bell Helicopter, Fort Worth, Tex.
INVESTIGATION OF THE STRUCTURAL DEGRADATION AND PERSONNEL HAZARDS RESULTING FROM HELICOPTER COMPOSITE STRUCTURES EXPOSED TO FIRES AND/OR EXPLOSIONS Final Report, Mar. 1979 - Dec. 1980
Raymond J. Schiltz, Jr. Aug. 1981 111 p refs
(Contract DAAK51-79-C-0009; DA Proj. 1L1-62209-AH-76)
(AD-A104757; USAAVRADCOM-TR-81-D-16) Avail: NTIS HC A06/MF A01 CSCL 13/12

A program was undertaken to investigate the structural degradation and personnel hazards resulting from exposure of helicopter composite structures to fire and/or explosion. The program consisted of a technical survey, a test program, and an analysis phase. A major part of the technical survey was a literature survey. In addition, organizations working in the fields of interest were contacted for information, and some were visited for further, detailed discussions. The computer programs currently available for modeling enclosure fires were screened, and one was chosen for further study. The test program consisted of a series of tests on two representative helicopter structures: a sheet-stiffened, built-up door of Kevlar 49 fabric impregnated with an epoxy resin, and a honeycomb sandwich fuselage shell structure of graphite/epoxy fabric skins on a Nomex honeycomb core. The tests conducted on materials from these structures were smoke generation tests, and structural degradation tests. Ballistic tests on the complete test article were conducted to determine whether the structures would ignite under HEI impact conditions. Based on the survey and testing, design criteria for structural composite components were investigated and, when appropriate, formulated. Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N82-12058# National Aerospace Lab., Tokyo (Japan).
STUDY ON STRAPDOWN INERTIAL NAVIGATION REDUNDANT SENSOR SYSTEM
Hirokimi Shingu 1981 26 p refs In JAPANESE; ENGLISH summary
(NAL-TR-660; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

An efficient method of increasing the reliability of a strapdown inertial navigator by use of a redundant sensor is described along with a preliminary technique to detect and isolate the sensor failures, and how to determine the tolerance limits of the detection delay. The reliability and the accuracy of various redundant systems using four five and six-sensor are analyzed. It is found that models of nonorthogonal orientation have higher reliability than those of orthogonal orientation using the same number of sensors. If the sensor arrays are optimum, the improvement of accuracy was found to be 13.4%, 22.5%, and 29.3% for four five and six-sensor systems in comparison with conventional three-sensor arrays when all sensors are operating normally. A trail to detect a sensor failure and to find a way to compensate for performance degradation of a system is done by using a set of parity equations. The system is a six-sensor array. The method is one of substituting the integrated values of the sensor data into those equations in order that the detection performance be better. The detection is evaluated as a quantitative relation to the navigational error on the assumption that a redundant system is employed for a mission. J.M.S.

N82-12059# Federal Aviation Administration, Atlantic City, N.J.
FLIGHT EVALUATION OF LORAN-C AS A HELICOPTER NAVIGATION AID IN THE BALTIMORE CANYON OIL EXPLORATION AREA Final Report, Mar. - May 1979
William A. Lynn May 1981 43 p
(FAA Proj. 045-390-130)
(AD-A105260; FAA-CT-80-53; FAA-RD-81-27) Avail: NTIS HC A03/MF A01 CSCL 17/7

A series of flight tests were conducted to investigate the use of long range navigation (LORAN)-C as a helicopter navigation system in the offshore New Jersey Baltimore Canyon oil exploration area. Tests were flown aboard the Federal Aviation Adminstration (FAA) Technical Center's CH-53A using a Teledyne Systems TDL-711 LORAN Micro-Navigator. The purpose of the tests was to determine the accuracy and operational usability of LORAN-C for offshore en route navigation and nonprecision approaches. The total system accuracy met or exceeded the requirements of Advisory Circular (AC) 90-45A 'Accuracy Requirements of Area Navigation Systems' for terminal and en route phases of flight, provided the proper LORAN triads were selected." The LORAN-C System did not meet AC 90-45A nonprecision approach accuracy criteria. Author (GRA)

N82-12060# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
THE USE OF GROUNDSPEED, IN A WIND SHEAR AND THE FLIGHT EVALUATION OF A RADAR-ALTIMETER-BASED SYSTEM FOR THE MEASUREMENT OF GROUNDSPEED Final Report, Jan. 1978 - Oct. 1980
David Lawrence Jul. 1981 44 p refs
(AD-A104758; FAA-CT-81-34; ACT-100F) Avail: NTIS HC A03/MF A01 CSCL 04/2

The use of groundspeed in combination with airspeed has been considered and shown to be an effective aid in the execution of an approach and landing in a heavy jet transport airplane. A flight dynamics analysis shows that the response of such aircraft to sudden changes in headwind is quite sluggish, requiring more than 100 seconds for equilibrium conditions to be regained in the worst case. A feasibility demonstration model of a radar-altimeter-based system for the measurement of groundspeed has been subjected to a limited in-flight evaluation. It is a self-contained unit requiring no ground-based equipment and no on-board equipment other than the small flush transmit and receive antennas and the associated cable runs. While the current unit does not meet the desired accuracy standard (delta = + or 3 knots, or less), it approaches it at times, and greater accuracy can be achieved with further development. Responsiveness to rapidly changing groundspeed matched that of the reference inertial navigation system; and satisfactory groundspeed tracking was maintained during turning, climbing, and descending flight. Author (GRA)

N82-12061# Ohio Univ., Athens. Dept. of Electrical Engineering.
MLS PERFORMANCE ASSESSMENT, TASK 4. VOLUME 1: EVALUATION PROCEDURES AND EQUIPMENT DESIGN Final Report
Robert W. Lilley, Richard H. McFarland, and Walter D. Phipps Dec. 1980 83 p refs
(Contract DOT-FA79NA-6030)
(AD-A105393; EER-47-2-Vol-1; FAA-CT-81-50-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 17/7

Preliminary flight-check procedures and system tolerances for the Microwave Landing System (MLS) are presented. A data-collection and recording package for use in light-aircraft measurement of MLS parameters in support of the System Test and Evaluation Program (STEP) is included containing a ground reference system, digital telemetry link airborne MLS sensor unit and system computation/display element. Author (GRA)

N82-12062# Teledyne Systems Co., Northridge, Calif.
DESIGN STUDY REPORT FOR GENERAL AVIATION LORAN-C RECEIVER Final Report
H. L. Walker and R. Ellerbe May 1981 257 p
(Contract DT-FA01-80-C-10108)
(AD-A104921; FAA/RD-81/36) Avail: NTIS HC A12/MF A01 CSCL 17/7

This document summarizes the results of studies and trade-off

analysis conducted for a low cost Loran-C Receiver. The Loran-C Receiver is intended to meet the Minimum Operational Performance Standards for area Navigation (RNAV) equipment for General Aviation Aircraft operating in the National Aerospace System. The studies and analysis examined the required receiver performance, design approaches and design criteria, and cost to the user of the receiver. The study concludes that a low cost receiver meeting the General Aviation RNAV requirements is practical. A design approach for the receiver is described.
Author (GRA)

N82-12063# Technische Hogeschool, Delft (Netherlands).
ORIENTING DESCRIPTION OF AIR TRAFFIC CONTROL IN THE NETHERLANDS [ORIENTERENDE BESCHRIJVING VAN DE LUCHTVERKEERSLEIDING IN NEDERLAND]
W. H. vanTuijl Aug. 1979 84 p refs In DUTCH
(VTH-LR-285) Avail: NTIS HC A05/MF A01

A general impression is given of air traffic control (ATC) in the Netherlands and of the signal automatic radar data processing (SARP) air traffic control system for Schiphol airport emphasizing safety and efficiency. Flight conditions, air structure, and navigation and landing aids of the ATL system are described. In the SARP system, data relative to position and flight plans are, on a real time basis, processed by a set of computers and distribued. Task sharing in SARP, its technical layout, its operational layout, operational functions and flight data are reviewed. Author (ESA)

N82-12064# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
THE EFFECT OF VISUAL INFORMATION ON MANUAL APPROACH AND LANDING
P. H. Wewerinke 28 Apr. 1980 20 p refs Presented at 16th Ann. Conf. on Manual Control, Cambridge, Mass., 5-7 May 1980 Abbreviated version of NLR-TR-80055-U
(NLR-MP-80019-U; NLR-TR-80055-U) Avail: NTIS HC A02/MF A01

The effect on approach performance of visual scene information, in combination with basic display information, is discussed for the manual approach and landing task. Good, poor, and night visibility conditions are considered, combined with basic head-up display configurations representing a variety of visual cues (runway contours, etc). A pre-experimental model analysis was performed in terms of an optimal control model. The resulting aircraft approach performance predictions were compared with the results of a moving base simulator program. The results illustrate that the model provides a meaningful description of the visual (scene) perception process involved in the complex (multivariable, time varying) manual approach task with a useful predictive capability. The theoretical framework is shown to allow a straight forward investigation of the complex interaction of a variety of task variables. Author (ESA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-12065*# Foster-Miller Associates, Inc., Waltham, Mass.
EXPERIMENTAL AND ANALYTICAL STUDIES OF ADVANCED AIR CUSHION LANDING SYSTEMS Final Report
E. G. S. Lee, A. B. Boghani, K. M. Captain, H. J. Rutishauser, H. L. Farley, R. B. Fish, and R. L. Jeffcoat Washington NASA Nov. 1981 188 p refs
(Contract NAS1-15051)
(NASA-CR-3476) Avail: NTIS HC A09/MF A01 CSCL 01C

Several concepts are developed for air cushion landing systems (ACLS) which have the potential for improving performance characteristics (roll stiffness, heave damping, and trunk flutter), and reducing fabrication cost and complexity. After an initial screening, the following five concepts were evaluated in detail: damped trunk, filled trunk, compartmented trunk, segmented trunk, and roll feedback control. The evaluation was based on tests performed on scale models. An ACLS dynamic simulation developed earlier is updated so that it can be used to predict the performance of full-scale ACLS incorporating these refinements. The simulation was validated through scale-model tests. A full-scale ACLS based on the segmented trunk concept was fabricated and installed on the NASA ACLS test vehicle, where it is used to support advanced system development. A geometrically-scaled model (one third full scale) of the NASA test vehicle was fabricated and tested. This model, evaluated by means of a series of static and dynamic tests, is used to investigate scaling relationships between reduced and full-scale models. The analytical model developed earlier is applied to simulate both the one third scale and the full scale response. S.L.

N82-12066# Aeronautical Research Labs., Melbourne (Australia).
FLIGHT TRAIL OF THE AIRCRAFT FATIGUE DATA ANALYSIS SYSTEM (AFDAS) Mk 2 PROTOTYPE
P. J. Howard Dec. 1980 37 p refs
(AD-A105270; ARL/STRUC-NOTE-466; AR-002-249) Avail: NTIS HC A03/MF A01 CSCL 01/3

A prototype version of the Aircraft Fatigue Data Analysis System (AFDAS) has been evaluated in flight trials by a comparison with continuously recorded data. Over a limited period of test the range-mean-pairs count of strain cycles was the same for both sets of data, and the gains calculated for the AFDAS are identical to those deduced from the continuous record. Author (GRA)

N82-12067# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.
ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM (EMMADS) Final Report, Jun. 1977 - Jun. 1981
Jun. 1981 38 p refs
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85)
(AD-A105082; ACS-12386; USAAVRADCOM-TR-79-F-270)
Avail: NTIS HC A03/MF A01 CSCL 01/3

The design and fabrication of a programmable feasibility model of an electronic master monitor and advisory display system for helicoptrs is described. Functional requirements and system interfaces for signal analysis were determined for the helicopters studied. Human factors studies developed formats for reducing crew workloads and maximizing crew performance. Methods of data transfer from sensors to the monitor system were analyzed and appropriate interfaces and data transmission media were recommended. The programmable feasibility model is discussed.
R.J.F.

N82-12068# McDonnell Aircraft Co., St. Louis, Mo.
APPLICATION OF PULSE CODE MODULATION (PCM) TECHNOLOGY TO AIRCRAFT DYNAMICS DATA ACQUISITION Final Report, May 1979 - Jan. 1981
C. A. Detmer, C. J. Guenther, and J. H. Rixleben Apr. 1981 431 p refs
(Contract F33615-79-C-3205; AF Proj. 2401)
(AD-A104775; AFWAL-TR-81-3017) Avail: NTIS HC A19/MF A01 CSCL 14/2

AFWAL/FIBG has a facility that provides dynamics data acquisition and analysis to support ground and flight testing on Air Force systems. This capability is limited by the current analog data acquisition technology to the acquisition of 12 data channels simultaneously of 40 to 50 dB dynamic range. This report documents a study conducted to obtain an optimum data acquisition and analysis system using PCM technology to provide simultaneous acquisition of 144 channels with 60 to 70 dB dynamic range. Implementation of this design will advance the state-of-the-art for acquisition of high bandwidth (20 KHz) dynamics data and will result in a significant reduction in the cost of flight tests. Author (GRA)

N82-12069# Aeronautical Research Labs., Melbourne (Australia).
A VAPOUR CYCLE CABIN COOLING SYSTEM FOR THE SEA KING MK.50 HELICOPTER
Brian Rebbechi Feb. 1980 59 p refs
(AD-A105211; ARL/MECH-ENG-155; AR-002-793) Avail: NTIS HC A04/MF A01 CSCL 13/1

An experimental determination has been made of the design requirements for a cabin cooling system in the Sea King Mk. 50

helicopter. The purpose of this system is to bring the cabin environment in the helicopter to an acceptable level for effective crew performance. Cooling was provided by an experimental vapour cycle cooling system. Results of the trials have been used to formulate a heat transfer model of the cabin to enable prediction of required cooling capacity for extreme climatic conditions. A comparison, based on the trials results, is made between the performance attainable by a vapour cycle cooling system, and an air cycle system using the available engine bleed.
Author (GRA)

N82-12070# Hochschule der Bundeswehr, Munich (West Germany). Flugmechanik und Flugfuehrung.
EFFECTS OF AERODYNAMIC COUPLING ON THE DYNAMICS OF ROLL AIRCRAFT
Gottfried Sachs and Werner Fohrer Jan. 1981 48 p refs In GERMAN; ENGLISH summary
Avail: NTIS HC A03/MF A01

The effects of coupling of longitudinal and lateral aerodynamic characteristics on the dynamics of aircraft roll were studied, using simplified relations and complete six-degree of freedom calculations. The aerodynamic coupling is caused by unsymmetric flow conditions resulting from sideslipping, where rolling moments due to angle of attack and pitching moments due to angle of sideslip, are of particular significance for the problem. It is shown that the attainable rate of roll is significantly influenced and that marked effects on stability are possible. Furthermore, it is shown that aerodynamic coupling can cause autorotation, i.e., a rolling motion without aileron forcing moments. Author (ESA)

N82-12071# Loughborough Univ. of Technology (England). Dept. of Transport Technology.
MATHEMATICAL MODELS AND DIGITAL SIMULATION OF HYDRAULIC CONSTANT SPEED DRIVE UNITS FOR AIRCRAFT ELECTRICAL SUPPLY SYSTEMS, VOLUME 1
L. Taitsilonis and D. McLean Aug. 1981 180 p refs
(Contract Min-DEF/ERC/9/4/2170/074XR/EP)
(TT-8102-Vol-1) Avail: NTIS HC A09/MF A01

A mathematical model which represents the dynamic behavior of hydraulic constant speed drive units (CSDU) is presented. The model forms the basis of a complete digital simulation program, written in the ICL Continuous System Simulation Language (CSSL) called SLAM. The CSDU's used are sunstrand AE 8906 and AE 8050. Dynamic responses, obtained from AE 8050, are compared with similar responses obtained from digital simulation studies in order to validate the model. A number of suggestions are also presented for future application and extension of the mathematical model and the corresponding simulation. These include the use of electronic governing and the possible use of a CSDU as a starter generator.
Author (ESA)

N82-12072# Engins Matra, Velizy (France). Lab. Central.
ADVANTAGES AND LIMITATIONS OF VARIOUS MATERIALS USED IN THE CONSTRUCTION OF MODULES [ATOUT ET LIMITES D'EMPLOIS DES DIVERS MATERIAUX UTILISES DANS LA CONSTRUCTION DES CELLULES]
G. Hilaire 30 Jul. 1981 39 p In FRENCH Presented 9th Colloq. Aciers et Alliages Speciaux dans les Ind. Aerospatiales, Le Bourget, France, 11 Jun. 1981
(SNIAS-812-551-103; C-42796) Avail: NTIS HC A03/MF A01

Steels, light alloys, titanium alloys, and composites are compared for economy, mechanical characteristics, energy content, fatigue effects and toughness. The use of these materials in civil and military aircraft, helicopters, and engines is surveyed. Increasing use of composites is forecast for the next decade, with a corresponding drop in the use of light alloys. Steels and titanium alloys should not be affected. Author (ESA)

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

N82-12073 Washington Univ., Seattle.
INSTRUMENT FAILURE DETECTION FOR A LINEAR UNCERTAIN SYSTEM Ph.D. Thesis
Wen-Kuang Chen 1981 225 p
Avail: Univ. Microfilms Order No. 8121186

Software redundancy techniques were applied to detect the identify instrument failures for a system modeled by a set of linear uncertain dynamic equations. Classical and geometric approaches were employed to specify a condition on the structure of the system and the uncertainties in order to design a dedicated observer scheme (DOS). The DOS detects and identifies instrument failure for a linear uncertain system. In the observable subspace, a special direction called zero sensitive direction is found. In this direction, the observer is insensitive to system uncertainties and it will observe a linear combination of the state variables for a linear uncertain system unless the observer is driven by a faulty instrument. The geometric approach shows how to design the observer (to find the observer gain vector) and what the zero sensitive direction should be (to find a matrix representing that direction). This employs mapping theory of linear algebra rather then solving equations and inequalities. A cart-motor-inverted pendulum system is taken as an example, in which the length of the pendulum is assumed uncertain. Dissert. Abstr.

N82-12074# Air Force Flight Test Center, Edwards AFB, Calif. Flight Dynamics Div.
AFFTC STANDARD AIRSPEED CALIBRATION PROCEDURES Final Report
Albert G. DeAnda Jun. 1981 162 p refs
(AD-A104830; AFFTC-TIH-81-5) Avail: NTIS HC A08/MF A01 CSCL 01/4

This handbook has been compiled as a reference for use by AFFTC flight test engineers in the standard flight test methods, techniques and procedures for airspeed calibrations. Suggested airspeed calibration data reduction methods are presented. Some of the information included in this reference applies to the local AFFTC facilities; however, the data reduction outlines are for general application.
Author (GRA)

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion.*

N82-12075*# General Electric Co., Lynn, Mass. Aircraft Engine Group.
EFFECT OF A PART SPAN VARIABLE INLET GUIDE VANE ON TF34 FAN PERFORMANCE Final Report
Jose Alvarez and Paul W. Schneider Sep. 1981 133 p refs
(Contract NAS3-21624)
(NASA-CR-165458; R81AEG030) Avail: NTIS HC A07/MF A01 CSCL 21E

Experimental aerodynamic and performance data were obtained from a TF34 engine. Part span variable inlet guide vanes mounted in front of the fan on the TF34 engine were tested to demonstrate the feasibility of modulating air flow and thrust for vertical takeoff aircraft systems. The fan was mapped to stall for a range of speeds and variable inlet guide were settings. Modulated fan tip performance and unmodulated hub performance were evaluated with a without an extended fan bypass splitter. The effect of a crosswind distortion screen on performance was also evaluated.
R.J.F.

N82-12076# Aeronautical Research Labs., Melbourne (Australia). Mechanical Engineering Dept.
VIBRATION TEST PROCEDURES FOR ACCESSORY ANGLE DRIVE GEARBOXES ON ATAR 09C ENGINES
P. D. McFadden and D. H. Edwards Mar. 1981 57 p refs
(AD-A105269; ARL/MECH-ENG-TM-408; AR-002-264) Avail: NTIS HC A04/MF A01 CSCL 21/5

The Accessory Angle Drive gearbox powers the fuel and hydraulic pumps on the Atar engine in the Mirage aircraft. To insure against in-flight failure, each gearbox is vibration tested under load after overhaul by the local contractor. A new vibration testing technique, offering greatly improved accuracy and reliability, has been developed. The technique uses a real-time, fast-fourier spectrum analyzer, with direct digital read-out in engineering units, and a tracking adapter with built-in antialiasing filter. This report defines correct procudures for the connection and operation of the instruments, and the interpretation of the results. Author (GRA)

N82-12077# Lucas Group Services Ltd., Solihull (England).
THE USE OF METAL FINISHING IN AIRCRAFT FUEL SYSTEMS
S. L. Forgham and H. L. Tulloch 1981 28 p refs
Avail: NTIS HC A03/MF A01

Topics discussed are: (1) corrosion resistant finishes; (2) finishes to aid manufacture; (3) repair and overhaul; and (4) bearing finishes. In the case of (1) hydrogen embrittlement is identified as a major problem and processes generating hydrogen at the surface should be closely controlled. Results on drawing size of cadmium plating of rotor blades are presented. Various techniques of electrodepositing are compared. Pump rig tests on fuels containing chlorides, showing the effect on torque of additives after a 5 hr run and an additional 16 hr standing, are reported. Author (ESA)

N82-12078# European Space Agency, Paris (France).
THREE DIMENSIONAL FLOW INVESTIGATION WITH A METHOD OF CHARACTERISTICS IN THE INLET REGION AND THE BLADE-TO-BLADE CHANNELS OF SUPERSONIC AXIAL COMPRESSORS Ph.D. Thesis - Paris Univ. 6
Jean Martinon Sep. 1981 341 p refs Transl. into ENGLISH of 'Etude, au moyen d'une methode de bicaracteristiques, de l'ecoulement tridimensionnel dans la region d'entree et les canaux interaubes d'une roue de compresseurs axíaux supersoniques', ONERA, Paris Report ONERA-P-1979-1, 1979 Original report in FRENCH previously announced as N80-23325
(ESA-TT-637; ONERA-P-1979-1) Avail: NTIS HC A15/MF A01

A three dimensional method of characteristics is developed for the calculation of the supersonic flow in the inlet region and the blade-to-blade channels of blade cascades and high transonic axial flow compressors with subsonic or supersonic axial velocity. The numerical scheme is accurate, and required computer times are short. Results of calculations on several linear or annular cascades and rotating blade rows are presented and compared with test results. Author (ESA)

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-12079*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
RELIABILITY ANALYSIS OF THE F-8 DIGITAL FLY-BY-WIRE SYSTEM
L. D. Brock and H. A. Goodman Oct. 1981 152 p refs
(Contract NAS4-2571)
(NASA-CR-163110; R-1324) Avail: NTIS HC A08/MF A01 CSCL 01C

The F-8 Digital Fly-by-Wire (DFBW) flight test program intended to provide the technology for advanced control systems, giving aircraft enhanced performance and operational capability is addressed. A detailed analysis of the experimental system was performed to estimated the probabilities of two significant safety critical events: (1) loss of primary flight control function, causing reversion to the analog bypass system; and (2) loss of the aircraft due to failure of the electronic flight control system. The analysis covers appraisal of risks due to random equipment failure, generic faults in esign of the system or its software, and induced failure due to external events. A unique diagrammatic technique was developed which details the combinatorial reliability equations for the entire system, promotes understanding of system failure characteristics, and identifies the most likely failure modes. The technique provides a systematic method of applying basic probability equations and is augmented by a computer program written in a modular fashion that duplicates the structure of these equations. S.L.

N82-12080*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Aerospace and Ocean Engineering.
COMPUTATIONAL METHODS OF ROBUST CONTROLLER DESIGN FOR AERODYNAMIC FLUTTER SUPPRESSION Final Report, 14 Nov. 1980 - 15 Nov. 1981
Leonard R. Anderson 15 Nov. 1981 66 p refs Presented at the 3rd Intern. Conf. on Math., Calif., 29-31 Jul. 1981 Submitted for publication
(Grant NAG1-80)
(NASA-CR-164983; VPI-Aero-125) Avail: NTIS HC A05/MF A01 CSCL 01C

The development of Riccati iteration, a tool for the design and analysis of linear control systems is examined. First, Riccati iteration is applied to the problem of pole placement and order reduction in two-time scale control systems. Order reduction, yielding a good approximation to the original system, is demonstrated using a 16th order linear model of a turbofan engine. Next, a numerical method for solving the Riccati equation is presented and demonstrated for a set of eighth order random examples. A literature review of robust controller design methods follows which includes a number of methods for reducing the trajectory and performance index sensitivity in linear regulators. Lastly, robust controller design for large parameter variations is discussed. R.J.F.

N82-12081# Tel-Aviv Univ. (Israel). Dept. of Electronic Systems.
FIXED GAIN CONTROLLER DESIGN FOR AIRCRAFT Final Scientific Report, 1 Jun. 1980 - 31 May 1981
Yoram Baram and Doron Eidelman 30 Jun. 1981 31 p refs
(Grant AF-AFOSR-0178-80; AF Proj. 2301)
(AD-A104877; ESTTR-81-06; SCIENTIFIC-2; EOARD-TR-81-10) Avail: NTIS HC A03/MF A01 CSCL 01/3

A Method for designing fixed gain controllers and filters for systems with large parameter variation is presented. The approach, based of minimax information criteria, is used to design a non-adaptive back-up control system for a given aircraft and is shown to provide good performance qualities. Author (GRA)

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-12082*# Computer Sciences Corp., Mountain View, Calif.
SIMULATOR CERTIFICATION METHODS AND THE VERTICAL MOTION SIMULATOR Final Report
Thomas W. Showalter 23 Sep. 1981 67 p refs
(Contract NAS2-9741)
(NASA-CR-166252) Avail: NTIS HC A04/MF A01 CSCL 14B

The vertical motion simulator (VMS) is designed to simulate a variety of experimental helicopter and STOL/VTOL aircraft as well as other kinds of aircraft with special pitch and Z axis characteristics. The VMS includes a large motion base with extensive vertical and lateral travel capabilities, a computer generated image visual system, and a high speed CDC 7600 computer system, which performs aero model calculations. Guidelines on how to measure and evaluate VMS performance were developed. A survey of simulation users was conducted to ascertain they evaluated and certified simulators for use. The results are presented. S.L.

N82-12083# National Aerospace Lab., Tokyo (Japan). Aerodynamics Div.

CONSTRUCTION AND PERFORMANCE OF NAL TWO-DIMENSIONAL TRANSONIC WIND TUNNEL

1980 104 p refs In JAPANESE; ENGLISH summary
(NAL-TR-647; ISSN-0389-4010) Avail: NTIS HC A06/MF A01

The construction and the results of initial calibration are described. This tunnel was built to meet the requirements of high Reynolds number testing of wing sections at transonic regime. It is a blowdown tunnel with a test section of 0.3m x 1.0m. The required capability of this wind tunnel is for Mach numbers ranging from 0.2 to 1.2 and for a Reynolds number up to 40 million at Mach number 0.8 with sufficient running time. An outline of the design objectives is given. The completed facilities, i.e., the wind tunnel, the instrumentation and operation system, the silencer and auxiliary equipment of the air compressor and the air reservoir, are described in detail. The performance of the tunnel when it is empty is described, and the results of a few experiments with an airfoil model of the NACA 64A410 are presented. High Reynolds number testing can be achieved in this wind tunnel without any trouble. B.W.

N82-12084*# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.

RESEARCH DEVELOPING CLOSED LOOP ROLL CONTROL FOR MAGNETIC BALANCE SYSTEMS Semiannual Status Report, 1 Feb. - 31 Jul. 1981

Eugene E. Covert and Charles W. Haldeman 31 Jul. 1981 50 p refs
(Grant NsG-1502)
(NASA-CR-164989; SAR-7) Avail: NTIS HC A03/MF A01 CSCL 14B

Computer inputs were interfaced to the magnetic balance outputs to provide computer position control and data acquisition. The use of parameter identification of a means of determining dynamic characteristics was investigated. The thyraton and motor generator power supplies for the pitch and yaw degrees of freedom were repaired. Topics covered include: choice of a method for handling dynamic system data; applications to the magnetic balance; the computer interface; and wind tunnel tests, results, and error analysis. A.R.H.

N82-12085*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

A LOOK INSIDE THE LANGLEY 16-FOOT TRANSONIC TUNNEL: USER'S GUIDE

Kathryn H. Peddrew, comp. Aug. 1981 197 p refs
(NASA-TM-83186) Avail: NTIS HC A09/MF A01 CSCL 14B

The 16-foot transonic tunnel is a single-return atmospheric wind tunnel having a slotted test section. The primary emphasis for research in this facility is the integration of the propulsion system into advanced aircraft concepts. The large test section size, 15.5 feet in diameter lends itself to conducting research in this area, where large models are required in order to provide adequate definition of the model geometry associated with the integration of the propulsion system. The nominal test Mach number range for this facility varies from 0.20 to 1.3. Topics covered include (1) facility description; (2) model installation equipment for aerodynamics; (3) model support system for propulsion simulation testing; (4) propulsion simulation systems; (5) calibrating propulsion simulation systems; (6) instrumentation; (7) data acquisition; (8) model design criteria; and (9) wind tunnel test planning. A.R.H.

N82-12086# Sandia Labs., Albuquerque, N. Mex. Central Receiver Test Facility Div.

USE OF SANDIA'S CENTRAL RECEIVER TEST FACILITY AS A HIGH-INTENSITY HEAT SOURCE FOR TESTING MISSILE NOSE-CONE (RADOME) RADAR SYSTEMS

Donald R. Porter Sep. 1981 26 p ref
(Contract DE-AC04-76DP-00789)
(DE82-000968; SAND-81-1025) Avail: NTIS HC A03/MF A01

A series of tests at Sandia's Central Receiver Test Facility in support of the US Navy's SM-2 Blk 2 Radome Improvement Program is described. The CRTF was the source of high-intensity solar radiation for testing onboard radar-tracking systems under heating conditions intended to simulate those that occur in supersonic flight. Also discussed are the hardware used and the software developed at the CRTF. DOE

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-12087*# Hughes Aircraft Co., El Segundo, Calif.

PC-403: PIONEER VENUS MULTIPROBE SPACECRAFT MISSION OPERATIONAL CHARACTERISTICS DOCUMENT, VOLUME 1

F. C. Barker 22 May 1978 339 p 3 Vol.
(Contract NAS2-9366)
(NASA-CR-166261-Vol-1; HS507-7517-Vol-1) Avail: NTIS HC A15/MF A01 CSCL 22A

The operational characteristics of the multiprobe system and its subsystem are described. System level, description of the nominal phases, system interfaces, and the capabilities and limitations of system level performance are presented. Bus spacecraft functional and operational descriptions at the subsystem and unit level are presented. The subtleties of nominal operation as well as detailed capabilities and limitations beyond nominal performance are discussed. A command and telemetry logic flow diagram for each subsystem is included. Each diagram identifies in symbolic logic all signal conditioning encountered along each command signal path into, and each telemetry signal path out of the subsystem. S.L.

N82-12088*# Hughes Aircraft Co., El Segundo, Calif.

PC-403: PIONEER VENUS MULTIPROBE SPACECRAFT MISSION OPERATIONAL CHARACTERISTICS DOCUMENT, VOLUME 2

F. C. Barker 22 May 1978 385 p 3 Vol.
(Contract NAS2-9366)
(NASA-CR-166261-Vol-2; HS507-7517-Vol-2) Avail: NTIS HC A17/MF A01 CSCL 22A

The data handling subsystem, command subsystem, communications subsystem, power subsystem, and mission operations of the Pioneer Venus multiprobe are presented. The multiprobe spacecraft performance in normal operating modes that correspond to the performance of specific functions at the time of specific events in the mission is described. S.L.

N82-12089*# Hughes Aircraft Co., El Segundo, Calif.

PC-403: PIONEER VENUS MULTIPROBE SPACECRAFT MISSION OPERATIONAL CHARACTERISTICS DOCUMENT, VOLUME 3

F. C. Barker 22 May 1978 385 p 3 Vol.
(Contract NAS2-9366)
(NASA-CR-166261-Vol-3; HS507-7517-Vol-3) Avail: NTIS HC A17/MF A01 CSCL 22A

The Pioneer Venus spacecraft primary and backup operational modes and operational limitations for maneuvers, roll references transfer, attitude determination, spacecraft power discipline and spacecraft thermal discipline, are described. The functions and operations of the large and small probes, as well detailed performance in the normal operating modes and backup modes are presented. S.L.

N82-12090*# Hughes Aircraft Co., El Segundo, Calif. Pioneer-Venus System Engineering

PC-402 PIONEER VENUS ORBITER SPACECRAFT MISSION OPERATIONAL CHARACTERISTICS DOCUMENT

F. C. Barker, L. W. Butterworth, R. E. Daniel, R. J. Drean, K. A. Filetti, J. N. Fisher, L. A. Nowak, J. Porzucki, J. O. Salvatore, and G. A. Tadler Feb. 1978 1027 p refs Revised
(Contract NAS2-9366)
(NASA-CR-166260; SCG-86112A) Avail: NTIS HC A99/MF A01 CSCL 22A

The operational characteristics of the Orbiter spacecraft and its subsystems are described. In extensive detail. Description of the nominal phases, system interfaces, and the capabilities and limitations of system level performance are included along with functional and operational descriptions at the subsystem and unit level the subtleties of nominal operation as well as detailed capabilities and limitations beyond nominal performance are discussed. A command and telemetry logic flow diagram for each subsystem is included. Each diagram encountered along each command signal path into, and each telemetry signal path out of the subsystem. Normal operating modes that correspond to the performance of specific functions at the time of specific events in the mission are also discussed. Principal backup means of performing the normal Orbiter operating modes are included. J.M.S.

N82-12091*# Rockwell International Corp., Downey, Calif. Space Operations and Satellite Systems Div.
SHUTTLE CONSIDERATIONS FOR THE DESIGN OF LARGE SPACE STRUCTURES
J. A. Roebuck, Jr. Nov. 1980 411 p refs
(Contract NAS9-15718)
(NASA-CR-160861; SSD80-0183) Avail: NTIS HC A18/MF A01 CSCL 22A

Shuttle-related considerations (constraints and guidelines) are compiled for use by designers of a potential class of large space structures which are transported to orbit and, deployed, fabricated or assembled in space using the Space Shuttle Orbiter. Considerations of all phases of shuttle operations from launch to ground turnaround operations are presented. Design of large space structures includes design of special construction fixtures and support equipment, special stowage cradles or pallets, special checkout maintenance, and monitoring equipment, and planning for packaging into the orbiter of all additional provisions and supplies chargeable to payload. Checklists of design issues, Shuttle capabilities constraints and guidelines, as well as general explanatory material and references to source documents are included. S.L.

N82-12092*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
STUDY TO DEFINE AN APPROACH FOR DEVELOPING A COMPUTER-BASED SYSTEM CAPABLE OF AUTOMATIC, UNATTENDED ASSEMBLY/DISASSEMBLY OF SPACECRAFT, PHASE 1 Final Report, 1 Jun. - 31 Dec. 1980
J. L. Nevins, T. L. DeFazio, D. S. Seltzer, and D. E. Whitney 1981 37 p refs
(Contract NAS5-26187)
(NASA-CR-166740; R-1436) Avail: NTIS HC A03/MF A01 CSCL 22A

The initial set of requirements for additional studies necessary to implement a space-borne, computer-based work system capable of achieving assembly, disassembly, repair, or maintenance in space were developed. The specific functions required of a work system to perform repair and maintenance were discussed. Tasks and relevant technologies were identified and delineated. The interaction of spacecraft design and technology options, including a consideration of the strategic issues of repair versus retrieval-replacement or destruction by removal were considered along with the design tradeoffs for accomplishing each of the options. A concept system design and its accompanying experiment or test plan were discussed. R.J.F.

N82-12093*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ANALYSIS OF SPAR 8 SINGLE-AXIS LEVITATION EXPERIMENT
J. E. Rush (Alabama Univ., Huntsville), C. F. Schafer, and R. L. Holland Sep. 1981 65 p refs
(NASA-TM-82447) Avail: NTIS HC A04/MF A01 CSCL 22A

The melting and resolidification of SPAR 8 payload melting and resolidification of a glass specimen from the in a containerless condition and the retrieval and examination of the specimen from the. The absence of container contact was assured by use of a single-axis acoustic levitation system. However, the sample contacted a wire cage after being held without container contact by the acoustic field for only approximately 87 seconds. At this time, the sample was still molten and, therefore, flowed aroung the wire and continued to adhere to it. An analysis of why the sample did not remain levitated free of container contact is presented. The experiment is described, and experimental observations are discussed and analyzed. S.L.

N82-12094*# General Dynamics/Convair, San Diego, Calif. Advanced Space Programs.
SPACE CONSTRUCTION EXPERIMENT DEFINITION STUDY (SCEDS), PART 1. VOLUME 1: EXECUTIVE SUMMARY Final Report
1 Sep. 1981 34 p
(Contract NAS9-16303)
(NASA-CR-167458; GDC-ASP-81-009-Vol-1-Pt-1;
DRL-T-1346; DRD-MA-664T) Avail: NTIS HC A03/MF A01 CSCL 22A

Definition was completed on a basic flight experiment which will provide data on the construction of large space systems from the orbiter which could not be practicably obtained from ground tests. Dynamic behavior of a representative large structure was predicted. On-orbit construction operations were studied. Orbiter control during and after construction was investigated. Evolutionary or supplmental flight experiments for the development of augmentation of a basic flight experiment were identified and defined. R.J.F.

N82-12113*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DROP DYNAMICS
D. D. Elleman *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 32-33
(For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22A

N82-12118*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SUSCEPTIBILITY OF MATERIALS PROCESSING EXPERIMENTS TO LOW-LEVEL ACCELERATIONS
Robert J. Naumann *In its* Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 63-68 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22A

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

No abstracts in this category.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N82-12095*# General Dynamics/Convair, San Diego, Calif. Advanced Space Programs.
SPACE CONSTRUCTION EXPERIMENT DEFINITION STUDY (SCEDS), PART 1. VOLUME 2: STUDY RESULTS Final Report
1 Sep. 1981 149 p refs
(Contract NAS9-16303)
(NASA-CR-167432; GDC-ASP-81-010-Vol-2-Pt-1;
DRL-T-1346; DRD-MA-664T) Avail: NTIS HC A07/MF A01 CSCL 22B

A basic Space Shuttle flight experiment which will provide needed data on the construction of large space systems from the Orbiter was defined. The predicted dynamic behavior of a representative large structure, on-orbit construction operations, and Orbiter control during and after construction were studied.

Evolutionary or supplemental flight experiments for the development or augmentation of a basic flight experiment were identified and defined. The study was divided into six major tasks with appropriate sub-tasks noted. R.J.F.

N82-12093*# Howard Univ., Washington, D. C. Dept. of Mechanical Engineering.

THE DYNAMICS AND CONTROL OF LARGE FLEXIBLE SPACE STRUCTURES Semiannual Status Report, 16 May - 15 Nov. 1981

Peter M. Bainum, R. Krishna, V. K. Kumar, and A. S. S. R. Reddy 15 Nov. 1981 26 p refs
(Grant NsG-1414)
(NASA-CR-164982) Avail: NTIS HC A03/MF A01 CSCL 22B

The dynamics and attitude and shape control of very large, inherently flexible spacecraft systems were investigated. Increasingly more complex examples were examined, beginning with a uniform free-free beam, next a free-free uniform plate/platform and finally by considering a thin shallow spherical shell structure in orbit. The effects devices were modeled. For given sets of assumed actuator locations, the controllability of these systems was first established. Control laws for each of the actuators were developed based on decoupling techniques (including distributed modal control) pole placement algorithms and a application of the linear regulator problem for optical control theory. B.W.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-12097* National Aeronautics and Space Administration, Washington, D. C.

THIRD INTELSAT 5 SATELLITE SCHEDULED FOR LAUNCH

27 Nov. 1981 8 p
(NASA-News-Release-81-185; P81-10189) Avail: NASA Scientific and Technical Information Facility, P. O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 22B

The launch sequence of the Intelsat 5-C satellite is announced. A brief description of the satellite and the Atlas Centaur launch vehicle is given. Prelaunch operations are included. S.L.

N82-12098 Engins Matra, Velizy (France).

SATELLITE MAINTENANCE IN ORBIT [MAINTENANCE DES SATELLITES EN ORBITE]

Helene Cerbelaud 1981 95 p In FRENCH Sponsored by ESA
Avail: Issuing Activity

Maintenance strategies are outlined, refering to the Brasilsat telecommunications satellite. System reliability is extrapolated from data concerning individual items. By varying parameters such as size, load, working life, etc., satellite optimization is deduced. Choice of maintenance system should be based on cost/benefits ratios, bearing in mind increased survivability which maintenance endows. No specific recommendations are made. Author (ESA)

N82-12099*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

AE-5 END OF MISSION TESTS REPORT

Thomas H. Stengle, Fred Kissel (Westinghouse Electric Corp.), J. Schaefer (Westinghouse Electric Corp.), and Ford Kalil Oct. 1981 37 p refs Submitted for publication
(NASA-TM-83845) Avail: NTIS HC A03/MF A01 CSCL 22B

A spin up test and a TDRS tracking simulation were performed on the AE-5 spacecraft before its end of mission. the spin up test showed that the Body Horizon Scanner could be successfully used on other spacecraft with spin rates up to 10 RPM. the TDRS tracking simulation showed that an AE-5 type attitude control system could be successfully used to point the spacecraft towards a TDRS for the purpose of transmitting/relaying data via the TDRS. N.W.

N82-12100# National Aerospace Lab., Tokyo (Japan).

THRUSTER-EXHAUST-PLUME-IMPINGEMENT NCE TORQUE OF THREE-AXIS-STABILIZED SATELLITE

Katsuhisa Koura, Shoichi Tsuda, Katsuyoshi Arai, and Makoto Kajikawa 1981 17 p refs In JAPANESE; ENGLISH summary
(NAL-TR-670; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

For a three-axis-stabilized satellite with reaction control thrusters and extended solar paddles, the thruster-exhaust-impingement on the paddle causes a plume impingement disturbance torque. A method of theoretical estimation of the plume torque is established and the PITS (plume-impingement torque simulation software) is produced. The plume torque obtained by the PITS is compared with the plume torque data of the Japanese medium-scale broadcasting satellite (BS). Although the roll torque is in partial disagreement. Since the present theoretical model can reasonably estimate the BS plume torque, the PITS may be available for plume-torque estimation in forthcoming three-axis-stabilized satellites. Author

N82-12101# Ballistic Research Labs., Aberdeen Proving Ground, Md. Ballistic Research Lab.

YAWSONDE TESTS OF 2.75-INCH Mk66 MOD 1 ROCKET Final Report

William H. Mermagen and Vural Oskay Aug. 1981 55 p refs
(DA Proj. 1L1-62618-AH-80)
(AD-A104904; ARBRL-MR-03127) Avail: NTIS HC A04/MF A01 CSCL 19/7

The Mk66 Mod 1 is a 2.75-inch rocket which uses three wrap-around fins for flight stabilization and roll control. Performance requirements made it necessary to closely control the spin history of the rocket over its trajectory so as to avoid a resonance region. The BRL performed a small yawsonde test program to measure the roll history and yaw behavior for selected fin configurations. GRA

N82-12102# Army Missile Command, Redstone Arsenal, Ala. Ground Equipment and Missile Structures Directorate.

HAWK LAUNCHER SHOCK ABSORBER (PART NUMBER 11567877) Final Test Report

John D. Alston Jul. 1981 53 p
(AD-A105384; AD-E950157; DRSMI/RL-81-8-TR) Avail: NTIS HC A04/MF A01 CSCL 16/1

This report summarizes the test methods and results of a series of tests to determine compliance of modified Hawk launcher shock absorbers with Technical Data Package (TDP) requirements. The primary test was a dynamic impact of the shock absorber with a 1000-lb weight traveling at 28 in./sec. The force/time relationship during shock absorber actuation induced by this impact was recorded on an oscillograph and by a digital computer. Correlation of test results was excellent and performance of the shock absorbers was good. There were some areas of noncompliance to the performance requirements of the shock absorber TDP. Author (GRA)

N82-12103# Centre National d'Etudes Spatiales, Toulouse (France). Centre Spatial.

ENERGY DISSIPATION IN EXOSAT TANKS: TEST RESULTS

Jean-Louis Marce, Louis Torres, David Assemat (Societe pour le Perfectionnement des Materiels et Equipements Aerospatiaux, Toulouse), and Solange Michel (Societe pour le Perfectionnement des Materiels et Equipements Aerospatiaux, Toulouse) Mar. 1981 117 p refs In ENGLISH; FRENCH summary
(CNES-NT-98) Avail: NTIS HC A06/MF A01

Results of tests performed with inertia ratio and filling ratio scanning on Ariene tanks are presented. The Exosat launch requires the use of a fourth stage (P 0.7). The Exosat + P 0.7 assembly is spin stabilized with a spin rate of 50 rpm during transfer orbit. The unstable assembly is fitted with an active nutation damping system. To size this, it is necessary to know the time constant of nutation build up essentially due to fuel motion in the propane tanks and the hydrazine tank of Exosat. The major source of dissipation is the hydrazine tank for which an hysteresis phenomenon on diaphragm position was observed: the worst time constants of nutation build up, deduced from tests are 2.5 mn before P 0.7 and 1.9 mn after P 0.7 firing, taking into account the appropriate safety factors. Author (ESA)

N82-12104# Joint Publications Research Service, Arlington, Va.
CHINA REPORT: SCIENCE AND TECHNOLOGY, NO. 133
27 Oct. 1981 53 p Transl. into ENGLISH from various Chinese articles
(JPRS-79301) Avail: NTIS HC A04/MF A01

Progress in science and technology in the People's Republic of China was reported. The following topics are presented: (1) applied sciences; (2) scientists and scientific organization; (3) publications; (4) communications; (5) genetics; (6) iron and steel technology; (7) telecommunication technology. For individual title, see N82-12105.

N82-12105# Joint Publications Research Service, Arlington, Va.
USE OF SKW-9 SINGLE LAUNCH VEHICLE FOR THREE SATELLITES DESCRIBED
In its China Rept.: Sci. and Technol., No. 133 (JPRS-79301) 27 Oct. 1981 p 6-9 Transl. into ENGLISH from Wen Wei Po (Hong Kong), 25 Sep. 1981 p 2 (For primary document see N82-12104 03-15)
Avail: NTIS HC A04/MF A01

The ninth scientific experimental satellite (SKW-9) launch in the Chinese Peoples Republic is described. One launch vehicle was used to insert three satellites into orbit simultaneously, the one rocket multiple satellite launch technique. The three satellites have different shapes. The heaviest satellite is composed of two frustum shaped sections which emit radiowaves continuously. The lightest satellite is spherically shaped, consisting of a metallic sphere and a balloon connected by a thin wire. The third satellite is the main component of SKW-9. Its shape is an octagonal prism with a diameter of 1.2 m. Its panels convert solar energy into electrical energy to provide power to the electronic instruments aboard the satellite. The SKW-9's mission is to survey the physical properties of the upper atmosphere. E.A.K.

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N82-12106*# Engineering Analysis, Inc., Huntsville, Ala.
ADVANCED SHUTTLE SIMULATION TURBULENCE TAPES (SSTT) USERS GUIDE
Frank B. Tatom and S. Ray Smith 29 Sep. 1981 82 p
(Contract NAS8-33818)
(NASA-CR-161890; EAI-TR-81-003A) Avail: NTIS HC A05/MF A01 CSCL 22B

A nonrecursive model (based on von Karman spectra) for atmospheric turbulence along the flight path of the shuttle orbiter was developed which provides for simulation of instantaneous vertical and horizontal gusts at the vehicle center-of-gravity and also for simulation of instantaneous gust gradients. Based on this model, the time series for both gusts and gust gradients was generated and stored on a series of magnetic tapes which are entitled shuttle simulation turbulence tapes (SSTT). The time series are designed to represent atmospheric turbulence from ground level to an altitude of 120,000 meters. An appropriate description of the characteristics of the simulated turbulence stored on the tapes, as well as instructions regrding their proper use are provided. The characteristics of the turbulence series, including the spectral shape, cutoff frequencies, and variation of turbulence parameters with altitude, are discussed. Information regarding the tapes and their use is presented. Appendices provide results of spectral and statistical analyses of the SSTT and examples of how the SSTT should be used. B.J.F.

N82-12107*# Axiomatix, Los Angeles, Calif.
PAYLOAD/ORBITER SIGNAL-PROCESSING AND DATA-HANDLING SYSTEM EVALUATION Final Report
William E. Teasdale and Andreas Polydoros 22 Dec. 1980 198 p refs
(Contract NAS9-15240G)
(NASA-CR-161007; R8012-5) Avail: NTIS HC A09/MF A01 CSCL 17B

Incompatibilities between orbiter subsystems and payload communication systems to assure that acceptable and to end system performamce will be achieved are identified. The potential incompatabilities are associated with either payloads in the cargo bay or detached payloads communicating with the orbiter via an RF link. The payload signal processing and data handling systems are assessed by investigating interface problems experienced between the inertial upper stage and the orbiter since similar problems are expected for other payloads. S.L.

N82-12108# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Bereich Raumfahrt.
POSITION AND HOLD MOUNT. DEMONSTRATION MODEL Final Report
Paris ESA 27 May 1981 94 p refs
(Contract ESA-4059/79/NL-AK)
(ESA-CR(P)-1460) Avail: NTIS HC A05/MF A01

A position hold mount (PHM) demonstration model to test the suitability of the established PHM concept design of a general purpose PHM on Spacelab is described. The data electronics are based on the MUDAS processor and peripheral modules. The power electronics are standard commercial devices. Emergency electronics include a generator for on/off pulses; microswitches for direction indication and stop function mounted on the drive units; power supplies for the motors. The PHM software is for the demonstration phase, so no Spacelab interface software was generated. Test results indicate that the system can be adapted for Spacelab. Author (ESA)

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-12109*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPACECRAFT DYNAMICS AS RELATED TO LABORATORY EXPERIMENTS IN SPACE
G. H. Fichtl, ed., B. N. Antar, ed., and F. G. Collins, ed. Nov. 1981 206 p refs Workshop held in Huntsville, Ala., 1-2 May 1979
(NASA-CP-2199; M-362) Avail: NTIS HC A10/MF A01 CSCL 22B

Proceedings are presented of a conference sponsored by the Physics and Chemistry Experiments in Space Working Group to discuss the scientific and engineering aspects involved in the design and performance of reduced to zero gravity experiments affected by spacecraft environments and dynamics. The dynamics of drops, geophysical fluids, and superfluid helium are considered as well as two phase flow, combustion, and heat transfer. Interactions between spacecraft motions and the atmospheric cloud physics laboratory experiments are also examined. For individual titles, see N82-12110 through N82-12130.

N82-12110*# National Bureau of Standards, Washington, D.C. Thermophysics Div.

DEFINING CRITICAL POINT EXPERIMENTS FOR A SPACE LABORATORY

Mike R. Moldover *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 11-17 refs (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

Three representative low-gravity experiments for a fluid near its liquid-vapor critical point are being defined. Two of these experiments require very careful measurements of properties of the fluid in thermodynamic equilibrium, while the third experiment is a series of optical observations of the phenomena which occur as a fluid is changed from one phase to two phases, either by cooling through the critical point, or by adiabatic expansion. There is concern that residual spacecraft motions may complicate the interpretation of the data from the proposed experiments. It is possible that the Spacelab environment will render certain desirable experiments impractical. A.R.H.

N82-12111*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DYNAMICS OF SUPERFLUID HELIUM IN ZERO GRAVITY

c31

Peter V. Mason *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 18-24 ref (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 20L

The Spacelab 2 superfluid helium experiment was designed to: (1) examine the behavior of capillary waves and measure their velocity and damping; (2) study the sloshing motion of bulk superfluid helium in near-zero gravity in order to determine its effects on sensors and attitude control systems for far infrared telescopes; and (3) determine the temperature distributions in the liquid and their correlation with bulk motion. The experiment system includes a helium cryostat with a sensor head and a microcomputer to provide electrical excitation and gather and transmit resultant responses to the experiment teams on the ground. Astronaut intervention is possible. A.R.H.

N82-12112*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

GEOPHYSICAL FLUID DYNAMICS

c34

William W. Fowlis *In its* Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 25-31 refs (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 20D

Systematic scaling or dimensional analysis reveals that certain scales of geophysical fluid flows (such as stellar, ocean, and planetary atmosphere circulations) can be accurately modeled in the laboratory using a procedure which differs from conventional engineering modeling. Rather than building a model to obtain numbers for a specific design problem, the relative effects of the significant forces are systematically varied in an attempt to deepen understanding of the effects of these forces. Topics covered include: (1) modeling a large-scale planetary atmospheric flow in a rotating cylindrical annulus; (2) achieving a radial dielectric body force; (3) spherical geophysical fluid dynamics experiments for Spacelab flights; (4) measuring flow and temperature; and (5) the possible effect of rotational or precessional disturbances on the flow in the rotating spherical containers. A.R.H.

N82-12113*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DROP DYNAMICS

c12

D. D. Elleman *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 32-33 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22A

The drop dynamics module is a Spacelab-compatible acoustic positioning and control system for conducting drop dynamics experiments in space. It consists basically of a chamber, a drop injector system, an acoustic positioning system, and a data collection system. The principal means of collecting data is by a cinegraphic camera. The drop is positioned in the center of the chamber by forces created by standing acoustic waves generated in the nearly cubical chamber (about 12 cm on a side). The drop can be spun or oscillated up to fission by varying the phse and amplitude of the acoustic waves. The system is designed to perform its experiments unattended, except for start-up and shutdown events and other unique events that require the attention of the Spacelab payload specialist. A.R.H.

N82-12114*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

INTERACTIONS BETWEEN SPACECRAFT MOTIONS AND THE ATMOSPHERIC CLOUD PHYSICS LABORATORY EXPERIMENTS

B. J. Anderson *In its* Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 34-35 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

In evaluating the effects of spacecraft motions on atmospheric cloud physics laboratory (ACPL) experimentation, the motions of concern are those which will result in the movement of the fluid or cloud particles within the experiment chambers. Of the various vehicle motions and residual forces which can and will occur, three types appear most likely to damage the experimental results: non-steady rotations through a large angle, long-duration accelerations in a constant direction, and vibrations. During the ACPL ice crystal growth experiments, the crystals are suspended near the end of a long fiber (20 cm long by 200 micron diameter) of glass or similar material. Small vibrations of the supported end of the fiber could cause extensive motions of the ice crystal, if care is not taken to avoid this problem. A.R.H.

N82-12115*# State Univ. of New York at Stony Brook.

COMBUSTION EXPERIMENTS IN SPACE

c25

A. L. Berlad *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 36-42 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 21B

Pivotal areas for needed combustion observations (available through space shuttle experimentation) include: (1) single- and two-phase premixed flame propagation and extinction limits; (2) noncoherent flame propagation and extinction; (3) autoignition of premixed single-phase and two-phase combustible reactants; (4) upper pressure limit combustion phenomena and ignition, propagation, and extinction processes in the neighborhood of such limits; (5) oscillatory combustion associated with the hydrocarbon-oxygen and with the carbon monoxide-oxygen systems; (6) two-phase flame spread and extinction involving lage liquid-gas or solid-gas interfaces; (7) radiative ignition of solids and liquids; (8) pool burning; (9) smoldering of solid combustibles and the associated transition to flaming or extinction; (10) laminar gas jet combustion; and (11) transient responses of combustible systems to time variation in gravitational field strengths. A number of these may be impacted by undesirably high g-jitter effects. A.R.H.

N82-12116*# Tennessee Univ. Space Inst., Tullahoma.

TWO-PHASE FLOW AND HEAT TRANSFER UNDER LOW GRAVITY

c34

Walter Frost *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 43-57 refs (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 20D

Spacelab experiment to investigate two-phase flow patterns under gravity uses a water-air mixture experiment. Air and water are circulated through the system. The quality or the mixture or air-water is controlled. Photographs of the test section are made and at the same time pressure drop across the test section is measured. The data establishes a flow regime map under reduced gravity conditions with corresponding pressure drop correlations. The test section is also equipped with an electrical resistance heater in order to allow a flow boiling experiment to be carried out using Freon II. High-speed photographs of the test section are used to determine flow patterns. The temperature gradient and pressure drop along the duct can be measured. Thus, quality change can be measured, and heat transfer calculated. A.R.H.

N82-12117*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TRIBOLOGY EXPERIMENT c37
William A. Wall *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 58-60 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 20K

A two-dimensional concept for Spacelab rack 7 was developed to study the interaction of liquid lubricants and surfaces under static and dynamic conditions in a low-gravity environment fluid wetting and spreading experiments of a journal bearing experiments, and means to accurately measure and record the low-gravity environment during experimentation are planned. The wetting and spreading process of selected commercial lubricants on representative surface are to the observes in a near-zero gravity environment. A.R.H.

N82-12118*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SUSCEPTIBILITY OF MATERIALS PROCESSING EXPERIMENTS TO LOW-LEVEL ACCELERATIONS c12
Robert J. Naumann *In its* Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 63-68 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22A

The types of material processing experiments being considered for shuttle can be grouped into four categories: (1) contained solidification experiment; (2) quasicontainerless experiments; (3) containerless experiments; and (4) fluids experiments. Low level steady acceleration, compensated and uncompensated transient accelerations, and rotation induced flow factors that must be considered in the acceleration environment of a space vehicle whose importance depends on the type of experiment being performed. Some control of these factors may be exercised by the location and orientation of the experiment relative to shuttle and by the orbit vehicle attitude chosen for mission. The effects of the various residual accelerations can have serious consequence to the control of the experiment and must be factored into the design and operation of the apparatus. A.R.H.

N82-12119*# Case Western Reserve Univ., Cleveland, Ohio.
CONVECTION IN FLUIDS AT REDUCED GRAVITY c34
Simon Ostrach *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 69-95 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 20D

Natural convection is not always harmful and, therefore, to be avoided. In some situations it may be desirable to have fluid flows in space processes, e.g., to stir the fluid phase for mixing and cooling or to help maintain concentration gradients. In may event, it is important to know the extent and nature of convection in space and the factors on which it depends, in order either to minimize the effects to convection, or to utilize the convection to advantage. The information needed to assess both conventional and unstable convection includes: (1) the magnitude and direction of accelerations; (2) gometric configuration; (3) imposed boundary conditions; and (4) material properties. A.R.H.

N82-12120*# Rochester Univ., N. Y. Dept. of Mechanical and Aerospace Engineering.
EFFECTS OF SPACECRAFT MOTIONS ON FLUIDS EXPERIMENTS c34
Roger F. Gans *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 96-102 refs (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 20D

The equations of motion governing an incompressible fluid contained in an orbiting laboratory were examined to isolate various fictitious forces and their relative influence on the fluid. The forces are divided into those arising from the orbital motions and those arising from small local motions of the spacecraft about its center of mass. The latter dominate the nonrotating experiments. Both are important for rotating experiments. A brief discussion of the onset of time-dependence and violent instability in earth-based rotating and precessing systems is given. T.M.

N82-12121*# National Aeronautics and Space Administration, Washington, D. C.
TRANSIENT THERMAL CONVECTION IN MICROGRAVITY c34
Robert F. Dressler *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 103-112 refs (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 20D

The unsteady two-dimensional thermal convection in a cylinder due to a transient acceleration solved for a step-function excitation. From this, the solution was obtained for an arbitrary time-dependent acceleration. The solutions are valied for sufficiently low Rayleigh numbers and therefore, relevant to microgravity fields. As an example, two graphs are presented for he convection resulting from the movement of an astronaut inside the Shuttle. The analysis can be applied to obtain any other convective flows such as those caused by g-jitter or variable rotation of the Shuttle. T.M.

N82-12122*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPACECRAFT DYNAMIC ENVIRONMENTS
George H. Fichtl *In its* Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 115-120 refs (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

Zero-gravity conditions in Earth orbit cannot be obtained in the Shuttle Orbiter, however, through careful planning, the dynamic environment and its effects on experiments can be minimized. Futhermore, although the dynamic environment of the Shuttle Orbiter is to a large degree stochastics, it is possible to predict characteristics of this environments so that scientists and technologists can plan their experiments and mission managers can plan missions with a view toward minimizing the effects of spacecraft dynamics on experiments. Characteristics of the dynamic environment that might be predicted include typical and 'worst case' values of vehicle acceleration for the anticipated acceleration sources, typical number of acceleration event, duration times of disctete acceleration events, bandwidth of acceleration time history, etc. T.M.

N82-12123*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ORBITAL ENVIRONMENT DYNAMICS
Robert E. Smith *In its* Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 121-128 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

Diurnal density variatios of the upper atmosphere are described. Temperature distribution above the thermopause were mapped and extremes of temperature variation over the 11-year solar cycle were determined. Day and nigth density profiles in the upper atmosphere at sunspot minimum and at a time of exceptionally high solar activity are presented. T.M.

N82-12124*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CONTRIBUTIONS OF ORBITAL MECHANICS TO CONDUCTING EXPERIMENTS IN SPACE
Larry D. Mullins *In its* Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 129-136 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

Orbital mechanics as a discipline is principally concerned with solving the set of equations for analyzing the motion of a satellite under various conditions. This activity on the surface may not seem crucial to conducting experiments in space, but it provides insights into the way in which forces may influence these experiments. More directly, for experiments concerned with external targets, it provides predictions of the satellites's position and velcoity varus time, enabling extensive preflight planning and resulting in optimum use of on-orbit time. Author

N82-12125*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DYNAMIC BEHAVIOR OF PARTICLES IN SPACECRAFT
Barton S. Perrine *In its* Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 137-146 refs (For primary

document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

The behavior of particles relative to a spacecraft frame of reference was examined. Significant spatial excursions of particles in space can occur relative to the spacecraft frame of reference as a result of drag deceleration of the vehicle. These vehicle excursions tend to be large as time increases. Thus, if the particle is required to remain in a specified volume, constraints may be required. Thus, for example, in levitation experiments it may be extremely difficult to turn off the forces of constraint which keep the particles in a specified region. This means experiments which are sensitive to disturbances may be very difficult to perform if perturbation forces are required to be absent. T.M.

N82-12126*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
DESIGN OF THE SPACE SHUTTLE DIGITAL AUTOPILOT AND RESULTING DYNAMIC ENVIRONMENT
Stanley Fay *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 147-166 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

This compilation progresses through the development of the Space Shuttle phase plane controller form fundamental considerations. Quantitative insight regarding the nature of the dynamic environment aboard the Shuttle is provided. T.M.

N82-12127*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
EXCEEDANCE STATISTICS OF ACCELERATIONS RESULTING FROM THRUSTER FIRINGS ON THE APOLLO-SOYUZ MISSION
George H. Fichtl and Robert L. Holland *In its* Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 167-174 ref (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

Spacecraft acceleration resulting from firings of vernier control system thrusters is an important consideration in the design, planning, execution and post-flight analysis of laboratory experiments in space. In particular, scientists and technologists involved with the development of experiments to be performed in space in many instances required statistical information on the magnitude and rate of occurrence of spacecraft accelerations. Typically, these accelerations are stochastic in nature, so that it is useful to characterize these accelerations in statistical terms. Statistics of spacecraft accelerations are summarized. T.M.

N82-12128*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ELASTIC BODY DYNAMICS
Ben W. Holder *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 175-180 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

Most of the structural dynamics resources allocated to the Space Shuttle are concentrated on the flight events which result in critical structural loads and/or minimum control stability margins. Since these events are primarily sub-orbital, the data base of interest to those involved in orbital experimentation is somewhat limited. A brief discussion of available data is given. Although estimates of peak acceleration levels and the associated frequency spectrum in the payload bay due to thrusting of the various control system thrusters were made, the actual levels and time histories must be based on updated structural math models and a detailed knowledge of the input forcing functions. T.M.

N82-12129*# National Aeronautics ano Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CREW ACTIVITIES IN SPACE c54
Guion S. Bluford, Jr. *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 181-187 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 05H

One of the mission requirements of the Space Shuttle is to serve as a working platform for experiments in space. Many of these experiments will be performed by crewmembers (mission specialists and payload specialists) in a general purpose laboratory called Spacelab. All nonexperiment-related activities or housekeeping activities will be done in the Orbiter, while most of the mission-related activities (experiments) will be done in Spacelab. In order for experimenters to design their experiments to best utilize the capabilities of the Orbiter, the Spacelab, and the crew, the working environment in the Orbiter and in Spacelab is described. In addition, the housekeeping activities required of the crew are summarized. T.M.

N82-12130*# Martin Marietta Corp., Denver, Colo.
ACOUSTIC AND VIBRATION ENVIRONMENTS FOR LABORATORY EXPERIMENTS IN SPACE
W. P. Rader *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 188-195 refs (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

The basic parameters of random noise and vibration are described, and typical environments for the launch phase and orbital operations are presented. For the latter, both acoustically induced and structure-borne, thruster-included vibration are addressed, using data obtained during the Skylab and Titan programs. T.M.

N82-12131*# Astro Research Corp., Carpinteria, Calif.
CRITICAL REQUIREMENTS FOR THE DESIGN OF LARGE SPACE STRUCTURES Final Report
John M. Hedgepeth Washington NASA
Nov. 1981 50 p refs
(Contract NAS1-15347)
(NASA-CR-3484; ARC-R-1016) Avail: NTIS HC A03/MF A01 CSCL 22B

The design criteria for large space structures are studied. Critical baseline design requirements for general types of structures are identified by a series of rational parametric analyses. Requirements imposed by operational loads, stiffness, and structural-control interactions are addressed along with deformations, precision and member slenderness criteria. Examples of applications of the identified loads and criteria to the design of the spacecraft structures discussed include: truss antenna reflectors, interorbit propulsion loads, and free-flying solar reflectors. S.L.

N82-12132# Aerospace Corp., El Segundo, Calif. Materials Sciences Lab.
QUALIFICATION VIBRATION TEST REPORT FOR SD 802 MATERIALS EXPERIMENT
A. F. DiGiacomo 3 Aug. 1981 41 p refs
(Contract F04701-80-C-0081)
(AD-A105321; TR-0081(6950-05)-3; SD-TR-81-58) Avail: NTIS HC A03/MF A01 CSCL 22/2

The qualification vibration tests conducted for SD 802 Spacecraft Materials Experiment Hardware, NASA Experiment No. M0003, are described. These tests were performed to demonstrate the structural integrity of the experiment modules when mounted in flight configuration. Author (GRA)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-12133*# Hughes Research Labs., Malibu, Calif. Ion Physics Dept.
RETROFIT AND ACCEPTANCE TEST OF 30-cm ION THRUSTERS Final Report, 12 Apr. 1978 - 1 Apr. 1981
R.. L. Poeschel Jun. 1981 324 p
(Contract NAS3-21357)
(NASA-CR-165259) Avail: NTIS HC A14/MF A01 CSCL 21C

Six 30 cm mercury thrusters were modified to the J-series design and evaluated using standardized test procedures. The thruster performance meets the design objectives (lifetime objective requires verification), and documentation (drawings, etc.) for the design is completed and upgraded. The etrofit modifications are described and the test data for the modifications are presented and discussed. S.L.

N82-12134# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
APPLICATION OF THE THREE BEAM LASER CROSS CORRELATION TECHNIQUE IN THE EXHAUST PLUME OF A LIQUID FUELLED ROCKET MOTOR
G. J. Ball May 1981 38 p refs
(Contract AT/2040/084/XP)
(AASU-343) Avail: NTIS HC A03/MF A01

A method for acquiring data in order to validate computer predictions of radial profiles of rms density fluctuations is presented. The three beam laser cross correlation technique was used to measure radial profiles of rms density fluctuation in a liquid fuelled rocket motor. The measured values are in close agreement with computer predicted profiles. A detailed error analysis is presented which indicates that fundamental limitations on the accuracy of the technique are set by practical motor burn times and the power spectrum of the fluctuating density field. Author (ESA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-12135*# Ultrasystems, Inc., Irvine, Calif.
THERMAL OXIDATIVE DEGRADATION REACTIONS OF PERFLUOROALKYLETHERS Final Report, Sep. 1980 - Sep. 1981
K. L. Paciorek, T. I. Ito, and R. H. Kratzer Oct. 1981 46 p refs
(Contract NAS3-22517)
(NASA-CR-165516; SN-1020-A1-F) Avail: NTIS HC A03/MF A01 CSCL 07C

The mechanisms operative in thermal oxidative degradation of Fomblin Z and hexafluoropropene oxide derived fluids and the effect of alloys and additives upon these processes are investigated. The nature of arrangements responsible for the inherent thermal oxidative instability of the Fomblin Z fluids is not established. It was determined that this behavior is not associated with hydrogen end groups or peroxy linkages. The degradation rate of these fluids at elevated temperatures in oxidizing atmospheres is dependent on the surface/volume ratio. Once a limiting ratio is reached, a steady rate appears to be attained. Based on elemental analysis and oxygen consumption data, CF2OCF2CF2O2, no. CF2CF2O, is one of the major arrangements present. The action of the M-50 and Ti(4 Al, 4 Mn) alloys is much more drastic in the case of Fomblin Z fluids than that observed for the hexafluoropropene derived materials. The effectiveness of antioxidation anticorrosion additives, P-3 and phospha-s-triazine, in the presence of metal alloys is very limited at 316 C; at 288 C the additives arrested almost completely the fluid degradation. The phospha-s-triazine appears to be at least twice as effective as the P-3 compound; it also protected the coupon better. The Ti(4 Al, 4 Mn) alloy degraded the fluid mainly by chain scission processes this takes place to a much lesser degree with M-50. S.L.

N82-12136# Texas A&M Univ., College Station. Dept. of Chemistry.
REACTIONS OF TRIBUTYLSTANNYL ANIONIODS WITH ALKYL BROMIDES
Martin Newcomb and Michael G. Smith 28 Sep. 1981 23 p refs Submitted for publication
(Contract N00014-79-C-0584; Grant NSF CHE-78-27411; NR Proj. 053-714)
(AD-A105433; TR-2) Avail: NTIS HC A02/MF A01 CSCL 07/3

The reactions of tributylstannyl anionoids (Bu3SnM, M = Li, K, Cs) with alkyl bromides have been studied. Tributylstannylpotassium and -cesium were prepared by deprotonation of tributyltin hydride with the mixed deprotonating agents potassium (cesium) diisopropylamide/lithium tert-butoxide. The predominant mechanism for alkylation of tributylstannyl anionoids by primary bromides is an S(N)2 displacement or its mechanistic equivalent, but the reactions of tributylstannyllithium with two secondary bromides appear to involve free radicals as intermediates. Dicyclohexylphosphine, which serves as a trapping agent for intermediate free radicals, was found to react relatively slowly with tributylstannyllithium to give hexabutylditin. GRA

N82-12137# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
METALS AND CERAMICS DIVISION MATERIALS SCIENCE PROGRAM Annual Progress Report, period ending 30 Jun. 1981
C. J. McHargue, comp. and Sigfred Peterson, ed. Sep. 1981 273 p refs
(Contract W-7405-eng-26)
(DE81-030697; ORNL/TM-7970) Avail: NTIS HC A12/MF A01

Information is presented concerning the theoretical studies of metals and alloys; X-ray diffraction research; structural ceramics; structure of coal; analytical and high-voltage electron microscopy; deformation and mechanical properties; mechanisms of surface and solid-state reactions; physical properties research; metastable materials; neutron radiation effects; charged particle radiation effects; theory and modeling of radiation effects; facility and advanced technique development; fundamentals of welding and joining; and studies in nondestructive evaluation. DOE

24 COMPOSITE MATERIALS

Includes laminates.

N82-12138# National Aerospace Lab., Tokyo (Japan).
STRENGTH EVALUATION TEST OF HOT-PRESSED SILICON NITRIDE AT ROOM TEMPERATURE
Katsutoshi Matsusue, Kitao Takahara, and Ryosaku Hashimoto 1981 26 p refs In JAPANESE; ENGLISH summary
(NAL-TR-676; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

In order to study strength characteristics at room temperature and the strength evaluating-method of ceramic materials, bending-tests of bars, tensile tests of rectangular plates and spin-tests of disks with a hole in the center were conducted on hot-pressed Si3N4 specimens. The mean strengths of the specimens as shown by either the tensile or the spin tests, agreed well with the values predicted from the results of the mean strength and the Weibull's modules by bending-tests of the material and the effective volume. The mean strength generally decreased with increasing effective volumes of the specimens when said effective volumes were not very small. However, they approached a certain value independent of the effective volumes when they were small enough. The limit value of the effective volumes was about 1 cm mm. Spin-testing was shown to be a useful method of testing the strength of ceramics. Observations of the fracture origins and of propagation on the fracture surfaces were made. When the effective volumes were large as in the case of spin-testing, two or more fracture origins were sometimes observed. Locations of the fracture origins did not necessarily coincide with that site where maximum stress was predicted to occur, and the discrepancies between the actual and predicted sites were generally great when stress-gradients on the fracture surface were small. B.W.

N82-12139*# Composites Horizons, Pomona, Calif.
HYBRIDIZED POLYMER MATRIX COMPOSITE Final Report
Bruce A. Stern and Teunis Visser Sep. 1981 85 p refs
(Contract NAS3-21384)
(NASA-CR-165340) Avail: NTIS HC A05/MF A01 CSCL 11D

Under certain conditions of combined fire and impact, graphite fibers are released to the atmosphere by graphite fiber composites. The retention of graphite fibers in these situations is investigated. Hybrid combinations of graphite tape and cloth, glass cloth, and resin additives are studied with resin systems. Polyimide resins form the most resistant composites and resins based on simple novolac epoxies the least resistant of those tested. Great improvement in the containment of the fibers is obtained in using graphite/glass hybrids, and nearly complete prevention of individual fiber release is made possible by the use of resin additives. S.L.

N82-12140*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE EFFECT OF RESIN ON THE IMPACT DAMAGE TOLERANCE OF GRAPHITE-EPOXY LAMINATES
Jerry G. Williams and Marvin D. Rhodes Oct. 1981 46 p refs Presented at the 6th ASTM Conf. on Composite Mater.: Testing and Design, Phoenix, Ariz., May 1981
(NASA-TM-83213) Avail: NTIS HC A03/MF A01 CSCL 11D

The effect of the matrix resin on the impact damage tolerance of graphite-epoxy composite laminates was investigated. The materials were evaluated on the basis of the damage incurred due to local impact and on their ability to retain compression strength in the presence of impact damage. Twenty-four different resin systems were evaluated. Five of the systems demonstrated substantial improvements compared to the baseline system including retention of compression strength in the presence of impact damage. Examination of the neat resin mechanical properties indicates the resin tensile properties influence significantly the laminate damage tolerance and that improvements in laminate damage tolerance are not necessarily made at the expense of room temperature mechanical properties. Preliminary results indicate a resin volume fraction on the order of 40 percent or greater may be required to permit the plastic flow between fibers necessary for improved damage tolerance. B.W.

N82-12141*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
BIAXIAL TESTS OF FLAT GRAPHITE/EPOXY LAMINATES Final Report, 1 Feb. 1976 - 31 Dec. 1980
Harold Liebowitz and Douglas L. Jones Oct. 1981 106 p refs
(Grant NsG-1289)
(NASA-CR-165793) Avail: NTIS HC A06/MF A01 CSCL 11D

The influence of biaxially applied loads on the strength of composite materials containing holes was analyzed. The analysis was performed through the development of a three dimensional, finite element computer program that is capable of evaluating fiber breakage, delamination, and matrix failure. Realistic failure criteria were established for each of the failure modes, and the influence of biaxial loading on damage accumulation under monotonically increasing loading was examined in detail. Both static and fatigue testing of specially designed biaxial specimens containing central holes were performed. Static tests were performed to obtain an understanding of the influence of biaxial loads on the fracture strength of composite materials and to provide correlation with the analytical predictions. The predicted distributions and types of damage are in reasonable agreement with the experimental results. A number of fatigue tests were performed to determine the influence of cyclic biaxial loads on the fatigue life and residual strength of several composite laminates. B.W.

N82-12142*# Boeing Commercial Airplane Co., Seattle, Wash.
IN-SERVICE INSPECTION METHODS FOR GRAPHITE-EPOXY STRUCTURES ON COMMERCIAL TRANSPORT AIRCRAFT Final Report
M. L. Phelps Nov. 1981 105 p refs
(Contract NAS1-15304)
(NASA-CR-165746) Avail: NTIS HC A06/MF A01 CSCL 11D

In-service inspection methods for graphite-epoxy composite structures on commercial transport aircraft are determined. Graphite/epoxy structures, service incurred defects, current inspection practices and concerns of the airline and manufacturers, and other related information were determind by survey. Based on this information, applicable inspection nondestructive inspection methods are evaluated and inspection techniques determined. Technology is developed primarily in eddy current inspection. S.L.

N82-12143# McDonnell Aircraft Co., St. Louis, Mo.
EFFECT OF FIGHTER ATTACK SPECTRUM ON COMPOSITE FATIGUE LIFE Final Report, Sep. 1978 - Oct. 1980
R. Badaliance and H. D. Dill Mar. 1981 126 p refs
(Contract F33615-78-C-3218; AF Proj. 2401)
(AD-A105034; AFWAL-TR-81-3001) Avail: NTIS HC A07/MF A01 CSCL 11/4

The objective was to evaluate the effect of fighter wing load spectrum variations on the life behavior of composite structures. Six types of spectra were generated: (a) clipping to 90% test limit stress, (b) addition of stress overloads, (c) addition of low loads, (d) truncation to 70% test limit stress, (e) clipping of tension loads, (f) increased severity and number of air-to-air loads. A single hole compression test specimen was designed to simulate fatigue critical areas of fighter wing skins. GRA

N82-12144# Mississippi Univ., University. Dept. of Electrical Engineering.
ELECTROMAGNETIC DIFFRACTION BY A NARROW SLIT IN AN IMPEDANCE SHEET-E-POLARIZATION Final Report
Donald F. Hanson 24 Jul. 1981 65 p refs
(Grant AF-AFOSR-0172-80; AF Proj. 2301)
(AD-A105029; AFOSR-81-0645TR) Avail: NTIS HC A04/MF A01 CSCL 11/4

Composite materials have come into use lately in aircraft construction because of their high strength and low weight. This report examines a method for computing the shielding effectiveness of a narrow slit in a composite material. This corresponds to a joint or seam between two composite panels. For low frequency incident fields, the composite can be effectively modelled as an infinitely thin impedance sheet. The literature on impedance sheets is reviewed and a general integral equation formulation for impedance sheets is described. Since only narrow slits (seams) are of practical interest, a quasi-static (low frequency) approach is developed. A dual integral equation is derived for the problem. The dual integral equation is reduced to a Fredholm second kind integral equation. This integral equation is solved by expanding the unknown in terms of Legendre polynomials. An analytic solution for the problem of a narrow slit in a perfectly conducting plane is also obtained. GRA

N82-12145# Universal Energy Systems, Inc., Dayton, Ohio.
RADIO SHACK TRS-80 POCKET COMPUTER SOLUTIONS TO COMPOSITE MATERIALS FORMULAS Final Report, Jan. - May 1981
Won J. Park Aug. 1981 26 p refs
(Contract F33615-79-C-5125)
(AD-A105173; AFWAL-TR-81-4074) Avail: NTIS HC A03/MF A01 CSCL 11/4

This volume contains the description and instructions of the use of Radio Shack TRS-80 Pocket Computer for the key calculations of the stiffness and strength of symmetric laminated composites. The magnetic cassette tapes contain the required programming in the language of BASIC. With the aid of tape recorder for loading the program into TRS-80, instant calculation can be made for practical use. The formulas and equation numbers used in the programming have been derived in a book entitled, Introduction to Composite Materials, coauthored by S. W. Tsai and H. T. Hahn, published by Technomic Publishing Company, Westport, CT, July 1980. GRA

N82-12146# Battelle Inst., Frankfurt am Main (West Germany). Haupabt. Materialtechnologie.
RESEARCH AND DEVELOPMENT WORK CONCERNING A FIBER REINFORCED PLASTIC MATERIAL WHICH IS ISOELASTIC TO BONE Final Report
Eva Poeschel, Kari Koester-Loesche, Harald Ehard, Johann Kubicek, Heinrich Deibig, Ulrich Mueller, and Ulrich Roth Bonn Bundesministerium fuer Forschung und Technologie Oct. 1980 84 p refs In GERMAN; ENGLISH summary Original contains color illustrations Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-063; R-63.436-9; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,70

A material used for endoprothesis, whose biomechanical properties allow it to adapt to prevailing stress conditions, is presented. A fiber reinforced plastic, adaptable to the specific loading conditions of the bone with the aid of its anisotropic mechanical properties, is applied. Polymethylmethacrylate reinforced with carbon fibers, glass fibers, or a combination of both, proves suitable. According to the present state of development and knowledge, these materials exhibit good biocompatibility and are suitable for medium loads in optimized form. Further investigations are required for application under conditions of extreme stress. Author (ESA)

N82-12147# Technical Research Centre of Finland, Espoo. Poltto-ja Voiteluainelab.
SIGNIFICANCE OF MICROPORES IN ESTIMATING ADSORPTION PROPERTIES OF ACTIVATED CARBON
Jussi Ranta May 1981 120 p refs In FINNISH; ENGLISH summary
(VTT-39; ISBN-951-38-1197-2; ISSN-0355-3590) Avail: NTIS HC A06/MF A01

Literature on the pore structure and the micropore structure of activated carbon is reviewed. Classical research methods based on Kelvin's equation are still most generally used, although reliable information is obtained only about larger pores. In micropore research, a method based on Dubinin's equation determines the total volume and mean size. These parameters are of central significance in the adsorption from steam or gas phases. The determination of micropore parametres with the aid of nitrogen adsorption is studied. Owing to the strong adsorbability, adsorption into larger pores also occurs simultaneously, and is considered when calculating properties of micropores. The dependence of adsorption from liquid phases on the micropore parameters of activated carbon was studied in part with the aid of water solutions of partly water soluble organic materials. The limit volume of micropores is essential. Author (ESA)

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-12148 Iowa State Univ. of Science and Technology, Ames.
APPLICATIONS OF VIBRATING WIRE ELECTRODES TO ELECTROANALYSIS Ph.D. Thesis
Kenneth W. Pratt, Jr. 1981 290 p
Avail: Univ. Microfilms Order No. 8122556

The design and construction of Au and Pt vibrating electrodes are described. These electrodes were vibrated by means of a loudspeaker at peak to peak amplitudes from 0 to 3.3 mm and frequencies from 30 to 510 Hz. Electronic intrumentation is described which permitted direct recording of the limiting current as a function of the vibrational amplitude. This instrumentation was also used to effect hydrodynamic modulation at the vibrating electrode, with phase selective detection of the resultant 10 Hz alternating component of the electrode current. The hydrodynamic behavior of vibrating electrodes was studied visually and electrochemically. Hydrodynamic transitions in the flow patterns induced by the vibrating electrodes were characterized. The exponential dependencies of the limiting current on the vibrational parameters were determined. Dissert. Abstr.

N82-12149 Iowa State Univ. of Science and Technology, Ames.
TUBULAR ELECTRODES IN FLOW INJECTION ANALYSIS Ph.D. Thesis
Peter Lawrence Meschi 1981 210 p
Avail: Univ. Microfilms Order No. 8122540

Equations describing the current-time response of the electrode, i(t) the maximum of the current-time curve, i sub p and the area under the current-time curve, Q sub p, are derived as a function of the volume of the sample, V sub s, the volume of the flow system, V sub r the flow rate of the fluid stream, V sub s, the coefficient of dispersion, K and the steady-state current, I sub s for the dispersion of a sample in a straight tube under the conditions of laminar flow. The steady-state behavior of the tubular electrode is also described and the validity of the concept of a flow-rate independent component of the steady-state is brought into serious question. The concept was originally proposed to explain the nonzero intercepts obtained for linear extrapolations of plots of V sub f (1/3). The nonzero intercepts are concluded to be mathematical artifacts of inaccurate data analysis rather than the results of an electrochemical phenomenon.
Dissert. Abstr.

N82-12150 Rensselaer Polytechnic Inst., Troy, N. Y.
ANALYSIS FOR ORGANIC PIGMENTS USING SOLUTION SPECTROPHOTOMETRY Ph.D. Thesis
Romesh Kumar 1981 219 p
Avail: Univ. Microfilms Order No. 8121151

Simple analytical schemes and standard reference data were developed for the identification of organic pigments by solution spectrophotometry. This technique involves extraction of the pigment in a suitable solvent and the measurement of the resulting solution on an analytical spectrophotometer (380-900 nanometers) followed by the comparison of the solution spectrum with the spectra of known pigments. The solution spectra were obtained as log absorbance vs wavelengths displays because of the independence of the curve shape of the concentration of the solution. Samples such as oil paints, acrylic paints, inks and plastics containing single and mixed pigments were analyzed successfully. A solvent-extraction and separation scheme was also developed for the identification of natural organic colorants used in old paintings. Organic pigments used in some painting samples and postage stamps were also identified. Dissert. Abstr.

N82-12151 Iowa State Univ. of Science and Technology, Ames.
LASER EXCITED SHPOL'SKII SPECTROSCOPY FOR THE SELECTIVE EXCITATION AND DETERMINATION OF POLYNUCLEAR AROMATIC HYDROCARBONS Ph.D. Thesis
Yen Yang 1981 131 p
Avail: Univ. Microfilms Order No. 8122572

An excimer laser pumped, dye-laser coupled with gated detection was employed in the LESS system. The sharp absorption bandwidth exhibited PAHs in Shpol'skii hosts (n-alkanes) at 15 K facilitated the selective excitation and sensitive detection of the luminescence through narrow band laser excitation. It was shown that LESS is capable of distinguishing between structural isomers was well as alkyated substitutional isomers when these occurred in complex mixtures. Luminescence spectra, site population dependency on concentrations, anaytical curves, and detection limits were studied. It was found that: reproducible site population of PAHs at concentration levels below one ppm could be achieved through reproducible cooling regimes; self-absorption of the 0-0 fluorescence lines could be alleviated on excitation with reduced laser power; analytical calibration curves were linear over 3.5 decades in concentration; and detection limits were on the order of parts-per-trillion. Dissert. Abstr.

N82-12152 Iowa State Univ. of Science and Technology, Ames.

THE KINETICS OF THE REVERSE DEACON REACTION Ph.D. Thesis

Arun K. Nanda 1981 153 p
Avail: Univ. Microfilms Order No. 8122546

The kinetics of the chlorination of water vapor at high temperatures were investigated using an eleven-pass glass reactor 4 mm ID and 511 mm long. The rate expression for the reverse Deacon reaction was developed from the experimental data at 879 deg K. Varying the partial pressures of the reactants, the rate data were collected, and these results were synthesized to formulate the rate law. The rate expression was verified by the integral approach and the results were extended to two other temperatures, 777 and 983 deg K. The parameters of the rate expression were obtained by means of a linear-least square fit. The frequency factor and the energy of activation were determined for the reverse Deacon reaction. An attempt was made to verify these parameters with the theoretical values from collision theory and activated complex theory. A mechanism consistent with one of the limiting conditions was postulated. The effects of the flow rates of the reactants and temperature on conversion of chlorine were also examined. Dissert. Abstr.

N82-12153 Toledo Univ., Ohio.

SURFACE CHEMICAL REACTIONS ON STATIONARY OR ROTATING BODIES IN NONISOTHERMAL LAMINAR BOUNDARY LAYER FLOWS Ph.D. Thesis

Ronald Lester Fournier 1981 160 p
Avail: Univ. Microfilms Order No. 8121651

The transport phenomena occurring when species present in an external forced convective flow react according to arbitrary kinetics at the surface of an arbitrary stationary or axisymmetrical rotating body is analyzed. Dissert. Abstr.

N82-12154 Pennsylvania State Univ., University Park.

CARBON-SUPPORTED IRON CATALYSTS FOR CO HYDROGENATION Ph.D. Thesis

Hyun-Jong Jung 1981 304 p
Avail: Univ. Microfilms Order No. 8120442

Carbon blacks, activated carbons, graphitized carbon, and molecular sieve glassy carbons are used to prepare a number of supported iron catalysts. All catalysts are characterized by CO chemisorption and X-ray diffraction measurements to determine average iron crystallite sizes. Magnetization measurements are made on representative samples to estimate metal particle sizes which are compared to the aforementioned values. The catalytic properties of carbon supported iron are then determined for the CO hydrogenation reaction at 101 kPa using a differential, plug flow reactor. Carbon monoxide hydrogenation over iron is a structure sensitive reaction, because of lower surface concentrations of hydrogen on small crystallites caused by inhibited H_2 chemisorption. Dissert. Abstr.

N82-12155 Rutgers - The State Univ., New Brunswick, N. J.

FERMENTATION KINETICS AND PROCESS DEVELOPMENT FOR ENHANCED RATE OF PRODUCTION OF ETHANOL FROM CARBOHYDRATES Ph.D. Thesis

Chun-Ko Jin 1981 221 p
Avail: Univ. Microfilms Order No. 8122085

A continuous cascade fermentation process comprising eight tanks in series, employing a protein phosphoipid complex as a protective agent (PA) was performed for ethanol production from glucose. An increase of 58.4% in fermenter productivity was obtained due to the addition of PA. A kinetic model including product and substrate inhibition effects is proposed. Parameters appearing in the kinetic model were estimated by using the method of least squares. It is found that product inhibition effect dominates over the substrate inhibitor system. On the addition of PA, both inhibitor effects are reduced to as little as about one fourth of that without PA. It is also found that the use of PA primarily protects the cells against ethanol inhibition rather than substrate inhibition. A steady state criterion is discussed. Dissert. Abstr.

N82-12156 Arizona Univ., Tucson.

FUEL NITROGEN CONVERSION DURING FUEL RICH COMBUSTION OF PULVERIZED COAL AND CHAR Ph.D. Thesis

James William Glass 1981 334 p
Avail: Univ. Microfilms Order No. 8121921

The conversion of coal and char nitrogen is investigated during fuel rich combustion. The roles of NO, HCN, and NH_3, and char nitrogen in the post combustion gases in the first, fuel rich stage of a staged combustor are clarified. The fuel rich conversion of char nitrogen show that at all stoichiometries, the concentrations of HCN and NH_3 in the post time gases are small compared to the concentration of NO. Char nitrogen conversion is stoichiometric or greater. Destruction of NO is found to be controlled by a heterogeneous mechanism involving the char carbon surface. The mechanism is deactivated by oxygen. Dissert. Abstr.

N82-12157 New Jersey Inst. of Tech., Newark.

CORRELATION AND PREDICTION OF VAPOR-LIQUID EQUILIBRIUM IN ELECTROLYTIC SOLUTIONS Ph.D. Thesis

Anil Krishna Rastogi 1981 313 p
Avail: Univ. Microfilms Order No. 8121970

Two expressions for the excess Gibbs free energy are presented which correlated and predict vapor-liquid equilibrium and the mean molal activity coefficient of an electrolyte in a ternary mixture containing water and either MeOH of EtOH. The proposed equations take into account coulombic forces between ions and the physical interaction forces between ion-solvent and solvent-solvent molecules in a solution. Dissert. Abstr.

N82-12158 New Jersey Inst. of Tech., Newark.

SEPARATION VIA MULTI-COLUMN pH PARAMETRIC PUMPING Ph.D. Thesis

Wei Tai Yang 1981 218 p
Avail: Univ. Microfilms Order No. 8121973

The study of multi-column pH parametric pumping, a separation technique which applies the principle of parametric pumping and uses pH as control variable is presented. Studies emphasize on the mass transfer and the capability of separation by multi-column pH parametric pumping. A Two-pH Levels Parapump is capable of enriching the product stream with solute components; a Three-pH Levels Parapump is capable of splitting components into two product streams. The separation capability of multi-column parapump is greatly superior to that of single-column parapump. As compared to cycling zone operation, parametric pumping gives a higher separation factor. Hemoglobin and albumin are chosen for the experimental model system to demonstrate the separation capability of multi-column pH parametric pumping, and to verify the predictability of the models. Dissert. Abstr.

N82-12159 Carnegie-Mellon Univ., Pittsburgh, Pa.

ION TRANSPORT IN CHARGED POROUS MEDIA THEORY AND EXPERIMENTS Ph.D. Thesis

Gerald Bruce Westermann-Clark 1981 169 p
Avail: Univ. Microfilms Order No. 8118795

A mathematical model for ion transport in a charged porous medium as well as the results of experiments to test the validity of this model are presented. The Nernst-Planck, Poisson-Boltzmann, and Navier-Stokes equations are used to predict the steady state transport of ions through a circular capillary caused by concentration, pressure and electrical potential differences across the ends of the capillary. The ratio of the capillary radius to the Debye length of the solution inside the capillary and the product of the capillary radius and surface charge density must be known for the model to be solved. The track etched mica system used to test the model has a known number of identical pores in a given membrane, pores whose geometry is very accurately determined, and whose surface charge is the only unknown parameter. Dissert. Abstr.

N82-12160 Lehigh Univ., Bethlehem, Pa.

CONTROL OF HIGH PURITY DISTILLATION COLUMNS Ph.D. Thesis

Carmelo Fuentes 1981 109 p
Avail: Univ. Microfilms Order No. 8118832

The dynamics and control were studied via digital simulation. The effects of product purity, relative volatility, composition analyzer sampling time and magnitude of the disturbance were explored.

Equimolar and non-equimolar overflow systens were considered. Results show that systems with low relative volatility (alpha = 2) respond slowly enough so that good control can be achieved at very high purity levels with a 5 minute dead time in the analyzer. However, systems with high volatility (alpha = 4) respond so quickly that large deviations in products purity occur before the analyzer can respond. The dynamic response of the latter systems is very non linear. Effective control was obtained for these high relative volatility systems by using a composition/temperature cascade system. Dissert. Abstr.

N82-12161 Princeton Univ., N. J.
CRYOGENIC DEPOSITION, DESORPTION, AND REACTION STUDIES OF STRATOSPHERICALLY RELEVANT SPECIES Ph.D. Thesis
Richard Fezza 1981 413 p
Avail: Univ. Microflms Order No. 8121469

The condensing of CF2Cl2, CFCl3, N2, O3, NO, N2O, and CO2, on various cryosurface materials including electropolished, gold-flashed, or hexa-methyidisilazane coated stainless steel disks was investigated. A strong, spurious, first condensation was observed in the 200-250K temperature range for N2O, CO2, NO, CF2Cl2, and CFCl3, with weaker effects for N2 and O2. This phenomenon is believed due to water vapor contamination of the cryosurface, possibly forming a clathrate-like structure with the beam and background species. Desorption spectra for the binary systems CF2Cl2/N2, CF2Cl2/O2, CFCl3/N2, and CFCl3/O2, as well as those for the pure components shown carry over of the chlorofluoromethanes at low concentrations by N2 and O2. Temperature programmed and flash desorption techniques revealed a surprising, persistent disproportionation of NO to NO2 during desortion of NO-containing condensates t levels near 50%. Ozone was found to recombine during desorption, exhibiting a threshold concentration effect, and conversion related to absolute quantities of deposits. Dissert. Abstr.

N82-12162 California Univ., Santa Barbara.
DYNAMIC MODELING AND CONTROL STRUCTURES FOR A TUBULAR AUTOTHERMAL REACTOR AT AN UNSTABLE STATE Ph.D. Thesis
Dominique Bonvin 1980 455 p
Avail: Univ. Microfilms Order No. 8120742

A laboratory scale autothermal fixed bed reactor with internal countercurrent heat exchange was operated at a naturally unstable state. Modal control with incomplete state feedback was used: the often difficult task of estimating the unmeasured state variables was purposely avoided. A generalized structural dominance method was developed to determine along with the dominant response modes of the system, the most sensitive state variables and the most effective inputs. The method provides strong guidelines to model reduction. The technique is successfully demonstrated in applications to other large scale systems in addition to the autothermal reactor. A major emphasis is given to the investigation of modal approaches to model reduction, and several techniques were evaluated on a common basis which permits comparisons to be made. Dissert. Abstr.

N82-12163 State Univ. of New York at Buffalo.
BEHAVIOR AND MORPHOLOGY OF PALLADIUM ON ALUMINA MODEL CATALYSTS IN HYDROGEN AND OXYGEN Ph.D. Thesis
James Jenyee Chen 1981 121 p
Avail: Univ. Microfilms Order No. 8122162

The sintering behavior of Pd crystallites supported on gamma alumina in 1 atm flowing hydrogen as a function of time and temperature is studied. Model catalysts consisting of Pd crystallites supported on thin films of alumina are heated at 650 C, 725 C, and 800 C for various time intervals. The same region of a specimen is examined with a transmission electron microscope after each heat treatment to follow the changes of each Pd crystallite. The various events which occur during short, intermediate, and long durations of heating are identified. The possible mechanisms are outlined and discussed. Dissert. Abstr.

N82-12164 Colorado Univ. at Boulder.
STRUCTURE OF LAMINAR PREMIXED FLAMES OF METHANE, METHANOL AND THEIR BLENDS IN OXYGEN Ph.D. Thesis
Habib Ibrahim Abu-Al-Hamayel 1981 145 p
Avail: Univ. Microfilms Order No. 8122264

The overall characteristics of the flames under study were examined. The effect of variation of combustion chamber pressure was observed. The decrease in pressure of the combustion chamber spread the flame zone and better sampling of the combustion gases was possible. Higher temperature profiles were noticed for subatmospheric pressure runs as a result of moving the flame away from the burner surface. The changed of species mole fractions with equivalence ratio is reported. The mole fraction profiles of CO2 mole fraction profile were observed to be minimum for the richest flame for the three fuels. In the attached flame runs, significant product concentrations are found near the burner surface. By increasing the total flow rate of the reactants, the free standing flames were formed and higher fuel concentrations were observed over the prereaction zone. The effect of the fuel structure on the composition profiles was determined.
Dissert. Abstr.

N82-12165 Technische Hogeschool, Delft (Netherlands).
SCALE PREVENTION. STUDY ON THE CRYSTALLIZATION OF CALCIUM SULFATE AND BARIUM SULFATE WITH AND WITHOUT INHIBITORS Ph.D. Thesis
Gerda Maria vanRosmalen 1981 164 p refs
Copyright. Avail: Issuing Activity

Scale formation (precipitation fouling) is defined and its effects on various industrial processes and systems are described. Chemical, physical, and mechanical methods for removing and controlling scale are reviewed with emphasis on the chemical threshold treatment with the addition of trace amounts of inhibitors as well as the use of a fluidized bed. Topics covered include: (1) growth affinity in aqueous solutions; (2) growth kinetics in slightly soluble crystals; (3) growth of calcium sulfate dihydrate crystals in suspension; (4) quantitative description of the influence of the inhibitor concentration on the growth rate; (5) growth of barium sulfate crystals in suspension; (6) influence of the molecular structure of some biosphosphonates on the growth inhibition of barium sulfate crystals in suspension; (7) the influence of various additives at different ph values on the growth rate; and scale inhibition of calcium sulfate by a fluidized bed. A.R.H.

N82-12166* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ELECTROPHOTOLYSIS OXIDATION SYSTEM FOR MEASUREMENT OF ORGANIC CONCENTRATION IN WATER Patent
H. Eugene Winkler, inventor (to NASA) Issued 6 Oct. 1981 9 p Filed 21 May 1979 Supersedes N79-23167 (17 - 14, p 1818)
(NASA-Case-MSC-16497-1; US-Patent-4,293,522;
US-Patent-Appl-SN-041145; US-Patent-Class-422-80;
US-Patent-Class-23-230PC; US-Patent-Class-23-232E;
US-Patent-Class-204-1T; US-Patent-Class-204-195S;
US-Patent-Class-204-263; US-Patent-Class-204,264;
US-Patent-Class-204-266; US-Patent-Class-204-275;
US-Patent-Class-204-276; US-Patent-Class-204-278) Avail: US Patent and Trademark Office CSCL 07D

Methods and apparatus for determining organic carbon in aqueous solution are described. The method comprises subjecting the aqueous solution to electrolysis, for generating oxygen from water, and simultaneously to ultraviolet radiation, for oxidation of substantially all organic carbon to carbon dioxide. The carbon dioxide is measured and the value is related to the concentration of organic carbon in the aqueous solution.
Official Gazette of the U.S. Patent and Trademark Office

N82-12167*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
REQUIREMENTS DOCUMENT FOR MINI SYSTEM TEST UNIT
Dominic Garofolo Aug. 1981 16 p
(Contract NAS9-15800)
(NASA-CR-167436; JSC-17634; LEMSCO-17199) Avail: NTIS HC A02/MF A01 CSCL 07D

The mini system test unit (STU) for the Trace Gas Analyzer (TGA) is defined. The interface signals of the components used to implement the STU are also defined. The mini STU is used to support pre-flight ground test operations. The STU indications of TGA operation (organic and carbon monoxide analyses) and its ability to monitor gas chromatograph and mass spectrometer test signals are included. S.L.

N82-12168*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FIRE EXTINGUISHANT MATERIALS Patent Application
Robert L. Altman, Ludwig A. Mayer (San Jose State Univ.), and Alan C. Ling, inventors (to NASA) (San Jose State Univ.) Filed 3 Nov. 1981 11 p
(NASA-Case-ARC-11252-1; US-Patent-Appl-SN-317877) Avail: NTIS HC A02/MF A01 CSCL 21B

Fire extinguishant materials were developed for extinguishing fires on hot metal surfaces caused by liquid fuels such as jet engine fuels. The composition of the materials is a mixture of a finely divided aluminum compound and alkali metal, stannous or plumbous halide. The aluminum compound may be aluminum hydroxide, alumina or boehmite, but preferably it is an alkali metal dawsonite. The metal halide may be an alkali metal, e.g. potassium iodide, bromide, or chloride, or stannous or plumbous iodide, bormide, or chloride. Potassium iodide is preferred. The presence of the halide improves the performance of the aluminum compound in extinguishing fires on hot metal surfaces. *NASA

N82-12169# Technische Hogeschool, Delft (Netherlands).
COPRECIPITATED NICKEL-ALUMINA METHANATION CATALYSTS Ph.D. Thesis
Edgar Charles Kruissink 1981 145 p refs Sponsored by Netherlands Foundation for Chemical Research and Netherlands Organization for the Advancement of Pure Research
Avail: NTIS HC A07/MF A01

Methanation is used in a process which aims at the long distance transport of heat obtained from a nuclear high temperature reactor. Heat is transported by means of a chemical circuit. After transport of the cooled product gas, the energy is regained with high efficiency by exothermic methanation reaction. For the system reforming reaction, suitable catalyst preparation, chemical composition and structure are investigated, as is the characterization of calcined and reduced coprecipitates. Coprecipitated nickel alumina catalysts are studied. S.L.

N82-12170# Helsinki Univ. of Technology, Espoo (Finland). Dept. of Technical Physics.
INVESTIGATIONS AND APPLICATIONS OF POLARIMETRIC AND HIGH RESOLUTION MOESSBAUER SPECTROSCOPY
K. Riski 1981 13 p refs Sponsored by the Academy of Finland
Avail: NTIS HC A02/MF A01

Two special topics of mossbauer spectroscopy were investigated, the use of recoilless gamma radiation in studies of magnetic and electric hyperfine interactions and the use of the [illegible] high energy resoluton of the Mossbauer resonance of 67 Zn in small energy shift determinations with special application to the measurement of the gravitational red shift. A density matrix theory was extended to take into account the change of polarization of gamma rays in matter with anisotropic nuclear absorbtion. Isomer shifts and linewidths of ZnO powders were studied. Instruments were built to measure how the red shift depends on the propagation direction of the photon. R.J.F.

N82-12171# National Aerospace Lab., Tokyo (Japan).
COMBUSTION AND EMISSION CHARACTERISTICS OF A MODEL GAS TURBINE COMBUSTOR BURNING LEAN HETEROGENEOUS MIXTURES
Shigeru Hayashi and Hideshi Yamada 1981 21 p refs In JAPANESE; ENGLISH summary
(NAL-TR-666; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Rich, heterogeneous mixtures of kerosine and air were injected into the combustion air using an acoustic atomizer and flames were stablized by means of a swirler. Experiments were made at inlet air temperatures of 450, 550, and 650 K under atmospheric pressure. The overall equivalence ratio ranged from the blow-off limit to unity. The degrees of atomization were varied by changing the feeding rate of the atomizing air. The emission indexes of NOx are compared with those for some simplified model combustors burning homogeneous mixtures and for fuel-rich primary zone combustors burning sprays from conventional pressure atomizers or premixed sprays from a mixing tube. The emission index of NOx at th exit is correlated with the adiabtic flame temperature T sub f. The temperature coefficient is compared with a typical value of 0.0006 for homogenous mixtures. Standard Arrhenius plots of the rate of EI(NOx) versus 1/T sub f give a typical value of 18kcal/mol for the activation energy. The NOx emission decreases with increasing degrees of atomization and mixing, the effect being more significant at higher inlet air temperature. The emission indexs of CO, THC, and NOx at 650 K are 8, 0.003 and 13, respectively, under the highest degree of atomization with a combustion efficiency greater than 99.9% and blow-off velocity of about 60m/sec. J.M.S.

N82-12172# Cornell Univ., Ithaca, N. Y. Dept. of Chemistry.
SECONDARY ION MASS SPECTROMETRIC IMAGE DEPTH PROFILING FOR THREE-DIMENSIONAL ELEMENTAL ANALYSIS Interim Technical Report
Adam J. Patkin and George H. Morrison 1 Oct. 1981 24 p refs
(N00014-80-C-0538)
(AD-A105092; TR-5) Avail: NTIS HC A02/MF A01 CSCL 07/4

Three-dimensional elemental microcharacterization of the near-surface regions of solid samples is performed by combining the dynamically eroding nature of secondary ion mass spectrometry (SIMS), spatially resolved multi-area, multi-element ion intensity data, and digital image processing. Multiple simultaneous depth profiles and three-dimensional image profiles are used to analyze a metal-oxide semiconductor (MOS) integrated circuit and ion implant samples. Author (GRA)

N82-12173# Dayton Univ., Ohio.
ADVANCED COMBUSTION/PLUME DIAGNOSTICS Final Report, 1 Oct. 1978 - 30 Sep. 1980
Jay D. Eversole Jul. 1981 47 p refs
(Contract F04611-77-C-0042; AF Proj. 2308; AF Proj. 9993)
(AD-A105115; UDR-TR-81-01; AFRPL-TR-81-09) Avail: NTIS HC A03/MF A01 CSCL 21/2

The procedures and some results of an experimental program to record and analyze the thermal radiation from particles suspended in a gaseous flow (two-phase flow) are presented in this report. Carbon particles were added to a nitrogen gas stream at 800-900 K flowing at approximately 50 m/s. Thermal radiation from these particles was observed and recorded using a scanning monochromator for the wavelength range of 1.0 to 5.5 micrometers. These spectra were corrected for instrument response and are compared to theoretical calculations which predict the infrared emission from small particles. Since these predictive calculations depend on the particle size parameter, different techniques were used to obtain the average particle size in the two-phase flow. Author (GRA)

N82-12174# Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
ELECTRONIC EXCITATION IN MOLECULAR COLLISIONS: STRUCTURAL, DYNAMIC AND KINETIC CONSIDERATIONS Annual Summary Report, Sep. 1980 - Aug. 1981
R. D. Levine Aug. 1981 12 p refs
(Grant N00014-78-G-0036)
(AD-A105054) Avail: NTIS HC A02/MF A01 CSCL 07/4

The factors governing chemical reactivity with special reference to the role of electronic energy in promoting the reaction and to the production of electronically excited species are examined. The problem is studied both in general terms (i.e., the development of the required theoretical framework) and in application to specific systems. Author (GRA)

N82-12175# Naval Postgraduate School, Monterey, Calif.
ANALYSIS OF COMBUSTION OF A COMPOSITE PLATE M.S. Thesis
Robert Emmett Luby, Jr. Jun. 1981 77 p refs
(AD-A104852) Avail: NTIS HC A05/MF A01 CSCL 21/2

The combustion of a porous graphite fiber plate is analyzed. A transient one-dimensional, mathematical model is utilized to conduct numerous computer tests. The model simulates the thermal response of a porous graphite fiber plate and it is based on appropriate energy equations. Two of the energy equations are based on energy balances conducted on both the porous structure and on the air within the graphite fibers. The third energy equation is based on a mass balance performed on a differential volume of porous medium. A test plan is formulated and computer test runs are conducted to investigate the effects of plate thickness, filament diameter, permeability, porosity and exterior wind velocity on the thermal response of the porous graphite fiber structure. The test results are analyzed and conclusions are presented. Author (GRA)

N82-12176# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
ACETYLENE TERMINATED PHENYLENE THERMOSET SYSTEMS Final Report, Jan. - Oct. 1979
G. A. Loughran, B. A. Reinhardt, E. J. Soloski, and F. E. Arnold
Jun. 1981 30 p
(AF Proj. 2419)
(AD-A105394; AFWAL-TR-81-4006) Avail: NTIS
HC A03/MF A01 CSCL 07/3

A series of acetylene terminated phenylene (trademark) thermoset systems have been synthesized and their thermal and thermal mechanical properties correlated with molecular structure. The synthesis provided the materials as a mixture of monomer and oligomer. The monomer was separated from the oligomer by means of column chromatography. Their glass transition temperature before and after thermal cure were determined using DSC plus thermomechanical analyses (TMA). The thermal and thermooxidative properties of the materials were evaluated with cured monomers by thermogravimetric analysis and isothermal aging in air, at 600 F. Author (GRA)

N82-12177# Army Armament Research and Development Command, Dover, N. J. Large Caliber Weapon Systems Lab.
CARS SPECTROSCOPY OF GUN PROPELLANT FLAMES
L. E. Harris and M. E. McIlwain Sep. 1981 34 p refs
(AD-A105224; ARLCD-TR-81007) Avail: NTIS
HC A03/MF A01 CSCL 14/2

Temperature measurements were made in a slightly fuel rich, premixed, propane/air reference flame and nitrate ester propellant flames burning in air at atmospheric pressure using Coherent Anti-Stokes Raman Scattering (CARS). Both single and multiple-pulse CARS nitrogen spectra in the reference flame agreed with model spectra and the derived temperature agreed with sodium line reversal values. Single pulse CARS nitrogen spectra obtained in the propellant flames were analyzed to give temperatures consistent with the values calculated using the NASA-Lewis thermochemical calculation. Comparison of a 0.1-second separated sequence of single pulse CARS spectra indicated turbulent air mixing in these propellant flames. The results demonstrated that temporal and spatially resolved temperature measurements could be determined in transient, turbulent flames. Author (GRA)

N82-12178# Atlantic Research Corp., Alexandria, Va. Combustion and Physical Science Dept.
CHEMISTRY OF COMBUSTION OF FUEL-WATER MIXTURES Final Technical Report, 1 Jun. 1980 - 31 May 1981
Edward G. Skolnik, Edward T. McHale, and Harley L. Heaton
Sep. 1981 51 p refs
(Contract N00014-80-C-0534)
(AD-A105401) Avail: NTIS HC A04/MF A01 CSCL 21/2

The continuation of an experimental flame study concerning the nonphysical processes that lead to soot suppression when water is added to fuel, begun in a previous program is reported. The study included a mapping of temperature, chemical species and soot profiles of laminar diffusion flames with and without water added. Fuels studied included ethylene and a benzene/hydrogen mixture. Flames with nonreactive gases added (argon, nitrogen), were also studied for comparison purposes. The study concludes that the reduction of soot by water in an ethylene diffusion flame can be completely explained by thermal effects. The results are not as definitive for benzene. The addition of water causes a greater reduction in soot than does a thermally equivalent addition of argon, but no noticeable differences in chemical species profiles are observed. There is evidence, however, that water addition causes an increase in concentration of an oxygen-containing tarry substance present in the flame prior to soot formation. During the course of the study it was also possible to estimate both soot particle diameters (1-2 x .000001 cm at the beginning of the oxidation zone) and an activation energy for soot oxidation by the OH radical (7-8 kcal/mole). In addition, it was possible to confirm the presence of and quantify the oxygen concentration in the center of diffusion flames, first reported under the previous program. Author (GRA)

N82-12179# Pennsylvania State Univ., University Park. Dept. of Chemistry.
THE IMAGE POTENTIAL AND ION TRAJECTORIES IN SIMS
R. A. Gibbs, S. P. Holland, K. E. Foley, B. J. Garrison, and N. Winograd Sep. 1981 20 p refs Submitted for publication
(Contract N00014-80-C-0491; NR Proj. 051-744)
(AD-A105377) Avail: NTIS HC A02/MF A01 CSCL 07/4

The angle and energy distributions Ni+ ions ejected from ion bombarded Ni(001)c(2/2)-CO are shown to be in excellent agreement with classical trajectory calculations for Ni atoms if the calculations are corrected for the presence of an image force. Two important consequences of this observation are that the ionization probability, R+, is nearly isotropic and that it is only weakly dependent on particle velocity. These constraints impose severe restrictions on proposed ionization theories. Author (GRA)

N82-12180# Massachusetts Univ., Amherst. Astronomy Research Facility.
INFRARED EMISSION SPECTROSCOPY OF LOW PRESSURE GASEOUS DISCHARGES Final Report, 1 Oct. 1975 - 30 Sep. 1980
Hajime Sakai Hanscom AFB, Mass. AFGL Mar. 1981 51 p refs
(Contract F19628-76-C-0087; AF Proj. 2310)
(AD-A104123; UMASS-ARF-80-312; AFGL-TR-80-0355) Avail: NTIS HC A04/MF A01 CSCL 04/1

Our study conducted on the infrared emission of atmospheric atoms and molecules is summarized. In addition, the nitrogen emission study which was conducted in the final phase of the contract is reported. The singlet transition w 1 delta sub u minus a 1 pi sub g, which was partially observed by McFarlane, was fully observed and its band constants were determined. The only vibrational transition detected for the triplet transition W 3 delta sub u minus B 3 pi sub g was the (2-0) band. We failed to detect other members which belong to the same transition. Author (GRA)

N82-12181# California Univ., Livermore. Lawrence Livermore Lab.
BEHAVIOR OF ALKALI METAL-ACID PHOSPHATES DURING ELEVATED TEMPERATURE WATER ELECTROLYSIS
Margaret Steinbugler 19 Aug. 1981 14 p refs
(Contract W-7405-eng-48)
(DE82-000243; UCID-19192) Avail: NTIS HC A02/MF A01

Use of molten salts containing water as electrolytes for the high temperature (approx. 300 to 4000 C) electrolysis of water is explored as part of a research program on Thermochemical Cycles for the Production of Hydrogen. The purpose of this study is to determine the behavior of the phosphate-based electrolytes KH5 (PO4)2, LiH5 (PO4)2, and NaH5 (PO4)2, during electrolysis. The behavior of these molten salts was observed while measuring the cell potential as a function of time at constant current densities up to 1 A/cm(2) using platinum electrodes. Our experiments demonstrated several important characteristics of the electrolytes. Perhaps the most obvious characteristics is the tendency to dehydrate in an open container. This loss of water increases the potential for any given current and temperature for each electrolyte. This dehydration effect was most pronounced in the sodium- and lithium-based electrolytes, with the potassium-based electrolytes showing a relatively slow dehydration rate. DOE

N82-12182# Georgetown Univ., Washington, D.C.
INDUSTRIAL APPLICATION OF FLUIDIZED-BED COMBUSTION Quarterly Technical Progress Report, Jan. - Mar 1981
1981 123 p
(Contract DE-AC21-78ET-10381)
(DE81-030272; DOE/ET-10381/197) Avail: NTIS

HC A06/MF A01

An atmospheric fluidized bed boiler using high sulfur coal functioning as a source of steam was constructed and is operated as a demonstration plant. Operations since start up are summarized. Boiler thermal efficiency is low. Factors affecting efficiency are discussed. S.L.

N82-12183# Argonne National Lab., Ill.
SIMPLE CODE FOR CHEMICAL EQUILIBRIUM AND THERMODYNAMIC PROPERTIES FOR USE WITH GPSAP
Howard K. Geyer Jul. 1981 28 p refs
(Contract W-31-109-eng-38)
(ANL/MHD-81-11) Avail: NTIS HC A03/MF A01

A simple code for chemical equilibrium and thermodynamic properties calculations is described. The code, designed to enhance the General Purpose Systems Analysis Preprocessor (GPSAP) system code for performing system studies where many different gas streams may occur, is based on the law of mass action and conservation of element mass. Fifteen gas species are considered, with the equations representing chemical equilibrium, solved by a Broyden update technique. DOE

N82-12184# Colorado Univ., Boulder. Joint Inst. for Astrophysics.
STUDIES OF FREE RADICALS BY ULTRAVIOLET EXCIMER LASER PHOTOLYSIS Progress Report, 1 Apr. 1981 - 1 Oct. 1981
Stephen R. Leone 1981 29 p refs
(Contract DE-AS02-79ER-10396)
(DE82-000688; DOE/ER-10396/1) Avail: NTIS HC A03/MF A01

The reactions, energy transfer, and dynamics of free radicals produced by ultraviolet laser photolysis are investigated. Free radical chain reactions are analyzed by fully time-resolved techniques involving infrared emission spectroscopy. The low resolution infrared spectrum of the CH3(mu2) cut-of-plane bending vibrational progression is measured. Complex chain reaction chemistry is studied via the laser initiated chain reaction technique to provide a general analysis of the method to obtain rate constants and to probe the time evolution of energy disposal and product formation. Methods to probe very slow chain reactions and to measure absolute rate constants for methyl radical reactions are developed. DOE

N82-12185# General Atomic Co., San Diego, Calif.
FINES RECYCLE MODELING FOR AN ATMOSPHERIC FLUIDIZED-BED COAL COMBUSTOR Final Report
W. L. Brimhall, D. E. Fields, and W. S. Rickman Aug. 1981 66 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1179-6)
(DE81-904223; EPRI-CS-2010) Avail: NTIS HC A04/MF A01

A fine carbon combustion model was modified to predict combustion efficiencies as a function of several process variables in the Babcock and Wilcox (B and W) 6 ft by 6 ft atmospheric fluidized bed coal combustor. The coal fines combustion kinetics were determined using the model and fines recycle test data from the combustor. The overall combustion efficiency was determined as a function of fines recycle rate, supercricial gas velocity, bed depth, freeboard length, and fines reentry temperature. The results of the model indicate that a fines recycle rate of approximately 2.5 times the coal feed rate is required to achieve a 99% combustion efficiency in the combustor using the current operating parameters. DOE

N82-12186# General Electric Co., St. Petersburg, Fla. Gas Turbine Div.
FUNDAMENTAL COMBUSTION STUDIES OF BURNING OIL-SPRAY FLAMES Final Report
Aug. 1981 102 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1187-3)
(DE81-904246; EPRI-AP-1978) Avail: NTIS HC A06/MF A01

Burning processes in oil-spray flames are presented. Technical data for the design of low NOx combustors for gas turbines are provided. Three studies are detailed: a bench-scale flame study, a full-size gas turbine combustor operated at atmospheric pressure, and measurements on full-size test-stand combustors operated at higher pressures. A laser velocimeter used to measure hot gas velocities is described, and the initiation of a combustion model study is reviewed. DOE

N82-12187# Energy and Environmental Research Corp., Santa Ana, Calif.
ASSESSMENT OF PULVERIZED-COAL-FIRED COMBUSTOR PERFORMANCE Quarterly Progress Report, 1 Apr. - 30 Jun. 1981
W. Richter, W. Clark, and R. Payne Jul. 1981 28 p refs
(Contract DE-AC22-80PC-30297)
(DE81-030860; DOE/PC-30297/T4; QPR-3) Avail: NTIS HC A03/MF A01

This program is concerned with the provision of a technology base to expedite the conversion of industrial processes from oil and gas to coal and other pulverized fuels. It addresses primarily the impact of fuel type on the thermal performance of a combustor. The program incorporates two experimental tasks and is constructed around an analytical task (Task 1) which will identify and upgrade a family of computer programs required to undertake thermal performance analysis studies. These anaytical tools will thus be used to predict the effects of parameters such as fuel type and furnace variables on combustor performance, and to identify those properties which have a major impact on thermal performance. The second task uses a combustion reactor to screen the key variable identified in Task I and to provide data on the properties of coal particulate matter which affect heat transfer performance. Verification of the engineering analytical approach will be provided by measurements made in a pilot-scale furnace in the third task. Progress is reported. DOE

N82-12188# Colorado State Univ., Fort Collins.
PALLADIUM-CATALYZED COUPLING REACTIONS: MECHANISM OF REDUCTIVE ELIMINATION Progress Report, 1 Oct. 1980 - 30 Jun. 1981
J. K. Stille Jun. 1981 28 p refs
(Contract DE-AS02-78ER-04903)
(DE81-030169; DOE/ER-04903/3) Avail: NTIS HC A03/MF A01

The mechanisms of the reductive elimination of alkyl partners from palladium, particularly under reaction conditions characteristic of the palladium-catalyzed coupling of organic halides and organometals, can take place either from Pd(II) or Pd(IV). The coupling of alkyl groups from a dialkylpalladium(II) complex requires that the organic partners be to one another. The reaction is a first-order intramolecular process that sometimes requires prior dissociation of a ligand, leading to a Y-or T-shaped intermediate. Coupling also can take place by the prior oxidative addition of organchalide to the dialkylpalladium(II) complex to yield a palladium(IV) species from which reductive elimination takes place rapidly. The reductive elimination step takes place with retention of geometry at an sp(2) carbon, and retention of configuration at an sp(3) carbon. Which catalytic reversible cycle, Pd(O) (FEMALE) Pd(II) or Pd(II) (FEMALE) Pd(IV) operates depends on the organic groups, the ligands and the reaction solvent. DOE

N82-12189# California Inst. of Tech., Pasadena. Dept. of Chemistry.
APPLICATION OF ION CYCLOTRON RESONANCE SPECTROSCOPY, PHOTOIONIZATION MASS SPECTROMETRY AND PHOTOELECTRON SPECTROSCOPY TO STUDY THE PROPERTIES AND REACTIONS OF IONS IN GASES Final Technical Report, 1 Apr. 1977 - 31 Mar. 1978
Jesse L. Beauchamp 9 Sep. 1981 24 p refs
(Contracts DE-AI03-76ER-72008; EY-76-S-03-0767)
(DE81-030296; CALT-767P8-8) Avail: NTIS HC A02/MF A01

Ion cyclotron resonance spectroscopy was used to study the acid-base properties of molecules, photoelectron spectra of free radicals, multiphoton dissociation of molecules with low-power continuous-wave infrared laser radiation, gas-phase organometallic chemistry, and radiative association reactions. A summary of the research is given with no data. A bibliography of 156 research publications is included. DOE

N82-12190# Oak Ridge National Lab., Tenn.
FUNDAMENTAL STUDIES IN CONTINUOUS ANNULAR

CHROMATOGRAPHY
R. J. Torres, C. S. Chang, and H. A. Epstein Sep. 1981 96 p refs Prepared in cooperation with MIT, Oak Ridge, Tenn.
(Contract W-7405-eng-26)
(DE82-000519; ORNL/MIT-329) Avail: NTIS HC A05/MF A01

The effects on separation performance of bed-rotation rate, bed loading, and feed concentrations are investigated using a pressurized continuous chromatograph. Ion-exchange chromatography was used to separate [Ni(NH3) 6-x(H2O)x] (2+), [Co(NH3)4CO3] (+), and [Co(NH3)5CO3] (+) with 1.6 M (NH4)2CO3 of pH 9.0 as eluant. The experimental results are compared with predictions of plate theory and with a theoretical multicomponent chromatography model. Experimentally observed band positions are accurately predicted in the low feed concentration region. The experimentally determined bandwidths, however, are underestimated. A correction to the experimental bandwidths is necessary to account for the discrete nature of the sampling. DOE

N82-12191# Texas Southern Univ., Houston. Dept. of Chemistry.
SOLVENT EXTRACTION STUDIES USING HIGH-MOLECULAR-WEIGHT AMINES
C. McDonald 25 Aug. 1981 4 p refs
(Contract DE-AS05-76ER-04535)
(DE81-030061; DOE/ER-04535/8) Avail: NTIS HC A02/MF A01

This research project is concerned with systematically investigating high-molecular-weight amines and high-molecular-weight quaternary ammonium salts to ascertain the feasibility of their utilization for the extraction of group II B transition metal ions from aqueous solution. Methods which have promise of being scaled up for utilization by industries for the economical removal of toxic metal such as mercury, cadmium and nickel from their effluent waste water are being investigated. During this contract period, the following two research projects were completed: solvent extraction of mercury using alamine 304; and ion flotation of nickel using ethylhexadecyldimethylammonium bromide. DOE

N82-12192# Ames Lab., Iowa.
INDUCTIVELY COUPLED PLASMA AS AN ION SOURCE FOR THE DETERMINATION OF TRACE ELEMENTS IN SOLUTIONS BY MASS SPECTROMETRY Ph.D. Thesis
Robert Samuel Houk 1980 131 p refs
(Contract W-7405-eng-82)
(DE81-030744; IS-T-898) Avail: NTIS HC A07/MF A01

Aerosols of trace elements in solution are injected into an inductively coupled argon plasma to generate a relatively high number density of positive ions derived from the trace elements. A small fraction of these ions is extracted through a pinhole sampling orifice into a differentially pumped vacuum system housing an ion lens and quadrupole mass spectrometer. The positive ion mass spectrum obtained during nebulization of the solvent (1% HNO3 in H2O) consist essentially of ArH(+), Ar(+), H3O(+), H2O(+), NO(+), O2(+), HO(+), Ar2(+), Ar2H(+), and Ar(+)2. There are few potential interferences from solvent or argon ions above 42 u. The mass spectra of the trace elements studied consists almost entirely of singly charged monatomic (M(+)) or oxide (MO(+)) ions. The various isotopes of those elements studied are detected in the correct relative isotopic abundances. Several trace elements are readily detected in a mass spectrometer scanning mode at 0.05 SIGMA g/mL. Analytical calibration curves obtained in a single ion mode are linear over nearly four orders of magnitude with detection limits of 0.001 to 0.01 SIGMA g/mL for those elements studied. Rapid sample throughput, direct introduction of solutions, and the capability of direct isotopic determination of trace elements are among the features of this analytical approach. DOE

N82-12193# Purdue Univ., Lafayette, Ind.
SYNCHRONOUS FLUORESCENCE/MATRIX ISOLATION METHOD FOR TRACE ORGANIC ANALYSIS Progress Report, Jul. 1980 - Jul. 1981
Harry L. Pardue 1981 5 p
(Contract DE-AC02-79EV-10240)
(DE81-030958; DOE/EV-10240/T1) Avail: NTIS HC A02/MF A01

The principal components of the system are a high intensity Xenon arc lamp for excitation, two flat field f/4 spectrographs (J-4 Model UFS-2000) for dispersion of excitation and emission spectra, fused silica cuvette, an image dissector camera system (EMR Photoelectric 658A) for detection of emission intensity, a custom designed and constructed computer interface for scan control and data acquisition, and PDP-8 computer with assorted peripherals. Preliminary data indicate a range of at least 400 nm can be resolved to about 1 -nm for both excitation and emission spectra. Computer interface and software are designed to permit any one of three modes of operation: (1) the diagonal scans required to generate synchronous fluorescence spectra directly; (2) random access to any set of excitation/emission coordinates; and (3) total scans of any selected area (up to 100%) of the complete set of excitation/emission coordinates. The complete system became operational in late 1980. Data for anthracene are presented to illustrate system response. DOE

N82-12194# Wisconsin Univ., Madison. Dept. of Mechanical Engineering.
COAL COMBUSTION IN HIGH CONVECTIVE FLOWS Progress Report, 1 Mar. - 31 Aug. 1981
Kenneth W. Ragland 8 Sep. 1981 6 p
(Contract DE-FG22-80PC-30213)
(DE81-030391; DOE/PC-30213/T1) Avail: NTIS HC A02/MF A01

Fundamental data on ignition delay, volatile burn time, volatile reactivity, char burn time, char reactivity, aerodynamic drag, particle surface temperature, and internal porosity of burning coal particle are being obtained as a function of coal type, particle size, gas temperature, gas velocity and oxygen concentration. Simulation of conditions inside a furnace has been achieved in two test rigs which have been constructed. In the first rig single coal particle 3 to 12 mm diameter are suspended on a 0.02 mm diameter stainless steel wire which extends from an electronic balance into a 5 mm diameter tube containing flowing electrically heated gas. This setup extends the traditional thermogravimetric analysis to flowing systems. In the second rig coal particles are levitated freely in a 50 mm diameter diverging insulated quartz nozzle. To date 16 fixed particle test runs have been made-7 with a Kentucky bituminous coal, 3 with a Montana sub-bituminous and 6 with a Texas lignite. Gas temperture ranged from 760 to 11400K, flow rates 2 to 11 scfm, gas-particle velocities from 1.8 to 10.4 m/s, and Reynolds numbers from 100 to 1150. DOE

N82-12195# Physical Sciences, Inc., Woburn, Mass.
EFFECTS OF PREIGNITION ON PULVERIZED COAL COMBUSTION Quarterly Report, 1 Apr. - 30 Jun. 1981
Girard A. Simons and G. Kothandaraman Sep. 1981 66 p refs
(Contract DE-AC22-80PC-30293)
(DE81-030170; DOE/PC-30293/3; QR-3) Avail: NTIS HC A04/MF A01

A continous branching description of the pore tree has been developed. The pores branch in a continuous downsizing manner. The theory predicts that the total surface area of each tree may be several orders of magnitude greater than the surface area of the tree trunk. The total volume of the pore tree may be one order of magnitude greater than that of the trunk and the total height of the tree may be as much as 30 times the trunk diameter. All expressions for the size and shape of the pore tree reduce to that describing a single isolated pore in the limit that the trunk radius approaches the minimum pore radius. While the above description of the pore tree is consistent with the actual structure of a common shade tree, the features of the pore tree may best be verified through its transport properties. Char oxidation is shown to be sensitive to the structure of the pore tree. The continuous branching model developed herein accurately reproduces the kinetic and diffusion solutions which were utilized in developing the transport model. The validation of the transport model in describing char oxidation indirectly verifies the continuous branching description of the pore tree. DOE

N82-12196# Cornell Univ., Ithaca, N. Y.
PYROLYSIS OF COAL-DRIVED FUELS USING THE LASER-

POWERED HOMOGENEOUS PYROLYSIS TECHNIQUE Technical Progress Report, 5 Aug. 1980 - 31 Jul. 1981
P. C. T. deBoer 31 Jul. 1981 19 p refs
(Contract DE-FG22-80PC-30217)
(DE82-000251; DOE/PC-30217/T2) Avail: NTIS
HC A02/MF A01

The progress made can be divided into two areas: theoretical work leading to an accurate computation of the temperature and velocity fields in the sample cell; and experimental work studying various chemical reactions involving hydrocarbons. The laser-powered homogeneous pyrolysis (LPHP) technique was applied to the unimolecular decomposition of 1,4-cyclohexandiene to benzene and hydrogen and of 1-chloropropene (n-propylchloride) to propene and hydrogen chloride as well as to the isomerization of cis-2-butene to trans-2-butent. These reactions proceed in different temperature ranges, with reaction rates that are well known. The temperature range covered is 575 to 8500K. The objective of this investigation was to establish proper operation of the LHLP technique over the temperature range of interest for the pyrolysis of coal-derived hydrocarbons. A set of equations was derived describing the motion of the strongly heated gas in the sample cell. The equations take account of the variations of viscosity and thermal conductivity with temperature, as well as of the dependence of the radiation absorption coefficient on temperature and density. DOE

N82-12197# Pittsburg and Midway Coal Mining Co., Englewood, Colo.
SOLVENT-REFINED COAL (SRC) PROCESS Final Report
Aug. 1981 87 p refs
(Contract DE-AC05-76ET-10104)
(DE81-031937; DOE/ET-10104/12) Avail: NTIS
HC A05/MF A01

In late 1979 the Pittsburgh and Midway Coal Mining Co., recommended to the Department of Energy that certain areas of the SRC Pilot Plant should be modified to represent the SRC-II Demonstration Plant design. The proposed modifications were for design confirmation; start-up, transient and other operational guidance studies; and training of operator and professional personnel. The pilot plant facilities proposed for modification were: Coal Slurry Mixing - Area 01; Dissolver Effluent Cooling and Separation - Area 02; and Vacuum Flash/Residue Pump Testing - Area 04. A summary justification assessment for the modifications is included. A preliminary engineering study by Badger Energy, Inc. was completed in late 1980. A proposed to begin detailed engineering had been submitted to DOE for approval when all work was discontinued at the direction of the DOE in April 1981. DOE

N82-12198# Montana State Univ., Missoula.
CATALYTIC HYDROGENATION OF COAL-DERIVED LIQUIDS Interim Report, Mar. - May 1981
Lloyd Berg and F. P. McCandless Jul. 1981 50 p
(Contracts EX-76-C-01-2034; DE-AC22-76ET-10495)
(DE81-030485; DOE/ET-10495/T2; FE-2034-23) Avail: NTIS
HC A03/MF A01

Two runs of more than 100 hours of catalyst life were completed using SRC-I and SRC-II as the feeds. One run had catalyst regeneration every three hours, the other every eight hours. The catalyst, 4% CoO, 8% MoO3, 1% NiO and 8% WO3 on NALCO-78-6008C alumina base, reduced the nitrogen content to less than 0.3% showed no signs of deterioration in activity. Regeneration after the three or eight hour periods was by burnoff with oxygen in nitrogen followed by re-sulfiding with H2S in hydrogen. The liquid yield from SRC was 90% of which 30% was 50 to 2040C boiling range gasoline. It appears that a viable process to convert SRC into a feedstock acceptable to a petroleum refinery was discovered. A study of the effect of carbon laydown on pore volume and subsequent deactivation of the catalyst was carried out in a pressurized batch reactor. Little reduction in pore volume was noted. Three commerical catalysts, Harshaw HT400, NALCO MO477 and NALCO MN5O2, were evaluated with SRC-II. DOE

N82-12199# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
OXYDESULFURIZATION OF COAL BY ACIDIC IRON SULFATE SOLUTIONS M.S. Thesis
David A. Mixon and Theodore Vermeulen Aug. 1981 161 p refs
(Contract W-7405-eng-48)
(DE82-000464; LBL-9963-Rev) Avail: NTIS
HC A08/MF A01

To facilitate by-product recovery and eliminate elemental sulfur formation in coal oxydesulfuirization, high-sulfur bituminous coal has been treated with aqueous ferric sulfate/sulfuric acid and oxygen at 100 to 1500C. The rate of pyrite oxidation increases with oxygen partial pressure, temperature, and fitness of grinding. This reaction rate is relatively insensitive to sulfuric acid and ferric sulfate concentrations, so that pyrite removal may be satisfactorily performed in solutions containing 25% H2SO4 and 12% Fe2(SO4)3 (weight percentages relative to total H2O plus HsSO4); preliminary data suggest that such a leaching solution is only mildly corrosive to T316 stainless steel, at 1500C or below, in the presence of oxygen. To provide an accurate assessment of coal oxydesulfurization stoichiometry, and analytical technique based on uv spectrophotometry has been developed for the determination of elemental sulfur in coal. Prepared coal samples are extracted for 24 hours with cyclohexane. Other exploratory oxydesulfurization runs have shown that vanadium oxides are not effective catalysts at 1000C, with oxygen. DOE

N82-12200# Utah Univ., Salt Lake City. College of Mines and Mineral Industries.
INVESTIGATION OF FACTORS AFFECTING THE IN-SITU COMBUSTION RETORTING OF OIL SHALE Final Report
H. Y. Sohn, C. H. Pitt, and A. G. Oblad 29 May 1981 166 p refs
(Contracts DE-AS03-78ET-13095; ET-77-S-03-1760; EF-77-S-04-3909)
(DE82-000482; DOE/ET-13095/T1) Avail: NTIS
HC A03/MF A01

Subprocess taking place during an in situ combustion retorting of oil shale were investigated. Some of these subprocesses also occur in a surface retorting process. The specific topics of this research program include: (1) experimental determination of the intrinsic kinetics of kerogen decomposition producing oil; (2) mathematical formulation of the retorting of a oil shale block in the presence of heat transfer effects; (3) experimental determination of the intrinsic kinetics of oil shale char oxidation; (4) mathematical modeling of the oxidation of oil shale char in a spent shale block in the presence of heat and mass transfer effects; (5) determination of ignition delay and energy requirements for the ignition of an oil shale bed; (6) determination of thermal expansion of oil shale; and (7) determination of heat capacities of oil shale and the heat of decomposition of kerogen. The results of the investigation of these topics are presented. Some of the results have been published in journals which are readily available. In such a case only a brief summary of the results are presented. DOE

N82-12201# Brookhaven National Lab., Upton, N. Y.
DEHYDROGENATION/HYDROGENATION REACTIONS IN HYDROAROMATIC SYSTEMS
T. Gangwer 1981 6 p refs Presented at the Intern. Conf. on Coal Sci., Dusseldorf, West Germany, 7 Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-027667; BNL-29825; CONF-810914-3) Avail: NTIS
HC A02/MF A01

The basic chemistry of donor solvent dehydrogenation/hydrogenation process is an important component of liquefaction. Kinetic and mechanistic work on the hydroaromatic donors: tetralin (T), 1,2-dihydronapthalene (DN) and 9,10-dihydroanthracene (DA) is yielding insight into this chemistry. The chemical reactions are found to be heterogeneously controlled. The composition of product mixtures are sensitive to the initial density of the hydroaromatic reactant. As reactant density increases, the tetralin product mix changes. Reaction mechanisms are proposed which describe the observed processes in terms of reversible heterogeneous site reactions. A general reaction mechanism was developed which describes the observed reactant/product sequences. Conclusions are as follows: reactions of hydroaromatic systems can be modeled using the proposed heterogeneous reaction mechanism; dihydro-reactants can react along more than one pathway; and the extent of reaction is a function of the hydrogen content of the heterogeneous surface. DOE

N82-12202# Brookhaven National Lab., Upton, N. Y.
ELECTROCATALYSIS AT OXIDE-COVERED METAL ELECTRODES
S. Gottesfeld (Tel-Aviv Univ.), J. Rishpon (Tel-Aviv Univ.), and S. Srinivasan 1981 18 p refs Presented at the Sym. on Electrocatalysis, Minneapolis, 10-15 May 1981
(Contract DE-AC02-76CH-00016)
(DE81-027650; BNL-29821; CONF-8105105-1) Avail: NTIS HC A02/MF A01

Thick oxide layers grown electrochemically on Rh, Ir, Ru and their alloys exhibit electrocatalytic properties associated with an internal redox process. For simple faradiac processes at the Rh/Rh oxide electrode it is shown that the rates of charge transfer and transport depend critically on the interaction between the redox couples in solution and in the oxide at the oxide electrolyte interface. The phenomenon of anodic activation found for the o.e.r. at Ru and Ru alloys is shown to be associated with film growth (monitored optically) and with the enhancement of the internal redox activity in the oxide. DOE

N82-12203# Technische Hochschule, Aachen (West Germany). Inst. fuer Verfahrenstechnik.
REMOVAL OF NITRATES FROM GROUND WATERS BY REVERSE OSMOSIS Final Report
Robert Rautenbach and Karl-Heinz Henne Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 56 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-155; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,80

A concept for hybrid ground water processing is presented, which makes it possible to economically reduce the content of nitrates to the allowable limit (50 ppm) while simultaneously reducing the total salt content, and to harmlessly dispose of the concentrated brine. A pilot plant (18 cum/hr drinking water) as well as a large capacity plant (360 cum/hr) were layed out and the total expected drinking water cost was calculated. After detailed engineering studies of the paramesers, it was concluded that: (1) reverse osmosis (RO) is the most economical process for removing nitrates from ground water; yields of up to 91.5 % are possible; (2) agricultural utilization of the RO brine is not possible; and (3) considering operational and economical aspects, the modified process of multistage evaporation by expansion with a liquid circulating heat carrier is best compared with a multi-effect falling-film-evaporator seeding process, when directly evaporating the RO brine. However, this two stage hybrid process with an additional drinking water cost of 1.40 DM/cum is too costly. A more economical alternative for the discharge of the RO brine is a process consisting of; softening, electrodialysis and evaporation. Author (ESA)

N82-12204# Starck (Hermann C.) Berlin, Goslar (West Germany). Werk Goslar.
DEVELOPMENT OF A PROCESS FOR RECOVERY OF VALUABLE COMPONENTS FROM COMPLEX HYDRODESULFURIZATION CATALYSTS ESPECIALLY TUNGSTEN, MOLYBDENUM, VANADIUM, NICKEL AND COBALT Final Report
Bruno Krismer, Hans-Georg Nadler, and Hartmut Pungs Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 20 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-186; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4,20

For the nonpolluting recovery of the valuable components W, Mo, Co, Ni and V from complex hydrodesulfurization catalyst residues, an economical process was developed in which the valuable elements are reduced out by carbothermal reactions in the electric arc furnace as a first process step. The metal obtained is ground, roasted, and the oxides are dissolved in a combined acid-base dissolving process. The valuable elements are separated by liquid-liquid extraction steps which make it possible to isolate the valuable materials in the desired grade of chemical purity. Author (ESA)

N82-12205# Ruhrchemie A.G., Oberhausen (West Germany). Abt. Umweltschutz.
THERMAL PROCESSING OF USED CATALYSTS Final Report
Dieter Ernst and Sebastien Speth Bonn Bundesministerium fuer Forschung Technologie Dec. 1980 24 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-189; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5,05

A preliminary treatment of the used catalysts following fluidized bed thermal processing is presented. It is possible to obtain a starting material free from organic impurities, which is suited to the usual recovery of the valuable components of the catalysts. In the course of the operation optimization, it was possible to successfully complete the feeding of the fluidized bed reactor with used catalysts from widely varying sources. The waste gas purification and fine dust separation comply with emission regulations. The unit is to be regarded as a demonstration plant, especially if waste heat utilization can be integrated to improve economic performance. Author (ESA)

N82-12206# Brown, Boveri und Cie, A.G., Heidelberg (West Germany). Central Research Lab.
MEASUREMENT PROCEDURE TO DETERMINE ORGANIC COMPOUNDS IN WATER (COMBUSTION METHOD) Final Report
Rainer Berthold, Gerold Gamer, Rudolf Krapf, Rainer Strietzel, and Karl Reiss Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 47 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-014; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9,70

A procedure and an apparatus for measuring the content of organic compounds in water and providing a measured value correlating to the chemical oxygen demand are described. They provide cheap and reliable waste water analysis. The signal can be understood as a displacement of the equilibrium of the thermal dissociation of water (vapor) under the influence of organic (reducing) compounds. Contrary to the conventional technique, the procedure works without dosing of oxygen or carrier gas and continuously gives a measurement signal. It is therefore possible to realize on this basis an uncomplicated process measuring device, providing reproducible results. Author (ESA)

N82-12115*# State Univ. of New York at Stony Brook.
COMBUSTION EXPERIMENTS IN SPACE
A. L. Berlad *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 36-42
(For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 21B

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-12207 Carnegie-Mellon Univ., Pittsburgh, Pa.
THE INFLUENCE OF DEFORMATION MODE DURING COLD FORMING ON THE POST-FORMED FLOW AND FRACTURE BEHAVIOR OF LOW CARBON AND HIGH STRENGTH LOW ALLOY STEEL SHEETS Ph.D. Thesis
Philippe Lucien Pascal Charpentier 1981 412 p
Avail: Univ. Microfilms Order No. 8114626

The influence of mode and amount of deformation during sheet formins on post formed flow and fracture behavior is studied in two hot rolled vanadium nitrogen high strength low alloy steels (an 80 ksi yield strength ferrite pearlite steel, and a dual phase steel) and in a hot rolled aluminum killed low carbon steel. Five modes of prior deformation are investigated: inplane balanced biaxial stretching, plane strain deformation (cold rolling), uniaxial tension, cup drawing, and inplane compression, a laboratory forming technique developed to produce a drawing type deformation essentially free from strain gradients. The post formed yield strength was approximately given by the isotropic effective stress effective strain relationship after balanced biaxial stretching and cold rolling. However, after the three other deformation modes this result only applies in the direction of the positive (tensile) surface strain. Dissert. Abstr.

N82-12208 Iowa State Univ. of Science and Technology, Ames.
THERMOTRANSPORT OF HYDROGEN AND DEUTERIUM IN VANADIUM, NIOBIUM AND TANTALUM ALLOYS Ph.D. Thesis
Mark Francis Smith 1981 75 p
Avail: Univ. Microfilms Order No. 8122504

A mass spectrometric technique was used to simulataneously measure heats of transport for hydrogen and deuterium in single specimens of pure vanadium, niobium and tantalum, in vanadium alloyed with either niobium, titanium or chromium; and in niobium tantalum alloys. This technique greatly increased the precision with which isotope effects in the heat of transport could be measured. The predominant effect of alloying was to dramatically increase thermotransport, however, thermotransport decreased as niobium was added to tantalum. The heat of transport did not vary greater at low concentrations of the substitutional element. Heats of transport for hydrogen in pure vanadium, niobium and tantalum are 1.4, 11.9 and 28.5 kJ/mol, respectively and corresponding values for deuterium are 4.8, 18.0 and 34.8 kJ/mol. Dissert. Abstr.

N82-12209 California Univ., Los Angeles.
ACOUSTIC EMISSION OF PLASTIC FLOW IN METALS AND ALLOYS Ph.D. Thesis
Shuh-Yueh Simon Hsu 1981 231 p
Avail: Univ. Microfilms Order No. 8120973

A theoretical model of continuous acoustic emission (AE) originating from dislocation motion correlates the AE output voltages with dynamic dislocation behavior, including the unpinning, the operation of sources, the motion of mobile dislocations under the influence of internal stress and phonon drag, and the deceleration of mobile dislocations at obstacles. The strain, temperature and heat treatment dependencies of AE during tensile deformation are discussed for: high purity aluminum and copper; commercial 99.6% purity nickel; austenitic 304L and 316 stainless; and the solid solution alloys Cu-10Ni, Cu-30Ni; Cu-10Zn, Cu-15Zn, Cu-30Zn, Cu-40Zn, Ni-22Fe, and Cu-7.5Al. Dissert. Abstr.

N82-12210 Rensselaer Polytechnic Inst., Troy, N. Y.
STRUCTURE: PROPERTY RELATIONSHIPS IN GOLD BASED SLIDING ELECTRICAL CONTACT MATERIALS Ph.D. Thesis
Jaydev D. Desai 1981 309 p
Avail: Univ. Microfilms Order No. 8121142

Directionally solidified and chill cast two phase Au-Co and Au-Si alloys with a hard and insoluble second phase, and rapidly quenched (splat cooled) Au-Si alloys with simple phase amorphous and/or crystalline microstructures were examined from the standpoint of electrical resistivity, electrical noise, and wear resistance. The splat cooled alloys with their single phase amorphous and/or crystalline microstructures exhibited the highest wear resistance (as compared to the two phase Au-Si alloys with similar hardness), due to none or only a few crack nucleation sites, which is consistent with the delamination of wear. No discernable difference was found in the electrical noise performance of the DS eutectic Au-Co alloys as a function of the growth rate, which may be due to their similarity in electrical resistivities. The Au-Si alloy exhibited higher electrical noise than the Au-Co alloy in presence of isopropyl alcohol. Dissert. Abstr.

N82-12211 Johns Hopkins Univ., Baltimore, Md.
EXPERIMENTAL INVESTIGATION OF THE INFLUENCE OF HIGH POWER ULTRASOUND ON METALS Ph.D. Thesis
Richard Blase Mignogna 1981 127 p
Avail: Univ. Microfilms Order No. 8120040

The three most prevalent mechanisms proposed to account for the observed softening effects are simple superposition of the dynamic high power ultrasonic stress on the quasistatic stress, heating of the specimen caused by the applied waves with dislocations in localized regions of the test specimen. A decrease in the Young's modulus of the material during insonation is also suggested. A multiparameter experimental system was developed which permits simultaneous measurement of sufficient quantities to test all of the proposed mechanisms causing the softening effect. The results indicate that a combination of superposition of the dynamic stress on the quasistatic stress and interaction of the high power ultrasonic waves with dislocation is responsible for the softening. Dissert. Abstr.

N82-12212 Vanderbilt Univ., Nashville, Tenn.
INVESTIGATION OF THE ELECTROCHEMICAL BEHAVIOR OF ION-IMPLANTED Ti-Pt ALLOYS Ph.D. Thesis
Neil Garnett Thompson 1981 166 p
Avail: Univ. Microfilms Order No. 8120220

The corrosion behavior of Ti-Pt alloys were examined. Near-surface alloys of approximately 100 nm in depth were produced by the acceleration and penetration of the Pt ions into a Ti substrate. The near-surface alloys have a gaussian Pt concentration distribution. A combination of electrochemical examination and Rutherford backscattering analysis provided a means of quantitatively determining parameters which characterize the mechanisms involved in the dissolution of Ti-Pt alloys. The corrosion behavior of Ti-Pt alloys were examined in hydrogen saturated 1NH2SO4 at 30 C. High purity, cold fabricated Ti was employed for this study. The pure Ti samples were thoroughly examined electrochemically prior to implantation. Both, open-circuit potential and potentiostatic polarization measurements were used to characterize the implanted samples. Rutherford backscattering analysis (a non-destructive, quantitative determination of the Pt concentration depth distribution) was performed prior to, and at the completion of electrochemical examination. Dissert. Abstr.

N82-12213 Pennsylvania State Univ., University Park.
FRACTURE OF MAGNESIUM ALUMINATE SPINEL Ph.D. Thesis
Ronald Leroy Stewart 1981 158 p
Avail: Univ. Microfilms Order No. 8120467

The fracture toughness or K sub ic of magnesium aluminate spinel was measured as a function of orientation for single crystals, and for different grain sizes and stoichiometry (Al2O3 rich) for polycrystalline material. Measurements were made in air as a function of temperature to 1500 C. The single crystals of MgAl2O4 were measured in three different orientations having fracture planes of h/111/, and /110/. The /100/ orientation was also examined, at elevated temperatures, as a function of stressing rate. Hot-pressed stoichiometric polycrystalline MgAl2O4 was measured as a function of grain size over the range of 5 to 38 microns. Hot-pressed aluminia-rich super saturated spinel solid solutions were measured as a function of stoichiometry at the composition ratios of 1MgO:1.25Al2O3, 1MgO:1.50Al2O3, 1MgO:1.75Al2O3, 1MgO:2.00Al2O3, and 1MgO:2.50Al2O3, each at a grain size of approximately 35 microns. Dissert. Abstr.

N82-12214 Pennsylvania State Univ., University Park.
A PHENOMENOLOGICAL THEORY FOR PREDICTING THE TEMPERATURE DEPENDENCE OF ELASTIC COMPLIANCE IN SIMPLE PROPER FERROELECTRIC TUNGSTENBRONZES Ph.D. Thesis
Thomas Richard Shrout 1981 171 p
Avail: Univ. Microfilms Order No. 8120465

The Landau-Ginsburgh-Devonshire phenomenological theory for simple proper ferroelectrics was extended to include all elastoelectric coupling terms up to sixth order. For the tetragonal ferroelectric bronze Sr(0.61)Ba(0.39)Nb2O6 direct measurements by induced piezoelectric resonance in the paraelectric phase clearly showed a coupling between the stiffened elastic compliances on induced electric polarization in a manner consistent with that predicted from the sixth order electrostriction. The sixth order electrostriction (phi) constants were used to predict the elastic behavior in the spontaneously polarized ferroelectric phase region. The observed behavior of the phi constants was consistent with other higher order constants being only weakly temperature dependent and thus likely also compositionally independent. The phenomenological method does permit the correlation of low

temperature data in the ferroelectric phase with a limited family of temperature independent higher order constants of the simpler paraelectric symmetry and with accumulating experience.
Dissert. Abstr.

N82-12215 Rensselaer Polytechnic Inst., Troy, N. Y.
GRAVITATIONAL INFLUENCE ON BINARY ALLOY MELT EQUILIBRIA AND EUTECTIC SOLIDIFICATION Ph.D. Thesis
Robert Stanley Sokolowski 1981 174 p
Avail: Univ. Microfilms Order No. 8121164

A high-temperature ultracentrifuge was developed from the concept of a compact, low cost, air-turbine. The equation governing sedimentation equilibrium in homogeneous liquid binary alloys is derived in differential form by defining a gravochemical potential, which includes inertial terms in addition to the usual chemical potential. The resulting first order non-liner ordinary differential equation is solved and the results are presented graphically. Microstructures of Pb-Sn and Bi-Sn eutectic alloys are presented as experimental evidence supporting the numerical results and refuting conflicting data found in the literature on clustering liquid alloys. These results are discussed with regard to the nucleation behavior of alloys and solidification fluid dynamics. A series of eutectic alloys, mainly Pb-Sn and Bi-Sn were solidified under centrifuged fields. The unique behavior of alloy solidification at high levels of acceleration is revealed by numerous microstructural data which are discussed and interpreted. Dissert. Abstr.

N82-12216*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PROGRESS IN PROTECTIVE COATINGS FOR AIRCRAFT GAS TURBINES: A REVIEW OF NASA SPONSORED RESEARCH
John P. Merutka 1981 29 p refs Presented at the 5th Ann. Conf. on Composite and Adv. Mater., Merritt Island, Fla., 19-22 Jan. 1981; sponsored by the Am. Ceramic Soc., Inc.
(NASA-TM-82740; E-711) Avail: NTIS HC A03/MF A01 CSCL 11F

Problems associated with protective coatings for advanced aircraft gas turbines are reviewed. Metallic coatings for preventing titanium fires in compressors are identified. Coatings for turbine section are also considered. Ductile aluminide coatings for protecting internal turbine-blade cooling passage surface are also identified. Composite modified external overlay MCrAlY coatings deposited by low-pressure plasma spraying are found to be better in surface protection capability than vapor deposited MCrAlY coatings. Thermal barrier coating (TBC), studies are presented. The design of a turbine airfoil is integrated with a TBC, and computer-aided manufacturing technology is applied. S.L.

N82-12217# Materials Research Labs., Ascot Vale (Australia).
LIQUIDUS TEMPERATURES OF COMMERCIAL ESR SLAGS
Richard C. Andrew and George M. Weston May 1981 21 p refs
(AD-A105268; MRL-R-813) Avail: NTIS HC A02/MF A01 CSCL 11/6

Melting point data for a number of slag systems of particular interest in the electroslag refining of steel have been determined under laboratory conditions. In several instances, the melting point temperatures determined differed considerably from those quoted commercially. Such discrepancies were attributed to the presence of impurities in the raw feed materials, causing their composition to differ considerably from nominal. Author (GRA)

N82-12218# Materials Research Labs., Ascot Vale (Australia).
SURVEY OF NICKEL-ALUMINIUM-BRONZE CASTING ALLOYS ON MARINE APPLICATIONS
G. M. Weston Apr. 1981 38 p refs
(AD-A105263; MRL-R-807) Avail: NTIS HC A03/MF A01 CSCL 11/6

The structure and corrosion performance of nickel-aluminium bronze (NAB)--covered by naval specification DGS-8520 and DGS-348--have been investigated. No evidence was found to suggest that there would be any significant difference in corrosion performance between alloys meeting the two specifications. Early corrosion problems associated with the weld repair areas of castings have been overcome largely by using improved foundry and welding techniques followed by a heat-treatment procedure. Both crevice and pit corrosion still occur in operating systems. However, recent reports indicate that with improved NAB foundry practice this is less widespread, with penetration often being confined to the surface grains. Author (GRA)

N82-12219# Drexel Univ., Philadelphia, Pa. Dept. of Materials Engineering.
A FUNDAMENTAL STUDY OF FATIGUE IN POWDER METALLURGY ALUMINUM ALLOYS Final Technical Report, Mar. 1977 - Feb. 1981
A. Lawley and M. J. Koczak Aug. 1981 93 p refs
(Grant AF-AFOSR-3247-77; AF Proj. 2306)
(AD-A105080; AFOSR-81-0692TR) Avail: NTIS HC A05/MF A01 CSCL 11/6

Processing-microstructure-fatigue relationships have been examined in high-strength powder metallurgy aluminum alloys (Al-Cu, Mg, Zn, Co) in air and salt fog. Three phases were included: (i) The combined effects of cobalt level and processing mode on fatigue life and resistance to crack propagation; (ii) The role of plane-strain forging on fatigue life and crack propagation response; (iii) The combined effects of cobalt level and processing mode on strain-controlled low-cycle fatigue. While the interplay between processing history, alloy composition and orientation is complex, a basic understanding of the role of microstructure on the crack initiation and propagation stages of fatigue has been obtained. Direct comparisons of the corresponding fatigue response of counterpart ingot metallurgy alloys were included. In general, the P/M processed material exhibits superior resistance to fatigue crack initiation compared to the I/M form. However the relative crack growth rates in the P/M and to the I/M form. However the relative crack growth rates in the P/M and I/M materials depend on orientation and the level of delta K. Author (GRA)

N82-12220# Wisconsin Univ., Madison. Dept. of Nuclear Engineering.
COMMENTS ON THE HYDROGEN SOLUBILITY DATA FOR LIQUID LEAD, LITHIUM AND LITHIUM-LEAD ALLOYS AND REVIEW OF A TRITIUM-SOLUBILITY MODEL FOR LITHIUM-LEAD ALLOYS
E. M. Larsen, M. S. Ortman, and K. E. Plute May 1981 17 p refs
(Contract DE-AS02-78ET-52048)
(DE81-030828; DOE/ET-52048/18; UWFDM-415) Avail: NTIS HC A02/MF A01

The projected use of lithium-lead alloys as the tritium breeding blanket and heat transfer agent in fusion reactors requires data on the solubility of hydrogen isotopes in the alloys at the temperatures of interest. In the absence of available experimental data in the desired temperature range, estimates were made on the hydrogen isotope solubility in the lithium-lead alloys. In NUMAK, solubility estimates were based on activity studies of lithium in lithium-lead while in WITAMIR the solubility was extrapolated from deuterium measurements in the alloy at higher temperatures. Existing data are summarized and methods of estimating the tritium solubility in the desired temperature range are reviewed. DOE

N82-12221# Ames Lab., Iowa.
MECHANICAL PROPERTIES AND HYDROGEN EMBRITTLEMENT OF SCANDIUM M.S. Thesis
Michael Paul Zalesky Feb. 1981 95 p refs
(Contract W-7405-eng-82)
(DE81-030745; IS-T-918) Avail: NTIS HC A05/MF A01

The strength and ductility of polycrystalline scandium were studied as a function of hydrogen concentration and test temperature. The effects of hydrogen on the mechanical behavior of scandium are dicussed in terms of current embrittlement concepts for hydride forming metals. Hydrogen concentrations ranging from 0.20 to 20.83 atomic percent and temperatures from 78 to 473 K were employed. Scanning electron microscopy fractographs illustrate the modes of tensile failure. DOE

N82-12222# Bendix Corp., Kansas City, Mo.
MECHANICAL PROPERTIES OF TITANIUM CASTINGS
M. G. Ulitchny Sep. 1981 13 p ref
(Contract DE-AC04-76DP-00613)

(DE81-030693; BDX-613-2680) Avail: NTIS HC A02/MF A01

Cast and hot isostatically pressed Ti-6Al-4V and Ti-6Al-6V-2Sn alloys were tested for mechanical properties. Specimens from these alloys were tested in as received, mill annealed, and solution treated and aged conditions. Results show that tensile strength at least equal to the guaranteed minimum for wrought titanium can be developed using solution treat and age heat treatments. The fracture toughness associated with this strength level is adequate, but tensile ductility is usually less than the desired 10 percent level. Development of modified heat treatments would likely lead to increase in ductility and would extend the uses of titanium alloy castings. DOE

N82-12223# Rockwell International Corp., Golden, Colo. Energy Systems Group.

SILVER FILMS FOR SOLID STATE BONDING

E. R. Naimon, R. G. Kurtz, D. Vigil, L. Williams, and G. A. Riordan, ed. 13 Aug. 1981 13 p refs
(Contract DE-AC04-76DP-03533)
(DE82-000414; RFP-3125; DOE/TIC-4500-Rev-69) Avail: NTIS HC A02/MF A01

Silver films deposited from a hot hollow cathode source continue to be instrumental in promoting high-strength solid state bonds at Rocky Flats. Such phenomena as effects of surface condition prior to coating, effects of varying times between coating and bonding, and effects of film thickness on bond strength are discussed. DOE

N82-12224# Joint Research Centre of the European Communities, Ispra (Italy). Engineering Div.

THERMAL DESORPTION SPECTRA, EQUILIBRIUM DESORPTION RATES AND EQUILIBRIUM SURFACE COVERAGES OF MECHANICALLY POLISHED AND OF SAND AND BEAD BLASTED INCONEL 600 SURFACES

J. Camposilvan and F. Reiter 1980 44 p refs Submitted for publication
(EUR-7114-EN) Avail: NTIS HC A03/MF A01

Equilibrium surface coverage and equilibrium outgassing rate of materials facing the plasma in fusion technology are studied. Inconel 600 surfaces were examined in the temperature range from 20 to 550C. The first sample was mechanically polished and had a total hemispherical emissivity at low temperatures Epsilon = 0.146 and a surface roughness CLA1 = 0.08 microns while the second sample was sand and bead blasted with Epsilon = 0.382 and CLA2 = 1.2 microns. Author (ESA)

N82-12225# Riso National Lab., Roskilde (Denmark). Metallurgy Dept.

FATIGUE PHENOMENA IN COPPER

Kurt Viggo Rasmussen Sep. 1980 81 p refs In DANISH; ENGLISH summary
(Riso-M2241; ISBN-87-550-0703-1; ISSN-0418-6435) Avail: NTIS HC A05/MF A01

The relevant literature on low amplitude fatigue in single crystals and polycrystals is briefly reviewed. Results of experiments are shown. Single crystals and polycrystals of pure copper were fatigued in tension-compression at constant low amplitudes of plastic strain and low cycling frequencies at room temperature in air. Surface patterns of persistent edge dislocations were quantitatively examined by optical microscopy. Bulk dislocation microstructures were examined by transmission electron microscopy. The microstructure and mechanical behavior observed for the single crystals are in close quantitative agreement with comparable existing fatigue data. The cyclic stress-strain diagram of the polycrystals shows a plateau in a linear plot. The area fraction of edge dislocations on the polycrystals increases roughly linearly with the plastic strain amplitude. The dislocation microstructure in bulk grains consist of regular wall structures embedded in a matrix of less regular structures. Author (ESA)

N82-12226# Technical Research Centre of Finland, Espoo. Metallilab.

SUBSTITUTING COPPER ALLOY TUBES IN OLD SEA WATER CONDENSERS

Pertti Auerkari 1981 34 p refs In FINNISH; ENGLISH summary
(VTT-87; ISBN-951-38-1211-1; ISSN-0355-6395) Avail: NTIS HC A03/MF A01

The use of chromium alloyed copper nickels (CACN), titanium, and stainless steels to replace copper alloys in sea water condensers is discussed. The corrosion resistance of titanium tubes is good at normal temperatures, but because of vibration problems, they are suitable only if the distance between the supporting plates can be reduced. When stainless steels are used the former support plate distance is normally sufficient. With both titanium and stainless steel retubing, care should be taken to achieve tight and leak free joints, good in service cleaning, and reliable corrosion protection of the end plates and other condenser parts that are in contact with the substituting tubes. Author (ESA)

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-12227 Rutgers - The State Univ., New Brunswick, N. J.

MICROSTRUCTURE FORMATION IN THE Au-SiO2 CERMET DURING ANNEALING Ph.D. Thesis

Joseph Thomas McGinn 1981 219 p
Avail: Univ. Microfilms Order No. 8122101

The microstructure of Au-SiO2 cermet films was characterized as a function of both annealing time and Au concentrtion. Results indicate that the cermet forms a two phase system with discrete prticles of Au surrounded by a SiO2 matrix. With annealing, the Au particles both decrease in number and increase in size. The growth mechanism is shown to be a complex combination of Ostwald ripening and particle coalescence. The microstructure of the individual Au particles exhibits a variety of well ordered boundary structures. These boundaries are shown to be separate twin related grains and to result from particle-particle coalescence and subsequent grain boundary migration. The simple boundary structures which are observed in these particles makes it possible to distinguish between 'growth accident' and 'pop-out' models of annealing twin formation. The theory of annealing twin formation is extended to account for the explicit nature of the twin boundaries observed. Dissert. Abstr.

N82-12228 Rensselaer Polytechnic Inst., Troy, N. Y.

MOLECULAR ORIENTATION IN POLYMERS: A STUDY OF HOT-DRAWN POLYMETHYLMETHACRYLATE Ph.D. Thesis

Jay Scott Rosenthal 1981 287 p refs
Avail: Univ. Microfilms Order No. 8121159

Using hot-drawn polymethylmethacrylate as the particular material for investigation, a number of different aspects of orientation were examined. The parameters employed to characterize orientation are investigated in order to resolve the present controversy regarding the characterization of orientation. Also the relationship between the draw process, the orientation state, and mechanical properties is explored. These investigations are related to a third aspect of the orientation process which is concerned with the rheology of the polymer. This involves the concepts of a spectrum of rheological events describing the process of deformation and orientation. The results reported for when the material is drawn at constant draw rate and cooled or drawn at constant draw rate, relaxed and then cooled agree quantitatively with the predictions of the draw model, thus confirming the concept of a disentanglement spectrum. Dissert. Abstr.

N82-12229 Rutgers - The State Univ., New Brunswick, N. J.

THE EFFECT OF PRESSURE ON THE PHYSICAL AND MECHANICAL PROPERTIES OF SOLITHANE 113 ELASTOMER Ph.D. Thesis

David Lee Questad 1981 158 p
Avail: Univ. Microfilms Order No. 8122116

Pressure-volume-temperature measurements of Solithane 13, a polyurethane elastomer, showed that the glass transition temperature increased linearly for pressures up to about 2.5kbar, and then nonlinearly with pressure up to more than 8kbar. The change in thermal expansivity decreased rapidly with pressure at low pressures. The specific volume in the glassy state was shown to depend on the glass formation pressure. Plotting the

dielectric data as an activation plot show that the activation energy at a certain frequency is independent of pressure. Ultrasonic longitudinal velocity measurements show a broad step decrease in the region of the attenuation maxima as the temperature was raised at each isobar. Stress strain measurements show that recovery of plastic strain is pressure dependent, and that the strain of fracture increases with increasing pressure.
Dissert. Abstr.

N82-12230* International Harvester Co., San Diego, Calif.
FORMULATION AND CHARACTERIZATION OF POLYIMIDE RESILIENT FOAMS OF VARIOUS DENSITIES FOR AIRCRAFT SEATING APPLICATIONS Final Report, 15 Feb. 1980 - 30 Sep. 1981
J. Gagliani, R. Lee, and U. A. K. Sorathia 30 Sep. 1981 151 p refs
(Contract NAS9-16009)
(NASA-CR-167421; CSR81-R-4834-20) Avail: NTIS HC A08/MF A01 CSCL 11G

Light weight, heat and fire resistant low smoke generating polyimide foams are developed for aircraft seating applications. The material is upgraded and classified into groups for fabrication of cushions possessing acceptable comfort properties. Refinement and selection of foaming processes using a variety of previously developd foaming techniques and definition of property relationships to arrive at the selection and classfication of polyimide foams into five groups in accordance with predetermined ILD values are emphasized. S.L.

N82-12231# Naval Research Lab., Washington, D. C.
APPLICATION OF HIGH PRESSURES TO CERAMICS Interim Report
R. W. Rice 13 Oct. 1981 14 p refs
(RR0220242)
(AD-A105249; NRL-4637) Avail: NTIS HC A02/MF A01 CSCL 11/2

The use of pressure, an important variable in the study and especially the processing of ceramics, is first briefly reviewed showing that most pressures used are well below the high pressure range. Three areas of high pressure studies of ceramics that can be important in understanding ceramic behavior and can also be useful in specialized ceramic processing are then briefly outlined: compaction of powder or porous bodies, phase conversion (often with consolidation), and plastic deformation. Formation and consolidation of diamond and cubic BN are only briefly noted since they are extensively addressed elsewhere. It is shown that powder outgassing can be an important problem for some of these processes. Particular attention is given to impact or shock treatment, especially compaction of powders, and to hot extrusion of ceramics, including conventional as well as hydrostatic extrusion. Next, possible future application of high pressure to processing of ceramics is addressed. Explosive compaction of ceramics, especially of certain tougher ceramic composites wherein a synergism may be effective is suggested. Then the past and potential application of high pressure in mechanically working and shaping ceramics is discussed, again in part focused on processing tougher ceramic composites.
Author (GRA)

N82-12232# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
ORIENTATION MEASUREMENTS FROM POLYMER SURFACES USING FOURIER TRANSFORM INFRARED PHOTOACOUSTIC SPECTROSCOPY
K. Krishnan, S. Hill, J. P. Hobbs, and C. S. P. Sung Sep. 1981 18 p refs
(Contract N00014-78-C-0676)
(AD-A105398; TR-4) Avail: NTIS HC A02/MF A01 CSCL 11/9

Fourier Transform IR Photoacoustic (FTIR-PAS) dichroism studies have been applied to determine molecular orientation from the surface of one-way drawn poly(ethylene terephthalate) film. When compared with ATR dichroic spectra obtained with a modified, rotatable sample holder on the same sample, PA spectra show saturation effects in strong absorption bands near 1730, 1250 and 1100/cm, probably due to the greater penetration depth in the PA technique. The dichroic ratios (k sub x/k sub y) on the plane of the sample film have been calculated from PA spectra, only on bands which do not show saturation and compared with the analogous ratios determined from ATR dichroic spectra. For three well-known parallel bands at 1335, 975 and 795/cm the dichroic ratio is greater than unity in both ATR and PAS, as expected from the drawing process. In general, somewhat lower dichroic ratios are observed by PA spectra than by ATR spectra with this sample. Possible reasons for this trend are discussed. This study demonstrates the potential of FTIR-PAS dichroism as a complementary technique to ATR dichroism, especially on samples with rough or brittle surfaces.
Author (GRA)

N82-12233# Ohio State Univ., Columbus. Dept. of Ceramic Engineering.
CERAMIC MICROSTRUCTURE DEVELOPMENT Progress Report, 1 Apr. - 15 Aug. 1980
Dennis W. Readey Oct. 1980 6 p
(Contract N00014-80-C-0523)
(AD-A105364) Avail: NTIS HC A02/MF A01 CSCL 11/2

Results from various investigations of ceramic microstructure development are outlined. Halide oxidation, oxide precursor melt decomposition, Ostwald ripening in halide melts, aqueous precipitation, particle packing, and sintering and vapor transport are discussed. M.G.

N82-12234# Rockwell International Corp., Golden, Colo.
PAINT SELECTION FOR COATING RADIOACTIVE-WASTE DRUMS
J. L. Briggs 1 Jul. 1980 22 p refs Presented at ASTM Rockwell Intern. Corrosion Conf., Nashville, 23 Jun. 1981
(Contract DE-AC04-76DP-03533)
(DE81-026259; RFP-3119) Avail: NTIS HC A02/MF A01

White epoxy paint sample E is suitable for coating waste drums, but the additional pretreated costs of grit blasting prior to paint application precludes adoption of that paint system. The specified 10.0 mil coating thickness of that coating also incurs higher costs. The Vorac epoxy phenolic base paint (buff or yellow) is the only other paint that exhibits suitable corrosion and impact resistance required for coating the waste drums. In addition, that paint does not require a grit blasted substrate or other costly pretreatment prior to coating. DOE

N82-12646# Joint Publications Research Service, Arlington, Va.
GLASS-MAT-REINFORCED THERMOPLASTIC: STRONG, EASY TO WORK
Martin Welz, Erkhard Siler, and Hartmut Schriever *In its* W. Europe Rept.: Sci. and Technol., No. 72 (JPRS-78876) 1 Sep. 1981 p 1-14 Transl. into ENGLISH from Tech. Rundschau (Bern), 2 Jun. 1981 p 33 and 35 (For primary document see N82-12645 03-44)
Avail: NTIS HC A03/MF A01

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-12235 Saint Louis Univ., Mo.
A NON-LINEAR MODEL FOR LOW VELOCITY UNDERWATER EXPLOSIONS Ph.D. Thesis
Mark Albert Dablain 1980 223 p
Avail: Univ. Microfilms Order No. 8120607

The theory and computed results of an explosion model based upon a perturbation technique are presented. The perturbation parameter was selected to be the ratio of the initial particle velocity to the liquid sound speed. The explosion model is studied in conjunction with the air-gun source of seismic marine exploration. The distinction between this model and past models is the preservation of wave propagation interior to the sphere. Although the effects of these interior waves seem to be negligible for explosion sources with high initial velocities, their interaction with the gas-liquid boundary seem to significantly affect the

expansion of bubbles from the low velocity air-gun source. The theory indicates that during bubble growth the bubble surface expands toward its equilibrium radius while oscillating about intermediate points during the whole course of its motion. Although direct and clear observational data seem to be lacking, the data which are available lend support to this idea.
Dissert. Abstr.

N82-12236 Dartmouth Coll., Hanover, N.H.
PARTIAL ACID HYDROLYSIS PRETREATMENT FOR ENZYMATIC HYDROLYSIS OF CELLULOSE: A PROCESS DEVELOPMENT STUDY OF ETHANOL PRODUCTION Ph.D. Thesis
Diane Ruth Knappert 1981 175 p
Avail: Univ. Microfilms Order No. 8121523

Cellulosic substrates (poplar, corn stover and bagasse) were pretreated in a continuous, plug flow reactor at conditions of 160-220 C, 0-1.5% acid, and retention times up to 13 seconds. The pretreated material was then hydrolyzed with Trichoderma reesei C30 cellulase, for 48 hours. Glucose concentrations were measured during the 48 hours of hydrolysis, and results are compared to those from controls, hydrolysis of untreated material. Results show a significant increase in glucose yields after pretreatment. For example, after pretreatment, glucose yields from hydrolysis of poplar as high as 75% are obtained, compared to 20% yields from hydrolysis of untreated poplar. Successful pretreatments are found to solubilize about 40% of the poplar hemicellulose. The cost of producing ethanol using a 10 MM gal/yr plant size are evaluated, and the process is scaled up to a 50 MM gal/yr plant.
Dissert. Abstr.

N82-12237 Tufts Univ., Boston, Mass.
THE STABILIZATION OF COAL-OIL MIXTURES Ph.D. Thesis
Mary Adams Viola 1981 501 p
Avail: Univ. Microfilms Order No. 8121367

An understanding was developed of the stabilization by three methods: the addition of water; the addition of chemical additives; and the control of the particle size distribution (PSD) of the coal (so-called ultrafine COM). Aggregation of the coal particles was determined to control both the sedimentation and rheological properties of the COM. The degree of coal particle aggregation depends upon the nature and PSD of the coal powder, on the nature of the oil used, and the use of chemical additives, such as water and/or surfactants.
Dissert. Abstr.

N82-12238 Houston Univ., Tex.
SOLID-SOLID REACTIONS IN COAL CONVERSION PROCESSES Ph.D. Thesis
Daniel Clark Baker 1981 198 p
Avail: Univ. Microfilms Order No. 8120902

The thermal stability of calcium sulfate and sulfated coal ashes was studied as well as the catalytic effect of metal carbonates on coal char gasfication. Five model reactions which could result in undesirable evolution of sulfur oxides are considered: decomposition of pure CaSO4 between 950 C - 1130 C; decomposition of CaSO4 in the presence of thin film melts of KCl and NaCl at 1020 C; reactions of CaSO4 with metal oxides in binary systems at 1020 C; reactions of CaSO4 with aluminosilicates in multicomponent systems at 1020 C; and decomposition of sulfated coal and lignite ashes at 820 C and 1020 C. Metal carbonates did not change the mechanism of char gasification when CO2 was the reactive gas. It was noted that reactions of the solid-solid complex with silicates and aluminosilicates in the ash of the char can result in loss of catalytic activity and poor catalyst recovery.
Dissert. Abstr.

N82-12239 Engins Matra, Velizy (France).
EXPLOSION EXPERIMENTS USING CYLINDRICAL AND CONICAL CHARGES [EXPERIMENTATION D'EXPLOSION AU CEG GRAMAT SUR DES CHARGES CYLINDRIQUES ET CONIQUES]
P. Croizer 24 Jan. 1980 17 p In FRENCH
(N-40-1871-0) Avail: Issuing Activity

High speed photographs of explosions, taken to check the accuracy of a computer model (STRESS 2DL), are presented. Conical and cylindrical charges composed of 65% hexogen and 35% TNT were detonated in either steel or aluminium envelopes. Explosions were photographed at 960,000 frames/sec for the aluminium cylinder and cone, and 480,000 frames/sec for the steel cone. Agreement with model predictions is good.
Author (ESA)

N82-12240*# National Aeronautics and Space Administration. Pasadena Office, Calif.
HYDRODESULFURIZATION OF CHLORINATED COAL Patent Application
John J. Kalvinskas (JPL, California Inst. of Technology, Pasadena) and Naresh K. Rohatgi, inventors (to NASA) (JPL, California Inst. of Technology, Pasadena) Filed 30 Oct. 1981 24 p
(Contract NAS7-100)
(NASA-Case-NPO-15304-1; US-Patent-Appl-SN-315587) Avail: NTIS HC A02/MF A01 CSCL 21D

A method of desulfurization is described in which high sulfur coals are desulfurized by low temperature chlorinolysis of coal in liquid media, preferably water, followed by hydrodesulfurization at a temperature above 500 C. The coals are desulfurized to an extent of up to 90% by weight and simultaneously dechlorinated to a chlorine content below 0.1% by weight. The product coals have lower volatile loss, lower oxygen and nitrogen content and higher fixed carbon than raw coals treated with hydrogen under the same conditions. Heating the chlorinated coal to a temperature above 500 C in inert gas such as nitrogen results in significantly less desulfurization.
NASA

N82-12241*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SUPERCRITICAL MULTICOMPONENT SOLVENT COAL EXTRACTION Patent Application
William H. Corcoran, inventor (to NASA) (JPL, California Inst. of Technology, Pasadena) Filed 30 Oct. 1981 27 p
(Contract NAS7-100)
(NASA-Case-NPO-15767-1; US-Patent-Appl-SN-315584) Avail: NTIS HC A03/MF A01 CSCL 21D

The yield of organic extract from the supercritical extraction of coal with larger diameter organic solvents such as toluene is increased by use of a minor amount of from 0.1 to 10% by weight of a second solvent such as methanol having a molecular diameter significantly smaller than the average pore diameter of the coal.
NASA

N82-12242# General Accounting Office, Washington, D. C.
STATUS OF THE GREAT PLAINS COAL GASIFICATION PLANT
16 Mar. 1981 30 p
(EMD-81-64) Avail: NTIS HC A03/MF A01

A coal gasification plant with a production capacity of 125 million cubic feet per day of high Btu gas, equivalent to about 22,000 barrels of oil per day, is proposed for Mercer County, N. Dak. This synthetic gas is a direct substitute for natural gas. The process employed to convert the coal to gas is the Lurgi pressurized, fixed bed gasification process with Lurgi methanation.
S.L.

N82-12243# Drexel Univ., Philadelphia, Pa. Environmental Studies Inst.
MICROBIAL METHANE FERMENTATION KINETICS FOR TOXICANT EXPOSURE Final Report, Jul. 1979 - Aug. 1981
Gene F. Parkin, Walter M. Kocher, and Steven W. Miller 31 Aug. 1981 281 p refs
(Contract F49620-79-C-0190; AF Proj. 2312)
(AD-A104868; AFOSR-81-0680TR) Avail: NTIS HC A13/MF A01 CSCL 06/13

Methane fermentation of industrial wastes offers the dual potential of pollution abatement and energy conservation. This report presents results of experiments designed to investigate the effects of toxic substances on methane bacteria. Toxicants studied were calcium, cadmium, chromium, nickel, sulfide, chloroform, dichloroethylene, trichloroethylene, ethyl benzene, cationic surfactants, gasoline, jet fuel, and hydrazine. The effect of toxicant concentration, solids retention time, and temperature on methanogenic response, acclimation, and reversibility was studied. Experiments included slug and continuous addition of toxicants.
GRA

N82-12244# Georgia Inst. of Tech., Atlanta School of Aerospace Engineering.
COMBUSTION MECHANISMS OF SOLID PROPELLANTS Annual Technical Report, 1 Aug. 1979 - 31 Jul. 1980
E. W. Price, R. K. Sigman, and R. R. Panyam 27 Jul. 1981 39 p refs
(Contract N00014-79-C-0674)
(AD-A105163) Avail: NTIS HC A03/MF A01 CSCL 21/2

Investigation of mechanisms of combustion and combustion zone microstructure continued, using ammonium perchlorate-hydro-carbon binder sandwiches and the quench-burning method to obtain high resolution measurements. Binder-thickness deflagration limits were also determined, and work started on measurement of burning rate vs binder thickness. On the basis of results to date, a modified picture of the combustion zone is proposed that differs sharply from the classical model, particularly in those regions of the sandwich surface that are close enough to the AP-binder interface to correspond to processes in solid propellant combustion. Author (GRA)

N82-12245# State Univ. of New York Coll. at Fredonia. Dept. of Chemistry.
A SEARCH FOR NEW FUEL COMPONENTS IN EXPLOSIVE MIXTURES WITH AMMONIUM NITRATE Final Report, 1 May 1980 - 30 Apr. 1981
Maurice C. Neveu 30 Apr. 1981 25 p refs
(Grant AF-AFOSR-0134-80; AF Proj. 2303)
(AD-A104881; AFOSR-81-0697TR) Avail: NTIS HC A02/MF A01 CSCL 19/1

A series of about 80 dye samples was tested by differential scanning calorimetry (DSC) for eutectic formation with ammonium nitrate and release of energy. Thirteen of these showed these desired characteristics. These were in the class of oxazines and dioxazines with ionic groups; and of ionic and non-ionic aminoanthraquinones. A discussion is given about the possibility of the non-ionic aminoanthraquinones to form eutectic mixtures with ammonium nitrate. A synthesis of 2,2'4,4'6,6'-hexanitro-3,3'-biphenol was carried out and its thermal properties as well as those of its potassium and ammonium salts were determined by differential scanning calorimetry. The significance of the use of dyes as fuels in fuel/oxidizer explosive systems and of the Colour Index for the discovery of further intermolecularly reacting explosive systems is discussed. Author (GRA)

N82-12246# Maryland Univ., College Park. Computer Vision Lab.
HOW A DIGITAL COMPUTER CAN TELL THAT A STRAIGHT LINE IS STRAIGHT
Azriel Rosenfeld and Chul E. Kim Jul. 1981 21 p refs
(Grant AF-AFOSR-3271-77; AF Proj. 2304)
(AD-A105076; TR-1072; AFOSR-81-0658TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

Recent results on digital straightness and convexity are reviewed, and it is shown that the criteria for a set of lattice points to be the digitization of a convex set, or for a digital arc to be the digitization of a straight line segment, depend critically on the definition of digitization that is used. Author (GRA)

N82-12247# Minnesota Univ., Minneapolis. Dept. of Aerospace Engineering and Mechanics.
PREFRACTURE BEHAVIOR OF SOLID PROPELLANTS Final Report, Sep. 1978 - Jul. 1980
C. C. Hsiao, S. S. Chern, and C. H. Cheng Edwards AFB, Calif. AFRPL Jul. 1981 72 p
(Contract F04611-78-C-0078; AF Proj. 2307)
(AD-A104746; AFRPL-TR-81-52) Avail: NTIS HC A04/MF A01 CSCL 21/9

A preliminary research in propellant prefracture behavior has been conducted. Both theoretical and experimental approaches have been carried out according to three phases of a program. Phase I was primarily concerned with the development of a mathematical model which would be applicable to a single prefracture configuration of solid propellant under stress. The occurrence of such a prefracture configuration in polymeric systems is usually termed a craze. Concurrently an experimental technique was to be developed for determining the displacement and stress fields in the vicinity of a craze. During this phase some specially prepared propellant polymers with and without ammonium perchlorate were tested. In Phase II extension to highly filled propellant polymer samples was to be added to the investigations. Phase III was to extend the studies to massive crazing and craze-crack transition and fracture propagation. This report covers the attempts made and work done in Phase I. Since the nature of this research is basic and complex, the efforts and developments are reported under separate headings as reflected in Section 2. GRA

N82-12248# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mechanical Engineering.
DETERMINATION AND ANALYSIS OF JET AND MISSILE FUEL DEPOSITS Final Report
James L. Lauer 14 Aug. 1981 32 p
(Contract N00164-79-M-2522)
(AD-A105458; NWSC/CR-RDTR-151) Avail: NTIS HC A03/MF A01 CSCL 21/4

Jet fuel deposits, some of them supplied on their original support by Dr. Hazlett of the Naval Research Laboratory, were examined by attenuated total reflection spectroscopy and by infrared Fourier transform emission spectroscopy for the purpose of finding a procedure suitable for in situ analysis. The infrared radiation emitted by samples at 50-65 C was adequate for qualitative analysis, which can readily be made quantitative by further work. Definite sharp peaks corresponding to aromatic materials were found. Author (GRA)

N82-12249# Los Alamos Scientific Lab., N. Mex.
PREDICTION OF CRYSTAL DENSITIES OF ORGANIC EXPLOSIVES BY GROUP ADDITIVITY
James R. Stine Aug. 1981 28 p refs
(Contract W-7405-eng-36)
(DE81-032016; LA-8920) Avail: NTIS HC A03/MF A01

The molar volume of crystalline organic compound is assumed to be a linear combination of its constituent volumes. Compounds consisting only of the elements hydrogen, carbon, nitrogen, oxygen, and fluorine are considered. The constituent volumes are taken to be the volumes of atoms in particular bonding environments and are evaluated from a large set of crystallographic data. The predicted density has an expected error of about 3 percent. These results are applied to a large number of explosive compounds. DOE

N82-12250# Aerospace Corp., El Segundo, Calif. Mobile Systems Directorate.
PROJECT FOR RELIABILITY FLEET TESTING OF ALCOHOL/GASOLINE BLENDS Technical Progress Report
Jul. 1981 85 p refs
(DE82-000004; DOE/CS-50023/T15) Avail: NTIS HC A05/MF A01

Progress is reported in reaching the near-term goal of bringing the end-use technology for formulated alcohol/gasoline blends to the point of commercial technical readiness, in support of the Alcohol Fuels Program element of the DOE Alternative Fuels Utilization Program (AFUP). Activities considered include acquiring data for proof-of-concept through engineering tests in a small controlled fleet using various formulated blends of ethanol/gasoline and methanol/gasoline as well as for statistical proof-of-performance through large-scale reliability fleet tests using selected blends. Implementation of the 4-year plan is continuing in accordance with funding availability. DOE

N82-12251# United Technologies Corp., South Windsor, Conn. Power Systems Div.
EVALUATION OF SHALE OIL AS A UTILITY GAS-TURBINE FUEL Final Report
A. P. Grasso, R. A. Sederquist, F. G. Sykes, J. Frese, J. McVey, G. Lewis (Pratt and Whitney Aircraft, West Palm Beach, Florida), and J. Matheson (Pratt and Whitney Aircraft, West Palm Beach, Florida) Aug. 1981 139 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1691-2)
(DE81-904234; EPRI-AP-1975) Avail: NTIS HC A07/MF A01

An FT4A-9 engine and a selected single-can combustor from an O engine were tested using No. 2 petroleum distillate fuel and hydrotreated Paraho shale oil residual, with and without water injection. The engine operated successfully with low smoke when running on shale oil residual and No. 2 petroleum distillate fuel. The use of hot water injection was successfully demonstrated with reduced No/sub x/ emissions when operating on both fuels. Post-test engine inspection showed that all combustor components, including turbine inlet vanes, were in good condition. No/sub x/ emissions from single-can combustor testing with both fuels exceeding engine levels. Carbon monoxide and unburned hydrocarbons were slightly lower. DOE

N82-12252# Los Alamos Scientific Lab., N. Mex.
PROPAGATION OF A LIQUID-LIQUID EXPLOSION
Francis H. Harlow and Hans M. Ruppel Aug. 1981 13 p refs
(Contract W-7405-eng-36)
(DE81-030780; LA-8971-MS) Avail: NTIS HC A02/MF A01

Direct contact between two liquids, one cold and the other hot, may be both fluids results in rapid local boiling, which may initiate a propagating liquid-liquid explosion. A mechanism is discussed for the propagation that involves implosion of the film, rapid mixing of the fluids, heat exchange to warm the cold fluid above the temperature for spontaneous nucleation, and the explosion generation of vapor, which in turn continues to sustain the film implosion. Plausibility for the model is demonstrated by means of numerical studies by high speed computer. DOE

N82-12253# EMCON Associates, San Jose, Calif.
STATE OF THS ART OF METHANE GAS ENHANCEMENT IN LANDFILLS
Jun. 1981 70 p refs Prepared for Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE82-000155; ANL/CNSV-23) Avail: NTIS HC A04/MF A01

Of great importance to the effective design and operation of landfill gas recovery systems are certain parameters that affect the lag time, yield, and rate of production of landfill-generated methane. These enhancement parameters include moisture content, pH buffering of the aqueous phase, nutrient addition, bacterial seeding, particle size, and density of refuse. Laboratory and field observations suggest that an increase in moisture content, coupled with buffering by a pH of 7 and the addition of nutrients and bacteria, will result in a shorter lag time while increasing both the yield and rate of methane generation. Work performed to date, however, does not enable quantifying functional relationships between the methanegenic process and its paramgters. Such quantitative data are needed to predict overall process dynamics and optimize the design of any recovery system. DOE

N82-12254# Boeing Engineering and Construction, Seattle, Wash. Engineering and Construction Div.
FEASIBILITY AND ECONOMIC STUDY OF MEDIUM-Btu COAL GAS BLENDED WITH HIGH-Btu BY-PRODUCT GAS AS AN INDUSTRIAL ENERGY SOURCE AT BILLINGS, MONTANA Final Report
May 1981 297 p refs Prepared in cooperation with Northern Resources, Inc., Billings, Mont.
(Contract DE-FG01-79RA-20219)
(DE81-030622; DOE/FE-20219/2) Avail: NTIS HC A13/MF A01

The technical and economic feasibility of blending a medium Btu gas (MBG) produced from coal by the Winkler fluidized bed gasification process with excess refinery fuel gas to be used as an industrial fuel in Billings, Montana is assessed. The background of the project, the site selection process, the conceptual design of the process and supporting facilities, the retrofit requirements and other costs associated with burning the MBG, the environmental and permitting aspects of the project, the cost estimates and economic considerations, the contract provisions for MBG buy/sell agreements; the government's role in supporting the project, and the market potential for the project in Billings and similar projects in other markets are discussed. The project is technically feasible and economically viable today although parity with conventional fuels will not occur until 1985. DOE

N82-12255# Brookhaven National Lab., Upton, N. Y. Catalyst Group.
DEVELOPMENT OF CATALYTIC SYSTEMS FOR THE CONVERSION OF SYNGAS TO JET FUEL AND DIESEL FUEL AND HIGHER ALCOHOLS Annual Report
William A. Slegeir Oct. 1980 19 p
(Contract DE-AC02-76CH-00016)
(DE82-000067; BNL-51423) Avail: NTIS HC A02/MF A01

A highly active series of Fischer-Tropsch catalysts are developed on the basis of insights provided by the oxide theory. The method of catalyst formulation is unique in Fischer-Tropsch chemistry, yet is simple and reproducible. These catalysts are superior to ordinary catalysts for hydrocarbon synthesis with regard to rate, operating conditions, and, product selectivity and longevity. The products of these catalysts are ideally suited for use as diesel and jet fuels. Once formed, the catalysts display remarkable stability toward air. Oxide interactions, the role of promoters, and the synergistic behavior of bimetallic catalysts systems are studied. Bimetallic systems for hydrocarbon and alcohol synthesis are discussed. DOE

N82-12256# Argonne National Lab., Ill. Energy and Environmental Systems Div.
ETHANOL PRODUCTION VIA FUNGAL DECOMPOSITION AND FERMENTATION OF BIOMASS, PHASE 2 Semiannual Progress Report, Oct. 1980 - Mar. 1981
Antonios A. Antonopoulos and Edward G. Wene Mar. 1981 21 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contract W-31-109-eng-38)
(DE82-000104; ANL/EES-TM-148) Avail: NTIS HC A02/MF A01

Research efforts focused mainly on continuing the: (1) isolating, culturing, and maintaining of Fusarium strains for biochemical evaluation; (2) screening for potentially cellulolytic F. strains; (3) searching for lignolytic and hemicellulolytic F. strains; (4) screening for effective pentose- and hexose-fermenting F. strains; and (5) evaluating various methods and materials for the optimization of certain fermentation parameters. Approximately 200 additional Fusarium isolates were isolated and screened; all showed cellulolytic activity, with 50 showing increased activity. Several isolates that formed fusoid to spheroid spores and cells on Xylan media were observed to retain their morphology in cellulose suspensions. All tested isolates were found to ferment glucose to ethanol; some yielded amounts of ethanol approaching those produced by yeast. In screening more than 600 isolates for Xylose fermentation, 25 were identified as effective fermenters. Reutilization of inoculum during consecutive fermentations was employed to facilitate higher ethanol yields from Xylose. A few Fusarium isolates indicated relatively high ethanol tolerability. DOE

N82-12257# Argonne National Lab., Ill. Energy and Environmental Systems Div.
ETHANOL PRODUCTION VIA FUNGAL DECOMPOSITION AND FERMENTATION OF BIOMASS Progress Report
Antonios A. Antonopoulos and Edward G. Wene Sep. 1980 25 p refs
(Contract W-31-109-eng-38)
(DE82-000103; ANL/EES-TM-147) Avail: NTIS HC A02/MF A01

Recorded evidence that Fusarium strains decompose cellulose, hemicelluloses, pectic substances, and lignin, and also ferment both pentoses and hexoses to ethanol promoted the following activities: (1) collecting and reviewing relevant bibliographic materials for a forthcoming publication; (2) isolating, culturing, and maintaining Fusarium, Trichoderma, and actinomycetous strains for biochemical screening and evaluation; (3) manipulating the genetic constitution of promising Fusarium strains to develop more effective strains for the decomposition and fermentation of biomass; (4) screening for potentially cellulclytic Fusarium and Trichoderma strains; (5) searching for lignolytic and hemicellulolytic Fusarium strains; and (6) screening for effective pentose- and hexose-fermenting Fusarium strains. More than 500 Fusarium strains and about 150 Trichoderma strains show cellulolytic activity. DOE

N82-12258# Sandia Labs., Albuquerque, N. Mex.
W76 ELASTOMERS/PROPELLANT COMPATIBILITY
J. I. Martinez and D. A. Bouchard Jun. 1981 25 p refs
(Contract DE-AC04-76DP-00789)
(DE81-031933; SAND-81-0240) Avail: NTIS HC A02/MF A01

The survivability of unsealed section materials in a C-4 propellant outgassing environment was addressed. The compatibility of various materials, including the elastomers in an exaggerated environment was created by using an unrealistically large ratio of propellant to materials. Although most materials fared reasonably well in the test, it became obvious that further investigation of the elastomeric seals was necessary. The behavior of the elastomeric seals was also examined in a more realistic environment. DOE

N82-12259# Pittsburg Energy Technology Center, Pa.

SYNTHESIS GAS CONVERSION TO LIQUID FUELS USING PROMOTED FUSED IRON CATALYSTS

Richard A. Diffenbach, Richard R. Schehl, and Daniel J. Fauth Sep. 1981 67 p refs
(DE81-030857; DOE/PETC/TR-81/3) Avail: NTIS HC A04/MF A01

More active and stable nitrided iron catalysts were prepared for the conversion of synthesis gas to a proudct with a high alcohol content that could be used directly as an automotive fuel or converted to a gasoline-like product over a shape selective zeolite in a dual reactor unit. The rational is given for the preparation of a molybdenum-promoted nitrided fused ion catalyst. Catalyst characterization yielded equivocal results as to whether a mixed Fe-Mo nitride was formed. Regardless of the nature of the Mo-containing species, these catalysts were significantly more active than unpromoted nitrided fused iron catalyst. Characterization of fused iron catalysts using thermogravimetric analysis indicated the rates of reduction, carburization, and nitriding were strongly dependent on reaction temperature and particle size as well as the nature of the promoter. X-ray diffraction measurements indicated the metal crystallite size of the reduced catalysts was strongly dependent on reduction temperature. DOE

N82-12260# Institute of Gas Technology, Chicago, Ill.

DEVELOPMENT OF HYDROCONVERSION OF BIOMASS TO SYNTHETIC FUELS Technical Progress Report, 1 Jan. - 31 Mar. 1981

Jul. 1981 56 p refs
(Contract DE-AC02-80CS-83004)
(DE81-030954; DOE/CS-83004/3) Avail: NTIS HC A04/MF A01

The physical and chemical characterization data for Douglas fir hog fuel, maple hardwood, and corn stover are presented for comparison. Fluidization parameters were obtained for mixtures of char and hollow alumina spheres (-25 + 60 mesh) as the inert bed material. The driving characteristics of maple hardwood were measured isothermally in the range of 2000 to 4000 F. Three distinct moisture content regions were observed with different characteristic drying behaviors. Size reduction characteristics show that the throughput rate for various product screen sizes is lower for the moist, as-received feed then for the dried feed material. The hydrodevolatilization data of maple hardwood from the rapid heat-up rate, free-fall apparatus were analyzed. Comparison of the steam-char gasification rates of coal, peat, and maple hardwood chars shows that the reactivity level expected of the biomass char is significantly higher than that of coal and peat. DOE

N82-12261# Department of Energy, Morgantown, W. Va.

FIXED-BED GASIFICATION

Jan. 1981 29 p refs
(DE82-000432; DOE/METC/SP-184) Avail: NTIS HC A03/MF A01

Since the completion of construction in 1967, the METC Gasifier Pilot Plant has produced data and demonstrated operation on all major ranks of US coals. In 1976, METC began an expansion program to include a novel gas-cleanup facility to evaluate the environmental problems associated with gasification plants and also to develop improved cleanup systems. The construction and checkout of this full-scale cleanup system was completed within the past year and the pilot-plant facility now has the capability of gasifying all US coals and producing a relatively tar, oil, particulate, and sulfur free fuel gas. The Department of Energy's (DOE) fixed-bed gasification evelopment program includes other facilities that provide DOE with a broad capability to address alternative and advanced gasification technologies. In addition to utilizing these facilities to evaluate and improve gasification/cleanup configurations, the pilot plants are also being used to support a number of related projects. DOE

N82-12262# Argonne National Lab., Ill.

DENSITY-MEASUREMENT STUDIES AT THE BI-GAS PILOT PLANT

S. H. Sheen and A. C. Raptis Sep. 1981 17 p refs
(Contract W-31-109-eng-38)
(DE82-000910; ANL/FE-81-57) Avail: NTIS HC A02/MF A01

An acoustic flow/no-flow monitor for the char return line of the BI-GAS pilot plant was developed. The indicator has operated successfully for the last three years. It was observed that the strength of the microphone signal is related to the amount of char in the line. In a recent experiment at BI-GAS this observation was further explored, and it was found that the signal is related to the char valve opening in the frequency range of 1 to 20 kHz. This is a clear indication that the flow/no-flow indicator can be upgraded to a density meter and consequently to a true mass flowmeter. This can be done by installing another flow/no-flow indicator upstream or downstream of the existing one and cross-correlating the two signals. DOE

N82-12263# Oak Ridge National Lab., Tenn.

SELECTIVE SEPARATION OF COAL FEEDSTOCKS FOR CONVERSION BY MAGNETIC SEPARATION TECHNIQUES

E. C. Hise and A. S. Holman 1981 8 p refs Presented at 91st Natl. Meeting of the Am. Inst. of Chem. Engr., Detroit 16 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028060; CONF-810814-6) Avail: NTIS HC A02/MF A01

The Open-Gradient Magnetic Separation (OGMS) technique can separate particles on the basis of small differences in magnetic susceptibility. The highly reactive coal macerals are diamagnetic while the minerals and less reactive macerals range from slightly diamagnetic to paramagnetic with the pyritic minerals exhibiting the greatest positive magnetic susceptibility. OGMS can spread a falling stream of fine coal into a spectrum permitting the physical separation of these several maceral and mineral groups. Several eastern bituminous coals were selectively separated into five to ten fractions. Petrographic examination of these separated fractions shows a concentration of the maceral and mineral groups in the appropriate fractions. It is proposed that the selective separation of the most reactive macerals, as well as of those minerals that exhibit a catalytic effect, can enhance the efficiency of coal conversion. DOE

N82-12264# California Univ., Livermore. Lawrence Livermore Lab.

DESIGNING PROCESS WELLS FOR AN UNDERGROUND COAL-GASIFICATION ENVIRONMENT

D. S. Thompson Jun. 1981 20 p refs Presented at 7th Underground Coal Conversion Symp., Fallen Leaf Lake, Calif., 8 Sep. 1981
(Contract W-7405-eng-48)
(DE81-028434; UCRL-85839; CONF-810923-7) Avail: NTIS HC A02/MF A01

The reasons why process well integrity is important are covered in a review and evaluation of significant data generated from various field tests, including identification of well failure mechanisms. A close relationship is observed between process well behavior and process performance. As a logical extension of this evaluaton, design and performance criteria for underground coal gasification (UCG) process wells are developed. Applications to the next generation of field tests are presented in the form of proposed design features for UCG process wells, features intended to prevent the failure modes that have occurred in past field experiments. DOE

N82-12265# Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.

CHARACTERIZATION OF WESTERN COALS AND COAL MACERALS BY SOLID STATE NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY Progress Report

Ronald J. Pugmire and David M. Grant 5 Aug. 1981 60 p refs

(Contract DE-FG22-80PC-30226)
(DE81-028928; DOE/PC-30226/T1) Avail: NTIS HC A04/MF A01

Progress in the establishment of a laboratory for petrographic analysis and maceral seperation of bituminous coals is reported. Coals high in maceral concentration (i.e., vitrinite, bituminite, fusinite, or semi-fusinite) are selected for analysis using an NMR spectrometer. Laboratory techniques are described. S.L.

N82-12266# Chemische Werke, Huels (West Germany). Marketforschung.
ASSESSMENT OF POTENTIAL FUTURE MARKETS FOR THE PRODUCTION OF HYDROGEN FROM WATER Final Report
Helmut Kalende and Gerhard Ruckelshauss Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 232 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-012; ISSN-0340-7608) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 39,60

The market potential of hydrogen as a chemical raw material and a secondary energy carrier in the Federal Republic of Germany was assessed for various market sectors for the period from 1985 to 2025. The present status of research and technology is depicted. The hydrogen demand in the market sectors of chemistry, petroleum refining industry, steel production, energy, and transport are assessed. Hydrogen production costs for different actual and future technologies are asessed and compared with the production of competing energy carriers, including nuclear high temperature heat. The anticipated demand of hydrogen, broken down according to market sectors is given for the years 1985, 2005 and 2025, taking into account the development of the national and global energy demand. Eight technologies for the production of hydrogen and four technologies for the production of synthetic natural gas are compared, both technically and economically. Hydrogen from high temperature electrolysis of steam is expected to enter the market as a competitive energy carrier not before 2015 to 2025. Author (ESA)

N82-12267# Engins Matra, Velizy (France).
APPLICATION OF THE PISCES TWO DIMENSIONAL ELK PROGRAM TO EXPLOSION CALCULATIONS [APPLICATION DU PROGRAMME PISCES 2D ELK AUX CALCULS D'EXPLOSION]
M. L. Bourdin 4 Jun. 1981 121 p In FRENCH
(N-40-2815-0) Avail: NTIS HC A06/MF A01

Results for the explosion using a eulerian code, and for the steel using a lagrangean, are presented. Internal and kinetic energy in the steel and the explosion are given for both codes. Cone deformations calculated by Pisces and by Stress (2D)L are provided. Only a few minor modifications are required to perfect Pisces (2D)ELK. Author (ESA)

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-12268 Utah State Univ., Logan.
FINITE ELEMENT ANALYSIS OF SOIL-SHEET PILE INTERACTION Ph.D. Thesis
David William Nyby 1981 232 p
Avail: Univ. Microfilms Order No. 8120717

A finite element model which accurately and economically models soil-sheet pile structures was developed. The model was used to analyze cantilever and anchored sheet pile walls. The finite element model includes transition and interface elements. The transition element has the capability of conforming to the displaced shape of the sheet pile elements on one side (cubic element) and soil elements on the other sides (bilinear element). The interface element models the frictional resistance between the soil and the sheet pile. It behaves elastically below a threshold force level (Coulomb friction) and perfectly plastic above this value. The soil is modeled using nonlinear constitutive relations. These relations are used for both the transition elements and the bilinear elements. The economy of the finite element model was increased in two ways. Closed-form integration was used to reduce the computational effort and an equation solver was used which takes advantage of the banded, symmetric, and positive-definite characteristics of the global stiffness matrix. Dissert. Abstr.

N82-12269 Polytechnic Inst. of New York, Brooklyn.
AN IMPROVED MODEL FOR SOIL-STRUCTURE INTERACTION ANALYSIS Ph.D. Thesis
Abdul Quddus Mohammad 1981 170 p
Avail: Univ. Microfilms Order No. 8118889

A model for beams supported on a soil layer of finite thickness is developed by proposing that such foundations may be represented by vertical springs (with stiffness, k) connected by shear springs (representing shear properties of soil) defined by shear stiffness, k sub s. A method of solution based on the principle of minimum potential energy is proposed for such a model. Numerical examples for a wide range of foundation variables are worked out for displacement of the contact surface along the length of the beam as well as beyond the physical limits of the beam. The pressure distribution at the interface and the bending moment of the beam are also solved. Numerical results indicate that displacements, pressure distribution, and bending moment differ considerably as compared to Winkler solution. Dissert. Abstr.

N82-12270 Washington Univ., Seattle.
SOIL STABILIZATION BY CHEMICAL ADDITIVES Ph.D. Thesis
Fouad Muhammed Ghazali 1981 229 p
Avail: Univ. Microfilms Order No. 8121199

The effects of phosphoric acid and lime additives on the compaction characteristics, the cohesion value, and the angle of friction of soils containing various percentages of Kaolin clay were compared and the applicability of Sherif's procedure for determining the coefficient of lateral earth pressure at rest for chemically stabilized soils was investigated. Both additives were found to increase the cohesion and the angle of friction of compacted sandkaolin clay mixtures. Increments were greater in basic addition than in acidic addition. The increment in the cohesion value is dependent mostly on clay content, water content and dry density while the increment in the angle of friction is mostly dependent on clay content and water content, with the factors of the type and content of the chemical common to both increments. Compaction data indicate that maximum dry density, and optimum water content are dependent on clay content and chemical type and content. The expression proposed by Sherif was found to be applicable for chemically treated cohesive soils. Dissert. Abstr.

N82-12271 Iowa State Univ. of Science and Technology, Ames.
BEHAVIORAL PREDICTIONS OF COMPACTED EMBANKMENTS ON RIGID FOUNDATIONS Ph.D. Thesis
Darwin Eugene Fox 1981 231 p
Avail: Univ. Microfilms Order No. 8122513

Samples of excavated schists were taken during construction from railroad right-of-way of the nearly vertical multicolored beds used in embankments as high as 35 m. From one site, composite samples weighing 667 N each were taken of individual colored layers, red, yellow, white, and black, at a depth of 30 m. The red layer was also sampled at a depth of 8 m, and a representative mixed sample was taken from the adjacent fill area. At a second site, 50 km eastward, a grey-green micaceous schist, more highly metamorphosed, was at the 35 m depth. Samples were examined by X-ray diffraction and electron microscopy. Standard engineering tests placed all samples in the ASSHTO A-4 classification, close to the boundary of A-5, being nonplastic or with low plasticity indexes, and with liquid limits from 30 to 38. Based on results of an Iowa K-Test and a mathematical model, earth pressure and settlement predictions are made, and stability calculations along a cycloidal rupture surface are shown. Procedures are seen to be compatible with simplified hand calculationns or computerized finite element techniques, and produce realistic values. Dissert. Abstr.

N82-12272 Rensselaer Polytechnic Inst., Troy, N. Y.
STRAIN AND PORE PRESSURE BEHAVIOR OF FINE

GRAINED SOILS SUBJECTED TO CYCLIC SHEAR LOADING Ph.D. Thesis
Rune Dyvik 1981 380 p
Avail: Univ. Microfilms Order No. 8121143

The behavior of fine grained soils subjected to cyclic loading is investigated. Consolidated, constant volume, static (monctonic) and cyclic laboratory shear tests were performed using the Norwegian Geotechnical Institute direct simple shear device, which was modified for cyclic loading capabilities. All cyclic tests were performed with stress controlled square wave loading and most with complete and symmetric stress reversal. Pore pressure is found to be a basic indication of the degradation of a soil specimen subjected to shear. Pore pressure is used directly in predicting the behavior of soil specimens subjected to varying cyclic stress levels. A unique relationship between modulus and pore pressure for a particulr soil subjected to cyclic loading is observed. If the cyclic shear strain at any test parameter combination (cyclic shear stress level and number of cycles) is determined (through constitutive relations or graphically), the resulting pore pressure is also determined from this unique relationship. Dissert. Abstr.

N82-12273# Geological Survey, Washington, D. C.
THE HANDLING, HAZARDS, AND MAINTENANCE OF HEAVY LIQUIDS IN THE GEOLOGIC LABORATORY
Phoebe L. Hauff and Joseph Airey 1980 28 p refs
(USGS-CIRC-827) Avail: NTIS HC A03/MF A01

Data on toxic properties are presented for organic heavy liquids bromoform, methylene iodide, tetrabromoethane, and cleric compounds used for mineral separation processes. The physical properties, hazards of handling, proper storage facilities, and adequate protective clothing are discussed for each compound as well as for their common and less-common solvents. Toxicity data are listed along with exposure symptoms and suggested first aid treatments. Safety for the worker is emphasized. Three reclamation methods which recover the solvent used as a dilutant and purify the heavy liquid are discussed. These include: the water cascade, refluxing-distillation-condensation, and flash evaporation methods. Various techniques for restoration and stabilization of these heavy liquids are also included. S.L.

N82-12274# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.
A ONE-DIMENSIONAL PLANE WAVE PROPAGATION CODE FOR LAYERED RATE-DEPENDENT HYSTERETIC MATERIALS Final Report, Nov. 1979 - Sep. 1981
John O. Curtis Sep. 1981 95 p refs
(DA Proj. 4A1-61101-A9-1D)
(AD-A105241; WES/MP/SL-81-25) Avail: NTIS HC A05/MF A01 CSCL 08/13

Recent experimental data on soils showing that the application of loads with submillisecond rise times results in significant rate-dependent compressibility behavior have prompted the need for a one-dimensional plane wave propagation code for layered rate-dependent hysteretic or visco-compacting materials. An explicit one-dimensional finite element code--named ONED3P--was developed which incorporates a three-parameter (spring and dashpot) mechanical model consisting of a linear spring and dashpot in series coupled in parallel with a piecewise linear hysteretic or compacting spring. ONED3P allows for analysis of a column of multilayered visco-compacting soils loaded by a digitized surface pressure-time history. Any set of consistent units may be used with this code and results may be obtained in the form of stress-, strain-, acceleration-, velocity-, and/or displacement-time histories as well as stress-strain curves using standard Calcomp software. Several demonstration problems were calculated using ONED3P to evaluate its features and capabilities against (a) available analytical solutions for viscous and nonviscous problems, (b) other code solutions, and (c) measurements from field experiments that evince rate-dependent soil behavior. In general, results were extremely good. Special attention was given to the effects of loading rate or frequency on wave speeds in viscous media and to methods of deriving the ONED3P model parameters from laboratory material property test data. Program listings and a user's guide are included. GRA

N82-12275# Bendix Corp., Kansas City, Mo.
METAL-FINISHING PROCESSES: SURFACE-FINISH IMPROVEMENT
Laroux K. Gillespie Aug. 1981 49 p Submitted for publication
(Contract DE-AC04-76DP-00613)
(DE81-030188; BDX-613-2578) Avail: NTIS HC A03/MF A01

The role finishing operations play in the manufacture of parts, some basic concepts of surface characteristics, surface improvement processes, and the technical challenges posed by surface finish requirements are addressed. DOE

N82-12276# California Univ., Berkeley. Lawrence Berkeley Lab.
ENERGY EFFICIENCY BUILDINGS PROGRAM Annual Report
May 1981 76 p refs
(Contract W-7405-eng-48)
(DE81-028050; LBL-11985) Avail: NTIS HC A05/MF A01

Progress is reported in developing techniques for auditing the energy performance of buildings. The ventilation of buildings and indoor air quality is discussed from the viewpoint of (1) combustion generated pollutants; (2) organic contaminants; (3) radon emanation, measurements, and control; (4) strategies for the field monitoring of indoor air quality; and (5) mechanical ventilation systems using air-to-air heat exchanges. The development of energy efficient windows to provide optimum daylight with minimal thermal losses in cold weather and minimum thermal gain in hot weather is considered as well as the production of high frequency solid state ballasts for fluorescent lights to provide more efficient lighting at a 25% savings over conventional core ballasts. Data compilation, analysis, and demonstration activities are summarized. DOE

N82-12277# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
MIDWAY HOUSE-TIGHTENING PROJECT: A STUDY OF INDOOR AIR QUALITY
Francis J. Offermann, John R. Girman, and Craig D. Hollowell May 1981 30 p refs
(Contract W-7405-eng-48)
(DE81-030886; LBL-12777) Avail: NTIS HC A03/MF A01

Effects leakage areas and average concentrations of nitrogen dioxide, formaldehyde, and radon, were measured in 12 houses before and after special house-tightening retrofits. The average reduction in leakage area resulting from these retrofits was 32%. None of the pollutants measured before or after the retrofits reached levels exceeding existing guidelines. The moderate increases in radon and formaldehyde concentrations observed are consistent with what could be expected from the estimation average decrease in air-exchange rates. Because the pre- and post-retrofit measurement involved only single, relatively short-term samples taken two months aparts, uncertainties associated with the variability of source strength and occupant activities affecting ventilation remain and preclude any definitive conclusions. DOE

N82-12278# Aerospace Corp., El Segundo, Calif. Energy and Resource Div.
SOLAR HEATING AND COOLING OF BUILDINGS (SHACOB): REQUIREMENTS DEFINITION AND IMPACT ANALYSIS-2. VOLUME 1: ENERGY-CONSERVING DESIGN FOR RESIDENTIAL STRUCTURES
C. K. Cretcher Nov. 1980 140 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 553-2)
(DE82-900206; EPRI-EM-1506-Vol-1) Avail: NTIS HC A07/MF A01

The impact of stringent energy conserving building standards on electric utility service areas and their customers was analyzed. The demands on the seven broadly representative electric utilities were aggregated to represent the total new construction electric heating demands in the years 1990 and 2000 to be compared to the aggregate obtained similarly for a nominal, less stringent standard, viz., ASHRAE 90-75. Results presented include the percentage of energy savings achieved in both heating and cooling seasons and typical demand profile changes. A utility economic impact analysis was performed for the cases investigated to determine changes in operating costs and potential capacity sales.

A third cost component considered is the incremental cost of superinsulation (over ASHRAE 90-75) to the customer. The aggregate net cost to the utility/customer entity is utilized as a measure of overall economic benefit. DOE

N82-12279# Aerospace Corp., El Segundo, Calif. Energy and Resources Div.

SOLAR HEATING AND COOLING OF BUILDINGS (SHACOB): REQUIREMENTS DEFINITION AND IMPACT ANALYSIS-2. VOLUME 2: DOMESTIC HOT WATER SYSTEMS

C. K. Cretcher Nov. 1980 121 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 553-2)
(DE82-900207; EPRI-EM-1506-Vol-2) Avail: NTIS HC A06/MF A01

The various types of solar domestic hot water systems are discussed including their advantages and disadvantages. The problems that occur in hydronic solar heating systems are reviewed with emphasis on domestic hot water applicatons. System problems in retrofitting of residential buildings are also discussed including structural and space constraints for various components and subsystems. System design parameters include various collector sizing methods, collector orientation, storage capacity and heat loss from pipes and tanks. The installation costs are broken down by components and subsystems. The approach used for utility economic impact analysis is reviewed. The simulation is described, and the results of the economic impact analysis are given. A summary assessment is included. DOE

N82-12280# Aerospace Corp., El Segundo, Calif. Energy and Resources Div.

SOLAR HEATING AND COOLING OF BUILDINGS (SHACOB): REQUIREMENTS DEFINITION AND IMPACT ANALYSIS-2. VOLUME 3: CUSTOMER LOAD MANAGEMENT SYSTEMS

C. K. Cretcher and R. C. Rountredd Nov. 1980 87 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 553-2)
(DE82-900208; EPRI-EM-1506-Vol-3) Avail: NTIS HC A05/MF A01

Customer Load Management Systems, using off-peak storage and control at the residences, are analyzed to determine their potential for capacity and energy savings by the electric utility. Areas broadly representative of utilities in the regions around Washington, DC and Albuquerque, NM were of interest. Near optimum tank volumes were determined for both service areas, and charging duration/off-time were identified as having the greatest influence on tank performance. The impacts on utility operations and corresponding utility/customer economics were determined in terms of delta demands used to estimate the utilities' generating capacity differences between the conventional load management, (CLM) direct solar with load management (DSLM), and electric resistive systems. Energy differences are also determined. These capacity and energy deltas are translated into changes in utility costs due to penetration of the CLM or DSLM systems into electric resistive markets in the snapshot years of 1990 and 2000. DOE

N82-12281# Oak Ridge Y-12 Plant, Tenn. Dept. of Fabrication Systems.

CONTROL SYSTEMS IMPROVEMENTS IN A PRECISION COORDINATE MEASURING MACHINE

S. S. Douglass, E. F. Babelay, Jr., R. E. Igou, L. M. Woodard, and W. L. Green Sep. 1981 17 p refs
(Contract W-7405-eng-26)
(DE82-000024; Y-2248) Avail: NTIS HC A02/MF A01

A conventional, manually driven Moore No. 3 coordinate measuring machine at the Oak Ridge Y-12 Plant is being upgraded to provide a continuous-path numerical control capability and simultaneously serve as a vehicle for testing new machine slide-control concepts. Besides new lead screw drive motors, an NC machine control unit, and a closed-loop servo system, the machine has also been equipped with vibration isolation, air-bearing slideways, and laser interferometric position feedback. The present conventional slide servo system will be replaced with a digital servo system wherein various feedback and compensation techniques can be realized through the use of a high speed, dedicated digital processor. The improvements to data are described with emphasis on identification and compensation of the slide control systems. GRA

N82-12282# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

INTERIOR DESIGN FOR PASSIVE SOLAR HOMES

Jill C. Breen Jul. 1981 7 p refs Presented at the 6th Natl. Passive Solar Conf., Portland, Oreg., 8-12 Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-027939; SERI/TP-721-1312; CONF-810925-10) Avail: NTIS HC A02/MF A01

The increasing emphasis on refinement of passive solar systems brought recognition to interior design as an integral part of passive solar architecture. Interior design can be used as a finetuning tool minimizing many of the problems associated with passive solar energy use in residential buildings. In addition, treatment of interior space in solar model homes may be a prime factor in determining sales success. A new style of interior design is evolving in response to changes in building from incorporating passive solar design features. The psychology behind passive solar achitecture is reflected in interiors, and selection of interior components increasingly depends on the functional suitably of various interior elements. DOE

N82-12283# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

COMPARISON OF RESIDENTIAL WINDOW DISTRIBUTIONS AND EFFECTS OF MASS AND INSULATION

M. Hannifan, C. Christensen, and R. Perkins Jul. 1981 7 p refs Presented at the 6th National Passive Solar Conf., Portland, Oreg. 8-12 Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-027938; SERI/TP-721-1300; CONF-810925-9) Avail: NTIS HC A02/MF A01

The energy requirements and comfort implications of various window distributions and window areas (representing conventional, sun-tempered, and passive solar designs) are investigated for single-family residences in Albuquerque, NM, Denver, CO, and Madison, WI. Three distinct mass levels ranging from lightweight to heavyweight interiors and three distinct insulations levels, including energy-conserving, night-insulated, and superinsulated cases, are analyzed. Energy requirements are reported for residences with electric resistance heating and mechanical air conditioning. Comfort conditions reported are based on interior average air temperatures and mean-squared errors. DOE

N82-12284# Los Alamos Scientific Lab., N. Mex.

MATERIALS FOR MAGNETIC REFRIGERATION BETWEEN 2 AND 20 K

J. A. Barclay and W. A. Steyert May 1981 24 p refs
(Contract W-7405-eng-36)
(DE81-024031; LA-8746-MS) Avail: NTIS HC A02/MF A01

As part of a research and development program on magnetic refrigeration, paramagnetic materials suitable for magnetic refrigeration in the 2 to 20 K range were studied for the Jet Propulsion Laboratory. The best materials with known properties, as derived from a literature survey, are plotted. For one of those materials, gadolinium gallium garnet, the results are presented of field-dependent heat capacity measurements. Preparation and fabrication of gadolinium compounds are discussed briefly as well as the scope of further work for selecting and studying working materials for magnetic refrigeration. DOE

N82-12285# STEAG A.G., Essen (West Germany). Zentralbereich Forschung und Entwicklung.

NEW BUILDING MATERIALS. A CONTRIBUTION TO ENVIRONMENTAL PROTECTION. SUBPROJECT: FLY ASH CEMENT Final Report

Dieter Deuster Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 138 p refs In GERMAN; ENGLISH summary Sponsored by Forschung und Technologie
(BMFT-FB-T-80-176; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 29

Fly ash cement was developed from a mixture of Portland cement and fly ash as a hydraulic binding agent. In laboratory investigations, fly ash cement was produced by homogenizing

Portland cement, clinkers, and fly ash as well as by grinding Portland cement, clinkers, gypsum and fly ash together. The experiments indicate that grinding the components together gives higher compressive strength than grinding separately, followed by homogenizing. Investigations were conducted in which the fly ash cement was produced by grinding the components together with a fly ash content of 30% by weight. This cement meets specifications and fits into the range of the cement standard DIN 1164. For the Federal Republic of Germany, it is officially permitted for the first time for construction purposes as fly ash cement, designated as FAZ 35 F. Author (ESA)

N82-12286# Centre Technique des Industries Mecaniques, St. Etienne (France).
SIMULATION OF THE FLOW DURING STAMPING: CHARACTERISTICS AND APPLICATION OF MODELING CLAY USED FOR SIMULATION OF MATERIAL FLOW IN A FORGE Final Report [SIMULATION DES ECOULEMENTS EN ESTAMPAGE]
S. Jacomet, H. J. Braudel, J. L. Chenot, and Sophia Antipolis (CEMEF) 9 Mar. 1981 60 p In FRENCH
(Contract CEMEF-4.79.7465)
(CETIM-1.3K.28.2) Avail: NTIS HC A04/MF A01

Information is given on the design of experiments where material flow during a stamping process is simulated. The choice of modeling clay is discussed, relating to seven different types. Rheological tests in order to characterize the modeling clays are described. The preparation of specimens is explained. The mechanical equipment necessary for stamping simulation is determined. Author (ESA)

N82-12287# Earthquake Engineering Research Inst., Berkeley, Calif.
MODELLING OF SOIL-STRUCTURE INTERACTION BY FINITE AND INFINITE ELEMENTS Ph.D. Thesis
Francisco Medina Dec. 1980 68 p refs Sponsored in part by Chile Univ., Santiago and Organization of American States
(Grants NSF ENV-76-04264; NSF PFR-79-08261)
(PB81-229270; UCB/EERC-80/43; NSF/RA-800548) Avail: NTIS HC A04/MF A01 CSCL 13M

A direct method for solving dynamically excited structures on elastic semi-infinite media is suggested as an improvement over available approaches. The method consists in modeling the near field with finite elements and the far field with infinite elements. The method falls within the framework of the classical finite element method and preserves its flexibilities. The key to the success of the proposed method is the proper definition of the infinite element shape functions. An axisymmetric infinite element is developed to solve three dimensional wave propagation problems in cylindrical orthotropic, elastic, unbounded continua. The element is capable of propagating Rayleigh, shear and compressional waves in the frequency domain. A scheme to numerically integrate the element characteristic matrices is formulated based upon Gauss-Laguerre quadrature. GRA

N82-12288# Sydney Univ. (Australia). Civil Engineering Labs.
SOME ASPECTS OF SKIN FRICTION OF PILES IN CLAY UNDER CYCLIC LOADING
H. G. Poulos Dec. 1980 33 p refs Sponsored in part by the Australian Research Grants Committee and the Univ. of Sydney
(PB81-226730; R-379) Avail: NTIS HC A03/MF A01 CSCL 13B

A number of mode tests on a pile shaft in clay were performed to investigate the influence of cyclic loading on the ultimate skin friction. It is found that the loss of skin friction due to cyclic loading depends on both the cyclic displacement prior to failure and the number of cycles of load. Such loss of skin friction can occur both for one way or two way cyclic loading. The cyclic stiffness of the pile depends on the cyclic displacement of the pile. The rate of loading also influences the skin friction but does not appear to influence the stiffness of the pile. GRA

N82-12111*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DYNAMICS OF SUPERFLUID HELIUM IN ZERO GRAVITY
Peter V. Mason *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 18-24 ref (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 20L

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-12289 California Univ., Los Angeles.
UNIFICATIONS AND EXTENSIONS OF THE MULTIPLE ACCESS COMMUNICATIONS PROBLEM Ph.D. Thesis
Mart Lauri Molle 1981 138 p
Avail: Univ. Microfilms Order No. 8121012

Multiple access protocols permit a broadcast communications channel to be shared by a large number of stations under distributed control. It is assumed that only one message at a time can be transmitted successfully over the common channel. A local optimality condition for synchronous multiple access protocols was derived and it is shown that many known protocols are special cases of this condition. A survey of much of the recent work on infinite population tree algorithms that use the history of channel activity to carry out short-range dynamic scheduling is included. An approach is presented for deriving upper bounds on the maximum stable throughput with finite average delay for infinite population protocols. Dissert. Abstr.

N82-12290 Washington Univ., Seattle.
MODELING AND PERFORMANCE OPTIMIZATION OF LARGE-SCALE DATA-COMMUNICATION NETWORKS Ph.D. Thesis
Francis D. Gorecki 1981 159 p
Avail: Univ. Microfilms Order No. 8121200

A theory of modeling, analysis, and performance optimization is developed and illustrated for large-scale, data communication networks. In a novel and significant departure from existing problem formulations, channel and network models are presented which include the effects of channel distortion, nodal processing errors, and protocol dependent errors. All of these effects are of critical importance in practice, but cannot be readily incorporated into other models. Information theoretic techniques are developed and used to characterize network capacity and message integrity as a function of protocols, routing policies, channel capacity assignment, and channel distortion. Flow assignment techniques which optimize network performance with respect to certain classes of physically important performance matrices are formulated and employed to derive centralized and distributed routing algorithms. Dissert. Abstr.

N82-12291 Rensselaer Polytechnic Inst., Troy, N. Y.
A COMBINED SOURCE-CHANNEL CODING APPROACH TO IMAGE TRANSMISSION Ph.D. Thesis
David George Daut 1981 410 p
Avail: Univ. Microfilms Order No. 8121141

A combined source-channel coding approach is described for the encoding, transmission, and remote reconstruction of image data. Several two dimensional image source encoding schemes are considered. Each source encoding technique is relatively efficient in the absence of channel errors. In the presence of channel errors, however, system performance degrades rapidly. By providing error control protection to those encoded bits which contribute most significantly to image reconstruction, it is possible to minimize this degradation without sacrificing transmission bandwidth. The result is a relatively robust overall system design which is reasonably insensitive to channel errors and yet provides performance approaching the rate distortion bound. Dissert. Abstr.

N82-12292 California Univ., Los Angeles.
ANALYSIS OF NONCOHERENT MULTIPLE ACCESS COMMUNICATION CHANNELS Ph.D. Thesis
Ronald Eugene Sorace 1981 149 p
Avail: Univ. Microfilms Order No. 8122849

A number of users simultaneously transmitting M-ary frequency shift keying signals via a multiple access channel to a receiver are considered. The two types of noncoherent detectors considered for each of the M orthogonal frequencies are a binary hard decision single threshold detector and a multilevel soft decision detector. After presentation of a random coding bound for block codes, a random coding bound for a hybrid convolutional coding scheme using a super Viterbi decoder is given. This latter notion is contrasted to independent user decoding. The convolutional coding system is studied for two types of noise which are particularly detrimental to multiple access communication. Various combinatorial expressions to facilitate performance computations are presented. Emphasis is given to the hard decision scheme, since the reduced information at the receiver renders this situation more difficult. A closely related pulse position modulation laser communication system with multiple access is also examined. Dissert. Abstr.

N82-12293 Northeastern Univ., Boston, Mass.

BANDWIDTH CONSTRAINED SIGNAL DESIGN FOR DIGITAL COMMUNICATION OVER RAYLEIGH FADING CHANNELS AND PARTIAL BAND INTERFERENCE CHANNELS Ph.D. Thesis

Iftekhar Rahman 1981 320 p
Avail: Univ. Microfilms Order No. 8122612

Signal design techniques involving bandwidth efficient coding and modulation are investigated for Rayleigh fading channels and partial band interference channels, and several aspects of the design problem are discussed. Performance is evaluated by deriving upper bounds to the bit error rates as a function of the bit signal to noise ratio and with a bandwidth constraint. Single level codes and concatenated codes are treated. Hard decision decoding and unquantized soft decision decoding are evaluated and compared. Several signal designs are compared and conclusions drawn regarding their relative efficiency. A more general approach to the design problem is then taken by deriving the capacity and computational cut-off rate limits. These limits are then used to obtain performance bounds for the existing codes. Finally, it is discussed how one may in practice use the results to design efficient waveforms, from a basic set of FSK-type (bandwidth limted) signals, for reliable communication over Rayleigh Fading channels. Dissert. Abstr.

N82-12294 California Univ., Los Angeles.

MESSAGE QUEUEING DELAYS IN POLLING SCHEMES WITH APPLICATIONS TO DATA COMMUNICATION NETWORKS Ph.D. Thesis

Luis Felipe M. deMoraes 1981 241 p
Avail: Univ. Microfilms Order No. 8120941

Polling multiple-access schemes, which are intended to provide the coordination and efficient share of communication facilities among the several users of a network, are presented and analyzed. Two polling disciplines, the gated and exhaustive, under which the terminals are polled in a cyclic fashion, are considered and studied. A polling scheme with positional priorities is also introduced. By noting the several similarities between this last and a TDMA scheme, where the messages at each terminal can belong to several priority levels, results for such a TDMA scheme are also obtained. Finally, another polling procedure, which employs reservation polling (probing) time periods during which busy terminals are identified, is introduced and analyzed. The performance index used in analyses consists of the message waiting time. The analyses are carried out within a queueing theoretic framework for network terminals modeled as independent sources, which generate messages according to a renewal process. An analytical technique, which employs a Markov ratio limit theorem is presented for the derivation of performance parameters. Dissert. Abstr.

N82-12295 Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

MULTIPLE ARRESTED SYNTHETIC APERTURE RADAR Ph.D. Thesis

Jerrold Stuart Shuster 1981 296 p
Avail: Univ. Microfilms Order No. 8119140

A radar (MASAR) for the detection of slowly moving targets in clutter was analytically conceptualized and evaluated. The radar consists of a succession of synthetic aperture antennas which are coincident in space but are displaced in time by several interpulse periods. The radar is evaluated using the target to clutter power ratio as the measure of performance. The radar is assumed to be clutter power limited, so noise is ignored in the evaluation. The evaluation consists of a comparison between three different receiver processing schemes. The first processor is a set of weights which optimizes the target to clutter power ratio and is the central feature of MASAR. The second processor is a set of weights comprising the target signal, itself; it is shown to be optimum for rapidly decorrelating clutter. The third processor is set of binomial weights; effectively, it reduces the system to an n-pulse canceller which, for a two antenna system, is the well known displaced phase center antenna (DPCA) radar. Dissert. Abstr.

N82-12296 Colorado Univ. at Boulder.

EFFICIENT STRUCTURE, AND ALGORITHMS FOR DIGITAL SIGNAL PROCESSING Ph.D. Thesis

Masud M. Arjmand 1981 280 p
Avail: Univ. Microfilms Order No. 8122266

Algorithms and structures for specific signal processing problems that effectively utilize the capabilities offered by modern integrated circuit technology are developed. Several parameters that determine whether or not a given algorithm and its resultng hardware structure is efficient are studied. Among these parameters are finite wordlength effects, computational and hardware complexity (measured in the form of chip area of an implementation), speed of operation or data throughput, modularity and regularity. The definition of an efficient algorithm is determined by the technology used to implement that algorithm. Some of the factors that influence the development of very large scale integration algorithms for signal factors for signal processing are discussed. Three major areas of signal processing, namely, linear filtering, noncyclic convolution and Fourier transformation are considered. Dissert. Abstr.

N82-12297* National Aeronautics and Space Administration. Pasadena Office, Calif.

REAL-TIME MULTIPLE-LOOK SYNTHETIC APERTURE RADAR PROCESSOR FOR SPACECRAFT APPLICATIONS Patent

Chialin Wu (JPL, California Inst. of Technology, Pasadena) and Vance C. Tyree, inventors (to NASA) (JPL, California Inst. of Technology, Pasadena) Issued 29 Sep. 1981 13 p Filed 15 Dec. 1978 Supersedes N79-14278 (17 - 05, p 0586) Sponsored by NASA
(NASA-Case-NPO-14054-1; US-Patent-4,292,634;
US-Patent-Appl-SN-969761; US-Patent-Class-343-5CM) Avail: US Patent and Trademark Office CSCL 17I

A spaceborne synthetic aperture radar (SAR) having pipeline multiple-look data processing is described which makes use of excessive azimuth bandwidth in radar echo signals to produce multiple-looking images. Time multiplexed single-look image lines from an azimuth correlator go through an energy analyzer which analyzes the mean energy in each separate look to determine the radar antenna electric boresight for use in generating the correct reference functions for the production of high quality SAR images. The multiplexed single look image lines also go through a registration delay to produce multi-look images.

Official Gazette of the U.S. Patent and Trademark Office

N82-12298*# National Aeronautics and Space Administration. Pasadena Office, Calif.

A PIPELINED DIGITAL SAR AZIMUTH CORRELATOR USING HYBRID FFT/TRANSVERSAL-FILTER Patent Application

Chialin Wu (JPL, California Inst. of Technology, Pasadena) and Kuang Y. Liu, inventors (to NASA) (JPL, California Inst. of Technology, Pasadena) Filed 26 Oct. 1981 41 p
(Contract NAS7-100)
(NASA-Case-NPO-15519-1; US-Patent-Class-314-92U) Avail: NTIS HC A03/MF A01 CSCL 17I

A pipe lined digital signal processor for producing real time high resolution synthetic aperture radar (SAR) images is described. The hybrid processor is comprised of a fast Fourier transform for correlation in the SAR response in the range direction. S.L.

N82-12299# Communications Research Centre, Ottawa (Ontario). Space Technology and Applications Branch.

AN EVALUATION OF THE PERFORMANCE OF 12 GHz LOW COST TVRO TERMINALS IN NORTHWESTERN ONTARIO
R. W. Huck and E. L. Perrier Aug. 1981 79 p
(CRC-1345) Avail: NTIS HC A05/MF A01

The technical performance of low cost terminals over a long period, the ability of users to operate the terminals, and the acceptability of the signals received from Anik B were assessed at 25 of the 43 terminals installed in Northwestern Ontario, to receive programs of the Ontario Educational Communications Authority. The procedures used to make the on-site measurements are described. Results are summarized and analyzed for the following: (1) polarization angle error; (2) antenna pointing errors; (3) noise figures; (4) carrier-to-noise ratio and signal-to-noise ratio; (5) baseband distortions; (6) IF bandpass response and AFC operation; and (7) remodulator response. A.R.H.

N82-12300*# Rensselaer Polytechnic Inst., Troy, N. Y.
FORMULATION OF A DYNAMIC ANALYSIS METHOD FOR A GENERIC FAMILY OF HOOP-MAST ANTENNA SYSTEMS Progress Report
A. Gabriele and R. Loewy 2 Nov. 1981 18 p refs
(Grant NAG1-171)
(NASA-CR-164981) Avail: NTIS HC A02/MF A01 CSCL 20N

Analytical studies of mast-cable-hoop-membrane type antennas were conducted using a transfer matrix numerical analysis approach. This method, by virtue of its specialization and the inherently easy compartmentalization of the formulation and numerical procedures, can be significantly more efficient in computer time required and in the time needed to review and interpret the results. R.J.F.

N82-12301*# Environmental Research and Technology, Inc., Concord, Mass.
HANDBOOK FOR THE ESTIMATION OF MICROWAVE PROPAGATION EFFECTS: LINK CALCULATIONS FOR EARTH-SPACE PATHS (PATH LOSS AND NOISE ESTIMATION)
Robert K. Crane and David W. Blood Jun. 1979 88 p refs
(Contract NAS5-25341)
(NASA-CR-165002; TR-1; P-7376-TR1) Avail: NTIS HC A05/MF A01 CSCL 20/14

A single model for a standard of comparison for other models when dealing with rain attenuation problems in system design and experimentation is proposed. Refinements to the Global Rain Production Model are incorporated. Path loss and noise estimation procedures as the basic input to systems design for earth-to-space microwave links operating at frequencies from 1 to 300 GHz are provided. Topics covered include gaseous absorption, attenuation by rain, ionospheric and tropospheric scintillation, low elevation angle effects, radome attenuation, diversity schemes, link calculation, and receiver noise emission by atmospheric gases, rain, and antenna contributions. N.W.

N82-12302# Federal Aviation Administration, Washington, D.C. Systems Research and Development Service.
PROMPT DETECTION OF AIRCRAFT MANEUVERS BY USE OF RANGE RATE RADAR DATA Final Report
James A. Shannon Aug. 1981 46 p
(AD-A105063; FAA-RD-81-62) Avail: NTIS HC A03/MF A01 CSCL 17/9

In addition to the usual range and bearing information concerning aircraft targets, the next generation of long range radars can have the capability of measuring directly a component of velocity. An investigation was conducted to determine first, the accuracy with which target velocity can be measured and secondly, how these velocity data can be exploited so as to better predict aircraft position. A B727 was flown in a special pattern, which included many maneuvers, at a distance of about 100 nmi from a prototype of the velocity measuring radar. The standard deviation of the measurement of the component of velocity was found to be less than 1.3 knots. The velocity data from the test flight were subjected to processing by a tracker which calculates changes in aircraft heading from changes in velocity component. The results are promising. In all maneuver were immediately detected and the velocity vectors constructed by the tracker followed closely the vectors flown by the aircraft. The benefical consequences of incorporating a tracker using velocity data are pointed out. An example is given comparing the automatic of a potential conflict using the conventional tracker and then the tracker which processes velocity data. In the example the use of such data is vital to a safe resolution. GRA

N82-12303# Federal Aviation Administration, Atlantic City, N.J.
MOVING TARGET DETECTOR/AIRPORT SURVEILLANCE RADAR (ASR-7) FIELD EVALUATION Final Report, Feb. 1979 - Jan. 1980
W. Goodchild Aug. 1981 52 p refs
(AD-A105196; FAA-CT-81-31; FAA-RD-81-57) Avail: NTIS HC A04/MF A01 CSCL 17/7

The Moving Target Detector (MTD) II, a sophisticated radar processor, was evaluated to determine its capability to provide improved radar detection in an air traffic control (ATC) environment. The MTD II was installed on one channel of an airport surveillance radar (ASR-7) at Burlington, Vermont. The major objective of testing was to compare the performance of the MTD II with that of the ASR-7 Moving Target Indicator (MTI). This report concentrates on the comparative probability of detection, false alarm rate, MTI improvement factor, subclutter visibility, dynamic range, velocity response, and the simultaneous flight test results of the two systems. Comparison of the MTD II to the MTD I system is made when necessary to show major improvements or deficiencies in the MTD II design. The results of the tests have shown that the MTD II provides surveillance capabilities superior to those of the ASR-7/MTI. Author (GRA)

N82-12304# Federal Aviation Administration, Atlantic City, N.J.
COLUMBUS, OHIO, VOICE RESPONSE SYSTEM DEMONSTRATION AND EVALUATION Final Report, Dec. 1979 - Apr. 1980
John C. Henline Jun. 1981 54 p
(FAA Proj. 131-402-854)
(AD-A104750; FAA-CT-80-50; FAA-RD-81-20) Avail: NTIS HC A04/MF A01 CSCL 17/2

The Voice Response System (VRS) was subjected to a 4-month demonstration in the Columbus, Ohio, Flight Service Station (FSS) preflight area. The purpose of the experiment was to test and evaluate the VRS system, user acceptance, and the effects on the specialists/facility workload, and to determine the general impact of VRS on the Columbus (CMH) FSS preflight area. In addition, the test permitted collection of technical performance data which could serve as the framework for an integrated national system for the mass dissemination of weather information. It is concluded that the VRS caused a shift in user demand/preference, reduced FSS briefer workload, reduced demand for basic pilots automatic telephone weather answering service (PATWAS), and was determined to be acceptable to the general aviation user. Author (GRA)

N82-12305# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Electrical Engineering.
OPTICAL PROCESSING FOR ADAPTIVE PHASED ARRAY RADAR Final Technical Report, 1 Jan. - 31 Dec. 1980
David Casasent Jun. 1981 193 p refs
(Contract F30602-80-C-0048; AF Proj. 2304)
(AD-A105124; RADC-TR-81-152) Avail: NTIS HC A09/MF A01 CSCL 17/9

Three new optical signal processing techniques for adaptive phased array radar (APAR) signal processing are described. The coherent optical correlator uses acousto-optic transducers and computes the far-field noise distribution of the antenna. Digital post-processing is then used to compute the adaptive weights from this information. A new hybrid time and space integrating optical signal processing architecture is advanced and a new adjunct antenna concept is introduced for this processor. Initial acousto-optic experimental results and initial simulations are advanced. An electronic support system and the necessary post-processing issues are described. The second technique uses an input LED array and fiber optic interconnections with a linear photo detector to realize a vector-matrix processor. With the addition of an electronic feedback system, an iterative optical processor results. This system computes the set of adaptive weights given the covariance matrix of the noise field and the desired steering vector. The design and performance of the system fabricated and its use in an APAR signal processing are described. A new wavelength diversity processor concept for the iterative optical processor is described in many new algorithms and potential applications of the system are provided. Author (GRA)

N82-12306# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
COMPARATIVE STUDY OF NONLINEAR TIME WARPING TECHNIQUES IN ISOLATED WORD SPEECH RECOGNITION SYSTEMS
A. Waibel and B. Yegnanarayana 17 Jun. 1981 60 p refs
(Contract F33615-78-C-1551; ARPA Order 3597; Grant NSF MCS-78-25825)
(AD-A104865; CMU-CS-81-125) Avail: NTIS
HC A04/MF A01 CSCL 09/2

In this paper we present the description of an isolated word recognition system and a discussion of various design choices that affect its performance. In particular, we report experimental results aimed at evaluating several methods to optimize the performance of dynamic warping algorithms. Three major aspects that have been suggested have been investigated: relaxation of the boundary conditions to allow for inaccurate begin-end time detection; choice of warping algorithm, e.g., Itakura asymmetric, Sakoe and Chiba symmetric, Sakoe and Chiba asymmetric; and choice of an appropriate warping window to restrict computation to a minimum needed for best recognition results. Recognition results were tested on two vocabularies: the digits and a highly confusable subset of the alphabet (e.g., e, b, d, p, t, g, v, c, z). The relaxation of the boundary conditions degraded the performance of the confusable subset and the digits. The asymmetric Itakura algorithm yielded better results for the confusables, while we obtained slightly better results for the digits using the symmetric Sakoe and Chiba algorithm. The choice of a 100-ms warping window appears to be optimal for both vocabularies used. Author (GRA)

N82-12307# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
EFFECT OF REFERENCE SET SELECTION ON SPEAKER DEPENDENT SPEECH RECOGNITION: FRAME COMPRESSION IN ISOLATED WORD RECOGNITION
Zongge Li, Fil Allava, and Raj Reddy 23 Jul. 1981 18 p refs
(Contract F33615-78-C-1551; Grant NSF MCS-78-25824; ARPA Order 3597)
(AD-A104794; CMU-CS-81-134) Avail: NTIS
HC A02/MF A01 CSCL 09/2

This paper describes an algorithm for compressing the spectral representation of an utterance along the time axis while keeping the main features intact. The goal of the algorithm is to save template storage space and to reduce the time required for recognition. For 8 speakers, 5 data sets each, the results indicated that we can save about 40% of the template space and 35% of the recognition time with only a slightly higher error rate. Author (GRA)

N82-12308# Naval Research Lab., Washington, D. C.
RADAR IMAGING FROM A DISTORTED ARRAY
B. D. Steinberg 13 Oct. 1981 24 p refs
(WF12100000)
(AD-A104803; NRL-MR-4646) Avail: NTIS
HC A02/MF A01 CSCL 17/9

High angular resolution radar imaging may be achieved with a large-aperture antenna even if the aperture is distorted, provided that adaptive signal processing compensates for the distortion. An algorithm for imaging ground-based targets is described and experimental results are given for a 3 cm wavelength demonstration system using a distorted 27 m, random, sparse array. The measured beamwidth of one mr conformed to theory, confirming the validity of the technique. Extension of the algorithm to accommodate isolated targets such as aircraft and ships also is discussed. Author (GRA)

N82-12309# Naval Research Lab., Washington, D. C.
ESTIMATION OF BIAS ERRORS IN ANGLE-OF-ARRIVAL MEASUREMENTS USING PLATFORM MOTION Interim Report
A. Grindlay 28 Aug. 1981 17 p refs
(RR0210541)
(AD-A104742; NRL-8512) Avail: NTIS HC A02/MF A01 CSCL 17/3

An algorithm has been developed to estimate the bias errors in angle-of-arrival measurements made by electromagnetic detection devices on-board a pitching and rolling platform. The algorithm assumes that continuous exact measurements of the platform's roll and pitch conditions are available. When the roll and pitch conditions are used to transform deck-plane angular measurements of a nearly fixed target's position to a stabilized coordinate system, the resulting stabilized coordinates (azimuth and elevation) should not vary with changes in the roll and pitch conditions. If changes do occur they are a result of bias errors in the measurement system and the algorithm which has been developed uses these changes to estimate the sense and magnitude of angular bias errors. Author (GRA)

N82-12310# Messina Univ. (Italy). Inst. de Struttura Della Materia.
MULTIPLE ELECTROMAGNETIC SCATTERING FROM A CLUSTER OF SPHERES. VOLUME 1: THEORY Special Report, Jun. 1979 - Sep. 1980
F. Borghese, P. Denti, and O. I. Sindoni Aberdeen Proving Ground, Md. Army Armament Research and Development Command Sep. 1981 21 p refs
(Grant DA-ERO-78-G-106)
(AD-A105453; ARCSL-SP-81008) Avail: NTIS
HC A02/MF A01 CSCL 20/6

A method to calculate the electromagnetic scattering properties of a cluster of spheres of arbitrary radii and possibly complex refractive indexes is proposed. The suggested approach takes into account multiple scattering effects and does not require any approximation except for the truncation of the multipolar expansions describing the scattered field. Author (GRA)

N82-12311# Notre Dame Univ., Ind. Dept. of Electrical Engineering.
NEW APPROACH TO SPEECH DIGITIZATION COMBINING TIME-DOMAIN HARMONIC SCALING AND ADAPTIVE RESIDUAL CODING Final Report, Oct. 1980 - Aug. 1981
James L. Mela and Arun K. Pande 31 Aug. 1981 174 p refs
(Contract DCA100-80-C-0050)
(AD-A105383) Avail: NTIS HC A08/MF A01 CSCL 09/2

This report describes the results of a twelve-month study, supported under DCA Contract 100-80-C-0050, of a new speech digitization algorithm combining Time-Domain Harmonic Scaling (TDHS) and Adaptive Reidual Coding (ARC). The FORTRAN simulation of this system conducted as part of this study produces high quality speech reproduction at mediumband bit rates of 9.6 kb/s and 16 kb/s. This system also displays excellent robustness characteristics for channel bit error rates as high as 1% and for acoustic background noise. By basing the required pitch extraction on a three-level clipped signal, the hardware requirements for the system are kept modest. The combined algorithm has several features which become significant in a fuel system applications. Because the algorithm is a high performance, waveform matching algorithm, extremely good pervformance in the random configuration with other algorithms is anticipated. Since the technique is basically a waveform reconstruction technique, it will perform well on non speech signals such as in-band signaling and modem tones. Author (GRA)

N82-12312# Joint Publications Research Service, Arlington, Va. Foreign Technology Div.
ANTENNA
15 Oct. 1981 101 p refs Transl. into ENGLISH from Antenny (USSR), no. 13, 1971 p 3-48 and 56-70
(AD-A106521; FTD-ID(RS)T-0943-81) Avail: NTIS
HC A06/MF A01 CSCL 20/14

Various investigations of antenna design and operation are presented. The design of phased annular antenna arrays of interacting radiators excited by a Butler circuit is discussed. The critical wave number and wave resistance of a coaxial line with a cross-shaped interior conductor are determined. In addition, the synthesis of difference direction patterns of spherical antennas is examined and the input resistance of a vibrator with a dielectric cover is calculated by the induced EMF method.

Finally, the calculation of the H-plane stepped joint of rectangular waveguides is discussed. M.G.

N82-12313# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
COMBINED REPORT NUMBER 22. SATNET DEVELOPMENT AND OPERATION, PLURIBUS SATELLITE IMP DEVELOPMENT, REMOTE SITE MAINTENANCE, INTERNET DEVELOPMENT, MOBILE ACCESS TERMINAL NETWORK, TCP FOR THE HP3000, TCP-TAC, TCP FOR VAX-UNIX Quarterly Technical Report, 1 May 1980 - 30 Jul. 1981
R. D. Bressler Aug. 1981 81 p refs
(Contracts N00039-78-C-0405; MDA903-80-C-0353; MDA903-80-C-0214; N00039-79-C-0386; N00039-80-C-0664; N00039-81-C-0408)
(AD-A104931; BBN-4761) Avail: NTIS HC A05/MF A01 CSCL 17/2

This quarterly technical report describes work on the development of and experimentation with packet broadcast by satellite; on development of Pluribus Satellite IMPs; on a study of the technology of Remote Site Maintenance; on the development of Inter-network monitoring; on shipboard satellite communications; and on the development of Transmission control protocols for the HP3000, TAC, and VAX-UNIX. Author (GRA)

N82-12314# Harry Diamond Labs., Adelphi, Md.
AN ADVANCED 500-MHZ-BANDWIDTH FIBER-OPTIC SIGNAL LINK FOR EMP AND GENERAL LABORATORY APPLICATIONS Technical Report, Sep. 1978 - Nov. 1979
James C. Blackburn Jul. 1981 29 p refs Sponsored in part by Defense Nuclear Agency
(AD-A105118; HDL-TR-1940) Avail: NTIS HC A03/MF A01 CSCL 17/2

Means have been found to control modal noise in a fiber-optic system using single-mode lasers. Laser coherence is reduced by dithering, and careful attention is given to fiber connections. These techniques, in combination with miniaturization, have produced a compact wideband analog fiber-optic link that is well suited to signal transmission where dielectric transmission is dictated by electrical noise, need for complete isolation, TEMPEST considerations, or a requirement for wide bandwidth. The optical transmitter has a volume of 550 cc, contains an optically remote-controlled 0- to 45-dB input attenuator and calibrator, and will operate for 2 hr on its internal batteries. Maximum input sensitivity is a few millivolts into 50 ohms, system risetime in 0.8 ns, and dynamic range is greater than 30 dB. Transmission distances up to kilometers are possible, although fiber dispersion will reduce bandwidth at long distances. Author (GRA)

N82-12315# Scripps Institution of Oceanography, La Jolla, Calif.
THE METHOD OF FRIEMAN AND KROLL FOR THE CALCULATION OF ELECTROMAGNETIC FIELDS AND ITS APPLICATION TO DATA INVERSION
Peter D. Young Sep. 1981 39 p refs
(Contract N00014-75-C-0999; Grant NSF OCE-78-14524)
(AD-A104809; SIO-REF-81-15) Avail: NTIS HC A03/MF A01 CSCL 20/4

The derivation of the method developed by Frieman and Kroll (1973) for the calculation of electromagnetic fields due to a transmitting antenna within a one-dimensional profile of electrical conductivity starts with Maxwell's equations in the charge-rationalized MKS system of units. Author (GRA)

N82-12316# Sandia Labs., Albuquerque, N. Mex. Entry Control Systems Div.
EVALUATION OF ACTIVE AND PASSIVE NEAR-MILLIMETER-WAVE RADIOMETRIC IMAGING TECHNIQUES FOR DETECTION OF CONCEALED OBJECTS
Earl E. Reber, Frank B. Foote, Ralph L. Schellenbaum, and Robert G. Bradley Jul. 1981 21 p refs Prepared in cooperation with Aerospace Corp., Los Angeles
(Contract DE-AC04-76DP-00789)
(DE81-031938; SAND-81-1051) Avail: NTIS HC A02/MF A01

The potential of radiometric imaging technique to detect shielded nuclear materials and explosives carried covertly by personnel was investigated. This method of detecting contraband depends upon the differences in emissivity and reflectivity of the contraband relative to human tissue. Explosives, unlike metals and metal composites, generally have high emissivities and low reflectivities that closely approximate those of human tissue making explosives difficult to detect. Samples of several common types of explosives (TNT, Detasheet, C4, and several types of water gels) were examined at the 1.4- and 3-mm wavelengths using active and passive radiometeric techniques. DOE

N82-12317# Sandia Labs., Albuquerque, N. Mex.
TARGET ASSESSMENT PERFORMANCE WITH 5 INCH AND 9 INCH TELEVISION MONITORS
L. M. Weston, B. H. Finley, and R. R. Prairie Jun. 1981 55 p refs
(Contract DE-AC04-76DP-00789)
(DE81-026754; SAND-81-1242) Avail: NTIS HC A04/MF A01

Target assessment performance with 5 in. and 9 in. television monitors are studied. The scenarios consisted of intrusion, nuisance, and false alarm scenarios under daytime and nighttime illumination levels. Performance differences between the 5 and 9 in. monitors are analyzed. DOE

N82-12318# Fernmeldetechnisches Zentralamt, Darmstadt (West Germany). Forschungsinst.
CHARACTERISTICS OF A CODE DIVISION MULTIPLEX CONFIGURATION WITH DIRECT MODULATION
Heinz Huebner Feb. 1980 30 p refs In GERMAN; ENGLISH summary
(Rept-442-TBr-61) Avail: NTIS HC A03/MF A01

Nature and optimal usage of signal multiplexing by direct modulation code division is described. The advantage of resulting spreading of the spectra of individual narrow band input signals over the whole frequency bandwidth of the transmission channel is pointed out. The coding and decoding signal processing is explained and signal distortion and crosstalk are discussed. It is shown that distortion free transmission without crosstalk is possible provided the code carriers are orthogonal and the signals are converted into appropriate step-shaped intermediate signals. It is demonstrated that with nonorthogonal carriers only discrete input signals can be transmitted error free. Influences of nonideal transmission channels or components were not considered.
Author (ESA)

N82-12319# Philips Zentrallaboratorium G.m.b.H., Hamburg (West Germany). Forschungsabteilung Technische Systeme.
AUTOMATIC RECOGNITION OF COOPERATIVE SPEAKERS Final Report
Ruediger Frehse, Rudolf Geppert, Rainer Gierloff, Michael H. Kuhn, Hermann Ney, Herbert Piotrowski, and Horst Tomaschewski Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 168 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-DV-80-009; ISSN-0170-8011) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 33,30

Various statistical features were extracted in real time from speech samples from speakers and then processed for automatic identification and verification. On the basis of the most reliable feature, the long term averaged spectrum, two prototypes were set up: a minicomputer system with speaker reference on magnetic card for banking applications, and a microprocessor device for automatic entry control purposes. The error rates for false rejection and false acceptance are on the order of 2%. Author (ESA)

N82-12320# Fernmeldetechnisches Zentralamt, Darmstadt (West Germany). Forschungsinst.
REDUCTION OF MULTIPATH FADING IN RADIO RELAY LINKS BASED ON THE PRINCIPLE OF OPTIMUM BEAM SCAN [VERRINGERUNG VON MEHRWEGESCHWUND IN GERICHTETEN FUNKVERBINDUNGEN NACH DEM PRINZIP DER OPTIMALEN STRAHLAUSRICHTUNG]
Karl-Peter Dombek Jan. 1981 38 p refs In GERMAN; ENGLISH summary
(Rept-455-TBr-71) Avail: NTIS HC A03/MF A01

A reflector antenna with limited electronic beam scan which allowed multi path fading to be reduced and requiring neither additional frequencies nor space for an extra antenna was constructed. Multipath fading and the diversity methods currently employed for its reduction are introduced. The antifading principle is described: in the case of interference, the antenna main beam is scanned in such a way that the angles of incidence of the direct and multipath signals are within the steep slope of the main beam. The required scanning range and the principle of signal processing are explained. Simulation of the field at the receiving antenna under fading conditions allows operation to be investigated experimentally. The results fully confirm theoretical predictions. Author (ESA)

N82-12321# Kiruna Geophysical Inst. (Sweden).
INCOHERENT SCATTER ION LINE FITTING PACKAGE
J. Murdin Jun. 1981 28 p refs
(KGI-TR-032) Avail: NTIS HC A03/MF A01

A program package for the analysis of incoherent scatter radar autocorrelation factor (ACF) measurements of ion lines is described. Input data is a suitably normalized ACF, noise corrected and corrected for the non-flat receiver frequency response (if necessary) and normalized by removal of the radar constants. Radar parameters and pulse are then delineated. Measured ACF is compared in the least squares sense to a theoretical ACF. Fit weights must be stated. The required plasma parameters that are to be adjusted in the least squares fit are selected and their initial values are chosen. The least squares fit is then implemented. Examples are worked through. Author (ESA)

N82-12322# Politecnico di Torino (Italy). Inst. di Elettronica e Telecommunicazioni.
SIMULATION OF A TELECOMMUNICATION DISTRESS SYSTEM Final Report
Ajmone M. Marsan, S. Benedetto, E. Biglieri, V. Castellani, L. L. Presti, and M. Pent Paris ESA Jul. 1980 160 p refs
(Contract ESTEC-3699/78)
(ESA-CR(P)-1449) Avail: NTIS HC A08/MF A01

A user oriented simulation package, TOPSIM (Torino politecnico simulator) designed for the study of communication systems is described. It allows the user to implement all the most typical system blocks through very simple and concise programming statements. It was used to analyze the distress system in the MARECS satellite. The simulation philosophy and the main building blocks of the package are outlined. A simplified approach to the theoretical analysis of the distress system is presented which shows the type of results expected. The usefulness of a simulation approach for a deeper insight into different parts of the system, is emphasized. A simulation example is given. Author (ESA)

N82-12323# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Systemes et Communications.
PHONEMATIC RECOGNITION BY LINEAR PREDICTION: EXPERIMENT [RECONNAISSANCE PHONEMIQUE PAR PREDICTION LINEAIRE. L'EXPERIENCE DE L'ECOLE NATIONALE SUPERIEURE DES TELECOMMUNICATIONS (E.N.S.T.)]
Laurent Miclet, Yves Grenier, and Joel Leroux 1981 27 p refs In FRENCH; ENGLISH summary Presented at 12th Journees d'Etude sur la Parole, Montreal, May 1981
(ENST-C-81001) Avail: NTIS HC A03/MF A01

The recognition of speech signals analyzed by linear prediction is introduced. The principle of the channel adapted vocoder (CAV) is outlined. The learning of each channel model and adaptation to the speaker are discussed. A method stemming from the canonical analysis of correlations is given. This allows, starting with the CAV of one speaker, the calculation of that of another. The projection function is learned from a series of key words pronounced by both speakers. The reconstruction of phonemes can be explained by recognition factors arising from the vocoder. Automata associated with the channels are used for local smoothing and series of segments are treated in order to produce a phonemic lattice. Author (ESA)

N82-12324# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. d'Informatique.
PERFORMANCE EVALUATION OF THE VIRTUAL SUBCHANNEL CONCEPT FOR SATELLITE LINK COMMUNICATION
Guy Pujolle and Otto Spaniol (Frankfurt Univ.) Jul. 1981 31 p refs
(ENST-D-81002) Avail: NTIS HC A03/MF A01

The virtual subchannel concept which splits the satellite link into several components is analyzed and evaluated. These subchannels are assigned for transmission in cyclic order and are controlled independently of each other by the HDLC procedure. The efficiency evaluated in terms of error probability, system saturation, number of subchannels, frame length, etc., is lower than its theoretical maximum because of: (a) blocking of subchannels (due to an increased number of errors a subchannel becomes unable to accept new frames in its sender buffers), and (b) mutual blocking of subchannels; the flow control rule of the concept that any subchannel is blocked from accepting new frames if one channel is blocked by reason (a). Formulas for blocking probabilities are derived. The influence due to blocking can be neglected and efficiency tends to its theoretical maximum if a sufficient number of buffers are available. Author (ESA)

N82-12325# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 4: Microwaves.
THE 94GHz PROPAGATION FACILITY AT THE YPENBURG AIRFIELD AND THE FIRST EXPERIMENTAL RESULTS
W. P. M. N. Keizer Sep. 1979 34 p refs
(PHL-1979-34; TDCK-73420) Avail: NTIS HC A03/MF A01

Attenuation at 94 GHz caused by rain was investigated for vertical polarization on a 935 m link, with four rapid response rain gages and a distrometer. The measured and the theoretically predicted rain attenuation derived from the actually measured raindrop size distribution are compared. The decrease of antenna gain at 94 GHz due to water on a 1.2 m Cassegrain antenna is discussed. It is demonstrated that for accurate propagation measurements it is necessary to equip the antennas with protective shelters. Author (ESA)

N82-12326# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 4: Microwaves.
THE EFFECT OF PHASE ERRORS ON THE PERFORMANCE OF THE CAISSA ANTENNA
H. J. vanSchaik Oct. 1979 56 p
(PHL-1979-45; TDCK-73424) Avail: NTIS HC A04/MF A01

The effect of random and systematic phase errors on the performance of the CAISSA antenna, was investigated. To calculate the effect of phase deviation on performance, a random phase error distribution was adjusted to all antenna elements. It is indicated that degradation of antenna performance depends on the bounds of the phase error distribution and the position of the elements with the largest phase errors. As the total number of radiating elements increases, the influence of random phase errors decreases. Position of elements which fail is more important than quantity. It is shown that as the main lobe gets broader, gain decreases. Author (ESA)

N82-12327# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 1: Physics.
DETECTION OF LASER RADIATION BY MEANS OF FORWARD SCATTERING IN THE ATMOSPHERE
J. A. Boden Nov. 1979 120 p refs
(PHL-1979-51; TDCK-73428) Avail: NTIS HC A06/MF A01

Scattering measurements of atmospheric aerosol size distributions for angles from 1 to 10 deg are reported. An optical tunnel was used to study forward and angular scattering. No correlation is found between variations of scatter signal and number of particles but angular scattering curves are similar to aerosol size distributions outside the laboratory. Detection distance was measured using source distance and detector field of view as parameters. For distant sources the detection limit is determined by the extinction coefficient and angular scattering function. Fraunhofer angular diffraction functions from the same aerosol size, but for different wavelenghts, are connected by the relevant Junge exponent. Author (ESA)

N82-12328# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 4: Microwaves.
ESTIMATION OF THE CUMULATIVE ATTENUATION DISTRIBUTION DUE TO RAIN ON A PATH EXCEEDING 1km, GIVEN THE CUMLATIVE DISTRIBUTION DUE TO RAIN ON A PATH OF 1km
J. H. Buijs Mar. 1980 25 p refs
(PHL-1980-13; TDCK-73642) Avail: NTIS HC A02/MF A01

Methods of forecasting the cumulative attenuation distribution at 94 GHz on various path lengths, using the value obtained for a 1 km path, are discussed. Where the probability of exceeding a specific attenuation is high, a path formed by a series of n paths, each of 1 km, is likely to suffer too. Where probability is low, the probability of a high attenuation value on a 1 km path, e.g., 15 dB, is assumed to be independent of the probability of the same attenuation on the following 1 km path in the series. The probability of exceeding a high attenuation value over the total path is determined by adding the values for that specific attenuation of all n 1 km paths. Differences for values around 15 dB are shown. Knowledge of the structure of rain showers should improve accuracy and investigation of a 5 km path is recommended. Author (ESA)

N82-12329# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 6: Signal Processing.
TRACKING PROCEDURES FOR FUCAS
A. M. Navarro Dec. 1980 44 p refs
(Contract A74/K/077)
(PHL-1980-45; TDCK-75027) Avail: NTIS HC A03/MF A01

Tracking procedures and the observation interval adaption algorithm of FUCAS, a phased array radar system, are described. The antenna pattern has an electronically steerable pencil beam. The antenna movements are not inertia limited. The FUCAS performs high quality tracking for more than one target, or combines search and track. Energy allocation is done seperately for several tasks, range accuracy of > 3 m. The observation interval adaption algorithm keeps tracking errors constant. A change in acceleration interval is compensated by a change in the observation interval. Author (ESA)

N82-12330# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 6: Signal Processing.
EVALUATION OF THE PERFORMANCE OF A SIMPLIFIED MTI CANCELLER SELECTION RULE FOR FUCAS
G. W. M. vanMierlo Jul. 1981 46 p refs
(PHL-1981-24; TDCK-74960) Avail: NTIS HC A03/MF A01

A rule for the selection of a particular canceller from a set forming part of the FUCAS phased array radar system, is described. The rule takes clutter and noise suppression into account instead of signal to interference ratio (SIR) at the filter outputs. For a five-pulse canceller bank, performance loss when the wrong canceller is chosen is at most, 6 db, except where clutter center velocity is midway between the two canceller stopbands. Here loss may increase to 9 db. A bank of three-pulse cancellers shows maximum performance loss of 4 db, outside the region of target suppression in the stopbands. A strong correlation is shown between variation of the canceller transmission at the target velocity, and the variation in performance loss and probability of incorrect decision. Author (ESA)

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-12331 Rutgers - The State Univ., New Brunswick, N. J.
HYDROGEN AND HYDROCARBON ABSORPTION AND DESORPTION IN SENSORS WITH TRANSITION METAL GATES ON MOS CAPACITORS Ph.D. Thesis
Tommy Leroy Poteat 1981 180 p
Avail: Univ. Microfilms Order No. 8122114

A change in the work function of transition metal oxides upon absorption or desorption of hydrogen and hydrocarbon gases was utilized to fabricate and characterize sensitive gaseous detectors. These sensors were made in the MNOS device structure with transition metal gates. The substrate semiconductor used in these experiments was silicon, dielectric layers were SiOs and Si3N4. Several types of transition metal gates were obtained by evaporation and sputtering of Pd, Pt and Ni, principal method of gaseous detection was the shift in the C-V curves upon absorption and desorption. A special tracking circuit was designed to measure the change in voltage at constant capacitance during hydrogenation. Dissert. Abstr.

N82-12332 California Univ., Los Angeles.
USE OF ON-CHIP REDUNDANCY FOR FAULT-TOLERANT VERY LARGE SCALE INTEGRATED CIRCUIT DESIGN Ph.D. Thesis
Tulin Erdim Mangir 1981 148 p
Avail: Univ. Microfilms Order No. 8121006

Use of redundancy to provide fault tolerance to manufacturing defects is studied through the use of a model for regularly designed chips. The sources of failures for MOS VLSI circuits are considered, improvement of yield with redundancy is modelled, and the techniques of bypassing defective areas on a logic chip which is designed regularly are reviewed. The emphasis is on identifying and classifying sources of failures during various stages of the lifetime of a VLSI chip, and on the development of a yield model for chips which are designed with extra (redundant) modules. Effects of various factors on yield improvement are studied. Here the emphasis has been on the effect of interconnection requirements. It is shown that, yield improvements of 100% or more over the nonredundant yields can be expected when redundancy is provided only for the logic areas. It is also observed that the improvement saturates above a certain amount (-10%) of redundancy. This indicates that the chips can be designed around an optimal amount of additional hardware on the chip to improve the yields. Dissert. Abstr.

N82-12333 Arizona Univ., Tucson.
MODULAR IMPLEMENTATION OF A DIGITAL HARDWARE DESIGN AUTOMATION SYSTEM Ph.D. Thesis
Manzer Masud 1981 182 p
Avail: Univ. Microfilms Order No. 8121928

An automation system based on AHPL (A Hardware Programming Language) was developed. The project may be divided into three distinct phases: (1) Upgrading of AHPL to make it more universally applicable; (2) Implementation of a compiler for the language; and (3) illustration of how the compiler may be used to support several phases of design activities. Several new features were added to AHPL. These include: application-dependent parameters, mutliple clocks, asynchronous results, functional registers and primitive functions. The new language, called Universal AHPL, has been defined rigorously. The compiler design is modular. The parsing is done by an automatic parser generated from the SLR(1)BNF grammar of the language. The compiler produces two data bases from the AHPL description of a circuit. The first one is a tabular representation of the circuit, and the second one is a detailed interconnection linked list. The two data bases provide a means to interface the compiler to application-dependent CAD systems. Dissert. Abstr.

N82-12334 State Univ. of New York at Stony Brook.
ON FINITE WORD LENGTH EFFECTS OF SECOND ORDER RECURSIVE DIGITAL FILTERS Ph.D. Thesis
Pei-Hwa Lo 1981 177 p
Avail: Univ. Microfilms Order No. 8120709

Factors which improve digital performance include filter structure, usage of different types of adders and calculation of scale factor. Based on the state space eigenvalue sensitivity function, a low sensitivity realization of a second order IIR filter was determined. The low sensitivity, modularity and mutual compatibility of the implemented output coefficients make this structure a good candidate for filter realization. A closed form upper bound of the filter state was found and used to determine the proper scale factor. For the uniform grid structure, it is shown that if the poles of the filter lie within a specific region, the proposed bound is better than the existing bounds. An algorithm for computing the signal to round off noise power ratio for all minimum realization configurations, is presented. Large magnitude, self-sustained, zero input limit cycle oscillations exist in a two's complement filter of canonical form. The locations of poles and the initial conditions of the filter affect the oscillation. A number of interesting properties concerning this phenomenon are investigated. Dissert. Abstr.

N82-12335 Cornell Univ., Ithaca, N. Y.

COMPUTER-AIDED SYNTHESIS AND DESIGN OF MONOLITHIC MICROWAVE INTEGRATED CIRCUITS (MMICS) Ph.D. Thesis

Louis Cho-Tai Liu 1981 199 p

Avail: Univ. Microfilms Order No. 8119462

A systematic computer aided synthesis technique of lumped lossy matching network, and a synthesis procedure of mixed lumped distributed matching network with arbitrary gain taper are presented. The exact synthesis procedure for lumped lossy matching networks presented can take arbitrary finite quality factor Q for each lumped element in the matching network. The gain bandwidth limitations of some useful lumped lossy matching networks are discussed and are summarized in a set of gain band width constraint plots. Design examples of both low noise and high power microwave broadband amplifiers using state of the art GaAs metalized semiconductor field effect transistor are presented to illustrate the synthesis and design procedure. The mixed lumped distributed matching networks are applicable monolitic microwave integrated circuits. Dissert. Abstr.

N82-12336 Colorado Univ. at Boulder.

A DESIGN PROCEDURE FOR TIME-VARYING DIGITAL FILTERS WITH HIGHLY QUANTIZED COEFFICIENTS Ph.D. Thesis

Frederick Lee Kitson 1981 165 p

Avail: Univ. Microfilms Order No. 8122298

Specific methods are given for both non-recursive and recursive structures. In both cases, the filter coefficients are periodic with period N and restricted to values of -1, 0 or + 1. Simple gain factors are also included in the recursive filters to ensure stability. It is shown that the filtering characteristics of these designs are nearly identical to those of time-invariant filters which employ 60 bit coefficient precision. The limitations of periodic time-varying finite impulse response filters with coefficients -1, 0 and + 1 were investigated. These filters were reformulated as N parallel time-invariant filters with commutating input switching. It was demonstrated that the time-varying filter design can sometimes lead to time-invariant structures having similar quantization. Dissert. Abstr.

N82-12337 Cornell Univ., Ithaca, N. Y.

NONUNIFORMLY DOPED GALLIUM ARSENIDE MICROWAVE POWER MESFETS Ph.D. Thesis

Seno Jadaprawira 1981 137 p

Avail: Univ. Microfilms Order No. 8119467

Nonuniform doping profile GaAS microwave power metallized semiconductor field effect transistors (MESFET) structures were investigated to explore the effects of various doping profiles on device charcteristics. Using molecular beam epitaxial materials, microwave power MESFETs with exponential, impulse, delta function as well as uniform doping profiles were fabricated. Device characteristics were examined at DC as well as at microwave frequencies. The nonuniformly doped MESFETs were found to have inferior field distribution which lead to smaller drain current capability. The drain-source burnout voltage was not affected, however, provided the full channel current was properly chosen. Burnout voltage of 45 volts was routinely obtained independent of the doping profile. graded doping profiles were found to be most effective in improving a MESFET's linearlity when the operating power level was well below the saturated power of the device. At large signal application, the advantage was significantly smaller. Hence the graded doping profile FETs are most useful for very linear operation but less so for the applications where larger power is more important than the linearity. Dissert. Abstr.

N82-12338 Iowa State Univ. of Science and Technology, Ames.

APPLICATION OF KALMAN FILTERING IN COMPUTER RELAYING OF POWER SYSTEMS Ph.D. Thesis

Adly Ageeb Girgis 1981 214 p

Avail: Univ. Microfilms Order No. 8122515

Kalman filter models for the optimal estimation of the post-fault currents and voltages for computer relaying purposes of power systems are presented. As a prerequisite for the Kalman filtering implementation, the random description of the fault-induced noise signals was quantitatively studied. Empirical formulas that describe the random nature of the noise based on the probability of fault location and the frequency of occurrence of the difference types of faults are given. These empirical formulas offer the possibility of developing other techniques in computer relaying of power systems. Sensitivity of the Kalman filers to incorrect model parameters was studied through extensive simulation. A Kalman-filtering-based digital distance relay was designed to detect, classify, and locate faults in a high voltage transmission line in the shortest period of time. Comparison of the developed technique with four other algorithms demonstrated that the Kalman-filtering-based algorithm is superior to other techniques in the rate of convergence to the exact values, accuracy, and computer burden. Thus the Kalman filtering approach appears to be especially well-suited to the power system protection problem. Dissert. Abstr.

N82-12339 California Univ., Los Angeles.

SMALL-CHANNEL EFFECTS IN CHARGE-COUPLED DEVICES Ph.D. Thesis

John Yuantai Chen 1981 227 p

Avail: Univ. Microfilms Order No. 8120932

A two dimensional empty-well model is developed to calculate the potential barrier height for various interelectrode gap lengths in an overlapping CCD structure. The barrier height limits the charge handling capacity in short channel CCDs. A simple measurement technique is developed to obtain experimental data using submicrometer test devices, and the data are compared with the model. Several important process parameters relating to the barrier lowering are investigated for design consideration. Both short-channel and narrow-channel effects are investigated. Theoretical and experimental work are carried out to understand important CCD characteristics such as charge-handling capacity, charge transfer efficiency, and dark current in reduced geometry devices. Dissert. Abstr.

N82-12340 Illinois Univ. at Chicago Circle, Chicago.

THE STABILITY AND SOLDERING VOID EFFECT OF LARGE SUPERCONDUCTOR Ph.D. Thesis

Yuchi Huang 1981 235 p

Avail: Univ. Microfilms Order No. 8120567

A test facility was designed and set up for the investigation of superconductor performance and superconducting magnet safety under both steady-state and transient conditions. The conductor for the superconducting magnetohydrodynamic dipole magnet for the Coal-Fired-Flow-Facility at the University of Tennessee Space Institute was tested. The result showed that the superconductor performance test facility was properly set up and highly serviceable. The effect of the soft soldering void between the superconducting cable and the copper stabilizer of the MHD superconductor was investigated experimentally and theoretically. In the theoretical simulation mode, an equation for critical void length was analytically obtained. The electrical equation and heat balance equations were also solved by using the backward difference method. Both experimental test results and numerical analysis results showed that the recovery characteristics were strongly dependent on the void length. Dissert. Abstr.

N82-12341 Rensselaer Polytechnic Inst., Troy, N. Y.

IMPLEMENTATION OF SAW CHIRP TRANSFORM AND SAW CONVOLVERS IN SPREAD SPECTRUM COMMUNICATION SYSTEMS Ph.D. Thesis

Dan Abraham Shklarsky 1981 161 p

Avail: Univ. Microfilms Order No. 8121163

Surface Acoustic Waves (SAW) signal processing devices are attractive for use in wide-band communication systems, specifically in large TB spread spectrum systems. Three ideas in which SAW elements are implemented to improve the performance of spread spectrum communication system are discussed: an adaptive narrow-band interference suppressor, the introduction the Hilbert transformed carrier sequence to double that data rate of a given spread spectrum system, and a time integrating correlation (TIC) which is insensitive to Doppler shifts of the carrier frequency. In the narrowband suppressor, real time SAW chirp Fourier transformers are the main elements of the system in which the Fourier domain signals are going through an adaptive notch filtering process which identifies, locates and suppresses possible narrow-band interference sources. The result is a system which can increase the effective compression gain of a given spread spectrum system whenever narrow-band interference sources exist. Dissert. Abstr.

N82-12342 Rensselaer Polytechnic Inst., Troy, N. Y.
THE EFFECT OF OPTICALLY ENHANCED LEAKAGE CURRENT ON S-BAND TRAPATT DIODE OSCILLATORS Ph.D. Thesis
April Marie Schweighart 1981 239 p
Avail: Univ. Microfilms Order No. 8121162

The effects on output power and frequency of oscillation are presented and compared with a theoretical, closed form model. In general, the power decreases gradually and the frequency increases rapidly with photocurrent at low levels, while the power decreases rapidly while teh frequency levels off a higher levels of photocurrent. These results, however, are found to be very dependent on the tuning of the TRAPATT device. The design and fabrication of unique top ring contact N(+)PP(+) silicon devices was made to permit optical excitation. The devices were mounted junction side up with the top metal contact having an optical window to allow the light to shine directly on the silicon surface, and thus generate photocurrent. The two-dimensonal effects inherent in this structure were found to be negligible from passive RF tests. Dissert. Abstr.

N82-12343 Houston Univ., Tex5.
ELECTROSTATIC LENSES OF THE ANTISYMMETRIC QUADRUPOLE AND SYMMETRIC OCTUPOLE QUADRUPLET Ph.D. Thesis
Leon Fa-Lian Chang 1981 170 p
Avail: Univ. Microfilms Order No. 8120903

Electrostatic quadrupole octupole lens systems are studied to focus a cone of electron beams emanating from a point source. The half angle of emission is 0.01 radian and the accelerating voltage is 10 KV. These are desirable parameters for e beam lithography. An antisymmetric quadruplet simulates a round lens which gives a regular image with the capability of aberration correction. The analytical solution for trajectories is obtained by assuming an ideal hyperbolic field and by neglecting the second-order effects such as the fringe-field, local voltage, and relativistic effect. An initial guess of the sign parameters is provided. For the real case design, a successive over relaxation technique is used to solve Laplace's equation for potential distribution in three dimensional cylindrical coordinates. The boundary values are imposed around the primary region which is the first 45 deg for a quadrupole and the first 22.5 deg for an octupole. Dissert. Abstr.

N82-12344*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
S-BAND SHALLOW BULK ACOUSTIC WAVE (SBAW) MICROWAVE SOURCE Final Report
Jul. 1981 44 p refs
(Contract NAS5-26002)
(NASA-CR-166744) Avail: NTIS HC A03/MF A01 CSCL 09C

Techniques necessary to fabricate a high performance S-band microwave single source using state-of-the-art shallow bulk acoustic wave (SBAW) were explored. The bulk wave structures of the AlN/Al 2O3 were investigated for both the R plane and basal plane of sapphire. A 1.072 GHz SBAW delay line and oscillators were developed. A method of selecting and setting oscillator output frequency by selecting substrate orientation angle was also established. B.W.

N82-12345*# National Aeronautics and Space Administration. Pasadena Office, Calif.
MULTIPLE-BEAM, HIGH-POWER, PRECISION POINTING ANTENNA SYSTEM Patent Application
Kenneth E. Woo (JPL, California Inst. of Tech., Pasadena) and Paul W. Cramer, Jr., inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 30 Oct. 1981 16 p
(Contract NAS7-100)
(NASA-Case-NPO-15406-1; US-Patent-Appl-SN-315585) Avail: NTIS HC A02/MF A01 CSCL 09C

An antenna with a plurality of beams that can be electronically steered simultaneously in unison is described. The beams may be steered independently. A relatively small phased array of antenna elements feeding a near field dual reflector system is used to magnify the aperture of the feed array to that of the main reflector thereby providing high gain. The main reflector and the subreflector are shaped reflectors which may be confocal paraboloids having nominally the some focal length to diameter ratio, although the subreflector may be oversized. The array feed is placed so that the subreflector is in the near field of feed. S.L.

N82-12346*# National Aeronautics and Space Administration. Pasadena Office, Calif.
PHASE SENSITIVE GUIDANCE SENSOR FOR WIRE-FOLLOWING VEHICLES Patent Application
George R. Hansen (JPL, California Inst. of Technology, Pasadena) Filed 30 Oct. 1981 15 p
(Contract NAS7-100)
(NASA-Case-NPO-15341-1; US-Patent-Appl-SN-315583) Avail: NTIS HC A02/MF A01 CSCL 09C

A guidance sensor for a wire-following vehicle which is phase sensitive is described. The sensor includes an array of coils positioned to sense the vertical component of a magnetic field produced by the AC current through the guidance wire. The outputs of the coils are fed to associated flip flops. Flip flops associated with coils, through which flux passes in one direction, e.g., up, are driven to one state, e.g., true, and flip flops associated with coils through which flux passes in the opposite direction, e.g., down, are driven to a false state. The control signal to guide the vehicle to be over the wire is a function of the number of flip flops in the true state. Circuitry is included to prevent flip flops from assuming a wrong state due to noise. NASA

N82-12347*# Duke Univ., Durham, N. C. Dept. of Electrical Engineering.
HIGH-FREQUENCY HIGH-VOLTAGE HIGH-POWER DC-TO-DC CONVERTERS
Thomas G. Wilson, Harry A. Owen, Jr., and Paul M. Wilson 1981 11 p refs Presented at the U.S-Japan Sci. Seminar on Analysis and Design in Power Electron., Kobe, Japan, 25-28 Nov. 1981
(Grant NsG-3157)
Avail: NTIS HC A02/MF A01 CSCL 09C

The current and voltage waveshapes associated with the power transitor and the power diode in an example current-or-voltage step-up (buck-boost) converter were analyzed to highlight the problems and possible tradeoffs involved in the design of high voltage high power converters operating at switching frequencies in the range of 100 Khz. Although the fast switching speeds of currently available power diodes and transistors permit converter operation at high switching frequencies, the resulting time rates of changes of current coupled with parasitic inductances in series with the semiconductor switches, produce large repetitive voltage transients across the semiconductor switches, potentially far in excess of the device voltage ratings. The need is established for semiconductor switch protection circuitry to control the peak voltages appearing across the semiconductor swtiches, as well as to provide the waveshaping action require for a given semiconductor device. The possible tradeoffs, as well as the factors affecting the tradeoffs that must be considered in order to maximize the efficiency of the converters are enumerated. A.R.H.

N82-12348# Technische Universitaet, Brunswick (West Germany).
X-RAY EMISSION OF HIGH VOLTAGE VACUUM DEVICES Ph.D. Thesis
D. Dohnal 1981 175 p refs In GERMAN; ENGLISH summary
Avail: NTIS HC A08/MF A01

The X-ray emission of vacuum arrangements, especially of vacuum circuit breakers, is reported at voltages up to 140 kV. The theoretical relationship between X-ray generation and the measurement of dose quantities is discussed. Various processes of electrode conditioning were analyzed. In the predischarge phase at d.c. voltage the relationship between X-rays and electrical values was studied, considering the influence of a large number of parameters, such as electrode material, electrode curvature and surface roughness. The effects at a.c. voltage are specified and compared with the results obtained at d.c. voltage. The experimental results offer a large range of applications for X-rays as a means of diagnosis. Some of these possibilities are discussed. T.M.

N82-12349*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A SIMPLIFIED POWER FACTOR CONTROLLER WITH INCREASED ENERGY SAVING CIRCUIT Patent Application
Frank J. Nola, inventor (to NASA) Filed 28 Aug. 1981 12 p
(NASA-Case-MFS-25323-1; US-Patent-Appl-SN-297524) Avail: NTIS HC A02/MF A01 CSCL 09A

A device which controls the power input to an induction motor by controlling the power of the motor is disclosed. Two features of the device increase its sensitivity under conditions where the motor is unloaded in order that full control operation is possible with the device adjusted to operate with the power input just sufficient to sustain motor operation. A feedback circuit comprising of a resistor, which feeds back to a summing junction from a signal point at which a triac control signal appears. The requirement that motor current be directly sampled in the process of determining the power factor of the power input to a motor is eliminated. S.L.

N82-12350# Federal Aviation Administration, Atlantic City, N.J.
EVALUATION OF CATHODE-RAY TUBE PROTECTION FOR THE ELECTRONIC TABULAR DISPLAY SUBSYSTEM (ETABS) ENGINEERING MODEL Final Report, Jan. 1980 - Jan. 1981
Anthony R. Wilson Sep. 1981 17 p refs
(AD-A105199; FAA-CT-81-66; FAA-RD-81-26) Avail: NTIS HC A02/MF A01 CSCL 09/1

This report describes the safety evaluation of the 25-inch (diagonal) rectangular cathode-ray tube (CRT) that is used in the engineering model of the Electronic Tabular Display Subsystem (ETABS). An evaluation of ETABS will be performed at the Federal Aviation Administration (FAA) Technical Center for possible application in FAA Air Route Traffic Control Centers (ARTCC). The safety evaluation included standard industry pressure testing and special implosion testing on 12 CRT samples. Eleven of the twelve CRT samples satisfactorily met the safety requirements for both the pressure and implosion testing. One CRT cracked when subjected to 45 pounds per square inch (psi) of air pressure; however, the CRT did not implode. The 25-inch rectangular CRT will therefore provide a high degree of safety for use in each of the two tabular displays of the ETABS engineering model. Author (GRA)

N82-12351# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
A SYSTOLIC 2-D CONVOLUTION CHIP Interim Report
H. T. Kung and S. W. Song Mar. 1981 13 p refs
(Contract N00014-76-C-0370; N00014-80-C-0236; F33615-78-C-1551; Grant NSF MCS-78-23676)
(AD-A104872; CMU-CS-81-110) Avail: NTIS HC A02/MF A01 CSCL 09/5

This paper describes a chip for performing the 2-D (two-dimensional) convolution in signal and image processing. The chip, based on a systolic design, consists of essentially only one type of simple cells, which are mesh-interconnected in a regular and modular way, and achieves high performance through extensive concurrent and pipelined use of these cells. Denoting by u the cycle time of the basic cell, the chip allows convolving a kxk window with an nxn image in O(sq m)(u/k) time, using a total of cu k basic cells. The total number of cells is optimal in the sense that the usual sequential algorithm takes O(sq m)(sq k) (u) time. Furthermore, because of the modularity of the design, the number of cells used by the chip can be easily adjusted to achieve any desirable balance between I/O and computation speeds. Author (GRA)

N82-12352# Cornell Univ., Ithaca, N. Y. School of Electrical Engineering.
SILICON-ON-SAPPHIRE MEDIUM POWER MESFET Interim Report
Feb. 1981 10 p
(Contract N00014-80-C-0862)
(AD-A105378) Avail: NTIS HC A02/MF A01 CSCL 09/1

The key aspect in improving the performance of SOS MESFETs is to reduce the parasitic source resistance. While the extrinsic g sub m of GaAs MESFETs is now close to that of the intrinsic device (i.e., with R sub S = R sub D = 0), SOS MESFETs still have significant progress to be made in the area of source resistance reduction. The source resistance can be most effectively reduced by spacing the gate closer to the n(+) source implant. The smallest spacing is then determined by the gate-to-source breakdown voltage. GRA

N82-12353# Naval Research Lab., Washington, D. C.
ANALYSIS OF COAXIAL EMI FEEDTHROUGH FILTERS CONTAINING FERRITE ELEMENTS Interim Report
G. H. Stauss, J. J. Krebs, and W. G. Maisch 16 Oct. 1981 33 p
(XF43453401)
(AD-A105248; NRL-MR-4651) Avail: NTIS HC A03/MF A01 CSCL 09/5

An analysis of coaxial EMI (Electromagnetic Interference) feedthrough filters containing high permeability ferrite and high permittivity dielectric elements is given. The frequency dependent complex permeability and permittivity of useful materials are modeled, and the effect of these parameters as well as load and source impedance, filter dimensions and number of filter elements on the insertion loss behavior are investigated. Filter problems are treated as are suggestions for improved performance. GRA

N82-12354# University of Southern California, Los Angeles. Dept. of Electrical Engineering.
FEASIBILITY STUDY OF DEVICE SYNTHESIS OF NONLINEAR FILTERS Final Report, 1 Mar. 1976 - 31 May 1981
R. S. Bucy and W. H. Steier May 1981 19 p refs
(Contract F44620-76-C-0085; AF Proj. 2305)
(AD-A105417; AFOSR-81-0665TR) Avail: NTIS HC A02/MF A01 CSCL 09/5

Efforts to date have shown that with careful tailoring to the problem at hand and by taking maximum advantage of recent advances in parallel/pipeline array processor architecture, the nonlinear filter is a practical estimation technique. The computational effort is signifcantly greater than for conventional linear or linearized (e.g., extended Kalman filtering) techniques, but the performance advantage may be significant where the observation is a significantly nonlinear function of the estimated states, and/or where the observation noise (or plant noise) is significantly non-Gaussian. The research has concentrated on the phase estimation problem which has proven to be an ideal test problem. However, with the techniques that have now been developed and proven, it is appropriate to consider a larger class of problems. Potential applications should meet the following criteria: (1) Performance advantages are of significant economic value, (2) Observations are essentially nonlinear functions of the states that have to be estimated where the linear filter leads to unacceptable performance, (3) Measurement (or state) noise is highly non-Gaussian. Excellent example meeting all the above criteria would be the ELF communications problem. Other examples occur in deep space communication and in detection and tracking problems in general. Author (GRA)

N82-12355# Advanced Research and Applications Corp., Sunnyvale, Calif.
SILICON QUALITY: A CONSIDERATION FOR VHSI CIRCUIT DEVELOPMENT Final Report, 15 Dec. 1979 - 15 Sep. 1981
T. J. Magee, C. Leung, R. Ormond, and L. J. Palkuti 28 Sep. 1981 89 p refs
(Contract N00014-80-C-0071)
(AD-A105198; ARACOR-FR-81-53) Avail: NTIS HC A05/MF A01 CSCL 13/8

A detailed evaluation of the quality of silicon wafers from representative domestic and foreign vendors was made. To avoid pre-selection of wafers by vendors, material was obtained directly from device manufacturers and therefore represents a statistical sampling of Si material as currently being used in production-line processing. The results of this study have shown extreme batch-to-batch variability, lack of control in material quality and, in many cases, unacceptable levels of defects in silicon wafers used in manufacturing. The development of front-and-back-surface

laser-gettering procedures for improving quality is reported and newly developed techniques for stabilizing back-surface damage, using the enhanced diffusion of oxygen, are discussed.
Author (GRA)

N82-12356# Eaton Corp., Melville, N.Y.
MICROWAVE TRANSVERSAL EQUALIZER. OPEN LOOP ADAPTIVE COMPUTER CONTROL TECHNIQUES Final Technical Report, 7 Jan. 1980 - 27 Feb. 1981
A. Leber, G. Kanischak, D. Wang, M. Daigle, and R. Indin Griffiss AFB, New York RADC Jul. 1981 90 p
(Contract F30602-80-C-0042; AF Proj. 4506)
(AD-A105005; RADC-TR-81-197) Avail: NTIS HC A05/MF A01 CSCL 09/5

Adaptive equalization techniques, as well as suitable algorithms and computer programming procedures, have been developed to provide open loop control of the Microwave Transversal Equalizer. The resultant computer analysis will determine the necessary MTE control adjustments to minimize time sidelobe distortion.
Author (GRA)

N82-12357# Fulmer Research Inst. Ltd., Stoke Poges (England).
FIELD EMISSION COLD CATHODE DEVICES BASED ON EUTECTIC SYSTEMS Final Technical Report, 1 May 1977 - 31 Dec. 1979
Duncan Stewart, Vivian G. Rivlin, and Paul D. Wilson Jul. 1981 117 p refs
(AD-A104795; RADC-TR-81-170) Avail: NTIS HC A06/MF A01 CSCL 09/1

A survey has been made of the performance as field emission cold cathodes of selected refractory materials fabricated as needle arrays by unidirectional solidification. Cathodes based upon refractory metal carbides have been fabricated and tested. Performance data has been obtained using niobium, tantalum and vanadium carbides with various cathode geometries. Life times of over 1,000 hours and current densities of up to 1 A/sq. cm. have been obtained. Preliminary experiments indicated the LaB6 can be formed into platelets by conventional cooling in an aluminum matrix and that directional solidification should produce suitable rod-like morphology.
Author (GRA)

N82-12358# Hughes Research Labs., Malibu, Calif.
LOW-LOSS FIBER WAVEGUIDES Annual Technical Report, 1 Aug. 1980 - 30 Jun. 1981
J. A. Harrington Sep. 1981 56 p refs
(Contract N00014-79-C-0691)
(AD-A104943) Avail: NTIS HC A04/MF A01 CSCL 09/1

This annual report summarizes our second year of effort to fabricate low-loss fiber waveguides with potential loss near 10 to the minus 3 dB/km. To develop such low-loss waveguides, we have used alkali and thallium halides to form poly- and single-crystal fibers. To date our best polycrystalline KRS-5 (T1BrI) fiber remains 5 orders of magnitude above the goal of 10 to the minus 3 dB/km.
Author (GRA)

N82-12359# Rockwell International Corp., Thousand Oaks, Calif. Electronics Research Center.
PIEZOELECTRIC ZnS FILM ON SILICON Final Report, 1 Nov. 1979 - 31 Oct. 1980
Edward J. Staples Jun. 1981 26 p refs
(Contract F49620-79-C-0022; AF Proj. 2306)
(AD-A105161; ERC41018.3FR; AFOSR-81-0682TR) Avail: NTIS HC A03/MF A01 CSCL 09/5

The objective of the present research investigation is to theoretically analyze the electromechanical coupling of piezoelectric zinc sulfide films on silicon substrates. During the past twelve months, considerable efforts have been made in analyzing the experimental results which were obtained in FY 1979. In order to accomplish this, a computer program was written to calculate surface-acoustic-wave electromechanical coupling constants for layered media. The calculation included four configurations of the excitation of surface acoustic waves in different orientations of silicon using cubic and hexagonal ZnS films. The calculated results showed that the best acoustic coupling for ZnS films is 0.0001 which is an order of magnitude smaller than ZnO films on silicon. Also included in this report is the calculation of ZnO films on fused quartz and various orientation of silicon.
Author (GRA)

N82-12360# Rockwell International Corp., Thousand Oaks, Calif.
ION IMPLANTED GaAs I. C. PROCESS TECHNOLOGY Final Technical Report, 1 May 1977 - 30 Jun. 1980
R. Zucca, S. I. Long, B. M. Welch, F. S. Lee, P. Asbeck, C. G. Kirkpatrick, C. P. Lee, Y. D. Shen, R. C. Eden, and F. H. Eisen Jul. 1981 275 p refs
(Contract F49620-77-C-0087; ARPA Order 3384)
(AD-A104946; ERC41005.25FR; AFOSR-81-0893TR) Avail: NTIS HC A12/MF A01 CSCL 09/5

This report covers a program on the development of a planar GaAs digital integrated circuit (IC) technology. The main goals of this program were the development and implementation of the fabrication technology, and the demonstration of the feasibility of reaching large-scale integration (LSI) with high-speed, low-power GaAs digital ICs. In approximately 3 1/2 years a planar fabrication process was developed and refined. The program started with the fabrication of the first planar FET transistors using the new process, and the demonstration of Schottky diode-FET logic (SDFL) gates, showing high speed operation of ring oscillators. After this initial stage, many logic circuits have been built. The complexity of these demonstration circuits, involving both combinatorial and sequential logic, grew at a nearly exponential rate. Among the most complex circuits fully demonstrated is a 5 x 5 bit parallel multiplier employing 280 SDFL gates.
GRA

N82-12361# TriTec, Inc., Columbia, Md.
ADVANCED ELECTROFLUIDIC SERVOVALVE DEVELOPMENT Final Report, Apr. 1980 - Apr. 1981
Lester K. Pecan Fort Eustis, Va. Applied Technology Lab. Aug. 1981 47 p
(Contract DAAK51-80-C-0017; DA Proj. 1L1-62120-AH-25)
(AD-A105172; USAAVRADCOM-TR-81-D-30) Avail: NTIS HC A03/MF A01 CSCL 09/5

This report covers the advanced development of an electro fluidic servovalve. This device accepts and sums electrical and hydraulic inputs and provides an output capable of accurately positioning a hydraulic actuator. The design employs fluidic amplifiers with rotating movable flow splitters, an actuator piston feedback mechanism, and a unique positive derivative feedback circuit. The need for adequate actuator flow is met by use of a spool valve to augment the driving amplifier output. The positive derivative feedback circuit controls spool response, so that flow to the actuator is proportional to actuator velocity. Demonstration tests of the final design showed satisfactory performance of the rotary splitter concept, and an order-of-magnitude increase in servovalve frequency response through use of derivative feedback.
Author (GRA)

N82-12362# Stanford Linear Accelerator Center, Calif.
STUDY OF THE EMISSION PERFORMANCE OF HIGH-POWER KLYSTRONS: SLAC XK-5
Yong-xiang Zhao Jul. 1981 51 p refs
(Contract DE-AC04-76SF-00515)
(DE81-030177; SLAC-TN-81-5) Avail: NTIS HC A04/MF A01

There are hundreds of high power klystrons operated in the Linac gallery and about fifty to sixty tubes fail every year. The lifetime ranges from a few thousand up to seventy thousand hours except those which fail during an early period. The overall percentage of failures due to emission problems is approximately 25 percent. It is also noted that a 10 percent increase in mean lifetime of klystrons will reduce the overall cost per hour as much as a 10 percent increase in efficiency. Therefore, it is useful to find some method to predict the expected life of an individual tube. The final goal has not been attained yet, but some useful information was obtained. It is thought that this information might be helpful for those people who will study this subject further.
DOE

N82-12363# Ames Lab., Iowa.
SUPERCONDUCTIVITY IN Th-Nb COMPOSITES Ph.D. Thesis
Loren Frederick Goodrich 1980 144 p refs
(Contract W-7405-eng-82)
(DE81-030746; IS-T-926) Avail: NTIS HC A07/MF A01

Heat capacities, critical temperatures and critical currents have been measured for directionally solidified eutectic Th-Nb wires in order to determine whether superconductor-normal metal boundary is a strong pinning center for quantized vortices. The het capacity data show that there is a large change in pair potential at the super-normal boundaries as predicted by de Gennes boundary conditions. The T/sub c/ data were used to evaluate the extrapolation length b, and to show that Ginsburg-Landau predicts the changes in the superconductors rather well. Hence, the equilibrium thermodynamical properties are predicted from the filament size and spacing rather well. DOE

N82-12364# Sandia Labs., Albuquerque, N. Mex.
UPGRADING THE INTENSE NEUTRON SOURCE HIGH VOLTAGE POWER SUPPLY
A. A. Riedel Jul. 1981 12 p refs
(Contract DE-AC04-76DP-00789)
(DE81-028970; SAND-81-1665) Avail: NTIS HC A02/MF A01

The intense neutron source high voltage power supply displayed breakdown problems from the start of the project. The problems are analyzed and solutions provided for upgrading the supply. Recent modifications have virtually eliminated power supply internal breakdowns. The report also specifies preacceptance tests for a supply to assure reliable operation under an arcing load. DOE

N82-12365# Fraunhofer-Inst. fuer Festkoerpertechnologie, Munich (West Germany).
DEVELOPMENT OF MICROPROCESSOR COMPATIBLE SENSORS Final Report
Herbert Reichl, Ernst Obermeier, Eberhard Rose, Ho-Jung Hwang, Csaszlo Csepregi, and Klaus Dieter Muehlbauer Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 248 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-197; ISSN-0340-7608) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 45,70

A frequency analog monolithic pressure sensor was developed. The doping and temperature dependence of the piezo-coefficients were measured and the arrangement of the resistors on the diaphragm was optimized. Based on the use of I(2)L ring oscillators in frequency analog sensors, a two-wire measurement system was developed for multisensor applications. For noncontact temperature measurements, a thin film bolometer with a risetime of 6 msec was fabricated. An ion implanted Al2O3 humidity sensor with linear output characteristics was also developed. Low cost microprocessor controlled analog to digital conversion methods were investigated together with the linearization and approximation of sensor output characteristics. Author (ESA)

N82-12366# Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).
INVESTIGATION OF ELECTROCHROMIC EFFECTS FOR DISPLAY APPLICATION Final Report
Guenter Baur, Lutz Pickelmann, Ortwin Schirmer, Peter Schlotter, Volker Wittwer, Heidrun Biebl, Heinz Strinitz, and Christa Vogel Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 65 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-196; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,70

The physical and physicochemical properties of tungsten oxide layers which are important for display applications are elucidated: the electrochromic switching behavior, particularly the ion transport mechanism, and the stability and aging effects. A solution of these problems implies a systematic analysis of the structure of the thermally evaporated tungsten oxide layers used for electrochromic displays. By variation of the evaporation conditions and by studying the film structure it was possible to find out the structure of thermally evaporated layers as well as the principles of the ion transport mechanism. Author (ESA)

N82-12367# Vacuumschmelze G.m.b.H., Hanau (West Germany). Entwicklungsabt.
HIGH FIELD SUPERCONDUCTORS OF NbTi WITH CURRENT CAPACITIES IN EXCESS OF 3000A FOR APPLICATION IN MAGNET SYSTEMS WITH ALTERNATING FIELD COMPONENTS Final Report
Karl Juergen Best, Hans Hillmann, Hans Hoeflich, Johann Rudolph, Irmtraud Pfeiffer, and Hartwin Weber Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 207 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-009; ISSN-0340-7608) Avail: NTIS HC A10/MF A01

Monolithic and fully transposed NbTi base conductors in the form of flat cables, with current capacities of up to 10,000 A at 5 T and 4.2 K were developed for use in magnet systems. Methods for measuring the critical values of optimized conductors are described. For conductor manufacturing, extrusion as well as bundling and sealing methods were developed and tested. A number of conductors with different substrate amounts and combinations with high resistivity Cu Ni substrate were produced and electrically optimized. Fully transposed conductors were developed as flat cables. A process for continuous soldering and a soldering cable were developed and set up in order to meet higher mechanical requirements. Author (ESA)

N82-12368# Siemens A.G., Munich (West Germany). Research Labs.
BLUE LIGHT EMITTING LUMINESCENT DIODES OF SILICON CARBIDE Final Report
Guenther Ziegler Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 42 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-010; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8,65

A substantially improved procedure for the fabrication of SiC-LED's (maximum wavelength 475 nm) by liquid phase epitaxy on 6 H silicon carbide substrates is described. The quantum efficiency of encapsulated diodes is increased to 1.2 x 10E-4. The reproducibility of fabrication is improved by refined substrate control and preparation techniques. The epitaxial process is simplified, the surface of the layers is improved and doping concentrations are optimized. Reliable bonding of contacts is achieved. Diced chips show a decrease in quantum efficiency and a green shift of the emission spectrum, even under low current density conditions. This effect is avoided by mesa etching and an improved mounting technique. Author (ESA)

N82-12369# Siemens A.G., Munich (West Germany). Research Lab.
ELECTRICAL MACHINES WITH SUPERCONDUCTING WINDINGS. PART 3: HOMOPOLAR dc MACHINES Final Report
Dieter Kullman and Peter Henninger Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 163 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-015-Pt-3; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 32,60

The losses in rotating liquid metal contacts and the problems in including liquid metals were theoretically and experimentally studied. These machines are shown realiable. For electric ship propulsion, they are a more efficient method of power transmission than mechanical gearboxes. However, weight reduction as compared to mechanical gearboxes can hardly be achieved with machines fully shielded by magnetic iron. Author (ESA)

N82-12370# National Gas Turbine Establishment, West Drayton (England). Naval Electric Engineering Dept.
VOLTAGE TEST FACILITY FOR DEFENCE STANDARD 61-5
D. Pickering 1980 100 p
(Contract R-D-Item-7809/4776/1)
(NGTE-M-80112(L); BR77257) Avail: NTIS HC A05/MF A01

The design of a microprocessor controlled waveform synthesizer to effect the automatic generation of a defined 440 volt 60 Hz supply for tests of compliance with Defense Standard 61-5 is described. It is able to produce both LIMIT 1 and 2 voltage envelopes when in control of the 1 MW generator.

Operation is simple and because of features built into the controlling software, a high degree of safety in operation is achieved. Accurately repeatable over/under voltage testing of electrical equipment is possible. Author (ESA)

N82-12371# Filtronic Components Ltd., Leeds (England).
EXTRACTED-POLE FILTER MULTIPLEXION AND ASYMETRIC DOUBLE ARRAY NETWORK SYNTHESIS
J. D. Rhodes Paris ESA 1980 32 p refs
(Contract ESTEC-4289/80/NL-DG)
(ESA-CR(P)-1453) Avail: NTIS HC A03/MF A01

Using an analytical technique, the modifications necessary to a TE011 mode extracted pole device are estimated. If in the physical device there is tuning on the irises and for the resonant frequencies of the cavities, then the individual doubly terminated filter may be tuned to operate as any channel in a manifold multiplexer. The synthesis procedure is analytic apart from the numerical factorization of the numerator of the reflection coefficient. The procedure accurately determines the maximum gain constant consistent with obtaining a bounded real transfer function. Author (ESA)

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N82-12372 Rensselaer Polytechnic Inst., Troy, N. Y.
RADIATIVE HEAT TRANSFER IN EMITTING, ABSORBING AND ANISOTROPICALLY SCATTERING PARTICULATE CLOUDS Ph.D. Thesis
Farzin Homayoun Azad 1981 193 p
Avail: Univ. Microfilms Order No. 8121136

Radiative heat transfer in emitting, absorbing and anisotropically scattering media. The validity of the well established differential approximation to the case of anisotropic scattering is extended. Furthermore, the influence of highly anisotropic Mie scattering is investigated. Exact solutions for temperature distribution and radiative flux are found for scattering phase functions with up to 35 terms in their Legendre polynomial series expansion and are used as basis for comparison of linear anisotropic and differential approximation models. In dealing with anisotropic scattering in cylindrical media, and exact solution is developed, resulting in a first order integral equation. Also, two approximate methods are developed and tested for their accuracy. Dissert. Abstr.

N82-12373 Arizona Univ., Tucson.
HEAT TRANSFER IN A FIXED BED AND MASS TRANSFER IN A COUNTER-CURRENT MOVING BED Ph.D. Thesis
Filho Osmario Dellaretti 1981 138 p
Avail: Univ. Microfilms Order No. 8120721

The behavior of gas-solid reactors known as compact-fixed and moving beds, is analyzed from a theoretical viewpoint. For a compact fixed-bed the solution of the energy balance equations is obtained for the cases of a uniform temperature inside the solid pellets (i.e., the Biot number is zero) and for the case in which there are temperature gradients within the pellets ($Bi > 0$). For short contact times, beds with $Bi > 0$ have gas- and solid- temperatures which are greater than the temperatures within beds with $Bi = 0$. For long times, the situation is reversed. For a compact-moving bed the solution of the mass balance equations is obtained for the cases of a feed-solid with an oscillating concentration. For both types of beds there is an equivalence between mass transfer and energy transfer so that the solutions can be interchanged with suitable definitions of dimensionless variables. Dissert. Abstr.

N82-12374 Lehigh Univ., Bethlehem, Pa.
SELF-SUSTAINED OSCILLATIONS OF A MIXING LAYER-EDGE SYSTEM Ph.D. Thesis
Samir Refaat Ziada 1981 242 p
Avail: Univ. Microfilms Order No. 8118853

Velocity measurements using hot film anemometry, flow visualization using hydrogen bubble and dye injection techniques, and simultaneous recording of the force exerted on the wedge were employed to explore the globally organized nature of the mixing layer-wedge interaction. Velocity perturbations at the separation location are intimately related to the force exerted on the wedge and grow exponentially downstream with growth rates in close agreement with the linear stability theory. Higher harmonics of the fundamental mode are generated near the critical layer of the mixing layer while the disturbance amplitude is still small. Vortex-wedge interaction mechanisms and the amplitude of the force exerted on the wedge are a strong function of he transverse offset between the leading edge of the wedge and the center of the incident vortex. A special case of 'resonance' was also investigated, in which the subharmonic mode is coupled with a free surface wave phenomenon, resulting in a process of consistant vortex pairing upstream of the impingement wedge. Dissert. Abstr.

N82-12375 State Univ. of New York at Buffalo.
GENERALIZED STUDY OF A HYDRAULICALLY ACTUATED MECHANISM SYSTEM Ph.D. Thesis
Viswanathan Venkatraman 1981 390 p
Avail: Univ. Microfilms Order No. 8122207

A composite system consisting of the mechanism and the actuator is considered with emphasis on the interaction between the two important subsystems. A mathematical model based on the lumped parameter system is formulated and a set of dimensionless nonlinear state equations representing the dynamics of the composite system is derived. All the significant system parameters, namely, mechanical inertia, load, Coulomb friction, viscous damping, fluid capacitance, fluid inertia, leakage and fluid resistance are accounted for in the model. System analysis techniques in the time domain are applied and the behavior of the system is studied. It is shown that the behavior of the mechanism actuator system is controlled by certain dimensionless system parameters. Dissert. Abstr.

N82-12376 Iowa State Univ. of Science and Technology, Ames.
PREDICTION OF THE INCOMPRESSIBLE FLOW OVER A REARWARD-FACING STEP Ph.D. Thesis
O Key Kwon 1981 335 p
Avail: Univ. Microfilms Order No. 8122533

A viscous inviscid interaction scheme is presented for computing steady, two dimensional, incompressible, laminar, and turbulent flows over a rearward-facing step. The boundary layer equations for the region of viscous flow and the Laplace equation for streamfunction in the region of inviscid flow are used. The boundary layer continuity and momentum equations are solved inversely in a coupled manner using an improved finite-difference calculation procedure. Consideration is given to the applicability of the boundary layer equations to two dimensional channel expansion flows with developed inlet velocity profiles. No inviscid flow region can be identified so that the viscous inviscid interaction procedure is not applicable. Predictions of laminar flows of this type using the inverse boundary layer numerical method are shown to be in agreement with existing Navier-Stokes solutions and experimental measurements. Dissert. Abstr.

N82-12377 New Jersey Inst. of Tech., Newark.
DEPOSITION OF PARTICLES IN VERTICAL CONDUITS DUE TO ELECTROSTATIC CHARGE, DIFFUSION, AND GRAVITY Ph.D. Thesis
Melvin Wilbur Gelber 1981 99 p
Avail: Univ. Microfilms Order No. 8121967

The effect on the deposition of fine particles in a vertical channel and in a vertical tube due to the influence of electrostatic charge, diffusion, and gravity acting in the direction of flow is investigated. The flow considered was laminar, incompressible and steady. The flow patterns considered were uniform, developing and fully developed with symmetry about the axis of the channel or tube. Dissert. Abstr.

N82-12378 State Univ. of New York at Stony Brook.
EXPERIMENTAL AND ANALYTICAL STUDY OF NATURAL CONVECTION HEAT TRANSFER OF INTERNALLY HEATED FLUIDS Ph.D. Thesis

George Alanson Greene 1981 137 p
Avail: Univ. Microfilms Order No. 8121481

Boundary heat transfer from a liquid pool with a uniform internal heat source to a vertical or inclined boundary was investigated. In an open rectangular liquid pool in which the internal heat source was generated by electrical heating. The local heat flux was measured to a boron nitride test wall which was able to be continuously inclined from vertical. Under the assumption of laminar natural convection, it was found that the local heat transfer data could be empirically correlated by the relation Nu(x) = 0.153 Ra(x) to the 0.25 power with a standard deviation in the coefficient of + or - 14%, and the average heat transfer data could be empirically correlated by bar Nu = 0.127Ra(L) to the 0.25 power with a standard deviation in the coefficient of + or - 8%. The component of the gravitational acceleration along the wall, was found to help account for the inclination of the boundary although some systematic effect was still evident in the data. Dissert. Abstr.

N82-12379 State Univ. of New York at Buffalo.

ANALYTICAL SOLUTION OF ANISOTROPIC HEAT CONDUCTION IN SIMPLE AND IRREGULAR REGIONS Ph.D. Thesis

Shyan-Cherng Huang 1981 416 p
Avail: Univ. Microfilms Order No. 8122172

The general theory of heat conduction in anisotropic media homogeneous in rectangular Cartesian coordinates is first presented in a systematic manner through the use of coordinate transformation and Green's functions. The Levi's function and its extension in the theory of partial differential equations are derived. Several problems which cannot be solved straightforwardly by standard techniques in the solutions of isotropic problems are solved exactly. Two-dimensional steady-state problems in arbitrarily shaped regions are solved by the use of approximate Green's functions. Variational method is employed for unsteady state problems. The limitations of its applicability to general boundary and initial conditions are discussed by numerical examples. Exact solutions of number of steady and unsteady state problems with mixed-type boundary conditions are obtained. The Wiener-Hopf technique is applied. The accuracy of the kernel approximation is discussed. Dissert. Abstr.

N82-12380 Cornell Univ., Ithaca, N. Y.

THE TRANSITION FROM DEFLAGRATION TO DETONATION Ph.D. Thesis

Donald Scott Stewart 1981 209 p
Avail: Univ. Microfilms Order No. 8119439

A unified, mathematical description of all steady, one-dimensional combustion waves, deflagrations and detonations, and the unsteady flame acceleration process inherent in DDT is presented. A set of equations governing one-dimensional, unsteady combustion using the mathematical limit in which the activation energy of Arrehnius kinetics becomes large compared to the thermal energy of the gas were analyzed. The problem posed by activation-energy asymptotics (AEA) is discussed generally and in the simpler, particular case where the heat release during chemical reaction is small. Dissert. Abstr.

N82-12381 Catholic Univ. of America, Washington, D.C.

A STUDY OF TIME EVOLUTION OF CONTINUOUS VORTEX LOOPS IN A HOMOGENEOUS OR STRATIFIED FLUID Ph.D. Thesis

Chiou-Hsin Peter Cheng 1981 93 p
Avail: Univ. Microfilms Order No 8120149

A numerical study was made to simulate the time evolution of a series of vortex loops in a homogeneous or stratified fluid. The physical models for vortex structure in the wake of a three dimensional body are presented and investigated. The closed-end double helix is found to be a reasonable representation of the vortex structure behind a three-dimensional body. An existing self-consistent theory of vortex loops is applied and the vortex structure is conceived as vortex loops resembling the configuration of a closed-end double helix. It was found that the vortex structure in the wake of a spanwise elongated body approaches the well-known two-dimensional case of the Karman vortex street. The simulated features of the wake collapse in a stratified fluid are obtained, and the three-dimensional wake structure is compared with the previously published experimental results. Dissert. Abstr.

N82-12382 Ecole Polytechnique Federale de Lausanne (Switzerland). Inst. de Thermique Appliquee et de la Chaire de la Mecanique de la Turbulence.

CALCULATION AND MEASUREMENT OF THE TURBULENCE OF AN INCOMPRESSIBLE FLOW IN A LABYRINTH SEAL BETWEEN A ROTATING SHAFT AND A CYLINDER AT REST Ph.D. Thesis [CALCUL ET MESURE DE LA TURBULENCE D'UN ECOULEMENT INCOMPRESSIBLE DANS LE LABYRINTHE ENTRE UN ARBRE EN ROTATION ET UN CYLINDRE STATIONNAIRE]

Horst Stoff Zurich Juris-Verlag 1979 169 p refs In FRENCH; ENGLISH summary
(EPFL-ITA-8; ISBN-3-260-04775-1) Avail: Issuing Activity

Axisymmetric flow is computed with a pressure/velocity code in order to explain leakage phenomena against the mean pressure gradient. The main circumferential flow induces a secondary mean flow vortex pattern inside annular cavities on the surface of the shaft. One such cavity (in a model) is examined by comparing the finite difference result of a computer program with measurements obtained by a backscattering laser Doppler velocimeter. At a cavity Reynolds number of 30,000 and a Taylor number of 10,000 the boundary layers are 10% of the cavity width and the mean circumferential bulk velocity is 60% of the shaft rotation velocity. The probability density distribution of the circumferential velocity is gaussian outside the boundary layers with a degree of turbulence of < 5%. The energy spectrum shows the isotropic dissipation of the order of magnitude of the computation whereas the autocorrelation function indicates values smaller by one order of magnitude. The mean velocity field is well represented by the numerical computation. Author (ESA)

N82-12383 Karlsruhe Univ. (West Germany). Ausbreitungs- und Transportvorgaenge in Stroemungen.

CALCULATION OF ANNULAR AND TWIN PARALLEL JETS USING VARIOUS DISCRETIZATION SCHEMES AND TURBULENCE MODEL VARIANTS

M. A. Leschziner and W. Rodi Feb. 1980 24 p refs
(KU-SFB-80/T/159) Avail: Issuing Activity

Numerical and experimental predictions are compared for (1) the hybrid upwind/central differencing scheme, (2) the hybrid skew-upwind/central differencing scheme, and (3) the quadratic, upstream-weighted differencing scheme. The turbulence models examined are the standard k-epsilon model and two variants. The first accounts for effects of stream-line curvature on turbulence and the second for the prefential influence of normal stresses on the dissipation of turbulence energy. Numerical scheme (1) particularly in conjunction with turbulence model modifications, results in severe solution errors and in a generally anomalous response to changes in the modelled viscosity field. In contrast, in all cases, schemes (2) and (3) yield, similar results and respond in an expected manner to the modifications. The modifications, particularly the one that accounts for streamline curvature, reduce, in some cases drastically, the discrepancies between computed and experimental data. Satisfactory results are obtained for both jets examined. Author (ESA)

N82-12384# National Aerospace Lab., Tokyo (Japan). Second Aerodynamics Div.

A SECOND-ORDER ACCURATE PROCEDURE FOR SOLVING THE BOUNDARY LAYER EQUATIONS BASED ON THE PREDICTOR-CORRECTOR FORM OF THE CRANK-NICOLSON SCHEME

Kenichi Matsuno Jun. 1981 13 p refs
(NAL-TR-655T) Avail: NTIS HC A02/MF A01

The numerical accuracy of a predictor-corrector form of the Crank-Nicolson scheme for solving boundary layer equations is examined. The Crank-Nicolson Scheme, with a predictor-corrector step to deal with nonlinearity, exhibits only first-order accuracy unless the boundary layer continuity and momentum equations are solved in a coupled manner. A predictor-corrector form of the Crank-Nicolson scheme, based on a coupled solution for the continuity and momentum equations, is presented for both the incompressible and compressible flows. The present scheme was subjected to a computer experiment using the problem of the laminar boundary layer development in a linearly retarded edge velocity field. The results are compared with the Davis coupled scheme. It is shown that the present scheme posesses second-order accuracy and is more efficient than the Davis coupled scheme. R.J.F.

N82-12385# National Aerospace Lab., Tokyo (Japan).
ON THE FLOW MEASUREMENTS AND VELOCITY VECTOR ANALYSIS USING FIVE-HOLE PITOT TUBES
Hideaki Nishimura 1981 29 p Partly in JAPANESE; partly in ENGLISH
(NAL-TR-668; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

Five-hole pitot tubes are widely used to determine directions and magnitudes of velocities in three dimensional flow fields, because of their simplicity in handling and their reliability. A method of reducing data obtained from five-hole pitot tube measurements with the aid of a few sets of calibration daa is described. By using mini-computers, pitch and yaw angles and Mach numbers of flows can be computed simultaneously by this method with reasonable accuracy in the range of the pitot tube calibration. Author

N82-12386*# Calspan Advanced Technology Center, Buffalo, N.Y. Aerodynamic Research Dept.
AN EXPERIMENTAL STUDY OF MASSIVE BLOWING FROM A NOSETIP DURING JOVIAN ENTRY Final Report, Sep. 1979 - Dec. 1980
M. S. Holden Hampton, Va. NASA. Langley Research Center Nov. 1981 60 p refs
(Contract NAS1-15948)
(NASA-CR-165756; CALSPAN-6593-A-1) Avail: NTIS HC A04/MF A01 CSCL 20D

The fluid dynamic structure and stability of the boundary layer and shock layer ahead of a highly blowing heat shield in an environment simulating entry into the Jovian atmosphere were investigated. The experimental studies were conducted in the Calspan 96 in shock tunnel with a freestream of a H2/He mixture at Mach numbers above 10. Measurements of heat transfer and pressure were made on the porous model surface, and high-speed schlieren photography was used to examine the structure and stability of the shock layer. Results are presented which show how the heat transfer and shock layer stability vary for gases of different molecular weights for a range of Reynolds numbers and mass-addition rates. M.G.

N82-12387*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A TITLE-GAP FLOW MODEL FOR USE IN AERODYNAMIC LOADS ASSESSMENT OF SPACE SHUTTLE THERMAL PROTECTION SYSTEM: PARALLEL GAP FACES
Douglas L. Dwoyer, Perry A. Newman, Frank C. Thames, and N. Duane Melson Oct. 1981 78 p refs
(NASA-TM-83151) Avail: NTIS HC A05/MF A01 CSCL 20D

The problem of predicting aerodynamic loads on the insulating tiles of the space shuttle thermal protection system (TPS) is discussed and seen to require a method for predicting pressure and mass flux in the gaps between tiles. A mathematical model of the tile-gap flow is developed, based upon a slow viscous (Stokes) flow analysis, and is verified against experimental data. The tile-gap pressure field is derived from a solution of the two-dimensional Laplace equation; the mass-flux vector is then calculated from the pressure gradient. The means for incorporating this model into a lumped-parameter network analogy for porous-media flow is given. The means for incorporating this model into a lumped-parameter network analogy for porous-media flow is given. The flow model shows tile-gap mass flux to be very sensitive to the gap width indicating a need for coupling the TPS flow and tile displacement calculation. Analytical and experimental work to improve TPS flow predictions and a possible shuttle TPS hardware modification are recommended. A.R.H.

N82-12388*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
HADY-I, A FORTRAN PROGRAM FOR THE COMPRESSIBLE STABILITY ANALYSIS OF THREE-DIMENSIONAL BOUNDARY LAYERS Final Report
Nabil M. El-Hady Washington NASA Sep. 1981 118 p refs
(Grant NsG-1645)
(NASA-CR-3467) Avail: NTIS HC A06/MF A01 CSCL 20D

A computer program HADY-I for calculating the linear incompressible or compressible stability characteristics of the laminar boundary layer on swept and tapered wings is described. The eigenvalue problem and its adjoint arising from the linearized disturbance equations with the appropriate boundary conditions are solved numerically using a combination of Newton-Raphson interative scheme and a variable step size integrator based on the Runge-Kutta-Fehlburh fifth-order formulas. The integrator is used in conjunction with a modified Gram-Schmidt orthonormalization procedure. The computer program HADY-I calculates the growth rates of crossflow or streamwise Tollmien-Schlichting instabilities. It also calculates the group velocities of these disturbances. It is restricted to parallel stability calculations, where the boundary layer (meanflow) is assumed to be parallel. The meanflow solution is an input to the program. M.G.

N82-12389# Douglas Aircraft Co., Inc., Long Beach, Calif.
COMPUTATION OF GENERAL TWO-DIMENSIONAL STEADY VISCOUS FLOWS
P. G. Williams and Tuncer Cebeci Jul. 1981 42 p refs
(Contract N00019-80-C-0036)
(AD-A105232; MDC-J2248) Avail: NTIS HC A03/MF A01 CSCL 20/4

In a previous report it was shown that a code based on the biharmonic formulation of the Navier-Stokes equations with the corresponding Newtonized difference equations solved by a direct band solver could be quite competitive in situations where considerably more grid points are used in one direction than in the other, such as flow in a long channel. The main advantages of this approach are that it is straightforward and robust. Both of these terms are subjective of course. To justify the first we may summarize the approach as follows: From derivative coefficients generated for the x and y variable grids we can immediately write down the difference equations and it is then a simple matter to write down the Newton equations. The coefficients are stored by diagonals as required by the band solver and the righthand sides computed, then the Newton corrections are obtained by calls to the band solver. Also the uniformity of the approach used for introducing the boundary conditions in section 4 simplifies the treatment of a wide variety of boundary conditions. GRA

N82-12390# University of Southern California, Los Angeles. Dept. of Aerospace Engineering.
ON THE MANIPULATION OF SPREADING RATES OF FORCED MIXING LAYERS Technical Report, 1 Jul. 1980 - 30 Jun. 1981
Chih-Ming Ho and Yu-Quan Zhang Sep. 1981 5 p refs
(Contract N00014-77-C-0314)
(AD-A105236) Avail: NTIS HC A02/MF A01 CSCL 20/4

The vortex merging in a mixing layer can be modified by applying periodic forcing at the origin. When the forcing parameters (frequency, amplitude as well as phase difference between fundamental and subharmonic) varies, the pattern of vortex merging changes. Consequently, the spreading rate of the mixing layer can be manipulated. The effect of each forcing parameter on the change in the spreading is discussed in the present paper. Author (GRA)

N82-12391# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Hydraulics Lab.
ADVECTIVE EFFECTS IN THE NUMERICAL SIMULATION OF LONG PERIOD, LARGE AMPLITUDE WAVE BEHAVIOR Final Report, Nov. 1977 - Sep. 1981
H. Lee Butler Sep. 1981 35 p refs
(AD-A105231; WES/MP/HL-81-4) Avail: NTIS HC A03/MF A01 CSCL 20/4

Numerical modeling of water-wave behavior has progressed rapidly in the last decade and is now generally recognized as a useful tool capable of providing solutions to many coastal problems. The U. S. Army, through various agencies, has sponsored development of two-dimensional numerical models for simulating long period wave behavior. Many of these models have included the advective terms in their formulation. Demonstrated in numerous papers throughout the literature, inclusion of advective effects can lead to instabilities in the solution. This fact was exemplified in the work of Sloss (1972) in his attempt to include these effects in storm surge simulation. The primary objective of this investigation was the assessment of the role of advective terms in the numerical simulation of long period, large amplitude wave behavior. A major effort in accomplishing this objective was the development of an appropriate representation of the non-linear terms in the difference equations of motion. To this end, a stabilizing correction, double sweep implicit scheme was encoded into an existing and extensively used hydrodynamic model, WIFM. The scheme manifested a high degree of stability in various numerical flume tests. GRA

N82-12392# ARO, Inc., Arnold Air Force Station, Tenn.
AN INVESTIGATION OF F-16 NOZZLE-AFTERBODY FORCES AT TRANSONIC MACH NUMBERS WITH EMPHASIS ON MODEL SCALE EFFECTS Final Report, Oct. 1979 - Sep. 1980
Earl A. Price, Jr. Sep. 1981 149 p refs
(AD-A104905; AEDC-TR-80-57; AFWAL-TR-81-2110) Avail: NTIS HC A07/MF A01 CSCL 20/4

An experimental program was conducted to provide nozzle-afterbody data with a minimum interference support system on a 0.25-scale F-16 model and to determine the interference induced on then nozzle-afterbody region by sting and strut model support systems. Data obtained on the 0.25-scale model are compared with data from a 0.11-scale model for evaluation of model scale effects. The investigation was conducted over the Mach number range from 0.6 to 1.5. Data are presented in terms of coefficients and increments in coefficients of nozzle-afterbody axial and normal forces obtained from integrating pressure data. High-pressure air at ambient temperature was utilized for exhaust plume simulation. The results indicate close agreement in axial-force coefficient between configurations having full and annular nozzles at design pressure ratio. Very little effect of Reynolds number was found on the nozzle-afterbody axial force. Wave interference adversely affected axial-force data from the 0.25-scale model at Mach numbers between 1.0 and 1.1, producing lower axial force on the model afterbody. Large differences were determined in both the magnitude and the sign of strut interference from the two model installations. Author (GRA)

N82-12393# Pennsylvania State Univ., University Park. Applied Research Lab.
OBSERVATIONS OF THE EFFECTS OF BOUNDARY LAYER AND NUCLEI ON CAVITATION OF AXISYMMETRIC BODIES
J. A. Carroll 13 Feb. 1981 225 p refs
(Contract N00024-79-C-6043)
(AD-A104779; ARL/PSU-TM-81-60) Avail: NTIS HC A10/MF A01 CSCL 20/4

An investigation of limited cavitation was conducted on three different axisymmetric models. Test models included a hemispherical nose, a Schiebe nose, and a David Taylor Naval Ship Research and Development Center (DTNSRDC) nose. All models had a 2.0-in. diameter. Theoretical pressure distribution calculations and laminar boundary layer growth calculations were performed for the above models which were subsequently tested and also for a 1.5-caliber ogive nose, a 1.0-caliber ogive nose, and an International Towing Tank Conference (ITTC) nose to serve as supplementary information. The test models were chosen in accordance with their boundary layer flow characteristics. Laminar boundary layer separation was predicted to occur on the hemispherical nose for all test velocities. Calculations for the Schiebe nose indicated that laminar boundary layer separation does not occur and, therefore, this model exhibits an attached boundary layer for all velocities Laminar separation was predicted for the DTNSRDC nose; however, this model has a relatively low critical Reynolds number. As a result, the DTNSRDC nose exhibits laminar separation at low velocities and an attached boundary layer at high velocities. GRA

N82-12394# Pennsylvania State Univ., University Park. Applied Research Lab.
IN-DUCT VISCOUS FLOW PRESSURE DISTRIBUTION ON A BODY WITH BOUNDARY LAYER CONTROL
G. C. Lauchle 10 Aug. 1981 30 p refs
(Contract N00024-79-C-6043)
(AD-A105396; ARL/PSU-TM-81-165) Avail: NTIS HC A03/MF A01 CSCL 20/4

It is well known that the static pressure distribution of an axisymmetric body operating within the boundaries of a duct such as a wind or water tunnel test section is altered from that observed in a free stream because of solid blockage and horizontal buoyancy effects. Because potential flow solutions can account only for the solid blockage, auxiliary analysis must be performed to account for the viscous (horizontal buoyancy) effects. One such analysis has been performed by this author, where it was assumed that boundary layer development occurred in a natural, flat plate-like manner over the test body and duct walls. In this report, a modification of that analysis is presented which permits one to analyze bodies with boundary layer control. In addition to the theoretical formulation, a numerical example is presented to illustrate the effect on the pressure distribution of a 0.318 m diameter body with surface suction operating in a 1.22 m diameter duct. Author (GRA)

N82-12395# Oak Ridge National Lab., Tenn. Computer Sciences Div.
QUASI-STATIONARY APPROXIMATION FOR THE STEFAN PROBLEM WITH A CONVECTIVE BOUNDARY CONDITION
A. D. Solomon, D. G. Wilson, and V. Alexiades Sep. 1981 40 p refs
(Contract W-7405-eng-26)
(DE81-030372; ORNL/CSD-84) Avail: NTIS HC A03/MF A01

It is shown the solution to the Stefan problem with a convective boundary condition tends to the quasi-stationary approximation are given, and some examples are presented. DOE

N82-12396# California Univ., Berkeley. Lawrence Berkeley Lab. Earth Sciences Div.
STUDY OF ATES THERMAL BEHAVIOR USING A STEADY FLOW MODEL
Christine Doughty, Goeran Hellstroem, Chin Fu Tsang, and Johan Claesson (Lund Inst. of Tech.) Jan. 1981 79 p refs
(Contract W-7405-eng-48)
(DE81-030883; LBL-11029; PNL-3924) Avail: NTIS HC A05/MF A01

The thermal behavior of a single well aquifer thermal energy storage system in which buoyancy flow is neglected is studied. A dimensionless formulation of the energy transport equations for the aquifer system is presented, and the key dimensionless parameters are discussed. A simple numerical model is used to generate graphs showing the thermal behavior of the system as a function of these parameters. Some comparisons with field experiments are given to illustrate the use of the dimensionless groups and graphs. DOE

N82-12397# TRW Defense and Space Systems Group, Redondo Beach, Calif.
DESIGN ANALYSIS OF SUPPLEMENTAL HEATING SYSTEMS Final Report
Sep. 1981 239 p refs
(Contract DE-AC03-80ER-52058)
(DE81-030678; DOE/ER-52058/T1) Avail: NTIS HC A11/MF A01

Program priorities for the development of the heating techniques, particularly reactor heating systems are evaluated. Each technique is evaluated against a set of selection criteria. The selection criteria include: the status of the theory; the status of the technology; system efficiency; cost; susceptibility to radiation, maintainability; and critical real estate requirements. DOE

N82-12398# TRW Defense and Space Systems Group, Redondo Beach, Calif.
DESIGN ANALYSIS OF SUPPLEMENTAL HEATING SYSTEMS Final Report
Sep. 1981 13 p
(Contract DE-AC03-80ER-52058)
(DE82-030677; DOE/ER-52058/T1) Avail: NTIS HC A02/MF A01

Tokamak supplemental heating techniques are studied.

Conceptual designs for reactor level heating systems are developed. Ion cyclotron radiation heating and negative ion beams are selected. DOE

N82-12399# General Electric Co., St. Petersburg, Fla. Fluid Mechanics and Combustion Branch.
LAMINAR-FLOW-CYCLONE DEVELOPMENT PROGRAM Final Technical Report, 1 Nov. 1978 - 31 May 1981
W. B. Giles Jun. 1981 96 p refs
(Contract DE-AC21-78ET-11031)
(DE81-001297; DOE/ET-11031/T1; FE-3242-33) Avail: NTIS HC A05/MF A01

The feasibility of maintaining laminar flow in a cyclone separator was investigated. Various experimental models were used to simulate the essential flow requirements, and observations were conducted on the turbulent-laminar character of the flow. From this, it was concluded that laminar flow could be maintained up to relatively high Reynolds numbers in the radially-inward swirl flow regime. However, a large-scale instability occurs in turning to the axial swirlflow regime. All present attempts to suppress this instability failed, and the investigation was terminated. DOE

N82-12400# Oak Ridge National Lab., Tenn. Chemical Technology Div.
MEASUREMENT OF THERMAL CONDUCTIVITIES IN COAL FLUIDS
C. S. Chang, J. B. Bader, and J. L. Plawsky Sep. 1981 52 p refs
(Contract W-7405-eng-26)
(DE82-000523; ORNL/MIT-334) Avail: NTIS HC A04/MF A01

As a qualification of a transient hot wire, thermal conductivity cell for use on the Coal Liquids Flow System, the thermal conductivity of toluene was mesured between 25 and 850 C. Static measurements over a 4-sec time span yielded a thermal conductivity at 250 C of 0.12607 W/m-K and a slope of thermal conductivity vs temperature of -272.8 W/m-K (squared). All results are within 2 to 5% of the most recent literature data. An experimental error analysis showed all errors to be less than 1%. Dynamic-mode measurements in which flow through the cell was interrupted only for the measurement period agreed within experimental accuracy with the static-mode measurements, demonstrating that the hot-wire cell is immediately applicable to coal-slurry thermal-conductivity measurements in the Coal Liquids Flow System. Sedimentation experiments showed that settling should have a negligible effect on thermal-conductivity measurements over the time period envisioned for measurement. Excellent agreement was obtained between previous measurements of thermal conductivities of coal slurries and the predictions of the Rayleigh equation for heterogeneous-mixture thermal conductivities. DOE

N82-12401# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
RING EDDY FLOW METAMORPHOSIS AS A BASIS FOR IMPLOSION OF PARTIAL VACUUMS, SCHWENK'S DROP PICTURE METHOD AND CUTTING BY MEANS OF A WATER JET [DIE RINGWIRBELMETAMORPHOSE ALS GRUNDLAGE DER IMPLOSION VON KAVITATIONSBLASEN, DER SCHWENKSCHEN TROPFENBILDMETHODE UND DES WASSERSTRAHLSCHNEIDENS]
Peter E. M. Schneider Aug. 1980 66 p refs In GERMAN
(MPIS-13/1980; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,55

The flow characteristics of ring eddies were experimentally investigated in order to explain materials erosion by cavitation. A literature review is presented and a ring eddy experiment is described. It was demonstrated that the implosion of partial vacuums (cavitation bubbles) occurs inside gaseous or fluid ring eddies passing over from laminar into turbulent flow resulting in a bubble jet capable of eroding solid materials. In the unstable vortex flow between colder gas core and warmer surrounding fluid an important temperature difference develops, heating the material and contributing to its erosion. The invarying degrees of periodicity, shaping and reshaping of secondary bubbles, helix and double-helix-like flows in the vortices probably contribute to cavitation noise. - Author (ESA)

N82-12402# Fraunhofer-Inst. fuer Bauphysik, Holtzkirchen (West Germany). Inst. fuer Bauphysik.
THE WINDOW AND ITS HEAT BALANCE CONSIDERING SOLAR RADIATION AND ADDITIONAL INSULATION MEASURES Final Report
Helmut Kuenzel and Christine Snatzke Bonn Bundesministerium fuer Forschung und Technologie Nov. 1980 27 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-070; B-HO-4/77; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5,70

Tests were carried out with a common wooden framed window with clear-glass double glazing to determine the improvement of the transmission coefficient when shades, shutters, or curtains are used at night. During daytime remarkable gains of heat are obtained from solar radiation through windows. Taking into consideration day and nightime of the 12 day test period, more than 30 % of heating capacity is saved. The threshold value of solar radiation, for which gain of heat was equal to loss of heat, is found for the tested exterior wall surface at about 200W/sq m and for the clear glass double glazing at just 100W/sq m the difference of temperature between room air and outside air being 20k. The results can only be applied to conditions prevailing in the test rooms. However, based on these results, it can be stated that the heat balance of the window is favorably influenced by solar radiation especially through south windows, as well as by adequate insulation measures during the night (shades, curtains). Author (ESA)

N82-12403# Weiss Technik G.m.b.H., Reiskirchen (West Germany).
PRACTICAL DEMONSTRATION OF HEAT PUMPS FOR UTILIZATION OF ANIMAL-GENERATED HEAT Final Report
Hans-Ulrich Amberg Bonn Bundesministerium fuer Forschung und Technologie Sep. 1980 47 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-100; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,30

Airconditioning of pigpens to eliminate effects of temperature extremes is reported. A stall air conditioner was installed as heat pump in a pigpen for final fattening. The heat, recovered from the exhaust air, is supplied to the outside air so that heated fresh air is blown into the stall. The test was accomplished on a farm with intensive pig breeding with 120 preliminary fattening places and 240 final fattening places. The stall air conditioner offers the possibility to attenuate the extreme temperature variations during the year. Author (ESA)

N82-12404# Escher Wiss G.m.b.H., Ravensburg (West Germany). Abt. Papiermaschinen.
AIR CIRCUIT WITH HEATING PUMP Final Report
Herbert Holik, Hans Joachim Bauder, Hubert Brugger, Anton Reinhart, and Karl-Heinz Spott Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 56 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-188; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,80

A pump which draws energy from exhaust air from a paper drying process to heat up the blow air was studied. The use of a heat pump instead of a steam heated exchanger can reduce primary energy consumption for blown air heating by more than half and the costs for air heating up to half. The amortization times for the heat pump extend from 5 to 10 years. Since in the pulp and paper industry, amortization times of less than two years are required for such relatively small investments, the heat pump so far is only used to heat blown air under highly favorable conditions. The rising energy prices shorten the heat pump amortization time. The 100% fuel price increase brought the heat pump with diesel engine drive already to very favorable amortization times of 2 to 5 years. A 20% increase will make the heat pump economically advantageous with an amortization time between 1 and 2 years. Author (ESA)

N82-12405# Gesellschaft fuer Systemtechnik m.b.H., Essen (West Germany).
BASIC INVESTIGATIONS OF AN ABSORPTION HEAT PUMP, USING HEAT OF MEDIAN TEMPERATURE (HEAT TRANSFORMER) Final Report
Paul Franzen, Hans Herrmann, Chahpar Mostofizadeh, Horst Schinke, Dieter Seher, and Karl Stephan Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 305 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-013; ISSN-0340-7608) Avail: NTIS HC A14/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 46,90

It is noted that heat transformer circuits enable temperature rises without requiring any real high grade energy. The fundamental thermodynamics are described, and an outline of the present state of technology and of previous work in the field of heat transformer circuits is presented. In order to assess their suitability for the execution of this process, work media and plant concepts and components were looked at. Besides the thermodynamic construction of one and two stage plants, the applicability of the system was analyzed using laboratory equipment, and the application potential and productiveness of heat transformer circuits were estimated. From the results of these theoretical and experimental studies it is deduced what research and development work will be necessary for the further development of the system. Author (ESA)

N82-12406# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
LATERAL MIGRATION OF NEUTRALLY BUOYANT RIGID SPHERES IN SMALL DUCTS
Andreas Heertsch Nov. 1980 70 p refs In GERMAN; ENGLISH summary
(MPIS-20/1980; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,65

Velocity profiles were measured with a laser Doppler velocimeter in microducts for rigid spheres suspended in water to study blood flow in capillary tubes. Assuming Hagen-Poiseuille flow, concentration distribution in terms of number density over wall distance are obtained. Distributions indicate that the particles assemble at a stable position at a quarter duct width from the wall. No further lateral particle migration away from this stable position is observed. Particles, entering the duct near its centers reach this stable position within a downstream distance, which is 5.7 times longer than the corresponding distance for particles entering the duct near the wall. It is found that these distances are proportional to the ratio duct width/particle size. Optical observations of particle traces are also discussed. Author (ESA)

N82-12407# Technische Hochschule, Aachen (West Germany). Inst. of Heat Transfer and Air Conditioning.
TECHNICAL HEAT AND FLOW INVESTIGATIONS INTO HEAT EXCHANGERS MADE OUT OF SYNTHETIC MATERIALS, FOR USE IN DRY COOLING TOWERS Final Report
Helmut Pollack Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 43 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-004; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8,70

Bare tube and flat heat exchangers (HE) made out of synthetic materials were investigated for use in dry cooling towers with natural draft. The advantages of synthetic materials are higher corrosion resistance, easier workability and lower cost. Suitability tests were performed designing the total system based on HE and tower construction. It is shown that bare tube bundles composed of tube walls or hollow plates separated by plastic strips with wall thicknesses less than 0.6 mm are an alternative to finned tube HE's of metal. Assuming specific building costs of 330 DM/sqm for the tower shell and HE manufacturing costs of 20 DM/kg, several solutions can be found with slight differences in heat transfer conditions and total costs between 22 and 25.10E6 DM. Author (ESA)

N82-12408# Centre National de la Recherche Scientifique, Meudon (France). Lab. d'Aerothermique.
THE GRAVITY WAVE IN A LIQUID WITH A SURFACE FILM, IN THE PRESENCE OF AN APPLIED ELECTRIC FIELD
M. Dudeck and R. PrudHomme Jun. 1980 21 p refs
(Rept-80-2; Publ-620) Avail: NTIS HC A02/MF A01

The equation for the dispersion of a gravity wave is studied, using a simple electromagnetic model (no magnetic field, no polarization, electrical neutrality for the liquid and the gas). The surface is a medium possessing mass and inertia. The liquid behaves as a perfect fluid, allowing slippage of the film. A small amplitude disturbance was applied to the liquid. When the electric field is zero the two propagation modes are oscillatory and undamped (for n > one where n is a nondimensional parameter tied to the film's elasticity). The evolution is hence stable. For n < or equal to one, instability results. For a nonzero field and n > one, instability is determined by the parameters of the field in the reference state. For n < or equal to one the pattern of evolution is always unstable. Author (ESA)

N82-12409# British Aerospace Aircraft Group, Warton (England). Aerodynamics Dept.
COMPUTATIONAL FLUID MECHANICS AND ITS IMPACT ON THE AIRCRAFT AERODYNAMICIST
Barry Hunt 1981 45 p refs
(DGLR-Paper-81-3) Avail: NTIS HC A03/MF A01

The capabilities of current theoretical methods for predicting the more important types of aerodynamic flow are summarized. Their shortcomings as well as successes are indicated and the likelihood of their development and acceptance as routine, mainstream tools of the aircraft aerodynamicist is discussed. Navier-Stokes solutions, boundary layer solutions, and inviscid models are treated critically. Author (ESA)

N82-12410# Stuttgart Univ. (West Germany). Inst. fuer Kernenergetik und Energiesysteme.
DEVELOPMENT OF AN IMPROVED HIGH PERFORMANCE ARTERY HEAT PIPE Final Report
H. Kraehling Paris ESA May 1981 30 p
(Contract ESTEC-4050/79/NL-AK)
(ESA-CR(P)-1459) Avail: NTIS HC A03/MF A01

An existing space-qualified arterial high performance heat pipe was improved. Attempts to cut grooves with a self made single point threading tool were not successful. The grooves were not deep enough, so that a sufficient liquid supply over the entire circumference in the heating zone could not be obtained. Employment of commercially available thread taps showed an improvement in the groove depth but the groove profile itself was still poor. A further improvement of the profile shape was attained with a special set of threading tools consisting of an entering tap and a plug tap. Performance measurements with respective artery heat pipes confirmed that the heat pipe performance became better with the improvement of the circumferential groove profile. However, all investigated circumferential groove designs revealed a definitely poorer performance than the standard design with a screenwick as a secondary capillary structure. Author (ESA)

N82-12411# Imperial Coll. of Science and Technology, London (England). Heat Transfer Div.
METHODS OF CALCULATING HEAT TRANSFER WITHIN THE PASSAGES OF HEAT EXCHANGERS
D. Brian Spalding Jul. 1981 13 p refs Presented at NATO Advanced Study Inst. Lectures, Ankara, 13-24 Jul. 1981
(HTS/81/4) Avail: NTIS HC A02/MF A01

Predictions of heat transfer and fluid flow processes within the passages of heat exchangers using: (1) experimental information generalized by dimensional analysis, (2) experimental information generalized by analogies between heat, mass and momentum transfer, (3) the methods of classical mathematics, and (4) numerical methods embodied in computer programs are considered. Practices (1) and (2) are becoming increasingly expensive while practice (3) remains of extremely limited utility. Practice (4) is increasing its power and reducing its costs as new computers, computer programs and experimental information become available. The principles of the numerical approach to within-passage heat transfer and fluid flow are described together with some of the difficulties of implementation and methods of overcoming them. Predictive capability, however, remains insufficient for designers, especially in respect of turbulence complicated by low Reynolds number and two phase phenomena. Author (ESA)

N82-12412# Imperial Coll. of Science and Technology, London (England). Dept. of Mechanical Engineering.

THE CALCULATION OF HEAT EXCHANGER PERFORMANCE

D. Brian Spalding Jul. 1981 16 p refs Presented at NATO Advanced Study Inst., Ankara, 13-24 Jul. 1981

(HTS/81/5) Avail: NTIS HC A02/MF A01

The general principles of the numerical approach to computation of heat exchanger performance are outlined. Attention is given to several specific topics: (1) how partial elimination can accelerate convergence; (2) a solving scheme for linear equations; (3) the ways in which the velocity components for interpenetrating continua can be defined; and (4) how resistances to flow, such as baffles and tube support plates, are allowed for. The advantages of the method are that transient phenomena can be predicted as well as the steady state; temperature dependent and otherwise nonuniform transfer coefficient data can be handled; unusual flow patterns can, if known, be allowed for; unknown flow patterns, and their influence on the heat transfer performance, can be computed; reciprocal interactions of the temperature and velocity fields, such as those resulting from buoyancy effects, can be correctly taken into account; and two and three dimensional variations of temperature and other flow variables can be allowed for. Author (ESA)

N82-12413# Imperial Coll. of Science and Technology, London (England). Centre for Computational Fluid Mechanics, Heat Transfer and Combustion.

NUMERICAL COMPUTATION OF TWO PHASE FLOW IN GUN BARRELS

D. Brian Spalding Jun. 1981 17 p refs Presented at US Army Workshop on Multi-Phase Flow, Aberdeen, Maryland, 2-4 Feb. 1981

(HTS/81/6) Avail: NTIS HC A02/MF A01

There are three or four imdependent variables and seventeen or more independent ones involved in the computer simulation of gun-barrel phenomena which is recognized as transient compressible, two-phase flow in a moving cordinate system. Two cmputer programs for predicting the distributions of velocities, pressures, and temperatures are reviewed. The major obstacle to making realistic predictions is ignorance of the precise laws governing interphase transport, turbulent mixing, particle-particle and particle-wall impacts, and chemical kinetics. It is argued that numerical modeling conducted at the particle-scale level, can be helpful. Numerical computations on grids of subparticle size confirm friction, heat transfer, and mass transfer laws. Hypotheses are needed for turbulence and particle impact.

A.R.H.

N82-12414# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

SELF-INDUCED PULSATING LIQUID FLOW IN A HYDRAULIC SYSTEM

Gerd E. A. Meier and Andrzej P. Szumowski Dec. 1980 49 p refs

(MPIS-15/1980; ISSN-0436-1199) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,35

Pulsating liquid flow of large amplitude in a system containing a tank, a tube and a valve which has an elastically supported plate is investigated. The functions of the flow properties versus some nondimensional parameters were found. These parameters depend on supply pressure, inertia of the liquid and of the valve as well as on the elasticity of the plate support and the dimensions of the system. The occurrence of cavitation zones in the liquid flow is taken into account. Theoretical and experimental results are compared. Both show that the amplitude of the pressure can exceed supplied pressure. Author (ESA)

N82-12415# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

PROPAGATION ON FINITE DISTURBANCES IN THE BOUNDARY LAYER

Geert Zimmermann Mar. 1981 40 p refs

(MPIS-3/1981; ISSN-0436-1199) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9

Amplitude disturbances at large Reynolds numbers are considered. They are assumed to be wave like. A two scale expansion leads, in the lowest order of the Reynolds number, to a nonlinear eigenvalue problem for the local wave shapes and an integral condition for the long range development of these waves. Local conditions are engendered by evaluation of this integral condition. These help solve the eigenvalue problem. Waves over longer propagation ranges are shown to be asymptotic by the results of the evaluation of the propagation equation in the vicinity of the critical stream line. Author (ESA)

N82-12416# European Space Agency, Paris (France).

A SOLUTION OF THE NAVIER-STOKES EQUATIONS BY A MIXED FINITE ELEMENT METHOD Thesis

Marc Bredif Sep. 1981 109 p refs Transl. into ENGLISH of "Resolution des Equations de Navier-Stokes par une Methode d'Elements Finis Mixtes", ONERA, Paris Report ONERA-NT-1981-1, 1981 Original report in FRENCH

(ESA-TT-720; ONERA-NT-1981-1) Avail: NTIS HC A06/MF A01

The numerical treatment of steady state, two-dimensional Navier-Stokes equations in the incompressible case is studied. The approximation method retained is the mixed finite element method, as regards stream function and vortex function. The improvements to this formulation are: possibility of choice of boundary conditions of various types; introduction of a finite element formulation of the stagnation pressure calculation; definition of a corrected formulation with a view to studying laminar flows in the case of large Reynolds numbers. The chosen formulation is discussed theoretically, encompassing the aspects mentioned. A solution algorithm is presented, based on a general conjugate gradient method; numerical results are presented for various cases of viscous, incompressible, laminar flows: (1) in a square cavity; (2) around a circular cylinder; and (3) around a NACA 0018 profile at zero angle of attack for Reynolds numbers up to 5000. Author (ESA)

N82-12112*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

GEOPHYSICAL FLUID DYNAMICS

William W. Fowlis *In its* Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 25-31 refs (For primary document see N82-12109 03-18)

Avail: NTIS HC A10/MF A01 CSCL 20D

N82-12116*# Tennessee Univ. Space Inst., Tullahoma.

TWO-PHASE FLOW AND HEAT TRANSFER UNDER LOW GRAVITY

Walter Frost *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 43-57 refs (For primary document see N82-12109 03-18)

Avail: NTIS HC A10/MF A01 CSCL 20D

N82-12119*# Case Western Reserve Univ., Cleveland, Ohio.

CONVECTION IN FLUIDS AT REDUCED GRAVITY

Simon Ostrach *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 69-95 (For primary document see N82-12109 03-18)

Avail: NTIS HC A10/MF A01 CSCL 20D

N82-12120*# Rochester Univ., N. Y. Dept. of Mechanical and Aerospace Engineering.

EFFECTS OF SPACECRAFT MOTIONS ON FLUIDS EXPERIMENTS

Roger F. Gans *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 96-102 refs (For primary document see N82-12109 03-18)

Avail: NTIS HC A10/MF A01 CSCL 20D

N82-12121*# National Aeronautics and Space Administration, Washington, D. C.
TRANSIENT THERMAL CONVECTION IN MICROGRAVITY
Robert F. Dressler *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 103-112 refs (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 20D

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-12417 New Jersey Inst. of Tech., Newark.
STATISTICAL AVERAGING IN POSITION DETERMINATION BY HOLOGRAPHY UNDER TURBULENCE CONDITIONS Ph.D. Thesis
Paul Aloysius McGovern 1981 153 p
Avail: Univ. Microfilms Order No. 8121969

An investigation of several, disparate phenomena was conducted with the aim of developing a surveying system capable of overcoming the limitations imposed by turbulence in modern surveying. This method incorporates standard holographic techniques and time domain statistical averaging of survey data. Some pertinent characteristics of atmospheric turbulence were reviewed, and the restrictions imposed on standard surveying practices by such turbulence are identified. A model for the turbulent medium is proposed and several theoretical results summarized and extended. Dissert. Abstr.

N82-12418 California Univ., Santa Barbara.
DEVELOPMENT AND APPLICATIONS OF COMPUTER-ASSISTED ACOUSTIC HOLOGRAPHY Ph.D. Thesis
Carl Frederick Schueler 1980 160 p
Avail: Univ. Microfilms Order No. 8120752

Holographic underwater imaging with coherent acoustic radiation and a digital computer is described. The development of hardware and software to produce and digitally reconstruct acoustic holograms is discussed. Among several digital techniques to reconstruct acoustic holograms is one known as backward-propagation. This method is described in a way so that its peculiar characteristics can be explained with reference to aliasing and replication of discrete Fourier transforms. One and two-dimensional images are presented. Using the concept of point-image size, the resolution of the coherent experimental system used to obtain these results is found to be about 1.5 times the diffraction-limited resolution value. Furthermore, the diffraction-limited system resolution matches the Rayleigh resolution criterion that is usually used to evaluate incoherent imaging systems. Dissert. Abstr.

N82-12419*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A RADIONUCLIDE COUNTING TECHNIQUE FOR MEASURING WIND VELOCITY
Jag J. Singh, G. S. Khandelwal (Old Dominion Univ.), and Gerald H. Mall (Computer Sciences Corp., Hampton, Va.) Dec. 1981 25 p refs
(NASA-TM-83202; L-14792) Avail: NTIS HC A02/MF A01 CSCL 14B

A technique for measuring wind velocities of meteorological interest is described. It is based on inverse-square-law variation of the counting rates as the radioactive source-to-counter distance is changed by wind drag on the source ball. Results of a feasibility study using a weak bismuth 207 radiation source and three Geiger-Muller radiation counters are reported. The use of the technique is not restricted to Martian or Mars-like environments. A description of the apparatus, typical results, and frequency response characteristics are included. A discussion of a double-pendulum arrangement is presented. Measurements reported herein indicate that the proposed technique may be suitable for measuring wind speeds up to 100 m/sec, which are either steady or whose rates of fluctuation are less than 1 kHz. N.W.

N82-12420# Naval Research Lab., Washington, D. C. Optical Sciences Div.
PHOTOTHERMAL MEASUREMENT OF OPTICAL SURFACE ABSORPTION USING STRAIN TRANSDUCERS Interim Report
D. H. Leslie and G. L. Trusty 15 Sep. 1981 14 p refs
(AD-A104745; NRL-MR-4575) Avail: NTIS HC A02/MF A01 CSCL 10/2

We discuss the measurement of small optical surface absorption coefficients. A demonstration experiment was performed using a metallurgical strain gauge to measure 488 nm absorption on the surface of a glass plate. A strain of 10 to the minus 8th power resulted from absorption of 0.3 watts. The results are interpreted and the sensitivity of a proposed fiber optic strain gauge is discussed. GRA

N82-12421# Spectrack Systems Div., Cypress, Calif.
CABLE-LENGTH-MEASUREMENT SYSTEM Final Report
30 Apr. 1981 50 p
(Contract W-7405-eng-48)
(DE81-030015; UCRL-15355-Add) Avail: NTIS HC A03/MF A01

The system utilizes the CHIRP technique to measure accurately the static cable length, and the Doppler effect to measure the dynamic rate of change of cable length as it is burned away during tests. Results of this study show that both techniques work well when operated one at a time, but when both CHIRP and Doppler channels are operated simultaneously, interference is produced. DOE

N82-12422# Bendix Corp., Kansas City, Mo.
AUTOMATION OF A SPECIMEN STAGE IN AN ELECTRON MICROPHOBE Final Report
T. E. Pedersen Sep. 1981 17 p refs
(Contract DE-AC04-76DP-00613)
(DE81-030691; BDX-613-2668) Avail: NTIS HC A02/MF A01

The specimen stage of the electron microprobe at Bendix Kansas City was automated. Hardware was constructed to match stepping motors to the stage axis drives; axis drive mechanisms were overhauled; and spatial resolution on each axis was determined. DOE

N82-12423# Stanford Linear Accelerator Center, Calif.
COORDINATE MEASUREMENT BY CURRENT DIVISION: A SIMPLE SYSTEM FOR MULTICHANNEL DETECTORS
B. Gottschalk Aug. 1981 33 p ref
(Contract DE-AC03-76SF-00515; Grant NSF PHY-79-20821)
(DE81-030176; SLAC-TN-81-6) Avail: NTIS HC A03/MF A01

A current division scheme is described based on an unorthodox connection of the 733 amplifier chip: a common-base input can be obtained by grounding the normal inputs and driving a gain control terminal. With ganged multiwire chambers detecting cosmic rays in the proportional region, under realistic operating conditions (charge approx. 2 picocoulombs per gap), the resolution is about 2% of full length. Calibration procedures are discussed, as are the effects of changing various parameters. DOE

N82-12424# Unitex Corp., Salt Lake City, Utah.
HIGH-TEMPERATURE COUNTER-FLOW RECUPERATOR Final Report
F. Rudloff May 1981 324 p refs
(Contract DE-AC07-80ID-12077)
(DE81-031923; DOE/CS-12077/T1) Avail: NTIS HC A14/MF A01

The commercial potential of a helical recuperator design in recovering waste heat from industrial furnaces is reported. The helical recuperator concept consists of a cylindrical column with an interior helical interface which separates the preheat air and the combustion gas. The column operates in a teer flow mode and is formed from modular sections. The material evaluation consisted of exposing material samples to a soda-lime glass furnace environment for a fifteen week period. ECP-3, X-81, and Unichrome were the best suited for use in a soda-lime environment and ECP-3 was the best candidate with respect to manufacturing. Two potential design modifications were identified: a finned design and a double helix design. For materials that showed the greatest potential for use in the glass environment, the double helix design made from ECP-3 was the most economical producing payback periods of 6 to 14 years. DOE

N82-12425# Los Alamos Scientific Lab., N. Mex.
USER'S GUIDE TO THE HYDROGEN MONITOR
M. M. Meir (NBS, Washington, D.C.) and E. L. Adams Aug. 1981 22 p refs
(Contract W-7405-eng-36)
(DE81-032023; LA-8957-MS) Avail: NTIS HC A02/MF A01

A protocol for calibration of the hydrogen monitor and for its use as an assay instrument is presented. A statistical analysis for the system, including effects of deadtime and pile-up loss, is developed, and the software that supports the system is described. DOE

N82-12426# Siemens A.G., Munich (West Germany). Unternehmensbereich Bauelemente.
INTEGRATED HUMIDITY SENSOR Final Report
Heinz Hebbeker, Johann Kammermaier, Rudolf Knauer, Franz Lindl, Winfried Peters, Joachim Rauhut, and Rudolf Theuerl Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 57 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-007; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,80

A compact humidity sensor with a capacitive sensor element and processing electronics, for measuring the relative humidity of air, was developed. By a systematic selection of materials for dielectrics and electrodes, signals with linear dependence on moisture and only small changes with temperature were obtained. The electronic circuits are based on pulse length modulation and are designed for digital display. Two alternatives were developed. The circuits with bipolar IC's were specially laid out with 20 mA output, while the CMOS circuits were designed to save energy. In both cases the output signals are evaluated by microcomputers. A specially formed case provides mechanical protection for the sensor element and moistureproof encapsulation of the circuits. The modules were developed for one fabrication stage and were given to consumers for testing. Author (ESA)

N82-12427# Valvo G.m.b.H., Hamburg (West Germany). Produktbereich MOS-ICS.
NEW PHOTOLITHOGRAPHIC METHODS: PROJECTION ALIGNMENT FOR THE METALLIZATION OF HIGHLY INTEGRATED CIRCUITS Final Report
Ulrich Koenig, Hans-Peter Eggers, Walter Demmer, and Wolfgang Zetmann Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 75 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-018; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,50

A multilayer metallization interconnection system with a layer sequence of Pt Si-CO-SiO2-Ti-Pt-An was developed. The high quality of the metallization system is documented by life test results. The performance of the complete technology is shown by the realization of an IEZL design with a high packing density. The system is suitable for bipolar integrated circuits, but due to high costs it is only meaningful in cases with high metallization requirements. The projection alignment system, appropriate to a production process and with optical and technological performances suitable for a double layer interconnection, was tested. Author (ESA)

N82-12428# Valvo G.m.b.H., Hamburg (West Germany). Roehren- und Halbleiterwerke.
NEW PHOTOLITHOGRAPHIC METHOD FOR SMALL DIMENSION. DIRECT STEP AND REPEAT TECHNIQUE (SILICON REPEATER) Final Report
Heino Fehling Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 104 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-019; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21,60

The direct step and repeat technique was investigated with a silicon repeater, designed for mask as well as slice illumination. The testing of this machine in connection with slice technology is emphasized, especially as to the automatic alignment system. The excellent optical performance and the high positioning and alignment accuracy were demonstrated with different semiconductor technologies. The automatic alignment system performs mask to wafer alignments within + or - 01 micron and overlays of different mask levels within + or - 0.25 micron. For the process evaluation, a comparison was made with a projection aligner. Author (ESA)

N82-12429# Technische Physische Dienst TNO-TH, Delft (Netherlands).
HOLOGRAPHIC STUDY OF IMPACT PHENOMENA
R. L. vanRenese and H. J. Raterink 2 Dec. 1980 34 p refs
(TPD-1980-0-3; TDCK-75067) Avail: NTIS HC A03/MF A01

Impact phenomena of airgun projectiles on ceramic targets are discussed. The difference between the deformation velocities observed in different experiments is studied. While measured values of about 1.6 m/sec are cited, under similar experimental conditions velocities one or two orders of magnitude greater are also found. A model is developed which describes the spatial extension of the double exposure interference pattern as a function of the parameters deformation velocity, radial velocity of the deformation wave, pulse duration, whole body motion and time. Nonlinear relations for the deformation velocity, and the radial velocity, as a function of time are considered in order to bring the computed results into better agreement with the observed phenomena. As the interference patterns observed appear to be very finely detailed, an alternative holographic setup is described, yielding holograms that can be microscopically evaluated. Author (ESA)

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-12430 Cornell Univ., Ithaca, N. Y.
INTENSE PROTON BEAM EXCITATION OF A HIGH PRESSURE ARGON-NITROGEN LASER Ph.D. Thesis
Larry Glenn Wiley 1981 321 p
Avail: Univ. Microfilms Order No. 8119479

An intense proton-beam diode source was developed and beam transport was studied. The magnetically insulated diode produced a uniform planar proton beam having a half-angle divergence less than 4 deg. Beam transport studies included vacuum propagation with and without magnetic focusing fields. Also, spatial bunching of the proton beam during propagation was obtained by using a variable impedance pulse forming line to produce a rapidly rising accelerating voltage pulse. The 0.5 MeV proton beam extracted from the diode source was injected into a high pressure laser cavity through a 2 micron thick mylar foil window. The protons deposited about 0.18 MeV of their energy in the foil and the remainder within a short range (0.15 to 1.2 cm) in the 300-3040 Torr Ar/N2 gas mixture. Ionization and excitation of the gases by the proton beam led to selective excitation of the upper laser level and to subsequent laser action at wavelength of 337.1, 357.7, and 380.5 nm corresponding to electronic transitions to the lower laser levels, respectively. Results from the experimental study of the laser energy, power, and spectral emission were compared to the predictions of a zero dimensional, uniform-gain model of the laser which was solved numerically. Dissert. Abstr.

N82-12431*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXCESS NOISE IN TUNABLE DIODE LASERS
Carroll W. Rowland Nov. 1981 16 p refs
(NASA-TP-1935; L-14453) Avail: NTIS HC A02/MF A01

CSCL 20E

The method and the apparatus for identifying excess-noise regions in tunable diode lasers are described. These diode lasers exhibit regions of excess noise as their wavelength is tuned. If a tunable diode laser is to be used as a local oscillator in a superheterodyne optical receiver, these excess-noise regions severely degrade the performance of the receiver. Measurement results for several tunable diode lasers are given. These results indicate that excess noise is not necessarily associated with a particular wavelength, and that it is possible to select temperature and injection current such that the most ideal performance is achieved. Author

N82-12432# Naval Research Lab., Washington, D. C.
A NEW POWER METER CONCEPT FOR HIGH ENERGY LASERS Interim Report
P. B. Ulrich, G. L. Trusty, and D. H. Leslie 24 Sep. 1981 15 p refs
(AD-A104824; NRL-MR-4429) Avail: NTIS HC A02/MF A01 CSCL 20/5

We describe a new concept for measurement of High Energy Laser (HEL) power. The technique is based upon the phenomenon of optoacoustic detection, which is a sensitive measurement of the sound waves created by absorption of a laser beam of known power with a sample of absorber material for the purpose of absorption coefficient determination. We propose that this process can be inverted to produce an absolute measurement of laser power by using a material for which the absorption coefficient at the laser frequency is sufficiently well known. We present a conceptual design and we suggest studies for future development of the concept. Author (GRA)

N82-12433# Naval Research Lab., Washington, D. C.
THE RAYLEIGH-TAYLOR AND KELVIN-HELMHOLTZ INSTABILITIES IN TARGETS ACCELERATED BY LASER ABLATION Interim Report
M. H. Emery, J. H. Gardner, and J. P. Boris 25 Sep. 1981 20 p refs
(AD-A104804; NRL-MR-4626) Avail: NTIS HC A02/MF A01 CSCL 20/5

Using the FAST2D laser-shell simulation model we have accelerated a 20 micrometer thick plastic foil up to 160 km/s. The foil maintained its integrity up to 10 ns giving an aspect ratio of 40. We are able to follow the Rayleigh-Taylor bubble-and-spike development far into the nonlinear regime and beyond the point of foil fragmentation. Strong shear flow develops at the interface between the bubble-and-spike which leads to the development of the Kelvin-Helmholtz instability. The K-H instability causes the tips of the spikes to widen and as a result reduce their rate of 'fall'. Author (GRA)

N82-12434# Naval Research Lab., Washington, D. C.
COHERENT AND INCOHERENT RADIATION FROM FREE ELECTRON LASERS WITH AN AXIAL GUIDE FIELD Interim Report
H. P. Freund, P. Sprangle, D. Dillenburg, E. H. daJornada, B. Liberman, and R. S. Schneider 8 Oct. 1981 54 p refs
(WF32389592)
(AD-A104806; NRL-MR-4643) Avail: NTIS HC A04/MF A01 CSCL 20/5

The spontaneous and induced emission from a free electron laser is treated for the case in which an axial magnetic field is imposed in addition to the helical, axially periodic wiggler magnetic field. The classes of possible single-particle trajectories in this configuration are discussed, and the results are applied to a calculation of the incoherent radiation from a beam of relativistic electrons in the system. The coherent radiation is treated by solving the Vlasov-Maxwell equations for the linear gain in the tenuous beam limit, where the beam plasma frequency is much less than the radiation frequency and self-field effects can be ignored. Author (GRA)

N82-12435# University of Southern California, Los Angeles. Electronic Sciences Lab.
STUDIES OF OPTICAL-BEAM PHASE-CONJUGATION BY NONLINEAR REFRACTION Interim Scientific Report, 1 Dec. 1979 - 30 Nov. 1980
R. W. Hellwarth 30 Jan. 1981 41 p refs
(Contract AF-AFOSR-3479-78; Grant NSF ENG-78-04774; AF Proj. 2301)
(AD-A105066; AFOSR-81-0643TR; ISR-3) Avail: NTIS HC A03/MF A01 CSCL 20/5

We demonstrated the first cw phase-conjugating mirror with gain, and made a self-oscillating resonator which emitted a diffraction-limited optical beam while severe phase aberration was present in the resonator. We demonstrated storable and erasable phase-conjugate images in the nanosecond regime by a one-photon photorefractive process. We achieved the first demonstration of a wide angle (approx. 45 deg.) narrowband (approx. 1/10 cm) optical filter using phase conjugation. We achieved the first demonstration of full vector-wave phase-conjugation by which an image was restored after double-passing a birefringent phase aberrator. We demonstrated edge-enhancement of an optical phase-conjugate image in real time. Studies of resonant nonlinear refraction and phase conjugation in sodium vapor continued. Author (GRA)

N82-12436# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.
SCALING LAWS FOR PULSED CHAIN-REACTION CHEMICAL LASERS
Harold Mirels, Robert Hofland, Jr., and James S. Whittier 7 Aug. 1981 42 p refs
(Contract F04701-80-C-0081)
(AD-A104752; TR-0081(6725)-1; SD-TR-81-57) Avail: NTIS HC A03/MF A01 CSCL 20/5

Scaling laws for pulsed chain-reaction chemical lasers are deduced with the use of a two-level vibrational model. The performance of a saturated laser depends only on the parameter K = t sub cd/t sub p, where t sub cd and t sub p are the characteristic collisional deactivation and characteristic pumping times, respectively. The normalized output energy per unit volume per pulse of a saturated HF chain-reaction laser is 2E/Epsilon H sub 2,0 = K(1 + O(K)), where E is output energy per unit volume per pulse, Epsilon is energy per mole of photons, and H sub 2, O is the initial concentration of H sub 2 in moles per unit volume. In the range 0.02 < or = thi << 1 the normalized output energy from a saturated HF laser can be expressed as 2E/Epsilon H sub 2, O = thi, where thi approx. = (F/F sub 2) sub O 1/2(F sub 2/H sub 2)O(1 + 0.094(F sub 2/H sub 2) sub O) to the minus 1/2 power. In the latter regime the product Et sub e is a constant for a saturated laser (t sub e = pulse length). Corrections for multiple vibrational levels are given in an Appendix. Author (GRA)

N82-12437# Sandia Labs., Albuquerque, N. Mex. Laser Technology Div.
LASER SYSTEMS FOR THE COMBUSTION RESEARCH FACILITY: ORION
P. J. Brannon, F. R. Franklin, and E. D. Jones Jul. 1981 33 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030989; SAND-81-1598) Avail: NTIS HC A03/MF A01

A frequency doubled Nd:YAG/Glass laser system was constructed to make single shot spontaneous Raman spectroscopy measurements of ongoing combustion processes. The output of the system is 5 J of 1.064 micron radiaton and 0.8 J or 532 nm radiation in a 2 micron sec pulse. The repetition rate of the system is 1 pps. A microprocessor based diagnostic and control system for the operation is described. DOE

N82-12438# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
CONSTRUCTION AND CHARACTERISTICS OF AN OPTICALLY PUMPED FIR-LMR SPECTROMETER [AUFBAU UND EIGENSCHAFTEN EINES OPTISCH GEPUMPTEN FIR-LMR-SPEKTROMETERS]
A. W. Preuss, F. Temps, and H. G. Wagner Sep. 1980 63 p refs In GERMAN
(MPIS-18/1980; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 12.45

The principle of the spectrometers, the CO2 and FIR lasers are described in detail. The FIR laser operates at more than 50 lines in the wavelength region from 70 to 743 microns and has an output power of about 0.2 mW. Spectrometer absorption

signals are directly proportional to the concentration of radicals. Due to the large number of detectable particles and its sensitivity, this apparatus enables the direct measurement of the concentration of reagents and reaction products for the determination of the time constants of the reactions of free radicals.
Author (ESA)

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-12439 California Univ., Los Angeles.
FRICTION AND WEAR BEHAVIOR OF Ti-6Al-4V AND A Ni BASE ALLOY (HASTELLOY C-276) Ph.D. Thesis
Nam-Soo Kim 1981 181 p
Avail: Univ. Microfilms Order No. 8120989

Some variables for wear and friction were investigated riding Ti-6Al-4V and Hastelloy C-276 with a low carbon steel as a mating material. A ring on ring type of specimen contact rather than a pin on disk type was used. The effect of specimen geometry was investigated when two kinds of specimen contact were arranged. Material properties and specimen geometry were variables for the titanium alloy and steel couple. The specimens of Ti-6Al-4V were heat-treated in different ways. It was found that specimen geometry is an important factor for friction and wear behavior specially when the difference in hardness between two contacting materials is large. Variables of load, speed, and specimen geometry were investigated for the Hastelloy and steel couple. Wear amount increases with increasing load and sliding speed. The average coefficient of friction significantly decreases with increasing the applied load. Dissert. Abstr.

N82-12440 Rensselaer Polytechnic Inst., Troy, N. Y.
THE EFFECT OF A TRANSLATING HIGH ASPECT RATIO PARTICLE IN A PLANE SLIDER BEARING Ph.D. Thesis
Michael Thomas Languirand 1981 127 p
Avail: Univ. Microfilms Order No. 8121153

An approximate solution of Stokes equations to determine the pressure and velocity fields in an infinite slider bearing containing a two dimensional high aspect ratio particle of arbitrary cross sectional shape is presented. The fluid field is divided into four regions; upstream, above, below and downstream of the particle. The Stokes equations are applied to each region and solved through specific continuity requirements and pressure matching conditions. Approximate solutions are given for the pressure and velocity fields. A pressure drop which develops in the pressure field at the particle location is noted. The magnitude of this drop is dependent on particle size, velocity and location. The particle has a major effect on the bearing pressure field when it is able to significantly obstruct the flow of the lubricant. The transient pressure in a slider bearing as a high aspect ratio two dimensional rectangular particle is passed through the fluid film. The apparatus measures pressure at a particular location in the bearing and simultaneously measures the particle's displacement with respect to its initial starting location. The effect of particle velocity on the pressure field in the bearing is demonstrated. Dissert. Abstr.

N82-12441* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
LIQUID IMMERSION APPARATUS FOR MINUTE ARTICLES Patent
Jewell G. Belcher, Jr. and Ben R. Hollis, Jr., inventors (to NASA) Issued 1 Sep. 1981 4 p filed 18 Jul. 1980 Supersedes N80-32585 (18 - 23, p 3121)
(NASA-Case-MFS-25363-1; US-Patent-4,286,542; US-Patent-Appl-SN-171933; US-Patent-Class-118-423; US-Patent-Class-118-500; US-Patent-Class-134-137) Avail: US Patent and Trademark Office CSCL 13D

Apparatus is disclosed for immersing minute integrated circuit chips in an etching solution in manufacturing integrated circuits during research and development. The apparatus includes a holder, having a handle and basket support for carrying a removable unitary basket and lid structure where fluid flow-through passages are formed, and wherein graduated openings in the handle provide for adjustably supporting the basket in a breaker at a desired level.
Official Gazette of the U.S. Patent and Trademark Office

N82-12442* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MODIFIED FACE SEAL FOR POSITIVE FILM STIFFNESS Patent
Izhak Etsion (Technion - Israel Inst. of Tech.) and Abraham Lipshitz, inventors (to NASA) (Technion - Israel Inst. of Tech.) Issued 29 Sep. 1981 4 p Filed 7 Nov. 1979 Supersedes N80-12414 (18 - 03, p 0334) Sponsored by NASA
(NASA-Case-LEW-12989-1; US-Patent-4,291,887; US-Patent-Appl-SN-092145; US-Patent-Class-277-27; US-Patent-Class-277-40; US-Patent-Class-277-93R) Avail: US Patent and Trademark Office CSCL 11A

The film stiffness of a face seal is improved without increasing the sealing and dam area by using an apparatus which includes a primary seal ring in the form of a nose piece. A spring forces a sealing surface on the seal ring into sealing contact with a seat to form a face seal. A circumferential clearance seal is formed in series with this face seal by a lip on the piece. The width of the surface of the lip is subsntially the same as the width of the sealing surface on the face seal and the clearance between the surface on the lip and the shaft is substantially the same as the spacing between the face sealing surfaces on the face seal when the shaft is rotating. The circumferential clearance seal restricts the flow of fluid from a main cavity to an intermediate cavity with a resulting pressure drop. The hydrostatic opening face is strongly dependent on the face seal clearance, and the desired axial stiffness is achieved.
Official Gazette of the U.S. Patent and Trademark Office

N82-12443# National Aerospace Lab., Tokyo (Japan).
STUDY AND DEVELOPMENT OF FACE-CONTACT, BELLOWS MECHANICAL SEAL FOR LIQUID HYDROGEN TURBOPUMP
Masataka Nosaka, Mineo Suzuki, Yukio Miyakawa, Kenjiro Kamijo, Masataka Kikuchi, and Masahiro Mori 1981 38 p refs In JAPANESE; ENGLISH summary
(NAL-TR-653; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

A face contact, bellows mechanical seal for a liquid hydrogen turbopump (seal diameter: 43.2 mm) is developed. The developed mechanical seal has a seal nosepiece, which reduces the sealing face distortion at low temperature and high pressure, and results in a small amount of seal leakage and wear and a low starting torque. A vibration damper made of Teflon sheets is fixed in the nosepiece in order to prevent it from fluttering during the rapid start or stop of a turbopump. The turbopump mechanical seal satisfied almost all requirements for application to a turbopump: seal leakage, wear life, reliability and starting torque. S.L.

N82-12444*# Chrysler Corp., Detroit, Mich.
AGT-102 AUTOMOTIVE GAS TURBINE Summary Report
Jun. 1981 434 p refs Sponsored by NASA. Lewis Research Center Prepared jointly with Williams Research Corp., Walled Lake, Mich.
(Contract DE-AC02-76CS-52749)
(NASA-CR-165353; DOE/NASA/2749-81/1) Avail: NTIS HC A19/MF A01 CSCL 13I

Development of a gas turbine powertrain with a 30% fuel economy improvement over a comparable S1 reciprocating engine, operation within 0.41 HC, 3.4 CO, and 0.40 NOx grams per mile emissions levels, and ability to use a variety of alternate fuels is summarized. The powertrain concept consists of a single-shaft engine with a ceramic inner shell for containment of hot gasses and support of twin regenerators. It uses a fixed-geometry, lean, premixed, prevaporized combustor, and a ceramic radial turbine rotor supported by an air-lubricated journal bearing. The engine is coupled to the vehicle through a widerange continuously variable transmission, which utilizes gearing and a variable-ratio metal compression belt. A response assist flywheel is used to achieve acceptable levels of engine response. The package offers a 100 lb weight advantage in a Chrysler K Car front-wheel-drive installation. Initial layout studies, preliminary transient thermal analysis, ceramic inner housing structural analysis, and detailed performance analysis were carried out for the basic engine. S.L.

N82-12445*# Bales-McCoin Tractionmatic, Inc., El Paso, Tex.
DESIGN STUDY OF A CONTINUOUSLY VARIABLE ROLLER CONE TRACTION CVT FOR ELECTRIC VEHICLES Final Report
Dan K. McCoin and R. D. Walker Sep. 1980 197 p refs
(Contract DEN3-115; EC-77-A-31-1044)
(NASA-CR-159841; DOE/NASA/0115-80/1;
Bales-McCoin-80-BMT-002) Avail: NTIS HC A09/MF A01
CSCL 13I

Continuously variable ratio transmissions (CVT) featuring cone and roller traction elements and computerized controls are studied. The CVT meets or exceeds all requirements set forth in the design criteria. Further, a scalability analysis indicates the basic concept is applicable to lower and higher power units, with upward scaling for increased power being more readily accomplished. S.L.

N82-12446*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MAGNETOHYDRODYNAMICS (MHD) ENGINEERING TEST FACILITY (ETF) 200 MWe POWER PLANT. DESIGN REQUIREMENTS DOCUMENT (DRD) Final Report
H. S. Rigo, R. W. Bercaw, J. A. Burkhart, T. S. Mroz, D. J. Bents, and A. M. Hatch (MIT) Sep. 1981 88 p refs Revised
(Contract DE-AI01-77ET-10769)
(NASA-TM-82705; DOE/NASA/10769-20-Rev-3) Avail: NTIS
HC A05/MF A01 CSCL 10B

A description and the design requirements for the 200 MWe (nominal) net output MHD Engineering Test Facility (ETF) Conceptual Design, are presented. Performance requirements for the plant are identified and process conditions are indicated at interface stations between the major systems comprising the plant. Also included are the description, functions, interfaces and requirements for each of these major systems. The lastest information (1980-1981) from the MHD technology program are integrated with elements of a conventional steam electric power generating plant. M.D.K.

N82-12447*# EG & G Washington Analytical Services Center, Inc., Riverdale, Md.
IONOSPHERIC PROPAGATION CORRECTION MODELING FOR SATELLITE ALTIMETERS
George Nesterczuk Nov. 1981 14 p refs
(Contract NAS6-3075)
(NASA-CR-156881) Avail: NTIS HC A02/MF A01 CSCL 20D

The theoretical basis and avaliable accuracy verifications were reviewed and compared for ionospheric correction procedures based on a global ionsopheric model driven by solar flux, and a technique in which measured electron content (using Faraday rotation measurements) for one path is mapped into corrections for a hemisphere. For these two techniques, RMS errors for correcting satellite altimeters data (at 14 GHz) are estimated to be 12 cm and 3 cm, respectively. On the basis of global accuracy and reliability after implementation, the solar flux model is recommended. Author

N82-12448# Naval Ocean Systems Center, San Diego, Calif.
PORTABLE AIR DRIVEN VARIABLE SPEED FIBER OPTIC CABLE TERMINATION POLISHER Technical Report, Mar. 1979 - Aug. 1980
A. Flores 15 Mar. 1981 46 p refs
(AD-A104797; NOSC/TR-708) Avail: NTIS
HC A03/MF A01 CSCL 13/8

Manufacturing processes and techniques were developed to produce in larger volume a portable air driven variable speed fiber optic cable polisher with the necessary characteristics to perform in the operational environments encountered during installation and maintenance of fiber optic cables in military aircraft. Author (GRA)

N82-12449# Alpha Glass, Inc., El Segundo, Calif.
CUTTING TOOL COATINGS PROGRAM Final Report
Nov. 1980 47 p
(Contract DE-AC03-80CS-40446)
(DE81-026289; DOE/CS-40446/T1) Avail: NTIS
HC A03/MF A01

This project was designed to validate the energy saving potential of hard refractory coatings on cutting tools. One-quarter-inch jobber drills were selected to be coated with the hard refractory compounds of TiC and TiN by the Activated Reactive Evaporation (ARE) process. The TiN-coated drills performed best with tool lives from 2 to 4 times those of the black oxide coated drills, and up to 20 times those of bright drills. This improvement in tool life can be correlated to energy savings as expressed by the criteria of Btu/lb of material removed. Limited direct force measurements were also taken and indicated a reduction in cutting forces of TiN-coated drills over black-oxide-coated drills. A commercial ARE coating system was concieved and analyzed; it was found to be a potentially economica solution to coating a large variety of tools. If coated tools from such a system were fully used in industry, an estimated energy savings of 10 to the 13th power 10 to the 14th power Btu/y could be achieved. This report describes the cutting tool program background work, the project tasks, and the results of the project. DOE

N82-12450# Westinghouse Electric Corp., Pittsburgh, Pa.
STEAM TURBINE BLADES: CONSIDERATIONS IN DESIGN AND A SURVEY OF BLADE FAILURES
R. C. Bates, F. J. Heymann, V. P. Swaminathan, and J. W. Cunningham Aug. 1981 127 p refs Sponsored by EPRI
(EPRI Proj. 912-1)
(DE81-904249; EPRI-CS-1967) Avail: NTIS
HC A07/MF A01

Thermo-mechanical considerations and material selection criteria for the design of steam turbine blades are discussed from the mechanical engineer's point of view. Sources of vibratory excitation, responses to excitations, stress levels, resultant load histories, and various design features incorporated to minimize or resist stresses are covered. Blading alloy properties are discussed and compared, and parameters for fatigue testing are recommended. Several blade failure surveys are described. Results of a questionnaire on LP blade failures to American utilities and a review of recent Westinghouse experience are presented. Correlations between the number of failures and parameters such as blade life, failure locations, alloy, deposit chemistry, steam source, feedwater treatment, cooling water source, balance of plant problems, and temperature and pressure at the failed row are attempted. DOE

N82-12451# Mechanical Technology, Inc., Latham, N. Y.
ASSESSMENT OF ROTOR-BEARING DYNAMICS: A PLANNING STUDY FOR THE UTILITY INDUSTRY Summary Report
J. A. Tecza and E. S. Zorzi Electric Power Research Inst. Aug. 1981 22 p Sponsored by Electric Power Research Inst.
(EPRI Proj. 1648-2)
(DE81-904242; EPRI-CS-1990-SY) Avail: NTIS
HC A02/MF A01

This summary report presents results, recommendations, and conclusions drawn from a program effort to determine the current state of the art of rotor and bearing dynamic analyses of large steam turbine generators. The conclusions are grouped into three main areas of rotordynamic analysis, bearings, and condition monitoring. Budgetary estimates and program schedules are included. DOE

N82-12452# United Technologies Corp., South Windsor, Conn. Power Systems Div.
ADVANCED COOLING FULL-SCALE ENGINE DEMONSTRATION Final Report
Jul. 1981 215 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1319-3)
(DE81-904253; EPRI-AP-1934) Avail: NTIS
HC A10/MF A01

The advantages of advanced fabrication techniques for convectively cooled airfoils for utility combustion turbines were discussed with emphasis on airfoils fabricated from thin sheets of metal (water airfoil). It is demonstrated that low metal temperatures could be achieved, corrosion, erosion and deposition problems could be relieved, and economic benefits realized.

Results show that wafer airfoils could be fabricated in utility combustion turbine sizes. Low metal temperatures were achieved in a conceptual design, but experimental verification was not obtained. Tests to show that corrosion, erosion, and deposition problems were relieved. There are economic benefits for wafer airfoils relative to conventionally cast airfoils. Benefits are not large relative to benefits achievable by another fabrication technique, the bonded airfoil, which has a higher degree of development and manufacturing capability. DOE

N82-12453# Metallgesellschaft, A.G., Frankfurt am Main (West Germany). Metall-Lab.

FEASIBILITY STUDY ON THE FABRICATION OF LONGITUDINALLY WELDED HEAT EXCHANGER TUBES FOR SEA WATER DESALINATION PLANTS ON A FACTORY SHIP Final Report

Juergen Burggraf, Reiner Theobald, and Guenter Tietjen Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 104 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-M-80-004; Rept-54/1980; ISSN-0340-8868;) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21,90

These tubes offer advantages over seamless ones and make possible long tube evaporators elaborating a rough production layout estimating the weight as well as the space and drive power required. The necessary ship unit was designed, evaluating investment and operation costs. The technical feasibility of the construction of a factory ship for welded tubes appears realistic. However, corresponding tubes must first be tested on an industrial scale. Author (ESA)

N82-12454# Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium). Section Construction Metallique.

THE RELATION BETWEEN WELDING PARAMETERS FOR A BEAM SECTION AND ITS BUCKLING RESISTANCE [RELATION ENTRE LES PARAMETRES DE SOUDAGE D'UNE COLONNE ET SA CHARGE DE FLAMBEMENT]

A. Plumier Apr. 1981 43 p refs In FRENCH; ENGLISH summary Sponsored by Inst. pour l'Encouragement de la Recherche Scientifique dans l'Industrie et l'Agriculture

(CRIF-MT-143) Avail: NTIS HC A03/MF A01

Standardized curves for the calculation of buckling strength are called into question. These curves pertain to different structural members, such as beams and plates. It is demonstrated that for certain fabrication conditions, i.e., manual welding, particularly of I beams, these dimensioning curves give unreliable specifications. The analytical determination of the residual stress distribution in a welded I beam is considered. The evolution of the stress field in a plate being welded is described. Both thin and thick welded plates are dealt with. The method is applied to arrive at parametrical results for the buckling strength of welded sections, allowing the real safety factor to be determined for the defined distribution of welding parameters and cross sections. Complete relations for the calculation of residual stress in various structural profiles are shown. Author (ESA)

N82-12455# Centre Technique des Industries Mecaniques, St. Etienne (France).

STUDY OF FOAMING CHARACTERISTICS AND FOAMING UNDER PRESSURE: DEAERATING LUBRICANTS AND THE INFLUENCE OF ANTIFOAMING ADDITIVES [ETUDE DES CARACTERISTISQUES DE MOUSSAGE ET DE MOUSSAGE SOUS PRESSION - DESAERATION DES LUBRIFIANTS - INFLUENCE DES ADDITIFS ANTI-MOUSSE]

J. F. Maurel Dec. 1980 29 p In FRENCH Supersedes CETIM-1.2E.12.0

(CETIM-1.2E.12.3-Pt-5; CETIM-1.2E.12.0) Avail: NTIS HC A03/MF A01

The characteristics of foaming under pressure and their relevance to deaerating oil lubricants are discussed. Laboratory tests are described. The type of oil, test temperature, and the type of antifoaming additive were controlled. Results center on the concentration of antifoaming additive needed in order to assure only an acceptable amount of foaming. Foaming under pressure and deaerating can influence the effectiveness of an air/oil separator filter like those used in oil injection cooled reciprocating compressors. Author (ESA)

N82-12456# Centre Technique des Industries Mecaniques, Senlis (France).

LUBRICATION DURING DRAWING: BIBLIOGRAPHICAL ANALYSIS AND RESULTS, VOLUME 1 Final Report [LUBRIFICATION EN EMBOUTISSAGE. ANALYSE BIBLIOGRAPHIQUE, RESULTATS CETIM. TOME 1]

A. Ferron, R. Lombry, and R. Martin Sep. 1980 163 p refs In FRENCH

(CETIM-13-Y-152-Vol-1) Avail: NTIS HC A08/MF A01

Different lubricants used industrially in metal forming processes were characterized. Analysis results provide a rationale for the choice of lubricant. Friction and wear phenomena are reviewed. Lubrication, either as a thick film or thin film, is explained and criteria for classifying lubricants are established. Industrial objectives specific to deep drawing of mild steel, stainless steel, and aluminum are defined and related to different lubricants available, i.e., oils, aqueous emulsions, chemical solutions, and solid lubricants. The experimental analysis, using an industrial press, is outlined. Author (ESA)

N82-12457# Centre Technique des Industries Mecaniques, Senlis (France).

A HIGH PRESSURE HYDRAULIC PUMP: GHP 1000 DESCRIPTION Final Report [GROUPE HYDRAULIQUE HAUTE PRESSION GHP 1000 - DESCRIPTIF]

J. Lallement 11 Jan. 1981 10 p In FRENCH

(CETIM-5.42.24.0) Avail: NTIS HC A02/MF A01

A hydraulic pumping system is depicted. The main units (feed, return circuit, high pressure pump) are characterized. Operating data are discussed. The hydraulic fluid, pump operating life, system capacity, and operating safety systems are determined. Author (ESA)

N82-12458# National Centre of Tribology, Risley (England).

BALL BEARING EVALUATION FOR A HIGH PRECISION RADIOMETER MIRROR DRIVE

M. J. Todd and A. J. Walton Paris ESA May 1981 52 p refs

(Contract ESA-4012/79/NL-PP)

(ESA-(ESTL)47; ESA-CR(P)-1461) Avail: NTIS HC A04/MF A01

Rolling element bearings are considered for use with a rotating scanning mirror requiring extremely high pointing accuracy and low jitter on the rotational speed. The mirror is used in the ocean color monitor of COMSS. A theoretical assessment of possible bearing systems was made. Radial stiffness was measured and run out on ultra high precision shafts and bearings was performed to determine actual rotational speed variations. Results indicate that commercial ball bearings can be selected to meet the pointing system requirements. Author (ESA)

N82-12459# Lucas Aerospace Ltd., Hemel Hempstead (England).

COMPRESSION STRESS RELAXATION TESTING FOR DETERMINING THE PERFORMANCE OF ELASTOMERIC FLUID SHELLS

M. W. Aston, K. P. Palmer, and J. Bayley 1981 17 p refs

Avail: NTIS HC A02/MF A01

The compression stress relaxation properties of fluorocarbon and fluorosilicone 'O' rings are correlated to their sealing performance and related to other properties which are commonly used for assessing this performance. Correlation with sealing performance is good. Poor correlation is obtained with volume swell, compression set, low temperature brittle point and the Gehman T10 value. These properties could give a misleading indication of the likely sealing performance of the elastomer. Compression stress relaxation is the property which most closely conforms to the configuration in which most elastomeric seals are used and is the best property for indicating their likely sealing performance, particularly as it can be measured over the full range of environmental conditions that might be applied to the seal. Author (ESA)

N82-12117*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

TRIBOLOGY EXPERIMENT

William A. Wall *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 58-60 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 20K

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-12460# Centre Technique des Industries Mecaniques, St. Etienne (France).
FACING ON STAMPING DIES Final Report [REVETEMENT DES GRAVURES D'ESTAMPAGE]
Batit 15 Dec. 1980 21 p refs In FRENCH
(CETIM-1.3K.26.2) Avail: NTIS HC A02/MF A01

Three surface treatments, commercially available to improve the wear resistance of stamping die matrices, were tested and compared. The surface coatings were applied by the companies marketing the techniques. Testing was carried out in the laboratory under semi-industrial conditions. Results show that: (1) the Rocklin coating, which consists of tungsten carbides and/or titanium carbides, has the same wear characteristics as the unsurfaced test die; (2) electrodeposition of cobalt alloys (still process) improves wear resistance; and (3) boride coating on stamping tool steel is of little benefit since there is not enough difference in fracture strength between the unsurfaced die face and the coating. Author (ESA)

N82-12461# Centre Technique des Industries Mecaniques, St. Etienne (France).
BIBLIOGRAPHICAL STUDY OF NONDESTRUCTIVE TESTING APPLICABLE TO BONDING [ETUDE BIBLIOGRAPHIQUE DES MOYENS DE CONTROLE NON DESTRUCTIF ENVISAGEABLES POUR LES COLLAGES]
Benazet Oct. 1980 37 p refs In FRENCH
(CETIM-1.3N.20.2-Pt-1) Avail: NTIS HC A03/MF A01

The nondestructive characterization of surfaces to be bonded as well as tests which reveal the spreading behavior of glues after bonding are reviewed. No test which can unequivocably determine the suitability of a surface for bonding is found. However, for a given process, i.e., aluminum bonding, measurement of the difference in surface contact potentials gives good results. Among methods for testing the even spreading of glue between bonded surfaces, only ultrasonic techniques are at present economically feasible on an industrial level. Author (ESA)

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N82-12462# Polish Academy of Sciences, Warsaw.
SHEAR WAVES IN BUILDINGS SUBJECTS TO SEISMIC LOADING
Wladyslaw Nadolski, Amalia Pielorz, and Zaklad Ukladow Mechanicznych 1981 22 p refs
(ISSN-0208-5658) Copyright. Avail: Issuing Activity

The displacements of cross sections of columns in a multistorey building were determined with the use of one dimensional elastic waves taking into account reflections. Formulas were developed for accelerations of the building foundation and for equivalent damping of the viscous type. Analytical solutions were obtained in the form of recurrence formulas for the functions, by means of which displacements of the cross sections of the building columns can be determined at any moment of time. The physical model of a multistorey building is examined. A.R.H.

N82-12463# Polish Academy of Sciences, Warsaw. Inst. of Fundamental Technological Research.
THE PROBLEM OF AXIALLY SYMMETRIC FLOW OF IDEAL RIGID-PLASTIC HUBER-MISES MEDIUM WITHOUT ANY SPECIFIC HYPOTHESES
Marian Rogozinski 1981 21 p refs
(ISSN-0208-5658) Copyright. Avail: Issuing Activity

The general system of seven equations in the problem is reduced to two by means of, among other things, the introduction of two unknowns: alpha and beta. The necessary boundary values for posing the boundary problem in the case of a hyperbolic system are determined. The integrodifferential equation system is reduced to a hyperbolic system in the whole region under consideration by means of a suitable transformaton of alpha, beta, into bar alpha, beta. The method of characteristics is used. In the case of ellipticity, (the main alternative of the hyperbolicity, there is no uniqueness of solution, and some instability would occur because of the unbounded domain. A.R.H.

N82-12464 Iowa State Univ. of Science and Technology, Ames.
THE RESPONSE AND THE LIFT FORCE ANALYSIS OF A CYLINDER OSCILLATING IN STILL WATER Ph.D. Thesis
Youn-sik Park 1981 131 p
Avail: Univ. Microfilms Order No. 8122553

An elastically mounted cylinder exposed to a periodic fluid flow field is studied. The prediction of fluid lift forces and cylinder responses normal to the deterministic, sinusoidal oscillating flow is emphasized. A cylinder model was driven sinusoidally in still fluid in order to give a relative sinusoidal motion between the fluid and cylinder. A simple experimental apparatus and a strict control of the input variables such as cylinder driving amplitude and frequency were selected. The corresponding fluid lift forces and the cylinder response amplitude were measured for two different size cylinder models for various cylinder driving frequencies and amplitudes. It was found that the fluid lift forces and the cylinder response amplitudes for an elastically mounted cylinder can be explained and predicted using frequency ratios rather than Reynolds and the Keulegan-Carpenter numbers. The measured fluid lift forces were found to be far greater than those corresponding to a stationary cylinder exposed to an oscillating flow field. Dissert. Abstr.

N82-12465 Rensselaer Polytechnic Inst., Troy, N. Y.
EMISSION SPECTRA FROM EHD CONTACTS Ph.D. Thesis
Vincent Wen-Shiuan King 1981 134 p
Avail: Univ. Microfilms Order No. 8121150

A ball/plate sliding elastohydrodynamic contact was constructed by placing a diamond window at the bottom of a cup containing test fluid and rotating a loaded bearing ball over it about a horizontal axis. The infrared radiation generated by viscous friction in the lubricant film is transmitted through the window, collected by an all-mirror microscope objective, and analyzed by a Michelson interferometer. It is thus possible not only to determine lubricant and bearing ball surface temperatures but the infrared spectrum of the lubricants as well. The radiation emitted in the contact region is very weak, but the high sensitivity of the interferometer (Fourier spectrometer) is more than adequate to analyze it. The equivalence between infrared emission and absorption spectra was established. Dissert. Abstr.

N82-12466 Polytechnic Inst. of New York, Farmingdale.
VIBRATION OF CYLINDRICAL SHELLS AND PANELS OF OVAL CROSS-SECTION Ph.D. Thesis
Vlasios K. Koumousis 1980 285 p
Avail: Univ. Microfilms Order No. 8118881

The dynamic characteristics of simply supported and infinitely long cylindrical shells of oval cross section are established on the basis of Flugge type, thin shell theory. A method obtaining the dynamic characteristics of cylindrical panels of non circular cross section with simply supported, curved edges and any boundary conditions along their straight edges is presented. Numerical results are presented and the effect of the ovality as well as other geometric parameters of the shell are investigated, and the range of validity of the Donnell and Love type theories is established. The general solution of this system of eight equations is written as a linear combination of a set of eight independent solutions involving eight constants. Numerical results are obtained on the basis of the Flugge and Donnel type theories for oval panels with different ovality, length, thickness ratio and opening angles of 180 and 120. The influence of the geometric parameters and a comparison of the different theories were studied. Dissert. Abstr.

N82-12467 Washington Univ., Seattle.
WAVE INDUCED VIBRATIONS OF CONTINUOUS FLOATING STRUCTURES Ph.D. Thesis
Constantinos Georgiadis 1981 118 p
Avail: Univ. Microfilms Order No. 8121197

The response of continuous floating structures was studied. Hydrodynamic forces on a continuous floating structure are examined and boundary element methods were used for the numerical solution. Response of a continuous floating structure to long crested, oblique waves are investigted. Fourier transformation techniques and finite element modeling were applied. Errors of a rational finite element model are pointed out. Response of a continuous floating structure to short crested waves the sea is modelled as a random process with a directional energy spectrum. Monte-Carlo and linear filtering methods are used to obtain nodal loads satisfying appropriate space correlation of the waves. Response of floating bridges and breakwaters to boat wakes are also studied. Computer programs are developed to implement and to give a complete design support for the mentioned structures. Dissert. Abstr.

N82-12468 Illinois Univ. at Chicago Circle, Chicago.
PROPERTIES OF CONFINED CONCRETE SUBJECTED TO STATIC AND DYNAMIC LOADS Ph.D. Thesis
Shuaib Haroon Ahmad 1981 397 p
Avail: Univ. Microfilms Order No. 8120556

Accurate and reproducible complete stress-strain curves of unconfined and confined concrete subjected to uniaxial monotonic and cyclic compressive loads are investigated. Prior to systematically obtaining the stress-strain curves, the effect of the testing parameters (method of obtaining the descending portion of the stress-strain curve, effect of size, shape of the specimen, effect of age at testing) and methods of measuring (gage length effects for strain measurements) were also carefully studied. A constitutive law under multiaxial compressive loadings, for predicting the complete (ascending and descending portions) stress-strain curves was developed. A simple experimental technique (concrete confined in steel tube) was developed to obtain the post peak behavior under cylindrical trixial compressive loadings. Dissert. Abstr.

N82-12469 Washington Univ., Seattle.
A CRITICAL VOID GROWTH FAILURE CRITERION DEVELOPED FOR DYNAMIC AND STATIC LOADING CONDITIONS Ph.D. Thesis
A. M. Rajendran 1981 74 p
Avail: Univ. Microfilms Order No. 8121255

The classical plastic instability which precedes ductile failure is examined under conditions in which inertia terms are significant. When the constitutive laws for incompressible materials are used in the dynamic stability analysis, the results confirm the experimental evidence which indicates that the plastic instability is inhibited by inertia. This analysis however, can not provide an instability criterion capable of predicting failure under dynamic loading. Replacing the incompressible model with one applicable to porous plastic materials, provides an alternative means to predict failure under both static and dynamic loading conditions by the introduction of a failure criterion based on a critical void volume fraction. Encouraging results are obtained when this failure analysis is applied to different experimental conditions in which the failure occurs under either low or high mean stress levels. The results indicate that a material may fail when the void volume fraction reaches a critical level, and that the critical level is not dependent on the type of loading process required to produce this void volume fraction. Dissert. Abstr.

N82-12470 Cornell Univ., Ithaca, N. Y.
THE BEHAVIOR AND STRENGTH OF LAPPED SPLICES IN REINFORCED CONCRETE BEAMS SUBJECTED TO CYCLIC LOADING Ph.D. Thesis
Anthony Daniel Tocci 1981 275 p
Avail: Univ. Microfilms Order No. 8119436

Tensile lap splices in reinforced concrete beams are studied using specimens subjected to repeated and reversed cyclic loading into the inelastic range. The parameters that influence the strength of tensile lap splices are valuated and guidelines for the design of splices to resist seismic loading are developed. Tests on full scale beam specimens which had either two no. 8 or two no. 10 main bars spliced in a region of constant moment or a region of combined moment and shear were conducted. The main variables studied are load history, the amount and distribution of transverse steel and the influence of shear. The number of cycles and maximum strain level in the inelastic range has a greater influence on splice performance than if load reversals are included in the loading sequence. Dissert. Abstr.

N82-12471 State Univ. of New York at Buffalo.
INELASTIC FINITE STRAIN ANALYSIS OF STRUCTURAL METALS SUBJECTED TO NONPROPORTIONAL LOADINGS Ph.D. Thesis
Nien-Tsu Tseng 1981 209 p
Avail: Univ. Microfilms Order No. 8122206

The formulation of material constitutive relationships and solution procedures to deal with inelastic finite strain analysis of structural metals subjected to nonproportional loadings is studied. When metal structures are undergoing strong earthquake ground motions, the loadings are nonproportional in nature and the strains in various locations of the structure should be treated as finite. In order to treat the dependent behavior of materials under nonproportional conditions, a rate independent plasticity model is proposed. Excellent correlation is established between the proposed model and experimental observations on stress relaxation, cyclic creep and other transitory phenomena of strain hardening or strain softening materials subjected to generalized uniaxial cyclic loadings. Dissert. Abstr.

N82-12472*# General Research Corp., Santa Barbara, Calif.
TEST PROGRESS ON THE ELECTROSTATIC MEMBRANE REFLECTOR
D. J. Mihora Hampton, Va. NASA. Langley Research Center
29 Jun. 1981 129 p refs
(Contract NAS1-16133)
(NASA-CR-165792; CR-2-998) Avail: NTIS
HC A07/MF A01 CSCL 20K

An extemely lightweight type of precision reflector antenna, being developed for potential deployment from the space shuttle, uses electrostatic forces to tension a thin membrane and form it into a concave reflector surface. The typical shuttle-deployed antenna would have a diameter of 100 meters and an RMS surface smoothness of 10 to 1 mm for operation at 1 to 10 GHz. NASA Langley Research Center built and is currently testing a subscale (16 foot diameter) model of the membrane reflector portion of such an antenna. Preliminary test results and principal factors affecting surface quality are addressed. Factors included are the effect of the perimeter boundary, splicing of the membrane, the long-scale smoothness of commercial membranes, and the spatial controllability of the membrane using voltage adjustments to alter the electrostatic pressure. Only readily available commercial membranes are considered. A.R.H.

N82-12473*# National Aeronautics and Space Administration, Washington, D. C.
THEORY OF THERMOELASTICITY
Dorin Iesan Nov. 1980 414 p refs Transl. into ENGLISH of the book "Teoria Termoelasticitatii" Bucharest, Editura Academiei Republicii Socialiste Romania, 1979 p 1-275 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-75510) Avail: NTIS HC A18/MF A01 CSCL 20K

The development of the theory of thermoelasticity, which examines the interactions between the deformation of elastic media and the thermal field, is traced and the fundamental problems of the theory are presented. Results of recent studies on the subject are presented. Emphasis is primarily on media with generalized anisotropy, or isotropy media. Thermomechanical problems and mathematical formulations and resolutions are included. A.R.H.

N82-12474*# National Aeronautics and Space Administration, Washington, D. C.

LAMINATED ANISOTROPIC REINFORCED PLASTIC PLATES AND SHELLS

V. I. Korolev Oct. 1981 241 p refs Transl. into ENGLISH of the book "Sloistyye Anizotropnyye Plastinki i Obolochki iz Armirovannykh Plastmass" Moscow, Mashinostroyeniye Press, 1965 p 1-272 Translation was announced as N75-75901 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76585) Avail: NTIS HC A11/MF A01 CSCL 20K

Basic technical theories and engineering calculation equations for anisotropic plates and shells made of rigid reinforced plastics, mainly laminated fiberglass, are presented and discussed. Solutions are given for many problems of design of structural plates and shells, including curved sections and tanks, as well as two chapters on selection of the optimum materials, are given. Accounting for interlayer shearing and transverse separation, which are new engineering properties, are discussed. Application of the results obtained to thin three ply plates and shells wth a light elastic filler is presented and discussed. Author

N82-12475# Naval Research Lab., Washington, D. C.

THE RESPONSE OF TWO FLUID-COUPLED PLATES TO AN INCIDENT PRESSURE PULSE Progress Report, Nov. 1980 - Mar. 1981

R. S. Schechter and R. L. Bort 12 Oct. 1981 36 p refs
(SF43400001)
(AD-A104801; NRL-MR-4647) Avail: NTIS HC A03/MF A01 CSCL 19/4

The response of two plates coupled by an acoustic fluid to an incident pressure pulse is calculated using flat-plate theory. In addition, a similar calculation is done by a different method, where the interior fluid between the plate is modeled as a lumped parameter system of masses and springs. It is shown that as more masses and springs (fluid elements) are used that this solution approaches the continuous fluid solution. The cases where the second plate is backed by water and air are computed using both methods. The lumped-parameter model of the interior fluid is found to degrade the detail of the responses of the plates compared to the continuous-fluid solution, but the general features of the response (timing and magnitude of the peak velocities, for example) are not greatly affected even for relatively crude representations of the fluid, of two to five fluid elements. The calculations are carried out to better understand the interaction of a shockwave from an underwater explosion and the sail appendage of a submarine. Author (GRA)

N82-12476# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Metals and Ceramics Div.

VISCOPLASTIC AND CREEP CRACK GROWTH ANALYSIS BY THE FINITE ELEMENT METHOD Ph.D. Thesis. Final Report, Jul. 1977 - Jun. 1980

Terry D. Hinnerichs Jul. 1981 191 p refs
(AF Proj. 2307)
(AD-A105120; AFWAL-TR-80-4140) Avail: NTIS HC A09/MF A01 CSCL 11/6

Creep crack growth in a nickel base alloy at elevated temperatures was analyzed through a hybrid experimental-numerical (HEN) procedure. This HEN procedure consisted of simultaneous use of creep crack growth test displacement data from center cracked plate specimens of IN-100 at 1350 F and a theoretical finite element model of the test specimen. A two-dimensional (constant strain triangular) finite element program was developed which accounts for both nonlinear viscoplastic material behavior and changing boundary conditions due to crack growth. Three viscoplastic material models -- (1) Malvern Flow Law, (2) Norton's Creep Law, and (3) Bodner-Partom Flow Law -- were incorporated into the program. These time dependent material models were numerically integrated through time by a linear Euler extrapolation technique. A variable time step algorithm was included that maximized time step size during the analysis while maintaining good accuracy. This program was used as the plane stress theoretical model for the HEN procedure to analyze sustained load creep crack growth. A method for getting creep crack growth behavior solely from high resolution displacement measurements, in conjunction with a cracked specimen model which utilizes realistic constitutive relationships, has been developed. GRA

N82-12477# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon System Lab.

ELASTIC-PLASTIC THICK-WALLED TUBES SUBJECTED TO INTERNAL PRESSURE AND TEMPERATURE GRADIENT Final Report

P. C. T. Chen Sep. 1981 24 p refs Presented at the Conf. of Army Mathematicians (27th), West Point, N. Y., 10-12 Jun. 1981
(DA Proj. 1L1-61102-BH-57)
(AD-A105243; ARLCB-TR-81038) Avail: NTIS HC A02/MF A01 CSCL 20/11

Using von Mises' criterion and the Prandtl-Reuss flow theory, numerical solutions are obtained for the stresses, strains, and displacements in an elastic-plastic thick-walled tube subjected to internal pressure and temperature gradient. The material is based on the incremental finite-difference method in conjunction with a scaled loading approach. All incremental quantities are determined in the program and no iteration is needed. The approach is simpler than others yet quite general and accurate. Author (GRA)

N82-12478# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.

ACOUSTIC EMISSION FROM CONCRETE SPECIMENS Final Report, Apr. 1979 - Sep. 1980

P. F. Mlakar, R. E. Walker, and B. R. Sullivan Sep. 1981 39 p refs
(DA Proj. 4A1-61101-A-91D)
(AD-A105416; WES/MP/SL-81-26) Avail: NTIS HC A03/MF A01 CSCL 11/2

Six monotonic and six cyclic load compression tests on 6- by 12-in. cylindrical concrete specimens were monitored for acoustic emission. Fundamental data were collected and analyzed and the Kaiser effect was observed. The data are presented as counts versus events to aid in the identification of source characteristics. One multiaxial load (compression and tension) test was also monitored. The slope of counts versus event curve for this primarily tension test differed from those of the curves for the primarily compression test. This difference suggests that the source characteristics of concrete acoustic emissions can be empirically separated and identified. Author (GRA)

N82-12479# Argonne National Lab., Ill. Applied Mathematics Div.

BUCKLING OF A THIN INITIALLY WRINKLED RECTANGULAR PLATE

Bernard J. Matkowsky (Northwestern Univ.), Leonard J. Putnick (Siena College), and Edward L. Reiss (Northwestern Univ.) Aug. 1981 19 p refs
(Contract W-31-109-eng-38)
(DE81-029963; ANL-81-51) Avail: NTIS HC A02/MF A01

The deformation of a thin elastic plate, which is initially wrinkled, when the plate is subjected to a constant compressive and thrust is considered. It is found that the initial deformation (imperfection) of the plate leads to solutions which explain the experimentally observed decrease in the buckling load from that predicted by bifurcation theory and the smooth transition to a buckled solution. DOE

N82-12480# Sandia Labs., Albuquerque, N. Mex. Mechanical Metallurgy Div.

MECHANICAL PROPERTIES OF A 4142 STEEL PRESSURE VESSEL FOR AUXILIARY CLOSURES

M. S. SooHoo Aug. 1981 29 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030983; SAND-81-0884) Avail: NTIS HC A03/MF A01

Tensile, fracture toughness, and stress corrosion cracking susceptibility measurements were performed on an SISI 4142 seamless steel tubing material. This steel tubing is a candidate pressure vessel material for use in underground door closure systems at Nevada Test Site. Experiments indicate that while the post weld heat treatment produces a uniform weld, the weld zone is the region most susceptible to stress corrosion cracking from water. DOE

N82-12481# Hanford Engineering Development Lab., Richland. Wash.
MINIATURIZED FATIGUE CRACK GROWTH SPECIMEN TECHNOLOGY AND RESULTS
R. J. Puigh, R. E. Bauer, A. M. Ermi, and B. A. Chin 11 Jun. 1981 16 p refs Presented at the 2nd Topical Meeting on Fusion Reactor Mater., Seattle, 9-12 Aug. 1981
(Contract DE-AC14-76FF-02170)
(DE81-029757; HEDL-SA-2475) Avail: NTIS HC A02/MF A01

The miniature fatigue crack propagation technology was extended to in-cell fabrication of irradiated specimens. Baseline testing of selected titanium alloys was performed at 250 C in air. At relatively small values for the stress intensity factor, (RADICAL)K, the crack growth rates for all titanium alloys investigated are within a factor of three. The crack growth rates for these titanium alloys are a factor of three greater than the crack growth rates of either 316 SS (20% CW) or HT-9. Each of the titanium alloys has observable crack propagation for stress intensity factors as small as 4.2 MPa(INTEGRAL)m. DOE

N82-12482# Brookhaven National Lab., Upton, N. Y. Corrosion Science Group.
FRACTURE MECHANISMS OF SENSITIZED STAINLESS STEELS IN SULFUR-CONTAINING ENVIRONMENTS
R. C. Newman, K. Sieradzki, and H. S. Isaacs 1981 10 p refs Presented at the Intern. Conf. on Environ. Degradation of Eng. Mater., Blacksburg, Va., 21 Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-026052; BNL-29671; CONF-810913-5) Avail: NTIS HC A02/MF A01

The stress corrosion cracking of sensitized type 304 stainless steel was studied in a 6 x 10 to the minus fourth M sodium thiosulfate solution at room temperature. Under constant extension rate conditions the crack initiation probability is a maximum at -100 mV (SCE) and approaches zero for a smooth surface at > -300 or < +300 mV. Initiated cracks propagate at high rates at potentials as high as +500 mV; a maximum crack velocity of 8 micrometers/sec was measured in a precracked specimen under constant load. Crack initiation probability can be correlated with the repassivation behavior of simulated grain boundary material, but the high crack propagation rates probably require a large contribution from intermittent mechanical grain boundary failure. DOE

N82-12483# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).
WORKING STRENGTH OF NOTCHED SPECIMENS IN STEEL Ck45 AND STEEL 42 Cr Mo4 [BETRIEBSFESTIGKEIT VON KERBSTAEBEN AUS STAHL Ck 45 UND STAHL 42 CrMo4]
E. Haibach and C. Matschke 1980 108 p refs In GERMAN; ENGLISH summary
(LBF-FB-155(1980)) Avail: NTIS HC A06/MF A01

The working strength of notched steel specimens was investigated and the test results evaluated in connection with a damage accumulation calculation. The test program comprising 12 series and a total of 199 tests on notched specimens (Kt = 3.6) in steel Ck 45 or steel 42 CrMo 4, were performed by using programmed loading, random loading or a digitally reproduced service load sequence. In addition, 109 constant amplitude test results were considered for reference in an analyzing procedure based on the concept of uniform scatter bands applying to the S-N curves in question. A statistical analysis shows that the experimental scatter bands of the variable amplitude fatigue life curves are closely correlated to the particular scatter bands as computed by a modified version of Miner's rule, but with the experimental mean values being lower by factors of 0.883 to 0.911 in terms of stress. The results are tabulated. Author (ESA)

N82-12484# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).
INFLUENCE OF A MULTIAXIAL MEMBRANE STRESS SITUATION ON THE STRESS CONCENTRATION FACTOR, USING THE EXAMPLE OF AN OPEN UNFINISHED DRILLED HOLE [UEBER DEN EINFLUSS EINES MEHRACHSIGEN MEMBRANSPANNUNGSZUSTANDES AUF DEN SPANNUNGSKONZENTRATIONSFAKTOR AM BEISPIEL EINER OFFENEN UNBEARBEITETEN BOHRUNG]
Lueder Schwarmann 12 Nov. 1979 14 p refs In GERMAN
(Ek-43-B/251/79) Avail: NTIS HC A02/MF A01

The stress concentration factor alpha C for a plate with limited width W, containing a circular drilled hole (diameter D) is calculated, using the linear elastic theory of elastomechanics. The factor alpha C does not only depend on the geometrical ratio D/W, but also on the applied membrane stresses Tx, Ty, Txy. Compared with one-axial tensile strain (y-direction), additional tensile strains (in the x-direction) cause a reduction of alpha C while an additional compressive strain (in the x-direction) and additional shear strain cause an increase in alpha C. The results are also valid for other groove problems. Author (ESA)

N82-12485# Centre Technique des Industries Mecaniques, Senlis (France).
IN SITU GONIOMETER [GONIOMETRE IN SITU]
B. Miege Nov. 1980 64 p refs In FRENCH
(CETIM-5.41.22.0-Pt-1) Avail: NTIS HC A04/MF A01

A system for stress analysis, based on a linear direction detector, is described. The system allows X-ray diffraction stress measurement on large specimens and under industrial conditions. The goniometer system was characterized for spatial resolution, positioning linearity, sensitivity and energy resolution. Laboratory results are used to develop computer programming for stress analysis. The mechanical support for the goniometer is also presented. Author (ESA)

42 GEOSCIENCES (GENERAL)

N82-12486 Connecticut Univ., Storrs.
A TWO-LAYER GROUND HYDROLOGY MODEL INTERACTIVE WITH AN ATMOSPHERIC CIRCULATION MODEL Ph.D. Thesis
John Joseph Alfano 1981 641 p
Avail: Univ. Microfilms Order No. 8122768

A global ground hydrology model (GHM) consisting of a surface or upper root zone and a lower root zone is developed for use in an atmospheric general ciculation model (GCM) for studying land surface processes. The GCM calculates momentum, moisture, energy and pressure changes in the atmosphere by discretizing the global surface into cells, 4 deg latitude by 5 deg longitude, where the hydrology deg model provides these fluxes at the ground surface. The GHM operates in two modes. The first is a noninteractive mode where the GHM uses a set of prescribed meteorological data and the other is an interactive mode where the GCM and GHM are calculated simultaneously. The noninteractive mode is shown to be an efficient way to prepare and evaluate the GHM before it is used to the GCM. In the noninteractive mode the GHM reads a global data tape furnished from a previously run GCM contaning a standard ground hydrology model which may or may not be the same as the GHM. The GHM is an improvement over the standard hydrology model that exists in the GCM because it furnishes more realistic moisture and heat fluxes needed in calculating the global general ciculation. Dissert. Abstr.

N82-12487# Geological Survey, Washington, D. C.
WORLDWIDE DIRECTORY OF NATIONAL EARTH-SCIENCE AGENCIES AND RELATED INTERNATIONAL ORGANIZATIONS
Wenonah E. Bergquist, comp., Elizabeth J. Tinsley, comp., Laura Yordy, comp., and Ralph L. Miller, comp. 1981 91 p
(USGS-CIRC-834) Avail: NTIS HC A05/MF A01

This edition of the 'Worldwide Directory' was prepared in response to continuing requests for up-to-date information on earth-science organizations. It provides addresses of governmental earth-science agencies around the world that have functions similar to those of one or more of the operating divisions of the U.S. Geological Survey; it also lists addresses of major international organizations that are concerned with some phase of the earth sciences. The directory is arranged alphabetically by the name of the country. The location of each country is shown on a small index map, which is keyed to one oı eight reference maps showing major regions of the world. The index maps should be helpful to the user in identifying countries that have adopted new names or that have recently attained independence. L.F.M.

N82-12488# Delft Hydraulics Lab. (Netherlands).
MODELING AS A TOOL
L. Postma Apr. 1981 14 p refs
(Publ-252; ISSN-0166-7521) Avail: NTIS HC A02/MF A01

The use of mathematical models to investigate problems in aquatic biology is introduced. Rules governing the construction of models are explained, (system identification, calibration, verification). The aims of models, (generation of hypotheses, estimation of parameters, extrapolation, etc.) are considered. Examples of tests of hypotheses, estimation of parameters, and transposition of results are illustrated by considering investigations of the death of the blue green algae anabaena in Lake Brielle, the meaning of light curves for algal succession, and of the succession of phytoplankton and z00 plankton in a reservoir. Models exist which predict the maximum biomass, but models for biomass plus transition states from one maximum to another, or z00 plankton and fish together have to be constructed by physicians, chemists, biologists and mathematicians working together. Author (ESA)

N82-12489# Joint Publications Research Service, Arlington, Va.
USSR REPORT: EARTH SCIENCES, NO. 17
2 Nov. 1981 79 p refs Transl. into ENGLISH from various Russian publications
(JPRS-79342) Copyright. Avail: NTIS HC A05/MF A01

Research in the areas of oceanography, geophysics, atmospheric physics, is reported. Mining experiences in the antactic are included. Specifically, topics include analysis of oceanographic and meteorological data, development of geophysical and atmospheric models, and seismic profiling. For individual title, see N82-12490.

N82-12490# Joint Publications Research Service, Arlington, Va.
HYDROPHYSICAL INSTRUMENTATION AND COMPUTER COMPLEX
Ye. G. Nechesin, A. V. Nikitin, A. N. Paramonov, Ye. I. Timofeyev, and Yu. I. Shapovalov *In its* USSR Rept.: Earth Sci., No. 17 (JPRS-79342) 2 Nov. 1981 p 7-17 refs Transl. into ENGLISH from Upr. Sist. Mash. (Kiev), no. 3, May-Jun. 1981 p 100-106 (For primary document see N82-12489 03-42)
Avail: NTIS HC A05/MF A01

An instrumentation computer complex developed for onboard collection and primary processing of oceanographic data is described. The progressive concept of buswise organization ad modularity of the functional assemblies is the basis for the design of the complex. A block diagram of the complex is given. The submersible measurement system and the onboard data conversion and processing system are described. J.M.S.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N82-12491 Cornell Univ., Ithaca, N. Y.
REMOTE SENSING STUDIES OF SOME IRONSTONE GRAVELS AND PLINTHITE IN THAILAND Ph.D. Thesis
Pichit Jamnongpipatkul 1980 336 p
Avail: Univ. Microfilms Order No. 8177113

Ironstone gravels and plinthite in eastern Thailand were found to be associated with alluvial terraces as well as shale and basalt formation. Selected stereopairs of airphotos of known areas of ironstone gravels and plinthite were studied. The keys for airphoto interpretation were developed on the basis of the relation with types of landform, vegetation and appearance on the airphotos. Visual analysis of LANDSAT data provided information on the types of LANDSAT and vegetation which could lead to more detailed investigation of probable areas of ironstone gravels and plinthite. Digital analysis of LANDSAT data indicated that the difference of spectral reflectances from areas of ironstone gravels and those from the surrounding areas is considerable. Field study was conducted to verify the results of airphotos interpretation and LANDSAT data analysis and to obtain information in regard to genesis and morphology of soils with ironstone gravels and plinthite. Soil profile descriptions for typical soils with ironstone gravels and plinthite are included.
Dissert. Abstr.

N82-12492*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SKYLAB EXPLORES THE EARTH
Washington 1977 512 p refs Original contains color illustrations
(NASA-SP-380; LC-77-829) Avail: NTIS MF A01; SOD HC $16.50 CSCL 08B

Data from visual observations are integrated with results of analyses of approxmately 600 of the nearly 2000 photographs taken of Earth during the 84-day Skylab 4 mission to provide additional information on (1) Earth features and processes; (2) operational procedures and constraints in observing and photographing the planet; and (3) the use of man in real-time analysis of oceanic and atmospheric phenomena. For individual titles, see N82-12493 through N82-12509.

N82-12493*# Geological Survey, Denver, Colo.
DESERT SAND SEAS
Edwin D. McKee, Carol S. Breed (Geological Survey, Flagstaff, Ariz.), and Steven G. Fryberger (Geological Survey, Flagstaff, Ariz.) *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 5-48 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC$16.50 CSCL 08B

The usefulness of manned observations and handheld-camera photographs from space is confirmed by the immediate application of Skylab 4 data to the study of sand seas. The Skylab 4 crew provided information that: (1) confirms a tentative global classification of eolian sand deposits based on observed similarities in most of the major deserts of the world; (2) allows the preparation of maps that show the relationships of sand deposits to each other, to sand source areas, to natural sand distribution barriers, and to human land use; and (3) allows the regional patterns of large-scale dune morphology to be studied in relation to rainfall distribution and surface winds. Four sites in the Sahara and sub-Sahara of northern Africa, four in the Namib and Kalahari Deserts of southern Africa, two in the Empty Quarter of Saudi Arabia, five in the Takla Makan and Gobi Deserts of China, and three in the trans-Caspian deserts of the U.S.S.R. were selected as well as additional areas in northern Africa, India, Mexico, and Australia. A.R.H.

N82-12494*# Texas Univ. at Austin.
GLOBAL TECTONICS: SOME GEOLOGIC ANALYSES OF OBSERVATIONS AND PHOTOGRAPHS FROM SKYLAB
W. R. Muehlberger, P. R. Gucwa, A. W. Ritchie, and E. R. Swanson *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 49-88 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 08G

Spreading zones, transform faults, and subduction zones were observed visually and by hand-held camera on Skylab 4. Geological studies of these observations are discussed for the Near and Middle East, the Atacama fault in Chile, the Alpine Fault zone in New Zealand, the Sierra Madre Occidental, in Mexico, and the Caribbean/Americas plate boundary in Guatemala and Southern Mexico. A.R.H.

N82-12495*# California Inst. of Tech., Pasadena.
GEOLOGICAL FEATURES OF SOUTHWESTERN NORTH AMERICA
L. T. Silter, T. H. Anderson, C. M. Conway, J. D. Murray, and R. E. Powell *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 89-136 refs (For primary document see N82-12492 03-43)

Avail: NTIS MF A01; SOD HC$16.50 CSCL 08G

Photographic and visual observation of geological target areas were integrated with other aspects of the ground investigations to: (1) identify and evaluate zones of major faulting in south eastern California, Baja California, and northwestern Sonora; (2) develop a new key to the regional stratigraphy of the prebatholithic rocks of northern Baja California; (3) discover the most southwesterly known occurrence of Precambrian crystalline rocks in North America; (4) discover a previously unmapped section of Mesozoic volcanic rocks in southeastern California; and (5) contribute important overview perspectives to many regional geologic problems. Skylab 4 data are discussed for the San Andreas fault system and architecture of Southern California; Nothern Baja, California; Sierra Mazatan and Sierra del Alamo in Sonora, Mexico; the northwest Sonora coast fault zones; and Arizona, including that portion of the Colorado Plateau in the vicinity of the Grand Canyon. A.R.H.

N82-12496*# Geological Survey, Denver, Colo.
SKYLAB 4 OBSERVATIONS OF VOLCANOES. PART A: VOLCANOES AND VOLCANIC LANDFORMS. PART B: SUMMIT ERUPTION OF FERNANDIAN CALDERA, GALAPAGOS ISLANDS, ECUADOR
Jules D. Friedman, Grant Heiken (Low Alamos Scientific Labs., New Mexico), Tom Simkin (Smithsonian Inst., Washington, D.C.), and Arthur F. Krueger (NOAA, Washington, D.C.) *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 137-173 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC$16.50 CSCL 08K

Terrestrial volcanic features were observed and photographed from Skylab 4 under a variety of viewing conditions and Sun angles. Eruptions of Sakura-zima in southern Kyushu, Japan and the remote Fernandina volcano in the Galapagos Islands provided rare documentation of eruption clouds. Remote volcanic regions were also surveyed including the Tibesti volcanic massif and the Emi Koussi Caldera in Chad; the Altiplano volcanic field of Bolivia, Argentina, and Chile; the Kanchatcha Penninsula, U.S.S.R.; and the southeastern central plateau of Mexico. The landforms of volcanic provinces of Hawaii, southern Italy, the Aleutian Islands, Oregon, and Washington State were also investigated. Previously unobserved relationships between geomorphology and structure and previously unmapped tectonic ligaments were revealed as well as stratigraphic or relative age distinctions between partly overlapping basaltic flows. A.R.H.

N82-12497*# Energy, Mines and Resources Canada, Ottawa (Ontario).
THE MANICOUAGAN IMPACT STRUCTURE OBSERVED FROM SKYLAB
M. R. Dence *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 175-190 refs (For primary document see N82-12492 03-43)
(Contrib-544) Avail: NTIS MF A01; SOD HC $16.50 CSCL 08B

From comprehensive views of eastern Canada provided by Skylab oblique photographs, the main elements of the multi-ring Manicougan structure can be defined. By gravitational scaling, the structure is an analog for 200 km diameter structures on Mars and Mercury and 400 km to 500 km basins on the Moon. Because much larger structures on the other planets have rings spaced at intervals of 2 to the 1/2 power spacing, it is of interest to know if rings with intermediate spacing can be identified. A.R.H.

N82-12498*# Environmental Research and Technology, Inc., Concord, Mass.
SNOW-MAPPING EXPERIMENT
James C. Barnes, Clinton J. Bowley, J. Thomas Parr, and Michael D. Smallwood *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 191-224 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 08L

More than 300 hand-held camera photographs were taken of most part of the United States in which snow existed during the mission. The sites include the Sierra Nevada in California; the Salt-Verde Watershed in central Arizona; the Rocky Mountains in Colorado; the Great Salt Lake and Yellowstone Park in Utah and Wyoming; the Cascade Range in Washington and Oregon; the Black Hills in South Dakota; the Central Plains; and the Great Lakes. Snow in the European Alps; the Caucasus and Himalaya Mountains; the Pacific coastal areas of the U.S.S.R.; and New Zealand was also mapped. The experiment shows that: (1) a space observer can identify snow that photointerpreters cannot distinguish on a photograph of the same area, (2) can integrate, through partial cloud cover, to view the terrain, and (3) can select the optimum viewing angle and Sun angle and the appropriate film and filter combination to acquire the best data. A.R.H.

N82-12499*# Texas Univ. at Austin.
CULTURAL FEATURES IMAGED AND OBSERVED FROM SKYLAB 4
Robert K. Holz *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 225-242 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC$16.50 CSCL 08B

Data from Skylab 4 observations of metropolitan complexes are limited to city outline, major transportation arteries, suburban built-up areas, overall textural patterns of the city as compared to those of adjacent areas, and the color or albedo. Typical agricultural patterns, forest regions, and transportation networks on rural landscapes can be discerned, as well as the disturbances of soil during construction and mining which expose surface materials of a different albedo. Photographs of Denver, Colorado; San Antonio, Texas, Chicago, Illinois, and San Diego, California are analyzed. A.R.H.

N82-12500*# California Univ., Berkeley.
VEGETATION PATTERNS
David M. Carneggie and Brain T. Fine (California Univ. at Davis) *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 243-262 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 08F

In an effort to make meaningful observations of vegetation resources, the following sites and features were examined: (1) wheat in Argentina, Australia, and the U.S.; (2) rangelands in Australia, Africa, and the U.S.; (3) land use in Malayasia; (4) vegetation in New Zealand; (5) agriculture in California; (6) drought in northern Australia; (7) insect and disease damage in any of the sites; and (8) forest and range fires wherever found. The important factors that governed the ability of the crew to observe these features were angle of view from the spacecraft; atmospheric conditions; Sun angle; speed of the spacecraft; characteristics of natural and cultivated vegatation; and familiarity with the phenomena to be observed. User reaction to the imagery is discussed and photograph quality is evaluated. A.R.H.

N82-12501*# American Univ., Washington, D. C. Drought Analysis Lab.
REPORT ON SKYLAB 4 AFRICAN DROUGHT AND ARID LAND EXPERIMENT
N. H. MacLeod, J. S. Schubert, and P. Anaejionu *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 263-286 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 08B

Vegetation patterns, flooding, soil erosion, interdunal water accumulation, natural drainage systems, and drainage patterns in the Black Volta and White Volta River basins were observed and photographed in an effort to determine the causes of desertification in the Sahel. The Niger Island delta in Mali was selected to examine the distribution and changing patterns of vegetation and flooding of the major freshwater resources in that drought-prone area. Observations Nimbus-3, Apollo-9, and Skylab of dust and cloud movements, vegetation patterns, land surface features, the color and distribution of surface water, and color changes of lakes within the drought zone show that widespread destructice land practices contribute to the arid conditions. A.R.H.

N82-12502# Office of Naval Research, Pasadena, Calif.
VISUAL OBSERVATIONS OF THE OCEAN
Robert E. Stevenson, L. David Carter (Geological Survey, Menlo Park, Calif.), Stephen P. VonderHaar (Univ. of Southern California, Los Angeles), and Richard O. Stone *In* NASA. Johnson Space

Flight Center Skylab Explores the Earth 1977 p 287-338 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 08J

The Skylab 4 mission allowed large scale, dynamic features such as ocean currents and associated eddies to be observed, described, and photographed repeatedly. Examples of regional and topical studies are included which discuss ocean currents, plankton, internal waves, coastal-sediment plumes, subtropical convergence, windborne sediment entering the ocean, and the interaction of ocean waves and currents. The importance of the observation of mesoscale phenomena is discussed as well as the amendement of charts of ocean currents. A.R.H.

N82-12503*# National Oceanic and Atmospheric Administration, Miami, Fla. Atlantic Oceanographic and Meteorological Labs.
AN ASSESSMENT OF THE POTENTIAL CONTRIBUTIONS TO OCEANOGRAPHY FROM SKYLAB VISUAL OBSERVATIONS AND HANDHELD-CAMERA PHOTOGRAPHS
George A. Maul and Michael McCaslin *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 339-352 (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 08J

The possible roles that space observes may play in oceanographic experimentation are considered in a discussion of several ocean photographs and visual observations made during the Skylab 4 mission. While hand-held camera photography has a distinct role in reconnaissance, it cannot surpass the quantitativeness of a multispectral observation from a known altitude. Significantly, many of the most interesting scenes were taken by the S190B camera, which produced very high resolution photographs taken from a vertical position. From the standpoint of long term oceanographic observation, quantitative observations are needed with accurate geographical positioning. Concurrent ocean surface observations are also needed to correlate the data. A.R.H.

N82-12504*# Geological Survey, Tacoma, Wash.
VISUAL OBSERVATIONS OF FLOATING ICE FROM SKYLAB
W. J. Campbell, R. O. Ramseier (Dept. of Environment, Ottawa, Ontario), W. F. Weeks (Cold Regions Research and Engineering Lab.), and J. A. Wayenberg *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 353-380 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 08L

The lake and sea ice visual observation experiment performed during the Skylab 4 mission was very successful. In the initial experiment design, the Gulf of St. Lawrence and Lake Ontario were chosen as prime sites at which ground-truth measurements and aircraft remote-sensing data were to be obtained. In addition, the Skylab 4 astronauts obtained excellent photographs of sea ice in the Sea of Okhotsk and in the James Bay portion of Hudson Bay and of icebergs in the Southern Ocean. Some of the sequential photographs contain very useful broad-scale information on the distribution of ice and ice types, the overall deformation patterns, and the amount of relative ice motion. A.R.H.

N82-12505*# Air Resources Lab., Las Vegas, Nev.
QUANTITATIVE ANALYSIS OF ATMOSPHERIC POLLUTION PHENOMENA
Darryl Randerson *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 381-406 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 13B

Approximately 75 photographs of air pollution events were taken during the 84-day Skylab 4 mission. This imagery may be separated into two categories according to the sources of the pollution: natural pollution, which consists of dust generated by wind, naturally induced forest fires, and smoke generated by volcanic activity, and manmade pollution, which includes brush fires, smoke plumes from stacks or open burning, contrails, and ship trails. Results of the analysis of some of the most interesting photographs are discussed in this section. Photographs of the following are analyzed: the Sakura-zime volcanic activity; dust clouds, the Los Angeles pollution pall; long smoke plums; an African brush fire, an Argentine forest fire, cirrus cloud plumes, and a snow streak. A.R.H.

N82-12506*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
METEOROLOGICAL LAB APPLICATIONS OF SKYLAB HANDHELD-CAMERA PHOTOGRAPHS
W. C. Skillman and William E. Shenk *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 407-416 (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 04B

The high resolution and image contrast of Skylab 4 photographs reveal details of the cloud structure associated with extratropical storms that normally cannot be seen in routinely available meteorlogical satellite images. A stereopair take over southern Arizona and northwestern Mexico east of the Gulf of California provides a good example of the cirrus clouds associated with a subtropical jet stream and demonstrates the height differences of multilayered clouds. The effects of cold air flowing over the warmer waters of the eastern Great Lakes, New York, southern New England, and the Atlantic Ocean are detailed as well as the cloud structure of an occluded cyclone. A.R.H.

N82-12507*# National Hurricane and Experimental Meteorology Lab., Coral Gables, Fla.
SOME ASPECTS OF TROPICAL STORM STRUCTURE REVEALED BY HANDHELD-CAMERA PHOTOGRAPHS FROM SPACE
Peter G. Black *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 417-462 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 04B

The most important contribution to the fields of tropical storm research was the stereophotography of tropical storm Ellen during the Skylab 4 mission. Features of mature tropical storms revealed by Skylab 4 photographs are discussed and compared with data obtained by NOAA-2, Nimbus-5, and a DMSP satellite. A.R.H.

N82-12508*# Chicago Univ., Ill.
MESOSCALE WAKE CLOUDS IN SKYLAB PHOTOGRAPHS
T. Theodore Fujita and Jaime J. Tecson *In* NASA. Johnson Space Flight Center Skylab Explores the Earth 1977 p 463-478 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 04B

Examination of mesoscale cloud patterns within the wakes of obstacles seen in Skylab photographs reveals the existence of specific types of wake clouds. Cumulus streets occur when the lapse rate above the surface is adiabatic with a medium to slow flow rate. Karman vortex streets occur when the lapse rate above the surface is small, zero, or negative, with a slow to medium flow impinging against a relatively large obstacle. Wake waves occur when the lapse rate above the surface is small with a medium to fast flow rate impinging against a relatively small obstacle. When the flow rate exceeds a critical value, the transverse waves tend to disappear, leaving only the diverging waves. These phenomena are illustrated in Skylab photographs of the Aleutian Islands, the Kuril Islands, the Antipodes, South Pacific Islands, and the Bouvet Island in the South Atlantic. A.R.H.

N82-12509*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
MESOSCALE CLOUD FEATURES OBSERVED FROM SKYLAB
David E. Pitts, J. T. Lee (National Severe Storms Lab.), J. Fein (Oklahoma Univ., Norman), Y. Sasaki (Oklahoma Univ., Norman), Kit Wagner, and R. Johnson (Lockheed Electronics Co., Houston, Tex.) *In its* Skylab Explores the Earth 1977 p 479-501 refs (For primary document see N82-12492 03-43)
Avail: NTIS MF A01; SOD HC $16.50 CSCL 04B

The Skylab 4 mission study of severe storm development was designed to photograph cloud-street patterns, to estimate the physical dimensions of cloud streets, and to describe their relationship to other cloud features and to land features. The moisture convergence of cloud streets and whether cloud-street curvature was an indicator of the source of angular momentum that results in the generation of rotating storms as precursors to tornadoes was analyzed from photographs taken over the Great Lakes and South America. A.R.H.

N82-12510*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
PROGRESS IN RADAR SNOW RESEARCH
W. Stiles, F. T. Ulaby, A. K. Fung, and A. Aslam Feb. 1981 167 p refs
(Grant NsG-5335)
(NASA-CR-166709; RSL-TR-410-1) Avail: NTIS HC A08/MF A01 CSCL 08L

Multifrequency measurements of the radar backscatter from snow-covered terrain were made at several sites in Brookings, South Dakota, during the month of March of 1979. The data are used to examine the response of the scattering coefficient to the following parameters: (1) snow surface roughness, (2) snow liquid water content, and (3) snow water equivalent. The results indicate that the scattering coefficient is insensitive to snow surface roughness if the snow is dry. For wet snow, however, surface roughness can have a strong influence on the magnitude of the scattering coefficient. These observations confirm the results predicted by a theoretical model that describes the snow as a volume of Rayleig scatterers, bounded by a Gaussian random surface. In addition, empirical models were developed to relate the scattering coefficient to snow liquid water content and the dependence of the scattering coefficient on water equivalent was evaluated for both wet and dry snow conditions. Author

N82-12511# Utah State Univ., Logan. Electro-Dynamics Lab.
LIMIT ON REMOTE FTIR DETECTION OF TRACE GASES
A. S. Zachor (Atmospheric Radiation Consultants, Inc.), B. Bartschi, and M. Ahmadjian (AFGL) Sep. 1981 7 p refs
(Contract F19628-77-C-0203; AF Proj. 7670)
(AD-A104842; AFGL-TR-81-0272) Avail: NTIS HC A02/MF A01 CSCL 20/6

We studied the capability of a Fourier spectrometer system to remotely detect trace gases in localized clouds, e.g., stationary source effluents. Detection is based on the degree to which the observed IR spectral radiance contrast between the cloud and adjacent background is correlated with a computed reference spectrum. It is shown that trace gases can be reliably detected when spectral features are well below the noise level. The minimum detectable quantities (MDQ's) for various trace gases at one atmosphere total pressure are given. The MDQ's determine the combinations of gas column thickness and gas-background temperature difference that correspond to 95 percent detection probability and one percent false detection probability when an FTS system with modest-size foreoptics views the target through a path equivalent to approximately one air mass. Author (GRA)

N82-12512# Oak Ridge Gaseous Diffusion Plant, Tenn. Uranium Resource Evaluation Project.
HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR RUBY QUADRANGLE, ALASKA
31 Jul. 1981 104 p refs
(Contract W-7405-eng-26)
(DE81-029982; GJBX-290-81) Avail: NTIS HC A06/MF A01

Field and laboratory data are presented for 693 water samples from the Ruby Quadrangle, Alaska. The samples were collected as part of the National Uranium Resource Evaluation Program to assess uranium exploration. The uranium analysis by fluorescence spectroscopy was modified to alow for the reduced volume of water samples available. Results are reported as ppb in the original water sample. Detection limits for all elements are listed. Statistical summaries of results reported on control samples, which were analyzed along with the samples included in the survey, are given. DOE

N82-12513# Washington Univ., Seattle.
CHEMICAL AND GEOCHEMICAL STUDIES OFF THE COAST OF WASHINGTON Progress Report, Sep. 1980 - Jul. 1981
R. Carpenter, comp. Jul. 1981 14 p refs
(DE81-030319; DOE/EV-70024/44) Avail: NTIS HC A02/MF A01

A series of marine chemical and geochemical investigations involving both laboratory studies and field studies off the coast of Washington is addressed. Most of the field work was on the Washington continental shelf, slope, and the submarine canyons indenting the shelf north of the Columbia River. The aim is to provide basic data required to characterize underlying chemical and physical processes and their rates which control the distributions, concentrations, and ultimate fate of some of the potentially hazardous agents associated with fossil fuel and/or nuclear power production or transportation. Laboratory and field experiments and theories derived from are used iteratively to investigate: (1) vertical transfer of trace chemicals from surface seawaters to underlying waters and sediments; (2) processes which may transfer certain chemicals from sediments back into the overlying water column; (3) redox processes which besides changing valence states of certain chemicals may alter their precipitation/dissolution tendencies, their biological availability and/or toxicity; and (4) accumulation histories of potentially hazardous chemicals in sediments during the past 100 years. DOE

N82-12514# University of Southern California, Los Angeles. Dept. of Petroleum Engineering.
FORMATION EVALUATION IN LIQUID-DOMINATED GEOTHERMAL RESERVOIRS
Iraj Ershaghi, Elmer E. Dougherty, and Lyman L. Handy Apr. 1981 106 p refs
(Contracts DE-AT03-76ET-28384; EY-76-S-03-0113)
(DOE/ET-28384/T1) Avail: NTIS HC A06/MF A01

Studies relative to some formation evaluation aspects of geothermal reservoirs are reported. The particular reservoirs considered were the liquid dominated type with a lithology of the sedimentary nature. Specific problems of interest included the resistivity behavior of brines and rocks at elevated temperatures and studies on the feasibility of using the well log resistivity data to obtain estimates of reservoir permeability. Brine viscosity data at elevated temperatures, effect of dissolved gases on brine resistivity, design of a modified API filter test apparatus, and modeling of filter cake buildup during drilling are discussed. DOE

N82-12515# Washington State Univ., Pullman. Coll. of Engineering.
HYDROLOGIC STUDIES SUPPORT, INTERCOMP CODE CONVERSION Annual Report
Vernon I. Ichimura 16 Oct. 1980 57 p refs
(Contract DE-AT06-79RL-10119)
(DE81-030318; DOE/RL-10119/1; RR-80/15-44) Avail: NTIS HC A04/MF A01

The primary cause of mass and energy balance errors noted in IBM xecuted INTERCOMP code results are due to lack of precision in computing the global values of mass and energy. The correction of this problem led to numerical comparisons between the CDC and IBM computer results. The differences are greatest at an onset of a physical system perturbation and decrease with succeeding time steps. Good numerical comparison with analytical solutions seem to further prove the authenticity of code results. DOE

N82-12516# Union Oil Co. of California, Los Angeles. Geothermal Div.
GEOTHERMAL RESERVOIR ASSESSMENT: NORTHERN BASIN AND RANGE PROVINCE STILLWATER PROSPECT, CHURCHILL COUNTY, NEVADA Final Report, Apr. 1979 - Jul. 1981
D. L. Ash, R. F. Dondanville, and M. S. Gulati Aug. 1981 35 p
(Contract DE-AC08-79ET-27012)
(DE82-000529; DOE/ET-27012/1) Avail: NTIS HC A03/MF A01

The two wells were drilled to total depths of 6946 ft and 10,014 ft with no significant drilling problems. A maximum reservoir temperature of 353 F was measured at 9950 ft. The most productive well flow tested at a rate of 152,000 lbs/hr with a wellhead temperature of 252 F and pressure of 20 psig. Based upon current economics, the Stillwater geothermal prospect is considered to be subcommercial for the generation of electrical power. This synopsis of the exploratory drilling activities and results contains summary drilling, geologic, and reservoir information from two exploratory geothermal wells. DOE

N82-12517# California Dept. of Conservation, Sacramento. Div. of Mines and Geology.
GEOPHYSICAL SURVEY, PASO ROBLES GEOTHERMAL AREA, CALIFORNIA, PART OF THE RESOURCE ASSESSMENT OF LOW- AND MODERATE-TEMPERATURE GEOTHERMAL RESOURCE AREAS IN CALIFORNIA Progress Report, 1979 - 1980
R. H. Chapman, Gordon W. Chase, and Les G. Younds 10 Nov. 1980 42 p refs
(Contract DE-FG03-79ET-37035)
(DE81-026038; DOE/ET-37035/T2) Avail: NTIS HC A03/MF A01

Some general background information concerning the geology and geothermal occurrences in the Southern Coast Ranges is included, as well as the more detailed information dealing with the Paso Robles area proper. Results from ground magnetic and gravity surveys, are discussed and interpreted. There is possible correlation in some places with known and suspected faults. There are also suggestions of local differences in the Tertiary rocks. DOE

N82-12518# California Dept. of Conservation, Sacramento. Div. of Mines and Geology.
RESOURCE ASSESSMENT OF LOW AND MODERATE-TEMPERATURE GEOTHERMAL WATERS IN CALISTOGA, NAPA COUNTY, CALIFORNIA Progress Report, 1979 - 1980
Les G. Youngs, C. Forrest Bacon, Rodger H. Chapman, Gordon W. Chase, Chris T. Higgins, Hasmukhrai H. Majmundar, and Gary C. Taylor 10 Nov. 1980 394 p refs
(Contract DE-FG03-79ET-37035)
(DE81-025559; DOE/ET-37035/T1) Avail: NTIS HC A17/MF A01

The USGS Geotherm file for California was updated and completed and the final data were compiled for a geothermal resources map of the State. The methodology used to determine the depth, configuration, flow rate, capacity, water quality, and location of the hottest water in the reservoir at Calistoga is described. The historical use of the resource is reviewed. Other aspects considered include general geology, magnetic surveys, gravity surveys, seismic reflection, and electrica resistivity of the resource. The hydrology and groundwater quality are related to the geological structure and formation as well as to resource assessment. The development of models for volume and temperature, and explatory drilling are also discussed. DOE

N82-12519# Battelle Columbus Labs., Ohio.
EXTENSIBLE BRIDGE-CONVEYOR CONCEPT DEVELOPMENT Final Technical Report
James C. Swain and Edward C. Mullen 21 Apr. 1981 92 p refs
(Contracts DE-AC01-79ET-14210; DI-BM-JO-177051)
(DE81-031973; DOE/ET-12453/T1) Avail: NTIS HC A05/MF A01

Optimum applications for the CES were identified. Concepts were developed for the interfaces between system components and between the CES and the continuous miner and the room conveyor. Configurations were chosen for the CES which optimize system use in the applications identified. Cost estimates were prepared and general operating specifications were defined. Chain was selected as the preferred conveying element. The CES appeared to be a logical choice over shuttle cars in low to medium seam mines and over conventional continuous haulage in seams up to 80 inches if 88 percent availability is obtained, and if typical entry and crosscut centerline distances are employed. Longer centerline distances imply clear advantages for the CES concept. T.M.

N82-12520# Skelly and Loy, Harrisburg, Pa.
EVALUATION OF NOVEL UNDERGROUND TRANSPORT SYSTEMS Final Report
Jun. 1981 134 p refs
(Contract DE-AC01-79ET-11268)
(DE81-030279; DOE/ET-11268/T3) Avail: NTIS HC A07/MF A01

The feasibility of new or novel underground haulage equipment for transporting personnel and supplies is assessed to determine their relative impact on productivity and the cost per ton that is attributable to this segment of the mining operation. Novel equipment in its current design can potentially alleviate many of the personnel and supply problems encountered in United States coal mines. A review of rail haulage systems and European underground mining provided the basis for the introduction of three novel haulage systems: monorail, floor-mounted trapped rail haulage, and chairlifts. It was determined that monorail and floor-mounted trapped rail haulage systems exhibit the highest potential for domestic utilization. Monorail haulage equipment along with conventional battery powered rubber-tired equipment and two rail haulage systems were theoretically applied to five different mine sizes. Each system was then reviewed on an economic, operational, maintenance, and safety basis. From each standpoint, the monorail compared favorably with the other haulage systems. DOE

N82-12521# Skelly and Loy, Harrisburg, Pa.
FEASIBILITY ANALYSIS OF TRENCH STRIP AND AUGER MINING Summary Report
Jun. 1981 209 p refs
(Contract DE-AC01-79ET-11268)
(DE81-027557; DOE/ET-11268/14) Avail: NTIS HC A10/MF A01

The feasibility of using Trench Strip and Auger Mining as a means to extract coal reserves which are presently considered uneconomical to mine or which would present undesirable environmental effects if extracted using conventional surface mining methods is assessed. The conclusion is that Trench Strip and Auger Mining, when used as a primary mining system, is a viable alternative to conventional surface mining. Economically, a savings in the selling price of at least $12 per ton (from $28 to $16) can be realized with this concept. Environmentally, the amount of surface area disturbed can be reduced to half, and the amount of overburden handled can be reduced to one-seventh that of a conventional mine. It was also discovered that the trench mine gave similar results on certain surface minable sites that are economically and environmentally sound. DOE

N82-12522# Pennsylvania State Univ., University Park. Coal Research Section.
DATA BASE FOR THE ANALYSIS OF COMPOSITIONAL CHARACTERISTICS OF COAL SEAMS AND MACERALS Quarterly Technical Progress Report, Feb. - Apr. 1981
A. Davis, N. H. Suhr, W. Spackman, P. C. Painter, P. L. Walker, and P. H. Ogiven Aug. 1981 96 p refs
(Contract DE-AC22-80PC-30013)
(DE81-031977; DOE/PC-30013/5) Avail: NTIS HC A05/MF A01

The first objective of the program is to understand the systematic relationships between the properties of coals and the second is to determine the nature of lateral and vertical variability in the properties of a single seam. Four coal samples showed significant decrease in calorific value during storage over a two-year period; the lower the calorific value and the higher the moisture of the samples, the greater was the decrease. Ninety-three coal samples and 454 selected printouts of coal data were provided on request to the coal research community. Maceral analysis of 5-cm subsections of column samples of the Lower Kittanning seam reveal some differences in the profiles of the seam collected from two different environmental settings. General trends in carbon, hydrogen, oxygen and nitrogen contents of the Lower Kittanning seam of western Pennsylvania are presented. DOE

N82-12523# Office of Energy Resources, Augusta, Maine.
PEAT RESOURCE EVALUATION: STATE OF MAINE Quarterly Report
Joel Davis and Walter Anderson 1981 7 p
(Contract DE-FG18-79FC-14690)
(DE82-000227; DOE/FC-14690/T1) Avail: NTIS HC A05/MF A01

The amount and location of fuel-grade peat that may be harvested and utilized in an environmentally acceptable manner in Maine were surveyed. The resources inventory provides a detailed evaluation of the peat deposits including maps showing areal extent, thickness, and distribution of peat, stratigraphic cross sections, and surficial mapping. Many deposits were visited to accurately assess the physical characteristics of the deposits and to obtain laboratory samples. Representative samples from surveyed deposits are obtained through standard field sampling techniques. DOE

N82-12524# North Carolina Univ., Chapel Hill. Dept. of Geology.

PEAT DEPOSITS OF DISMAL SWAMP POCOSINS: CAMDEN, CURRITUCK, GATES, PASQUOTANK, AND PERQUIMANS COUNTIES, NORTH CAROLINA

R. L. Ingram and Lee J. Otte, (Kent State Univ., Ohio) Jul. 1981 31 p refs
(Contract DE-AC01-79ET-14693)
(DE81-029642; DOE/ET-14693/T3) Avail: NTIS HC A03/MF A01

The presence of peat is examined in the Dismal Swamp of northeastern North Carolina and southeastern Virginia. The deposits in North Carolina occupy an area of 76,800 acres containing about 68 million tons of moisture free peat. The deposits greater than 4 ft thick occupy an area of 34,700 acres containing about 43 million tons of peat. The surface elevation of the peat ranges from 15 to 20 ft. Two main types of peat are present: (1) a brown, decomposed fibrous peat usually found at the base of the thicker peats, and (2) a black, fine grained, highly decomposed peat that usually overlies the fibrous peat. Both peat types contain large amounts of wood. The moisture content ranges from 40 to 94% and usually increases with depth and total thickness of the peat. It is found that heat values for moisture free, low ash peats range from 8700 to 10,900 Btu/lb and the sulfur content ranges from 0.2 to 0.7%. DOE

N82-12525# Battelle Columbus Labs., Ohio.

EXTENSIBLE BRIDGE-CONVEYOR CONCEPTS FOR COAL-MINE FACE HAULAGE Final Technical Report

James C. Swain, David L. Thomas, and Edward C. Mullen 1981 87 p
(Contracts DE-AC01-79ET-14210; DI-DM-JO-177051)
(DE81-031974; DOE/ET-14210/T1) Avail: NTIS HC A05/MF A01

The objective was to develop design concepts for extensible bridge conveyors which can be used in multiples to form a continuous haulage system. Consultation services were provided by Jeffrey Mining Machinery Division on mining technology and B.F. Goodrich Engineered Systems Division on conveyor belt technology. Additional information was gathered in a mine visit, during visits to conveyor manufacturers, and contacts with several component suppliers. Three extensible conveyor approaches were selected and machinery arrangement and internal detail drawings were prepared for each. Two of the concepts are for a face haulage system in which separate nonconnected extensible conveyors are individually trammed into position to form a continuous haulage system. The third concept is for a connected extensible system similar to existing continuous face haulage systems but employing extensible rather than fixed-length bridges. Cost estimates were prepared for the three concepts. The concepts developed employ belt-type conveyors, however, chain-type conveyors were considered to be a viable alternative. DOE

N82-12526# Department of Energy, Washington, D. C. Assistant Administrator for Applied Analysis.

ANALYSIS REPORT: APPLIED ANALYSIS MODEL SUMMARIES

Dec. 1980 173 p
(DE81-029278; DOE/EIA-0293) Avail: NTIS HC A08/MF A01

Brief statements of each model's purpose are presented. Information on the models' characteristics, uses, and requirements is provided and sources for additional information are reported. T.M.

N82-12527# Geological Survey, Washington, D. C.

INTERACTIVE COMPUTER METHODS FOR GENERATING MINERAL-RESOURCE MAPS

James A. Calkins, Alan S. Crosby, Tod E. Huffman, Allen L. Clark, George T. Mason, Jr., and Robert J. Bascle 1980 75 p refs Presented at the 2nd U.S. Geol. Surv. Computer Symp., Reston, Va., 22-23 Mar. 1978
(CIRC-815) Avail: NTIS HC A04/MF A01

Two related methods for plotting computer generated maps as alternatives to conventional batch methods are devised. These methods are: Quick Plot, an interactive program whose output appears on a cathoe ray tube (CRT) device, and the interactive cartographic automatic mapping system (CAM), which combines batch and interactive runs. The output of the Interactive CAM system is final compilation (not camera-ready) paper copy. Both methods are designed to use data from the Computerized Resource Information Bank (CRIB) file in conjunction with a map-plotting program. Quick Plot retrieves a user selected subset of data from the CRIB file, immediately produces an image of the desired area on a CRT device, and plots data points according to a limited set of user selected symbols. The interactive CAM system links the output of an interactive CRIB retrieval to a modified version of the CAM program, which runs in the batch mode and stores plotting instructions on a disk, rather than on a tape. S.L.

N82-12528# Oak Ridge Gaseous Diffusion Plant, Tenn.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR WAINWRIGHT QUADRANGLE, ALASKA

30 Jun. 1981 80 p refs
(Contract W-7405-eng-26)
(DE81-028670; K/UR-336) Avail: NTIS HC A05/MF A01

Water samples were analyed for uranium content. Field and laboratory data are presented for 293 water samples from the Wainwright Quadrangle, Alaska. The samples were collected and laboratory analysis and data reporting were performed by the uranium resource evaluation project. DOE

N82-12529# Oak Ridge Gaseous Diffusion Plant, Tenn.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR POINT LAY QUADRANGLE, ALASKA

30 Jun. 1981 75 p refs
(Contract W-7405-eng-26)
(DE81-028669; K/UR-335) Avail: NTIS HC A04/MF A01

Uranium resources and areas for uranium exploration were assessed. Field and laboratory data are presented for 219 water samples from the Point Lay Quadragle, Alaska. Samples were collected and laboratory analysis and data reporting were performed by the uranium resource evaluation project. DOE

N82-12530# Oak Ridge Gaseous Diffusion Plant, Tenn.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR HARRISON BAY QUADRANGLE, ALASKA

30 Jun. 1981 78 p refs
(Contract W-7405-eng-26)
(DE81-028352; GJBX-252-81; K/UR-359) Avail: NTIS HC A05/MF A01

Field and laboratory data are presented for 328 water samples from the Harrison Bay Quadrangle, Alaska. The samples were collected and laboratory analysis and data reporting were performed. Results of reconnaissance of surface water, ground water, stream sediment and lake sediment, are reported. DOE

N82-12531# Oak Ridge National Lab., Tenn.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR TESHEKPUK QUADRANGLE, ALASKA

30 Jun. 1981 91 p refs
(Contract W-7405-eng-26)
(DE81-027408; GJBX-248-81; K/UR-346) Avail: NTIS HC A05/MF A01

Field and laboratory data are presented for 479 water samples which were collected and analyzed for uranium content. DOE

N82-12532# Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).

DETERMINATION OF GEOGRAPHIC LONGITUDES, LATITUDES AND AZIMUTHS WITH THE TRANSIT INSTRUMENT AP IN THE TEST GRID WESTHARZ [LAENGEN-, BREITEN- UND AZIMUTBESTIMMUNGEN MIT DEM PASSAGEINSTRUMENT AP 70 IM TESTNETZ WESTHARZ DER T.U. HANNOVER]

Hansdieter Grosse Frankfurt am Main Verlag des Instituts fuer Angewandte Geodaesie 1980 123 p refs In GERMAN;

ENGLISH summary
(Ser-B-249; ISSN-0071-9196) Avail: NTIS HC A06/MF A01

The results of the determination of geographic longitudes, latitudes and azimuths at the Laplace stations Bad Sachsa, Rowensberg, and Wulften, Recke, are reported. The azimuth from Wulften, Recke, to Bad Lauterberg, Gr. Knollen was measured. All three stations are triangulation points of the second order net. As reference station for the time determination, the observatory of Goettingen, meridian circle Reichenbach, was used. Its astronomic longitude is related to Hamburg, German Hydrographic Institute, in the BIH system of 1957/58. The observations performed, taking into account polar motion, are: (1) time (star transit times in the meridian, FK 4 - catalog); (2) latitude (meridian-zenith differences according to Horrebow-Talcott, general catalog with transformation to the system of FK 4); and (3) azimuth (star transit times in the azimuth of the earth target, FK 4 - catalog). The results are tabulated. An automatic recording and preprocessing system for the observation and evaluation of transit times is also described. Author (ESA)

N82-12533# Danish Meteorological Inst., Copenhagen.
THE ICE CONDITIONS IN THE GREENLAND WATERS
1980 69 p
(ISBN-87-7478-183-9) Avail: NTIS HC A04/MF A01

Charts showing weekly ice conditions for 1965 are presented. Thickness of fast ice measured at coastal stations is given and the number of icebergs sighted is reported. Polar ice progress is followed. Information on the size, boundary, age, water features, and topography is provided. For ice of land origin, the relative frequencies of bergy bits and growlers are indicated. Author (ESA)

N82-12534# Geological Survey, Albany, N.Y. Water Resorces Div.
WATER RESOURCES DATA FOR NEW YORK, WATER YEAR 1980. VOLUME 1: EASTERN NEW YORK EXCLUDING LONG ISLAND Annual Water Resources Investigation, 1 Oct. 1979 - 30 Sep. 1980
Apr. 1981 322 p 3 Vol.
(PB81-227308; USGS/WRD/HD-81/030-Vol-1;
USGS/WRD/NY-80/1-Vol-1) Avail: NTIS HC A14/MF A01
CSCL 08H

Water resources data for the 1980 water year for New York consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels of groundwater wells. Records for water discharge at 105 gaging stations, stage only at 10 gaging stations, and stage and content at 20 gaging stations and 18 other and reserviors water quality at 33 gaging stations; and water levels at 25 observation wells are presented. Also included are data for 63 crest-stage and 27-low-flow partial-record stations. GRA

N82-12535# Geological Survey, Albany, N.Y. Water Resources Div.
WATER RESOURCES DATA FOR NEW YORK, WATER YEAR 1980. VOLUME 3: WESTERN NEW YORK Annual Water Resources Investigation, 1 Oct. 1979 - 30 Sep. 1980
Apr. 1981 257 p 3 Vol.
(PB81-227316; USGS/WRD/HD-81/032-Vol-3;
USGS/WRD/NY-80/3-Vol-3) Avail: NTIS HC A12/MF A01
CSCL 08H

Water resources data for the 1980 water year for New York consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground-water wells. Records for water discharge at 83 gaging stations, stage only at 14 gaging stations, stage and contents at 6 gaging stations and 2 other lakes and reservoirs, water quality at 19 gaging stations, 5 quality of precipitation stations, and water levels at 19 observation wells are presented. Also included are data for 52 crest-stage and 16 low-flow partial-record stations. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *85 Urban Technology and Transportation.*

N82-12536* National Aeronautics and Space Administration, Washington, D. C.
ENERGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES Quarterly Report, 1 Apr. - 30 Jun. 1981
Jul. 1981 461 p
(NASA-SP-7043(30)) Avail: NTIS HC $15.00 CSCL 10B

This bibliography lists 1546 reports, articles, and other documents introduced into the NASA scientific and technical information system from April 1, 1981 through June 30, 1981. B.W.

N82-12537# Aeronautical Research Inst. of Sweden, Stockholm.
A TWO-DIMENSIONAL STUDY OF THE MAXIMUM POWER THAT CAN BE OBTAINED FROM A WIND TURBINE IN A WIND SHEAR LAYER
Bo C. A. Johansson Apr. 1981 60 p refs
(FFA-134) Avail: NTIS HC A04/MF A01

A two dimensional study, where the undisturbed velocity field is given and allowed to vary arbitrarily vertically, and the location of the wind turbine is given, is presented. The maximum power is calculated by the method of calculus of variations. The maximum power of common wind velocity profiles is only slightly larger than the power, which is obtained by a constant relative wind speed retardation, while for a linear velocity profile there is a considerable difference. S.L.

N82-12538*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
WORKSHOP ON MICROWAVE POWER TRANSMISSION AND RECEPTION. WORKSHOP PAPER SUMMARIES
1980 1366 p refs Workshop held in Houston, Tex., 15-18 Jan. 1980 Document contains eight bound supplements
(NASA-TM-84064) Avail: NTIS HC A99/MF A01 CSCL 10A

Microwave systems performance and phase control are discussed. Component design and reliability are highlighted. The power amplifiers, radiating elements, rectennas, and solid state configurations are described. The proper sizing of microwave transmission systems is also discussed. For individual titles, see N82-12539 through N82-12568.

N82-12539*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SYSTEM PERFORMANCE CONCLUSIONS
G. D. Arndt *In its* Workshop on Microwave Power Transmission and Reception 1980 p 1-12 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

System sizing is discussed in terms of reduced power levels and antenna diameters smaller than 1 km. The microwave transmission efficiency for smaller SPS systems was investigated. Startup and shutdown operations were examined with emphasis on solar eclipse effects on the solar arrays. The antennas and subarray mechanical alignments are also discussed. T.M.

N82-12540*# Boeing Aerospace Co., Seattle, Wash.
SPS LARGE ARRAY SIMULATION
S. Rathjen, B. R. Sperber, and Ervin J. Nalos *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 14-23 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

The computer programming efforts were directed primarily to beam pattern analysis. The computer programs used for simulation provide: verification of the reference design; definition of feasible departures such as quantized distributions; the study of far-out sidelobe roll-off characteristics; the analysis of errors and failures; illumination function analysis to develop beam patterns for efficient collection; and beam shaping synthesis to meet environmental constraints. T.M.

N82-12541*# Axiomatix, Los Angeles, Calif.

AN ACTIVE ALIGNMENT SCHEME FOR THE MPTS ARRAY

Richard Iwasaki *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 26-31 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

In order to maximize the efficiency of the microwave power transmission system (MPTS), the surface of the array antenna must be extremely flat, which is difficult to achieve using passive techniques over the 1 km dimensions of the array. In order to achieve and maintain this required flatness, a rotating laser beam used for leveling applications on Earth was utilized as a reference system. A photoconductive sensor with a reflective collecting surface was used to determine the displacement and polarity of any misalignment and automatically engage a stepping motor to drive a variable-length mechanism to make the necessary corrections. Once aligned, little power is dissipated since a nulling bridge circuit that centers on the beam is used, an important alignment feature since even laser beams broaden considerably at 1 km distances. T.M.

N82-12542*# Los Alamos Scientific Lab., N. Mex.

IONOSPHERIC POWER BEAM STUDIES

Lewis M. Duncan and William E. Gordon (Rice Univ.) *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 32-43 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

A power density level of 23 mW/sq cm is presented as a design specification based on theoretical calculations of a threshold for microwave ionosphere nonlinear interaction (thermal runaway). For comparable power densities, enhanced electron heating is observed to change the electron temperature by a factor of two or three, but not by an order of magnitude. T.M.

N82-12543*# Emmanuel Coll., Boston, Mass.

PROPOSED EXPERIMENTAL STUDIES FOR ASSESSING IONOSPHERIC PERTURBATIONS ON SPS UPLINK PILOT BEAM SIGNAL

Santimay Basu and Sunanda Basu *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 44-54 refs (For primary document see N82-12538 03-44)
(Contract F19628-78-C-0005; Grant NSF ATM-78-25264)
Avail: NTIS HC A99/MF A01 CSCL 10A

The microwave beam of the proposed Solar Power Satellite (SPS) at geosynchronous altitude is to be formed and directed by phase information derived from a pilot signal at 2.45 GHz transmitted from ground and received in a number of module locations on the SPS antenna. The frequency of the pilot signal was chosen to be sufficiently low as to avoid the effects of strong scattering by turbulence in the neutral atmosphere and yet high enough to avoid any possible reofractive effects caused by the ionized upper atmosphere. The propagation of the uplink pilot signal through the ionosphere which contains natural and possibly some artificial irregularities, was studied. T.M.

N82-12544*# LinCom Corp., Pasadena, Calif.

PERFORMANCE ANALYSIS AND SIMULATION OF THE SPS REFERENCE PHASE CONTROL SYSTEM

W. C. Lindsey and C. M. Chie *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 58-74 refs (For primary document see N82-12538 03-44)
(Contract NAS9-15782)
Avail: NTIS HC A99/MF A01 CSCL 10A

Key results pertinent to the SPS reference phase control system design are summarized. These results are a consequence of extensive system engineering tradeoffs provided via mathematical modeling, optimization, analysis and the development/utilization of a computer simulation tool called SOLARSIM. T.M.

N82-12545*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

DESIGN AND BREADBOARD EVALUATION OF THE SPS REFERENCE PHASE CONTROL SYSTEM CONCEPT

P. M. Hopkins and V. R. Rao *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 75-84 (For primary document see N82-12538 03-44)
(Contract NAS9-15800)
Avail: NTIS HC A99/MF A01 CSCL 10A

Efficient operation of a very large phased array such as the proposed solar power satellite, requires precision focusing and pointing of the power beam; i.e., the power beam must have a planar wavefront directed precisely at the center of the target antenna (rectenna). To maintain such a power beam requires real-time phase compensation at each subaperture in order to adjust for structural deformations and other transitory factors. In the current solar power satellite (SPS) baseline, the spaceborne antenna (Spacetenna) is an active retrodirective array. A pilot signal transmitted from the center of the rectenna is phase-conjugated at each subaperture (power module) of the spacetenna, thereby assuring that the radiated composite wave is focused on the target. This scheme requires a large amount of precision electronic circuitry on the spacetenna. Specifically, pilot receivers must be located at each power module and an adaptive distribution network is required in order to provide a properly phased reference signal at each conjugator. T.M.

N82-12546*# LinCom Corp., Pasadena, Calif.

COHERENT MULTIPLE TONE TECHNIQUE FOR GROUND BASED SPS PHASE CONTROL

C. M. Chie *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 85-94 refs (For primary document see N82-12538 03-44)
(Contract NAS9-15782)
Avail: NTIS HC A99/MF A01 CSCL 10A

The ground based phase control concept was studied as an alternative approach to the reference SPS phase control system. The details of the ground based phase control system study are documented. The coherent multiple tone technique used for the ground based phase measurement waveform design and phase control system is summarized. T.M.

N82-12547*# Novar Electronics Corp., Barberton, Ohio.

AN INTERFEROMETER-BASED PHASE CONTROL SYSTEM

James H. Ott and James S. Rice *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 95-98 refs (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

A system for focusing and pointing the SPS power beam is discussed. The system is ground based and closed loop. One receiving antenna is required on Earth. A conventional uplink data channel transmits an 8-bit phase error correlation back to the SPS for sequential calibration of each power modulo. Beam pointing resolution is better than 140 meters at the Rectenna. T.M.

N82-12548*# Novar Electronics Corp., Barberton, Ohio.

A SONIC SATELLITE POWER SYSTEM MICROWAVE POWER TRANSMISSION SIMULATOR

James H. Ott and James S. Rice *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 97-99 ref (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10C

A simulator which generates and transmits a beam of audible sound energy mathematically similar to the SPS power beam is described. The simulator provides a laboratory means for analysis of ground based closed loop SPS phase control and of ionospheric effects on the SPS microwave power beam. T.M.

N82-12549*# Boeing Aerospace Co., Seattle, Wash.

SPS PHASE CONTROL STUDIES

W. W. Lund, B. R. Sperber, and G. R. Woodcock *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 100-109 (For primary document see N82-12538 03-44)

Avail: NTIS HC A99/MF A01 CSCL 10A

To properly point and form the SPS microwave power beam, the outputs of the power amplifiers in the transmitting array must be phased in a specific and coherent fashion. The purpose of the SPB phase control system is to bring this about reliably. A number of different phase control schemes were studied. The one selected for the SPS baseline system is a retrodirective CW phase that is distributed via fiber optics. The basis of this selection is relative technical simplicity and requisite assurance of success. T.M.

N82-12550*# Boeing Aerospace Co., Seattle, Wash.
SPS FIBER OPTIC LINK ASSESSMENT
T. O. Lindsay and Ervin J. Nalos *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 110-114 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

Fiber optic technology was selected in the SPS baseline design to transmit a stable phase reference throughout the microwave array. Over a hundred thousand microwave modules are electronically steered by the phase reference signal to form the power beam at the ground receiving station. The initially selected IF distribution frequency of the phase reference signal was set at 980 MHz or a submultiple of it. Fiber optics offers some significant advantages in view of the SPS application. Optical transmission is highly immume to EMI/RFI, which is expected to be severe when considering the low distribution power. In addition, there will be savings in both mass, physical size, and potentially in cost. T.M.

N82-12551*# Rockwell International Corp., Pittsburgh, Pa.
IONOSPHERIC EFFECTS IN ACTIVE RETRODIRECTIVE ARRAY AND MITIGATING SYSTEM DESIGN
A. K. Nandi and C. Y. Tomita *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 115-125 refs (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

The operation of an active retrodirective array (ARA) in an ionospheric environment (that is either stationary or slowly-varying) was examined. The restrictions imposed on the pilot-signal structure as a result of such operation are analyzed. A 3-tone pilot beam system is defined which first estimates the total electron content along paths of interest and then utilizes this information to aid the phase conjugator so that correct beam pointing can be achieved. T.M.

N82-12552*# Boeing Aerospace Co., Seattle, Wash.
HIGH EFFICIENCY SPS KLYSTRON DESIGN
Ervin J. Nalos *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 127-136 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

The most likely compact configuration to realize both high efficiency and high gain is a 5-6 cavity design focused by an electromagnet. An outline of a potential klystron configuration is given. The selected power output of 70 kW CW resulted from a maximum assumed operating voltage of 40 kV. The basic klystron efficiency cannot be expected to exceed 70-75% without collector depression. Although impressive gains were achieved in raising the basic efficiency from 50% to 70% or so with a multi-stage collector, the estimated efficiency improvement due to 5-stage collector at the 75% level is only about 8% resulting in an overall efficiency of about 83%. T.M.

N82-12553*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYTIC INVESTIGATION OF EFFICIENCY AND PERFORMANCE LIMITS IN KLYSTRON AMPLIFIERS USING MULTIDIMENSIONAL COMPUTER PROGRAMS; MULTISTAGE DEPRESSED COLLECTORS; AND THERMIONIC CATHODE LIFE STUDIES
H. G. Kosmahl *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 139-146 refs (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

Due to complexity of the program which used a hydrodynamic, axially and radially deformable disk-ring model and the resulting long computing time only the output gap was investigated. Results from independent studies were used to initiate the starting conditions for the electrons and the RF voltage using our program. Although this method of computation is less exact than processing the entire klystron interaction in 3-Dimensions it is shown that, for a confined flow focused throughout the penultimate cavity, radial velocities remain very small and the beam is highly laminar. It is concluded that possible errors resulting from treating only the output cavity in 3-D would remain small. T.M.

N82-12554*# Raytheon Co., Waltham, Mass. New Products Center.
THE ADAPTING OF THE CROSSED-FIELD DIRECTIONAL AMPLIFIER TO THE REQUIREMENTS OF THE SPS Progress Report
William C. Brown *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 147-155 refs (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

Progress in adapting the crossed-field directional amplifier to the SPS is reviewed. Special emphasis is given to (1) recent developments in controlling the phase and amplitude of the microwave power output, (2) a received architecture for its placement in the subarray, and (3) recent developments in the critical pivotal areas of noise, potential cathode life, and efficiency. Author

N82-12555*# Boeing Aerospace Co., Seattle, Wash.
SPS ANTENNA ELEMENT EVALUATION
C. D. Lunden, W. W. Lund, and Ervin J. Nalos *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 158-165 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

The SPS transmitting array requires an architecture which will provide a low weight, high efficiency and high structural rigidity. Waveguide slot arrays constitute the most desirable option. Consequently, such an array was chosen for the SPS. Waveguide slot arrays offer high efficiency, uniform illimination, and are fairly lightweight. Bandwidths of such arrays are narrow, typically 1/2-2%. Although this does not directly impact the SPS, which transmits power at a single frequency of 2.45 GHz, the narrow bandwidth does constrain the thermal and mechanical tolerances of the antenna. The purpose of this program is to better define the electronic aspects of an SPS specific waveguide slot array. The specific aims of the program are as follows: (1) To build a full-scale half-module, 10 stick, array, the design parameters for which are to be determined analytical considerations tempered by experimental data on a single slotted radiating stick, (2) To experimentally evaluate the completed array with respect to antenna pattern, impedance and return loss; and (3) To measure swept transmission amplitude and phase to provide a data base for design of a receiving antenna. L.F.M.

N82-12556*# Rockwell International Corp., Pittsburgh, Pa.
THE RESONANT CAVITY RADIATOR (RCR)
K. G. Schroeder, R. L. Carlise, and C. Y. Tomita *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 167-177 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

The fundamental theory of MW antenna operation and basic array technology development status was used in the design of the 1-km diameter 5-Gw SPS microwave antenna. However, the aperture size and the high efficiency requirements make the MW antenna extremely complex. Studies show that the slotted waveguide array is one of the most efficient radiators for the antenna. Subsequent analyses show that the temperature interface between waveguides and dc-RF conversion tubes can cause severe thermal design problems on the array. An alternate design, the Resonant Cavity Radiator, is described here. L.F.M.

N82-12557*# Boeing Aerospace Co., Seattle, Wash.
EVALUATION OF THICK WALL WAVE GUIDE ELEMENT
Ervin J. Nalos *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 180-187 (For primary document see N82-12538 03-44)

Avail: NTIS HC A99/MF A01 CSCL 10A

The SPS transmitting array requires an archetecture which will provide a low weight, high efficiency and high structural rigidity. As noted above, waveguide slot arrays constitute the most desirable option. Consequently, such an array has been chosen for the SPS. Waveguide slot arrays offer high efficiency, uniform illumination, are are fairly lighweight. Bandwidths of such arrays are narrow, typically 1/2-2%. Although this does not directly impact the SPS, which transmits power at a single frequency of 2.45 GHz, the narrow bandwidth does constrain the thermal and mechanical tolerances of the antenna. The purpose of this program is to better define the electronic aspects of an SPS specific waveguide slot array. The specific aims of the program are as follows: (1) To build a full-scale half-module, 10 stick, array, the design parameters for which are to be determined by analytical considerations tempered by experimental data on a single slotted radiating stick, (2) To experimentally evaluate the completed array with respect to antenna pattern, impedance and return loss, and (3) To measure swept transmission amplitude and phase to provide a data base for design of a receiving antenna. L.F.M.

N82-12558*# Raytheon Co., Waltham, Mass. New Products Center.

METHOD FOR PRECISION FORMING OF LOW-COST, THIN-WALLED SLOTTED WAVEGUIDE ARRAYS FOR THE SPS

William C. Brown *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 188-190 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

A method for the precision-forming of thin-walled, slotted-waveguide arrays was devised. Models were constructed with temporary tools and evaluated. The application of the method to the SPS requirements is discussed. Author

N82-12559*# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.

CONSIDERATIONS FOR HIGH ACCURACY RADIATION EFFICIENCY MEASUREMENTS FOR THE SOLAR POWER SATELLITE (SPS) SUBARRAYS

D. J. Kozakoff, J. M. Schuchardt, and C. E. Ryan *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 191-200 refs (For primary document see N82-12538 03-44)
(Contract NAS8-33605)
Avail: NTIS HC A99/MF A01 CSCL 10A

The relatively large apertures to be used in SPS, small half-power beamwidths, and the desire to accurately quantify antenna performance dictate the requirement for specialized measurements techniques. Objectives include the following: (1) For 10-meter square subarray panels, quantify considerations for measuring power in the transmit beam and radiation efficiency to + or - 1 percent (+ or - 0.04 dB) accuracy. (2) Evaluate measurement performance potential of far-field elevated and ground reflection ranges and near-field techniques. (3) Identify the state-of-the-art of critical components and/or unique facilities required. (4) Perform relative cost, complexity and performance tradeoffs for techniques capable of achieving accuracy objectives. the precision required by the techniques discussed below are not obtained by current methods which are capable of + or - 10 percent (+ or - dB) performance. In virtually every area associated with these planned measurements, advances in state-of-the-art are required. L.F.M.

N82-12560*# Raytheon Co., Waltham, Mass. New Products Center.

THE HISTORY OF THE DEVELOPMENT OF THE RECTENNA

William C. Brown *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 203-212 refs (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

The history of the development of the rectenna is first reviewed through its early conceptual and developmental phases in which the Air Force and Raytheon Company were primarily involved. The intermediate period of development which involved NASA, Jet Propulsion Laboratory, and Raytheon is then reviewed. Some selective aspects of the current SPS rectenna development are examined. Author

N82-12561*# Boeing Aerospace Co., Seattle, Wash.

RECTENNA SYSTEM DESIGN

G. R. Woodcock and R. W. Andryczyk (GE) *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 213-222 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

Various rectenna system options are discussed. Among these are the half-wave dipole, modified half-wave dipole, yagi, half-wave dipole stripline, air dielectric transmission line feed, full wavelength dipole stripline, parabolic horn, and parabolic trough. L.F.M.

N82-12562*# Rensselaer Polytechnic Inst., Troy, N. Y.

RECTENNA SESSION: MICRO ASPECTS

Ronald J. Gutmann *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 223-231 refs (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

Two micro aspects of rectenna design are discussed: evaluation of the degradation in net rectenna RF to DC conversion efficiency due to power density variations across the rectenna (power combining analysis) and design of Yagi-Uda receiving elements to reduce rectenna cost by decreasing the number of conversion circuits (directional receiving elements). The first of these involves resolvinga fundamental question of efficiency potential with a rectenna, while the second involves a design modification with a large potential cost saving. L.F.M.

N82-12563*# Novar Electronics Corp., Barberton, Ohio.

A THEORETICAL STUDY OF MICROWAVE BEAM ABSORPTION BY A RECTENNA

James H. Ott, James S. Rice, and Donald C. Thorn *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1981 p 234-240 refs (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

The results of a theoretical study of microwave beam absorption by a Rectenna are given. Total absorption of the power beam is shown to be theoretically possible. Several improvements in the Rectenna design are indicated as a result of analytic modeling. The nature of Rectenna scattering and atmospheric effects are discussed. Author

N82-12564*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

RECTENNA ARRAY MEASUREMENT RESULTS

Richard M. Dickinson *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 244-250 refs (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

The measured performance characteristics of a rectenna array are reviewed and compared to the perfformance of a single element. It is shown that the performance may be extrapolated from the individual element to that of the collection of elements. Techniques for current and voltage combining were demonstrated. The array performance as a function of various operating parameters is characterized and techniques for overvoltage protection and automatic fault clearing in the array demonstrated. A method for detecting failed elements also exists. Instrumentation for deriving performance effectiveness is described. Measured harmonic radiation patterns and fundamental frequency scattered patterns for a low level illumination rectenna array are presented. Author

N82-12565*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

SESSION ON SOLID STATE: INTRODUCTION

In its Workshop on Microwave Power Transmission and Reception 1980 p 253-257 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

The possibilities of using solid state devices as part of the Satellite Solar Power System are discussed. Solid state advantages and disadvantages are presented along with two potential concepts for use of solid state in the system design. L.F.M.

N82-12566*# Boeing Aerospace Co., Seattle, Wash.
MODIFIED REFERENCE SPS WITH SOLID STATE TRANSMITTING ANTENNA
G. R. Woodcock and B. R. Sperber *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 258-267 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

The motivations for considering solid state microwave power amplifiers for the solar power satellite transmitting antenna are the possibilities of greatly increased system reliability due to elimination of electron tube cathodes, a lower mass per unit power and transmitting array area due to the high power densities obtainable in semiconductors, and, probably, cost savings due to development of small hardware items that can be handled by individuals instead of organizations. In order to provide a fair assessment where we stand today with regard to solid state SPS technology, the design described here is close to that of the NASA/DOE reference and is implemented using today's solid state technology with only a small 'push'. The small push is raising the efficiency of DC-RF conversion from the .68 obtained by RCA in 1975 to somewhat over .8 of the solid state SPS. This is generally considered feasible by semiconductor industry representatives. Other solid state SPS configurations can yield somewhat better performance. However, these generally do not provide as fair a vehicle for comparison with the reference and usually also incorporate somewhat more advanced technologies. L.F.M.

N82-12567*# Boeing Aerospace Co., Seattle, Wash.
SPS SOLID STATE ANTENNA POWER COMBINER
G. W. Fitzsimmons *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 268-277 (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

Solid state dc-rf converters offer potential improvements in reliability, mass and low voltage operation, provided that anticipated efficiencies in excess of 80 percent can be realized. Field effect transistors offer the greatest potential in the SPS frequency band at 2.45 GHz. To implement this approach it is essential that means be found to sum the power of many relatively low power solid state sources in a low-loss manner, and that means be provided to properly control the phase of the outputs of the large number of solid state sources required. To avoid the power combining losses associated with circuit hybrids it was proposed that the power from multiple solid state amplifiers be combined by direct coupling of each amplifier's output to the radiating antenna structure. The selected power-combining antenna consists of a unique printed (metalized) microstrip circuit on a ceramic type dielectric substrate which is backed by a shallow lightweight aluminum cavity which sums the power of four microwave sources. The antenna behaves like two one-half wavelength slot-line antennas coupled together via their common cavity structure. L.F.M.

N82-12568*# Rockwell International Corp., Pittsburgh, Pa.
SOLID-STATE RETRODIRECTIVE PHASED ARRAY CONCEPTS FOR MICROWAVE POWER TRANSMISSION FROM SOLAR POWER SATELLITE
K. G. Schroeder and I. K. Petroff *In* NASA. Johnson Space Center Workshop on Microwave Power Transmission and Reception 1980 p 279-298 ref (For primary document see N82-12538 03-44)
Avail: NTIS HC A99/MF A01 CSCL 10A

Two prototype solid-state phased array systems concepts for potential use in the Solar Power Satellite are described. In both concepts, the beam is centered on the rectenna by means of phase conjugation of a pilot signal emanating from the ground. Also discussed is on-going solid-state amplifier development. L.F.M.

N82-12569*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ELECTROCHEMICAL MODELS FOR THE DISCHARGE CHARACTERISTICS OF THE NICKEL CADMIUM CELL
Michael S. Spritzer (Villanova Univ.) Aug. 1981 19 p
(NASA-TM-83814) Avail: NTIS HC A02/MF A01 CSCL 10C

The potential time characteristics of a preconditioned fully charged cell discharge at constant current was studied. Electrochemical principles applied to the sealed nickel cadmium cell and its behavior and to predict operating characteristics were described. A thermodynamic approach to arrive at several related but different equations and its discharge are reported. E.A.K.

N82-12570*# Gilbert/Commonwealth, Reading, Pa.
MAGNETOHYDRODYNAMICS (MHD) ENGINEERING TEST FACILITY (ETF) 200 MWe POWER PLANT. CONCEPTUAL DESIGN ENGINEERING REPORT (CDER). VOLUME 1: EXECUTIVE SUMMARY Final Report
Sep. 1981 48 p
(Contracts DEN3-224; DE-AI01-77ET-10769)
(NASA-CR-165452-Vol-1; DOE/NASA-0224/1-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 10B

Main elements of the design are identified and explained, and the rationale behind them was reviewed. Major systems and plant facilities are listed and discussed. Construction cost and schedule estimates are presented, and the engineering issues that should be reexamined are identified. The latest (1980-1981) information from the MHD technology program is integrated with the elements of a conventional steam power electric generating plant. T.M.

N82-12571*# Boeing Co., Seattle, Wash.
TESTING OF SOLAR CELL COVERS AND ENCAPSULANTS CONDUCTED IN A SIMULATED SPACE ENVIRONMENT Final Report
D. A. Russell Nov. 1981 267 p
(Contract NAS3-22222)
(NASA-CR-165475; D180-26590-1) Avail: NTIS HC A12/MF A01 CSCL 10A

The materials included in the evaluation were 0211 microsheet, FEP-A used as a cover and as an adhesive, DC 93-500 adhesive, PFA 'hard coat' used as a cover, GE 615/UV-24 used as a cover, GR 650 used as a cover, and electrostatically bonded 7070 glass. The test environments were 1 MeV electron irradiation interspersed with thermal cycling, 0.5 MeV proton irradiation interspersed with thermal cycling and UV exposure interspersed with thermal cycling. Summary data is given describing the response of the test materials both visually and electrically to the three different environments. T.M.

N82-12572*# United Technologies Corp., South Windsor, Conn. Power Systems Div.
LOW NO SUB X HEAVY FUEL COMBUSTOR CONCEPT PROGRAM Final Report, 23 Oct. 1979 - Jul. 1981
Paul Russell, George Beal, and Bruce Hinton 15 Oct. 1981 99 p refs Prepared in cooperation with Pratt and Whitney Aircraft, East Hartford, Conn.
(Contracts DEN3-149; DE-AI01-77ET-13111)
(NASA-CR-165512; DOE/NASA/0149-1; QTR-3236) Avail: NTIS HC A05/MF A01 CSCL 10B

A gas turbine technology program to improve and optimize the staged rich lean low NOx combustor concept is described. Subscale combustor tests to develop the design information for optimization of the fuel preparation, rich burn, quick air quench, and lean burn steps of the combustion process were run. The program provides information for the design of high pressure full scale gas turbine combustors capable of providing environmentally clean combustion of minimally of minimally porcessed and synthetic fuels. It is concluded that liquid fuel atomization and mixing, rich zone stoichiometry, rich zone liner cooling, rich zone residence time, and quench zone stoichiometry are important considerations in the design and scale up of the rich lean combustor. E.A.K.

N82-12573*# Stonehart Associates, Inc., Madison, Conn.
PREPARATION AND EVALUATION OF ADVANCED ELECTROCATALYSTS FOR PHOSPHORIC ACID FUEL CELLS Quarterly Report
Paul Stonehart, John Baris, John Hochmuth, and Peter Pagliaro 30 Sep. 1981 31 p
(Contracts DEN3-176; DE-AI03-80ET-17088)
(NASA-CR-165519; DOE/NASA/0176-81/4; QR-7) Avail: NTIS HC A03/MF A01 CSCL 10A

A number of electrocatalyst combinations were prepared and characterized. These electrocatalysts were formulated to contain platinum combined with transition metal carbide forming elements (W, Mo, V) for cathodes and platinum combined with palladium for anodes. High resolution electron microscopy was used to determine the crystallite size and dispersion of platinum-palladium alloy electrocatalysts in order to provide analytical support for the electrochemical determinations of the particle dispersions. An equation was derived which correlates palladium crystallite size with electrochemical hydrogen adsorption. Based on comparisons of electrocatalyst performances in the presence of pure hydrogen and hydrogen containing carbon monoxide, it was shown that the apparent poisoning of the electrocatalyst by carbon monoxide is influenced by the electrode structure. DOE

N82-12574*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

PERFORMANCE OF ADVANCED CHROMIUM ELECTRODES FOR THE NASA REDOX ENERGY STORAGE SYSTEM Final Report

Randall F. Gahn, JoAnn Charleston, Jerri S. Ling, and Margaret A. Reid Nov. 1981 23 p refs
(Contract DE-AI04-80AL-12726)
(NASA-TM-82724; E-1025; DOE/NASA/12726-15) Avail: NTIS HC A02/MF A01 CSCL 10C

Chromium electrodes were prepared for the NASA Redox Storage System with meet the performance requirements for solar-photovoltaic, wind-turbine and electric utility applications. Gold-lead catalyzed carbon felt electrodes up tp 930 sq cm were fabricated and tested in single cells and multicell stacks for hydrogen evolution, coulombic efficiency, catalyst stability and electrochemical activity. Factors which affect the overall performance of a particular electrode include the carbon felt lot, the cleaning treatment and the gold catalyzation method. Effects of the chromium solution chemistry and impurities on charge/discharge performance are also presented. Author

N82-12575# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.

VOLTAGE LOSSES AND RECONDITIONING OF NiCd CELLS: BEHAVIOR DURING CYCLING

Albert H. Zimmerman and Melanie C. Janecki 21 Aug. 1981 36 p refs
(Contract F04701-80-C-0081)
(AD-A105418; TR-0081(6970-0)-4; SD-TR-81-62) Avail: NTIS HC A03/MF A01 CSCL 10/3

The voltage losses that accompany the cycling of NiCd satellite cells are studied under a variety of operational conditions. The recovery of these losses through reconditioning procedures involving complete cell discharge is also examined. The results indicate that the voltage losses arise from a combination of thermodynamic and kinetic changes in the Ni electrode and that these changes result from a solid-state phase transformation in the Ni electrode active material. Author (GRA)

N82-12576# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.

IMPEDANCE AND MASS TRANSPORT KINETICS OF NICKEL CADMIUM CELLS

Albert H. Zimmerman and Melanie C. Janecki 1 Sep. 1981 28 p refs
(Contract F04701-80-C-0081)
(AD-A105320; TR-0081(6970-01)-1; SD-TR-81-63) Avail: NTIS HC A03/MF A01 CSCL 10/3

The impedance of operating NiCd cells in the frequency range 0.001 to 100 Hz is characteristic of mass-transport processes that occur in the cells. Two diffusion processes are observed in the impedance spectrum, at least one of which appears to involve solid-state diffusion in a surface film. The diffusion characteristics have a pronounced dependence on cell current, as well as some dependence on cell state of charge and operating temperature. The diffusion properties of the NiCd cell do appear to be sensitive to the changes in morphological or chemical structure of the active materials that can occur during use. Author (GRA)

N82-12577# Army Electronics Research and Development Command, Fort Monmouth, N. J. Electronics Technology/Devices Lab.

ELECTROLYTES FOR RECHARGEABLE LITHIUM BATTERIES

Herbert F. Hunger Sep. 1981 15 p refs
(DA Proj. 1L1-61102-AH-47)
(AD-A105230; DELET-TR-81-17) Avail: NTIS HC A02/MF A01 CSCL 10/3

Theoretical considerations predict increased stability of cyclic ethers and diethers against reductive cleavage by lithium if the ethers have 2 methyl substitution. Diethers are solvents with low viscosity which are desirable for high rate rechargeable lithium batteries. Synergistic, mixed solvent effects increase electrolyte conductance and rate capability of lithium intercalating cathodes. Author (GRA)

N82-12578# Mazria (Edward) and Associates, Albuquerque, N. Mex.

PASSIVE SOLAR TECHNICAL PLANNING STUDY Final Report

Edward Mazria and M. S. Baker Oct. 1980 120 p refs
(EPRI-EM-1591; EPRI-TPS-79-750) Avail: NTIS HC A06/MF A01

The most promising passive solar techniques in buildings and their potential impact on electric utilities are examined. The differences between passive design and good energy conservation practices and the correlation between the passive solar contribution relative to reducing the building load from normal design practices are addressed. The potential for passive solar systems to alter residential load profiles, especially to reduce peaks for back-up energy needs is discussed. Computer code analysis techniques and capabilities required to simulate passive designs are presented. S.L.

N82-12579# Department of Energy, Washington, D. C.

DEPARTMENT OF ENERGY PROJECTS Quarterly Status Report

30 Jun. 1981 525 p
(DE82-000038; DOE/MA-0006/2) Avail: NTIS HC A22/MF A01

The report is designed to provide Department of Energy (DOE) management with a summary of the important baseline data that exists in the DOE project data base. This data base is maintained chiefly from periodic field management reports required by DOE Order 5700.4. Since most of the current estimates in this report are from field project managers, they do not necessarily have full headquarters approval. The current budget data sheet estimates that appear in the report are considered appropriate for reporting external to the Department. DOE

N82-12580# Data Resources, Inc., Lexington, Mass.

MODELS FOR FORECASTING ENERGY USE IN THE US FARM SECTOR Final Report

L. R. Christensen Electric Power Research Inst. Jul. 1981 200 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 682-1)
(DE81-904220; EPRI-EA-1956-Vol-1) Avail: NTIS HC A09/MF A01

Econometric models were developed and estimated for the purpose of forecasting electricity and petroleum demand in US agriculture. A structural approach is pursued which takes account of the fact that the quantity demanded of any one input is a decision made in conjunction with other input decisions. Three different functional forms of varying degrees of complexity are specified for the structural cost function, which describes the cost of production as a function of the level of output and factor prices. Demand for materials (all purchased inputs) is derived from these models. A separate model which break this demand up into demand for the four components of materials is used to produce forecasts of electricity and petroleum is a stepwise manner. DOE

N82-12581# Merix Corp., Wellesley, Mass.

ENERGY CONSERVATION IN DISTILLATION Final Report

T. W. Mix, J. S. Dweck, M. Weinberg, and R. C. Armstrong Jul. 1981 299 p refs
(Contract DE-AC07-76CS-40259)
(DE81-028650; DOE/CS-40259/1) Avail: NTIS HC A13/MF A01

An audit of major industrial and processes and key colums in each major process indicated that approximately twoquads of energy were consumed for distillation in the US in 1976. Energy usage by industry is included: petroleum refineries, 66% chemical (including petrochemical) industry, 29% natural gas liquids processing, 5%. Techniques and current practices for conserving distillation energy are reviewed, and guidelines indicating those process conditons which favor the use of each energy conserving technique are enumerated. Expressions for payout time for tray and control retrofit options are developed based on energy savings and increased throughput. Calculations for industrial colums suggested that both types of retrofits would frequently have short (,6 months) payout times based on either criterion. Extractive distillation is also discussed, and criteria enabling the estimation of the energy which may be conserved using this technique are developed. Good housekeeping practices and field techniques for checking the energy efficiency of industrial distillations are also discussed. DOE

N82-12582# Prototech, Inc., Newton Highlands, Mass.
ENERGY SAVINGS BY MEANS OF FUEL-CELL ELECTRODES IN ELECTRO-CHEMICAL INDUSTRIES Progress Report, 1 Feb. - 30 Apr. 1981
A. Bar-Ilan, Walter Juda, and Brian P. Finnigan 31 Jul. 1981 26 p refs
(Contract DE-AC02-78ET-25309)
(DE81-030975; DOE/ET-25309/T1; COO-4881-31) Avail: NTIS HC A03/MF A01

Life testing of palladium-loaded and low platinum-loaded anodes on type C supports and with type no 01 current collectors was continued and terminated. Additional life-test data are reported for high Pt-loaded and a second low Pt-loaded anode. The 6 in. x 6 in. depth cell was operated at reduced hydrogen back pressures, and the effect of the resulting flooding of the hydrogen chamber upon cell performance was determined. Furthermore, two 6 in. x 6 in. depth cells were fabricated from the same type platinum support and current collector, but following different preparation procedures. Cell performance was compared at various submergence depths under identical operating conditions. DOE

N82-12583# Los Alamos Technical Associates, Inc., N. Mex.
THE SEVERITY OF INSTITUTIONAL BARRIERS AFFECTING ENERGY-FROM-MUNICIPAL-WASTE TECHNOLOGIES
G. E. Dials, J. M. Greenwood, L. L. Lewis, and E. M. Cole Jun. 1981 58 p refs Presented at Inst. Barriers Assessment Workshop, Washington, D.C., 19 Feb. 1981 Prepared for Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE82-000133; ANL/CNSV-TM-79) Avail: NTIS HC A04/MF A01

The results from a workshop during which EMW experts were asked to indicate the importance of these barriers are summarized. The basic results of the workshop participants' scoring of the institutional barriers according to their importance are described. More elaborate analyses conducted on the workshop results are reported. A summary of the workshop results and a listing of the most important EMW technology/institutional barrier combinations are included. T.M.

N82-12584# Century Engineering, Inc., Towson, Md.
EVALUATION OF LANDFILL GAS AS AN ENERGY SOURCE
Dec. 1980 45 p refs
(Contract DE-FG02-78IR-05106)
(DE82-000116; DOE/IR-05106/T47) Avail: NTIS HC A03/MF A01

The benefits and problems associated with landfill gas recovery were considered by the City of Baltimore, resulting in the structuring and testing of a realistic gas recovery evaluation procedure for use by local governments. The Baltimore methodology is summarized and results of its application to a large landfill in the Baltimore area are presented. The landfill gas generation process potential uses for the recovered gas, and treatment requirements are covered. DOE

N82-12585# Battelle Pacific Northwest Labs., Richland, Wash.
UNITED STATES DEPARTMENT OF ENERGY THERMAL STORAGE PROGRAM
J. H. Swisher (DOE, Washington, D.C.) and W. A. Frier 1981 36 p refs
(Contracts DE-AI01-78CS-35217; DE-AC06-76RL-C1830; EM-78-1-01-5217)
(DE81-030263; DOE/RL-01830/T6) Avail: NTIS HC A03/MF A01

Thermal energy storage devices, processes, and subsystems that permit domestic energy resources to be supplied at the time and locations where they can be used are developed. Daily storage for active or passive solar and conventional heating and cooling, seasonal storage for building heating and cooling, thermal energy transport, thermal power storage, and chemical heat pumps are emphasized. DOE

N82-12586# Battelle Pacific Northwest Labs., Richland, Wash.
BIBLIOGRAPHY OF THE SEASONAL THERMAL ENERGY STORAGE LIBRARY
L. S. Prater, G. Casper (Midwest Research Inst.), and R. A. Kewin (Control Data Corp.) Aug. 1981 310 p
(Contract DE-AC06-76RL-01830)
(DE81-030470; PNL-3645) Avail: NTIS HC A14/MF A01

Seasonal storage of thermal energy which contributes to the relief of the national energy storage is described. Various forms of surplus energy (winter chill, summer heat, and industrial waste heat) are stored till needed. Potential storage media include: aquifers, lakes, ponds, and earth. Storage of thermal energy in aquifers is chosen for initial development. Other methods of seasonal storage are also evaluated. DOE

N82-12587# Argonne National Lab., Ill. Energy and Environmental Systems Div.
ASSESSMENT OF THE POTENTIAL OF COAL-FUELED HEAT ENGINES IN TOTAL AND INTEGRATED ENERGY SYSTEMS
J. C. Bratis, M. L. Jain, and T. J. Marciniak Jun. 1981 80 p refs
(Contract W-31-109-eng-38)
(DE82-000169; ANL/FE-81-56) Avail: NTIS HC A05/MF A01

The potential of several prime movers, especially those that use coal, for use in total and integrated energy systems in the residential and commercial sector was investigated. The prime movers considered are diesels, Stirlings, internally and externally fired gas turbines, and steam turbines. Total energy systems based on the prime movers are compared to the conventional system for four communities that represent different ratios of residential to commercial area. The energy savings, environmental effects, and economic benefits are shown. It is found that for both scenarios, neither coal nor oil using total energy systems have a definite economic advantage. DOE

N82-12588# Oak Ridge National Lab., Tenn. Energy Div.
DETECTING OUTLIERS IN ENERGY TIME-SERIES DATA
Michael R. Chernick (Aerospace Corp., Los Angeles), Darryl J. Downing, and David H. Pike Aug. 1981 43 p refs
(DE81-030230; ORNL/TM-7460) Avail: NTIS HC A03/MF A01

Occasional large errors in energy data can have drastic effects on estimates for such quantities as correlation coefficients, regression coefficients, and spectral density estimates. The effect of outliers on time series was investigated by considering the influence function for the autocorrelations p(k) of a stationary time series. Effects on estimates of the spectrum for power plant data are then shown. Finally, asymptotic theory was derived for the maximum average square influence function in order to formally test for outliers in stationary Gaussian sequences. DOE

N82-12589# Department of Energy, Washington, D. C. Industrial Data Systems Div.
NATIONAL INTERIM ENERGY-CONSUMPTION SURVEY: EXPLORING THE VARIABILITY IN ENERGY CONSUMPTION
Robert Latta, Thomas H. Woteki, Lynda Carlson, Wendel Thompson, and Kenneth Vagts Jul. 1981 70 p refs
(DE81-029910; DOE/EIA-0272) Avail: NTIS HC A04/MF A01

The variation in total energy consumption and consumption by end use are described. The report concentrates on regression models for describing the variability in natural gas and electricity consumption for households living in single family detached houses. Sample data and the subsets used in the analyses are described. A theoretical model for describing a household's energy consumption is presented. Graphical summaries of the data which serve to explain the specific models fit to the data are also presented. The empirical models fit to the data, and the method of fitting, are discussed. Results, speculation on interpretation of the model coefficients, and potential uses of the model are summarized. DOE

N82-12590# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
SECURITY ASSESSMENT OF POWER SYSTEMS INCLUDING ENERGY STORAGE AND WITH THE INTEGRATION OF WIND ENERGY Progress Report, 1 Apr. - 30 Jun. 1981
D. P. Carroll and P. C. Krause Jul. 1981 17 p
(Contracts DE-AS02-77ET-29100; EC-77-S-02-4206)
(DE81-030166; DOE/ET-29100/T1) Avail: NTIS
HC A02/MF A01

Methods of Resynchronizing wind turbine generators, and performance of wind turbines in a turbulent atmosphere, were discussed. The work on reduced order modeling by SEPI is reported. Aggregation techniques which have been formulated are validated. DOE

N82-12591# Sandia Labs., Albuquerque, N. Mex. Advanced Energy Project Div.
VERTICAL-AXIS WIND-TURBINE CONTROL STRATEGY
Gerald M. McNerney Aug. 1981 21 p refs
(Contract DE-AC04-76DP-00789)
(DE81-031932; SAND-81-1156) Avail: NTIS
HC A02/MF A01

Early expense in automatic operation of the Sandia 17-m vertical axis research wind turbine (VAWT) demonstrated the need for a systematic study of control algorithms. To this end, a computer model was developed that uses actual wind time series and turbine performance data to calculate the power produced by the Sandia 17-m VAWT operating in automatic control. The model was used to investigate the influence of starting algorithms on annual energy production. The results indicate that, depending on turbine and local wind characteristics, a bad choice of a control algorithm can significantly reduce overall energy production. The model can be used to select control algorithms and threshold parameters that maximize long-term energy production. DOE

N82-12592# COECORP, Mountain View, Calif.
INVESTIGATION AND RESEARCH OF SPECIFIC COMBUSTION-TURBINE AND COMBINED-CYCLE FIELD PROBLEMS Annual Report
Aug. 1981 62 p Prepared in cooperation with Aptech Engineering Services, Inc. Sponsored by Electric Power Research Inst.
(EPRI Proj. 1802)
(DE81-904231; EPRI-AP-1981) Avail: NTIS
HC A04/MF A01

Specific combustion turbine and combined cycle field problems are discussed. These are (1) fuel filter plugging, (2) apparent compressor surge, (3) oily waste water, (4) compressor wheel failure, and (5) combustor problems. Results of research efforts are outlined. DOE

N82-12593# Rocket Research Corp., Redmond, Wash.
UTILIZATION OF WASTE HEAT FROM MAJOR TRANSFORMER SUBSTATIONS. VOLUME 1: GENERIC STUDY Final Report
N. T. Christensen Aug. 1981 190 p refs Sponsored by Electric Power Research Inst. 2 Vol.
(EPRI Proj. 1274-1)
(DE81-904212; EPRI-EM-1968-Vol-1) Avail: NTIS
HC A09/MF A01

Large substation transformers reject substantial thermal energy. Since these units are usually close-coupled to facilities requiring low-temperature thermal energy for space conditioning, the ability to recover and efficiently utilize this energy is of significant interest. The intent of this project was to analytically evaluate the technical and economic potential of transformer waste heat recovery and utilization and verify the analysis with subscale testing. A general system was designed and optimized for the recovery of transformer waste heat. Simplified analytical techniques were developed to assist utilities in both preliminary analysis and detail design analysis of specific systems, including system economics. Critical component performance parameters were identified for the preparation of detailed specifications. Criteria was established for the specific application of such systems through system economics. A national mail survey was conducted to determine the quantity and usability of transformer waste heat in the United States. DOE

N82-12594# Rocket Research Corp., Redmond, Wash.
UTILIZATION OF WASTE HEAT FROM MAJOR TRANSFORMER SUBSTATIONS. VOLUME 2: SITE-SPECIFIC STUDY Final Report
N. T. Christensen Aug. 1981 93 p Sponsored by Electric Power Research Inst. 2 Vol.
(EPRI Proj. 1274-1)
(DE81-904236; EPRI-EM-1968-Vol-2) Avail: NTIS
HC A05/MF A01

The applicability of transformer waste heat utilization was examined by analyzing a site-specific application. The site is located in Seattle, Washington; the energy source is the Broad Street Substation and the energy user is the Pacific Science Center. A description of the system is presented in Section I. A preliminary heat source/heat service analysis is given in Section II. Transformer waste heat availability and system heat demand, the thermal performance and hydraulic analysis, overall system efficiency, operation flexibility, major component selection, and the thermal storage system are discussed. The substation site, the transmission system, and the retrofit of the Pacific Science Center are described. System cost details and a cash flow projection are given. DOE

N82-12595# Mid-American Solar Energy Complex, Minneapolis, Minn.
MASEC INDUSTRIAL FUEL-WOOD PROGRAM
M. Hohmann Jul. 1981 46 p refs
(Contract DE-AC02-79CS-30150)
(DE82-000461; MASEC/R-81-062; B-101-3) Avail: NTIS
HC A03/MF A01

The program is designed not only to identify technical and institutional barriers to the use of wood for fuel, but to effectively reduce these barriers and the economic uncertainty they cause by providing business and industry with the type of information they need for preliminary planning purposes. Information on resource availability, the types of equipment needed, sources of technical assistance, and the financial aspects of the potential investment are provided. A listing of existing wood-fired systems is also included. A key component of the program is a net-cash-flow analysis based upon a life-cycle economic model that is used to evaluate new and retrofit wood-fired boiler installations. T.M.

N82-12596# Battelle Columbus Labs., Ohio.
ENERGY RECOVERY FROM MUNICIPAL SOLID WASTE AND SEWAGE SLUDGE USING MULTI-SOLID FLUIDIZED BED COMBUSTION TECHNOLOGY
Jul. 1981 210 p refs
(Contract DE-AC01-78CS-20424)
(DE82-001142; DOE/CS-20424/1) Avail: NTIS
HC A10/MF A01

The concept is to recover energy as high and low pressure steam, simultaneously. High pressure steam would be generated from flue gas using a conentional tubular boiler. Low pressure steam would be generated by direct contact drying of DSS (as 4 percent solids) with hot sand in a fluidized bed that is an integral part of the MS-FBC process. It is proposed that high pressure steam could be used for district heating or electricity generation. The low pressure steam could be used for close proximity building heat. The results of the investigation show that the MS-FBC process concept for the co-utilization of MSW and DSS is technically feasible and that the thermal efficiency of the process is 76 to 82 percent based on experiments conducted in a 70 to 85 lb/h pilot plant and calculations on three conceptual cases. DOE

N82-12597# Commission of the European Communities, Luxembourg.
APPLICATION OF DIFFERENT KFA-MODELE IN THE FRAMEWORK OF THE ENERGY RESEARCH PROGRAMME OF THE EUROPEAN COMMUNITIES Final Report
1980 98 p refs
(EUR-6758-EN) Avail: NTIS HC A05/MF A01

Four West German energy models are presented: (1) an energy policy to decrease dependence on oil and gas imports, (2) fuel parameters of various nuclear power plant systems, (3) investments in environmental protection inthe energy sector and their effects on the gross national product, and (4) the use of FORTRAN in modular dynamic simulation. N.W.

N82-12598# Arizona Univ., Tucson. Solar Energy Research Facility.
GUIDEBOOK FOR SOLAR PROCESS-HEAT APPLICATIONS
Rocco Fazzolare, George Mignon, Leonel Campoy, and Francisco Luttmann Jan. 1981 169 p refs
(DE81-027977; DOE/TIC-1027977) Avail: NTIS HC A08/MF A01

The potential for solar process heat in Arizona and some of the general technical aspects of solar, such as insolation, siting, and process analysis are explored. Major aspects of a solar plant design are presented. Collectors, storage, and heat exchange are discussed. Reducing hardware costs to annual dollar benefits is also discussed. Rate of return, cash flow, and payback are discussed as they relate to solar systems. Design analysis procedures are presented. The design cost optimization techniques using a yearly computer simulation of a solar process operation is demonstrated. DOE

N82-12599# International Energy Agency, Paris (France).
OPTIMIZATION OF SOLAR HEATING AND COOLING SYSTEMS
T. L. Freeman (Atlas Corp., Santa Cruz, Calif.) Jun. 1981 56 p refs
(NP-1903997) Avail: NTIS (US Sales Only) HC A04/MF A01; DOE Depository Libraries

A review of general techniques and specific methods useful in the optimization of solar heating and cooling systems is undertaken. A discussion of the state of the art and the principal problems in both the simplified thermal performance analysis and economic analysis portions of the optimization problem are presented. Sample economic analyses are performed using several widely used economic criteria. The predicted thermal results of one typical, widely used simplified method is compared to detailed simulation results. A methodology for and the results of a sensitivity study of key economic parameters in the life cycle cost method are presented. Finally, a simple graphical optimization technique based on the life cycle cost method is proposed. DOE

N82-12600# Brookhaven National Lab., Upton, N. Y. Technology ,and Data Div.
COMPARATIVE ECONOMIC PERFORMANCE OF SELECTED PASSIVE SOLAR HEATING AND COOLING TECHNOLOGIES
W. Rutter May 1981 24 p refs
(Contract DE-AC02-76CH-00016)
(DE81-030220; BNL-51394) Avail: NTIS HC A02/MF A01

The economic performance of selected passive solar heating and cooling technologies which incorporate energy storage is assessed by using a set of uniform assumptions and methodologies. Where data are available, a given system is assessed at more than one geographical location. Results are obtained in the form of both payback period and net present value for residential applications, and in terms of net present value only for industrial/commercial uses. Results indicate that ventilated trombe walls, solar roof ponds, and certain night effect/floor storage strategies are cost effective, but night effect/rock bed cooling is not. Results also show that, although direct gain out-performs trombe walls in most parts of the country, both direct gain and trombe walls usually produce a net savings in the residential sector. Generally, however, tax regulations result in net economic loss for direct gain and trombe walls used to heat industrial and commercial buildings. DOE

N82-12601# Sandia Labs., Albuquerque, N. Mex. Thermal Sciences Div.
COMPARATIVE ECONOMICS OF SOLAR THERMAL CENTRAL RECEIVERS
Miriam J. Fish Aug. 1981 56 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029623; SAND-81-8236) Avail: NTIS HC A04/MF A01

For both electrical and industrial process heat (IPH) generation, central receivers compare favorably with oil and gas, and in many cases, coal. Calculational results are presented in which the levelized energy costs from central receiver plants are compared with those from oil, gas, and coal fired plants. Both electrical and IPH applications are discussed. Uncertainties in future capital costs, fuel price escalation rates, and the underlying economic climate are included in the analysis. DOE

N82-12602# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE: EXECUTIVE SUMMARY. VOLUME 1:, FOR NEWMAN POWER STATION, EL PASO, TEXAS
Aug. 1981 9 p
(Contract DE-AC04-76DP-00789)
(DE81-031934; SAND-81-7100-Vol-1; MR-14) Avail: NTIS HC A02/MF A01

The data given for a 20 kWp photovoltaic flat panel power system for an uninterruptable power supply load includes: total electrical energy produced during the month of June 1981, and for each day of the month; total incident solar energy in the plane of the collector during the month and for each day of the month; and array efficiency. The monthly average direct normal insolation during the month during daylight hours is also reported. T.M.

N82-12603# Battelle Pacific Northwest Labs., Richland, Wash.
TECHNOLOGY ASSESSMENT OF SOLAR ENERGY SYSTEMS: RESIDENTIAL USE OF FUELWOOD IN THE PACIFIC NORTHWEST
P. N. Petty and W. J. Hopp Aug. 1981 72 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000046; PNL-3918) Avail: NTIS HC A04/MF A01

The evidence of impacts associated with the use of fuelwood for residential space heating in the region including the states of Washington, Oregon, and Idaho is identified and evaluated. The use of fuelwood for space heating was projected into the future, and then the potential size of the impacts that had been identified and estimated was evaluated. These projections are provided in five year increments beginning in 1980 and proceeding to the year 2000. Policy options are suggested which may mitigate the adverse impacts identified, while preserving the positive effect of reducing residential demand for energy derived from nonrenewable sources. DOE

N82-12604# Mid-American Solar Energy Complex, Minneapolis, Minn.
WOOD RESOURCES AND UTILIZATION PATTERNS IN THE NORTH CENTRAL REGION AND ENERGY NEEDS FOR THE MANUFACTURE OF WOOD PRODUCTS
Steven A. Sinclair Mar. 1981 37 p refs
(Contract DE-AC02-79-CS-30150)
(DE81-030356; MASEC/R-81-005) Avail: NTIS HC A03/MF A01

The resources of the region are discussed on a state-by-state basis. The discussion of standing timber growth and removal is in terms of commercial growing stock; however, the total forest biomass may be estimated by simply adding the potential logging residue to the growing stock figure. The energy needs of various wood and paper products, plants, standard industrial classification codes 24 and 26, are highlighted. In addition, the ability of various wood manufacturing facilities to generate their energy needs from wood residues and by-products is explored. T.M.

N82-12605# United Technologies Corp., South Windsor, Conn.
DESIGN, CONSTRUCTION, AND OPERATION OF A FULL SCALE EXPERIMENTAL ANAEROBIC FERMENTATION FACILITY Final Report
Jun. 1981 235 p
(Contract DE-AC01-77ET-20009)
(DE81-029028; DOE/ET-20009/T1) Avail: NTIS HC A11/MF A01

A 25 ton per day anaerobic fermentation facility was designed to evaluate the technical and economic viability of producing fuel gas and an animal refeed product from the residues of an environmental beef cattle feedlot. The system has been in continuous operation and has been producing between 3 to 5 cubic feet of methane per pound of volatile solids fed to the system. Product gas is successfully utilized in: (1) the system process boiler which maintains thermophilic operating temperature in the fermentors; (2) a meat packing plant process boiler, cofired with fuel oil; (3) and a 440 kW grid connected engine/generator system. Feeding trials that will establish the value of the dewatered effluent were performed. It is indicated from the initial operation of the system that it will be a technically and economically viable process. DOE

N82-12606# Argonne National Lab., Ill. Energy and Environmental Systems Div.
TECHNOLOGY ASSESSMENT OF SOLAR ENERGY SYSTEMS: POTENTIAL SOIL EROSION EFFECTS OF HARVESTING CROP RESIDUES FOR ENERGY PRODUCTION
Michael F. Torpy, Loren J. Habegger, Mary A. Snider, and Terrence G. Surles Jan. 1981 38 p refs
(Contract W-31-109-eng-38)
(DE82-000149; ANL/EES-TM-152) Avail: NTIS HC A03/MF A01

An evaluation is presented of the potential increase in erosion that could result from removal of the ground cover that the residues provide. The study indicates that removal of crop residues sufficient to produce 0.13 and 0.42 x 10 to the 15th power Btu of end-use energy (as specified, respectively, in the two scenarios addressed by the Technology Assessment of Solar Energy Program) would have little effect on soil erosion except in a few areas. An alternative scenario is addressed in which all reasonably available crop residues would be harvested to produce 1.5 x 10 to the 15th power Btu of end-use energy. The approach used in evaluating erosion due to removal of residue is also described. DOE

N82-12607# Joint Center for Graduate Study, Richland, Wash.
INVESTIGATION OF SOLAR CELLS BASED ON Cu2 Final Progress Report, 1 Jun. 1980 - 31 May 1981
L. C. Olsen Jul. 1981 50 p refs
(Contract DE-AC02-77CH-00178)
(DE81-030274; SERI/TR-9190-1-T3) Avail: NTIS HC A03/MF A01

Copper oxide solar cells are investigated with emphasis on fabrication of a Cu20 junction with a built-in voltage significantly greater than 1 eV. Substrate fabrication and characterization, and n-type film studies for Cu20 heterojunctions were conducted. A Cu20 cell structure based on T1/Cu20 Schottky barrier is examined. Thick film T1/Cu20 Schottky barriers are analyzed as a function of temperature. Concentration profiles obtained for T1/Cu20 structures with Auger spectroscopy are presented. DOE

N82-12608# Motorola, Inc., Phoenix, Ariz.
PHOTOVOLTAIC MECHANISMS IN POLYCRYSTALLINE THIN FILM SILICON SOLAR CELLS Quarterly Technical Progress Report, 1 Feb. - 30 Apr. 1981
Bhushan Sopori 29 Aug. 1981 43 p refs
(Contract DE-AC02-77CH-00178)
(DE81-030370; DOE/SERI-9234/3; QTPR-3) Avail: NTIS HC A03/MF A01

Efforts are described in developing a technique for rapid identification of isolated line dislocations and dislocation networks in RTR ribbons. This was accomplished by extending the technique of Cu decoration to determine defect propagation in polycrystalline substrates. The basic characteristics of (100) textured surfaces are described, followed by a ray optics approach towards the analysis of textured surfaces, with and without AR coatings. The technique of optimization is demonstrated for a standard cell and an ultraviolet cell. DOE

N82-12609# Massachusetts Inst. of Tech., Cambridge.
PHOTOVOLTAIC MARKET ANALYSIS PROGRAM: BACKGROUND, MODEL DEVELOPMENT, APPLICATIONS AND EXTENSIONS
Gary L. Lilien and Frank H. Fuller Apr. 1981 158 p refs
(Contract DE-AM01-76EI-02295)
(DE81-029711; MIT-EL-81-012) Avail: NTIS HC A08/MF A01

Tools and procedures to help guide government spending decisions associated with stimulating photovoltaic market penetration were developed. The program has three msin components: (1) theoretical analysis aimed at understanding qualitatively what general types of policies are likely to be most cost effective in stimulating PV market penetration; (2) operational model developent (PV1), providing a user oriented tool to study quantitatively the relative effectiveness of specific government spending options and (3) field measurements, aimed at providing objective estimates of the parameters used in the diffusion model used in PV1. Existing models of solar technology diffusion are reviewed and the structure of the PV1 model is described. Theoretical results on optimal strategies for spending federal market development and subsidy funds are reviewed. The validity of these results is checked by comparing them with PV1 projections of penetration and cost forecasts for 15 government policy strategies which are simulated on the PV1 model. DOE

N82-12610# Massachusetts Inst. of Tech., Cambridge.
COST GOALS FOR A RESIDENTIAL PHOTOVOLTAIC/THERMAL LIQUID COLLECTOR SYSTEM SET IN THREE NORTHERN LOCATIONS
Thomas L. Dinwoodie and John P. Kavanaugh Oct. 1980 61 p refs
(Contract DE-AC02-76ET-20279)
(DE81-029700; MIT-EL-80-028) Avail: NTIS HC A04/MF A01

The allowable costs for a residential PV/T liquid collector system are compared with those of both PV only and side-by-side PV and thermal collector systems. Four typs of conventional energy systems provide backup: all oil, all gas, all electric resistance, and electric resistance hot water with space heating by parallel heat pump. Electric space cooling is modeled, and the electric utility serves as backup for all electrical needs. The analysis is separated into two parts: (1) a base case study using conservative market and financial parameters for comparing PV/T economics in three northern locations; and (2) the sensitivity of PV/T economics to pertinent physical, market, and financial variables is examined. The difference in economic outlook for PV/T in retrofit applications is also estimated. It is indicated that, it for northern locations modeled, is less than that of separate (side-by-side) collector systems, at total array areas between 40-80 sq m. Below this range, allowable costs diverge, benefiting optimally sized separate collector systems. DOE

N82-12611# Midwest Research Inst., Perth (Australia). Solar Energy Research Inst.
STATUS OF SOLAR ENERGY RESEARCH AND DEVELOPMENT IN AUSTRALIA
Susan G. Saunders May 1981 28 p refs Presented at the Solar Systems Develop. Assoc., Tokyo, 27 May 1981
(NP-1903916; Rept-1007) Avail: NTIS HC A03/MF A01

The solar energy research and development program in Australia is described. Programs with promise of widespread application researched are: (1) solar industrial process heat; (2) solar air conditioning; (3) solar electricity production; and (4) biomass fuels. DOE

N82-12612# Mid-American Solar Energy Complex, Minneapolis, Minn.
SOLAR ENERGY INFORMATION DATA BANK (SEIDB) PROGRAM, FY 1981 Final Project Report
Jun. 1981 24 p
(Contract DE-AC02-79CS-30150)
(DE81-030054; MASEC/R-81-074) Avail: NTIS HC A02/MF A01

The background, program objectives, technical highlights, FY

81 program activity, and recommendations for the SEIDB are reviewed. DOE

N82-12613# Systems Technology Corp., Xenia, Ohio.
CONVERSION OF MUNICIPAL SOLID WASTE TO ENERGY, JACKSONVILLE, FLORIDA, PHASE 1
Jul. 1981 237 p refs
(Contract DE-AC01-79CS-0231)
(DE82-000808; DOE/CS-20231/1) Avail: NTIS HC A11/MF A01

The development of new technology and to foster the commercialization of innovative concepts for energy recovery from municipal solid waste (MSW) was studied. A program to implement the Scientific energy engineering auger combustion system was evaluated. The commercial version of the system, with a capacity of 350 TPD, was developed. The evaluation of applying resource recovery involved the determination of: (1) the amount and characteristics of solid waste; (2) the location and requirement of candidate energy customers and materials markets; (3) the applicable incineration/heat recovery and resource recovery technologies; and (4) the institutional, legal, and environmental requirements for constructing a facility. An implementation plan is developed to define the specific steps required to employ a waste to energy technology. DOE

N82-12614# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
TECHNICAL DATABOOK FOR GEOTHERMAL ENERGY UTILIZATION
S. L. Phillips, A. Igbene, J. A. Fair, H. Ozbek, and M. Tavana Jun. 1981 55 p ref
(Contract W-7405-eng-48)
(DE81-029868; LBL-12810) Avail: NTIS HC A04/MF A01

Selected basic data on aqueous solutions needed to model geothermal energy utilization were surveyed. The data are used for the design and construction of power plants and for direct use. The results are given of the current status of data. The viscosity, thermal conductivity and density of sodium chloride solutions up to 3500 C and 50 MPa are emphasized. An ideal data book for geothermal energy is described. DOE

N82-12615# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
NEAR-TERM IMPROVEMENTS IN PARABOLIC TROUGHS: AN ECONOMIC AND PERFORMANCE ASSESSMENT
R. Gee and L. M. Murphy Aug. 1981 54 p refs
(Contract DE-AC02-77CH-00178)
(DE82-001158; SERI/TR-632-870) Avail: NTIS HC A04/MF A01

Improved parabolic trough concentrating collectors which result from better design, improved fabrication techniques, and the development and utilization of improved materials are analyzed. The improvements considered are evacuated receivers, silvered glass reflectors, improved receiver, selective coatings, higher optical accuracy concentrations, and higher transmittance receiver glazings. Upper bound costs for each improvement are provided as well as estimates of the increased solar system rates of return that are made possible by these improvements. It is shown that the performance and economic potential of these improvements are substantial, especially at higher collector operating temperatures. DOE

N82-12616# Sandia Labs., Albuquerque, N. Mex. Theoretical Div.
USER'S GUIDE TO HELIOS: A COMPUTER PROGRAM FOR MODELING THE OPTICAL BEHAVIOR OF REFLECTING SOLAR CONCENTRATORS. PART 1: INTRODUCTION AND CODE INPUT
C. N. Vittitoe and Frank Biggs Aug. 1981 64 p refs
(Contract DE-AC04-76DP-00789)
(DE81-031920; SAND-81-1180-Pt-1) Avail: NTIS HC A04/MF A01

HELIOS is a flexible computer code for evaluating designs for central receiver, parabolic dish, and other reflecting solar energy collector systems, for safety calculations on the threat to personnel and to the facility itself, for determination of how various input parameters alter the power collected, for design trade offs, and for heliostat evaluations. Input variables include atmospheric transmission effects, reflector shape and surface errors, suntracking errors, focusing and alignment strategies, receiver design, placement positions of the tower and mirrors, and time of day and day of the year for the calculation. Complete input instructions and a description of the code structure are given. DOE

N82-12617# Battelle Pacific Northwest Labs., Richland, Wash.
MANUFACTURING AND COST EVALUATION OF SECOND GENERATION HELIOSTATS. VOLUME 2: APPENDICES
K. Drumheller, P. D. Bondurant, D. R. Brown, and T. A. Williams Sep. 1981 121 p
(Contract DE-AC06-76RL-01830)
(DE82-000232; PNL-3967) Avail: NTIS HC A06/MF A01

Contractor estimated costs were evaluated. Cost comparision sheets and a breakdown of contractor costs are included. T.M.

N82-12618# Sandia Labs., Livermore, Calif. Thermal Sciences Div.
SOLAR THERMAL CENTRAL RECEIVERS FOR INDUSTRIAL PROCESS HEAT GENERATION: USER VIEWS AND RECOMMENDATIONS FOR COMMERCIALIZATION
M. J. Fish Aug. 1981 66 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029611; SAND-81-8235) Avail: NTIS HC A04/MF A01

Results of recent meetings with several private industrial groups in which solar thermal central receivers were discussed in depth as a potential for industrial process heat generation are summarized. Topics covering potential economics, technical requirements, and actions to promote commercialization of the technology are presented. These findings are then translated into recommendations for commercialization in private industrial markets. Key points include the need for small scale systems integration projects in addition to the 10 MW/sub e/ plant under construction at Barstow, CA, and the adoption of financial incentives, such as tax credits, for getting the early commercial plants built. DOE

N82-12619# Oak Ridge National Lab., Tenn.
PRODUCTION OF AMMONIA IN A PACKED-BED, ANAEROBIC UPFLOW (ANFLOW) BIOREACTOR M.S. Thesis - Tennessee Univ.
D. C. M. Hines Aug. 1981 101 p refs
(Contract W-7405-eng-26)
(DE81-030699; ORNL/TM-7622) Avail: NTIS HC A06/MF A01

The objective of this study was to monitor effluent ammonia concentrations and ammonia production rates within the ANFLOW bioreactor as influent soluble chemical oxygen demand (SCOD) concentrations and flow rates were varied. Correlations between influent organic loadings and effluent ammonia concentrations and ammonia formation were sought. Subsequent ammonia removal methods are proposed. A packed-bed, aerobic upflow bioreactor was tested for nitrification of effluent ammonia for the ANFLOW bioreactor. Removal rates of SCOD ranged from 87 to 95 percent within ANFLOW bioreactor. The most efficient SCOD removal occurred at the highest organic loading rate (OLR). Profiles of SCOD and volatile acids concentrations showed distinct regions of complex organics breakdown and wastes stabilization. DOE

N82-12620# Mid-American Solar Energy Complex, Minneapolis, Minn.
INTERACTIVE MODEL TO ASSESS ECONOMICS OF ANAEROBIC DIGESTION OF THE FARM
Aug. 1981 41 p
(Contract DE-AC02-79CS-30150)
(DE82-000452; MASEC/R-81-068) Avail: NTIS HC A03/MF A01

An interactive computer model, to provide economic assessment for on the farm anaerobic digestion systems was designed. The model is accessed as part of the MASEC Models Library. It consists of two phases: engineering analysis and economic analysis. User inputs are stored in a data base and may be retained for future use. Model outputs include a recap of user inputs, calculations for gas production, digester heat requirements, system revenues, yearly cash flow, and a graph of the net present value of the investment. The model is generalized so that nonfarm applications may also be analyzed. The program will work equally well for various digester designs such as continuously stirred reactors, plug flow systems, and fluidized bed columns. DOE

N82-12621# Gersham, Brickner and Bratton, Inc., Washington, D.C.

WASTE-TO-ENERGY SYSTEMS INSTITUTIONAL BARRIERS ASSESSMENT WORKSHOP

Jun. 1981 57 p Workshop Held in Washington, D.C., 19 Feb. 1981 Prepared for Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE82-000098; ANL/CNSV-TM-78) Avail: NTIS HC A04/MF A01

Nontechnical institutional barriers affecting implementation of the waste to energy technology, priorization, of identifed barriers, and utilization of information and data to formulate an institutional research plarr, were identified. The following important results are recorded for commercialized and noncommercialized combustor, siting existing laws, multipurisdictional ination, permiles and regulations, and the lack of data on environmental impacts. DOE

N82-12622# Mid-American Solar Energy Complex, Minneapolis, Minn.

VOCATIONAL-TECHNICAL INSTRUCTORS PASSIVE-SOLAR TRAINING WORKSHOP

Jul. 1981 24 p Workshop held in Kansas City, Mo., 1-2 Jun. 1981, Minneapolis, 4-5 Jun. 1981, and Columbus, Ohio, 11-12 Jun. 1981
(Contract DE-AC02-79CS-30150)
(DE81-030055; MASEC/CF-81-019; P-101-7) Avail: NTIS HC A02/MF A01

The successful efforts to provide training to instructors who teach residential design and construction at vocational-technical (vo-tech) schools are described. The training was directed toward those techniques one must consider when designing and/or constructing an energy efficient passive solar home. DOE

N82-12623# Midwest Research Inst., Golden, Colo.

FLEXIBILITIES IN PASSIVE DESIGN: EXAMINING SOME LIMITING SOLAR MYTHS

R. G. Derickson and K. S. Sadlon Jul. 1981 5 p refs Presented at 6th Natl. Passive Conf., Portland, Oreg., 8 Sep. 1981
(Contract DE-AC02-77CH-00178)
(DE81-028401; SERI/TP-721-1342; CONF-810925-15) Avail: NTIS HC A02/MF A01

Frequently cited rules-of-thumb or general guidelines that needlessly limit designer choice and freedom are examined. It is found that a rectangular design with an E-W elongation is not really essential to proper passive design, east and west windows do not necessarily detract from passive heating performance or negatively impact cooling efficiency, and a passive house need not be crammed with thermal mass. Some flexible design alternatives are explored and factors other than E-W elongation, windows, and thermal mass are considered. DOE

N82-12624# Westinghouse Electric Corp., East Pittsburgh, Pa. Advanced Systems Technology Div.

ECONOMIC ASSESSMENT OF ADVANCED CENTRAL-RECEIVER SOLAR-THERMAL POWER SYSTEMS: EXECUTIVE SUMMARY

Oct. 1980 23 p refs
(Contract DE-AC03-79SF-10601)
(DOE/SF-10601/0) Avail: NTIS HC A02/MF A01

The value and potential electric utility impact of several advanced central receiver solar thermal plant concepts in the role of electric generating stations were estimated. Economics, the cost of producing electricity, fuels displaced, and utility system reliability are examined. The central receiver plants evaluated included solar/fossil hybrid concepts and solar stand-alone plants with thermal storage. It is indicated that if the cost goals are achieved and projected solar plant performance attained, the advanced solar thermal concepts can be competitive in regions with good insolation and some continued use of oil or other surrogate distillate or gaseous fuels. DOE

N82-12625# Oak Ridge National Lab., Tenn. Energy Div.

SEASONAL PERFORMANCE FACTORS FOR ACTIVE SOLAR SYSTEMS AND HEAT-PUMP SYSTEMS

R. L. Reid and L. A. Abbatielio 1981 7 p refs Presented at the IECEC Conf., Atlanta, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028569; CONF-810812-35) Avail: NTIS HC A02/MF A01

Methods of evaluating solar systems are discussed and compared. Heating seasonal performance factor (SPFH) and annual coefficient of performance (ACOP) are selected as being of the most vaue to the consumer in determining his purchased energy requirements and also allow the direct comparison of solar and heat pump systems. A search of the literature produced seasonal or annual data from 20 solar and 12 heat pump systems that were instrumented well enough to measure the loads and energy consumptions necessary to calculate the SPFH and/or ACOP. Tables of these results show that well-designed solar systems have SPFHs of 1.6 to 2.8 compared to heat pump SPFHs of 1.6 to 2.0. However, the heat pump Annual Cycle Energy System ACOP was measured as 3.1 compared to a projected maximum ACOP for a solar system with heat pump cooling of 2.4 to 2.8. DOE

N82-12626# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

PERFORMANCE ANALYSIS OF 11 DENVER METRO PASSIVE HOMES

D. E. Claridge Jul. 1981 7 p refs Presented at the AS/ISES 6th Natl. Passive Solar Conf., Portland, Oreg., 8-12 Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-025473; SERI/TP-721-1325; CONF-810925-12) Avail: NTIS HC A02/MF A01

The auxiliary heating requirements for 11 passive solar homes were calculated using SLR or SUNCAT-2.4 with a standard set of basic assumptions. It is shown that: seven of the homes should use less than half as much heating fuel as typical houses, two should use about half, and two should use about two-thirds or more. These results are compared with performance estimates and show large discrepancies. Differences are attributed largely to specific differences in assumptions in every case but one. DOE

N82-12627# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

SUMMERTIME RESULTS FROM THE CLASS B PASSIVE-SOLAR PERFORMANCE-MONITORING PROGRAM

J. Swisher Jul. 1981 3 p Presented at the 6th Natl. Passive Solar Conf., Portland, Oreg., 8-12 Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-025471; SERI/TP-721-1317; CONF-810925-8) Avail: NTIS HC A02/MF A01

The program is designed to provide, at relatively low cost, accurate and consistent real-time estimates of building thermal performance, as well as detailed data regarding climate, indoor temperatures, and purchased energy needs. As part of this program, a microprocessor-based data acquisition system was installed in each of ten passive solar houses in the Denver area, primarily to evaluate heating-season performance. During the summer, however, the monitoring systems are used to study the overheating tendencies of the buildings. Examination of the conditions that lead to overheating, using graphical and statistical techniques, will provide insight into the solar design practices that provide the most comfortable summer environment. DOE

N82-12628# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

SOLAR EXPLOSION

B. C. Baccei Apr. 1981 5 p Presented at the 6th Natl. Passive Solar Conf., Portland, Oreg., 8-12 Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-026086; SERI/TP-721-1167R; CONF-810925-13) Avail: NTIS HC A02/MF A01

The Solar Energy Research Institute (SERI) and the Department of Energy (DOE) Passive Solar Manufactured Buildings and Solar Home Builders Programs are developing much needed cost and performance data on solar buildings produced by large-volume home builders. These programs also serve as a model on how government can work effectively with industry. DOE

N82-12629# Los Alamos Scientific Lab., N. Mex.
PASSIVE-SOLAR-RETROFIT STUDY FOR THE UNITED STATES NAVY
William O. Wray and Charles R. Miles (Naval Civil Engineering Lab.) 1981 6 p refs Presented at the 6th Natl. Passive Solar Conf., Portland, Oreg., 8-12 Sep. 1981
(Contract W-7405-eng-36)
(DE81-028921; LA-UR-81-2200; CONF-810925-7) Avail: NTIS HC A02/MF A01

A passive solar retrofit study was conducted to determine the energy savings obtainable in concrete block buildings from several passive solar heating strategies. Test cell data and computer simulation were employed to assess the merits of six retrofit options. The six strategies selected were chosen on the basis of providing a series of options that deliver increasing energy savings at the cost of correspondingly increased levels of commitment. DOE

N82-12630# Los Alamos Scientific Lab., N. Mex.
ECONOMIC IMPLICATIONS OF PASSIVE-SOLAR RETROFIT FOR SINGLE-FAMILY RESIDENCES IN ALBUQUERQUE, NEW MEXICO: A CASE STUDY
S. W. Martin (Public Service Company of New Mexico, Albuquerque) Jun. 1981 125 p refs
(Contract W-7405-eng-36)
(DE81-028402; LA-8892-T) Avail: NTIS HC A06/MF A01

Certain economic criteria are used to evaluate the potential of retrofitted passive solar systems. Actual system and labor costs along with calculated Input-Output income and employment multipliers are used to estimate changes in income and employment levels within the study area. Estimates of changing energy use patterns also are presented. The methodology presented can be expanded to include other technologies and can be used to examine other potential scenarios. DOE

N82-12631# Oak Ridge National Lab., Tenn. Energy Div.
PASSIVE COOLING AND HEATING PROGRAM AT OAK RIDGE NATIONAL LABORATORY FOR FY-1981
H. B. Shapira, S. I. Kaplan, and C. V. Chester 1981 11 p refs Presented at the DOE Passive and Hybrid Solar Energy Program Update, Washington, D.C., 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028573; CONF-810832-5) Avail: NTIS HC A02/MF A01

Construction was completed of an earth-sheltered, passively solar heated office-dormitory, the Joint Institute for Heavy Ion Research, designed at ORNL. Instrumentation of the building was designed, procured, and installed. Building performance will be monitored and compared with predictions of the DOE-2 code. A study of the incorporation of vegetation on architecture was conducted by the Harvard School of Design. A final report was issued which is a prototype handbook for the use of vegetation to reduce cooling loads in structures. An experiment to reduce the cooling requirement of mobile homes by shading with fast-growing vines was begun: a maintenance-oriented trellis was constructed and vines were planted. An RFP for the production of a prototype set of reflective insulating blinds was issued. DOE

N82-12632# Sandia Labs., Albuquerque, N. Mex. Div. of Solar Technology.
DEPARTMENT OF ENERGY SOLAR CENTRAL RECEIVER SEMIANNUAL MEETING
Jan. 1981 273 p refs Meeting held in San Francisco, 15-16 Oct., 1980
(Contract DE-AC04-76DP-00789)
(SAND-80-8049; CONF-8010129) Avail: NTIS HC A12/MF A01

The goals and current status of the solar thermal program were reviewed. The organization of the program is discussed, as is funding for fiscal year 1981. Technical progress and future prospects are discussed. T.M.

N82-12633# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
COSTS FOR ALTERNATIVE GRAIN-RESIDUE-COLLECTION SYSTEMS
Silvio J. Flaim, Bernie Neenan, Jan Dauve, and Harry P. Mapp, Jr. (Oklahoma State Univ., Stillwater) Jun. 1981 55 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-029072; SERI/TR-734-900) Avail: NTIS HC A04/MF A01

The costs for systems for corn and soybean production in Iowa are examined. All machinery field operations, fuel, other inputs, and labor requirements are identified for the base case with no residue harvest, and for residue harvest by stacks and large round bales, with the owner's equipment and for custom harvest. These five cases were developed for corn and soybeans for conventional and reduced tillage practices. Harvesting alternatives are compared on the basis of costs, fuel input requirements, and gross energy balances of residues collected less energy inputs. The cost of collecting corn and soybean residues varies widely over the collection and tillage systems examined. Other effects constant, the reduced tillage practice leads to a lower cost of harvest than conventional tillage, and stacks are always cheaper than large round bales; however, the former difference is greater than the latter. DOE

N82-12634# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
INNOVATIVE EQUIPMENT FOR SMALL-SCALE HYDRO DEVELOPMENTS
J. D. Lawrence and Leslie Pereira 1981 17 p refs Presented at the Waterpower Conf., Washington, D.C., 22 Jun. 1981 Prepared in cooperation with Acres American, Inc., Buffalo, N.Y.
(Contract DE-AC07-76ID-01570)
(DE81-027820; EGG-M-03381; CONF-8106137-4) Avail: NTIS HC A02/MF A01

The feasibility of using off the shelf pumps as turbines, with induction motors as generators, and combinations of available equipment such as speed increasers, inlet valves, and gates for typical small scale hydro installations are discussed. A computer simulation model was developed in the study which provides a basis to estimate the performance of pumps in the turbine mode of operation. It is indicated that a major part of the small hydro plant potential can be economically covered by the use of pumps as turbines and induction motors as generators especially for the smaller ratings. DOE

N82-12635# Gilbert Associates, Inc., Reading, Pa.
MODULAR HYDRO DAM APPROACH TO THE ECONOMIC DEVELOPMENT OF ULTRA LOW-HEAD HYDROPOWER
K. R. Broome 1981 19 p Presented at the Hydropower Conf., Washington, D.C., 22 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-027817; CONF-8106137) Avail: NTIS HC A02/MF A01

The potential for developing economical new ultra low head sites using an innovative concept known as the modular hydro dam (MHD) were explored. This concept, combines the benefits of shop fabrication and installation of equipment in truck transportable, waterproof power modules, with prefabricated gate sections that can be located between the power modules. The technical, economic, environmental, and institutional feasibility of the MHD concept are examined. Capital and operating costs are estimated. It is concluded that the potential for power generation at ultralow head sites justifies the development of the MHD concept. DOE

N82-12636# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
DOE SMALL-HYDROPOWER DEMONSTRATION PROGRAM
B. N. Rinehart and L. E. Felton Jun. 1981 15 p refs Presented at Waterpower 1981 Conf., Washington, D.C., 22 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-027819; CONF-8106137-2) Avail: NTIS HC A02/MF A01

Hydroelectric power demonstration projects were developed at small dams. The project methods and results are presented. S.L.

N82-12637# Brookhaven National Lab., Upton, N. Y. Div. of Energy and Economic Analysis.

MODELLING ENERGY-ECONOMIC INTERACTIONS IN DEVELOPING COUNTRIES: A LINEAR-PROGRAMMING APPROACH
Peter Meier and Vinod Mubayi 1981 51 p refs Presented at the 9th Intern. Conf. on Operational Res., Hamburg, 23 Jul. 1981; sponsored by International Federation of Operations Research Societies
(Contract DE-AC02-76CH-00016)
(DE81-026048; BNL-29747; CONF-810726-2) Avail: NTIS HC A04/MF A01

An energy economic assessment model for application to energy assessments in developing countries is described. A simple comprehensive treatment of the energy sector is emphasized. The input output model is directly incorporated in the Energy system LP. The major supply sectors, as well as the major energy using industries, are modelled as capacity expansion problems, in which explicit distinction is made between capital stock and energy flows. For most developing countries the notion of energy supply curves is far fetched, since energy prices are set by planning authority, not established by market clearing equilibrium. DOE

N82-12638# Institut fuer Chemie der Treib- und Explosivstoffe, Pfinztal (West Germany).
LATENT HEAT STORAGE DEVICES. PART 1: CHARACTERISTICS AND APPLICABILITY OF LATENT HEAT STORAGE DEVICES [LATENTWAERMESPEICHER, TEIL 1: EIGENSCHAFTEN UND ANWENDUNGSMOEGLICHKEITEN VON LATENTWAERMESPEICHERN]
K. Krichel Bonn Bundesministerium der Verteidigung 1979 90 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-79-12-Pt-1) Avail: NTIS HC A05/MF A01; DOKZENTBw, Bonn DM 30

Significant physicochemical data (melting point, specific enthalpy of fusion, crystallization kinetics, etc.) on heat storage media and construction materials are recorded. The best storage materials are paraffins, salt hydrates, clathrates, and their mixtures in the lower temperature range (-30 to 100 C), hydroxides and halides of light metals, and their mixtures in the medium temperature range (100 to 500 C), and alkali and alkaline earth halides, especially fluorides at high temperatures (above 500 C). Adaption of different latent heat capacitor designs to operational temperature and storage material, and the relation between heat transport, heat exchanger construction and type of crystallization are discussed. Possible failures caused by unfavorable crystallization kinetics (stratification, supercooling) and measures to avoid such faults are described. Construction and insulation materials, with special emphasis on corrosion and stability, are addressed. Author (ESA)

N82-12639# Institut fuer Chemie der Treib- und Explosivstoffe, Pfinztal (West Germany).
LATENT HEAT STORAGE DEVICES. PART 2: HEAT STORAGE MEDIA, DESIGNS AND CONSTRUCTION MATERIALS FOR HEAT OF FUSION STORAGE DEVICES [LATENTWAERMESPEICHER, TEIL 2: SPEICHERMASSEN, BAUFORMEN UND WERKSTOFFE FUER SCHMELZWAERMESPEICHER]
K. Krichel Bonn Bundesministerium der Verteidigung 1979 65 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-79-13-Pt-2) Avail: NTIS HC A04/MF A01; DOKZENTBw, Bonn DM 30

Because of the promising technical and operational advantages of latent heat storage, thermodynamic, kinetic and chemical properties of phase change materials are depicted. Eutectics and conguently melting compounds are the most useful substances among the potentially suitable latent heat storage materials. The operational temperature depending on the phase change material remains constant at charge and discharge. Melting is the most appropriate phase change for heat storage due to considerable heat capacities and high densities of condensed phases. Supercooling of many storage media is at present a considerable difficulty. Besides the treatment of economics, safety hazards and environmental problems and the description of some practical applications, two suggestions for military applications of latent heat storage devices are discussed. Author (ESA)

N82-12640# Nationale Raad voor Landbouwkundig Onderzoek TNO, The Hague (Netherlands).
BASIS FOR RESEARCH PROPOSALS CONCERNING (INDUSTRIAL) SOLAR ENERGY PRODUCTION PROCESSES DERIVED FROM BIOLOGICAL PRINCIPLES [BASIS VOOR ONDERZOEKVOORSTELLEN BETREFFENDE (INDUSTRIEELE) ZONNE-ENERGIEWINNINGSPROCESSEN AFGELEID VAN BIOLOGISCHE PRINCIPES]
1980 96 p refs In DUTCH
Avail: NTIS HC A05/MF A01

The economic feasibility of photochemical conversion systems for solar energy production processes derived from biological principles was studied. A global energy analysis shows that the period during which a solar energy installation has to deliver energy in order to regain the energy required for the construction is about one-seventh or one-eighth of its lifetime (10 times longer than conventional installations). Energy production with the help of photocatalytic systems in western Europe is only economical if the net conversion efficiency is substantially increased above 15%. Complex photocatalytic processes or combined photoelectric, photochemical and thermal mechanisms may be applied, i.e., coproduction, combining a photovoltaic or photocatalytic process with solar heat production or combining several photocatalytic systems. A tentative evaluation of conversion processes for solar energy is presented. Author (ESA)

N82-12641# Audi NSU Auto Union A.G., Neckarsulm (West Germany). Entwicklung Neckarsulm.
FUEL SAVINGS IN HOT WATER HEATING PLANTS BY APPLICATION OF HEAT PUMPS OPERATED WITH NATURAL GAS (NATURAL GAS HEAT PUMP). PROJECT: GAS ENGINE Final Report
Klaus Wissler Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 61 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-125; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,60

Energy consumption in residential heating using a heat pump driven by an internal combustion engine is discussed. A natural gas rotary engine was developed as a drive unit for a heat pump with 120 to 150 kW heating capacity. The engine was derived from an automotive prototype engine; it had an output of 50 kW at 6000 rpm. The efficiency was improved by an increased compression ratio and a rotor recess suitable for natural gas operation. The engine used specially developed spark plugs and high performance lubrication oil. To obtain longevity, the trochoid surface and the side housing surface were coated with a plasma spray wear coating, ceramic apex seals were used and the accessories were redesigned. Author (ESA)

N82-12642# Ludwig-Maximilians-Universitaet, Munich (West Germany). Inst. fuer Experimentalphysik.
IMPROVEMENT OF THERMAL EFFICIENCY OF FLAT PLATE SOLAR COLLECTORS Final Report
Hubert Boeck, Reinhard Hallermayer, Wolfgang Schoelkopf, and Alfred Wiesmeth Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 62 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-194; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13

Measuring methods (spectral resolution of absorptivity and the evaluation of overall absorptivity with a solar spectrum) and further developed (calorimetric device to measure the hemispherical thermal emissivity of various speciments) were examined. The convective heat transfer between cover and absorber of a flat plate collector is partially suppressed by various inserted structures. The optical transmission of the cover of flat plate collectors is improved by interference layers. Thus an improvement is important when a correct azimuthal orientation of the collector is impossible. Results of an experimental comparative test of several commercial flat plate collectors are presented.
Author (ESA)

N82-12643# Varta Aktiengesellschaft Forschungs- und Entwicklungszentrum, Kelkheim (West Germany).
GALVANIC HIGH ENERGY CELLS WITH MOLTEN SALT ELECTROLYTES Final Report
Waldemar Borger, Wolfgang Kappus, Dieter Kunze, Helmut Laig-Hoerstebrock, Harbans Panesar, and Gerhard Sterr Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 126 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-048; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 25,60

Engineering scale LiAl/LiCl Kcl/FeS electrochemical storage cells were developed for electric vehicle propulsion and peak current compensation. More than 300 deep cycles and 50 Whr/kg in 100 Ahr cells and up to 100 deep cycles and more than 80 Whr/kg in 200 Ahr cells were demonstrated. Separator development for LiAl/FeS cells was focused on ceramic powders. The aluminum nitride powder separator is promising for LiAl/FeS cells. The further development of these cells includes the enhancement of energy density and lifetime as well as ceramic powder separators. Author (ESA)

N82-12644# Technical Research Centre of Finland, Espoo. LVI-Tekniikan Lab.
THE PROPERTIES OF SOLAR AND HEAT PUMP HEATING SYSTEMS OF SMALL HOUSES AND ADDITIONAL HEAT SOURCES
Tino Kalema and Kari Wellman Apr. 1981 121 p refs In FINNISH; ENGLISH summary
(VTT-56; ISBN-951-38-1199-9; ISSN-0355-3469; RISO-M2241) Avail: NTIS HC A06/MF A01

The active use of solar energy in heating of small houses was studied with a computer program developed for this purpose. The calculations clear up the thermal properties of seven solar and heat pump systems with different operational principles. The following topics are studied: (1) how much energy is obtained from different heat sources (basic heat source, solar radiation, earth and wood); and (2) the influence of collector size, structure, and storage on the energy obtained from the collector in each system. The influence of the size and depth of the heat pump Earth pipes on compressor electricity consumption, Earth temperatures and freezing are also studied. Author (ESA)

N82-12645# Joint Publications Research Service, Arlington, Va.
WEST EUROPE REPORT: SCIENCE AND TECHNOLOGY, NO. 72
1 Sep. 1981 49 p Transl. into ENGLISH from various West European articles
(JPRS-78876) Avail: NTIS HC A03/MF A01

The production and mechanical properties of thermoplastic sheets reinforced with long glass fibers, the design and operation of a solar receiver in Spain, and the aerodynamic characteristics of a vertical axis wind turbine operating in Patogonia are described. For individual titles, see N82-12646 through N82-12648.

N82-12646# Joint Publications Research Service, Arlington, Va.
GLASS-MAT-REINFORCED THERMOPLASTIC: STRONG, EASY TO WORK c27
Martin Welz, Erkhard Siler, and Hartmut Schriever *In its* W. Europe Rept.: Sci. and Technol., No. 72 (JPRS-78876) 1 Sep. 1981 p 1-14 Transl. into ENGLISH from Tech. Rundschau (Bern), 2 Jun. 1981 p 33 and 35 (For primary document see N82-12645 03-44)
Avail: NTIS HC A03/MF A01

By means of the specifically oriented optimization of glass mats and matrix materials, it is possible to make semifinished products with adjusted shaping and flow performance. Semifinished product manufacturing is accomplished continually through the broad slit extrusion of the thermoplastic material. The soaking of the glass fibers with the polymer melt is performed by means of special process engineering measures so that a uniform distribution of the glass fibers is achieved in the plate along with intensive crosslinking with the polymers, without any noticeable air inclusions. Various coatings can be applied, such as metal foils and synthetic leathers. In contrast to hardenable semifinished products, the glass mat thermoplastics can be stored in an unlimited manner as semifinished materials. The mechanical properties of a polypropylene containing about 30% long glass fibers are compared with those of a steel plate and with SMC containing about 30% glass fibers. A.R.H.

N82-12647# Joint Publications Research Service, Arlington, Va.
SOLAR PROJECT AT ALMERIA NEARS COMPLETION
Hans Fricker *In its* W. Europe Rept.: Sci. and Technol., No. 72 (JPRS-78876) 1 Sep. 1981 p 15-17 Transl. into ENGLISH from Chem. Rundschau (Zurich), 25 May 1981 p 3 and 5 (For primary document see N82-12645 03-44)
Avail: NTIS HC A03/MF A01

Ninety-three mirrors (heliostats), steered by a computer, reflect the sunlight at all times of the day and year into the opening of a combustion chamber (receiver) mounted on a 43-meter high tower in southern Spain. The cooling medium, liquid sodium, is heated from 270 C to 530 C, after which it flows to the hot storage tank installed on the ground below. As needed, sodium can be circulated out of the tank through the steam generator into a cold storage tank and from there back to be reheated in the receiver. The steam created in the steam generator expands in a steam engine; the mechanical energy created there drives the 500 kW generator, which produces the electric power. The selection of sodium as the cooling medium, and the design of the receiver and the pressure relief system which guarantees the safety of the plant in the unlikely event of a steam pipe bursting are described. A.R.H.

N82-12648# Joint Publications Research Service, Arlington, Va.
GERMAN-ARGENTINE EXPERIMENT: VERTICAL-ROTOR WIND ENGINE
Peter Raabe *In its* W. Europe Rept.: Sci. and Technol., No. 72 (JPRS-78876) 1 Sep. 1981 p 18-19 Transl. into ENGLISH from Tagesspiegel (Berlin), 4 Jul. 1981 p 12 (For primary document see N82-12645 03-44)
Avail: NTIS HC A03/MF A01

Designed by aerodynamists, a wind motor built in Patagonia, is independent of the direction of the wind due to its vertical rotating axis. The narrow rotor blades have optimum aerodynamic efficiency. Drum-like wind collectors at the top and bottom of the rotating axis serve as starters. The plant incorporates simple instead of sophisticated mechanical parts, and its maintenance requirements are extremely low. Only the two rotating bearings located at the top and bottom of the axis require lubrication, with the oil being changed only twice a year. A.R.H.

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-12649 California Univ., Los Angeles.
DEVELOPMENT OF A MARINE MONITORING PROGRAM IN CALIFORNIA Ph.D. Thesis
Francis Henry Palmer, Jr. 1981 135 p
Avail: Univ. Microfilms Order No. 8121025

The development of a monitoring program for coastal and estuarine waters of California is described. A monitoring system was developed to provide a technical example of applying research findings to the establishment of a monitoring program and to give some independent, evaluative observations on the approach of the Water Resources Control board to supporting research investigations. A mussel watch concept of monitoring is based on using a marine organism, the mussel, as a sampling device. Locations where indigenous mussels bear elevated tissue levels of trace metal, petroleum hydrocarbons, and chlorinated hydrocarbons in comparison to other locations are identified. A research investigation is designed to examine the biological effects of observed elevated levels upon the organisms. Dissert. Abstr.

N82-12650 California Univ., Los Angeles.
A COMPUTER SIMULATION MODELING STUDY TO PREDICT AIR QUALITY IMPACTS FROM A 500 MW

COAL-FIRED POWER PLANT Ph.D. Thesis
Gary Van Jandegian 1981 255 p
Avail: Univ. Microfilms Order No. 8120979

A computer simulation modeling study was conducted to predict sulfur dioxide ambient air quality impacts resulting from the operation of a 500 megawatt coal-fired power plant expansion in the Trombay area of Bombay, India. The AQUAL, a multiple source Gaussian plume dispersion model employs diffusion coefficients and plume rise equations and predicts maximum and average 3 hour and 24 hour ground level pollutant concentrations for up to 250 receptor points within 20 kilometers of a power plant stack(s). Results of the modeling exercises are used to recommend proper SO2 controls such as flue gas desulfurization, fuel switching to low sulfur oil and natural gas, etc. Dissert. Abstr.

N82-12651 Natural Environment Research Council, London (England).
POLICY AND SUPPORT FOR RESEARCH IN MARINE LIFE SCIENCES
Hermann Bondi Sep. 1981 12 p
Copyright. Avail: Issuing Activity

The marine biological research effort is considered under a number of research headings: open ocean ecosystems, coastal and estuarine ecosystems, shores and marginal areas, southern ocean ecosystem, biological function, and marine mammals. The shifting emphasis in NERC's ecological research away from description based on the traditional survey type approach, towards studies in field and laboratory aimed at elucidating the fundamental processes that govern the behavior of estuarine, coastal, and open sea ecosystems, is highlighted. T.M.

N82-12652 Washington Univ., Seattle.
BENEFIT-COST ANALYSIS WITH UNCERTAIN INFORMATION: AN APPLICATION IN AIR POLLUTION CONTROL Ph.D. Thesis
Michael Gordon Ruby 1981 196 p
Avail: Univ. Microfilms Order No. 8121241

A form of the net present value decision rule for evaluating the economic advisability of policies and projects was developed and demonstrated. It discounts future benefits and costs at the social rate of time preference but accounts for the lost opportunity costs of the higher returns available to private investments. The uncertainties in the resulting calculations, due to inadequate data, for an air pollution control project at a model stationary source of sulfur dioxide air emissions were examined. Each of the variables in the rule for both a meso-scale and a long-range transport case at three levels of backgrouhd pollutant concentrations were examined. Estimates are given for both the dominance of the variables at specific nominal values and the uncertainty in the individual terms. Dissert. Abstr.

N82-12653# General Accounting Office, Washington, D. C.
SOLID WASTE DISPOSAL PRACTICES: OPEN DUMPS NOT IDENTIFIED. STATES FACE FUNDING PROBLEMS Report to the Honorable Albert Gore, Jr., House of Representatives
23 Jul. 1981 53 p
(CED-81-131) Avail: NTIS HC A04/MF A01

The problems of disposal and treatment of solid wastes from industrial, commercial, and residential sources are reported. The municipal waste and disposal facilities receive household wastes, medical wastes, paints, pesticides, dead animals, metals, plastics, and liquid chemical wastes. Many facilities are located on land that has little or no value for other uses, which poses the greatest potential for environmental damage, surface water and ground water contamination. Sanitary landfilling is a method of disposing of solid waste with only minimal damage to the environment and poses no hazard to public health or safety. Solid waste is also disposed on land through: surface impoundments (lagoons, pits, and ponds) for liquid wastes, and landspreading of sewage, industrial, and other sludges. Incineration and various resource recovery techniques are used to process waste. In is concluded that each of these processes results in a residue which must still be disposed of on the land. Suggestions for improved waste disposal are presented. E.A.K.

N82-12654*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF ACTIVITY INTERFERENCE ON ANNOYANCE DUE TO AIRCRAFT NOISE
Kelli F. Willshire and Clemens A. Powell Nov. 1981 29 p refs
(NASA-TP-1938; L-14808) Avail: NTIS HC A03/MF A01 CSCL 13B

The effects of aircraft flyover noise on annoyance were compared for face to face conversation, reverie, and television viewing. Eighteen 5 minute sessions, each composed of three flyovers, were presented on each of 2 days to subjects in a simulated living room. Twelve pairs of females and 12 pairs of males were tested, once before and once after work. Flyovers varied in peak noise level from 53 to 83 dB, A weighted. On each day, subjects engaged in 18 sessions, six of conversation, six of television viewing, and six of reverie. The subjects completed subjective ratings of annoyance and acceptability following every session. Annoyance and unacceptability rating scores were significantly higher for the activity of television viewing compared to conversation or reverie. There was no difference between judgments during the latter two activities. No differences were found in the judgments when compared on the basis of 'fatigue' (before/after work) or sex of the subject. Author

N82-12655*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CALIBRATION OF A TURBIDITY METER FOR MAKING ESTIMATES OF TOTAL SUSPENDED SOLIDS CONCENTRATIONS AND BEAM ATTENUATION COEFFICIENTS IN FIELD EXPERIMENTS
J. W. Usry and C. H. Whitlock Oct. 1981 17 p refs
(NASA-TM-81873) Avail: NTIS HC A02/MF A01 CSCL 13B

Management of water resources such as a reservoir requires using analytical models which describe such parameters as the suspended sediment field. To select or develop an appropriate model requires making many measurements to describe the distribution of this parameter in the water column. One potential method for making those measurements expeditiously is to measure light transmission or turbidity and relate that parameter to total suspended solids concentrations. An instrument which may be used for this purpose was calibrated by generating curves of transmission measurements plotted against measured values of total suspended solids concentrations and beam attenuation coefficients. Results of these experiments indicate that field measurements made with this instrument using curves generated in this study should correlate with total suspended solids concentrations and beam attenuation coefficients in the water column within 20 percent. T.M.

N82-12656*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PASSIVE OPTICAL SAMPLE ASSEMBLY (POSA) Final Report
Roger C. Linton, Edgar R. Miller, and Michael Susko Aug. 1981 47 p refs
(NASA-TM-82446) Avail: NTIS HC A03/MF A01 CSCL 13B

A Passive Optical Sample Assembly (POSA) unit was mounted and flown in the cargo bay of the space shuttle Columbia during the first Orbital Flight Test (OFT-1). A similar unit was mounted in a different location in the cargo bay during the postflight operations. The samples in both POSA arrays were subjected to a series of optical and analytical measurements prior to delivery for installation in the cargo bay and after retrieval of the flight hardware. The final results of a comparison of the two series of measurements are presented. These STS-1 results are based on data obtained from only a portion of one of the ten Induced Environment Contamination Monitor instruments to be flown on several shuttle flights beginning with STS-2. These limited results do not indicate shuttle contamination levels in excess of those anticipated. J.M.S.

N82-12657*# Mechanical Technology, Inc., Latham, N. Y.
ELECTRIC AND HYBRID VEHICLES ENVIRONMENTAL CONTROL SUBSYSTEM STUDY Final Technical Report
15 May 1981 288 p refs Sponsored in part by DOE Prepared for JPL
(Contract JPL-955682)

(NASA-CR-164995; JPL-9950-570; MTI-81TR36) Avail: NTIS HC A13/MF A01 CSCL 13B

An environmental control subsystem (ECS) in the passenger compartment of electric and hybrid vehicles is studied. Various methods of obtaining the desired temperature control for the battery pack is also studied. The functional requirements of ECS equipment is defined. Following categorization by methodology, technology availability and risk, all viable ECS concepts are evaluated. Each is assessed independently for benefits versus risk, as well as for its feasibility to short, intermediate and long term product development. Selection of the preferred concept is made against these requirements, as well as the study's major goal of providing safe, highly efficient and thermally confortable ECS equipment. S.L.

N82-12658*# TRW, Inc., McLean, Va. Energy Systems Planning Div.

ELECTRIC AND HYBRID VEHICLE ENVIRONMENTAL CONTROL SUBSYSTEM STUDY Final Report

Kenneth L. Heitner 4 Dec. 1980 198 p refs Sponsored in part by DOE Prepared for JPL
(Contract JPL-955683)
(NASA-CR-164996; JPL-9950-569; Rept-97649-E005-UX-02)
Avail: NTIS HC A09/MF A01 CSCL 13B

An environmental control subsystem (ECS) in electric and hybrid vehicles is studied. A combination of a combustion heater and gasoline engine (Otto cycle) driven vapor compression air conditioner is selected. The combustion heater, the small gasoline engine, and the vapor compression air conditioner are commercially available. These technologies have good cost and performance characteristics. The cost for this ECS is relatively close to the cost of current ECS's. Its effect on the vehicle's propulsion battery is minimal and the ECS size and weight do not have significant impact on the vehicle's range. S.L.

N82-12659# California Univ., Berkeley. School of Public Health.

DEVELOPMENT OF AN AIR SAMPLING AND ANALYTICAL METHOD FOR 1,6-HEXAMETHYLENE DIISOCYANATE Final Report

Stephen M. Rappaport 10 Jul. 1981 34 p refs
(Grant AF-AFOSR-0113-80; AF Proj. 2312)
(AD-A105002; AFOSR-81-0666TR) Avail: NTIS HC A03/MF A01 CSCL 07/4

A preliminary evaluation of a new air sampling and analytical procedure for 1,6-hexamethylenediisocyanate (HDI) is given. Airborne HDI is trapped by drawing air through a filter which had been impregnated with 1-naphthylenemethylamine (NMA) HDI and NMA react on the filter surface to form the stable urea, HDI-NMA, which quantified by HPLC. A novel procedure is presented for separating HDI-NMA from NMA during analysis. GRA

N82-12660# Aerospace Corp., Germantown, Md.

ENERGY TECHNOLOGIES AND THE ENVIRONMENT. ENVIRONMENTAL INFORMATION HANDBOOK

Jun. 1981 515 p refs
(Contract DE-AT03-76EV-74010)
(DE81-029809; DOE/EP-0026) Avail: NTIS HC A22/MF A01

Information on the environmental consequences of energy technologies that will be in use during the next 20 years are reviewed. Information on environmental issues, control technologies, and energy production and conservation processes is discussed. References are given for the statements, data, and conclusions. Environmental aspects of energy technologies and references that can be relied upon through changing policies and changing world energy prices are presented. DOE

N82-12661# Bioassay Systems Corp., Woburn, Mass.

DEVELOPMENT OF TESTING PROCEDURES AND BIBLIOGRAPHIC INFORMATION RELEVANT TO THE TESTING OF SOLID WASTES RESULTING FROM SYNTHETIC FUELS PRODUCTION Progress Report, 1 Apr. - 30 Jun. 1981

J. M. Smith and D. M. Hanson Jun. 1981 17 p refs
(Contract DE-AC22-80PC-30098)
(DE81-030822; DOE/PC-30098/T2) Avail: NTIS HC A02/MF A01

The data tables outlining which bioassay procedures were applied to various synfuel wastes were finalized. Justification for each of the assays (Health and Ecological Effects) proposed in the test battery were written. In addition, the extraction and assay schedules were developed for Task 3. DOE

N82-12662# Battelle Pacific Northwest Labs., Richland, Wash.

TREATMENT OF BIOMASS-GASIFICATION WASTEWATERS USING LIQUID-LIQUID EXTRACTION

N. E. Bell Sep. 1981 28 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000711; PNL-4016) Avail: NTIS HC A03/MF A01

Distribution coefficients for chemical oxygen demand (COD) removal were determined for the following solvents: methylisobutyl ketone (MIBK), n-butyl acetate, n-butanol, MIBK/n-butyl acetate (50:50 vol), MIBK/n-butanol (50:50 vol), tri-butyl phosphate, tri-n-octyl phosphine oxide (TOPO)/MIBK (10:90 wt), TOPO/kerosene (10:90 wt), kerosene, and toluene. The best distribution coefficient of 1.3 was given by n-butanol. Chemical analysis of the wastewater by gas chromatography (GC) showed acetic acid and propionic acid concentrations of about 4000 mg/1. Methanol, ethanol, and acetone were identified in trace amounts. These five compounds accounted for 45 percent of the measured COD of 29,000 mg/1. DOE

N32-12663# Battelle Pacific Northwest Labs., Richland, Wash.

COMBUSTION: AN OIL SPILL MITIGATION TOOL. PHASE 2: THE BURNING OF THE M/T BURMAH AGATE (EX-DANALAND)

J. L. Goodier and R. J. Siclari Aug. 1981 134 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000527; DOE/TIC-11471) Avail: NTIS HC A07/MF A01

A major marine casualty off the coast of Galveston, Texas is described. When two vessels collided, both caught fire and the tanker Burmah Agate burned for 69 days with extensive loss of life. Research directed towards burning an oil cargo in a stricken tanker was studied as a means of reducing the release of oil to the environment to protect the natural resources of the coastline from damage from oil. T.M.

N82-12664# California Univ., Livermore. Lawrence Livermore Lab. Environmental Sciences Div.

USER MANUAL FOR SILVA: A COMPUTER CODE FOR ESTIMATING EFFECTS OF POLLUTION ON THE GROWTH AND SUCCESSION OF WESTERN CONIFEROUS FORESTS

M. C. Axelrod and J. R. Kercher 1981 79 p refs Sponsored in part by EPA
(Contracts W-7405-eng-48; DI-FWS-14-16-009-78-969)
(DE82-000134; UCID-18594-Rev-1) Avail: NTIS HC A05/MF A01

A computer code (SILVA) developed for simulating impacts of SO2 pollution on the growth and succession of western coniferous forests was specifically parameterized for application to the Ponderosa pine and mixed conifer forests of the Sierra Nevada, California. A code (JABOWA) for simulating northeastern USA forests, was used as a framework for SILVA. This user maual describes sample inputs: code structure; data, dynamic control, and internal variables; sample output; and considerations for setup at the user's computer installation. A listing of the souce program and descriptions of all subroutines and functions are presented. DOE

N82-12665# Sandia Labs., Albuquerque, N. Mex. Environmental Research Div.

LAGRANGIAN MEASUREMENTS OF SULFUR DIOXIDE TO SULFATE CONVERSION RATES

B. D. Zak May 1981 38 p refs
(Contract DE-AC04-76DP-00789)
(DE82-000246; SAND-80-2175) Avail: NTIS HC A03/MF A01

On the basis of project MISTT data and proposed homogeneous gas phase oxidation mechanisms for sulfur dioxide, it is suggested that the degree of mixing with background air, the chemical composition of the background air, and the intensity of the sunlight available are key factors determining the rate of sulfur dioxide to sulfate conversion. These hypotheses were examined in light of Lagrangian measurements of conversion rates in power plant plumes. It is found that the Lagrangian conversion rate measurements are consistent with these hypotheses. T.M.

N82-12666# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environmental Div.

ENVIRONMENAL POLLUTANT STUDIES, FY 1980 Annual Report

Feb. 1981 55 p refs
(Contract W-7405-eng-48)
(DE81-028051; LBL-11986) Avail: NTIS HC A04/MF A01

Separate abstracts were prepared for the 16 papers presented in this annual report of the Energy and Environment Division. Among the topics discussed are the following: atmospheric aerosol project, membrane bioenergies research, and lake ecotoxicology research. DOE

N82-12667# Energy and Environmental Analysis, Inc., Arlington, Va.

IMPACT OF FUEL-ECONOMY SHORTFALL: TRENDS IN TECHNOLOGY-WEIGHTED EPA VERSUS ON-ROAD MPG. PERIODIC ANALYSIS MEMORANDUM NO. 1

1 Apr. 1981 23 p refs
(Contract DE-AC01-79PE-70032)
(DE81-030841; DOE/PE-70032/T1) Avail: NTIS HC A02/MF A01

The fuel consumption impacts of revised estimates of the shortfall between the EPA-measured and on-road fuel economy of light-duty vehicles (passenger cars and light-duty trucks less than 8500 lbs GVW) are examined. The analysis uses the DOE Highway Fuel Consumption model to project fuel demand. The technologies and technology-specific shortfall relations are examined. The procedure used to develop aggregate technology-weighted fuel economy shortfall relations for the Highway Fuel Consumption model is outlined. The fuel demand impacts of alternative assumptions regarding technology-specific shortfall are compared. DOE

N82-12668# Sandia Labs., Albuquerque, N. Mex.

GUIDANCE FOR IMPLEMENTING AN ENVIRONMENTAL, SAFETY AND HEALTH ASSURANCE PROGRAM. VOLUME 12: MODEL GUIDELINES FOR LINE ORGANIZATION ENVIRONMENTAL, SAFETY AND HEALTH INSPECTION AND MONITORING ACTIVITIES

A. C. Ellingson Aug. 1981 44 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030991; SAND-81-0643) Avail: NTIS HC A03/MF A01

The implementation of environmental safety and health (ES and H) assurance program is reported. The standard which specifies that the operational level of an institution must have internal control and assurance functions is discussed. Guidance for the inspection and monitoring activities which are a very basic part of assurance functions are provided. DOE

N82-12669# Sandia Labs., Albuquerque, N. Mex.

GUIDANCE FOR IMPLEMENTING AN ENVIRONMENTAL, SAFETY AND HEALTH ASSURANCE PROGRAM. VOLUME 13: MODEL GUIDELINES FOR LINE ORGANIZATION ENVIRONMENTAL, SAFETY AND HEALTH MEETINGS

A. C. Ellingson Aug. 1981 38 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030980; SAND-81-0644) Avail: NTIS HC A03/MF A01

The implementation of environmental safety and health (ES and H) assurance program is described. The participation by and feedback from employees in ES and H matters is stressed. It is shown how ES and H meetings are used as a framework for employee involvement in the ES and H program. It is found that involvement is essential for defining the acceptability of ES and H controls from an employee's perspective. DOE

N82-12670# Florida State Univ., Tallahassee. Inst. of Molecular Biophysics.

IMPACT OF ENERGY-RELATED POLLUTANTS ON CHROMOSOME STRUCTURE Progress Report, 1 Jan. - 31 Dec. 1981

Randolph L. Rill 1981 11 p
(Contract DE-AS05-78EV-05888)
(DE82-000153; DOE/EV-05888/4) Avail: NTIS HC A02/MF A01

Products of reactions of deoxyribonucleosides with diethylsulfate and ethyl methanesulfonate in neutral aqueous solution and in DMSO, and with ethyl iodide in DMSO, were separated and quantitiated by reverse phase PHLC. Aqueous reactions yielded small, but significant, amounts of nucleosides modified at exocyclic positions. Several unidentified derivatives not previously reported were found. A method for resolving all known ethylated deoxyribonucleotides was developed. The covalent coupling of ethidium monoazide to DNA alone and DNA in chromatin was examined. Covalently bound ethidium preferentially bound to DNA recovered in subnucleosomes. The amount of covalently bound ethidium recovered in mononucleosomes decreased with increasing nuclease digestion, suggesting that nucleosomes most susceptible to nuclease attack preferentially bind ethidium. DOE

N82-12671# Aerospace Corp., Germantown, Md.

TECHNOLOGY CHARACTERIZATIONS: ENVIRONMENTAL INFORMATION HANDBOOK, SECOND EDITION

Jun. 1981 340 p refs
(Contracts DE-AT03-76EV-74010; DE-AC01-81EV-10450)
(DE81-029993; DOE/EP-0028) Avail: NTIS HC A15/MF A01

Environmental characterization information for a range of energy supply systems is presented. Environmental residuals and physical resource requirements are the principal information provided. The specific energy technologies included are nuclear, petroleum, natural gas, synthetic fuels, coal, solar, geothermal, and hydroelectric. Each technology is characterized in terms of the resources required, costs, residuals released, energy products, and occupational safety and health data. The information is based on a facility of particular size and design, with the data presented on the basis of annual quantities or total facility lifetime quantities (e.g., construction materials), as appropriate. In addition, the data are normalized to 1 trillion Btu energy output to facilitate cross technology comparison and use of the data in computerized data bases. DOE

N82-12672# Oregon State Univ., Newport. Marine Science Center.

BIOGEOCHEMICAL STUDIES OF TECHNETIUM IN MARINE AND ESTUARINE ECOSYSTEMS Progress Report, 1 Jul. 1980 - 31 Jul. 1981

T. M. Beasley 1981 76 p refs
(Contracts DE-AM06-76RL-02227; DE-AT06-79EV-10251)
(DE81-030325; DOE/EV-10251/3) Avail: NTIS HC A05/MF A01

Progress from July 1980 through July 1981 on studies dealing with the biogeochemical behavior of technetium in marine and estuarine ecosystems is reported. The results of experiments have substantially extended understanding of the environmental behavior of Tc (principally as TcO(+4). DOE

N82-12673# Bioassay Systems Corp., Woburn, Mass.

DEVELOPMENT OF TESTING PROCEDURES AND BIBLIOGRAPHIC INFORMATION RELEVANT TO THE TESTING OF SOLID WASTES RESULTING FROM SYNTHETIC-FUELS PRODUCTION Technical Progress Report, 30 Dec. 1980 - 31 Mar. 1981

James M. Smith and Douglas M. Hanson Mar. 1981 25 p refs
(Contract DE-AC22-80PC-30098)
(DE81-030671; DOE/PC-30098/T1) Avail: NTIS HC A02/MF A01

A bibliography containing over 80 references on material pertinent to the biological testing of snyfuel products is presented along with a compedium of information on bioassays performed on all synfuel materials within the last ten years. A sample preparation procedure useful in extracting substances for bioassay testing and a bioassay test battery suitable for testing synfuel solid wastes are described. DOE

N82-12674# Oak Ridge National Lab., Tenn. Chemical Technology Div.

KINETICS OF WET OXIDATION OF BIOLOGICAL SLUDGES FROM COAL-CONVERSION WASTEWATER TREATMENT
R. K. Helling, M. K. Strobel, and R. J. Torres Sep. 1981 55 p refs
(Contract W-7405-eng-26)
(DE82-000525; ORNL/MIT-332) Avail: NTIS HC A04/MF A01

Combustible organics in aqueous solutions or suspensions, which are characteristic of waste aqueous solutions or suspensions, which are characteristics of waste treatment effluent from coal liquefaction, may be treatable by wet oxidation. The wet oxidation of model compounds (phenol in water or phenol in municipal waste sludge) in a batch autoclave reactor was found to proceed rapidly to 99% conversion in less than 15 min for temperatures between 185 and 2300C, oxygen pressures between 2000 and 1300 psig, and initial phenol concentrations of 2.5, 10, and 50 g/L. The reaction occurs in three phases: a slow induction period, a fast first-order reaction with a low activation energy of 4.9 kcal/gmol, followed by a slow first-order reaction. During the reaction a variety of colored intermediates (catechol, succinic acid, hydroquinine) form. It is postulated that the fast portion of the reaction sequence follows free-radical mechanism. DOE

N82-12676# Zawadzki (Edward A.) Ltd., McMurray, Pa.
PRELIMINARY STUDY: USE OF LOW-SULFUR COAL AND COAL CLEANING IN CONTROL OF ACID RAIN
May 1981 38 p
(Contract DE-AC21-80MC-14784)
(DE81-028930; DOE/MC-14784/T1) Avail: NTIS HC A03/MF A01

The acid rain problem and the feasibility of various control techniques are addressed. Two strategies that are proposed for control of acid rain, are considered, (1) use of naturally occurring low-sulfur coal; and (2) cleaning of raw coal in preparation plants prior to firing. The distribution and ownership of the US coal reserves are discussed with emphasis on the reserves having low sulfur content. Some of the basic constraints on the availability and use of low-sulfur coals by utilities are enumerated. A preliminary estimate of the sulfur reduction potential of US coals achievable by coal preparation is presented. Also included are a brief analysis of coal cleaning costs and the effects of coal cleaning on other aspects of acid rain control. DOE

N82-12676# Los Alamos Scientific Lab., N. Mex.
ENVIRONMENTAL CONTROL TECHNOLOGY FOR COAL CLEANING WASTES
P. Wagner, R. C. Heaton, L. E. Wangen, A. M. Nyitray, and M. M. Jones 1981 20 p refs Presented at a Workshop on Processing Needs and Methodology for Wastewaters from the Conversion of Coal, Oil Shale and Biomass to Synfuels, Germantown, Md., Jun. 1981
(Contract W-7405-eng-36)
(DE81-025331; LA-UR-81-1904; CONF-8106109-1) Avail: NTIS HC A02/MF A01

Three approaches to solution of the coal waste drainage problem are considered. The first is alteration of the waste to render it nonpolluting. Calcining of the waste is shown to be an effective way of accomplishing this, but the cost of this technique is too high. The second approach is codisposal of the coal waste with neutralizing and/or absorbing agents. The best way to implementing this approach is sequential slurry coating of the coal waste with lime and limestone, which is both effective and inexpensive. This is the best of the one time treatment which were evaluated when both effectiveness and cost are considered. The third approach to controlling coal waste effluent is by alkaline neutralization of the drainages. It is shown that it is effective provided that the iron is oxidized to the plus three oxidation state, and that the cost of this treatment is low. T.M.

N82-12677# Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht (West Germany). Inst. fuer Physik.
THREE DIMENSIONAL SIMULATION MODEL MODIS FOR THE PROPAGATION OF AIR POLLUTANTS
D. Eppel, J. Haeuser, and A. Mueller 13 Mar. 1981 15 p refs Presented at 5th Intern. Clean Air Congr., Buenos Aires, 20-26 Oct. 1980
(GKSS-80-E-56; ISSN-0344-9629) Avail: NTIS HC A02/MF A01

A three-dimensional model for the propagation of pollutants in the atmosphere is presented. The moments of the unknown concentration distribution with respect to one horizontal coordinate, i.e., normalization, mean value, width, skewness, etc., are determined by integrating numerically the pertaining transport equations over a vertical plane oriented in the main flow direction. The original three dimensional distribution can then be reconstructed approximately. Partial absorption at the surface boundary as well as decay, rainout, and washout processes may be simulated for various meteorological conditions. The numerical treatment of the transport equation is done using discrete element techniques. The resulting equations are integrated by an explicit scheme. Author (ESA)

N82-12678# Skelly and Loy, Harrisburg, Pa.
A LAND USE DECISION METHODOLOGY FOR MINE LANDS IN APPALACHIA Final Report
Charles Yuill, William T. Gorton, and Michael Frakes May 1981 319 p refs Sponsored in part by EPA
(Contract ARC-80-14/PA-7105)
(PB81-220113; ARC-80-14/PA-7105) Avail: NTIS HC A14/MF A01 CSCL 13B

The methodology which was developed presents a framework which is useful for examining land use options for previously mined land currently active mine sites, and unmined land which has a high value or likelihood for future mining are also discussed. T.M.

N82-12679# Environmental Protection Agency, Edison, N.J.
A STATISTICAL EVALUATION OF OHMSETT TESTING Final Report
Diane M. Foster, Sol H. Schwarz, and Gary F. Smith Jul. 1981 39 p ref Prepared in cooperation with Mason and Hanger-Silas Mason Co., Inc., Leonardo, N.J.
(Contract EPA-68-03-2642)
(PB81-226128; EPA-600/2-81-124) Avail: NTIS HC A03/MF A01 CSCL 13B

This program was initiated to provide a statistical evaluation of performance data generated at the USEPA's Oil and Hazardous Materials Simulated Environmental Test Tank (OHMSETT). The objective was to investigate the value of replicate testing in developing efficient test programs giving the maximum reliable information from the minimum number of tests. This study was set up in two separate programs, each consisting of 24 tests: one program where 24 different conditions were tested and a second program where three replicates each of eight different conditions were tested. A comparison was then possible between the two types of programs. The 3-replicate test matrix was duplicated to produce six replicates and the validity of the nonreplicate and 3-replicate programs was evaluated with respect to the 6-replicate data. GRA

N82-12680# New Mexico State Univ., Las Cruces.
ASSESSMENT OF WATER SUPPLY CONTAMINATION DUE TO UNDERGROUND COAL GASIFICATION
Thomas M. Niemczyk and Edward A. Walters Dec. 1980 105 p refs Prepared in cooperation with New Mexico Univ., Albuquerque.
(PB81-209215; WRRI-128; W81-03269; OWRT-B-061-NMEX(1)) Avail: NTIS HC A06/MF A01 CSCL 13B

The potential for pollution by metal ions of groundwater as a consequence of proposed underground coal gasification was assessed focusing on subbituminous coal of the San Juan Basin in northwestern New Mexico. Baseline results for major and trace metal analysis of groundwater and minerals, anionic analyses, and trace organic analyses of groundwater are presented. GRA

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N82-12681 Dartmouth Coll., Hanover, N.H.
AN EXPERIMENTAL STUDY OF THE PROPAGATION AND

DISPERSION OF INTERNAL ATMOSPHERIC GRAVITY WAVES Ph.D. Thesis
Kenneth Alan Ballard 1981 423 p
Avail: Univ. Microfilms Order No. 8120765

Traveling ionospheric disturbances (TID's) are the manifestation, in the ionized medium, of internal atmospheric gravity waves. A model describing the propagation of gravity waves in an isothermal atmosphere is presented. The dispersion relation is derived from fundamental principles, and the relation between phase velocity and group velocity is examined. The effects of the Coriolis force and horizontally stratified winds on wave propagation are also analyzed. Conservation of energy in the gravity wave requires increasing amplitude with increasing altitude, inasmuch as the atmospheric density decreases with height. However, this is counteracted by dissipation of wave energy by ion drag, thermal conductivity, and viscous damping. The production of TID's (in the ionized medium) by gravity waves (in the neutral medium) is discussed in quantitative terms, and the vertical predictive function were derived. Dissert. Abstr.

N82-12682 Saint Louis Univ., Mo.
DETERMINATION OF CRUSTAL Q STRUCTURE FROM MULTI-MODE SURFACE WAVES Ph.D. Thesis
Chung-Chuan Cheng 1980 169 p
Avail: Univ. Microfilms Order No. 8120600

Determinations of Q structures are made using a method which matches theoretical and observed surface wave spectra. The importance of the method lies in its ability to utilize relatively short paths between a single source and a single receiver, both of which are preferably located within a single geologic province. In order to obtain theoretical Rayleigh wave spectral amplitudes at relatively short periods, improvements are made to existing computational schemes for computing the displacement-stress eigenfunctions as functions of depth. The effects of focal depth variations on the Rayleigh wave spectra for both fundamental and higher modes are studied. Inclusion of higher-mode data not only broadens the data base, but is also helpful when there is focal depth ambiguity. Dissert. Abstr.

N82-12683 Washington Univ., Seattle.
AN INVESTIGATION OF SAND AND SANDSTONE PERMEABILITY DEGRADATION AT ELEVATED TEMPERATURE AND PRESSURE Ph.D. Thesis
James Arthur Stottlemyre 1981 177 p
Avail: Univ. Microfilms Order No. 8121249

Masillon sandstone, 'virgin' Ottawa sand, and 'washed' Ottawa sand were examined. The dependent variables monitored during the experiments were permeability, volumetric strain, pH, suspended solids, and dissolved solids. Potential permeability damage mechanisms investigated include: pore volume reduction via bulk sample compaction and/or thermal expansion of constituent minerals, thermomechanical fragmentation, salinity and/or pH-induced particle dispersion, and temperature-induced internal or external particulate plugging. It is concluded that Masillon sandstone and Ottawa sand intrinsic permeabilities to deionized, deaerated water are not temperature sensitive to a significant degree provided certain precautions are taken to avoid colloidal contamination from the upstream hardware. Dissert. Abstr.

N82-12684 Texas Univ. at El Paso.
HEAT FLOW STUDIES AND GEOTHERMAL EXPLORATION IN WESTERN TRANS-PECOS TEXAS Ph.D. Thesis
Bruce D. G. S. Taylor 1981 339 p
Avail: Univ. Microfilms Order No. 8121977

The definition of possible geothermal resources in Trans-Pecos Texas, and a geothermal gradient map of the region are presented, based on nearly 200 temperature and gradient measurements. Several areas of high thermal gradient are located, notably in Presidio County, where several hot springs and wells exist. Possible mechanisms for the high gradients (and heat flow) here are discussed. A small high gradient area is also indicated in northeast El Paso County, and a geophysical investigation of this prospect is described. The proximity to the city of El Paso made this a prime target for resource evaluation. Geophysical methods employed include gravity, self-potential and electrical resistivity, the surveys culminating in a shallow drilling program to define the areal extent of the anomaly. Dissert. Abstr.

N82-12685* National Aeronautics and Space Administration. Pasadena Office, Calif.
MICROWAVE LIMB SOUNDER Patent
Jacob J. Gustincic, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 4 Aug. 1981 9 p Filed 24 Sep. 1979 Supersedes N79-34014 (17 - 24, p 3285) Sponsored by NASA
(NASA-Case-NPO-14544-1; US-Patent-4,282,525;
US-Patent-Appl-SN-078612; US-Patent-Class-343-100ME;
US-Patent-Class-343-100PE; US-Patent-Class-343-781P) Avail: US Patent and Trademark Office CSCL 04A

Trace gases in the upper atmosphere can be measured by comparing spectral noise content of limb soundings with the spectral noise content of cold space. An offset Cassegrain antenna system and tiltable input mirror alternately look out at the limb and up at cold space at an elevation angle of about 22. The mirror can also be tilted to look at a black body calibration target. Reflection from the mirror is directed into a radiometer whose head functions as a diplexer to combine the input radiation and a local ocillator (klystron) beam. The radiometer head is comprised of a Fabry-Perot resonator consisting of two Fabry-Perot cavities spaced a number of half wavelengths apart. Incoming radiation received on one side is reflected and rotated 90 deg in polarization by the resonator so that it will be reflected by an input grid into a mixer, while the klystron beam received on the other side is also reflected and rotated 90 deg, but not without passing some energy to be reflected by the input grid into the mixer.

Official Gazette of the U.S. Patent and Trademark Office

N82-12686# Bureau of Mineral Resources, Geology and Geophysics, Canberra (Australia). Dept. of National Development and Energy.
THE ARRINTHRUNGA FORMATION: UPPER CAMBRIAN EPEIRIC CARBONATES IN THE GEORGINA BASIN, CENTRAL AUSTRALIA
John Kennard 1981 67 p refs
(BMR-Bull-211; ISBN-0-642-06504-7; ISSN-0084-7089) Avail: NTIS HC A04/MF A01

A sedimentological study of the Upper Cambrian Arrinthrunga formation, a complex carbonate and mixed carbonate siliciclastic shelf sequence in the Georgina Basin, central Australia is presented. The determination and description of lithofacies within the sequence, and the elucidation of their environments of deposition are emphasized. A regional model of the depositional environments and the history of sedimentation is developed. S.L.

N82-12687*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SAGE MEASUREMENTS OF THE STRATOSPHERIC AEROSOL DISPERSION AND LOADING FROM THE SOUFRIERE VOLCANO
M. Patrick McCormick, Geoffrey S. Kent (Institute for Atmospheric Optics and Remote Sensing Hampton, Va.), Glenn K. Yue (Institute for Atmospheric Optics and Remote Sensing Hampton, Va.), and Derk M. Cunnold (Georgia Inst. of Techn., Atlanta) Nov. 1981 23 p refs
(NASA-TP-1922; L-14611) Avail: NTIS HC A02/MF A01 CSCL 04A

Explosions of the Soufriere volcano on the Caribbean Island of St. Vincent reduced two major stratospheric plumes which the stratospheric aerosol and gas experiment (SAGE) satellite tracked to West Africa and the North Atlantic Ocean. The total mass of the stratospheric ejecta measured is less than 0.5% of the global stratospheric aerosol burden. No significant temperature or climate perturbation is expected. It is found that the movement and dispersion of the plumes agree with those deduced from high altitude meteorological data and dispersion theory. The stratospheric aerosol dispersion and loading from the Soufrier volcano was measured. E.A.K.

N82-12688# Geological Survey, Washington, D. C.
MOUNT ST. HELENS VOLCANIC-ASH FALL IN THE BULL RUN WATESHED, OREGON, MARCH - JUNE 1980
Michael V. Shulters and Daphne G. Clifton 1980 19 p refs

(USGS-CIRC-850-A) Avail: NTIS HC A02/MF A01

Volcanic ash fall from the eruption of Mount St. Helens, Washington, was studied. Water samples collected from three stream sites within the Bull Run Watershed were compared with samples collected during the same season in previous years. No detectable changes were noted in chemical characteristics. Precipitation samples collected immediately after the June 12 and 13 ash fall ranged in specific conductance from 20 to 41 micromhos per centimeter at 25 C and in pH from 4.0 to 4.3 pH units. Stream samples collected during the May to June period ranged in specific conductance from 18 to 28 micromhos per centimeter at 25 C and in pH from 6.7 to 7.5 pH units. Volcanic ash samples were collected and analyzed for particles size, chemical composition, and weight. Significant differences in particle size of ash were found in samples from two separate eruptions. R.J.F.

N82-12689# Geological Survey, Washington, D. C.

EFFECTS OF VOLCANISM ON THE GLACIERS OF MOUNT ST. HELENS

Melinda M. Brugman and Austin Post 1981 15 p

(USGS-CIRC-850-D) Avail: NTIS HC A02/MF A01

The cataclysmic eruption of Mount St. Helens May 18, 1980, removed 2.9 sq/km of glacier snow and ice including a large part of Shoestring Forsyth, Wishbone, Ape, Nelson, and all of Loowit and Leschi Glaciers. Minor eruptions and bulging of the volcano from March 27 to May 17 shattered glaciers which were on the deforming rock and deposited ash on other glaciers. Thick ash layers persisted after the May 18 eruption through the summer on most of the remaining snow and ice, and protected winter snow from melting on Swift and Dryer Glaciers. Melting and recrystallization of snow and ice surviving on Mount St. Helens could cause and lubricate mud flows and generate outburst floods. Author

N82-12690# Geological Survey, Washington, D. C.

EARTHQUAKES IN THE UNITED STATES, JULY - SEPTEMBER 1979

J. H. Minsch, C. W. Stover, W. J. Person, and P. K. Smith 1980 43 p refs

(USGS-CIRC-836-C) Avail: NTIS HC A03/MF A01

This earthquake information supplements that published in the NEIS (National Earthquake Information Service) publications, PDE ('Preliminary Determination of Epicenters') and 'Preliminary Determination of Epicenters, Monthly Listing', by providing detailed felt and intensity data, for U.S. earthquakes. It provides a complete listing of macroseismic effects of earthquakes, which can be used in risk studies, nuclear power plant site evaluations, seismicity studies, and to answer inquiries by the public. The first part (table 1), which is mainly concerned with data obtained by seismographs, is a tabular listing of earthquakes in chronological order by State, consisting of the following basic information: date, origin time, hypocenter, magnitude, maximum intensity, and computational source of the hypocenter. The second section, which concerns intensity information, consists of two maps and table 2. This section also contains information on events which were felt but were not listed in the PDE because there was not enough instrumental data to obtain a solution. J.F.M.

N82-12691# Geological Survey, Washington, D. C.

EARTHQUAKES IN THE UNITED STATES, JANUARY - MARCH 1979

C. W. Stover, J. H. Minsch, B. G. Reagor, and P. K. Smith 1980 46 p refs

(CIRC-836-A) Avail: NTIS HC A03/MF A01

This earthquake information supplements that published in the NEIS (National Earthquake Information Service) publications, PDE ('Preliminary Determination of Epicenters') and 'Preliminary Determination of Epicenters, Monthly Listing', to the extent of providing detailed felt and intensity data, as well as isoseismal maps for U.S. earthquakes. It provides a complete listing of macroseismic effects of earthquakes, which can be used in risk studies, nuclear power plant site evaluations, seismicity studies, and answering inquiries by the public. The first (table 1) is a tabular listing of earthquakes in chronological order by State, consisting of the following basic information: date, origin time, hypocenter, magnitude, maximum intensity, and computational source of the hypocenter. The second section consists of six maps and table 2, which lists detailed intensity information. L.F.M.

N82-12692*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ON THE GEODETIC STABILITY OF THE GODDARD OPTICAL RESEARCH FACILITY

William J. Webster, Jr., Paul D. Lowman, Jr., and Richard J. Allenby Sep. 1981 25 p refs Submitted for publication

(NASA-TM-82175) Avail: NTIS HC A02/MF A01 CSCL 08G

Seismic observations of earthquakes and blasts, geologic analysis of LANDSAT images, and a search of the historical record was examined. However, no evidence for tectonic motion was found. Some faulting is present in the area but no evidence of seismic activity was found. No elastic resonances in the range from 0.3 to 15 Hz were found. It is concluded that, except for ground water induced changes, the facility is stable at least to the 0.5 cm level. E.A.K.

N82-12693# Geological Survey, Washington, D. C.

BIOGEOCHEMICAL EVIDENCE FOR SUBSURFACE HYDROCARBON OCCURRENCE, RECLUSE OIL FIELD, WYOMING: PRELIMINARY RESULTS

Mary C. Dalziel and Terrence J. Donovan 1980 14 p refs

(USGS-CIRC-837) Avail: NTIS HC A02/MF A01

Anomalously high manganese to iron ratios occurring in pine needles and sage leaves over the Recluse oil field, Wyoming, suggest effects of petroleum microseepage on the plants. This conclusion is supported by iron and manganese concentrations in soils and carbon and oxygen isotope ratios in rock samples. Seeping hydrocarbons provided reducing conditions sufficient to enable divalent iron and manganese to be organically complexed or adsorbed on solids in the soils. These bound or adsorped elements in the divalent state are essential to plants, and the plants readily assimilate them. The magnitude of the plant anomalies, combined with the supportive isotopic and chemical evidence confirming petroleum leakage, makes a strong case for the use of plants as a biogeochemical prospecting tool. Author

N82-12694# Geological Survey, Menlo Park, Calif.

SEISMIC ENGINEERING PROGRAM REPORT, SEPTEMBER - DECEMBER 1979

Ronald L. Porcella, ed. 1980 64 p refs

(Grant NSF CA-114)

(USGS-CIRC-818-C) Avail: NTIS HC A04/MF A01

A summary of the accelerograms recovered from the USGS National Strong-Motion Network during the period September 1, 1979 through December 31, 1979 is presented. Data recorded during the October 15, 1979 Imperial Valley earthquake are presented, as are summaries of recent strong motion reports, notes in the availability of digitized data and information on other strong motion programs. S.L.

N82-12695*# California Inst. of Tech., Pasadena. Seismology Lab.

GLOBAL ISOSTATIC GEOID ANOMALIES FOR PLATE AND BOUNDARY LAYER MODELS OF THE LITHOSPHERE

Bradford H. Hager 10 Nov. 1981 34 p refs

(Grant NsG-7610)

(NASA-CR-164985) Avail: NTIS HC A03/MF A01 CSCL 08G

Commonly used one dimensional geoid models predict that the isostatic geoid anomaly over old ocean basins for the boundary layer thermal model of the lithosphere is a factor of two greater than that for the plate model. Calculations presented, using the spherical analogues of the plate and boundary layer thermal models, show that for the actual global distribution of plate ages, one dimensional models are not accurate and a spherical, fully three dimensional treatment is necessary. The maximum difference in geoid heights predicted for the two models is only about two meters. The thermal structure of old lithosphere is unlikely to be resolvable using global geoid anomalies. Stripping the effects of plate aging and a hypothetical uniform, 35 km, isostatically-compensated continental crust from the observed geoid emphasizes that the largest-amplitude geoid anomaly is the geoid low of almost 120 m over West Antarctica, a factor of two greater than the low of 60 m over Ceylon. Author

N82-12696*# California Inst. of Tech., Pasadena. Seismological Lab.
FUNDAMENTAL STUDIES IN GEODYNAMICS Semiannual Report, 1 Feb. - 31 Jul. 1981
Don L. Anderson, Bradford H. Hager, and Hiroo Kanamori 31 Jul. 1981 64 p
(Grant NsG-7610)
(NASA-CR-164990) Avail: NTIS HC A04/MF A01 CSCL 08K

Research in fundamental studies in geodynamics continued in a number of fields including seismic observations and analysis, synthesis of geochemical data, theoretical investigation of geoid anomalies, extensive numerical experiments in a number of geodynamical contexts, and a new field seismic volcanology. Summaries of work in progress or completed during this report period are given. Abstracts of publications submitted from work in progress during this report period are attached as an appendix. L.F.M.

N82-12697*# National Aeronautics and Space Administration, Washington, D. C.
NASA GEODYNAMICS PROGRAM Annual Report
Oct. 1981 83 p refs
(NASA-TM-84010; ERG-2; AR-2) Avail: NTIS HC A05/MF A01 CSCL 08G

The status, progress, and future plans of the program are given. A list of publications of research results supported by the program is included. T.M.

N82-12698*# Pennsylvania State Univ., University Park. Dept. of Geosciences.
SYNTHESIS OF REGIONAL CRUST AND UPPER-MANTLE STRUCTURE FROM SEISMIC AND GRAVITY DATA Final Report, 15 Jun. 1978 - 14 Jun. 1979
S. S. Alexander and P. M. Lavin 14 Jun. 1979 89 p refs
(Grant NsG-5276)
(NASA-CR-165001) Avail: NTIS HC A05/MF A01 CSCL 08K

Available seismic and ground based gravity data are combined to infer the three dimensional crust and upper mantle structure in selected regions. This synthesis and interpretation proceeds from large-scale average models suitable for early comparison with high-altitude satellite potential field data to more detailed delineation of structural boundaries and other variations that may be significant in natural resource assessment. Seismic and ground based gravity data are the primary focal point, but other relevant information (e.g., magnetic field, heat flow, LANDSAT imagery, geodetic leveling, and natural resources maps) is used to constrain the structure inferred and to assist in defining structural domains and boundaries. The seismic data consists of regional refraction lines, limited reflection coverage, surface wave dispersion, teleseismic P and S wave delay times, anelastic absorption, and regional seismicity patterns. The gravity data base consists of available point gravity determinations for the areas considered. S.L.

N82-12699*# Research Inst. of Colorado, Fort Collins.
RADIATION BUDGET MEASUREMENT/MODEL INTERFACE RESEARCH Semiannual Report
Thomas H. VonderHaar Oct. 1981 37 p refs
(Grant NAG1-150)
(NASA-CR-165000) Avail: NTIS HC A03/MF A01 CSCL 04A

The NIMBUS 6 data were analyzed to form an up to date climatology of the Earth radiation budget as a basis for numerical model definition studies. Global maps depicting infrared emitted flux, net flux and albedo from processed NIMBUS 6 data for July, 1977, are presented. Zonal averages of net radiation flux for April, May, and June and zonal mean emitted flux and net flux for the December to January period are also presented. The development of two models is reported. The first is a statistical dynamical model with vertical and horizontal resolution. The second model is a two level global linear balance model. The results of time integration of the model up to 120 days, to simulate the January circulation, are discussed. Average zonal wind, meridonal wind component, vertical velocity, and moisture budget are among the parameters addressed. J.M.S.

N82-12700# Naval Research Lab., Washington, D. C.
TOWARD AN UNDERSTANDING OF THE TURBULENT ELECTRODE EFFECT OVER LAND Interim Report
J. C. Willett 29 Sep. 1981 32 p refs
(RR0330242)
(AD-A104902; NRL-8519) Avail: NTIS HC A03/MF A01 CSCL 09/1

A new concept of the turbulent electrode effect, which has emerged from the recent work of Hoppel and of the author, is described. The past theoretical and observational research relating to the transformation of the classical electrode layer in the case of strong turbulent mixing is reviewed. Results of two experiments designed to test key predictions of the new theories are reported. The first experiment, measurement of the conductivity profile over land on windy days, lends some support to the theoretical prediction that both the positive and the negative polar components of the atmospheric conductivity should decrease toward the surface under turbulent conditions. The second experiment measurement of the nonconductive component of the vertical current density at the ground, tends to confirm a crucial assumption of the theories that all of the current is carried by turbulent and molecular diffusion at the surface. Suggestions are given for further experimental and theoretical work. Author (GRA)

N82-12701# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
PITCH-ANGLE DIFFUSION IN CANONICAL COORDINATES: A THEORETICAL FORMULATION
Michael Schulz 21 Aug. 1981 37 p refs
(Contract F04701-80-C-0081)
(AD-A105392; TR-0081(6960-06)-4; SD-TR-81-69) Avail: NTIS HC A03/MF A01 CSCL 04/1

The equation for pitch-angle diffusion (at constrant particle energy E and shell parameter L) in a dipole field can be transformed into canonical form, by the introduction of a new coordinate called z. The new coordinate is obtained by integrating the bounce period of a particle (at fixed E and L) with respect to y sq, where y is the sine of the equatorial pitch angle alpha sub 0. A potpourri of applications serves to illustrate the usefulness of such a transformation. For example, if D sub zz is a suitably simple function of z, one can specify the eigenfunctions g sub n(z) of the diffusion operator is closed form. If D sub zz differs only slightly from such a simple function of z, then the corresponding eigenfunctions can be generated from the above set by procedures analogous to the Rayleigh-Schrodinger perturbation theory used in quantum mechanics. The availability of such eigenfunctions enables one to evaluate quantitatively the manner in which geomagnetically trapped particles are redistributed in alpha sub 0 and lost from the magnetosphere as the phase-space density f evolves in time. GRA

N82-12702# Analytic Sciences Corp., Reading, Mass.
MILITARY GEODESY AND GEOSPACE SCIENCE UNIT FOUR
Warren G. Heller and A. Richard LeSchack Feb. 1981 120 p refs
(Contract F19628-77-C-0152; AF Proj. 3204)
(AD-A105073; SCIENTIFIC-8; AFGL-TR-81-0031) Avail: NTIS HC A06/MF A01 CSCL 08/5

Satellite systems with military applications are considered. The tracking telemetry, command, and data processing for various systems were reviewed. Ground tracking networks are described. Remote sensing features of several geodetic satellites are discussed. Navigational uses of the systems are highlighted T.M.

N82-12703# Analytic Sciences Corp., Reading, Mass.
MILITARY GEODESY AND GEOSPACE SCIENCE, UNIT TWO
Warren G. Heller and A. Richard LeSchack Hanscom AFB, Mass. AFGL Feb. 1981 185 p
(Contract F19628-77-C-0152; AF Proj. 3204)
(AD-A105071; SCIENTIFIC-6; AFGL-TR-81-0029) Avail: NTIS HC A09/MF A01 CSCL 08/5

The general terrestrial mapping, charting, and geodesy (MC&G) problem can best be formulated as the problem of generating a metric description of the earth and its physical properties -- a description in which relative positions within and on the surface of the earth are accurately described, the figure of the earth is accurately portrayed, and the gravitational, magnetic, and spin properties of the earth are fully represented in quantitative terms. Broader and more comprehensive definitions of the MC&G problem might be found within the domain of the planetological sciences, but the concept of quantitative metric relationships resulting from actual measurement processes will always be central to the definition. In the context of modern weapon systems, MC&G applications tend to concentrate in the areas of relative position determination on the surface of the earth and quantitative characterization of the terrestrial gravity field. The classical long-range artillery problem, for example, requires highly accurate knowledge of gun and target locations with respect to a common datum in a well-defined local coordinate system, together with approximate characterization of the gravity field, if a reliable one-shot hit capability is required. Practical constraints on achieving this capability, due partly to gun/target relative location limitations and partly to non-geodetic problems in the aiming process, lead to a multiple-shot, shoot-sense-correct philosophy that persists to this day. GRA

N82-12704# Control Data Corp., Minneapolis, Minn. Research and Advanced Design Lab.

MORPHOLOGY OF STRATOSPHERIC PLANETARY WAVES Final Report, 1 Jun. 1979 - 31 May 1981

Denis G. Dartt, R. W. Wilcox, and A. D. Belmont 28 Jul. 1981 42 p refs
(Contract F49620-79-C-0160; AF Proj. 2310)
(AD-A105006; AFOSR-81-0651TR) Avail: NTIS HC A03/MF A01 CSCL 04/1

This paper compares sudden warmings to find any consistent behavior of the important variables. The properties examined are amplitude and phase of planetary waves, sensible heat and momentum fluxes by each wave, and zonal means of geostrophic zonal wind, temperature, derived meridional wind and vertical motions. This is done for the seven warmings from 1970-74 for which daily gridden data up to 0.4 mb were available. GRA

N82-12705# Los Alamos Scientific Lab., N. Mex.

REDUCTION OF PHOTOSYNTHETICALLY ACTIVE RADIATION UNDER EXTREME STRATOSPHERIC AEROSOL LOADS

Siegfried A. W. Gerstl and Andrew Zardecki Aug. 1981 24 p refs
(Contract W-7405-eng-36)
(DE81-030506; LA-8938-MS) Avail: NTIS HC A02/MF A01

The hypothesis that the Cretaceour-Tertiary extinctions might be caused by an obstruction of sunlight is tested by model calculations. First the total mass of stratospheric aerosols under normal atmospheric conditions is compared for four different (measured) aerosol size distributions and vertical profiles. For comparison, the stratospheric dust masses after four volcanic eruptions are also evaluated. Detailed solar radiative transfer calculations are then performed for artificially increased aerosol amounts until the postulated darkness scenario is obtained. Thus it is found that a total stratospheric aerosol mass between 1 and 4 times 10 g is sufficient to reduce photosynthesis to 10 of normal. The impact of a 0.4 to 3 km diameter asteroid or a close encounter with a Halley size comet may deposit that amount of particulates into the stratosphere. The darkness scenario of Alvarez et al. is thus shown to be a possible extinction mechanism, even with smaller size asteroids of comets than previously estimated. DOE

N82-12706# California Univ., Livermore. Lawrence Livermore Lab. Test Ban Treaty Verification Program.

CALCULATIONS ON SEISMIC COUPLING OF UNDERGROUND EXPLOSIONS IN SALT

M. E. Heusinkveld 20 Jan. 1981 117 p refs
(Contract W-7405-eng-48)
(DE81-030633; UCRL-53103) Avail: NTIS HC A06/MF A01

The results of a theoretical study of seismic coupling and decoupling of underground explosions in a salt medium are presented. A series of chemical and nuclear explosions was carried out in salt domes for the Cowboy and the Dribble programs to provide experimental data on seismic coupling for both tamped explosions and explosions in cavities. the Cowboy program consisted of a series of chemical explosions, and the Dribble program consisted of the tamped nuclear Salmon event, the Sterling nuclear event in the Salmon cavity, and an associated site calibration errors. The results of extensive computer calculations, which are in satisfactory agreement with the experimental data are given. The calculations were extended to give general results on seismic coupling in salt. The measure of seismic coupling was the rsidential reduced displacement potential (residual RDP). The decoupling associated with a shot in a cavity is expressed as the ratio of the resulting residual RDP to that of an equal sized tamped shot. DOE

N82-12707# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.

ENVIRONMENTAL DATA FOR SITES IN THE NATIONAL SOLAR DATA NETWORK

Aug. 1981 176 p Prepared for Argonne National Lab.
(Contract DE-AC01-79CS-30027)
(DE82-000071; SOLAR/0010-81/08) Avail: NTIS HC A09/MF A01

Environmental information collected at the sites of the National Solar Data Network is tabulated for each solar site. The sites are grouped into 12 zones, each of which consists of several adjacent states. The insolation table presents the total, diffuse, direct, maximum, and extraterrestrial radiation for the site. It also shows the ratio of total to extraterrestrial radiation. The temperature table gives the average, daytime, nighttime, maximum, minimum, and inlet-water temperature for the site. All of the passive and some active solar sites are equipped with wind sensors which provide information on wind speed and direction. For some sites, a humidity tables provides relative humidity values for day and night. It also gives values for the maximum and minimum humidity for each day. A technical discussion of the instruments and measurements used to obtain the data is included. DOE

N82-12708# Battelle Pacific Northwest Labs., Richland, Wash.

GEOCHEMICAL MODELING: A REVIEW

E. A. Jenne Jun. 1981 58 p refs
(Contract DE-AC06-76RL-01830)
(DE81-028969; PNL-3574) Avail: NTIS HC A04/MF A01

Two general families of geochemical models are reviewed. The ion speciation solubility group of geochemical models contain submodels to first calculate distribution of aqueous species and to secondly test the hypothesis that the water is near equilibrium with particular solid phases. The second geochemical models, the reaction path models, simulates the step wise precipitation of solid phase as a result of reacting specified amounts of water and rock. It is suggested that improvements in the present versions of these models enhances their value and usefulness to applications in nuclear waste isolation. DOE

N82-12709# Technische Universitaet, Brunswick (West Germany). Inst. fuer Geophysik und Meteorologie.

PROJECT PORCUPINE: MAGNETOMETER EXPERIMENT Final Report

Burkhard Theile and Hermann Luehr Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 48 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-80-028; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,10

The measurement of the particle current with a magnetometer is discussed. This allows an assessment of the total flux of particles originating from the magnetosphere and arriving in the ionosphere. The four sounding rocket payloads PORCUPINE, launched as part of the German contribution to the International Magnetosphere Study, were equipped with three component fluxgate magnetometers. Scientific data analysis for two flights is presented. The magnetic effects of active plasma experiments as well as of field aligned currents is observed. Author (ESA)

N82-12710# Fraunhofer Inst., Freiburg (West Germany).

IMPEDANCE PROBE EXPERIMENT IN PROJECT POLAR HIGH ATMOSPHERE OF THE SOUNDING ROCKET PROGRAM AERONOMY Final Report

Eugen Neske and Josef Molnar Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 56 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer

Forschung und Technologie
(BMFT-FB-W-80-035; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,80

An impedance probe was used to measure the absolute value of the local electron densities in the thermosphere and the ionosphere in order to deduce the conductivity. The frequency dependence of the mutual impedance of a double sphere system was used to determine the electron density. The applied electronic concept is described in detail. The electron temperature cannot be derived by means of this method. The electron density profiles and hence the conductivity profiles are determined with good accuracy and sufficient resolution. With regard to an exclusive measurement of the in situ electron density, the self-impedance probe is to be given preference over the transfer impedance probe used because interpretation of the measurement is simpler and safer. Author (ESA)

N82-12711# Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht (West Germany).
REMOTE DETERMINATION OF ATMOSPHERIC GASES WITH A DF LASER Ph.D. Thesis - Hamburg Univ. [FERNMESSUNG ATMOSPHAERISCHER GASE MIT EINEM DF-LASER]
J. Altmann 1980 160 p refs In GERMAN; ENGLISH summary
(GKSS-80-E-40) Avail: NTIS HC A08/MF A01

A system for the remote quantitative depth resolved determination of atmospheric gases is described. Measurements can contribute to the control of air pollution in industrial areas. The system is based on the differential absorption and scattering of laser light, the so-called DIAL lidar technique. The possibilities of remote determination of gases with the aid of pulsed DF lasers were investigated. Special design features, such as the purely geometric compression of the signal amplitude dynamics, and commercially unavailable components, i.e., the fast sensitive low noise preamplifiers and the multiple input analog delay multiplexer, are described in detail. Molecular absorption cross sections required for calibration and interference evaluation are measured with a multipass absorption cell. As an example, results of a determination of atmospheric N2O are presented.
Author (ESA)

N82-12712# Danish Meteorological Inst., Copenhagen.
DANISH METEOROLOGICAL INSTITUTE, RUDE SKOV, GEOPHYSICAL OBSERVATORY. MAGNETIC RESULTS Annual Report, 1979
Axel Hansen 1981 41 p ref
(ISBN-87-7478-187-1) Avail: NTIS HC A03/MF A01

The results of the standard observations carried out at the Rude Skov magnetic laboratory during 1979 are presented. The measurements show hourly means of magnetic declination. Diurnal extreme values and mean diurnal inequalities are also given.
Author (ESA)

N82-12713# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
INFRARED SPECTROSCOPY OF MICROORGANISMS NEAR 3.4 MICRONS IN RELATION TO GEOLOGY AND ASTRONOMY
F. Hoyle, N. C. Wickramasinghe, S. Al-Mufti, and A. H. Olavesen Jun. 1981 11 p refs Submitted for publication
(Preprint-69) Avail: NTIS HC A02/MF A01

Cracking of microorganisms at high temperature and pressure were examined for the existence of microfossils in sedimentary rocks of the Isna series. Microorganism specimens were examined for degradation by infrared spectroscopy over the wavelength range from 2.5 microns to 15 microns. Stability up to 380 C after which there is degradation towards graphite is shown. It is concluded that the preservation of microfossils is feasible in rocks metamorphosized at temperatures of 400 C. Author (ESA)

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-12714 Meteorologisches Observatorium, Hohenpeissenberg (West Germany).
SPECIAL OBSERVATIONS BY THE HOHENPEISSENBERG METEOROLOGICAL OBSERVATORY. NUMBER 42: RESULTS OF AEROLOGICAL AND SURFACE OZONE MEASUREMENTS DURING THE FIRST SEMESTER OF 1980 [SONDERBEOBACHTUNGEN DES METEOROLOGISCHEN OBSERVATORIUMS HOHENPEISSENBERG. NR 42: ERGEBNISSE DER AEROLOGISCHEN UND BODENNAHEN OZONMESSUNGEN IM 1. HALBJAHR 1980]
1980 194 p refs In GERMAN and ENGLISH
(Sonderbeob-42; ISSN-0581-1287) Avail: Issuing Activity

Tabular and graphical ozonometry results are presented. Surface ozone measurement data cover day of measurement, daily mean of ozone near the ground (nbar), daily maximum of ozone near the ground (nbar), hour of maximum (GMT), duration of extreme values in excess of 100 nbar in tens of minutes, daily minimum (nbar), and monthly mean (without extreme values). Total ozone measurement data, determined by Dobson-spectrophotometer, include day of measurement, time of observation, type of measurement, i.e., direct Sun blue zenith, number of measurements for daily mean, and total ozone amount for AD and C wavelengths (daily mean values). The pairs of wavelengths used are: 305.5 nm, 325.4 nm; 311.45 nm, 332.4 nm; and 317.6 nm, 339.8 nm. Author (ESA)

N82-12715*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE NUMERICAL STUDIES PROGRAM FOR THE ATMOSPHERIC GENERAL CIRCULATION EXPERIMENT (AGCE) FOR SPACELAB FLIGHTS
William W. Fowlis, ed. and M. H. Davis, ed. (Univ. Space Research Association, Boulder, Colo.) Nov. 1981 65 p refs Proc. of Meeting held in Boulder, Colo., 14-15 Apr. 1981
(NASA-CP-2200; M-366) Avail: NTIS HC A04/MF A01 CSCL 04B

The atmospheric general circulation experiment (AGCE) numerical design for Spacelab flights was studied. A spherical baroclinic flow experiment which models the large scale circulations of the Earth's atmosphere was proposed. Gravity is simulated by a radial dielectric body force. The major objective of the AGCE is to study nonlinear baroclinic wave flows in spherical geometry. Numerical models must be developed which accurately predict the basic axisymmetric states and the stability of nonlinear baroclinic wave flows. A three dimensional, fully nonlinear, numerical model and the AGCE based on the complete set of equations is required. Progress in the AGCE numerical design studies program is reported. For individual titles, see N82-12716 through N82-12723.

N82-12716*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
OVERVIEW
William W. Fowlis *In its* The Numerical Studies Program for the Atmospheric Gen. Circ. Expt. (AGCE) for Spacelab Flights Nov. 1981 p 1-9 (For primary document see N82-12715 03-47)
Avail: NTIS HC A04/MF A01 CSCL 04B

The creation of a spherical model in cylindrical geometry is discussed. The model requires a radial body force to simulate gravity. This force is achieved by dielectric effects on a liquid in the presence of a large voltage, but in the terrestrial laboratory it cannot be made large enough to overwhelm gravity. However, in an orbiting vehicle like Spacelab, this dielectric force will dominate. The behavior of a stripped down general circulation system (GCS) is a salient omission of GCM. It is suggested that the system will contribute to global weather and climate studies. E.A.K.

N82-12717*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE AGCE APPARATUS
William W. Fowlis *In its* The Numerical Studies Program for

the Atmospheric Gen. Circ. Expt. (AGCE) for Spacelab Flights Nov. 1981 p 10-15 ref (For primary document see N82-12715 03-47)
Avail: NTIS HC A04/MF A01 CSCL 04B

The atmospheric general circulation experiment (AGCE) apparatus, an instrument to extend previous experimental work on baroclinic flows in cylindrical geometry to spherical geometry was proposed. The instrument must be flown in Spacelab to allow the radial dielectric body force which simulates gravity to be dominant. The essential configuration of the proposed apparatus is shown. Some preliminary values of dimensions and imposed conditions are included. E.A.K.

N82-12718*# Arizona Univ., Tucson. Inst. of Atmospheric Physics.

HYDROSTATIC CALCULATIONS OF AXISYMMETRIC FLOW AND ITS STABILITY FOR THE AGCE MODEL

Timothy L. Miller and Robert L. Gall *In* NASA. Marshall Space Flight Center The Numerical Studies Program for the Atmospheric Gen. Circ. Expt. (AGCE) for Spacelab Flights Nov. 1981 p 16-22 (For primary document see N82-12715 03-47)
Avail: NTIS HC A04/MF A01 CSCL 04B

Baroclinic waves in the atmospheric general circulation experiment (AGCE) apparatus by the use of numerical hydrostatic primitive equation models were determined. The calculation is accomplished by using an axisymmetric primitive equation model to compute, for a given set of experimental parameters, a steady state axisymmetric flow and then testing this axisymmetric flow for stability using a linear primitive equation model. Some axisymmetric flows are presented together with preliminary stability calculations. E.A.K.

N82-12719*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

CYLINDRICAL ANNULUS MODELS

Fred Leslie *In its* The Numerical Studies Program for the Atmospheric Gen. Circ. Expt. (AGCE) for Spacelab Flights Nov. 1981 p 23-32 refs (For primary document see N82-12715 03-47)
Avail: NTIS HC A04/MF A01 CSCL 04B

The stability diagram for the atmospheric general circulation experiment (AGCE) was numerically determined. The cylindrical code of Warn-Varnas modified for linear stability and adapted to spherical geometry. The code computes axisymmetric basic states and then test their stability to zonal disturbances. The Warn-Varnas code and some of the basic state results are reported. E.A.K.

N82-12720*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

SPHERICAL MODELS: BASIC STATES AND STABILITY

Glyn O. Roberts *In its* The Numerical Studies Program for the Atmospheric Gen. Circ. Expt. (AGCE) for Spacelab Flights Nov. 1981 p 33-36 (For primary document see N82-12715 03-47)
Avail: NTIS HC A04/MF A01 CSCL 04B

Steady axisymmetric basic states in a spherical cap and their stability to azimuthally varying perturbations of different wave numbers were numerically investigated. The main features of the planned computer code and numerical methods are outlined. E.A.K.

N82-12721*# Tennessee Univ. Space Inst., Tullahoma.

THE THREE DIMENSIONAL SPHERICAL MODEL FOR THE AGCE

Basil N. Antar *In* NASA. Marshall Space Flight Center The Numerical Studies Program for the Atmospheric Gen. Circ. Expt. (AGCE) for Spacelab Flights Nov. 1981 p 37-39 (For primary document see N82-12715 03-47)
Avail: NTIS HC A04/MF A01 CSCL 04B

The development of accurate numerical model of the atmospheric general circulation experiment (AGCE) is discussed. The model will serve both as a design and diagnostic tool for the AGCE, as well as for conducting numerical experiments which otherwise cannot be performed by AGCE. The code in its final form will solve the complete three dimensional nonlinear Navier-Stokes energy equations with the Boussinesq approximation. The code will allow for any thermal boundary conditions and any external forcing in the form of rotation and body forces and will allow for variable thermodynamic coefficients. E.A.K.

N82-12722*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

MODEL VERIFICATION STUDIES USING ACCURATE MEASUREMENTS OF SPIN UP

Jae M. Hyun *In its* The Numerical Studies Program for the Atmospheric Gen. Circ. Expt. (AGCE) for Spacelab Flights Nov. 1981 p 40-43 refs (For primary document see N82-12715 03-47)
Avail: NTIS HC A04/MF A01 CSCL 04B

The reliability and accuracy of the numerical code for spin up flows in a cylinder by comparing the numerical results against high resolution laser Doppler velocimeter (LDV) measurements of the azimuthal flows were checked. A computer code to generate numerical solution for axisymmetric rotating fluid in a cylinder was obtained and amended for routine use at MSFC. The numerical simulations used the Navier-Stokes equations in axisymmetric form and employed finite difference techniques on both constant and variable grids. The numerical solutions are analyzed to gain further insight into the fundamental questions analyzed in rotating fluid dynamics. E.A.K.

N82-12723*# Miami Univ., Fla. School of Marine and Atmospheric Science.

PRELIMINARY REGIME DIAGRAM ON A SPHERE WITH A SIMPLIFIED GENERAL CIRCULATION MODEL

E. J. Pitcher, J. E. Geisler, and R. C. Malone (LASL) *In* NASA. Marshall Space Flight Center The Numerical Studies Program for the Atmospheric Gen. Circ. Expt. (AGCE) for Spacelab Flights Nov. 1981 p 45-55 (For primary document see N82-12715 03-47)
Avail: NTIS HC A04/MF A01 CSCL 04B

Numerical model studies useful design considerations and which can be accumulated to form the body of basic knowledge necessary for application of the atmospheric general circulation experiment (AGCE) data to understanding of atmospheric problems are reported. The most efficient way to obtain a computer model suitable for this objective is to modify an existing general circulation model (GCM) of the atmosphere rather than to develop such a model from first principles. The GCM and its modification is outlined. E.A.K.

N82-12724# Naval Environmental Prediction Research Facility, Monterey, Calif.

EVALUATION OF A METHOD FOR SHORT-RANGE FORECASTING OF EVAPORATION DUCT HEIGHTS Final Report ap HC A03/MF A01

Wayne A. Sweet Aug. 1981 40 p refs
(AD-A104892; NEPRF-TR-81-04) Avail: NTIS HC A03/MF A01 CSCL 04/2

A method for forecasting evaporation duct heights over periods of three to twelve hours is evaluated by comprising skill and threat scores to persistance scores. Although the evaluation of data from two ocean weather stations in the North Atlantic reveals an apparent advantage of the forecast method over persistance, an analysis of variance shows no statistically significant differences between the two sets of scores.
Author (GRA)

N82-12725# Naval Ship Research and Development Center, Bethesda, Md. Ship Performance Dept.

STANDARIZED WAVE AND WIND ENVIRONMENTS FOR NATO OPERATIONAL AREAS Final Report

Susan L. Bales, Wah T. Lee, and Joyce M. Voelker Jul. 1981 334 p refs
(AD-A105414; DTNSRDC/SPD-0919-01) Avail: NTIS HC A15/MF A01 CSCL 08/3

This report is a source document for specifying wind and wave conditions for those regions considered appropriate for joint operations of NATO naval forces. The areas considered are the North Atlantic Ocean northward from the Tropic of Cancer, the Mediterranean Sea, and coastal or landlocked areas such as the north, Baltic and Black Seas. The report provides seasonal and geographic distributions of wind and wave parameters and specifies mathematical models by which wave spectra, required by any ship seakeeping performance methodology, can be developed. Portions of the data are derived from the U.S. Navy's emerging Twenty Year Hindcast Wind and Wave Climatology, and are considered to be far superior to data previously available for those operating areas. Author (GRA)

N82-12726# Institute for Defense Analyses, Arlington, Va. Science and Technology Div.
ADVERSE WEATHER AND NIGHT CAPABILITY: A CALL FOR ACTION. VOLUME 2: APPENDIX, DATA BASE FOR SELECTED IMPORTANT MILITARY LOCATIONS Final Report
Lucien M. Biberman Jun. 1981 204 p
(Contract MDA903-79-C-0202)
(AD-A104991; AD-E500390; IDA-P-1570-Vol-2; IDA/HQ-81-23660-Vol-2) Avail: NTIS HC A10/MF A01 CSCL 04/2

This volume presents statistical data on relative humidity, absolute humidity, and visibility for selected locations of military importance. GRA

N82-12727# Weather Wing (7th), Scott AFB, Ill.
TERMINAL FORECAST REFERENCE NOTEBOOK, DETACHMENT 12, 15TH WEATHER SQUADRON FOR SELFRIDGE AIR NATIONAL GUARD BASE, MICHIGAN
John T. Pacek 30 Apr. 1981 43 p refs Revised
(AD-A105083; AD-E850099; Rept-7WW-TFRN-81-001) Avail: NTIS HC A03/MF A01 CSCL 04/2

This TFRN discusses the location, topography and local effects of Selfridge ANGB, MI. The meteorological importance of the Great Lakes, Lake St. Clair, Clinton River and pollution sources are also presented. The area's synoptic climatology is described and illustrated with typical examples. Climatic aids, forecasting techniques and problems are also discussed. GRA

N82-12728# Weather Wing (7th), Scott AFB, Ill.
TERMINAL FORECAST REFERENCE NOTEBOOK FOR SCOTT AIR FORCE BASE, ILLINOIS
David G. Knepper and Dee L. Keough 10 Jul. 1981 91 p refs Revised
(AD-A105084; AD-E850100; Rept-7WW-TFRN-81-002) Avail: NTIS HC A05/MF A01 CSCL 04/2

This TFRN discusses the location, topography and local effects, of Scott AFB, IL. The meteorological importance of the Great Lakes, air pollution sources, and physical location of weather equipment are presented. The area's synoptic climatology is described and illustrated with typical examples. Climatic aids, forecasting techniques and problems are also discussed. GRA

N82-12729# WestAq Corp., Grand Valley, Colo.
METEOROLOGICAL AND CLIMATOLOGICAL INVESTIGATION: REVIEW OF JANUARY - JUNE 1980 INVESTIGATIVE REPORT, VOLUME 1
David Rusty Lundberg and Hilding K. L. Spradlin Jul. 1981 170 p Prepared for Geokinetics, Inc., Concord, Calif.
(Contract DE-FC20-78LC-10787)
(DE81-030741; DOE/LC-10787/80-App-D-Vol-1) Avail: NTIS HC A08/MF A01

Since January 1979, a meteorological and climatological investigation for the purpose of establishing a microclimatic baseline has been continuously conducted at the Geokinetics oil shale research facility in Eastern Utah. The findings for only a six month segment (January 1 - June 30, 1980) of that ongoing investigation are presented. The WestAq data printouts are given. DOE

N82-12730# WestAq Corp., Grand Valley, Colo.
METEOROLOGICAL AND CLIMATOLOGICAL INVESTIGATION: REVIEW OF JANUARY - JUNE 1980 INVESTIGATIVE PERIOD, VOLUME 2
D. R. Lundberg and Hilding K. L. Spradlin Jul. 1981 145 p Prepared for Geokinetics, Inc., Concord, Calif.
(Contract DE-FC02-78LC-10787)
(DE81-030742; DOE/LC-10787/80-App-D-Vol-2) Avail: NTIS HC A07/MF A01

Since January 1979, a meteorological and climatological investigation for the purpose of establishing a microclimatic baseline has been continuously conducted at the Geokinetics oil shale research facility in eastern Utah. The findings for a six month segment (January 1 - June 30, 1980) of that ongoing investigation are presented. The WestAq data printouts are given. DOE

N82-12731# Geokinetics, Inc., Concord, Calif.
METEOROLOGICAL AND CLIMATOLOGICAL INVESTIGATION: REVIEW OF JANUARY - JUNE 1980 INVESTIGATIVE PERIOD
D. R. Lundberg and H. K. L. Spradlin Jul. 1981 81 p refs
(Contract DE-FC20-78LC-10787)
(DE81-030740; DOE/LC-10787/80) Avail: NTIS HC A05/MF A01

Since January 1979, a meteorological and climatological investigation for the purpose of establishing a microclimatic baseline has been continuously conducted at the Geokinetics oil shale research facility in eastern Utah. This report, however, presents the findings for only a six month segment (January 1 - June 30, 1980) of that ongoing investigation. Included in this report is a description of the program design, the handling and interpretation of the data, and program improvement considerations commended for inclusion into future segments of the investigation. DOE

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-12732 California Univ., Los Angeles.
HYDROCARBON COMPOSITION OF SEDIMENTS, WATER, AND FAUNA IN SELECTED AREAS OF THE GULF OF MEXICO AND SOUTHERN CALIFORNIA MARINE ENVIRONMENT Ph.D. Thesis
Paul Joseph Mankiewicz 1981 350 p
Avail: Univ. Microfilms Order No. 8121004

Predominantly sediments but also water column and faunal samples were analyzed for their hydrocarbon content using high resolution gas chromatography and gas chromatography/mass spectrometry. Seawater and geographic variability of faunal analyses appeared to be governed by feeding habit and source composition whereas water column analyses indicated a consistent petroleum component with biological contributions varying with temperature and salinity. In the nearshore areas off Texas and Louisiana the water column contained notable concentrations of petroleum in the dissolved phase, most notably alkyl naphthalenes and phenanthrenes whereas the sediments were tainted with petroleum derived from combustion sources of crude oil and refined products. In southern California, the dominant source of hydrocarbons in intertidal sediments is petroleum derived from seepage. However, in the offshore areas dated cores and surficial sediment analyses suggest that while seepage sourced petroleum is present, the dominant source of hydrocarbons is combustion derived air pollution. Dissert. Abstr.

N82-12733 State Univ. of New York at Buffalo.
LONG OCEAN WAVES ON LINEARLY VARYING BOTTOM TOPOGRAPHIES Ph.D. Thesis
Wayne Lawrence Neu 1981 67 p
Avail: Univ. Microfilms Order No. 8122192

The effects of bottom topography on long free surface gravity ocean waves were studied. Wave trapping and transmission-reflection problems are considered. The topographies are described by straight parallel bottom contours which in cross section are composed of segments of constant and linear depth variations. Over linearly varying depth segments, the solution to the vertically integrated governing equations is given in terms of two Kummer functions. Solutions were found for time harmonic waves periodic in the along contour direction and of exponential decay behavior normal to the contours over the constant depth segments. Dispersion equations relate the wave frequency to the along ridge wave number for trapped waves. The ridge and trench problems examine the portion of the incident wave energy reflected by or transmitted past the topography and the continental slope and shelf problem examines the amplication of the incident wave at the coast and resonances over the shelf. Dissert. Abstr.

N82-12734*# EG and G Washington Analytical Services Center, Inc., Pocomoke City, Md.

BOUNDARY DETECTION CRITERIA FOR SATELLITE ALTIMETERS

C. F. Martin and R. L. Taylor Nov. 1981 61 p refs
(Contract NAS6-3075)
(NASA-CR-156880) Avail: NTIS HC A04/MF A01 CSCL 14B

A procedure for using satellite altimeter data to determine the time of crossing of a surface boundary, such as ocean land or ocean ice, with the primary objective to flag altimeter data that do not properly represent oceanographic measurements were studied. Water to land crossing and water to sea ice crossing were investigated. For ocean ice crossings, a large increase in AGC occurred. Waveform tests for increasing the probability of detecting an ocean land crossing were investigated. It is recommended that the boundary test be based on a fit of the full waveform to a limited parameter set at a rate of 5 to 10 second. E.A.K.

N82-12735# National Academy of Sciences - National Research Council, Washington, D. C. Maritime Transportation Research Board.

MARITIME SUPPORT FOR OCEAN-RESOURCES DEVELOPMENT Final Report

Jun. 1981 188 p refs
(Contract N00014-75-C-0711)
(AD-A104730) Avail: NTIS HC A09/MF A01 CSCL 05/10

The issues associated with ocean development to determine their implication for the U.S. maritime industry have been examined. The examination embraced ocean energy systems, offshore oil and gas activities, food from the sea, deep seabed mining, and the use of ocean space. The requirements that ocean-resource development places on the maritime industry do not show sharp differences from one resource to the next. While the technological base on which the means of recovery and use of the resources can be built and deployed has been developed, more scientific work and technological development are needed. However, it is the committee's opinion that the true factors pacing the effort to bring many of the resources into use and to achieve the many benefits are of an economic, legal, and public-policy nature. Author (GRA)

N82-12736# Naval Oceanographic Office, Bay St. Louis, Miss.

OCEANOGRAPHIC TECHNOLOGY INFORMATION SERVICE: USER'S GUIDE Final Report

George H. Miller Aug. 1981 59 p
(AD-A104670; NOO-RP-37) Avail: NTIS HC A04/MF A01 CSCL 05/2

The oceanograhic technology information service (OTIS) a data managment system with the purpose to identify, define and serve as focal point for oceanographic technological capabilities is discussed. The OTIS includes summary information on specific types to technology. Major technical areas covered include: (1) measurement and sampling system, associated hardware and instrumentation; (2) mathematical, physical, computerized models; (3) data collection, reduction and analysis techniques; and (4) facilities providing calibration, testing, data reduction and analysis, fabrication of hardware and other services;. Author

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-12737 Utah State Univ., Logan.

HIGHER PLANT ACCLIMATION TO SOLAR ULTRAVIOLET-B RADIATION Ph.D. Thesis

Ronald Robberecht 1981 109 p
Avail: Univ. Microfilms Order No. 8121390

Plant acclimation to natural and intensified solar UV-B irradiance was investigated in three species, to determine: (1) the relationship between plant sensitivity and epidermal UV attenuation, (2) the effect of phenotypic changes in the leaf epidermis, resulting from UV-B exposure, on plant sensitivity to UV radiation, and (3) the plasticity of these changes in the epidermis leading to plant, acclimation to UV-B radiation. Epidermal UV transmittance was found to differ in magnitude and spectral distribution among the three species. Photosynthesis was not significantly depressed in the leaves of any of three species. A trend toward photosynthetic depression of response to UV-B irradiation was found. A mechanism of UV-B attenuation, and increase in the UV-B attenuation capacity of the epidermis, is suggested. It is suggested that the degree of plant sensitivity and acclimation to natural and intensified solar UV-B radiation involves a dynamic balance between the capacity for UV-B attenuation and UV-radiation repair mechanism in the leaf. Dissert. Abstr.

N82-12738# Norwegian Defence Research Establishment, Kjeller.

NEUROTRANSMITTER MECHANISMS IN THE NUCLEUS ACCUMBENS SEPTI AND RELATED REGIONS IN THE RAT BRAIN

Ivar Walaas Apr. 1981 26 p refs
(NDRE/PUBL-81/1001; ISSN-0085-4301) Avail: NTIS HC A03/MF A01

The localization of different transmitter candidate, particularly the amino acids gamma aminobutyrate (GABA) and glutamate (GLU), in limbic and basal ganglia regions in the rat brain was compared and the characteristics of nucleus accumbens were studied. The GABA neurons are found in nucleus accumbens, and GABA projections from this nucleus are identified in restricted basal forebrain and mesencephalic regions. The GLU projections from the neocortex or allocortex are terminated in nucleus accumbens and other forebrain and hypothalamic nuclei. Neurotransmitters in local neurons are identified in the hippocampus, nucleus accumbens, septum and caudatoputamen by local kainic acid injections, while neurons in the mediobasal hypothalamus are studied after systemic treatment of newborn animals with monosodium glutamate. E.A.K.

N82-12739*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

METHOD AND APPARATUS FOR DETECTING COLIFORM ORGANISMS Patent Application

Kenji Nishioka, David Nibley (Boeing Co., Palo Alto, Calif.), Eldon Jeffers (Boeing Co., Palo Alto, Calif.), and Richard Brooks, inventors (to NASA) (Boeing Co., Palo Alto, Calif.) Filed 26 Oct. 1981 25 p
(NASA-Case-ARC-11322-1; US-Patent-Appl-SN-315278) Avail: NTIS HC A02/MF A01 CSCL 06C

A sample containing coliform bacteria is cultured in a liquid growth medium. The cultured bacteria produce hydrogen which is vented to a second call containing a buffer solution in which the hydrogen dissolves. By measuring the potential change in the buffer solution caused by the hydrogen, as a function of time, the initial concentration of bacteria in the sample is determined. Alternatively, the potential change in the buffer solution can be compared with the potential change in the liquid growth medium to verify that the potential change in the liquid growth medium is produced primarily by the hydrogen gas produced by the coliform bacteria. NASA

N82-12740# Technische Hogeschool, Delft (Netherlands).

AN ENGINEERING STUDY OF BACTERIAL KINETICS AND ENERGETICS Ph.D. Thesis

A. A. Esener 1981 130 p refs
Avail: NTIS HC A07/MF A01

Bacterial kinetics and energetics were studied with reference to engineering applications. Three processes were identified: (1) to biosynthetic process during which presursors are formed from the substrate followed by the polymerization of them into biomass; (2) product formation; and (3) the maintenance processes. The distribution of the input energy and mass in the form of the substrate was studied in an attempt to manipulate the distribution so as to minimize the overall cost of the product. This was accomplished by describing the whole process in terms of a mathematical model and optimizing it according to an objective function. R.J.F.

N82-12741# International Atomic Energy Agency, Vienna (Austria).

GASTROINTESTINAL ALLERGY IN THE EXPERIMENTAL ANIMAL: THE USE OF RADIOIODINATED SERUM

ALBUMIN IN THE ASSESSMENT OF NEW DRUGS Final Report, 15 Oct. 1977 - 30 Nov. 1979
S. Freier Mar. 1980 24 p refs
(IAEA-R-2067-F) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

A rat model to study of gastrointestinal allergy and means to prevent it was developed. Allergic sensitivity to certain proteins by injecting proteins and adjuvants in various regimes was induced in rats. For suckling rats sensitivity was established by oral administration of the protein. A hypersensitive gastrointestinal reaction to challenge was demonstrated by electron microscopy, by light microscopy with conventional staining techniques, and by a radionuclide procedure wherein (51) Cr labelled albumin injected intravenously shortly before the challenge concentrated in the intestinal walls in rough proportion to the severity of the reaction. It is found that suppressing the hypersensitive intestinal reaction, disodium cromoglycate, dexamethazone, aspirin, indomethecan, and ipobrufen are ineffective and aminophylline was a slight amelioration. DOE

N82-12742# Technische Universitaet, Munich (West Germany). Institut fuer Klinische Zytologie.
COMPILATION OF CELL DATA BANK FOR AUTOMATION IN DIAGNOSTIC CYTOLOGY Final Report
Karlheinz Otto Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 30 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-158; ISSN-0340-7606) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,30

Automated cell recognition systems with high resolution which are required to analyze separate cells to detect cellular margins are discussed. Classified cells are used for compiling a learning data set. The preparation technique was improved, aiming at sufficient cellular isolation. In order to create a learning data set, 10,000 isolated cells were selected. The preparation procedure entails a distinct increase of isolated squamous epithelial cells and a diminution of clusters as well as white blood cells. The significance of specific and stoichiometric staining is shown. Author (ESA)

N82-12743# Medical Biological Lab. RVO-TNO, The Hague (Netherlands).
CHEMICAL PROTECTION OF CELLS IN CULTURE AND MICE AGAINST X-IRRADIATION Progress Report
O. Vos and L. Budke Jan. 1979 16 p
(MBL-1979-2; TDCK-71758) Avail: NTIS HC A02/MF A01

The effects of X-rays on the survivability of mice and cells in culture is discussed. Clone formation of heteroploid kidney cells in vitro was used as the survival parameter for the cells. Two germanied thiazolidines give good results, even though the effectiveness level of cysteamine is not reached. Author (ESA)

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-12744* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY. A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 224
Oct. 1981 51 p
(NASA-SP-7011(224)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 127 reports, articles, and other documents introduced into the NASA scientific and technical information system in September 1981. Author

N82-12745 Pennsylvania State Univ., University Park.
SWEATING RESPONSES OF MEN AND WOMEN DURING EXERCISE IN HUMID AND DRY HEAT Ph.D. Thesis
Andrea Jean Frye 1981 80 p
Avail: Univ. Microfilms Order No. 8120427

Four men and four women were matched on aerobic capacity and surface area to weight ratio. Each subject was acclimated to and tested in two equivalent environments (dry bulb temperature and wet bulb temperature). Maximum density of sweat gland activation (SGA sub max) was determined with the use of methacholine. Suppression of sweating due to skin hydration (hidromeiosis) was evidenced in both sexes by significantly lower total body sweat rate (m sub sw) and chest sweat rate (m sub sw) in the humid heat as compared to the dry heat. The women maintained significantly lower M sub sw and chest m sub sw than the men in the humid heat, but there were no differences in sweating rates between sexes in the dry heat. In the women, the SGA relative to SGA sub max) (% SGA sub max) was significantly higher in the dry heat than in the humid heat. SGF was similar in both environments. In the men, SGF was significantly higher in the dry heat than in the humid heat, while %SGA sub max was similar in both environments. The women were more sensitive to hidromeiosis than the men, and the nature of the response to hidromeiosis differed between the sexes. Dissert. Abstr.

N82-12746 Texas Univ. at San Antonio.
MEDICAL DIAGNOSTIC APPLICATION OF RADIOFREQUENCY RANGE ELECTROMAGNETIC WAVES Ph.D. Thesis
Michael Raymond Millner 1981 139 p
Avail: Univ. Microfilms Order No. 8120287

A method has been developed, using a scattering or S parameter network analyzer and a loop antenna, for measuring the phase change of the forward reflection S parameter, S11, in relation to volume changes. A phantom was designed utilizing a balloon immersed in saline with displacement volume measured in a standpipe. Volume changes were related to both changes in phase and amplitude of the S11. A model was developed, based on basic electromagnetic theory, of a wave propagating through a layer of water of varying thickness bounded by air. The complex reflection coefficient was calculated, plotted, and compared to the S11 for the phantom. Several different antenna designs were tested, including varying size and types. This method was applied to the study of breathing and cardiac volume changes in man. Both the amplitude and phase of the S11 parameter were correlated with a simultaneously recorded electrocardiogram. In order to correlate these measurements with cardiac volume changes, a dog was anesthetized, and by means of the thermal dilution technique, cardiac output was determined. Dissert. Abstr.

N82-12747 California Univ., Los Angeles.
MEASUREMENT OF THE BONE MINERAL DENSITY OF TRABECULAR BONE BY A COHERENT AND COMPTON SCATTERING TECHNIQUE Ph.D. Thesis
Shih-Shen Ling 1981 170 p
Avail: Univ. Microfilms Order No. 8120996

A simplified photon scattering method to measure the bone mineral density of the trabecular bone was studied. The method used the simultaneous detection of the coherent and Compton scattered photons from the bone sample in a narrow beam geometry. The bone mineral density is determined within the scattering volume which is defined by the configuration of the source and detector collimators and scattering angle. The size of the scattering volume is determined by the aperture diameter and the length of both the source and detector collimators for a geometric configuration, and scattering angle. The corrections to the coherent to Compton scattering ratio due to the presence of overlying tissue and the effect of fat content of the sample to this technique was also studied. A four source focused collimator was constructed to increase the incident photon intensity. Dissert. Abstr.

N82-12748 California Univ., Los Angeles.
THE MAGNETOSTATIC FORCE PRODUCED BY CURRENT LOOPS AND IS MEDICAL APPLICATIONS Ph.D. Thesis
Osman Kaldirim 1981 132 p
Avail: Univ. Microfilms Order No. 8120984

The magnetostatic force on permeable bodies both theoretically and experimentally was studied. Recent technological advances are tremendously advantageous to the delivery of protein carrying biologically active substances. The use of magnetic fields serves as the driving force in a guidance system to transport these substances to specific sites within the living system. Spheres of protein approximately one micron in diameter are impregnated with magnetite (Fe3O4) along with other desired substances, this combination of elements is then injected into the bloodstream. Once in the bloodstream they flow freely until the desirable site is reached. The magnetic fields and manetostatic forces which are necessary in the control of microspheres were analyzed. A theoretical analysis of the magnetostatic force due to current loops was made consisting of a systematic design and an experimental study involving the effects of magnetostatic forces on microspheres injected into animals. Dissert. Abstr.

N82-12749 Colorado Univ. at Boulder.

TRANSCUTANEOUS ELECTRICAL PERIPHERAL NERVE STIMULATION: IMPLICATIONS FOR NEURAL CONTROL MECHANISMS Ph.D. Thesis

Darrell Neal Jones 1981 158 p
Avail: Univ. Microfilms Order No. 8122295

Transcutaneous electric nerve stimulation (TENS) is used clinically to control chronic pain. Large nerve fiber activity which is induced by TENS is hypothesized to inhibit pain signals at spinal levels via the gate control mechanism. While TENS is highly effective in the control of chronic pain, few additional neural function effects are reported clinically. The paucity of such observations is enigmatic since the large fiber involvement characteristic of TENS impacts numerous peripheral neural functions. A battery of performance tests was given to volunteers under control conditions and acute clinical levels of TENS. The tests included reaction time tests, force estimation tasks, touch discrimination tests and temperature discrimination tests. The results show no significant TENS effects on sensory discrimination. However, TENS significantly affects motor function, as defined by slowed reaction times and reduced range of response in force estimation. Dissert. Abstr.

N82-12750 California Univ., San Diego.

THREE-DIMENSIONAL STRESS DISTRIBUTION IN ARTERIES: RADIAL COMPRESSION EXPERIMENTS OF ARTERIAL WALL; STRESS CONCENTRATION IN LUNG NEAR A CYLINDRICAL CAVITY; FINITE ELEMENT ANALYSIS OF PLEURAL SURFACE PRESSURE DISTRIBUTION IN DOG'S LUNG DURING ELECTROPHRENIC STIMULATION Ph.D. Thesis

Cheng-Jen Chuong 1981 167 p
Avail: Univ. Microfilms Order No. 8120521

A three dimensional stress strain relationship derived from a strain energy function of the exponential form was proposed for arterial wall. The effect of the nonuniform stress field in the radial direction on the water movement in arterial wall is pointed out. The elastic behavior of rabbit thoracic arteries in radial direction was studied by uniaxial compression order of magnitude of the elasticity in radial direction is the same as that in the circumferential and longitudinal directions. In the vicinity of cylindrical cavity the lung parenchyma can be subjected to very high stress concentration in the circumferential direction. Stress distributions at various infinity stretches as well as longitudinal stretches are given. During the electrophrenic stimulation the diaphragm contracts lowers and the apex t base length of the lung increase up to 25%. It is observed that reversal pleural pressure (p sub pl) gradient in which the basal p sub pl becomes more negative than the optical. This phenomena is studied by finite element method. Dissert. Abstr.

N82-12751*# BioTechnology, Inc., Falls Church, Va.

BIOMEDICAL RESEARCH

Washington NASA Nov. 1981 20 p
(Contract NASw-3469)
(NASA-CR-3487) Avail: NTIS HC A02/MF A01 CSCL 06B

Biomedical problems encountered by man in space which have been identified as a result of previous experience in simulated or actual spaceflight include cardiovascular deconditioning, motion sickness, bone loss, muscle atrophy, red cell alterations, fluid and electrolyte loss, radiation effects, radiation protection, behavior, and performance. The investigations and the findings in each of these areas were reviewed. A description of how biomedical research is organized within NASA, how it is funded, and how it is being reoriented to meet the needs of future manned space missions is also provided. T.M.

N82-12752*# General Electric Co., Houston, Tex. Apollo Systems Dept.

QUANTITATION OF TISSUE LOSS DURING PROLONGED SPACE FLIGHT

J. I. Leonard 24 Sep. 1979 44 p refs
(Contract NAS9-15487)
(NASA-CR-167460; TIR-74-LSP-9017) Avail: NTIS HC A03/MF A01 CSCL 06P

Data from Skylab missions related to tissue loss in space were analyzed. Significant changes in gross body composition occur during spaceflight, these include: alterations in water balance resulting from headward shifts of fluid, loss of musculoskeletal tissue, and alterations in fat depending upon the balance between caloric intake and energy expenditure. An effort was made to control the more essential components of body weight on the Skylab missions. E.A.K.

N82-12753*# General Electric Co., Houston, Tex.

SKYLAB WATER BALANCE ANALYSIS

J. I. Leonard 13 Apr. 1977 59 p refs
(Contract NAS9-14523)
(NASA-CR-167461) Avail: NTIS HC A04/MF A01 CSCL 06P

The water balance of the Skylab crew was analyzed. Evaporative water loss using a whole body input/output balance equation, water, body tissue, and energy balance was analyzed. The approach utilizes the results of several major Skylab medical experiments. Subsystems were designed for the use of the software necessary for the analysis. A partitional water balance that graphically depicts the changes due to water intake is presented. The energy balance analysis determines the net available energy to the individual crewman during any period. The balances produce a visual description of the total change of a particular body component during the course of the mission. The information is salvaged from metabolic balance data if certain techniques are used to reduce errors inherent in the balance method. E.A.K.

N82-12754# Technische Hogeschool, Delft (Netherlands).

IDENTIFICATION OF THE ADAPTIVE FEEDBACK OF THE HUMAN MOTOR SYSTEM USING THE RESPONSE DIFFERENCE METHOD Ph.D. Thesis

Anthonie Pieter Eland Jun. 1981 132 p refs Sponsored in part by the Netherlands Organization for the Advancement of Pure Research
Avail: NTIS HC A07/MF A01

Proprioceptive and the visual feedback of the human motor system in generating slow, goal directed movement was investigated. Two internal models are considered in the feedforward path. The sensory program specifies the expected position trajectory and its maximum velocity which explains the amplitude and the duration of the movement. The motor program is determined by the sensory program and the load's internal model and specific the amplitude and the duration of the force pattern. Learned goal directed movements are almost completely programmed. E.A.K.

N82-12755# Desmatics, Inc., State College, Pa.

A MONTE CARLO STUDY OF THE USE OF AUXILIARY INFORMATION IN THE DEVELOPENT OF AN IMPACT ACCELERATION INJURY PREDICTION MODEL

Dennis E. Smith and John J. Peterson Sep. 1981 14 p refs
(Contract N00014-79-C-0128; NR Proj. 207-037)
(AD-A105463; TR-112-9) Avail: NTIS HC A02/MF A01 CSCL 06/19

This report describes a small-scale Monte Carlo investigation of procedures for incorporating various sources of auxiliary information into an impact acceleration injury prediction model. Parameter estimates are tabulated and compared for standard and modified models. Based on the results of the investigation, the procedures appear to be helpful in reducing the mean square error of predictions. Author (GRA)

N82-12756# Arizona Univ., Tucson. Dept. of Pharmacology.

OXYGEN TOXICITY AND LUNG COLLAGENOUS PROTEIN Final Technical Report, 1 Sep. 1977 - 28 Feb. 1981

Klaus Brendel and I. Glenn Sipes 28 Feb. 1981 131 p refs
(Contract N00014-77-C-0506)

(AD-A104702) Avail: NTIS HC A07/MF A01 CSCL 06/20

The chemical composition and subunit structure of the basement membrane and collagenous components of the normal lung and of lungs exposed to agents promoting the formation of singlet oxygen and thereby produce oxidative damage to tissue components was investigated. The alveolar basement membrane, the structure and composition of this component of the extracellular matrix of the lung is determined that a complex population of proteins make up the extracellular matrix. Several new collagen types are described as well as high molecular weight non collagens that appear to be associated with normal basement membranes. It is concluded that the characterization of putative changes in the nature of matrix components in pathologic states lags behind a more thorough characterization of normal basement membrance and extracellular components.
E.A.K.

N82-12757# Brookhaven National Lab., Upton, N. Y.
REPAIR OF CHEMICAL DAMAGE IN MAMMALIAN CELLS
R. B. Setlow 1981 10 p refs Presented at the NATO CNEN Conf., Rome, 24 Aug. - 5 Sep. 1981 Submitted for publication
(Contract DE-AC02-76CH-00016)
(DE81-030823; BNL-30055; B10-3767; CONF-810873-1)
Avail: NTIS HC A02/MF A01

The repair of chemical damage to DNA is discussed. Most chemicals of environmental concern do not react directly with cellular macromolecules but must first be activated to nucleophiles. The different reactivities between agents reacting directly and those that react indirectly may produce products whose yields as a function of dose are completely different even though the products themselves may be the same. Nucleotide excision measurements of DNA repair are used extensively to detect agents that react with DNA which measurements help identify dangerous DNA adduct. The chemical damages that mimic UV are repaired by nucleotide excision, and the chemicals give rise to bulky adducts. The excision repair of bulky DNA adducts mimics the repair of UV damage in many ways, however the identity of the repair pathways is still controversial.
DOE

N82-12758# Atomic Energy of Canada Ltd., Chalk River (Ontario). Health Sciences Div.
BIOLOGICAL EFFECTS OF LOW DOSES OF IONIZING RADIATION: THREE REVIEW PAPERS
J. D. Childs and J. R. Johnson Sep. 1980 81 p refs
(AECL-7059) Avail: NTIS (US Sales Only)HC A05/MF A01; DOE Depository Libraries

The topics relate to the genetic effects of ionizing radiation. The dose-response relationship for the genetic and carcinogenic effects of low level radiation is discussed. A perspective on radiation exposures resulting from the use of nuclear energy is presented.
T.M.

N82-12759# Atomic Energy of Canada Ltd., Pinawa (Manitoba).
RADIATION EFFECTS ON LIVING SYSTEMS. A BIBLIOGRAPHY OF AECL PUBLICATIONS
Norma J. Hawley Oct. 1980 38 p In ENGLISH; FRENCH summary
(AECL-6797) Avail: NTIS HC A03/MF A01

The bibliography is divided into three topic areas: radiobiology, radiation chemistry, and radiation biochemistry. The living systems are arranged as follows: animals, cellular, human, insects, and subcellular.
T.M.

N82-12760# North Carolina Univ., Chapel Hill. Dept. of Biochemistry.
STUDIES IN ERYTHROPOIESIS: THE INFLUENCE OF THE GLYCOCALYX OF THE RED CELL MEMBRANE Ph.D. Thesis
M. W. Franco 1980 148 p refs
(Contracts DE-AS05-76EV-04157; EY-76-S-05-4157)
(DE81-030668; DOE/EV-04157/T3) Avail: NTIS HC A07/MF A01

The correlation between the removal from the circulation of aged cells and the production of new RBCs was investigated. An erthropoietic influence was associated with the glycocalyx of the erythrocyte membrane. The influencing factor, asialoglycophorin, was masked on the young RBC by an amino ketosugar, sialic acid. During the aging process, an increasing amount of sialic acid is removed from the membrane to expose the underlying erythropoietic message. The amount of erythropoietic activity was directly related to the number of desialated erythrocytes transfused and to the degree of desialation of the transfused erythrocytes. It is shown that asialoglycophorin is an erythrocyte stimulating factor following its isolation from the membrane and subsequent injection into test mice and both mouse and human asialoglycophorin and stimulatory.
DOE

N82-12761# Australian Radiation Lab., Melbourne.
MEASUREMENT OF GONADAL AND BONE-MARROW DOSES FROM DENTAL RADIOGRAPHY
S. B. Solomon and N. D. Morris Jun. 1980 30 p
(ARL/TR-022; ISSN-0157-1400) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

The method of calculation of the radiation doses to the gonads and to the active bone marrow arising from dental radiography is described. The bone-marrow doses have been calculated using a computer model of X-ray depth doses within the skull for typical dental radiographic examinations as performed in Australia. The ovarian and testicular doses, as a percentage of skin dose have been determined experimentally. The dependence of the gonadal doses on X-ray tube voltage, face to cone distance and direction of the X-ray beam relative to the face is detailed.
DOE

N82-12762# Australian Radiation Lab., Melbourne.
GONADAL DOSES FROM RADIOTHERAPY
S. B. Solomon and N. D. Morris Jun. 1980 25 p
(ARL/TR-020; ISSN-0157-1400) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

The measurement of scatter factors to the gonads from superficial and deep therapy is detailed and the analytic fits to the experimental data, as a function of field position, field size and beam energy are given. The data used to calculate the gonadal doses from treatments using linear accelerators, teletherapy and sealed sources are described and the analytic fits to the data given.
DOE

N82-12763# Australian Radiation Lab., Melbourne.
GENETIC AND MEAN BONE-MARROW DOSES FROM MEDICAL USE OF UNSEALED RADIOISOTOPES
D. W. Keam Jun. 1980 21 p refs
(ARL/TR-023; ISSN-0157-1400) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

Annual doses to the Australian population were derived for the year 1970 using results of a survey carried out at that time and published data on doses to individuals resulting from such use. Values of 3.9 and 38 microgray for the annual (per capita) genetic and mean bone marrow doses respectively are reported, which are similar to those reported for other countries at about that time.
DOE

N82-12764# Australian Radiation Lab., Melbourne.
CONTRIBUTIONS TO THE GENETIC AND MEAN BONE-MARROW DOSES OF THE AUSTRALIAN POPULATION FROM RADIOLOGICAL PROCEDURES
T. N. Swindon and N. D. Morris Jun. 1980 111 p
(ARL/TR-017) Avail: NTIS (US Sales Only) HC A06/MF A01; DOE Depository Libraries

The results of a national survey of radiological procedures used for diagnosis and therapy in medicine, dentistry, and chiropracty are reviewed. Statistical data for the distribution and frequency of various procedures in Australian hospitals and practices are summarized, together with their associated radiation doses. Annual genetically significant and mean bone-marrow doses to the Australian population arising from these procedures are derived for the survey year of 1970. Values of 176 microgray and 651 microgray for the annual (per capita) genetic and mean bone-marrow doses respectively are reported. These compare closely with corresponding estimates in other countries with similar medical practices to those in Australia.
DOE

N82-12765# Oak Ridge National Lab., Tenn.
OVERVIEW OF THE BIOMEDICAL AND ENVIRONMENTAL PROGRAMS AT THE OAK RIDGE NATIONAL LABORATORY

H. A. Pfuderer, comp. and J. B. Moody, comp. Jul. 1981 62 p
(Contract W-7405-eng-26)
(DE81-027864; ORNL-5806) Avail: NTIS HC A04/MF A01

Biomedical and environmental research, to provide information on environmental, health, and safety considerations, which can be utilized in the formulation and implementation of energy technology decisions is discussed. Information for the understanding of short term and long term consequences of processes in new energy technologies were researched. The mechanisms responsible for biological and ecological damage caused by substances associated with energy production and repair mechanisms are investigated. DOE

N82-12766# Texas A&M Univ., College Station. Dept. of Chemistry, Medical Microbiology and Immunology.
IDENTIFICATION AND TOXICITY OF FRACTIONATED-SHALE-OIL COMPONENTS
K. Wittnebel, D. C. Shelly, C.-N. Ho, I. M. Warner, and J. M. Quarles 1981 17 p refs
(Contract DE-AS05-80EV-10404)
(DE81-028460; DOE/EV-10404/T1) Avail: NTIS HC A02/MF A01

A procedure for the separation and identification of polynuclear aromatic hydrocarbons (PNAs) is presented. This procedure comprises two steps. First, the shale oil is separated into fractions according to ring size on a Chromosorb LC-9 normal phase column. Then each of these fractions are separated into individual components and identified using an analytical reversed-phase Ultrasphere ODS 5 micrometer column. In addition, toxicity studies are carried out on each fraction obtained from the amine column to indicate which class of PNAs warrants special attention and analysis. The results of this approach are reported. T.M.

N82-12767# Netherlands Organization for Applied Scientific Research TNO, Delft. Raad voor Gezondheiddresearch TNO.
INVENTORY OF MEDICAL TECHNOLOGICAL RESEARCH IN THE NETHERLANDS Annual Report, 1979-1980 [INVENTARISATIE VAN HET MEDISCH-TECHNOLOGISCHE ONDERZOEK IN NEDERLAND 1979-1980]
J. G. A. Luijten May 1980 73 p In DUTCH
Avail: NTIS HC A04/MF A01

An inventory of medical-technological research in the Netherlands during the years 1979 and 1980 is presented. The research projects are listed with title, contact person, year of beginning and termination and number of man years. Author (ESA)

N82-12768# National Physical Lab., Teddington (England). Acoustics Unit.
THRESHOLDS OF HEARING BY AIR CONDUCTION AND BY BONE CONDUCTION UNDER DIFFERENT MASKING CONDITIONS
M. S. Shipton and D. W. Robinson Jun. 1981 46 p refs
(NPL-Ac-100; ISSN-0143-7143) Avail: NTIS HC A03/MF A01

Air and bone conduction threshold determinations for 152 subjects in the age range 16 to 30 years are presented. Bone conduction tests were carried out using a vibrator applied to the left and right mastoid under three conditions at the contralateral ear: unoccluded, masked at 25 dB, and at 40 dB sensation level. By a systematic process of otological classification of the subjects, the bone conduction threshold for normal hearing was estimated with an uncertainty of less than 1 dB and was interpolated for masking noise levels from zero to 40 dB sensation level. Individual air-bone gaps are shown to be widely spread for an otologically normal group, but distributions are normal and have a mean value close to zero. Author (ESA)

N82-12769# National Physical Lab., Teddington (England). Acoustics Unit.
AN INVESTIGATION OF THE STATUS OF BONE CONDUCTION AUDIOMETER CALIBRATION IN THE NATIONAL HEALTH SERVICE
G. R. Torr and L. S. Whittle Jun. 1981 45 p refs
(NPL-Ac-101; ISSN-0143-7143) Avail: NTIS HC A03/MF A01

The accuracy and uniformity achieved in the calibration of bone conduction audiometers used in hospitals were studied. The acceleration output of precalibrated bone vibrator supplied as part of an audit kit was measured. the precalibration of the bone vibrator is on the order of 2 dB at all test frequencies, although the differences between the individual results and precalibration attained 5 dB at extreme frequencies in a few cases. However, differences are substantially reduced by reinterpreting the hospital measurements using determinations of the sensitivities of the artificial mastoids and by correcting the measurements to a common temperature. Author (ESA)

N82-12770# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
THE HEART RATE OF ASPIRANT AIR PILOTS IN A HYPOBARIC CHAMBER
A. W. K. Gaillard and C. L. Truijens 1979 21 p refs
(Contract A72/K/070)
(IZF-1979-35; TDCK-73413) Avail: NTIS HC A02/MF A01

Changes in heart rate, caused by stress induced when atmospheric pressure in a hypobaric chamber is suddenly decreased, are studied. The use of heart rate variables as a pilot selection criterion is also considered. Results show that the heart rate measures only differ between a group of experienced subjects and the other groups. No correlations are found between the heart rate measures and personality test scores, which were obtained from questionnaires given directly after stress exposure. Author (ESA)

N82-12771# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
DAMAGE RISK CRITERIA FOR IMPULSE NOISE
G. F. Smoorenburg 1980 35 p refs Presented at Intern. Symp. on New Perspectives on Noise Induced Hearing Loss, Cazenovia, New York, 15-18 Jun. 1980
(Contract A76/K/103)
(IZF-1980-26; TDCK-75018) Avail: NTIS HC A03/MF A01

Data on temporary threshold shifts (TTS) due to impulse noise exposure are evaluated. Peak levels of the impulses are determined at which only 10% of the people exposed show TTS, two minutes after exposure, of 15 dB or more averaged over the threshold shifts at 1, 2, and 3 kHz (TTS 1, 2, 3 > 15 dB). These peak levels are a function of the number of impulses per exposure times the duration of a single impulse. The result is compared with TTS data on steady noise as a function of exposure duration, and with data on permanent threshold shifts (PTS) induced by impulse and intermittent noise. This suggests that < 10% of the people exposed to impulse noise each working day will develop noise induced PTS 1, 2, 3 of 15 dB or more if the equivalent level of the noise is 85 dB. The hearing loss fence of 15 dB PTS 1, 2, 3 is discussed for loss of speech discrimination in a noisy background and it is shown that a higher fence cannot be allowed. The attenuation from ear plugs is less than laboratory values. Author (ESA)

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-12772*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PILOT ESTIMATES OF GLIDEPATH AND AIM POINT DURING SIMULATED LANDING APPROACHES
C. W. Acree, Jr. Nov. 1981 21 p refs
(NASA-TM-81325; A-8717) Avail: NTIS HC A02/MF A01 CSCL 05I

Pilot perceptions of glidepath angle and aim point were measured during simulated landings. A fixed-base cockpit simulator was used with video recordings of simulated landing approaches shown on a video projector. Pilots estimated the magnitudes of approach errors during observation without attempting to make corrections. Pilots estimated glidepath angular errors well, but had difficulty estimating aim-point errors. The data make plausible the hypothesis that pilots are little concerned with aim point during most of an approach, concentrating instead on keeping close to the nominal glidepath and trusting this technique to guide them to the proper touchdown point. Author

N82-12773# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

HOW TO DISPLAY DIGITAL SONAR SIGNALS. SOME PRIMARY THRESHOLD MEASUREMENTS

A. vanMeeteren and A. F. Sanders 1979 20 p refs
(Contract A73/KM/032)
(IZF-1979-16; TDCK-73399) Avail: NTIS HC A02/MF A01

The optimal task division between operator and computer when trying to identify echos in sonar observation of a noisy field is discussed. Confidence ratings defined four criteria, ranging from sure no target to sure target, and results were scored as d values as a measure of detectability at the different criteria. The d values are higher towards the sure target end of the range. There are significant differences between subjects, but none for interactions between subjects and display variables. It is found that at high display thresholds the intensity mode works best, whereas at display the length mode is superior regarding target detection. Author (ESA)

N82-12774# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

CONSPICUITY OF OBSERVATION POSTS AT THE AIR WEAPON FIRING RANGES ON THE VLIEHORS AND THE NOORDVAARDER

J. Boogaard, J. Varkevisser, and J. J. Vos 1979 20 p ref
Transl. into ENGLISH of 'Opvallendheid van observatieposten op de schietranges of de Vliehors en de Noordvarrder' Soesterberg, Netherlands
(Contract A78/KLu/058)
(IZF-1979-33-E; TDCK-73411) Avail: NTIS HC A02/MF A01

Visibility from the air of observation posts is examined in order to decrease the likelihood of their being mistaken for targets. Subjective assessments by tower personnel and pilots indicate that a yellow/black check pattern has no advantages for recognition. A scale model was used to test other color/pattern combinations and the effect of a marker beacon on the tower. Results show that: (a) visibility is improved by lights of 5 million cd, while higher values cause uncomfortable glare; (b) towers should be painted black; and (c) approach route must be clearly marked. However, tower staff fear that these measures will increase danger by making them too obvious a 'target', especially in poor visibility. Author (ESA)

N82-12775# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

CYBERNETICS AND CAR DRIVING: A MATHEMATICAL (COMPUTER) MODEL FOR THE SYSTEM TO BE CONTROLLED

G. J. Blaauw 1980 27 p refs
(IZF-1980-4; TDCK-75004) Avail: NTIS HC A03/MF A01

A mathematical representation of the system controlled by a car driver is presented. This system is defined by combinations of lateral and longitudinal vehicle dynamics, course following, and the execution of an arbitrary additional task. A linearized model is developed and implemented in subroutines on a digital computer. The model based on control theory uses state vector notation. The description results in a six-dimensional state vector and involves three lead variables (course of the road, velocity of the lead car and the stimulus of the additional task) and one disturbance variable (side-wind gusts or road irregularities). The routines calculate future values for the course of the road and the velocity of the lead car in order to make anticipation possible by the driver. Driver's actions are modeled by the position of the accelerator, the brake force and the steering wheel angle. Several routines are extended with additional procedures to allow for an independent use in other applications. For example, the mathematical representation of the vehicle dynamics is extended with nonlinear equations to cover the complete range of variables and can be used in specific studies of the effects of vehicle parameters. Author (ESA)

N82-12776# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

CYBERNETICS AND CAR DRIVING: A DRIVER MODEL AND ITS EXPERIMENTAL VALIDATION

G. J. Blaauw 1980 15 p refs
(IZF-1980-13; TDCK-75012) Avail: NTIS HC A02/MF A01

A linearized mathematical model which describes and predicts driver behavior is introduced. The internal representation consists of an estimation of the state vector describing the system to be controlled. The supervisory structure of the driver is studied by considering lateral and longitudinal control, combined with variations in bandwidth and energy of the lead variables. Car following and course following are included so that driver anticipation can be modeled by the observation of future values of the course of the road and the lead car velocity. A lead variable for the stimulus of an additional task can be included. Model validity is demonstrated by analyzing the effects of variables (driving experience, system disturbances, etc.) on the model parameters. Author (ESA)

N82-12777# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

LEVELS OF STEERING CONTROL: REPRODUCTION OF STEERING WHEEL MOVEMENTS

J. Godthelp 1980 36 p refs
(IZF-1980-16; TDCK-75014) Avail: NTIS HC A03/MF A01

A schematic description of the driving control process using levels of control, i.e., precognitive, pursuit, and compensatory, is presented. The efficiency of the higher levels of control depends on the accuracy of internal information (knowledge of the road, the car, etc.) plus proprioceptive feedback. The sensitivity of the proprioceptive system was analyzed by measuring subjects' accuracy when asked to reproduce steering wheel positions without visual feedback. For discrete positions, standard deviation increases with steering wheel angle amplitude. However, relative errors are greatest with small angles. Steering force reduces the variation in reproduction. For continuous movements, reproductions are less accurate with low movement velocity than for the discrete positions. An additional velocity overshoot occurs. Rapid movements show higher positioning accuracy than slow.
Author (ESA)

N82-12778# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

CYBERNETICS AND CAR DRIVING: PERSPECTIVE PERCEPTION AND THE OUTPUT VECTOR OF THE SYSTEM TO BE CONTROLLED

G. J. Blaauw 1980 22 p refs
(IZF-1980-19; TDCK-75008) Avail: NTIS HC A02/MF A01

A sensitivity analysis for the perspective perception of lateral position variations during course following and distance variations during car following is covered. Variations in the curvature of the road followed are also considered via a perspective transformation. The sensitivities are derived for the development of a cybernetical model to describe and predict driver behavior quantitatively. The curvature variations are related to the most substantial element of the lead vector. The sensitivity for lateral position variations distinguishes between guidance features (lane markers, postmounted delineators, public lighting, etc.). The sensitivities for distance variations are related to the angular perception of the lead car dimensions and the road interval between lead car and own vehicle. The derived transformation equations are combined into one display equation which represents the transformation of the variables involved in the system to be controlled and models the output vector of that system as input information for the driver. Author (ESA)

N82-12779# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

THE EFFICIENCY OF DETECTING TRIBAR PATTERNS MODULATED IN RANDOM DOT DENSITY

R. T. Flaherty (Night Vision and Electro-Optics Labs.) and A. VanMeeteren 1980 15 p refs
(IZF-1980-25; TDCK-75020) Avail: NTIS HC A02/MF A01

The ability of the visual system to resolve detail, and to integrate information over area in threshold measurements with tribar targets is examined. Frequency-of-seeing curves were measured for the detection of tribar patterns modulated in the density of computer generated random dot distributions. Comparison of actual and ideal results shows that the visual system uses only 22% of the available information in detecting tribar targets. For long presentation times of 1 sec no difference

in efficiency is found for targets of 1 deg X 1 deg and 10 deg X 10 deg. However, for short presentation times of 0.2 sec, the efficiency is about 40% lower for the 10 deg targets. This suggests that the field of view for pattern integration in one glimpse is smaller than 10 deg X 10 deg. Contrast sensitivity functions measured with tribar targets comprise a component for spatial integration inversely proportional to spatial frequency.
Author (ESA)

N82-12780# Departament d'Etudes et de Recherches en Technologie Spatiale, Toulouse (France). Inst. fuer Flugmechanik.
REVIEW OF HUMAN AND OPERATIONAL FACTORS AFFECTING THE FEASIBILITY OF THE SEE-AND-AVOID CONCEPT
Otto Weber May 1981 52 p refs
(DFVLR-Mitt-81-13) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 12.30

Theoretical analysis and flight test assessments of the see-and-avoid concept of accident prevention are discussed. The international definition of visibility is supplemented by maximum detection range (MDR) and horizontal standard visibility (HSV). The MDR is always significantly lower than the HSV. Representations from design eye reference points show that cockpit visibility is often poor, especially for light, and small jet, aircraft when flying a horizontal turn. The introduction of speed dependent visual flight regulations is recommended. Author (ESA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-12781 Pennsylvania State Univ., University Park.
CLOSE-RANGE CINE-PHOTOGRAMMETRY: A GENERALIZED TECHNIQUE FOR QUANTIFYING GROSS HUMAN MOTION Ph.D. Thesis
James Stephen Walton 1981 648 p
Avail: Univ. Microfilms Order No. 8120471

New cinematographic techniques for performing two and three dimensional analyses are described. Transformations between object coordinates and image coordinates were developed. The techniques are similar to those employed in analytical photogrammetry. Applications of the generalized three dimensional technique require information from a minimum of two distinct views. Applications of the generalized planar technique can e made using information from a single camera. A refined version of the generalized three dimensional technique is also described. This corrects for lens distortions and linear film deformations. It is shown that, using object distances of approximately 35 feet, the center of a golf ball can be located to within .1 inch of its true, three dimensional location. The acceleration of the center of mass of a spinning, yet freely falling frampolinist is determined and compared with the acceleration due to gravity.
Dissert. Abstr.

N82-12782*# Ohio State Univ., Columbus.
AN INVESTIGATION INTO PILOT AND SYSTEM RESPONSE TO CRITICAL IN-FLIGHT EVENTS. VOLUME 1: EXECUTIVE SUMMARY Final Report
Thomas H. Rockwell and Walter C. Griffin [1981] 199 p refs
(Contracts NAS2-10047; NAG2-75)
(NASA-CR-164993) Avail: NTIS HC A09/MF A01 CSCL 05H

Critical in-flight events (CIFE) that threaten the aircraft were studied. The scope of the CIFE was described and defined with emphasis on characterizing event development, detection and assessment; pilot information requirements, sources, acquisition, and interpretation, pilot response options, decision processed, and decision implemetation and event outcome. Detailed scenarios were developed for use in simulators and paper and pencil testing for developing relationships between pilot performance and background information as well as for an analysis of pilot reaction decision and feedback processes. Statistical relationships among pilot characteristics and observed responses to CIFE's were developed. R.J.F.

N82-12783*# Ohio State Univ., Columbus.
AN INVESTIGATION INTO PILOT AND SYSTEM RESPONSE TO CRITICAL IN-FLIGHT EVENTS. VOLUME 2: APPENDIX
Thomas H. Rockwell and Walter C. Griffin [1981] 150 p refs
(Contracts NAS2-10047; NAG2-75)
(NASA-CR-164994) Avail: NTIS HC A07/MF A01 CSCL 05H

Materials relating to the study of pilot and system response to critical in-flight events (CIFE) are given. An annotated bibliography and a trip summary outline are presented, as are knowledge surveys with accompanying answer keys. Performance profiles of pilots and performance data from the simulations of CIFE's are given. The paper and pencil testing materials are reproduced. Conditions for the use of the additive model are discussed. A master summary of data for the destination diversion scenario is given. An interview with an aircraft mechanic demonstrates the feasibility of system problem diagnosis from a verbal description of symptoms and shows the information seeking and problem solving logic used by an expert to narrow the list of probable causes of aircraft failure. R.J.F.

N82-12784# Naval Air Development Center, Warminster, Pa.
ANTI-EXPOSURE TECHNOLOGY IDENTIFICATION FOR MISSION SPECIFIC OPERATIONAL REQUIREMENTS Final Report
Suzanne M. Reeps, David C. Johanson, and Louis J. SantaMaria 8 Aug. 1981 113 p refs
(AD-A105070; NADC-81061-60) Avail: NTIS HC A06/MF A01 CSCL 06/17

A selected group of anti-exposure garment configurations have been evaluated at the Naval Air Development Center to determine their comparative levels of performance in the areas of mobility/reach, heat stress/comfort, and immersion hypothermia protection. The specific results of these evaluations are reported, as well as a discussion of how the results relate to the U.S. Navy Operational Requirements for cold water exposure protection, as currently specified by the CNO. GRA

N82-12785# ILC Industries, Inc., Dover, Del. Protective Equipment Div.
ZIPPER REAR CLOSURE ENDURANCE TESTING Final Report, 14 Apr. - 14 Jul. 1981
Charles R. Sandy 14 Jul. 1981 6 p refs
(Contract DAAK11-79-C-0066)
(AD-A104732) Avail: NTIS HC A02/MF A01 CSCL 06/17

A manned endurance test program of 22 two hr. tests was conducted to verify the reliability of the DPE Outergarment Zipper Rear Closure developed under task order nine of this contract. Testing indicates that the closure assembly reliably provides a positive seal in the rear of the Outergarment as it is actually worn and used. Author (GRA)

N82-12786# Systems Technology, Inc., Hawthorne, Calif.
USER'S GUIDE TO BIODYN-80: AN INTERACTIVE SOFTWARE PACKAGE FOR MODELING BIODYNAMIC FEEDTHROUGH TO A PILOT'S HANDS, HEAD AND EYES Final Report, Jan. 1979 - Oct. 1980
Susan A. Riedel, Raymond E. Magdaleno, and Henry R. Jex Jul. 1981 70 p refs
(Contract F33615-79-C-0519; AF Proj. 2312)
(AD-A104933; STI-TR-1146-1) Avail: NTIS HC A04/MF A01 CSCL 06/6

An interactive computer program (BIODYN-80) for solving the dynamic motion response of seated aircrew (pilots or equipment operators) working in a biodynamic environment (such as vibration or changing levels of acceleration in aircraft, surface vehicles, or motion simulators) is described. The multi-degree-of-freedom, lumped-parameter model includes elements for: pelvis, torso, neck, head, eyes, upper and lower arms, hand-grip and control stick (center-stick with arm rest). The nonlinear equations of motion of the body's main elements are linearized about a general set of body-limb-head postures, ranging from prone, to erect, to supine. Typical parameter ranges and sources are given, along with two 'typical' sets: a seated-pilot with center-stick, and a seated produce biomechanical transmissability files needed for use in the Air Force's PIVIB program for tracking performance estimation. Procedures and examples are given for both a Cyber 175 version and a PDP-10 version. GRA

N82-12787# Nederlands Inst. voor Praeventieve Gezondheidszorg TNO, Leiden.
HUMAN CONTROL AND REGULATION TASKS [MENSELIJKE STUUR-EN REGELTAKEN]
C. L. Ekkers, A. A. F. Brouwers, C. K. Pasmooij, and P. M. deVlaming Delft Netherlands Organization for Applied Scientific Research TNO Sep. 1980 246 p refs In DUTCH
Avail: NTIS HC A11/MF A01

The effects of technological development, defined as automation, on the nature and quality of human work in industrial process control systems and computer systems were investigated. Twenty four man machine systems with different degrees of automation and complexity were compared for characteristics of technical, organizational and individual tasks. It is noted that sharing of tasks between man and machine is more unfavorable at higher levels of automation. The operator's abilities are only occasionally utilized and the opportunity to do meaningful work is limited. Teamwork is more positive, but it limits the individual operator's autonomy, even more in highly automated systems. In administrative computer systems, the routine nature of the work and its rigid procedures are considered negative. A clear correlation is found between these problems, job satisfaction and sickness rate. Author (ESA)

N82-12788# Engins Matra, Velizy (France).
METHODICAL STUDY OF THE CONTRIBUTION OF THE HUMAN SYSTEM TO THE INSECURITY OF TECHNOLOGICAL SYSTEMS [ETUDE METHODIQUE DE LA CONTRIBUTION DU SYSTEM HUMAIN A L'INSECURITE DES SYSTEMES TECHNOLOGIQUES]
J. L. Deschamps 1981 18 p In FRENCH
Avail: NTIS HC A02/MF A01

The use of probability studies to increase system safety is advocated. The danger of overlooking human error when attributing blame for the failure of a piece of equipment is emphasized. The links between professional competence and physical and mental health are pointed out. It is recommended that serious accidents should be analyzed in terms of: the industry (petrochemical, construction, etc.); production unit (number of employees, foremen, etc.); job description; trades of persons involved; individual characteristics of persons involved (age, education, etc.); and the scenario (time, place, etc.).
Author (ESA)

N82-12789# Joint Publications Research Service, Arlington, Va.
CHINA REPORT: SCIENCE AND TECHNOLOGY, NO. 128
23 Sep. 1981 49 p Transl. into ENGLISH from various Chinese articles
(JPRS-79047) Avail: NTIS HC A03/MF A01

The state of the art in science and technology in the Chinese Peoples Republic is reported. Abstracts dealing with the following topics are presented: (1) applied sciences; (2) publications; (3) civil engineering; (4) electronics; (5) geography; (6) internal combustion engine engineering; (7) nuclear physics; (8) petroleum science; (9) solar energy; and (10) transportation modernization. For individual titles, see N82-12790 through N82-12790.

N82-12790# Joint Publications Research Service, Arlington, Va.
EQUIPMENT DESIGN MUST INCORPORATE EASE OF OPERATION
Xiong Jiayu *In its* China Rept.: Sci. and Technol., No. 128 (JPRS-79047) 23 Sep. 1981 p 1-6 Transl. into ENGLISH from Gongcheng Jixie (Tianjin), no. 6, 1981 p 30-33 (For primary document see N82-12789 03-54)
Avail: NTIS HC A03/MF A01

Essential factors in the design of construction machines and equipment are: (1) height of operating installation; (2) vision; (3) hearing; and (4) force required for operation. Topics discussed include adaptation to brightness and darkness, color discrimination, auditory threshold, exercise physiology, reaction time and dexterity. E.A.K.

N82-12129*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CREW ACTIVITIES IN SPACE
Guion S. Bluford, Jr. *In* NASA. Marshall Space Flight Center Spacecraft Dyn. as Related to Lab. Expt. in Space Nov. 1981 p 181-187 (For primary document see N82-12109 03-18)
Avail: NTIS HC A10/MF A01 CSCL 05H

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N82-12791 California Univ., San Diego.
OPTIMAL SYNCHRONIZATION FOR A DISTRIBUTED DATABASE Ph.D. Thesis
Robert Joel Hofkin 1981 133 p
Avail: Univ. Microfilms Order No. 8120528

A protocol for the synchronization of transactions in a distributed database management system is described. This protocol, called GUS, uses a completely distributed control mechanism, and quarantees the equivalent of a first-come, first-served order of transaction processing. Two measures of communication costs: the number of messages sent, and the time delay in transmission, are used to evaluate the performance of synchronization protocols. The GUS is compared to several other protocols used in distributed database sytems, and also to the theoretical lower bounds for the two costs. In the best case, GUS achieves both lower bounds. The GUS is always faster, and requires fewer messages than the other distributed synchronization protocols. The basic GUS protocol uses no acknowledgement messages, but instead relies upon characteristics of the communication medium to achieve improved performance. The problem of communication and site failure is reviewed. Interprocess communication is abstracted by a local capability model; this model facilitates the design of distributed systems using standard finite-state analysis. Dissert. Abstr.

N82-12792 Rutgers - The State Univ., New Brunswick, N. J.
NUMERICAL EXPERIMENTS FOR SOLVING SYMMETRIC HYPERBOLIC SYSTEMS WITH DISCONTINOUS INITIAL DATA Ph.D. Thesis
Yi-Ling Fan Chiang 1981 264 p
Avail: Univ. Microfilms Order No. 8122058

Numerical experiments were performed to observe the rate of weak convergence in applying difference schemes to linear, symmetric, hyperbolic problems with discontinuous initial data.

At a fixed time, the discrete solution as a function of the space variable may be viewed as decomposed into adjacent smooth regions and neighborhoods of discontinuity. In the smooth regions, the rate of convergence is the order of the scheme and is independent of the preprocessing technique. In the neighborhoods of discontinuity, for problems with constant coefficients, the rate of convergence is the minimum order to the employed scheme and the preprocessing technique. For problems with variable coefficients, the expected rate of convergence was never observed. Within reasonable limits on the mesh size, the asymptotic behavior of the solution is not achieved. Furthermore, the characteristic speed plays an important role in both the rate of convergence and the accuracy of the approximation. The measure of the L sub 2-underestimate is also studied. Dissert. Abstr.

N82-12793# RAND Corp., Santa Monica, Calif.

DEFERRING UPDATES IN A RELATIONAL DATA BASE SYSTEM

Stephanie Cammarata Jun. 1981 26 p refs Presented at the 7th Intern. Conf. on Very Large Data Bases, France, Sep. 1981; sponsored by the Inst. National de Recherche en Informatique et en Automtique
(P-6634) Avail: NTIS HC A03/MF A01

Deferred updating in a relational data base is a technique which delays the application of updates until a request is made for the value. In general we do not know, a priori, which of the updated values will be retrieved; therefore; it is beneficial to defer the access and computation. This technique promotes an 'update-by-need' policy. The method uses generalization, property inheritance, and procedural attachment for dynamically maintaining the update and query processes. The use of these representational concepts aids in maintaining the structure of the relational model, yet provides opportunities to extend the semantic power of the model. Author

N82-12794*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE GLAS EDITING PROCEDURES FOR THE FGGE LEVEL II-B DATA COLLECTED DURING SOP-1 AND 2

W. Baker, D. Edelmann, and H. Carus Sep. 1981 30 p refs
(NASA-TM-83811) Avail: NTIS HC A03/MF A01 CSCL 09B

The modifications made to the FGGE Level II-b data are discussed and the FORTRAN program developed to perform the modifications is described. It is suggested that the edited database is the most accurate one available for FGGE SOP-1 and 2. E.A.K.

N82-12795# National Aerospace Lab., Tokyo (Japan).

NEW SCHEDULER FOR JOB PROCESSING IN COMPUTER SYSTEMS

Masako Tuchiya, Kazuyo Suematsu, Masahiro Yoshida, and Shigeki Hatayama 1981 60 p refs In JAPANESE; ENGLISH summary
(NAL-TR-659; ISSN-0389-4010) Avail: NTIS HC A04/MF A01

The job processing method in computer systems is discussed. The conventional scheduler is criticized and it is pointed out that utilization of the central processing unit (CPU) is too sensitive to the input job-stream. This is the reason it is difficult to retain constantly high CPU utilization in keeping with the increasing throughput of the short job-class. A job processing method to solve this problem, the job/job-step scheduler, is proposed. The main concept is to schedule a job or a job-step so that a number of so-called CPU-bound job-steps may be in a state for immediate processing by CPU. In order to make the new scheduling possible, the operating systems must have the following job-processing capability: all job-steps setting up the job shall not necessarily be processed sequentially; it should be possible to halt the job processing temporarily at some job-step stage for preparation of the pool of CPU-bound job-steps. The skeleton of the simulator which was programmed to evaluate the performance of the job/job-step scheduler in an application for job processing with the NAL computer system is described. The results of the simulation experiment are given to illustrate the effectiveness of the proposed scheduler. B.W.

N82-12796*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

HARDWARE SURVEY FOR THE AVIONICS TEST BED

J. M. Cobb Jun. 1981 77 p
(Contract NAS9-15800)
(NASA-CR-161072; JSC-17451; LEMSCO-16838) Avail: NTIS HC A05/MF A01 CSCL 09B

A survey of major hardware items that could possibly be used in the development of an avionics test bed for space shuttle attached or autonomous large space structures was conducted in NASA Johnson Space Center building 16. The results of the survey are organized to show the hardware by laboratory usage. Computer systems in each laboratory are described in some detail. R.J.F.

N82-12797# Naval Postgraduate School, Monterey, Calif.

HARDWARE AND SOFTWARE IMPROVEMENTS TO A PACED DATA ACQUISITION SYSTEM FOR TURBOMACHINES M.S. Thesis

Patrick Anthony McCarville Jun. 1981 70 p refs
(AD-A104853) Avail: NTIS HC A04/MF A01 CSCL 09/2

Modification of the phase lock loop synchronizing circuits and of the method of input/output communication used in a synchronized data sampling system are reported. A device known as PACER which used an analog phase lock loop for synchronization and produced a nonlinar set of synchronizing pulses, was modified to use a CMOS digital phase lock loop, resulting in a linear set of pulses. A user's manual for paced data acquisition is included. T.M.

N82-12798# University of Southern California, Los Angeles. Dept. of Electrical Engineering.

NONLINEAR REAL-TIME OPTICAL SIGNAL PROCESSING Final Report, 14 Apr. 1977 - 14 Apr. 1981

A. A. Sawchuk, T. C. Strand, and A. R. Tanguay, Jr. 30 Jun. 1981 84 p refs
(Grant AF-AFOSR-3285-77; AF Proj. 2305)
(AD-A105186; USCIPI-1020; AFOSR-81-0650TR) Avail: NTIS HC A05/MF A01 CSCL 14/5

The results of a four year research program in nonlinear real time optical signal processing are described. The goal of the program was to extend fast parallel nonlinear operations to optical processing systems with large time bandwidth and space bandwidth products. Real time homomorphic and logarithmic filtering by halftone nonlinear processing has been achieved. A detailed analysis of degradation due to the finite gamma and other nonideal effects of the recording medium has been completed along with an extensive study of techniques for precompensating these effects. Further improvements in experimental work await a liquid crystal light valve (LCLV) or other real time spatial light modulator with a sharper threshold and better uniformity and repeatability. A direct nonlinear technique of real time parallel A/D conversion of an incoherent optical image has been developed. A detailed theoretical analysis and modeling of liquid crystal devices and associated photoconductors was completed, providing an excellent fit to experimental data obtained on several devices provided by Hughes Research Laboratories. These results have been used to make a flexible multiple light valve system (MLVS) in which the form of the nonlinearity can be varied. GRA

N82-12799# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

THINKING ABOUT LOTS OF THINGS AT ONCE WITHOUT GETTING CONFUSED: PARALLELISM IN ACT 1

Henry Lieberman May 1981 24 p refs
(Contracts N00014-75-C-0522; N00014-80-C-0505)
(AD-A104965; AI-M-626) Avail: NTIS HC A02/MF A01 CSCL 06/4

As advances in computer architecture and changing economics make feasible machines with large-scale parallelism, Artificial Intelligence will require new ways of thinking about computation that can exploit parallelism effectively. We present the actor model of computation as being appropriate for parallel systems, since it organizes knowledge as active objects acting independently, and communicating by message passing. We describe the parallel constructs in our experimental actor interpreter Act 1. Futures create concurrency, by dynamically allocating processing

resources much as Lisp dynamically allocates passive storage. Serializers restrict concurrency by constraining the order in which events take place and have changeable local state. Using the actor model allows parallelism and synchronization to be implemented transparently, so that parallel or synchronized resources can be used as easily as their serial counterparts.
Author (GRA)

N82-12800# Arizona Univ., Tucson. Dept. of Aerospace and Mechanical Engineering.

SOLUTION OF NONLINEAR STRUCTURAL PROBLEMS USING ARRAY PROCESSORS

Nesrin Sarigul, Jacek Maitan, and Hussein Kamel 20 Aug. 1981 30 p refs Presented at 1981 FENOMECH, Stuttgard, 25-28 Aug. 1981

(Contract N00014-75-C-0837; NR Proj. 064-531)

(AD-A104987; TR-8) Avail: NTIS HC A03/MF A01 CSCL 09/2

The paper describes ongoing efforts to investigate the usefulness of so called 'attached processors' or 'array processors', combined with mini-and superminicomputers, in the analysis of computationally demanding engineering problems; such as, in finite element nonlinear applications. A close examination of some basic algorithms, which play an important part in such analysis, is presented. Furthermore, a methodology is developed, which forms a useful guide to further efforts of this nature, including the more general case of multiprocessing. An emphasis is made on the ability to predict the performance of algorithms from time measurements of certain basic operations, coupled with an understanding of the characteristics of the hardware in question and the interplay between its various components. Four hardware alternatives are considered, two of which have attached array processors. Of the algorithms considered, it appears that the decomposition process is the one which benefits most from the presence of an array processor. The speed advantage gained in stiffness assembly, and forward and backward substitution may both be obtained by purchasing a more powerful superminicomputer.
Author (GRA)

N82-12801# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

UNIX NSW FRONT END ENHANCEMENTS, VOLUME 1 Final Technical Report, Jan. - Oct. 1980

Robert H. Thomas, Hendrik O. Lind, and Stephen G. Toner Griffiss AFB, N.Y. RADC Jun. 1981 203 p refs

(Contract F30602-80-C-0062; AF Proj. 5581)

(AD-A105035; BBN-4571-Vol-1; RADC-TR-81-164-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 09/2

The effort to develop a UNIX NSW Front End is part of the National Software Works (NSW) program sponsored jointly by the Air Force and ARPA. The goal of the NSW program is to develop a network operating system (called the NSW system or NSW for short) that provides an effective environment for software production, software configuration control, and software maintenance. Users access the National Software Works system by means of an NSW Front End. The objective of the UNIX NSW Front End project was to develop an NSW Front End that runs on a DEC PDP-11 computer under the UNIX operating system.
Author (GRA)

N82-12802# Oak Ridge Gaseous Diffusion Plant, Tenn. Dept. of Analytical Chemistry.

DEVELOPMENT OF ELEMENTAL ANALYZER TO PROGRAMMABLE CALCULATOR INTERFACE

Fred W. Postma, Jr. Sep. 1981 58 p refs

(Contract W-7405-eng-26)

(DE82-000895; K-2026) Avail: NTIS HC A04/MF A01

A solid state electronic interface was designed and constructed. It relieved the analyst of the responsibility for measuring changes in the pen position on the strip chart and for performing the calculations during the analysis and weighting period. A program was written to calculate blanks, standard factors, and sample weight fractions for nitrogen, carbon, and hydrogen. The interface passed data from a Pepkin-Elmer Elemental Analyzer to a Texas Instruments TI Programmable 59 pocket calculator and printer.
DOE

N82-12803# Siemens A.G., Munich (West Germany). Unternehmensbereich Bauelemente.

DEVELOPMENT OF MOS MEMORIES Final Report

Hans Moormann, Helmut Mueller, Adolf Scheibe, Jacobus Scholtens, and Hartmut Schrenk Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 220 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-80-161; ISSN-0340-7608) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 38,50

The designs were adjusted to the production process in such a way that modules with higher reliability and performance can be manufactured. Key technology developments were: the double-poly-Si technique, the varactor MOS technique, and the floating gate technique. Two of the memories are high density 16 Kbit and 64 Kbit random access memories. Three are nonvolatile unprogrammable memories: a 256 bit television station memory, an 8 Kbit electrically alterable read-only memory (ROM) and a 16 Kbit optically erasable ROM. Three are ROM's with 8, 16 and 32 Kbits.
Author (ESA)

N82-12804# Hamburg Univ. (West Germany). Fachbereich Informatik.

BENORSY: A FORMALIZED INSTRUMENT FOR THE USER ORIENTED REVISION OF DP-SYSTEMS Final Report

Heidrun Essig, Hanns-Wilhelm Heibey, Michael Kuehn, and Arno Wolf Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 190 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-DV-81-001; ISSN-0170-9011) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 35,30

User studies in data processing and social sciences are reviewed. The approach is based on two equally necessary assumptions for user oriented data processing systems: (1) a framework for user interactive systems, showing the problem areas important to the user and forming a foundation for technical oriented design instruments; and (2) user participation helping with this framework in practice. BENORSY, consisting of ANALYZE which determines the causes of low user compatibility and BESCHREIBUNG which describes the actual and desired situation of computer aided work systems transparently, was implemented in a participative project organization.
Author (ESA)

N82-12805# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. d'Informatique.

DATA FLOW AND BUS STRUCTURE IN A LOOSELY COUPLED MULTIPROCESSOR COMPUTER SYSTEM ARCADE

Ruben Gonzalez-Rubio and Gilles Allard Mar. 1981 19 p refs Presented at Euromicro 81, 8-10 Sep. 1981

(ENST-C-81003) Avail: NTIS HC A02/MF A01

The data flow for system operation and bus structure of ARCADE, a loosely coupled multiprocessor with two multiple nondedicated bus systems, is presented. Interprocessor communication is treated. System architecture, consisting of sets of dedicated processors, is decribed. The APL language is used. It allows system operation to be divided into two modes, definition and execution. The system is still in the experimental construction phase.
Author (ESA)

N82-12806# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.

EFFICIENT IMPLEMENTATIONS OF MULTICOUNTER MACHINES FOR OBLIVIOUS TURING MACHINES, ACYCLIC LOGIC NETWORKS, AND VLSI

P. M. B. Vitanyi May 1981 24 p refs Submitted for publication

(MC-IW-167/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3,15

The dependence of the required time and storage, to maintain counts, on storage structure and organization as well as the cost required by a combinatorial network are investigated. Results show that a one-tape oblivious Turing machine can simulate a k-counter machine on-line in linear time and logarithmic space. This leads to a linear cost combinational logic network implementing n steps of a k-counter machine. In the VLSI model of computation it is possible to simulate n steps of a k-counter machine in real time on area Omicron (k log n). A k-counter machine can be simulated in real time by a nonoblivious machine without head reversals. Results are also stated for oblivious k-counter languages. Author (ESA)

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-12807 Carnegie-Mellon Univ., Pittsburgh, Pa.
EVALUATION OF MICROPROCESSORS FOR PROCESS CONTROL APPLICATIONS Ph.D. Thesis
Thomas Edgar Dickey 1981 484 p
Avail: Univ. Microfilms Order No. 8118789

A procedure is developed for rating different microprocessors in terms of the relative difficulty of programming them for the same process control application in assembly language. The procedure is based on measuring the logical complexity of each microprocessor's instruction repetoire. A simple experiment is performed to test this procedure by programming a set of five kernel programs which are representative of typical tasks performed in a digital process control system. These kernel programs were coded for six different commercially available microprocessors. The kernel program development time and the complexity measure are very strongly correlated. Dissert. Abstr.

N82-12808 Kentucky Univ., Lexington.
DYNAMIC PROGRAMMING FOR PROBLEMS OF IMPULSE CONTROL Ph.D. Thesis
Armand Maurice Makowski 1981 255 p
Avail: Univ. Microfilms Order No. 8121612

The ideas and techniques are illustrated on two typical samples, namely a general problem of optimal stopping and a problem of inventory control with jump process input. The emphasis is on obtaining local necessary and sufficient optimality conditions; they take the form of a generalized (quasi-) variational inequality associated with the weak infinitesimal generator of a semigroup of conditioned shifts, generated by the flow of information. The analysis revolves around the study of a quantity--the auxiliary value function--which completely characterizes optimality and is differentiable in some semigroup sense. For both problems investigated, this differentiability is directly established by computing various Lipschitz-like estimates for the auxiliary value function. Dissert. Abstr.

N82-12809 George Washington Univ., Washington, D.C.
SISU: A PROGRAMMING LANGUAGE FOR COMPUTATIONAL LINGUISTICS, WITH AN APPLICATION TO THE ANALYSIS OF FINNISH Ph.D. Thesis
Irving David Woolf 1981 422 p
Avail: Univ. Microfilms Order No. 8118659

A programming language for Computational Linguistics (CL), is described. Natural-language processing and CL application areas and examples are examined to develop a list of requirements for such a programming language. The SISU language was developed to meet those requirements. A large number of features to simplify the construction of CL are provided. Command and data abstractions to facilitate handling blocks of text, sentences and words by referring to them as just that-text, sentences and words are reviewed. A number of commands which operate on individual words for the purpose of morphemic analysis, allowing the words to be easily taken apart, examined and altered are provided. A facile dictionary-building and referencing technique is also included, as well as debugging and text output features. Dissert. Abstr.

N82-12810 Rutgers - The State Univ., New Brunswick, N. J.
SINGULAR PERTURBATION MODELING AND ITS APPLICATION TO FAST ALGORITHMS OF CHANDRASEKHAR TYPE Ph.D. Thesis
George Panayiotou Syrcos 1981 153 p
Avail: Univ. Microfilms Order No. 8122132

The state equations of a large scale, time invariant model are converted to singularly perturbed form. Classification of the physical states as slow and fast is accomplished. The use of the Chandrasekhar algorithm in a singularly perturbed type of environment is addressed. A Chandrasekhar algorithm for singularly perturbed systems is developed and the structure of the solution is analyzed. The developd theory is applied to the design of the linearized F-100 turbofan engine. Dissert. Abstr.

N82-12811 Rutgers - The State Univ., New Brunswick, N. J.
RESTRUCTURING COBOL PROGRAMS TO IMPROVE READABILITY Ph.D. Thesis
Bobbie Ann Fredsall Othmer 1981 229 p
Avail: Univ. Microfilms Order No. 8122108

The problem of restructing programs for enhanced readibility from both a theoretical and empirical point of view is examined. Program readability is defined in terms of the information processing model of memory. In order to evaluate the efficacy of the restructuring algorithms presented, a six component readability measure is developed. Program structures and rules for the use of control structures advocated by adherents of structured programming are considered in choosing a form for the target of the restructuring process. Four forms were chosen for examination. They all use the repeat-loop with multilevel exists as the loop control structure. Restructuring algorithms for achieving each form from a control flow graph are presented. For a given program, the restructured version is unique or almost unique if certain desirable properties are required. The uniqueness is independent of the algorithm used for restructuring, and thus restructuring using only syntactic information has intrinsic limitations. Examples of the restructuring of several production programs are given. Dissert. Abstr.

N82-12812 University of Southwestern Louisiana, Lafayette.
DESIGN AND CONSTRUCTION OF A VIRTUAL MACHINE RESOURCE BINDING LANGUAGE Ph.D. Thesis
Scott Davidson 1980 254 p
Avail: Univ. Microfilms Order No. 8121477

A machine independent solution of the resource binding problem, a high level language incorporating this solution, the implementation of this language, and experiments conducted with the language are investigated. The Virtual Machine Resource Binding Language (MARBLE) solves the resource binding problem. The implementation of MARBLE is designed for the class of microprogrammable architectures. The solution to the resource binding problem consists of modelling target virtual machine resources by machine independent source language constructs. In MARBLE target data resources are modelled by type definitions. These models can be bound to the appropriate target resource through the use of a source language construct. All MARBLE programs are machine independent. Dissert. Abstr.

N82-12813*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VELOCITY-SPACE SYNTHESIS OF ISEE-1 MEASUREMENTS OF THE THREE DIMENSIONAL ELECTRON DISTRIBUTION FUNCTION
R. J. Fitzenreiter and Jack D. Scudder Oct. 1981 37 p refs
(NASA-TM-83838) Avail: NTIS HC A03/MF A01 CSCL 09B

A computer package which produces contour plots of the three dimensional electron distribution function measured by an electron spectrometer aboard ISEE-1 is described. Examples of the contour plots and an explanation of how to use the program, including the necessary computer code for running the program on the GSFC 360/91 computer is presented. The method by which the discrete measurements of the distribution function, given by points on the four dimensional surface are synthesized into a smooth surface in a three dimensional space which can be contoured is described. The velocity components are parallel and perpendicular to the magnetic field, respectively, in the proper frame of the electrons. S.L.

N82-12814# National Aerospace Lab., Tokyo (Japan).
TRANSONIC AIRFOIL DESIGN OF FULL POTENTIAL FLOW. 2: DEVELOPMENT OF THE FORTRAN CODE
Tomiko Ishiguro, Nobuhiko Kamiya, Nobuhiro Kawai, and Koiko Oguchi 1981 97 p refs In JAPANESE; ENGLISH summary
(NAL-TR-673; ISSN-0389-4010) Avail: NTIS HC A05/MF A01

A user's manual for the FORTRAN program is presented which is coded following the numerical procedure developed for design of transonic airfoils. This program can solve the inverse problem irrespective of the presence of shock waves. The airfoil geometry is designed so that the width of the trailing edge is the required one. The boundary layer calculation is included in a procedure whereby an actual airfoil geometry is obtained by subtracting a displacement thickness of a boundary layer from an airfoil geometry. R.J.F.

N82-12815*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

USE OF AN ENGINEERING DATA MANAGEMENT SYSTEM IN THE ANALYSIS OF SPACE SHUTTLE ORBITER TILES

Gary L. Giles and Maria Vallas Oct. 1981 13 p refs Presented at the AIAA Computers in Aerospace 3rd Conf., San Diego, Calif., 26-28 Oct. 1981
(NASA-TM-83215) Avail: NTIS HC A02/MF A01 CSCL 09B

The use of an engineering data management system to facilitate the extensive stress analyses of the space shuttle orbiter thermal protection system is demonstrated. The methods used to gather, organize, and store the data; to query data interactively; to generate graphic displays of the data; and to access, transform, and prepare the data for input to a stress analysis program are described. Information related to many separate tiles can be accessed individually from the data base which has a natural organization from an engineering viewpoint. The flexible user features of the system facilitate changes in data content and organization which occur during the development and refinement of the tile analysis procedure. Additionally, the query language supports retrieval of data to satisfy a variety of user-specified conditions. S.L.

N82-12816# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

RECOGNIZE REGULAR LANGUAGES WITH PROGRAMMABLE BUILDING BLOCKS Interim Report

M. J. Foster and H. T. Kung 19 Jun. 1981 13 p refs
(Contracts N00014-80-C-0236; F33615-78-C-1551)
(AD-A104874; CMU-CS-81-126) Avail: NTIS HC A02/MF A01 CSCL 09/2

This paper introduces a new programmable building-block for recognition of regular languages. By combining three types of basic cells a circuit for recognizing any regular language can be constructed or 'programmed' automatically from the regular expression describing that language. Recognizers built in this way are efficient pipeline circuits that have constant response time and avoid broadcast. In addition, the paper proposes the use of a single, regular layout, called the PRA (programmable recognizer array), that can be 'personalized' to recognize the language specified by any regular expression. PRA's provide compact reconfigurable layouts for recognizer circuits, requiring only O(n log n) area for regular expressions of length n. Author (GRA)

N82-12817# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

USING PROGRAM TRANSFORMATIONS TO DERIVE LINE-DRAWING ALGORITHMS

Robert F. Sproull Apr. 1981 19 p refs
(Contract F33615-78-C-1551; ARPA Order 3597)
(AD-A104873; CMU-CS-81-117) Avail: NTIS HC A02/MF A01 CSCL 09/2

A wide variety of line-drawing algorithms can be derived by applying program transformations to a simple, obviously correct algorithm. The transformations increase the algorithm's performance and eliminate the need for floating-point computations. Two familiar algorithms are derived in this way: Bresenham's algorithm and the digital differential analyzer (DDA). The transformations are then used to derive several highly parallel variants of Bresenham's algorithm, designed for use on displays that can generate more than one pixel at a time. The treatment shows a complete, extended example of the practical use of program transformations. Moreover, the transformations derive Bresenham's algorithm without recourse to complex geometric arguments. Author (GRA)

N82-12818# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

MINIMIZING COMPUTATIONAL COST FOR DYNAMIC PROGRAMMING ALGORITHMS

A. Waibel, N. Krishnan, and R. Reddy 17 Jun. 1981 25 p refs
(Contract F33615-78-C-1551; Grant NSF MCS-78-25824; ARPA Order 3597)
(AD-A104792; CMU-CS-81-124) Avail: NTIS HC A02/MF A01 CSCL 09/2

In this study we introduce and test several methods to reduce the computational cost in dynamic programming algorithms for isolated word recognition systems. Three methods will be discussed in detail: (1) pruning by preset thresholds; (2) search based on the Branch and Bound technique; (3) branch and Bound based search with additional pruning. Compared to conventional algorithms, Method 3 could be seen to yield a speed up of approximately a factor of 5, at no loss of recognition accuracy. The branch and bound method with pruning is also ideally suited for research oriented systems, since pruning is independent of the parametrization used (eliminates the necessity for retuning thresholds). Additional features of this method, which are of importance to maintaining the flexibility and diagnosticity needed for such a system, will be discussed. Author (GRA)

N82-12819# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

SCHEMES FOR COMMUNICATION

Mathai Joseph 3 Jun. 1981 44 p refs
(Contract F33615-78-C-1551; ARPA Order 3597)
(AD-A104791; CMU-CS-81-122) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report describes features of a language for distributed and parallel programming which has been designed to provide flexibility in the transfer of information and control between the individual components of a program. The language allows synchronous and asynchronous message-passing, multiple-source input and broadcast output, and enables particular features of a distributed architecture to be efficiently accommodated without modification to the language. The module serves as the unit of encapsulation and a single communication takes place between an output port in one module and a set of input ports in other modules: each port has a control rule which specifies the protocol for sending or receiving messages, and is associated with a particular communication scheme which implements the communication operations. Modules are assumed to execute independently of each other except when they communicate by sending messages: the lifetime of a module is therefore limited only by its ability to send and receive messages. The use of the distinctive features of the language, such as broadcast mode output, is illustrated with several examples. Author (GRA)

N82-12820# Maryland Univ., College Park. Computer Vision Lab.

PARALLEL STRING PARSING USING LATTICE GRAPHS

Azriel Rosenfeld May 1981 18 p refs
(Grant AF-AFOSR-3271-77; AF Proj. 2304)
(AD-A105028; TR-1036; AFOSR-81-0623TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

Given a grammar G and a string sigma, all possible parses of sigma can be constructed by repeatedly applying the rules of G in parallel. This process creates a 'lattice graph' in which any directed path from the least element to the greatest element is a sentential form that occurs in a (partial) parse of sigma. Examples are given illustrating how, at least for some grammars, this process does not lead to a combinatorial explosion, and could thus be used to parse strings very rapidly if suitable parallel hardware were available. Author (GRA)

N82-12821# Maryland Univ., College Park. Dept. of Computer Science.

AN OPERATIONAL APPROACH TO REQUIREMENTS SPECIFICATION FOR EMBEDDED SYSTEMS

Pamela Zave Aug. 1981 71 p refs
(Contract F49620-80-C-0001; AF Proj. 2304)
(AD-A105459; AFOSR-81-0662TR) Avail: NTIS HC A04/MF A01 CSCL 09/2

The approach to requirements specification for embedded, systems described in this paper called 'operational' because a requirements specification is an executable model of the proposed system interacting with its environment. The approach is embodied by the language PAISLey, which is motivated and defined herein. Embedded systems are characterized by asynchronous parallelism, even at the requirements level; PAISLey specifications are constructed of interacting processes so that this can be represented directly. Embedded systems are also characterized by urgent performance requirements, and PAISLey offers a formal, but intuitive, treatment of performance. Author (GRA)

N82-12822# Maryland Univ., College Park. Dept. of Computer Science.
ERROR PROPAGATION AND ELIMINATION IN COMPUTER PROGRAMS
Larry J. Morell and Richard G. Hamlet Jul. 1981 50 p refs
(Contract F49620-80-C-0001; AF Proj. 2304)
(AD-A105437; TR-1065; AFOSR-81-0661TR) Avail: NTIS HC A03/MF A01 CSCL 09/2

The current literature in program testing is surveyed. A strategy is proposed for eliminating categories of errors from programs. Errors may be classified as functional (an incorrect input-output pair) or structural (an incorrect statement). An error is eliminated if a successful program execution for a given input implies the program could not contain the error. A 'creation condition' guarantees that a structural error affects the program's computation. A 'propagation condition' guarantees that the effect produces a functional error. An error is eliminated whenever a computation satisfies both the creation and the propagation condition and produces correct output. Author (GRA)

N82-12823# Lincoln Lab., Mass. Inst. of Tech., Lexington.
PRACTICAL ASPECTS OF NONLINEAR OPTIMIZATION
Richard B. Holmes and Jeffrey W. Tolleson 19 Jun. 1981 56 p refs
(Contract F19628-80-C-0002)
(AD-A104858; TR-576; ESD-TR-81-155) Avail: NTIS HC A04/MF A01 CSCL 12/1

A general purpose nonlinear programming method and computer code are presented. The method is basically heuristic but extremely simple and reliable. Interactive operation of the code and its performance on several test problems is described. Author (GRA)

N82-12824# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
A PREVIEW OF ACT 1
Henry Lieberman May 1981 25 p refs
(Contracts N00014-75-C-0522; N00014-80-C-0505)
(AD-A104964; AI-M-625) Avail: NTIS HC A02/MF A01 CSCL 06/4

The next generation of artificial intelligence programs will require the ability to organize knowledge as groups of active objects. Each object should have only its own local expertise, the ability to operate in parallel with other objects, and the ability to communicate with other objects. Artificial Intelligence programs will also require a great deal of flexibility, including the ability to support multiple representations of objects, and to incrementally and transparently replace objects with new, upward-compatible versions. To realize this, we proposed a model of computation based on the notion of an actor, an active object that communicates by message passing. Actors blur the conventional distinction between data and procedures. The actor philosophy is illustrated by description of our prototype actor interpreter Act 1. Author (GRA)

N82-12825# Polytechnic Inst. of New York, Brooklyn.
SOFTWARE MODELING STUDIES. VOLUME 4: A STATISTICAL THEORY OF COMPUTER PROGRAM TESTING Final Technical Report, Jan. 1978 - Oct. 1980
Arthur E. Laemmel Jul. 1981 32 p refs
(Contract F30602-78-C-0057; AF Proj. 2304)
(AD-A105078; POLY-EE-80-004-Vol-4;
RADC-TR-81-183-Vol-4) Avail: NTIS HC A03/MF A01 CSCL 09/2

Program testing is studied for maximizing the reliability of computer programs. Several formulas are derived to estimate the number of tests required to say that a program being tested is correct with a given probability. Strategies to select those test cases which minimize the probability of program error while keeping the number of tests fixed, are investigated. (Author) GRA

N82-12826# Polytechnic Inst. of New York, Brooklyn.
SOFTWARE MODELING STUDIES. VOLUME 2: THE POLYNOMIAL MEASURE OF COMPLEXITY Final Technical Report, Jan. 1978 - Oct. 1980
Henry Ruston Jul. 1981 60 p refs
(Contract F30602-78-C-0057; AF Proj. 2304)
(AD-A105004; RADC-TR-81-183-Vol-2) Avail: NTIS HC A04/MF A01 CSCL 09/2

A new measure of software complexity is introduced, one which describes a flow chart by a polynomial. This measure takes both the elements of a flow chart and its structure into account. Rules are given for obtaining the polynomials for various types of flow charts. The polynomial complexity measure can be used to compare alternate software designs and to divide a computer program into modules to obtain a minimal overall complexity. A comparison is made of this measure with several known complexity measures. Author (GRA)

N82-12827# California Univ., Livermore. Lawrence Livermore Lab.
SCALD 2 LOGIC SIMULATOR
J. B. Rubin 17 Sep. 1981 17 p refs
(Contract W-7405-eng-48)
(DE81-030879; UCID-19191) Avail: NTIS HC A02/MF A01

The SCALD 2 design system, a set of computer-aided logic design programs written in PASCAL which facilitates the design and implementation of synchronous digital systems is discussed. It is divided into two major sub-categories: the logical and physical design subsystems. The logical design subsystem consists of the macro expander, timing verifier, and logic simulator programs, wereas the physical design subsystem consists of the layout program and the packager. The logic simulator is discussed in particular. DOE

N82-12828# Centre Technique des Industries Mecaniques, Senlis (France).
TECHNOLOGY OF TOMORROW: COMPUTER ASSISTED DESIGN AND FABRICATION Final Report [VEILLE TECHNIQUE CFAO]
M. Chaussier 28 Nov. 1980 45 p refs In FRENCH
(CETIM-1.4A.32.3) Avail: NTIS HC A03/MF A01

The potentials of computer assisted design and fabrication (CADF) are analyzed for mechanical applications in industry. Adaptation of CADF systems to the specific needs of industrial companies is seen as problematical. The linking of many systems through ever more sophisticated data bases is suggested in order to improve CADF efficiency. The impact of interactive man machine techniques and of automated decision making are taken into account. Interactive graphics, a successful application of CADF, is cited for its contribution to mechanical engineering. Increased development and diffusion of CADF technology is forecast. Author (ESA)

N82-12829# Saab-Scania, Goteberg (Sweden). Aerospace Div.
DATA RATE REDUCTION, PHASE 2 Final Report
Paris ESA 1 Dec. 1980 72 p
(Contracts ESTEC-3749/78/NL-HP; ESTEC-4179/79/NL-HP)
(TNOT/0001/SAAB-Issue-3; TNOT/0007/SAAB-Issue-1;
RA-SAT-5-275-Issue-2; ESA-CR(P)-1445) Avail: NTIS HC A04/MF A01

The results of the acceptance test of the breadboard model of a multispectral image data processor (IDP) are presented. A timing analysis of critical parts is included. Data were successfully compressed into 16 and then 32 classes. The hardware design of a processor for data rate reduction of image data for remote sensing satellites is given. The data reduction unit processes a whole multispectral image line. It is composed of several elementary processors (compressor modules) working in parallel. Each compressor module is a multispectral IDP, processing a 512 (maximum) pixel multispectral line segment. A breadboard model was used to verify functioning of the design of the processor with respect to those parts of the circuits carrying out specific steps of the selected algorithm. Author (ESA)

N82-12830# Scicon Consultancy International Ltd., London (England).

SYSTEM SOFTWARE FOR THE ESTEC MULTIPROCESSOR RECONFIGURABLE SIMULATOR Final Report

Paris ESA Feb. 1981 35 p refs

(ESA-CR(P)-1456) Avail: NTIS HC A03/MF A01

The MPRS is a multiprocessor computer system designed for real time simulation applications. The DEMOS software technology transferred from the DEMOS 86 multicomputer project solves the problem of programming several processors connected together, allowing the multiprocessor to be treated as one machine. Facilities for the development of simulation applications programs are explained along with an operating system for real time simulation programs. Author (ESA)

N82-12831# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.

THE GKS REVIEWING PROCESS

P. J. W. tenHagen Apr. 1981 22 p refs Submitted for publication

(MC-IW-164/81) Avail: NTIS HC A02/MF A01

The technical debate within the International Standards Organization on GKS is described, emphasizing the organization of the working group. Criteria for international acceptance of the GKS standard are studied. Results of the graphics standardization effort are related, mainly concerning reduction of the cost of accumulating hardware and software. Converting software to get an application running is also discussed. Author (ESA)

N82-12832# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.

ALGOL 68 PLUS: A SUPERLANGUAGE OF ALGOL 68 FOR PROCESSING THE STANDARD-PRELUDE

L. G. L. T. Meertens and J. C. vanVliet Jun. 1981 18 p refs

(MC-IW-168/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3,15

A sequence of declarations in a super language of ALGOL 68, ALGOL 68 plus, is given. These declarations together constitute the standard-prelude. In order to have an ALGOL 68 compiler process a version of the standard-prelude, it is necessary to define ALGOL 68 plus in which that version is written. The compiler must be able to accept programs (modules) written in ALGOL 68 plus. The necessary super language is defined, but only insofar as changes are needed to accomodate the standard-prelude itself (including the transput). Author (ESA)

N82-12833# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.

CORRECTNESS OF PROGRAMS WITH FUNCTION PROCEDURES

J. W. deBakker, J. W. Klop, and J.-J.C. Meyer (Free Univ., Amsterdam) Jul. 1981 21 p refs Submitted for publication

(MC-IW-170/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum FL 3,15

The correctness of programs with programmer-declared functions is investigated. The framework of typed lambda calculus with explicit declaration of (possibly recursive) functions is used. Its expressions occur in the statements of a simple language with assignment, composition and conditionals. A denotational and an operational semantics for this language are provided, and their equivalence is proven. A proof system for partial correctness is presented and its soundness is shown. Completeness is then established for the case that only call by value is allowed. Allowing call by name as well, completeness is shown only for the case that the type structure is restricted, and at the cost of extending the language of the proof system. The completeness problem for the general case remains open. In the technical considerations, an important role is played by a reduction system which essentially makes it possible to reduce expression evaluation to systematic execution of auxiliary assignments. Termination of this reduction system is shown using Tait's computability technique. Author (ESA)

62 COMPUTER SYSTEMS

Includes computer networks.

N82-12834 California Univ., Los Angeles.

THE ANALYSIS AND SYNTHESIS OF INTERCONNECTION NETWORKS FOR DISTRIBUTED COMPUTER SYSTEMS Ph.D. Thesis

Han-Ping Daniel Chen 1981 270 p

Avail: Univ. Microfilms Order No. 8120931

An interconnection network is synthesized from a set of user-specified requirements. Four well-defined synthesis procedures are proposed; the element deletion synthesis procedure, the matrix-reductio synthesis procedure, the stagewise-formulation synthesis procedure, and the tree-merging synthesis procedure. The user requirements are divided into two major categories: functional constraints and design constraints. A generalized failure model the 2 x 2 basic switching element is presented. A generalized reliability model is defined to handle all known failure modes and any given component dependency. A graphical evaluation structure and some graphical AND-OR operations are introduced to evaluate configuration reliability, connection reliability, functional reliability, and network reliability. Two kinds of network descriptions are used: first, the physical structure containing elements and wiring patterns; second, the logical model containing a set of logical entities using the graphical model as a starting point. Dissert. Abstr.

N82-12835# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Computer Sciences.

MULTICAST AND SYNCHRONIZATION IN DISTRIBUTED SYSTEMS

Jan Skansholm 1981 51 p refs

(Contract SWEDBTD-71.348-U-253)

(CTH-81.2-R) Avail: NTIS HC A04/MF A01

The construction of distributed algorithms and synchronization tools in distributed systems becomes simple if a multicast addressing principle is used. However, the transport mechanism must satisfy the requirements that all messages are delivered to all processes, and that all messages are delivered in the same order to all processes. These requirements are found to be realistic and some network types are especially well suited for this kind of addressing. An algorithm is presented which can make any network able to guarantee that messages are delivered in the same order to the processes in a system. Author (ESA)

N82-12836# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. d'Informatique.

FAULT TESTING AND DIAGNOSIS IMPLEMENTATION IN MICROPROCESSOR CONTROLLED DATA NETWORKS

Wafae Boghdady Mar. 1981 227 p refs

(ESNT-D-81001) Avail: NTIS HC A11/MF A01

Fault testing technique is reviewed and on-line self test procedures for microprocessor systems are proposed. Random access memory (RAM) test procedures with half the test time requirement of the known RAM minimum test pattern, MASEST, and increased applicability are considered. Global self test procedures for microprocessor units, derived from a combination of structural, functional and behavioral approaches, specified by introducing algorithmic patterns, and composed of sequential dedicated programs, each of which has its own meaningful test objective are discussed. Oriented test procedures based on the combination of the philosophy of real time tests and the partitioning of the applications programs by controllability observability and maintenance engineering technique (COMET) are presented. Author (ESA)

N82-12837# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.

COMMUNICATING GRAPHICS

P. J. W. tenHagen Apr. 1981 14 p refs Submitted for publication

(MC-IW-166/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3,15

Communication of computer graphics information via public data networks is analyzed. Communication levels are derived from functional levels in existing graphics systems for viewing.

The relationship between communication of graphical data and standards for graphics programming are outlined. Author (ESA)

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N82-12838 Maryland Univ., College Park.
THE QUEUEING DELAY PROBLEM IN MULTIPLE ACCESS SCHEMES Ph.D. Thesis
Tarek Nazir Saadawi 1980 164 p
Avail: Univ. Microfilms Order No. 8121100

Multiple access schemes with a finite number of buffered uses were analyzed. The approach is suitable for a variety of accessing schemes including random access schemes and reservation based demand access. The approach models the interaction between the competing terminals by a combination of two Markov chains; describes the buffer concepts of the typical user, and describes the state of all the users in the system. The dependence between equilibrium distributions of the states of the user Markov chain and those of the system Markov chain produces sets of coupled equations for these probabilities which are solved numerically. It is assumed that all messages consist of single packets, which are generated in a bursty manner, the arrival process at each terminal is assumed to be Bernoulli. Dissert. Abstr.

N82-12839*# Brown Univ., Providence, R. I. Center for Dynamical Systems.
A SURVEY OF SOME PROBLEMS AND RECENT RESULTS FOR PARAMETER ESTIMATION AND OPTIMAL CONTROL IN DELAY AND DISTRIBUTED PARAMETER SYSTEMS
H. T. Banks Jul. 1981 33 p refs Presented at the Conf. on Volterra and Functional Differential Equations, Blacksburg, Va., 10-13 Jun. 1981
(Contracts NAS1-15810; NAS1-16394; DAAG29-79-C-0161; Grants AF-AFOSR-3092-76; NSF MCS-79-05774-02; AF Proj. 2304)
(NASA-CR-16491; AD-A105415; LCDS-81-19; AFOSR-81-0670TR) Avail: NTIS HC A03/MF A01 CSCL 12A

The investigator surveyed a number of applications and problems motivating his current efforts on numerical techniques for parameter estimation in and optimal control of delay and partial differential equations. He then outlined two different approaches for establishing theoretical convergence results for estimation algorithms. An application of modal techniques to the investigation of transport in brain tissue is briefly explained. A sketch of a convergence theory for spline techniques for function space parameter estimation problems is given. GRA

N82-12840# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
KNOWLEDGE-BASED EXPERT SYSTEMS: A BRIEF BIBLIOGRAPHY
Michael D. Rychener 26 Jun. 1981 9 p
(Contract F33615-78-C-1551; ARPA Order 3597)
(AD-A104793; CMU-CS-81-127) Avail: NTIS HC A02/MF A01 CSCL 09/2

A number of Artificial Intelligence (AI) systems have appeared in recent years whose approaches appear very fruitful for a wide variety of real-world tasks that are performed by knowledgeable (but not necessarily understanding) experts. In the interest of acquainting a wider audience to a representative sampling of these systems, and especially to the approaches they embody, the following selective reading list is proposed. These readings are not overly technical, and usually make their main points by way of examples of natural language dialog between a user and the expert AI system. Papers usually contain further references to related work and background material. The intended audience includes engineers (especially designers), social scientists, computer specialists without AI background, and other professionals. In the following, I have grouped papers roughly into categories, some of which contain specific systems while others are broader overviews or even general introductions to the wider field of AI. In the interest of being representative, a number of systems of approximately equal significance to those given hear have been omitted. The papers here do in fact refer to these others. GRA

N82-12841# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
SEMANTICS OF INHERITANCE AND ATTRIBUTIONS IN THE DESCRIPTION SYSTEM OMEGA
Giuseppe Attardi and Maria Simi Aug. 1981 43 p refs
(Contracts N00014-80-C-0505; N00014-75-C-0522)
(AD-A104776; AI-M-642) Avail: NTIS HC A04/MF A01 CSCL 05/7

Omega is a description system for knowledge embedding which incorporates some of the attractive modes of expression in natural language such as descriptions, inheritance, quantification, negation, attributions and multiple viewpoints. Omega represent an investigation both on logic formalisms more expressive then first order predicate logic and on the foundations of knowledge representation. The logic of Omega combines mechanisms of the predicate calculus, type systems, and set theory. As a logic, Omega achieves the goal of an intuitively sound and consistent theory of classes which permits unrestricted abstraction within a powerful logic system. Description abstraction is the contruct provided in Omega corresponding to set abstration. Attributions and inheritance are the basic mechanisms for knowledge structuring. To achieve flexibility and incrementality, the language allows to express descriptions with an arbitrary number of attributions, rather then predicates with a fixed number of arguments as in predicate logic. This requires an unusual interpretation for instance descriptions, which in turn provides insights into the use and meaning of several kind of attributions. The logic foundations for Omega are investigated. Semantic models are provided, an axiomatization is derived and the consistency and completeness of the logic is established. Author (GRA)

N82-12842# Brookhaven National Lab., Upton, N. Y.
PROJECT IMPACT ANALYSIS AS AN OPTIMAL CONTROL PROBLEM
G. Anandalingam 1981 43 p refs Presented at the Joint Meeting of the Inst. of Management Sci. and Operations Res. Soc., Toronto, 3-6 May 1981
(Contract DE-AC02-76CH-00016)
(DE81-028465; BNL-29881; CONF-810542-5) Avail: NTIS HC A03/MF A01

The effects of a major investment project on a multi-sector less developed economy are analyzed. Single investment projects with external effects reaching across the entire economy are frequently encountered in developing countries. The Mahaweli Ganga development project in Sri Lanka, a multi-dam irrigation and hydroelectric power project is evaluated. The Mahaweli project calls for an annual investment level, in 1970 prices, of $150 million over a period of six years, which is 50 percent of the annual expenditure of the government. The project requires a large fraction of total investment over a medium term planning period and materially alters the existing supply and demand for major goods and services. The project is sufficiently large that its effect is economy-wide. The model used is a dynamic input-output optimizing model having the mathematical structure of an optimal control problem. DOE

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-12843 Iowa State Univ. of Science and Technology, Ames.
THE NUMERICAL SOLUTION OF FREDHOLM INTEGRAL EQUATIONS OF THE FIRST KIND Ph.D. Thesis
Kevin Ray Hickey 1981 135 p
Avail: Univ. Microfilms Order No. 8122522

A convergence theorem for Lee and Prenter's filtered least squares method for solving the Fredholm first kind equation Kf = g is corrected. Under suitable restrictions, the filtered least squares method is shown to be well-posed under compact perturbations in K and arbitrary perturbations in g. Several convergence results are proved for the M-solution. A modified Gram-Schmidt method for calculating the M-solution of Kf = g is compared to a modification of the normal equations method which is used to calculate the M-solution of Kf = g. This modified Gram-Schmidt method is shown to be well-posed under compact perturbations in K and arbitrary perturbations in g. A convergence theorem for Marti's method for solving the Fredholm first kind equation Kf = g is corrected. Marti's method is shown to be well-posed under perturbations in g. It is shown that Marti's method is not necessarily well-posed under compact perturbations in K. Dissert. Abstr.

N82-12844# Texas Univ., Austin.

NATURAL EXPONENTIAL FAMILIES WITH QUADRATIC VARIANCE FUNCTIONS

Carl N. Morris Jul. 1981 41 p Prepared jointly with Rand Corp., Santa Monica, Calif.
(Grant NSF MCS-80-03416)
(P-6637) Avail: NTIS HC A03/MF A01

The normal, Poisson, gamma, binomial, and negative binonial distributions are characterized as natural exponential families with quadratic variance functions. A sixth family is identified as being generated by the hyperbolic secant distribution. These families are examined in a unified way with respect to infinite divisibility, cumulants, orthogonal polynomials, large deviations, and limits in distribution. Insights are obtained concerning the possible limit laws and the self-regulating nature of infinite divisibility. R.J.F.

N82-12845*# College of William and Mary, Williamsburg, Va.

DEEP ANISTROPIC SHELL PROGRAM FOR TIRE ANALYSIS Final Report

Carl M. Andersen Washington NASA Nov. 1981 33 p refs
(Contract NAS1-15965)
(NASA-CR-3483) Avail: NTIS HC A03/MF A01 CSCL 12A

A finite element program was constructed to model the mechanical response of a tire, treated as a deep anisotropic shell, to specified static loads. The program is based on a Sanders Budiansky type shell theory with the effects of transverse shear deformation and bending-extensional coupling included. A displacement formulation is used together with a total Lagrangian description of the deformation. Sixteen-node quadrilateral elements with bicubic shape functions are employed. The Noor basis reduction technique and various type of symmetry considertions serve to improve the computational efficiency. M.G.

N82-12846# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.

A REGRESSION DESIGN APPROACH TO OPTIMAL AND ROBUST SPACING SELECTION

Randall L. Eubank Jul. 1981 20 p refs
(Contract N00014-75-C-0439)
(AD-A104728; TR-144) Avail: NTIS HC A02/MF A01 CSCL 12/1

The problem of location and/or scale parameter estimation using the asymptotically best linear unbiased estimator based on sample quantiles is considered. The problem of optimal spacing selection for these estimators is shown to be equivalent to the problem of regression design for time series with Brownian motion or Brownian bridge covariance structures and a particular variable knot spline approximation problem. This equivalence is employed, in conjunction with a regression framework, to investigate the asymptotic properties of certain spacing selection schemes. In particular, an asymptotic alternative is developed to a robust estimation procedure suggested by Chan and Rhodin (1980). Author (GRA)

N82-12847# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.

BIVARIATE CUMULANTS OF A SINGLY TRUNCATED BIVARIATE NORMAL DISTRIBUTION

Youn-Min Chou (Texas Univ. at San Antonio) and D. B. Owen Aug. 1981 9 p refs
(Contract N00014-76-C-0613)
(AD-A104914; TR-147) Avail: NTIS HC A02/MF A01 CSCL 12/1

A method of obtaining the bivariate cumulants of any order is given for a truncated bivariate normal distribution where one of the variates is truncated at w sub o. Some representative values are displayed in tables. Author (GRA)

N82-12848# Texas A&M Univ., College Station. Inst. of Statistics.

MINIMUM MEAN SQUARE ERROR PREDICTION OF AUTOREGRESSIVE MOVING AVERAGE TIME SERIES

H. Joseph Newton and Marcello Pagano (State Univ. of New York at Buffalo) Apr. 1981 29 p refs
(Contracts DAAG29-80-C-0070; N00014-81-MP-10001)
(AD-A104939; TR-N-24) Avail: NTIS HC A03/MF A01 CSCL 12/1

A computer program is described and presented for calculating finite memory predictors and prediction variances for autoregressive moving average time series models. The Cholesky decomposition algorithm is used, and a number of simplifying results are described and implemented in the program. Author (GRA)

N82-12849# Texas A&M Univ., College Station. Inst. of Statistics.

AUTOREGRESSIVE SPECTRAL ESTIMATION, LOG SPECTRAL SMOOTHING AND ENTROPY

Emanuel Parzen Jul. 1981 9 p refs
(Contract DAAG29-80-C-0070)
(AD-A104940; TR-N-26) Avail: NTIS HC A02/MF A01 CSCL 12/1

Two important methods of spectral estimation, autoregressive spectral estimation, and log spectral kernel estimation are derived from a minimum information divergence estimation principle. The fact that autoregressive spectral estimators are maximum entropy estimators is shown to be proved without the use of the calculus of variations using the properties of minimum information divergence estimation. Adaptive procedures for forming these estimators (and combining to form iterated estimators) are provided by order-determining and truncation point determining criteria, which are described. An estimated spectrum is given for Wolfer's sunspot data. Author (GRA)

N82-12850# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

A MODEL FOR UNCOORDINATED DISTRIBUTED COMPUTATION OF FIXED POINTS

Dimitri P. Bertsekas Sep. 1981 7 p refs
(Contract N00014-75-C-1183)
(AD-A104819; LIDS-P-1144) Avail: NTIS HC A02/MF A01 CSCL 09/2

We present an algorithmc model for distributed computation of fixed points whereby several processors participate simultaneously in the calculations while exchanging information via communication links. We place essentially no assumption on the ordering of computation and communication between processors thereby allowing for completely uncoordinated execution. We find that even under these potentially chaotic circumstances it is possible to solve several important classes of problems including the calculation of fixed points of contraction and monotone mappings arising in linear and nonlinear systems of equations, shortest path problems, and dynamic programming. Author (GRA)

N82-12851# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mathematical Sciences.

NUMERICAL METHODS FOR SINGULARLY PERTURBED DIFFERENTIAL EQUATIONS WITH APPLICATIONS Interim Report, 1 Jun. 1980 - 31 May 1981

Joseph E. Flaherty May 1981 18 p refs
(Grant AF-AFOSR-0192-80; AF Proj. 2304)
(AD-A105366; AFOSR-81-0626TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

During the period covered by this report, the investigator continued his research on the development and application of numerical methods for singularly-perturbed (or stiff) boundary value problems for ordinary differential equations. Results were obtained for collocation and finite difference methods for scalar and vector systems of two-point boundary value problems and for adaptive grid finite element methods for partial differential equations. His exponentially weighted finite element and spline in tension methods are being applied to partial differential

equations as well as to ordinary differential equations.
Author (GRA)

N82-12852# RAND Corp., Santa Monica, Calif.
SOLUTION METHODS ON ALGEBRA PROBLEMS WITH SIMULTANEOUS EQUATIONS
Jane Sachar Jan. 1981 24 p refs
(AD-A105178; RAND/P-6593) Avail: NTIS HC A02/MF A01 CSCL 12/1

Problem solving approaches often find a path from the givens to the unknown or from the unknown to the givens. This study explores those approaches using written protocols of Navy subjects while solving for the numerical value of an unknown from several knowns and a system of equations. For a subset of the items, solutions require subjects to retain expressions with both literals and numerals. Successful and unsuccessful students were similar in their preference to work backward and to use literals rather than numerals and in the efficacy of their solutions. Students acquired successful solution methods during instruction and used them consistently. Author (GRA)

N82-12853# SRI International Corp., Menlo Park, Calif.
TWO-DIMENSIONAL MESH AJUSTMENT ALGORITHM Annual Technical Report, 1 Jun. 1980 - 31 May 1981
C. M. Ablow and S. Schechter 17 Jul. 1981 6 p refs
(Contract F49620-77-C-0114; AF Proj. 2304)
(AD-A105439; AFOSR-81-0622TR; SRI-6469) Avail: NTIS HC A02/MF A01 CSCL 12/1

During the fourth year of research, the gradient and truncation error minimizing mesh adjustment algorithms have been applied to a reactive flow problem in one dimension and to basic illustrative examples in two dimensions. The methods increase the accuracy of a numerical solution with a fixed number of nodes. The storage needed for lower dimensional calculations is reduced, which makes higher dimensional ones feasible. Author (GRA)

N82-12854# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
AN ERROR ESTIMATE FOR THE H EXP (-1) GALERKIN METHOD FOR A PARABOLIC WITH NON-SMOOTH INITIAL DATA
Huang Mingyou and Vidar Thomee 1981 14 p refs
(CTH-Math-1981-11) Avail: NTIS HC A02/MF A01

A non-smooth data error estimate with respect to the L sub 2 norm for the continuous in time semidiscrete H (-1) Galerkin method is presented for an initial boundary value problem in a single space variable. If the trial and test spaces consist of piecewise polynomials of degree r-1 in C(k) and r+1 in C(k+2) respectively, with test functions satisfying boundary conditions, then the error norm is bounded by Ch(r)t(-r/2) for t positive, where h is the maximum mesh size. Author (ESA)

N82-12855# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
THE AUTOMATIC SOLUTION OF FREDHOLM EQUATIONS OF THE SECOND KIND
H. Schippers Dec. 1980 31 p refs Submitted for publication
(MC-NW-99/80) Avail: NTIS HC A03/MF A01; Stichting Mathemathisch Centrum, Amsterdam FL 4,20

A code for the automatic solution of Fredholm equations of the second kind, solve-int-eq, is presented. The linear system resulting from the discretization of the integral equation is iteratively solved by a multiple grid method. This method was selected because it has been shown that multiple grid processes take only O (N sup 2) arithmetic operations. For a variety of problems, the performance of solve-int-eq is compared with Aktinson's program iesimp. This program appears to be about 50% more expensive than solve-int-eq. Additionally, solve-int-eq was applied to the aerodynamic problem of calculation of potential flow around a Karman-Trefftz airfoil. Numerical examples were computed on a CDC Cyber 175 computer in single precision arithmetic. Results demonstrate the appropriateness of solve-int-eq to this class of aerodynamic problem. Author (ESA)

N82-12856# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
INSTRUCTIVE EXPERIMENTS WITH RUNGE-KUTTA-ROSENBRUCK METHODS
J. G. Verwer Mar. 1981 25 p refs Submitted for publication
(MC-NW-100/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3,15

Certain boundedness properties of Runge-Kutta-Rosenbrock methods when applied to nonlinear stiff systems are dealt with. Instructive examples and numerical experiments are performed with a number of simple two stage schemes and the Rosenbrock code ROW4A. Attention is paid to the conversion of nonautonomous problems to the autonomous form. An important conclusion is that this conversion may lead to a significant loss in accuracy. Author (ESA)

N82-12857# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
ON THE PRACTICAL VALUE OF THE NOTION OF BN-STABILITY
J. G. Verwer Mar. 1981 12 p refs Submitted for publication
(MC-NW-101/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3,15

A standard implementation of diagonally implicit Runge-Kutta methods, having equal diagonal elements, is discussed. Under what circumstances unconditional nonlinear stability can be realized in practice is questioned. The oldest concept of unconditional stability of numerical integration methods for ordinary differential systems is that of A-stability. This concept is related to linear systems having constant coefficients. There has been much interest in unconditional stability properties of numerical integration methods when applied to nonlinear dissipative systems (G-stability, BN-stability, A-contractivity). Various classes of implicit Runge-Kutta methods have already been shown to be BN-stable. However, contrary to the property of A-stability, when implementing such a method for practical use this unconditional stability property may be lost. This is clarified for the class of diagonally implicit methods and it is shown at the same time that Rosenbrock's method is not BN-stable. Author (ESA)

N82-12858# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
APPLICATION OF THE OSHER-ENGQUIST DIFFERENCE SCHEME AND THE FULL MULTIGRID METHOD TO A TWO DIMENSIONAL NONLINEAR ELLIPTIC MODEL EQUATION
E. J. vanAsselt Apr. 1981 19 p refs Submitted for publication
(MC-NW-103/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3,15

A nonlinear boundary value problem in two dimensions is considered. For the discretization of this boundary value problem, the Osher-Engquist difference scheme is used and the discrete equations are solved by a full multigrid method (FMGM). In the FMGM, a coarse to fine sequence of grids with uniform meshes is applied. The result obtained on a coarser grid serves as initial approximation to the solution on the finer grid. On each grid the discrete equations are solved by Newton iteration. The Newton equations are approximately solved by the iterative use of a linear multilevel algorithm. Numerical results are given and comparisons with the method of time steps show that the multigrid approach is far more efficient than the method with explicit time steps. Author (ESA)

N82-12859# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
ANALYSIS OF RICHARDSON ITERATION IN MULTIGRID METHODS FOR NONLINEAR PARABOLIC DIFFERENTIAL EQUATIONS
P. J. vanderHouwen and B. P. Sommeijer Apr. 1981 41 p refs Submitted for publication
(MC-NW-105/81) Avail: NTIS HC A03/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 5,25

The behavior of nonlinear Richardson iteration in multigrid methods for solving the implicit relations obtained when an implicit one step method is applied to the space discretized form of a nonlinear parabolic differential equation is analyzed. This analysis leads to an unconventional form of the Richardson method which turns out to be a remarkably efficient predictor formula to start the multigrid method. Numerical experiments are run with a two grid algorithm and a comparison is made with nonlinear Gauss-Seidel iteration. For large integration steps and for strongly nonlinear problems the Richardson iteration method appears to be superior to Gauss-Seidel iteration. Author (ESA)

N82-12860# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.

A SPECIAL CLASS OF MULTISTEP RUNGE-KUTTA METHODS WITH EXTENDED REAL STABILITY INTERVAL

P. J. vanderHouwen and B. P. Sommeijer May 1981 33 p refs Submitted for publication
(MC-NW-106/81) Avail: NTIS HC A03/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 4,20

A special class of k-step Runge-Kutta methods is investigated which is generated by nonlinear Chebyshev iteration (Richardson iteration) of an implicit linear multistep method. By terminating the iteration process after m iterations, a family of the k-step, m-stage Runge-Kutta method is obtained whose real stability interval can be derived for general values of k and m by a special application of the boundary locus method. The real stability boundary is maximized by choosing suitable values for the coefficients in the generating k-step method. The considerations are mainly restricted to second order methods. Examples are given for k = 1,2,3, and 4, and numerical experiments are reported with a nonlinear parabolic initial boundary value problem. Author (ESA)

N82-12861# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.

MODIFIED MULTILAG METHODS FOR VOLTERRA FUNCTIONAL EQUATIONS

P. H. M. Workenfelt Jun. 1981 33 p refs Submitted for publication
(MC-NW-108/01) Avail: NTIS HC A03/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 4,20

Linear multistep methods for ordinary differential equations in conjunction with a family of computationally efficient quadrature rules are employed to define a class of multilag methods for the solution of Volterra integral and integrodifferential equations. In addition, modified multilag methods are proposed which have the property that the stability behavior is independent of the choice of the quadrature rules. High-order convergence of the methods is established. In particular, a special class of high-order convergent methods is presented for the efficient solution of first kind Volterra equations. Numerical experiments are reported. Author (ESA)

N82-12862# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.

TWO THEOREMS ABOUT THE COMPLETENESS OF HOARE'S LOGIC

J. A. Bergstra (Leiden Univ.) and J. V. Tucker (Bristol Univ. England) Apr. 1981 16 p refs Submitted for publication
(MC-IW-165/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3,15

Two theorems about the completeness of Hoare's logic for the partial correctness of 'while' programs over an axiomatic specification are proven. The first result is a completion theorem: any specification (Sigma, E) can be refined to a specification (Sigma sub zero, E sub zero), conservative over (Sigma, E), whose Hoare's logic is complete. The second result is a normal form theorem: any complete specification (Sigma, E) possessing some complete logic for partial correctness can be refined to an effective specification (Sigma sub zero, E sub zero), conservative over (Sigma, E), which generates all true partial correctness formulas with Hoare's standard rules. Author (ESA)

N82-12863# Physics Lab. RVO-TNO, The Hague (Netherlands).

SIMULATION OF THE THERMAL BEHAVIOR OF AN OBJECT AND ITS NEARBY SURROUNDINGS

P. A. M. Jacobs Feb. 1980 96 p refs
(Contract A72/KL/026)
(PHL-1980-08; IDCK-73838) Avail: NTIS HC A05/MF A01

A physical-mathematical model which describes thermal behavior of an object in a natural environment is presented. An airtight rectangular box was fixed to a base which prevents evaporation, (brick, concrete, etc). Dimensions are arbitrary. The model is used to decide specifications for camouflage materials and/or to predict thermal contrasts. It calculates the daily course of temperature, sunshine etc. and the total irradiance incident on a detector at a given bearing. For given meteorological data the model solves the time dependant heat balance equation valid for the box surface and base. Effects of shadow, wind sheltering, etc., are taken into account. An explicit finite difference method is used for the algorithm. When checked against measurement (wind, solar irradiance, etc.) the model performs well. Author (ESA)

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-12864 Louisville Univ., Ky.

A STATISTICAL APPROACH TO FUZZY DATA ANALYSIS Ph.D. Thesis

Larry Wayne Lewis 1981 169 p
Avail: Univ. Microfilms Order No. 8121457

An extension of classical nonparametric hypothesis testing is given for the analysis of fuzzy-number data. An atypical format which permits a theoretical population containing fuzzified forms of data which reside in a classical population is discussed. A fuzzified parametric hypothesis testing format is given. This format lends itself to the direct analysis of fuzzy data sets of known distributional form. Both the nonparametric and the parametric procedures outlined for fuzzy data analyses reduce to their classical antecedents when the fuzzy numbers are sharp--i.e., real numbers. Dissert. Abstr.

N82-12865 California Univ., Los Angeles.

LOG ODDS RATIO ESTIMATION IN A GROUPED POPULATION Ph.D. Thesis

Richard Sposto 1981 237 p
Avail: Univ. Microfilms Order No. 8122850

A population consisting of a subpopulation of diseased individuals and one of nondiseased individuals, and made up of K-groups, such that the withingroup log odds ratio phi, of exposure to a factor is the same in all groups is considered. Methods to obtain point estimates and confidence intervals for phi in K-groups are examined. Some of the asymptotic properties of the point and interval estimators are derived and a sampling experiment is performed to assess and compare the small sample properties of these estimators. The study of properties of confidence intervals for the common log odds ratio is emphasized. It is indicated that the sampling experiment of the Mantel-Haenszel or unconditional maximum likelihood estimators of phi are at least as good as or preferable to the others. Dissert. Abstr.

N82-12866 California Univ., Los Angeles.

SPACE-TIME CLUSTERING ANALYSIS Ph.D. Thesis

Timothy Lane McAuliffe 1981 149 p
Avail: Univ. Microfilms Order No. 8120999

Methods for detecting space time clustering was surveyed. A method of testing for space time clustering which does not depend on arbitrary constants is proposed. Procedure is based on nearest neighbor distances. It is suggested that the powers of the Knox and the Mantel reciprocal transformation method are quite sensitive to the choice of their critical constants, with the Knox methods the more sensitive. The nearest neighbor approach has power usually as great as that of the Mantel procedure. The nearest neighbor approach is recommended for testing the presence of space time clustering based on its control of the true significance level, its power and its avoidance of choosing arbitrary constants. Dissert. Abstr.

N82-12867 California Univ., Los Angeles.

DISCRIMINATION RULES BASED ON MARGINAL DISTRIBUTIONS Ph.D. Thesis

Carl Edward Pierchala 1981 285 p
Avail: Univ. Microfilms Order No. 8121031

A new method of discriminant analysis used in a recent medical study was evaluated. The D-Rule method is based on the marginal distributions of the observations. For bivariate

Gaussian populations, results for the D-Rule were obtained and interpreted in geometric terms. The performance of Fisher's linear discrimination rule (LDR) in the case of the known univariate lognormal populations was examined. The effects of sample size and of missing values were studied. Sampling distributions of the cross-validation total probability of correct classification were compared by of box-and-whisker plots. The methods studied were the D-Rule; three variants thought to be improvements upon the D-Rule; and two versions of the LDR for missing data. The consequence of using the resubstitution total probability of correct classification to choose among the several rules is also studied.
Dissert. Abstr.

N82-12868 California Univ., Los Angeles.
OPTIMAL ADAPTIVE STOCHASTIC CONTROL OF LINEAR DYNAMICAL SYSTEMS WITH MULTIPLICATIVE AND ADDITIVE NOISE Ph.D. Thesis
Hagop Vartevar Panossian 1981 181 p
Avail: Univ. Microfilm Order No. 8121027

The adaptive stochastic control of linear multivariable discrete time systems with purely random parameters is investigated. No aposteriori learning is available for the system parameters and the control law is non-dual. In these cases of perfect measurement, the apriori level of uncertainty of the system parameters modulates the control law and the certainty equivalence principle does not apply. It is shown that for the linear-quadractic Gaussian (LQG) optimal control problem the steady-state solution exists only under certain conditions. The stability and optimality are treated and contrasted by studying the discounted cost version of the LQG problem. For the situation of noisy measurement, the problem of estimating the plant phase coordinate vector is considered. An algorithm is developed which is of lower dimension than the Kalman-Bucy filtering algorithm. The control law requires the solution of a coupled, highly nonlinear two point boundary value problem. Computer simulations of the forward and backward difference equations involved are presented for some insight for the closed-loop system.
Dissert. Abstr.

N82-12869 Illinois Univ. at Chicago Circle, Chicago.
ERROR PROPAGATION IN THE GRAVITY MODEL Ph.D. Thesis
James Stuart Weber 1981 216 p
Avail: Univ. Microfilms Order No. 8120574

The need for modeling of flows, the frequent use of the gravity family of models, the necessity for a basic statistical perspective, and the calculus notation needed for the study of error propagation in a multidimensional setting are reviewed. Two procedures for computing the linear estimates of the error propagation for the doubly constrained gravity model are derived, and the appropriate procedure for the estimation of confidence intervals for minority employment given certain aggregate statistics, the estimation of confidence intervals for doubly constrained gravity model forecasts, and the more efficient updating of doubly constrained gravity model flows are applied. The error propagation statistics for the generalized gravity model separation factor parameters is studied. Error propagation is examined in the context of model output in terms of estimates of expected flows, of forecasts of flows, and of an efficient updating procedure as well as in the context of variable selection and fitting the model to observed data.
Dissert. Abstr.

N82-12870 Texas A&M Univ., College Station.
A QUANTILE FUNCTION APPROACH TO THE k-SAMPLE QUANTILE REGRESSION PROBLEM Ph.D. Thesis
James Michael White 1981 122 p
Avail: Univ. Microfilms Order No. 8121975

A procedure for estimating the parameters of a quantile regression function is investigated. The procedure is based on the work of Parzen (1979a) in the theory of quantile functions and is applicable to a wide range of distributional families. The procedure assumes the quantile functions of k populations to be location-scale shifts of a common quantile function. First, a goodness-of-fit procedure for determining the common distributional shape of the k populations generalizes the one-population data modeling techniques of Parzen. An estimator of the shape parameter of a distribution is also investigated. A regression model for the location and scale parameters is specified, and the resulting estimators of the regression parameters are used to determine a regression function for any quantiles of the observed data. Finally it is shown that inferences about the quantile relationships can be based on the asymptotic normality of the estimated parameters. The procedures are applied to some published data sets.
Dissert. Abstr.

N82-12871 Illinois Univ. at Chicago Circle, Chicago.
ON PROBABILITY PROPORTIONAL TO SIZE SAMPLING DESIGNS: THEIR CONSTRUCTION, ALGEBRAIC PROPERTIES, AND APPLICATIONS Ph.D. Thesis
Bing-Ying Lang Lin 1981 78 p
Avail: Univ. Microfilms Order No. 8120568

A special method of sample selection, the so-called probability proportional to size sampling designs (abbreviated to PPS sampling designs) is presented. A sample, flexible, complete class type procedure is devised to construct PPS sampling designs (without replacement) for any sample size. The procedure for constructing a PPS sampling design is described. An algebraic interpretation of PPS sampling designs is described. Utilizing this algebraic interpretation, PPS sampling designs with property (2) are found by solving some related linear programming problems.
Dissert. Abstr.

N82-12872 Kentucky Univ., Lexington.
THE DISTRIBUTION OF QUADRATIC FORMS IN NORMAL VARIABLES WITH APPLICATIONS TO THE COMPARISON OF VARIABLE SELECTION CRITERIA Ph.D. Thesis
Robert Hayes Brown 1981 115 p
Avail: Univ. Microfilms Order No. 8121606

Some existing representations for the distribution function of quadratic forms in normal variables are reviewed and are found to lead to inefficient computational algorithms. In the positive definite case it is shown that these inefficiencies can be overcome through a simple rearrangement in the order of computations. These representations are then extended to the case of indefinite quadratic forms and it is shown that the computational efficiencies carry over to the more general case. Some well-known results concerning the mean squared error function of preliminary test estimates are reviewed and are seen to be restricted to the case where the test statistic is a simple function of the residual sum of squares of the given models. These results are then extended to the more general case where the test statistic is only assumed to be a quadratic form in the observations. The resultant mean squared error function is seen to involve the distribution function of a quadratic form in normal variables. Two variable selection criteria are then compared.
Dissert. Abstr.

N82-12873 Cornell Univ., Ithaca, N. Y.
CONFIDENCE INTERVAL ESTIMATION AND TESTS FOR TEMPORARY OUTMIGRATION IN TAG-RECAPTURE STUDIES Ph.D. Thesis
John Paul Balser 1981 215 p
Avail: Univ. Microfilms Order No. 8119520

A probability model was devised using the conditional distribution of the subsequent recaptures of the marked animals released at the various sample times, given appropriate summary statistics. The test is based on the chi square distribution and the power of the test is approximated for a number of possible parameter configurations by Monte Carlo simulation. The conditional test is derived and its power examined for the multiple recapture experiment as analyzed by the Jolly-Seber method, and for the bird banding study, a type of single recapture census. The power of this test is approximated by Monte Carlo simulation and is compared to that of the conditional test. For the Jolly-Seber method, the maximum likelihood estimate and two unbiased type estimates are examined. It is concluded that the confidence interval based on the natural logarithmic transformation is best for the Jolly-Seber estimate of survival, and that based on the square root transformation is best or the bird banding survival estimate.
Dissert. Abstr.

N82-12874# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
DEVELOPMENT AND ANALYSIS OF A MODIFIED SCREENING PROCEDURE TO INCREASE ACCEPTABLE PRODUCT
Youn-Min Chou (Texas Univ. at San Antonio) and D. B. Owen

Aug. 1981 16 p refs
(Contract N00014-76-C-0613)
(AD-A104936; TR-148) Avail: NTIS HC A02/MF A01 CSCL 12/1

Much work has been done on screening procedures under the assumption of a bivariate normal distribution. However, very little effort has been expended on data which are from a truncated bivariate normal distribution. Methods are developed for a screening procedure to increase acceptable product from a truncated distribution. An acceptance criterion on a linear combination of the largest order statistics from a truncated normal population with a given truncation point is discussed. This paper also uses the approximate distribution of the sample correlation coefficient in random samples of any size drawn from a singly truncated bivariate normal distribution to obtain a lower confidence limit on the population correlation coefficient sigma. The screening procedure discussed here is based on knowledge of the truncation point, the sample size and the lower confidence limit for sigma. Author (GRA)

N82-12875# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
ON THE COMPUTATION OF OPTIMAL DESIGNS FOR CERTAIN TIME SERIES MODELS WITH APPLICATIONS TO OPTIMAL QUANTILE SELECTION FOR LOCATION OR SCALE PARAMETER ESTIMATION
Randall L. Eubank, Patricia L. Smith, and Philip W. Smith Jul. 1981 28 p refs Prepared in cooperation with Old Dominion Univ., Norfolk, Va.
(Contract N00014-75-C-0439; Grant DAHC04-75-0816)
(AD-A104935; TR-146) Avail: NTIS HC A03/MF A01 CSCL 12/1

Using the results of Chow (1978) on the optimal placement of knots in the approximation of functions by piecewise polynomials, an algorithm is presented for the computation of optimal designs for certain time series models considered by Eubank, Smith and Smith (1981). The ideas underlying this algorithm form a unified approach to the computation of optimal spacings for the sample quantiles used in the asymptotically best linear unbiased estimator of a location or scale parameter. GRA

N82-12876# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
VARIANCES FOR ADAPTIVE TRIMMED MEANS
John E. Boyer, Jr. Aug. 1981 18 p refs
(AD-A104913; TR-145) Avail: NTIS HC A02/MF A01 CSCL 12/1

Variances for adaptive estimators of the location parameter in a family of symmetric distributions including the uniform, normal, and double exponential are examined at small to moderate sample sizes. The estimators are all trimmed means or means of trimmings where the proportion of trimming is determined by an easily computed measure of nonnormality. Comparisons are made to the asymptotic variances. Author (GRA)

N82-12877# Texas A&M Univ., College Station. Inst. of Statistics.
COMMENTS ON THE MEASUREMENT OF LINEAR DEPENDENCE AND FEEDBACK BETWEEN MULTIPLE TIME SERIES BY JOHN GEWEKE
Emanuel Parzen Jul. 1981 12 p refs Presented at the Am. Statist. Assoc. Ann. Meeting, Detroit, 13 Aug. 1981
(Contracts DAAG29-80-C-0070 N00014-81-MP-10001)
(AD-A104741; TR-N-27) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper is a discussion presented August 13, 1981 at the American Statistical Association Annual Meeting in Detroit of an invited paper by John Geweke entitled 'The Measurement of Linear Dependence and Feedback Between Multiple Time Series'. It shows how the results presented by Geweke can be derived and clarified using the approaches to multiple time series modeling published in Parzen (1967), (1969), (1977), and Parzen and Newton (1979). GRA

N82-12878# Texas A&M Univ., College Station. Inst. of Statistics.
THE FINITE MEMORY PREDICTION OF COVARIANCE STATONARY TIME SERIES
H. J. Newton and Marcello Pagano (State Univ. of New York at Buffalo) Apr. 1981 17 p refs
(Contracts DAAG29-80-C-0070; N00014-81-MP-10001; N00014-78-C-0599; Grant NCI CA-28066)
(AD-A105413; TR-N-21) Avail: NTIS HC A02/MF A01 CSCL 12/1

An algorithm is presented for conveniently calculating h step ahead minimum mean square linear predictors and prediction variances given a finite number of observations from c covariance stationary time series Y. It is shown that elements of the modified Cholesky decomposition of the covariance matrix of observations play the role in finite memory prediction that the coefficients in the infinite order moving average representation of Y play in infinite memory prediction. The algorithm is applied to autoregressive-moving average time series where further simplifications are shown to occur. A numerical example illustrating the basic points of the general algorithm is presented. Author (GRA)

N82-12879# Texas A&M Univ., College Station. Inst. of Statistics.
ON SOME NUMERICAL PROPERTIES OF ARMA PARAMETER ESTIMATION PROCEDURES
H. Joseph Newton Jul. 1981 8 p refs
(Contract DAAG29-80-C-0070)
(AD-A104938; TR-N-25) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper reviews the algorithms used by statisticians for obtaining efficient estimators of the parameters of a univariate autoregressive moving average (ARMA) time series. The connection of the estimation problem with the problem of prediction is investigated with particular emphasis on the Kalman filter and modified Cholesky decomposition algorithms. A result from prediction theory is given which provides a significant reduction in the computations needed in Ansley's (1979) estimation procedure. Finally it is pointed out that there are many useful facts in the literature of control theory that need to be investigated by statisticians interested in estimation and prediction problems in linear time series models. Author (GRA)

N82-12880# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands). Afd. Wageningen.
FITTING OF NEGATIVE BINOMIAL DISTRIBUTIONS USING THE APL PROGRAM GRPFITNEG [HET AANPASSEN VAN NEGATIEF BINOMIALE VERDELINGEN MET HET APL-PROGRAMMA GRPFITNEG]
C. J. F. terBraak Delft Netherlands Organization for Applied Scientific Research TNO Sep. 1979 32 p refs In DUTCH
(A-79-ST-44-24) Avail: NTIS HC A03/MF A01

The program calculates the maximum likelihood estimates for parameters of negative binomial distributions and verifies if these distributions have equal expectancy and/or equal form parameters. The estimates are iteratively calculated using the Newton-Raphson method. The program is not suited to very large (>100) values of probability and form parameter. Author (ESA)

N82-12881# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
NORM CONDITIONS FOR THE PATH REGULARITY OF RANDOM PROCESSES
Olav Kallenberg 1981 16 p refs
(CTH-Math-1981-12) Avail: NTIS HC A02/MF A01

Norm continuous L sub p processes of bounded L sub p-variation (p >1) are shown to be absolutely continuous with respect to some fixed measure. Moreover, the rate of convergence of the norm sums for finite interval partitions provides precise information on the sample path behavior of the process and its density, such as Lipschitz conditions on the process or its density, and absolute continuity of the density. A basic role is played by a general norm inequality for L sub p random variables of independent interest. Author (ESA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-12882 Pennsylvania State Univ., University Park.
LARGE-SCALE SYSTEMS OPTIMIZATION USING NONLINEAR INTEGER GOAL PROGRAMMING METHODS Ph.D. Thesis
Charles Hulbert Alvord, III 1981 199 p
Avail: Univ. Microfilms Order No. 8120397

Hybrid algorithms for solving large scale optimization problems which contain nonlinear constraints and/or objectives and discrete decision variables are presented. Goal programming fundamentals are used and several heuristics are combined with the modified Hooke-Jeeves pattern search technique. Nonlinear programming methods, discrete optimization methods, and heuristics are reviewed. Each method is evaluated for suitability in the content of a nonlinear integer goal programming algorithm. Arguments on the computational complexity of heuristic methods are summarized. The algorithm is applied to two real world large scale multi-objectie optimization problems, the system partitioning problem and the distributed processing design problem. The algorithm's performance is shown empirically for these problem types. Dissert. Abstr.

N82-12883 Illinois Univ. at Chicago Circle, Chicago.
SATISFACTORY SOLUTIONS APPROACH TO CONTROL AND OPTIMIZATION OF LARGE-SCALE SYSTEMS Ph.D. Thesis
Nachappagounder Gopalsami 1981 152 p
Avail: Univ. Microfilms Order No. 8120565

The design of decentralized control structures with minimum communication links among the controllers is considered. The decomposition of a large system problem into subproblems corresponding to subsystems and the coordination of the solution of these subproblems to obtain the overall solution is described. A multilevel feedback scheme is considered, in which the subsystems are decoupled by ignoring the interactions and the local controllers are designed in an optimal control theoretic setup. These subsystems are then interconnected and coordinated using the interaction variables in a feedback form. The degree of suboptimality of the derived control law can be inferred from a theoretical result, which provides a lower as well as an upper bound on the optimal index. An alternate approach to coordination is devised to make use of the cooperative aspect of the subsystems. The necessary mathematical framework to define and quantify a satisfactory solution is developed by considering a parameter optimization problem with a vector type of performance index. Numerical examples are presented to illustrate the solutions approach. A decentralized type of control for an interconnected power system is devised. Dissert. Abstr.

N82-12884# Stanford Univ., Calif. Center for Research on Organizational Efficiency.
TOPICAL SURVEY, 1980-1981 Progress Report
Mar. 1981 36 p refs
(Contract N00014-79-C-0685)
(AD-A105117) Avail: NTIS HC A03/MF A01 CSCL 12/1

The work at the center on game-theoretic models of multiperson decision problems has strengthened the analytical tools available to study the phenomena of organizations. There are bright prospects that several of the more intractible topics can be addressed a new with better chances of clear-cut resolution. To take a specific example, we are particularly interested in developing the theory of bargaining modeled as a dynamic game with incomplete information. That is, bargaining or negotiations are typically affected by incomplete information about each other's preferences, resources, and opportunities. At the same time, bargaining is inherently a dynamic process of offers and counteroffers, perhaps interrupted by combative tactics (strikes, lockout, 'war'). It seems clear that the analysis of such a model can proceed smoothly along the lines developed in work to date. GRA

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-12885*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A NUMERICAL SOLUTION FOR TWO-DIMENSIONAL FREDHOLM INTEGRAL EQUATIONS OF THE SECOND KIND WITH KERNELS OF THE LOGARITHMIC POTENTIAL FORM
Ralph E. Gabrielsen and Aynur Uenal Nov. 1981 10 p refs
(NASA-TM-81299; USAAVRADCOM-TR-81-A-20; A-8603)
Avail: NTIS HC A02/MF A01 CSCL 12A

Two dimensional Fredholm integral equations with logarithmic potential kernels are numerically solved. The explicit consequence of these solutions to their true solutions is demonstrated. The results are based on a previous work in which numerical solutions were obtained for Fredholm integral equations of the second kind with continuous kernels. Author

N82-12886# Carnegie-Mellon Univ., Pittsburgh, Pa. Graduate School of Industrial Administration.
OPTIMAL INTEGER AND FRACTIONAL COVERS: A SHARP BOUND ON THEIR RATIO
Egon Balas May 1981 12 p
(Contract N00014-75-C-0621; NR Proj. 047-048)
(AD-A104829; MSRR-475) Avail: NTIS HC A02/MF A01 CSCL 12/1

The ratio of the values of optimal integer and fractional solutions to a set covering problem was shown by Johnson and Lovasz to be bounded by B(d) = 1 + ln(d), where d is the largest column sum. GRA

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-12887# GTE Labs., Inc., Waltham, Mass.
FUNDAMENTALS OF MAGNETIC INTERACTIONS: NEW APPROACHES TO THEORY AND EXPERIMENT Final Report, 16 Jun. 1979 - 14 Jun. 1981
A. Lempicki, W. J. Miniscalco, B. C. McCollum, E. J. Johnson, R. W. Davies, R. Gamache (Lowell Univ.), S. J. Nettel (Rensselaer Polytechnic Inst.), and N. Sanford (Rensselaer Polytechnic Inst.) Aug. 1981 69 p refs
(Contract F49620-79-C-0182; AF Proj. 2301)
(AD-A105003; AFOSR-81-0676TR) Avail: NTIS HC A04/MF A01 CSCL 20/3

Optically induced changes in magnetization (optomagnetism) have been observed for CdCr2Se4 and several other magnetic semiconductors. The effect has never been adequately explained although the most likely cause is RKKY coupling through optically excited carriers. Optomagnetism and other manifestations of carrier-spin interaction are intimately related to the electronic structure of these materials, particularly the narrow d and f bands. Realistic theories of these effects are lacking, in part because of the controversy surrounding the electronic structure of many of these materials. GRA

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-12888 Johns Hopkins Univ., Baltimore, Md.
INVESTIGATIONS OF THE REFLECTION, TRANSMISSION, AND CONVERSION OF ULTRASONIC WAVES Ph.D. Thesis
Hugh Miles South 1981 134 p
Avail: Univ. Microfilms Order No. 8120048

A theory describing the reflection, transmission, and mode conversion of surface waves at the corners of wedges is developed. The theory is an asymptotic one, and the mathematics is developed for two regions of wedge: near the apex and far from the apex. The reflection and transmission coefficients of the surface waves are calculated and are shown to compare favorably with experimental results. The partition of power between the various wave types is also calculated. This partition provides a good check on the internal consistency of the theory. Next a optical technique for the measurement of bulk waves is described, and measurements using this technique are presented. The relationship between bulk waves and the optical properties of the sample material is then examined in detail. Experimental results are presented to confirm the theoretical predictions. Dissert. Abstr.

N82-12889*# National Aeronautics and Space Administration. Pasadena Office, Calif.

ACOUSTIC SYSTEM FOR MATERIAL TRANSPORT Patent Application

Martin B. Barmatz (JPL, California Inst. of Tech., Pasadena), Eugene Trinh (JPL, California Inst. of Tech., Pasadena), Taylor G. Wang (JPL, California Inst. of Tech., Pasadena), Daniel D. Elleman (JPL, California Inst. of Tech., Pasadena), and Nathan Jacobi, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 26 Oct. 1981 17 p
(Contract NAS7-100)
(NASA-Case-NPO-15453-1; US-Patent-Appl-SN-314929) Avail: NTIS HC A02/MF A01 CSCL 20A

An object within a chamber is acoustically moved by applying wavelengths of different modes to the chamber to move the object between pressure wells formed by the modes. In one system, the object is placed in one end of the chamber while a resonant mode, applied along the length of the chamber, produces a pressure well at the location. The frequency is then switched to a second mode that produces a pressure well at the center of the chamber, to draw the object. When the object reaches the second pressure well and is still traveling towards the second end of the chamber, the acoustic frequency is again shifted to a third mode (which may equal the first mode) that has a pressure well in the second end portion of the chamber, to draw the object. A heat source may be located near the second end of the chamber to heat the sample, and after the sample is heated it can be cooled by moving it in a corresponding manner back to the first end of the chamber. The transducers for levitating and moving the object may be all located at the cool first end of the chamber. NASA

N82-12890*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NUMERICAL TECHNIQUES IN LINEAR DUCT ACOUSTICS, 1980-81 UPDATE

Kenneth J. Baumeister 1981 51 p refs Presented at the 102 Winter Ann. Meeting, Washington, D.C., 15-20 Nov. 1981; sponsored by ASME
(NASA-TM-82730; E-1034) Avail: NTIS HC A04/MF A01 CSCL 20A

A review is presented covering finite element and finite difference analysis of small amplitude (linear) sound propagation in straight and variable area ducts. This review stresses the new work performed during the 1980-1981 time frame, although a brief discussion of earlier work is also included. Emphasis is placed on the latest state of the art in numerical techniques. Author

N82-12891*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

VERIFICATION OF AN ACOUSTIC TRANSMISSION MATRIX ANALYSIS OF SOUND PROPAGATION IN A VARIABLE AREA DUCT WITHOUT FLOW

J. H. Miles 1981 15 p refs Presented at the 102 Meeting of the Acoustical Soc. of Am., Miami Beach, Fla., 1-4 Dec. 1981
(NASA-TM-82741; E-1053) Avail: NTIS HC A02/MF A01 CSCL 20A

A predicted standing wave pressure and phase angle profile for a hard wall rectangular duct with a region of converging-diverging area variation is compared to published experimental measurements in a study of sound propagation without flow. The factor of 1/2 area variation used is sufficient magnitude to produce large reflections. The prediction is based on a transmission matrix approach developed for the analysis of sound propagation in a variable area duct with and without flow. The agreement between the measured and predicted results is shown to be excellent. Author

N82-12892# Naval Underwater Systems Center, New London, Conn. Surface Ship Sonar Dept.

REGIONAL DEPENDENCE OF VERY LOW-FREQUENCY SOUND ATTENUATION IN THE DEEP SOUND CHANNEL: CORRELATION WITH INTERNAL WAVE MEASUREMENTS

David G. Browning, Michael J. Fecher, and Robert H. Mellen 22 Sep. 1981 16 p Conf. held at Honolulu, Hawaii, 27 Nov. - 1 Dec. 1978
(AD-A105061; NUSC-TD-6561) Avail: NTIS HC A02/MF A01 CSCL 20/1

The most promising mechanism for the very low-frequency sound attenuation observed in the deep sound channel is diffusive scattering by internal waves. Mellen, et al. (1976) have obtained estimates for the extra attenuation using the Garrett-Munk internal wave model and found consistency with the lower experimental values reported. Kibblewhite, et al. (1976) have shown a definite regional dependence in the Pacific. This paper compares regional oceanographic measurements with the Garrett-Munk internal wave model and also correlate local acoustic measurements with estimates of the extra attenuation. GRA

N82-12893# Georgetown Univ., Washington, D.C. Dept. of Physics.

SOME ASPECTS OF ULTRASONIC NONSPECULAR REFLECTION Technical Report, 15 Oct. 1980 - 30 Sep. 1981

Walter G. Mayer and Tran D. K. Ngoc Oct. 1981 18 p refs
(Contract N00014-78-C-0584)
(AD-A105225; GUUS-10814) Avail: NTIS HC A02/MF A01 CSCL 20/1

A general description is given of the ultrasonic nonspecular reflection and transmission effects for layered media. This description forms the basis for evaluation, via acoustooptic interaction techniques to measure reflectivity from solid plates in a liquid and also for the detection of local inhomogeneities of the plate. Author (GRA)

N82-12894# Southampton Univ. (England).

RESEARCH ACTIVITIES REPORT OF THE INSTITUTE OF SOUND AND VIBRATION RESEARCH Annual Report

1981 75 p refs
Avail: NTIS HC A04/MF A01

A list of research areas in acoustics is furnished including: fluid dynamics and acoustics; automotive engineering; audiology and human effects; and structures and machinery. A compendium of computer programs with details of use, language, etc., is appended. Current projects on noise reduction and noise effects are ennumerated. Author (ESA)

N82-12895# Statens Provningsanstalt, Goraas (Sweden).

MEASUREMENT OF SOUND ABSORPTION OF SCREENS

Hans Jonasson Dec. 1979 53 p refs
(SP-RAPP-1979-31) Avail: NTIS HC A04/MF A01

A method for measurement in a reverberation room is given. Screens are randomly arranged in discrete positions with a minimum distance of 2 m between them. No screen is closer than 1 m to any reflecting surface. The measurements are carried out in 1/3 octave bands in the frequency range 100 to 5000 Hz. Below 300 Hz separate measurements with at least two sound sources, 3m apart, are made. Recordings are made with at least five microphone positions. Minimum number of decays for each frequency band is 10. A significant difference is shown between in-line and discrete positioning of screens. Discrete positions are recommended. Author (ESA)

N82-12896# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

EFFECT OF THE ORIENTATION OF THE SPEAKER'S HEAD AND AZIMUTH OF A NOISE SOURCE ON THE SPEECH RECEPTION THRESHOLD FOR SENTENCES

R. Plomb and A. M. Mimpen 1980 12 p refs Submitted for publication

(IZF-1980-18; TDCK-75015) Avail: NTIS HC A02/MF A01

The speech reception threshold (SRT) for sentences in a free field condition was investigated as a funcion of (1) the orientation of the speaker's head, and (2) the azimuth of a noise source, with the listener always looking in the direction of the speaker. A miniature electric microphone with a flat frequency response was glued to the upper lip of a pseudospeaker standing 2 m from a loudspeaker. For each of ten directional orientations of the pseudospeaker, corresponding to angles, of zero deg, 22.5 deg, 45 deg, 90 deg, and 180 deg relative to the loudspeaker, a list of 13 sentences was reproduced and rerecorded through the microphone. Results show that (1) the maximum effect of direction in speech radiation from the mouth of the speaker is, in terms of signal to noise ratio, 6 dB, and (2) the maximum effect of the azimuth of the noise source is 10 dB. Author (ESA)

N82-12897# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 7: Acoustics.
NONLINEAR INTERACTION OF SOUND WAVES IN WATER: EXPERIMENTS WITH PARAMETRIC ARRAYS
J. Verbiest, P. L. Rosenkranz, and J. M. H. Theunissen Oct. 1979 61 p refs
(PHL-1979-44; TDCK-73423) Avail: NTIS HC A04/MF A01

The theory of nonlinear interaction of sound waves and approaches to numerical prediction of parametric sound generation in water are presented. Lighthill's wave equation, nonlinearity in fluids, second order wave equations, collinear plane waves, attenuation effects, and calculation of the second order sound field are discussed. Sound pressure is measured as a function of range and azimuth angle with a hydrophone. A discrepancy between measured and predicted curves based on difference frequencies is shown. Author (ESA)

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-12898# Arizona Univ., Tucson. Optical Sciences Center.
TIME-OF-FLIGHT SPECTROSCOPY OF MOLECULAR STRUCTURE, COLLISION PROCESSES AND GAS-SURFACE INTERACTIONS Annual Technical Report, 15 Jun. 1980 - 14 Jun. 1981
Willis E. Lamb, Jr. and Laurence C. McIntyre, Jr. 15 Jul. 1981 9 p
(Grant AF-AFOSR-0218-80; AF Proj. 2301)
(AD-A105438; AFOSR-81-0644TR) Avail: NTIS HC A02/MF A01 CSCL 20/7

Progress is reported on research in molecular physics involving electron-bombardment molecular dissociation. The velocity distribution of metastable and ionic fragments are measured using a pulsed electron beam and a time-of-flight technique. Fragments from the hydrogen molecule and its deuterated forms have been investigated using electron energies from 30 to 100 electron-volts. Dissociation channels via particular molecular or molecular ion excited states have been proposed to explain observed features in the velocity spectra. A similar experiment involving hydrogen fragments from the hydrogen halides is also in progress. Preliminary data show several resolved velocity groups indicating the presence of multiple dissociating channels. Experiments using water and hydrogen sulfide molecules are also underway. Finally, we are continuing to develop our ion mass filter which allows us to obtain separate ion velocity distributions for each mass in a situation in which several ion masses are present. Author (GRA)

N82-12899# California Univ., Berkeley. Dept. of Chemistry.
INTERACTION POTENTIALS BETWEEN RARE GAS ATOMS AND HOLOGEN ATOMS Final Report, 1 Dec. 1977 - 1 Dec. 1980
Yuan T. Lee 10 Jun. 1981 75 p refs
(Contract N00014-77-C-0101)
(AD-A104836) Avail: NTIS HC A04/MF A01 CSCL 20/7

Interaction potentials are investigated for F + Ne, Ar, Kr, Xe, Cl + Xe and Br + Ar, Kr, Xe from the measurements of elastic differential cross sections in crossed molecular beams experiments. The general trend of the transition from van der Waals interactions to chemical interactions is carefully examined. Author (GRA)

N82-12900# Colorado State Univ., Fort Collins. Dept. of Chemistry.
OXYGEN INDUCED TRIPLET STATE TRANSITIONS OF BENZENE IN CRYOGENIC SOLUTIONS
J. Lee and E. R. Bernstein 16 Sep. 1981 21 p refs Submitted for publication Sponsored in part by ONR and NSF
(Contract N00014-79-C-0647)
(AD-A105432; TR-4) Avail: NTIS HC A02/MF A01 CSCL 07/3

A new way of investigating the oxygen induced triplet state transitions of simple organic molecules is presented. The method involves dissolving the organic along with oxygen in hydrocarbon liquids such as propane, ethane, or propene. Both triplet B(lu) from singlet A(lg) and triplet E(lu) from singlet A(lg) transitions of C6H6 and C6D6 are studied in this work. These results indicate that both triplet states and their vibrational spacings are quite sensitive to the environment. The suggested dominant feature of the triplet B(lu) state of C6H6 is nu(8) (916 per cm) of e(2g) symmetry. Observed triplet state intensity enhancement is believed to be due to a non-statistical oxygen/benzene van der Waals complex formed in the low temperature liquid. Author (GRA)

N82-12901# Naval Research Lab., Washington, D. C.
DYNAMICS OF AN INTENSE RELATIVISTIC ELECTRON BEAM INJECTED INTO FULL DENSITY AIR
R. B. Fiorito, E. W. Fordham, J. R. Greig, R. E. Pechacek, J. D. Sethian, R. F. Fernsler, and J. C. Halle 21 Sep. 1981 43 p refs
(RR0110941)
(AD-A104743; NRL-MR-4557) Avail: NTIS HC A03/MF A01 CSCL 20/8

We have injected an intense relativistic electron beam (about 1 Mev, 16 kA, 25 ns) into the atmosphere and observed the beam in visible light caused by direct beam excitation of air molecules. The emitted visible light was primarily emission in the 2nd positive system of N2 which was delayed with respect to the beam current by about 6 ns but had the same duration (FWHM) as the beam current. Streak photographs of the beam in this visible light were taken with an Imacon 790 camera at various axial positions with a camera time resolution of about 1 ns. These photographs show that the beam remained a single current filament which oscillated about its initial direction as it propagated through the atmosphere, and that while the 'body' of the beam was pinched to a radius of < or = 5 cm the 'nose' was expanded to give the characteristic trumpet-like shape. Beam and net current monitors were used to determine the beam current and the plasma return current whose peak value was > or = 60% of the peak beam current. Comparison of the measured net current to that predicted from the calculated air conductivity and a simple circuit model to represent the beam propagating in the atmosphere showed good agreement provided a transmission line model including the capacitance of the beam in the ionized atmosphere was used. Author (GRA)

N82-12902# Sandia Labs., Albuquerque, N. Mex. Theoretical Div.
BREMSSTRAHLUNG ENERGY SPECTRA FROM ELECTRONS OF KINETIC ENERGY 1 keV LESS THAN OR EQUAL TO T LESS THAN OR EQUAL TO 2000 keV INCIDENT ON NEUTRAL ATOMS 1 LESS THAN OR EQUAL TO Z LESS THAN OR EQUAL TO 92
Lynn Kissel, Crawford MacCallum, and R. H. Pratt (Pittsburgh Univ.) Aug. 1981 73 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030984; SAND-81-1337) Avail: NTIS HC A04/MF A01

Theoretical predictions for the electron bremsstrahlung energy spectrum from neutral atoms as a function of atomic number Z, incident electron kinetic energy T, and fraction of energy radiated k/T (k is the emitted photon energy) were tabulated. Values for

2 less than or equal to Z less than or equal to 92 were obtained by interpolation from a smaller set of calculated data points. The calculated points were obtained by describing bremsstrahlung as a single-electron transition in a relativistic self-consistent screened potential. Tabulated values for Z = 1 are obtained from the formfactor corrected Born approximation times the Elwert Factor. The tables correct errors found in a previous tabulation. Various plots of the tabulation are presented and the general behavior of the energy sspectrum is discussed. Energy scaling of the spectrum is investigated and T/Z is found to best scale the data. DOE

N82-12903# Oak Ridge National Lab., Tenn. Engineering Physics Div.
PAPIN: A FORTRAN-4 PROGRAM TO CALCULATE CROSS SECTION PROBABILITY TABLES, BONDARENKO AND TRANSMISSION SELF-SHIELDING FACTORS FOR FERTILE ISOTOPES IN THE UNRESOLVED RESONANCE REGION
J. G. Munoz-Cobos Aug. 1981 41 p refs
(Contract W-7405-eng-26)
(DE81-030436; ORNL/TM-7883; ENDF-310) Avail: NTIS HC A03/MF A01

A FORTRAN 4 code was developed to calculate cross section probability tables, Bondarenko self-shielding factors, and average self-indication ratios for non-fissile isotopes, below the inelastic threshold, on the basis of prescriptions for the unresolved resonance region. Monte-Carlo methods are utilized to generate ladders of resonance parameters in he unresolved resonance region, from average resonance parameters and their appropriate distribution functions. The neutron cross sections are calculated by the single level Breit-Wigner formalism, with s, p and d-wave contributions. The cross section probability tables are constructed by sampling the Doppler-broadened cross sections. The various self-shielded factors are computed numerically as Lebesgue integrals over the cross section probability tables. The program was validated through extensive comparisons with several deterministic codes. DOE

N82-12904# Oak Ridge National Lab., Tenn. Physics Div.
DESCRIPTION AND USE OF THE MONTE CARLO CODE LILITA
J. GomezdelCampo and Robert G. Stokstad Sep. 1981 42 p refs
(Contract W-7405-eng-26)
(DE81-030704; ORNL/TM-7295) Avail: NTIS HC A03/MF A01

Two major applications of the code LILITA were developed. The first is the prediction of relative yields, computer energy spectra and angular distributions of evaporation residues and light particles (alphas, protons and neutrons) produced in a heavy-ion compound-nuclear reaction. The second consists of modeling the equilibrium decay of excited fragments produced in a two-body collision (such as quasi-elastic or deep inelastic scattering). The equilibrium decay of the reaction products is calculated by using the Hauser-Feshbach formula in conjunction with the Monte Carlo method. The approximations used in evaluating the Hauser-Feshbach formula and its use in conjunction with the Monte Carlo method are described. A description of the program input and a discussion of the event-by-event calculations are given. The processing of the event-by-event file used for coincidence calculations, either for fusion reactions or for two-body inelastic collisons is described. Comments on the parameters used for the statistical model calculations are given, and the flow diagram of the code is discussed. DOE

N82-12905# Massachusetts Univ., Amherst.
NUCLEAR STRUCTURE STUDIES BY THE SCATTERING OF MEDIUM-ENERGY ELECTRONS Progress Report, 1 Oct. 1980 - 31 Jul. 1981
G. A. Peterson Aug. 1981 33 p refs
(Contract DE-AC02-76ER-02853)
(DE81-030058; DOE/ER-02853/T1) Avail: NTIS HC A03/MF A01

Both magnetic elastic and transverse inelastic scattering cross sections were measured. A liquid-nitrogen-cooled gas target is used in a study of deuteron elastic magnetic scattering and electrodisintegration over a large energy range. A measurement of elastic magnetic and transverse inelastic scattering from N-14 was started. Measurements of the elastic magnetic scattering from C-13, N-15, Al-27, Si-29, and P-31 were completed. The data set on N-15 inelastic scattering are now complete and analysis of the data is in progress. A study of M8 transitions in Fe-54 and Ni-60 is nearing completion. A measurement of the transverse quasi-elastic scattering from Fe-56 was started. Large-basis shell model calculations pertaining to the above nuclei and others were made. Theoretical calculations of exchange currents, nuclear convection currents, and other nuclear phenomena are in progress. Finally, considerations are being given to the design of an integrated storage-ring-experimental system. DOE

N82-12906# Los Alamos Scientific Lab., N. Mex.
INCLUSIVE PROTON SPECTRA AND TOTAL REACTION CROSS SECTIONS FOR PROTON-NUCLEUS SCATTERING AT 800 MeV
John Alexander McGill Aug. 1981 103 p refs
(Contract W-7405-eng-36)
(DE81-030505; LA-8937-T) Avail: NTIS HC A06/MF A01

Current applications of multiple scattering theory to describe the elastic scattering of medium energy protons from nuclei are shown to be quite successful in reproducing the experimental cross sections. These calculations use the impulse approximation, wherein the scattering from individual nucleons in the nucleus is described by the scattering amplitude for a free nucleon. Such an approximation restricts the inelastic channels to those initiated by nucleon-nucleon scattering. As a first step in determining the nature of p + nucleus scattering at 800 MeV, both total reaction cross sections and (p,p) inclusive cross sections were measured and compared to the free p + p cross sections for hydrogen, deuterium, and compared to the free p + p cross sections for hydrogen, deuterium, calcium 40, carbon 12, and lead 206. It is concluded that as much as 85% of all reactions in a nucleus proceed from interactions with a single nucleon in the nucleus, and that the impulse approximation is a good starting point for a microscopic description of p + nucleus interactions at 800 MeV. DOE

N82-12907# Denison Univ., Granville, Ohio.
NEUTRON CROSS SECTION MEASUREMENTS USING THE ORELA: THE STABLE TELLURIUM ISOTOPES (N, BETA), U(N,N')-238, TH(N,N')-232, OS(N,N')-187, OS(N,NN' BETA)-186,187,188, AND Tl(N,N BETA)-205 Progress Report, 1 Sep. 1980 - 1 Sep. 1981
R. R. Winters Aug. 1981 7 p ref
(Contract DE-AC02-76ER-02696)
(DE81-030164; DOE/ER-02696/11) Avail: NTIS HC A02/MF A01

A computer code which calculates the optical phase shifts from the observed widths and external B-function was written and used in a reanalysis of the S-32 + n data. Optical model potential well depths were found to agree with previous findings. Interpretation of the optical phase shifts analysis did not. Microstructure calculations which at least include coupling between the collective states of the deformed nucleus and the single particle states were warranted. Renormalization of neutron capture cross sections is reported. Measurement of the Ar-40 total cross section was completed the data analysis begun. N.W.

N82-12908# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
DIFFUSION OF GASES IN CAPILLARIES Ph.D. Thesis
Nathan S. Jacobson Aug. 1981 108 p refs
(Contract W-7405-eng-48)
(DE82-000267; LBL-13227) Avail: NTIS HC A06/MF A01

Two aspects of the diffusion of gases in capillaries are explored. A Monte Carlo computer simulation of Knudsen flow is adapted to count collisions and record collision distributions. The behavior of gases in both open and closed end tubes is examined. Given a tube with one end closed and a length-to-radius ratio of L/R, it is shown that a molecule entering this tube will strike the wall an average of 2 L/R times before escaping and that most molecules do not travel vary far into the pore. Those reaching the pore bottom usually strike the walls many times before escaping. The average number of collisions a molecule undergoes in passng through an open-end capillary is also calculated. If the reaction probability is already known, the

processes in a supported catalyst can be simulated. From this analysis the distribution of active material, pore size, and pellet diameter can be optimized for a given reaction. Knudsen and surface diffusion in porous aluminia is studied. Measurements of surface diffusion are shown to be temperature dependent.
DOE

N82-12909# Oak Ridge National Lab., Tenn. Fusion Energy Div.
MONTE CARLO SIMULATION OF MOLECULAR FLOW IN A NEUTRAL-BEAM INJECTOR AND COMPARISON WITH EXPERIMENT
R. A. Lillie, T. A. Gabriel, S. W. Schwenterly, R. G. Alsmiller, Jr., and R. T. Santoro Sep. 1981 30 p refs Submitted for publication
(Contract W-7405-eng-26)
(DE82-000503; ORNL/TM-7911) Avail: NTIS HC A03/MF A01

Monte Carlo calculations were performed to obtain estimates of the background gas pressure and molecular number density as a function of position in the prototype neutral beam injector. Estimates of these quantities together with the transient and steady state energy deposition and molecular capture rates on the cryopanels of the cryocondensation pumps and the molecular escape rate from the injector were obtained utilizing a detailed geometric model of the neutral beam injector. The molecular flow calculations were performed using an existing Monte Carlo radiation transport code which was modified slightly to monitor the energy of the background gas molecules. The credibility of these calculations was demonstrated by the excellent agreement between the calculated and experimentally measured background gas pressure in front of the beamline calorimeter located in the downstream drift region of the injector. The usefulness of the calculational method as a design tool was illustrated by a comparison of the integrated beamline molecular density over the drift region of the injector for three modes of cryopump operation.
DOE

N82-12910# Oak Ridge National Lab., Tenn. Fusion Energy Div.
ELECTRODE DESIGN AND PERFORMANCE OF THE ORNL POSITIVE ION SOURCES
J. H. Whealton, W. L. Gardner, H. H. Haselton, M. M. Menon, P. M. Ryan, D. E. Schechter, W. L. Stirling, C. C. Tsai, W. K. Dagenhart, and N. S. Ponte Aug. 1981 84 p refs
(Contract W-7405-eng-26)
(DE81-030426; ORNL/TM-7879) Avail: NTIS HC A05/MF A01

Four 50-kV, 100-A sources to be used for neutral beam heating of the confined plasma on Tokamak device were constructed. These sources have higher current capability than scaled down sources, and they are required to run for 0.5 s as opposed to the 0.3 s requirement for other sources. Due to an innovative electrode design, these higher power sources met these requirements and achieved a higher transmission efficiency - 76% of the total input power on target. Using the same electrode design with a tetrode accelerating structure and an indirectly heated cathode, repeatable long pulse, high energy conditions of, 70 kV, 7 A, 8 s, and 90 kV, 9 A, 5 s were achieved. Grid deformation calculations and Monte Carlo beam blocking, direct recovery device is described, and theoretical considerations of it are discussed.
DOE

N82-12911# Minnesota Univ., Minneapolis.
NUCLEAR STRUCTURE STUDY AT INTERMEDIATE ENERGIES Annual Progress Report, Nov. 1980 - Jul. 1981
N. M. Hintz 1981 128 p refs
(Contract DE-AS02-77ER-04215)
(DE81-030156; DOE/ER-04215/5) Avail: NTIS HC A07/MF A01

Experiments included high resolution spectrometer development; proton scattering on 2s- 1d shell nuclei at 800 MeV; proton scattering from heavy deformed nuclei; measurement of spin-flip probabilities in inelastic scattering; inelastic scattering at 333 and 500 MeV; and computer program development and theoretical analysis.
DOE

N82-12912# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
DETERMINATION OF A POTENTIAL MODEL FOR THE CALCULATION OF INTERATOMIC POTENTIALS IN THE CASE OF ALKALI-RARE GAS INTERACTION [UNTERSUCHUNGEN ZUR ERMITTLUNG EINES MODELLPOTENTIALS FUER DIE BERECHNUNG VON ZWISCHENATOMAREN POTENTIALEN BEI DER ALKALI-EDELGAS WECHSELWIRKUNG]
R. Dueren Sep. 1980 23 p refs In GERMAN
(MPIS-16/1980; ISSN-0436-1199) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,45

A review of potential calculations and exerimental work is given. Taking for example the system Na-Ar, the difference between the calculated potentials and the experimental values for the ground state and the first excited state approach the experimental errors. All matrix elements are correctly numerically integrated. The Hartree-Fock wave functions are used instead of the Bates-Bamgaard wave functions, and quadrupole and dynamic dipole polarizability are included in the charge-induced part of the interaction.
Author (ESA)

N82-12913# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
EXPERIMENTAL DEMONSTRATION OF FESHBACH RESONANCES IN ATOM-MOLECULE SCATTERING, WITH THE HELP OF MEASUREMENTS ON THE H2(pH2)-Kr AND HD-Xe SYSTEMS [AUSLEGUNG EINES EXPERIMENTS ZUM NACHWEIS VON FESHBACHRESONANZEN IN DER ATOM - MOLEKUEL STREUUNG MIT MESSUNGEN AN DEN SYSTEMEN H2(pH2)-Kr UND HD-Xe]
Klaus Mueller Sep. 1980 96 p refs In GERMAN
(MPIS-14/1980; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,40

An experimental scattering device was developed and used to determine closed channel (Feshbach) resonances in systems belonging to the outer range which require a high energy resolution and apparatus time constant. A primary blast nozzle source with a broad velocity range and a high time constant was developed and tested on the known H2-Kr system whose integral scattering cross section was determined with a 2.2% resolution. Theoretical background and detailed apparatus description are presented. To determine Feshbach resonances the integral scattering cross sections of the p-H2-Kr and HD-Xe systems were measured with an energy resolution from 1.9 to 2.2% in the range of the j=0 to 2 rotation transition, which is not sufficient to prove these resonances. Several improvements of the apperatus are required.
Author (ESA)

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-12914 Arizona Univ., Tucson.
APPLICATION AND DESCRIPTION OF THE INTERACTING BOSON MODEL Ph.D. Thesis
Philip Dewitt Duval 1981 140 p
Avail: Univ. Microfilms Order No. 8120729

The principles and phenomenology of the interacting boson model (IBM) are reviewed. The basic model is applied to the even tungsten isotopes and compared with experimental observables associated with the low-lying states. These observable include transition rates, branching ratios, rho(EO) values, quadrupole moments of the first two excited 2(+) states, two-neutron separation energies, and isomer and isotope shifts. The results agree with the experimental data. The IBM is extended to describe configuration mixing two sub-shells. The predictions for the IBM parameters dependent on neutron number are seen to be in better agreement with empirically determined values than the predictions for the single i-shell (the proton-number dependent parameters are not treated). The interacting boson-fermion model for describing nuclei with an odd number of protons or neutrons is introduced. Dissert. Abstr.

N82-12915 Cornell Univ., Ithaca, N. Y.
AXIAL TRANSLATION OF FIELD-REVERSING RELATIVISTIC ELECTRON RINGS Ph.D. Thesis
Donald John Rej 1981 287 p
Avail: Univ. Microfilms Order No. 8119449

As a consequence of experiments: (1) rings were generated for the first time in a low pressure ambient neutral gas (-10 mTorr H1 and D2), increasing their collisionally limited field-reversal times to over 1 millisecond or more than five times over that previously observed; (2) the first experimental test of adiabatic magnetic compression resulted in greater than factor of ten increases in the ring kinetic energy densities; and (3) two axially separted nonfield-reversed rings, generated from a single accelerator pulse, were successfully combined or stacked to form one field-reversed ring. A quantitative analysis of the translation data is made using retarding force calculations. The rings moved axially at the terminal speed associated with a balance between the accelerating and retarding forces. Conditions were found where the major contribution to the retarding force was due to either the resistive wall or plasma currents. The wall (plasma) force dominated when the rings were moved through the low (high) pressure background gas and inside of the higher (lower) conductivity wall. Dissert. Abstr.

N82-12916*# National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD AND SYSTEM FOR NUCLEAR WASTE DISPOSAL Patent Application
Taylor G. Wang, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 30 Oct. 1981 9 p
(Contract NAS7-100)
(NASA-Case-NPO-15454-1; US-Patent-Appl-SN-315586) Avail: NTIS HC A02/MF A01 CSCL 18G

A method and system for disposing of nuclear waste are described which comprised the encasement of small quantities of waste in spheroids containing lead. The spheroids may be formed of different materials preferably of high compressibility strength, including glass and stainless steel. The spheroids may be formed of any of these materials and coated with or lined by lead. NASA

N82-12917# Comptroller General of the United States, Washington, D.C.
IS SPENT FUEL OR WASTE FROM REPROCESSED SPENT FUEL SIMPLER TO DISPOSE OF?
12 Jun. 1981 66 p
(EMD-81-78) Avail: NTIS HC A04/MF A01

One of the highest priority programs of the Federal Government is to devise a waste disposal scheme that will guarantee the permanent isolation of both high level nuclear wastes and spent fuels. The GAO believes it makes sense that spent fuel not be buried in a repository, but be reprocessed to recover the valuable uranium and plutonium. An important factor in this decision is the future role of commercial nuclear power in the United States. Until Congress makes a decision on this issue, DOE has no option but to plan for any eventuality, including the potential geological disposal of spect fuel. Other long term storage options are available which would keep spent above above ground easily acceptable for future use. A.R.H.

N82-12918# Yale Univ., New Haven, Conn. Dept. of Engineering and Applied Science.
EXPERIMENTS WITH WAVES ON RELATIVISTIC ELECTRON BEAMS Final Report, 1 Oct. 1979 - 30 Sep. 1980
J. L. Hirshfield 1 Jan. 1981 18 p refs
(Grant AF-AFOSR-0025-80; AF Proj. 2301)
(AD-A105094; AFOSR-81-0641TR) Avail: NTIS HC A02/MF A01 CSCL 20/7

Installation of the Febetron electron accelerator, vacuum chamber, axial guide magnetic field, and pulsed magnetic wiggler is complete. Diode current and voltage diagnostics have been developed. Cathode designs have begun to produce low current (100's) of amperes) beams of low emittance. A novel 90 degree deflection momentum analyzer has been designed to determine the momentum spread for a sample of the beam. Low current cw beams in the energy range 4-20 keV were employed to determine electron orbits in the wiggler/guide field combination. Beam analyzers were designed and employed to distinguish orbit deflection and helicity. GRA

N82-12919# Sandia Labs., Albuquerque, N. Mex.
PHOENIX 2 ENERGY EXTRACTION AND ANGULAR MULTIPLEXING EXPERIMENTS
James M. Hoffman and Gerald N. Hays Aug. 1981 49 p refs
(Contract DE-AC04-76DP-00789)
(DE81-028972; SAND-81-1472) Avail: NTIS HC A03/MF A01

The energy extraction efficiency as a function of input intensity was determined from a large-volume HF amplifier. For an input intensity of 4 x 10(6)W/cm(2), 1080 Joules was extracted from the amplifier. This corrresponded to an energy extraction efficiency of 0.90. At the highest H2/F2/O2 pressures used, 1700 Joules was obtained from this system when used in an oscillator configuration. These results also show evidence that energy extraction at low input intensities in large-volume HF amplifiers is strongly influenced by parasitic oscillations. The results also indicate that, for a long-pulse HF amplifier (60-nsec electron beam), the timing between th amplifier and oscillator to achieve optimum operating conditions is not very critical. This same amplifier, used in conjunction with a short-pulse, good-beam-quality oscillator-preamplifier chain, has also been used to evaluate pulse compression using angular multiplexing. Using two sequential 24-nsec pulses, the essential elements of angulr multiplexing were evaluated as a function of interpulse separation time. DOE

N82-12920# Pennsylvania Univ., Philadelphia.
VERY-HIGH-ENERGY NUCLEAR PHYSICS Progress Report, 1 Jul. 1980 - 30 Jun. 1981
Sherman Frankel 14 Jul. 1981 9 p
(Contracts DE-AS02-78ER-04660; DE-AC02-78ER-04660)
(DE81-030025; DOE/ER-04660/1) Avail: NTIS HC A02/MF A01

High momentum phenomena in nuclei and ultrarelativistic nuclear-nuclear collisions are addressed. Experiments concerning measurement and backward production using polarized protons are reported. Direct measurement of the properties of the hadronization of excited nucleons is discussed. High multiplicity, in a region around a rapidity of y = 0, resulting from a head-on alpha-alpha collision in which four nucleons in each alpha have interacted, is reported. The frequency of multiple scatters in both p-alpha and alpha-alpha collisons is also reported. Five projects in progress are included. N.W.

N82-12921# Los Alamos Scientific Lab., N. Mex.
SPACE NUCLEAR SAFETY AND FUELS PROGRAM Progress Report
S. E. Bronisz, comp. Jul. 1981 14 p refs
(Contract W-7405-eng-36)
Avail: NTIS HC A02/MF A01

The use of (238) PuC2 in radioisotope power systems are discussed. Impact testing, module handling procedures, and nondestructive test data for encapsulated pellets are reported. DOE

N82-12922# Pacific Northwest Lab., Richland, Wash.
SURVEY OF MATRIX MATERIALS FOR SOLIDIFIED RADIOACTIVE HIGH-LEVEL WASTE
W. E. Gurwell Sep. 1981 58 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000708; PNL-3512) Avail: NTIS HC A04/MF A01

Practical matrix materials for future develoment that most enhance the stability of the matrix waste forms were investigated. The functions of the matrix were reviewed. Desirable matrix material properties were discussed and listed relative to the matrix functions. Potential matrix materials were discussed and recommendations were made for future matrix development. The matrix mechanically contains waste cores, reduces waste form temperatures, and is capable of providing a high quality barrier to leach waters. High r matrices that separate and individually encapsulate the waste cores are fabricated by powder fabrication methods, such as sintering, hot pressing, and hot isostatic pressing. Three material classes potential satisfy the requirements for a barrier matrix and are recommended for development: titanium, glass, and graphite. Polymers appear to be marginally adequate, and a more thorough engineering assessment of their potential should be made. DOE

N82-12923# Oak Ridge National Lab., Tenn. Engineering Physics Div.

ORELA ELECTRON GUNS

O. W. Christian and T. A. Lewis Sep. 1981 29 p refs
(Contract W-7405-eng-26)
(DE81-030703; ORNL/TM-7886) Avail: NTIS HC A03/MF A01

Procedures for gun production described include gun shell construction, anode and grid focus electrode, emitter preparation, and electrophoretic coating, and cathode heater assembly and support. The conversion of carbonates to oxide and cathode activation is also discussed as well as high voltage conditioning of the gun. Highlights of the performance characteristics are included. DOE

N82-12924# Oak Ridge National Lab., Tenn.

LOW-LEVEL RADIOACTIVE WASTE: AN INTRODUCTORY OVERVIEW

H. W. Godbee and A. H. Kibbey 1981 9 p Presented at the ASME Short Course on Radioactive Waste Management for Nucl. Power Reactors and Other Facilities, Alexandria, Va., 13-17 July, 1981
(Contract W-7405-eng-26)
(DE81-026334; CONF-810733-1) Avail: NTIS HC A02/MF A01

In 1980, the accumulated volume of buried low-level waste (LLW) in the United States amounted to over 92,000 cu m. Of this, 49,700 cu m was attributed to the US commercial fuel cycle, 36,400 cu m to institutional and industrial, and 76,300 cu m to government activities. In addition, there was another 6500 cu m of LLW sent to commercial burial grounds from government agencies or other licensed activities (e.g., fabrication of fuel for foreign reactors). If no more land is licensed for commercial burial, Barnwell with its limited waste acceptance will be the only site still operating in the year 2000. Of the DOE sites, only NTS and Hanford will have ample land. All the other principal DOE sites except LASL will be exhausted and this site will have about 7 of usable land left. DOE

N82-12925# Battelle Pacific Northwest Labs., Richland, Wash.

PROCESS FOR THE DENITRIFICATION OF HIGH-LEVEL RADIOACTIVE LIQUID WASTES

F. J. Gattys 10 Jul. 1981 17 p refs Transl. into ENGLISH of German patent 2,807,324 (21 Feb. 1978)
(DE81-026875; PNL-TR-415) Avail: NTIS HC A02/MF A01

Commercial paraformaldehyde with a low water content and mean particle size smaller than 60 microns is introduced as denitrifying agent at about 110 C into the liquid waste. A buffer of citric acid and phosphate is added during the denitrification reaction. The escaping gases contain nitrogen oxides which are recombined and concentrated to about 40 percent by weight nitric acid. DOE

N82-12926# Rockwell International Corp., Golden, Colo. Energy Systems Group.

NUCLEAR WASTE INCINERATION TECHNOLOGY STATUS

D. L. Ziegler, G. D. Lehmkuhl, and L. J. Meile 15 Jul. 1981 123 p refs
(Contract DE-AC04-76DP-03533)
(DE81-025751; RFP-3250) Avail: NTIS HC A06/MF A01

The incinerators developed and used for radioactive waste combustion are discussed and suggestions are made for uses of incineration in radioactive waste management programs and for incinerators best suited for specific applications. Information on the amounts and types of radioactive wastes are included to indicate the scope of combustible wastes being generated and in existence. Operating information on US and foreign incinerators is also included. Development needs are identified for extending incinerator applications and for establishing commercial acceptance. DOE

N82-12927# California Univ., Berkeley. Lawrence Berkeley Lab.

MONITOR FOR DETECTING NUCLEAR WASTE LEAKAGE IN A SUBSURFACE REPOSITORY

S. Klainer, T. Hirschfeld, H. Bowman, F. Milanovich, D. Perry, and D. Johnson 5 Nov. 1980 89 p refs
(Contract W-7405-eng-48)
(DE81-026429; LBL-11981) Avail: NTIS HC A05/MF A01

A remote fiber optics system is employed in conjunction with the coprecipitation enhanced fluorimetry technique to detect radioactive waste leakage. An in situ monitoring capability using fiber optics to effect communication between the instrumentation and the sample is demonstrated. The sample is an actinide or a tracer material leaking from an underground nuclear waste repository into the ground water. A lanthanide (which is an excellent fluorescent agent), actinide or other species which does not radiation damage is chosen as the tracer to maximize sensitivity, specificity, and relevance. Taggants having variable excitatio and emission wavelengths create a need for an acromatic retroreflective fiber coupler. This was done using the geometrical properties of the fiber to design a coupler requiring no dichroics or glossy energy splitting surfaces. DOE

N82-12928# Stuttgart Univ. (West Germany). Inst. fuer Kernenergetik und Energiesysteme.

CALCULATION OF TRANSIENT AND QUASI-STATIONARY FLOWS IN HIGH TEMPERATURE REACTORS WITH SPHERICAL NUCLEAR FUEL ELEMENTS, USING THE VORTEX FLOW METHOD Ph.D. Thesis [ZUR ANWENDUNG DER WIRBELSTROMMETHODE FUER DIE TRANSIENTE UND QUASISTATIONAERE STROEMUNGSBERECHNUNG IN HOCHTEMPERATURREAKTOREN MIT KUGELFOERMIGEN BRENNELEMENTEN]

Immanuel Hoefer Dec. 1980 183 p refs In GERMAN
(IKE-4-98) Avail: NTIS HC A09/MF A01

The equations of the vortex flow method were derived in their primitive form for inhomogeneous regions in order to calculate the flows and the temperature behavior in high temperature nuclear reactors, aiming at a further development of the computerized simulation of these reactors. By modifying the flow function in parallel channels in the reflector region, a parallel flow is simulated. The flow in regions with low pressure losses are approximated by a potential flow. After comparing a number of explicit and implicit difference methods to solve numerically the time dependent convective part of the equations, the method UPWIND differences was chosen as an interpolation procedure. Examples show the applicability of this calculation method for spherical nuclear fuel elements with forced and natural convection. Author (ESA)

74 OPTICS

Includes light phenomena.

N82-12929 California Inst. of Tech., Pasadena.

OPTOGALVANIC SPECTROSCOPY AND CATAPHORETIC LASER ISOTOPE SEPARATION Ph.D. Thesis

Andrew Keith Gabriel 1981 313 p
Avail: Univ. Microfilms Order No. 8121059

A microscopic theory for the positive column discharge (PCD) was developed using rate equations and power balance equations to model the microscopic discharge processes. Macroscopic variables were calculated from the microscopic parameters. The model is used to characterize a hydrogen-helium PCD. The equations in the model are modified to account for the presence of resonant (H-alpha) radiation from an external source. The model is then used to predict the voltage change in a hydrogen PCD (the optogalvanic effect) as a function of current, illumination intensity, and gas pressure. The results compare very favorably with experiments conducted to measure the OGE. Dissert. Abstr.

N82-12930*# Stanford Univ., Calif. Dept. of Electrical Engineering.

RADIOGRAPHIC APPLICATIONS OF SPATIAL FREQUENCY MULTIPLEXING Final Report, Jun. 1978 - Dec. 1980

Albert Macovski Jul. 1981 13 p

(Contract NAS5-25043)
(NASA-CR-166748) Avail: NTIS HC A02/MF A01 CSCL 20F

The application of spacial frequency encoding techniques which allow different regions of the X-ray spectrum to be encoded on conventional radiographs was studied. Clinical considerations were reviewed, as were experimental studies involving the encoding and decoding of X-ray images at different energies and the subsequent processing of the data to produce images of specific materials in the body. R.J.F.

N82-12931*# Perkin-Elmer Corp., Danbury, Conn. Optical Technology Div.

STUDY OF HOLLOW CORNER RETROREFLECTORS FOR USE IN A SYNCHRONOUS ORBIT Final Report, Sep. 1974 - Feb. 1975

P. R. Yoder, Jr. Mar. 1975 119 p refs
(Contract NAS5-20580)
(NASA-CR-166750; ER-275) Avail: NTIS HC A06/MF A01 CSCL 20F

The performance of a hollow corner cube retroreflector made up of three mutually perpendicular optically flat mirrors when undergoing the thermal-mechanical strains induced by a spacecraft environment was studied. Of particular interest was a device of 200 square centimeter optical aperture used on a satellite in a synchronous orbit. It was assumed that the reflector always faces the earth. The effects of direct solar irradiance, earthshine, and albedo were considered. The results included the maximum mirror surface temperature during the orbit as well as the worst-case loss of optical performance due to thermally-induced mirror distortions. It was concluded that a device made of three suitably coated flat ULE mirrors, optically contacted to each other and supported mechanically in a nonrigid mount, would be expected to concentrate over 80 percent of the theoretical maximum energy in the central of the far field diffraction pattern. Continued development of the device through a detailed design, fabrication, and test phase was recommended. R.J.F.

N82-12932# Cincinnati Univ., Ohio. Solid State Electronics Lab.

INTEGRATION OF A DETECTOR ARRAY WITH AN OPTICAL WAVEGUIDE STRUCTURE AND APPLICATIONS TO SIGNAL PROCESSING Final Report, 15 Jun. 1976 - 14 Mar. 1981

J. T. Boyd, D. A. Ramey, C. L. Chen, A. Naumaan, and S. Dutta 7 Aug. 1981 73 p refs
(Grant AF-AFOSR-3032-81; AF Proj. 2305)
(AD-A105067; AFOSR-81-0695TR) Avail: NTIS HC A04/MF A01 CSCL 20/12

Both planar thin film and channel optical waveguides have been integrated with charge-coupled devices (CCDs). Coupling of light from the waveguide region to the detector elements utilizes a smooth and uniformly-tapered region of SiO_2 to minimize scattering. CCd transfer inefficiency of 1.0 times ten to the minus fourth power is consistently obtained for a number of devices. A channel waveguide array formed in a fan-out pattern is introduced as a means of enhancing focal plane resolution in integrated optical devices using optical waveguide lenses. High spatial resolution can thus be obtained without making detector spacings too small, thus avoiding detector problems with regard to fabrication, crosstalk, linearity, and charge transfer inefficiency. Operation of an integrated optical channel waveguide array-CCD transversal filter is reported. Channel waveguides formed in V-grooves couple directly to the sensor elements of the four phase, double polysilicon CCD. Experimental results include a filter transfer function having good agreement with theoretical results. The voltage contrast mode of a scanning electron microscope (SEM) is utilized to observe charge-coupled devices (CCDs) which have been cross sectioned. A new cross sectioning technique which uses anisotropic etching to accurately define the axis along which fracture occurs is presented. GRA

N82-12933# ARO, Inc., Arnold Air Force Station, Tenn.

INFRARED REFLECTANCE AND REFRACTIVE INDEX MEASUREMENTS IN VACUUM-RATED HEMIELLIPSOIDAL MIRROR REFLECTOMETER FROM 20 TO 300 DEG K Interim Report, 1 Feb. 1977 - 1 Mar. 1979

B. E. Wood and A. M. Smith Sep. 1981 37 p refs
(AD-A105113; AEDC-TR-81-21) Avail: NTIS HC A03/MF A01 CSCL 20/6

Experimental studies have been carried out for determining the change in reflectance caused by the condensation of thin films on 77 and 20 deg. K mirror surfaces in the 20 to 25 microns wavelength range. Refractive indices of the gases condensed were measured at the He-Ne laser wavelength, 0.6328 microns. Hemispherical-directional reflectance measurements of the mirror-condensed gas composites were made using a hemiellipsoidal mirror reflectometer system. The refractive index and reflectance of condensed films of N_2, O_2, CO_2, H_2O, NH_3, N_2O, NO, CO, CH_4, argon, air, and allene were measured. Thicknesses and refractive indices were determined using the two-angle interference technique. In addition to the reflectance measurements made on cryogenic samples, an interfacility comparison of relfectance measurements was made on several anodized metal coatings at room temperature using reflectometers at the Air Force Materials Laboratory at Wright-Patterson Air Force Base, the Convair Division of General Dynamics Corporation in San Diego, and at AEDC. Reflectance measurements were also made on a variety of salt samples (such as nitrates, sulfates, and chlorides) at room temepratures and at 77 K to demonstrate the applications available for the HEMR. Author (GRA)

N82-12934# Mississippi State Univ., Mississippi State. Dept. of Physics.

THE UNIQUENESS OF PHASE RETRIEVAL FROM INTENSITY MEASUREMENTS Final Report, 1 Apr. 1980 - 31 Mar. 1981

John T. Foley Aug. 1981 57 p refs
(Grant AF-AFOSR-0162-80; AF Proj. 2301)
(AD-A105168; AFOSR-81-0679TR) Avail: NTIS HC A01/MF A01 CSCL 20/6

Several aspects of the question of the determination of the phase of a wavefield from the knowledge of its intensity in the aperture plane and focal plane of a thin lens are investigated. The role of diffraction from the lens aperture is studied. It is shown that for an astigmatic Gaussian beam this method of phase retrieval is highly nonunique if the beamwidth in the aperture plane is much smaller than the radius of the aperture. For several test cases, it is shown that if the beamwidth is not small compared to the radius of the aperture the above-mentioned nonuniqueness is removed (except for the well-known twin solution ambiguity). The twin solution is discussed and a method for eliminating it is proposed. Author (GRA)

N82-12935# Rochester Univ., N. Y. Inst. of Optics.

X-RAY OPTICS Final Scientific Report, 1 Feb. 1979 - 31 Mar. 1981

Nicholas George 11 Jul. 1981 35 p
(Grant AF-AFOSR-3563-78; AF Proj. 2306)
(AD-A105220; AFOSR-81-0684TR) Avail: NTIS HC A03/MF A01 CSCL 20/8

This final scientific report covers research activities on X-Ray Optics. The report description is contained in the following sections: Preliminary Study of Source Coherency; Lloyd's Mirror Experiment; X-Ray Speckle; Measurement of Film Resolution; Experiments of 20 - 22 May 1980; Experiments of 8 September 1980; Conclusions and Plans. GRA

N82-12936# Hughes Research Labs., Malibu, Calif.

ANISOTROPIC AND ELECTRO-OPTICAL EFFECTS IN LIQUID CRYSTALS Final Report, 1 Oct. 1976 - 30 Nov. 1980

J. David Margerum Aug. 1981 193 p refs
(Contract F49620-77-C-0017; AF Proj. 2303)
(AD-A105189; AFOSR-81-0690TR) Avail: NTIS HC A09/MF A01 CSCL 20/6

The objective of this program was to study the effects of the chemical structure of liquid crystal components on the anisotropic properties of nematic mixtures, especially in regard to their electro-optical response characteristics. The program was particularly aimed at obtaining a better understanding of the effects of components on the DS mode. A similar, secondary goal was to study the effects of structure on the VGM in some of the same nematic mixtures. We chose to study ester LCs in this program because of our prior experience with phenyl benzoate LCs and dopants for DS effects. The phenyl benzoate ester mixtures are of particular interest for DS because they are colorless and relatively stable to moisture, they can be formulated to have a negative dielectric anisotropy, they can be adequately purified for controlled doping, and they show good dc stability when used with redox dopants. In this program we have examined the properties and effects of many different types of ester LC components, including cyclohexanecarboxylates, biphenylcarboxylates, benzoylaoxybenzoates, acyloxybenzoates, and thiobenzoates, as well as various benzoate structures. GRA

N82-12937# Oak Ridge Y-12 Plant, Tenn. Fabrication Systems Dept.

PRODUCTION INTERFEROMETRIC TESTING OF DIAMOND-TURNED SURFACES

R. E. Sladky Sep. 1981 30 p refs
(Contract W-7405-eng-26)
(DE82-000172; Y-2208) Avail: NTIS HC A03/MF A01

Some of the optical interferometric tests that are used to examine the figure of diamond-turned optics are described. Some tests are routine, and the results can be statistically examined to measure the repeatability of the testing process. Interferograms are analyzed to obtain the rms or peak-to-valley errors and optical aberrations. From these data, the repeatability of the interferometric procedure is obtained. Tests show that a single interferogram can be digitized repeatedly with excellent precicion, but a series of interrerograms is affected by changing environmental conditions. Precision measurements of a plated mirror over a period of time are affected by variations in the temperatures of the mirror. DOE

N82-12938# MITEC G.m.b.H., Ottobrunn (West Germany).

DEVELOPMENT OF A SMALL OPTO-ELECTRONIC DISTANCE MEASURING DEVICE Final Report

Hans Jochen Koellner Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 19 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-168; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4

A miniaturized opto-electronic distance measuring device, suitable for mass production and capable of covering a variety of applications, was developed. The principle of time of flight measurement of light pulses is used. The basis of this development is a method of defining the beginning and the end of a time measurement. A prototype meeting the required technical specifications as to distance measuring range, distance and angle resolution, measuring frequency and averaging is presented. After running through a preparation phase it can be produced in large quantities in a relatively inexpensive way. Major application fields will be automation and general distance measurements.
Author (ESA)

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-12939# Nagoya Univ. (Japan). Dept. of Engineering.

DISRUPTION OF HIGH BETA PLASMA INDUCED BY RESISTIVE DRIFT MODE

Shinji Hiroe, Toshiju Kunibe, and Hidenori Akiyama Sep. 1981 37 p refs
(IPPJ-538) Avail: NTIS HC A03/MF A01

The observation of a disruptive instability when a high density cold plasma is injected into the ASMIC-I symmetric mirror is reported. The azimuthal mode number of the disruption is m = 0. When the plasma disrupts, it escapes both across and along the magnetic field lines. This disruption is observed only when the resistive drift instability grows near the surface of the plasma. The disruption can be suppressed when the resistive mode is stabilized. T.M.

N82-12940# Institute of Physical and Chemical Research, Saitama (Japan).

ECR DISCHARGE CLEANING EXPERIMENT IN THE JIPP T-11

Y. Sakamoto, Y. Ishibe, S. Ishii, K. Okazaki, H. Oyama, K. Yano, N. Noda (Nagoya Univ., Japan), K. Kawahata (Nagoya Univ., Japan), Y. Kawasumi (Nagoya Univ., Japan), and S. Tanahashi (Nagoya Univ., Japan) Nagoya, Japan Nagoya Univ. Sep. 1981 22 p refs
(IPPJ-539) Avail: NTIS HC A02/MF A01

The JIPP T-2 torus device was used to find the effect of the cleaning on Tokamak discharges. To characterize the Tokamak discharge property, mean plasma resistivity, intensity of an oxygen ions spectral line and mean electron density without gas puffing were measured. The first cleaning operation for 5 hrs drastically improved the purity of the Tokamak discharge plasma. The succeeding 75 hrs cleaning gave the wall surface condition corresponding to Z(eff) = 1.5. The cleaning plasma had the electron temperature of 5 eV and density of about 10 billion cu cm with a hydrogen pressure of 0.029 Pa and a microwave power of 800 W. A.R.H.

N82-12941# Yokohama National Univ. (Japan). Research Inst. for Energy Materials.

INTERACTION OF ION-ACOUSTIC SOLITIONS IN MULTI-DIMENSIONAL SPACE, 2

Fujio Kako and Nobuo Yajima (Kyushu Univ.) Nagoya, Japan Nagoya Univ. Aug. 1981 39 p refs
(IPPJ-535) Avail: NTIS HC A03/MF A01

Numerical computations are made to study the collision process between two cylindrical or spherical solitons. The soliton resonance is found to play an important role in collision process between two curved solitons as well as between two plane solitons. Author

N82-12942# Nagoya Univ. (Japan). Inst. of Plasma Physics.

STABILIZATION OF RAYLEIGH-TAYLOR INSTABILITY DUE TO THE SPONTANEOUS MAGNETIC FIELD IN LASER PRODUCED PLASMA

Masatada Ogasawara and Masami Takita (Keio Univ. Yokohama, Japan) Sep. 1981 17 p refs
(IPPJ-537) Avail: NTIS HC A02/MF A01

Spontaneous magnetic fields due to the temperature gradient VT0 produced by a focused laser beam on one point of a pellet are taken into account in deriving the dispersion relation of Rayleigh-Taylor instability. Growth rate (gamma) decreases with time. Density fluctuation with wavelength shorter than 1.5 (R/L sub T) x (n sub s/n sub 0) to the 1/2 power micrometer is remarkably stabilized, where R, L sub T, n sub s and n sub 0 are the radius of a pellet, L sub T/1 = (VT sub 0/T sub 0), number densities of solic and the pellet. Validity condition of the theory is gamma to sub 0 >> 1 or in another form R >> L, where t sub 0 is the time of thermal expansion of a pellet and L/1 = Vn sub 0/n sub 0. Author

N82-12943*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

END REGION AND CURRENT CONSOLIDATION EFFECTS UPON THE PERFORMANCE OF AN MHD CHANNEL FOR THE ETF CONCEPTUAL DESIGN

S. Y. Wang and J. Marlin Smith [1981] 9 p refs To be presented at the 20th Aerospace Sci. Conf., Orlando, Fla., 11-14 Jan. 1982; sponsored by AIAA
(Contract DE-AI01-77ET-10769)
(NASA-TM-82744; DOE/NASA/10769-22; E-1057) Avail: NTIS HC A02/MF A01 CSCL 20I

The effects of MHD channel end regions on the overall power generation were considered. The peak plant thermodynamic efficiency was found to be slightly lower than for the active region (41%). The channel operating point for the peak efficiency was shifted to the supersonic mode (Mach No., M sub c approx. 1.1) rather than the previous subsonic operation (M sub c approx. 0.9). The sensitivity of the channel performance to the B-field, diffuser recovery coefficient, channel load parameter, Mach number, and combustor pressure is also discussed. In addition, methods for operating the channel in a constant-current mode are investigated. This mode is highly desirable from the standpoint of simplifying the current and voltage consolidation for the inverter system. This simplification could result in significant savings in the cost of the equipment. The initial results indicate that this simplification is possible, even under a strict Hall field constraint, with resonable plant thermodynamic efficiency (40.5%). N.W.

N82-12944# Boston Gas Co., Mass. Dept. of Physics.
STRONGLY COUPLED PLASMA RESEARCH FOR THE EQUATION OF STATE AND CONDUCTIVITY OF A LASER-COMPRESSED ELECTRON-ION PLASMA Final Report, 1 Jan. 1976 - 31 Dec. 1980
G. Kalman, K. I. Golden (Northeastern Univ.), and P. Bakshi 15 Aug. 1981 15 p refs
(Grant AF-AFOSR-2960-76; AF Proj. 2301)
(AD-A105195; AFOSR-81-0674TR) Avail: NTIS HC A02/MF A01 CSCL 20/9

A novel scheme for the analysis of dense, strongly coupled plasmas, occurring in laser compression (and other) experiments, has been developed. The scheme has been applied to the analysis both of static and of dynamic properties of such plasmas. Comparison with conventional perturbative weak coupling theories and with other strong coupling schemes have been performed: they confirm the superiority of the present scheme. Author (GRA)

N82-12945# New Mexico Univ., Albuquerque. Bureau of Engineering Research.
PHYSICS OF HIGH TEMPERATURE, DENSE PLASMAS Interim Report, 1 Jan. 1980 - 31 Mar. 1981
D. M. Woodall Mar. 1981 66 p refs
(Grant AF-AFOSR-0060-79; AF Proj. 2301)
(AD-A105169; NE-91(81)AFOSR-765-2; AFOSR-81-0687TR) Avail: NTIS HC A03/MF A01 CSCL 20/9

The grant, 'The Physics of High Temperature, Dense Plasmas,' includes work on two projects in conjunction with the Advanced Concepts Branch of the Applied Physics Division at the Air Force Weapons Laboratory. The first is a relativistic electron beam-(REB) heated, dense plasma experiment using REB facilities at AFWL, and the second is soft X-ray instrumentation work pertinent to the SHIVA X-ray simulation facility. This report primarily details work in progress and results achieved in the REB-Plasma interaction experiments, since much of our effort during the period of this report have been directed at that project. GRA

N82-12946# Naval Research Lab., Washington, D. C. Space Science Div.
THRESHOLD CRITERIA FOR A SPACE SIMULATION BEAM-PLASMA-DISCHARGE Interim Report
E. P. Szuszczewicz, K. Papadopoulos (Science Applications, Inc., McLean, Va.), W. Bernstein (Rice Univ.), C. S. Lin (Bendix Field Engineering Corp., Columbia, Md.), and D. N. Walker 23 Sep. 1981 29 p refs
(RR0330244)
(AD-A104937; NRL-MR-4608) Avail: NTIS HC A03/MF A01 CSCL 20/9

We have conducted an experimental and theoretical study of the threshold characteristics of a space-simulation beam-plasma-discharge (BPD) with emphasis on density profiles and density-dependent ignition criteria. The study included various beam-plasma conditions covering beam currents from 8 to 85 ma, beam energies from 0.8 to 2.0 ke V and magnetic fields at 0.9 and 1.5 gauss. The study included experimental determinations of radial profiles of electron density for each of the selected conditions extending from a low-density per-BPD state to a strong BPD condition. At BPD threshold it was determined that 3.9 < or = omega p/omega c < or = 5.8 was the density-dependent ignition criterion. The experimental results are shown to agree with detailed model calculations which consider the BPD to be produced by large amplitude electron plasma waves resulting from the beam-plasma interaction. Author (GRA)

N82-12947# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
NOVEL LIMITER PUMP TOPOLOGIES
Joel E. Schultz 1981 33 p refs
(Contract DE-AC02-78ET-51013)
(DE81-030029; DOE/ET-51013/6) Avail: NTIS HC A03/MF A01

The use of limiter pumps as the principle plasma exhaust system of a magnetic confinment fusion device promises significant simplification, when compared to previous investigation of divertor based systems. Further simplifications, such as the integration of the exhaust system with a radio frequency heating system and with the main reactor shield and structure are investigated. The integrity of limiters in a reactor environment is threatened by many mechanisms, the most severe of which may be erosion by sputtering. Two novel topologies are suggested which allow high erosion without limiter failure. DOE

N82-12948# Association Euratom-CEA, Fontenay-aux-Roses (France). Dept. de Recherches sur la Fusion Controlee.
ELECTRON CYCLOTRON DAMPING FOR LARGE WAVE AMPLITUDE IN TOKAMAK PLASMAS
I. Fidone, G. Granata, and R. L. Meyer (Nancy Univ.) May 1980 36 p refs
(EUR-CEA-FC-1053) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

The quasilinear kinetic equation to study cyclotron wave absorption in Tokamak plasmas is derived and investigated. A simplified form of the steady-state equation is also obtained and used to discuss the nonlinear damping of the ordinary mode in a hot plasma. The amplitude dependent damping is numerically evaluated for wave powers of practical interest. It is also shown that, for wave propagation from the high magnetic side of the Tokamak, electron cyclotron wave absorption results in the creation of fast tail electrons. DOE

N82-12949# Oak Ridge National Lab., Tenn. Computer Sciences Div.
COMPARISON OF RESULTS BETWEEN THE BALLOONING MODES CODES BLOON AND BALOON
J. K. Munro, Jr. Aug. 1981 35 p refs
(Contract W-7405-eng-26)
(DE81-030259; ORNL/CSD/TM-157) Avail: NTIS HC A03/MF A01

Ballooning mode equation eigenvalues calculated by two different codes, BLOON and BALOON were compared for a sequence of equilibria having a range of beta values. The results agree for marginal stability only. Differences away from marginal stability may be due to differences in the coordinate systems used for the analysis in the two codes. Equilibria were generated using the ISLAND code. Results of various convergence studies made with the codes are presented together with recommendations for their use. DOE

N82-12950# Wisconsin Univ., Madison.
HIGH-MODE-NUMBER MHD STABILITY OF A TOROIDAL MULTIPOLE
M. W. Phillips Sep. 1981 25 p refs
(Contract DE-AS02-76ET-53051)
(DE81-030484; DOE/ET-53051/26) Avail: NTIS HC A02/MF A01

The stability of an axisymmetric plasma with no toroidal magnetic field is studied using a high toroidal mode number expansion of the MHD energy principle. A partial differential eigenvalue equation governing electromagnetic modes is derived. This equation is solved using a perturbation expansion with the inverse toroidal mode number as the smallness parameter resulting in two ordinary differential equations one determining the structure of the mode parallel to magnetic field lines and the other determining structure perpendicular to field lines. The equations are solved numerically for the levitated octapole and stability criteria are given. DOE

N82-12951# Flinders Univ., Bedford Park (Australia). School of Physical Sciences.
EFFECTS OF PREIONIZATION LEVEL ON A STABILIZED Z-PINCH
C. Silawatshananai, F. S. B. Anderson, M. H. Brennan, G. Durance, I. R. Jones, E. L. Murray, and J. Tendys Feb. 1980 54 p refs
(FUPH-R-164) Avail: NTIS (US Sales Only) HC A04/MF A01; DOE Depository Libraries

The influence of the degree of preionization on the formation and properties of a conventional 'stabilized' Z-pinch was studied experimentally for preionization levels ranging from 2 percent to 35 percent. It is concluded that the possibility exists of using varying levels of preionization to tailor radial profiles of density and pressure, and hence to influence the value of (ALPHA) sub (theta). DOE

N82-12952# California Univ., Livermore. Lawrence Livermore Lab.
USING SPECTRAL LINE PROFILES AS A DIAGNOSTIC OF THE PLASMA ELECTRON DENSITY
R. W. Lee and D. L. Matthews Aug. 1981 22 p
(Contract W-7405-eng-48)
(DE81-030313; UCID-19173) Avail: NTIS HC A02/MF A01

A simple interactive fitting procedure is given which uses line profiles calculated for highly stripped ions, i.e., hydrogenic, helium-like and lithium-like species. The calculation of these profiles is provided. DOE

N82-12953# Oak Ridge National Lab., Tenn.
SIMPLE-POWER-BALANCE MODEL FOR MICROWAVE HEATING IN EBT
D. B. Batchelor Aug. 1981 65 p refs
(Contract W-7405-eng-26)
(DE81-030428; ORNL/TM-7001) Avail: NTIS HC A04/MF A01

A simple model is presented for the production and absorption of ordinary and extraordinary mode energy in various regions of the ELMO bumpy torus plasma. The plasma is divided into two regions: (1) the low magnetic field side of the extraordinary mode cutoff and (2) the high field side of the cutoff. Energy balance equations are written for the sources (injection, mode conversion, and tunneling) and sinks (mode conversion, absorption, and tunneling) in each region, and simplified models are introduced to account for each of these processes. Since a typical ray makes several reflections from cavity wall surfaces before being absorbed, additional simplifying assumptions are made that the wave fields are an isotropic incoherent superposition of plane waves and that the energy density of each mode is uniform in a given region. DOE

N82-12954# Los Alamos Scientific Lab., N. Mex.
INERTIAL FUSION PROGRAM Program Dates, 1 Jun. - 30 Jun. 1979
F. Skoberne, comp. Jun. 1981 196 p refs
(Contract W-7405-eng-36)
(DE81-030512; LA-8114-PR) Avail: NTIS HC A09/MF A01

Progress in the development of high-energy short-pulse carbon dioxide laser systems for fusion research is reported. Improvements for the Gemini System and the eight-beam system Helios are summarized and the 100- to 200-TW Antares target irradiation system is discussed. Other topics covered include: (1) phase conjugation by degenerate four-wave mixing and its applicability to laser fusion system; (2) frequency multiplexing as a means toward multipulse energy extraction; (3) experiments with targets designed accurate diagnostics; (4) the detection of expanding ions, neutron yield, and X-ray emission; (5) target design codes for use with the CRAY-1 computer; (6) implosion phenomena; (7) the development of a ICF reactor blanket that offers a promising alternative to the usual lithium blanket; and (8) the formulation of capital-cost data base for laser fusion reactors. DOE

N82-12955# Australian National Univ., Canberra. Inst. of Advanced Studies.
PLASMA RESEARCH LABORATORY REPORT, 1979 Annual Report
1980 19 p refs
(INIS-mf-6087) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository libraries

Research activities outlined include upgrading of the Tokamak, studies of toroidal magnetic fields aimed at optimizing the field configuration on stellarators and a design study on a proposed large modular stellarator. DOE

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N82-12956 Cornell Univ., Ithaca, N. Y.
SELECTED AREA GROWTH FOR DIGITAL INTEGRATED CIRCUITS AND ATOMIC PLANE DOPING OF GALLIUM ARSENIDE BY MOLECULAR BEAM EPITAXY Ph.D. Thesis
George Martin Metze 1981 244 p
Avail: Univ. Microfilms Order No. 8119457

Molecular beam epitaxy, because of its low growth rate and control (i.e., modulation) over numerous molecular beams, provides tremendous accuracy and flexibility in growing the most complex structures. Lamella doping is used to tailor doping profiles within an active region to nearly any concentration gradient and profile required. The technique doping requires the momentary suspension of growth, during which a predetermined amount of dopant (lamella) is deposited on the surface of the grown layer. Growth is then resumed and the process repeated with subsequent lamella concentrations altered to provide correct doping profiles. Another potentially important technique involves the simultaneous deposition of single crystal and polycrystalline GaAs. This planar process of selective molecular beam epitaxy was used to define and isolate single crystal GaAs regions. Dissert. Abstr.

N82-12957 Cornell Univ., Ithaca, N. Y.
ELECTRON FIELD EMISSION TUNNELING SPECTROSCOPY OF PLATINUM GROUP AND TUNGSTEN METALS IN THE PRESENCE OF MOLECULAR GAS AND NOBLE METAL ADSORBATES Ph.D. Thesis
Robert Louis Billington, III 1981 182 p
Avail: Univ. Microfilms Order No. 8119476

Hydrogen, carbon monoxide, oxygen, nitrogen, nitric oxide, ammonia and hydrazine were adsorbed on several crystal faces of iridium. Gold and copper were adsorbed on iridium, rhodium and platinum and on the crystal faces of tungsten. On W(100) the surface state present in the clean FEED spectrum disappears immediately as adsorption of gold and copper begins. However, at both one and two monolayer coverages, the surface state and, in fact, the entire clean energy spectrum returns. For the platinum group metals, a large binding energy anisotropy between the Ir(111) plane and the emitter surface around it is found for both gold and copper. Either metal rapidly diffuses off the flat(111) plane at 600 K. The most common result obtained in the gas adsorption experiments is that the interesting d-band energy structure found on the clean iridium surface is removed, leaving a free-electron-like FEED spectrum. Complx phenomena observed for nitric oxide are described. Dissert. Abstr.

N82-12958 Tufts Univ., Boston, Mass.
A SYSTEMATIC STUDY OF THE EFFECTS OF 3d, 4f AND 5f IMPURITIES ON THE CRITICAL TEMPERATURE OF SUPERCONDUCTING Th; MEASUREMENTS TO 20 KILOBARS Ph.D. Thesis
John Bradley Bulman 1981 156 p
Avail: Univ. Microfilms Order No. 8121356

Superconducting transition temperature (Tc) measurements at pressures from zero to 20 kilobars are presented on alloy systems of various impurities from the iron group, rare earth and actinide series in thorium. The alloy systems studid are classified in terms of the effect of the impurity ions on Cooper pairs. The impurity system ThCr exhibits temperature dependent pair breaking and ThMn appears to also. The systems ThNd, ThSm, ThGd, ThDy, ThHo and ThEr show evidence of temperature independent pair breaking. Measurements on the ThPr and ThTb systems suggest a crystalline electric field modified pair breaking interaction, while the ThCe is a non-magnetic pair weakening system. The Actinide impurity system ThU too is a non-magnetic pair weakening system. Analysis of the initial rate of depression of Tc vs. impurity concentration supports an increasing degree of localization of the partially filled shells, progressing from the iron group to the actinides to the rare earths. Dissert. Abstr.

N82-12959 Iowa State Univ. of Science and Technology, Ames.
EFFECTS OF UNIAXIAL STRESS ON THE SCHOTTKY-BARRIER ELECTROREFLECTANCE SPECTRA OF GaAs AND GaP Ph.D. Thesis
Michael John Bohan 1981 102 p
Avail: Univ. Microfilms Order No. 8122502

Schottky barrier electroreflectance measurements were performed on samples of GaAs and GaP under uniaxial stress.

The E sub 0 structure of GaP and the E sub 2 structure of GaAs are investigated. Values are obtained for the linear contribution to the deformation potential of the E sub 0 peak of GaP. No stress induced splittings are resolved in the E sub 2 structure of GaAs due to the large value of the broadening parameter (200 mV). Empirical nonlocal pseudopotential calculations are used to locate two nearly degenerate critical points which may contribute to the E sub 2 structure. The predicted behavior of these critical points under uniaxial stress is calculated. Dissert. Abstr.

N82-12960 Arizona Univ., Tucson.
THE EXTINCTION BY SMALL ALUMINUM PARTICLES FROM THE FAR INFRARED TO THE VACUUM ULTRAVIOLET Ph.D. Thesis
Janice Elaine Rathmann 1981 79 p
Avail: Univ. Microfilms Order No. 8121922

Absorption measurements were performed from .12 micrometer to 250 micrometers on small particles of Al produced by the standard inert gas evaporation technique. These were done because experimental results of Granqvist et.al. revealed a discrepancy of over three orders of magnitude with the predictions of both the classical Drude theory for spherical particles and the quantum mechanical Gor'kov Eliashberg theory. The results of Granqvist et.al. in the far IR were confirmed and the data were extended to the UV. The anomalous absorption is explained with a model using the classical Drude theory by taking into account a distribution of ellipsoidal shapes and an amorphous oxide layer, which is found to cover the particles. In order to determine the optical constants of amorphous aluminum oxide required in the calculation, a technique applicable to powdered materials was used. The model developed with the shape distribution was found to give excellent agreement with the experimental results. Several models proposed by other authors to explain the anomalous far IR absorption were also considered, but did not agree as well with the data. Dissert. Abstr.

N82-12961 Washington Univ., St. Louis, Mo.
NUCLEAR MAGNETIC RESONANCE STUDIES OF SOLID KRYPTON Ph.D. Thesis
Eric Irvine Madaras 1981 229 p
Avail: Univ. Microfilms Order No. 8122748

A 1.55 MHz pulsed NMR experiment was performed on solid krypton samples containing 11.55% and enriched 73.1% Kr(83). The computer controlled experiment measured relaxation times T sub 1, T sub 2c, T sub 2q and T sub 1p; T sub 1 principally reflects quadrupolar Raman relaxation of the spin 9/2 Kr (83) by thermal phonons. The T sub 1p measured with an adiabatic demagnetization in the rotating frame (ADRF) at low H sub 1 field showed two relaxation times. One was associated with the partially resolved quadrupolar non-central transitions and labelled T sub 1pq(ADRF). The other time was associated with the-1/2 to 1/2 central transition and denoted by T sub 1pc(ADRF). The ratio of T sub 1 at high field to T sub 1pq(ADRF) at low field was 4 and is discussed in terms of relaxation by independent fluctuating quadrupolar interactions. All the various T sub 1p measurements indicated a thermally activated minimum associated with atomic diffusion near 95 K. These data, together with a corresponding temperature variation in T sub 2c provided a determination of self-diffusion in solid kryton. Dissert. Abstr.

N82-12962 Illinois Univ. at Chicago Circle, Chicago.
A STUDY OF THE PHASE TRANSITIONS IN BENZIL BY RAMAN AND BRILLOUIN SCATTERING TECHNIQUES Ph.D. Thesis
Douglas Raymond Moore 1981 163 p
Avail: Univ. Microfilms Order No. 8120570

The polarization Raman spectra exhibited by the external vibration modes of benzil were studied over the temperature range from 10 K to 300 K. Eight modes were observed above T sub c and the doubly degenerate E modes were seen to split into A and B components below T sub c. The lowest E mode exhibited considerable 'softening as the phase transition was approached from above and below and careful measurements near T sub c revealed a discontinuity in the Raman shift indicative of a first order transition. A series of Brillouin scattering measurements were performed on several oriented single crystals of benzil. At least squares analysis of the data led to the determination of the entire set of elastic constants at room temperature. A relatively small value of the elastic constant was found and its effect on the elastic properties of benzil is discussed. Dissert. Abstr.

N82-12963 State Univ. of New York at Binghamton.
IMPURITY RESISTANCE IN FERROMAGNETIC METALS Ph.D. Thesis
I-Min Jiang 1981 125 p
Avail: Univ. Microfilms Order No. 8120909

Two aspects of impurity resistance in ferromagnetic metals were investigated. First, the effect due to nonmagnetic impurities was investigated by considering the spin-dependent screened Coulomb potential as well as the different densities of states at the Fermi surface. It was found that the electrical resistivity increases monotonically with the increase of magnetization. This result is contrary to Neiminen's work which showed that electrical resistivity decreases when magnetization increases. Furthermore, The result also exhibited a significant difference from other results in which a resistivity minimum at low temperatures is predicted. Second, based on a dilute localized impurity spin model, the effect of magnetic impurities in a spin-polarized electron gas ated. A logarithmic divergent resistivity was found a low temperatures. This is qualitatively in agreement with the experiments. It is shown that the spin-dependent screened Coulomb potential is not able to interpret the anomalous resistivity minimum at low temperatures in ferromagnetic metals. However, magnetic impurities do contribute in a significant way to this anomaly. Dissert. Abstr.

N82-12964*# SEMTEC, Inc., Huntsville, Ala.
TRANSIENT AND DIFFUSION ANALYSIS OF Hg Cd Te Quarterly Progress Report, 20 Mar. - 20 Jun. 1980
J. C. Clayton 30 Jun. 1980 27 p refs
(Contract NAS8-33698)
(NASA-CR-161524) Avail: NTIS HC A03/MF A01 CSCL 20L

The solution of the one dimensional planar interface solidification problem is presented. Numerical solutions are applied to experimental solute profiles to determine the effective diffusion constant for Hg Co Te. Progress on the design and construction of a high gradient furnace is reported. S.L.

N82-12965*# Old Dominion Univ., Norfolk, Va. Dept. of Mathematical Sciences.
MODELING OF THIN-FILM GaAs GROWTH Progress Report, 15 May - 15 Sep. 1981
John H. Heinbockel Oct. 1981 42 p refs
(Grant NAG1-148)
(NASA-CR-164992) Avail: NTIS HC A03/MF A01 CSCL 20L

A solid Monte Carlo model is constructed for the simulation of crystal growth. The model assumes thermally accommodated adatoms impinge upon the surface during a delta time interval. The surface adatoms are assigned a random energy from a Boltzmann distribution, and this energy determines whether the adatoms evaporate, migrate, or remain stationary during the delta time interval. For each addition or migration of an adatom, potential wells are adjusted to reflect the absorption, migration, or desorption potential changes. Author

N82-12966# Florida Univ., Gainesville. Dept. of Electrical Engineering.
STUDY OF 1/f NOISE IN SOLIDS Progress Report, 1 Nov. 1979 - 31 May 1981
Karel M. VanVliet and Eugene R. Chenette May 1981 68 p refs
(Grant AF-AFOSR-0050-80; AF Proj. 2305)
(AD-A105219; AFOSR-81-0685TR) Avail: NTIS HC A04/MF A01 CSCL 20/12

A Hewlett-Packard digital fast Fourier transform spectral analyser was purchased and adapted for our purpose by writing several computer programs for the output display. Test jigs for devices under test and preamplifiers were built. Further, a real time dual channel correlation spectral analyzer was designed and partially built. Measurements involving temperature fluctuations and correlations in metal films and in integrated circuit transistors are described. The latter have been recently completed. It is conclusively shown that temperature fluctuations are not the cause of 1/f noise in these devices. Under the heading of theoretical work, an extensive analysis is presented of noise in diffusion systems. Several analytical models, not considered before, have been solved and the noise is presented. It is conclusively shown that volume (bulk) diffusion noise, whether based on the physical diffusion source or on Voss and Clarke's P-source, never leads to 1/f-type spectra. However, surface fluctuations as, e.g., caused by stochastic surface generation-recombination processes, can give rise to many decades of 1/f noise. This is worked out in detail for a MOSFET structure. We conclude, therefore, that the large noise observed in MOSFETs can be due to carrier number fluctuations subject to diffusion; at low frequencies the MacWhorter-van der Ziel model may be operative, whereas at higher frequencies our model takes over. Finally, in the theory section we present a novel derivation of quantum 1/f noise, occurring in emission processes. Author (GRA)

N82-12967# Georgia Inst. of Tech., Atlanta. Fracture and Fatigue Research Lab.
X-RAY SCATTERING INVESTIGATION OF MICROALLOYING AND DEFECT STRUCTURE IN ION IMPLANTED COPPER Progress Report
S. Spooner 26 Aug. 1981 17 p refs
(Contract N00014-78-C-0270)
(AD-A105442; GIT-E-19-664) Avail: NTIS HC A02/MF A01 CSCL 07/4

The double-crystal method for X-ray scattering analysis of radiation has been applied to the investigation of aluminum implanted copper. The interpretation of X-ray observations is based on effects of lattice strain in the surface microalloy and the presence of dislocation loops which originate from implantation damage. The copper crystal with a dislocation less than 1000 cm/cu cm was implanted with aluminum to a dose of 2 x 10 to the 16th power ions/cm with energies up to 200 keV. The response of the implanted crystal to annealing at 500 C and 600 C was determined. The quantitative use of the X-ray technique to assess implantation effects and the limitations of the technique are discussed. GRA

N82-12968# Georgia Univ., Athens.
SURFACE STRUCTURE AND GROWTH OF CRYSTALLINE MATERIALS Final Technical Report, 15 Nov. 1979 - 14 Nov. 1980
David P. Landua 14 Jul. 1981 7 p
(Grant AF-AFOSR-0053-80; AF Proj. 2301)
(AD-A105223; AFOSR-81-0621TR) Avail: NTIS HC A02/MF A01 CSCL 20/2

Computer simulation methods have been used to study spiral crystal growth from multiple dislocation edges. The results showed that after the spiral arms had all interacted once growth proceeded in agreement with the Burton-Cabrera-Frank continuum theory. For small Frank-Read dislocations the existence of a nucleation barrier was shown. Computer simulation studies of simple models of magnetic (binary alloy) lattices with exposed surfaces were also carried out. Surface order-disorder and order-order transitions were studied as a function coupling both below and above the bulk transition surface. GRA

N82-12969# Illinois Univ. at Urbana. Dept. of Metallurgy and Mining Engineering.
CHARACTERIZATION OF AS-GROWN DISLOCATION STRUCTURE IN NIOBIUM BY X-RAY DIFFRACTION TOPOGRAPHY
Stuart R. Stock, Haydn Chen, and Howard K. Birnbaum Sep. 1981 15 p refs
(Contract N00014-75-C-1012)
(AD-A105431) Avail: NTIS HC A02/MF A01 CSCL 07/4

The behavior of dislocations in b.c.c. metals has been extensively examined using relatively macroscopic methods, such as deformation studies and etch pitting, as well as with microscopic TEM methods. While these studies have led to significant increases in the understanding of dislocation behavior, the need remains for a method for studying the microscopic behavior of dislocations in relatively thick specimens. One such method, X-ray diffraction topography, has not been extensively applied due to the relatively high X-ray absorption of many of the metals of interest, such as niobium, and the consequent need to prepare highly perfect thin crystals. In the present note we report the preparation of such niobium crystals and the use of Lang topography to characterize their dislocation structures. Single crystal niobium specimens of thickness suitable for transmission topographic studies were grown by recrystallization of a heavily deformed polycrystalline ribbon of niobium. The procedure consisted of resistance heating at 2200 K and 2.6 times 10 to the minus 8th power Pa for times on the order of an hour. It should be noted, however, that due to outgassing of the niobium, protracted annealing was required to obtain this pressure. GRA

N82-12970# San Jose State Univ., Calif. School of Engineering.
DEEP LEVELS IN AL SUB X Ga SUB 1 XAs:Fe SINGLE CRYSTALS Interim Report
Rangaiya A. Rao 1 Mar. 1981 39 p refs
(Grant AF-AFOSR-0099-80; AF Proj. 2306)
(AD-A105233; TR-81-01; AFOSR-81-0696TR) Avail: NTIS HC A03/MF A01 CSCL 20/2

Deep levels are energy levels in the bandgap of a semiconductor with activation energies which are large compared to kT. At a deep defect, the carrier wavefunction is localized near the site of the defect and, hence, delocalized in k-space. The defect can couple to a variety of phonons and interacts strongly with the lattice. Deep states generally tend to be nonradiative centers. Physically, they could result from certain chemical impurities, native defects such as vacancies, complexes involving native defects and impurities, surfaces, and interfaces. A variety of deep centers are almost always present in semiconductor crystals. They may be introduced intentionally into a semiconductor crystal by various methods. Gold introduces a deep acceptor level and a deep donor level in silicon. Gold may be evaporated onto the surface of a silicon wafer and then diffused-in by heating the wafer at a temperature of the order of 900 C for several minutes so that the gold atoms distribute themselves uniformly in the silicon crystal. Impurities like chromium and iron may be added to the melt from which GaAs, Al sub x Ga(1 sub x)As, and other semiconductors are grown by liquid phase epitaxy. Heat treatment and bombardment by energetic electrons also create deep centers in semiconductors. Deep levels affect device performance in many ways. GRA

N82-12971# Stanford Univ., Calif. Lab. of Physics.
ELASTIC DOMAIN WALL WAVES IN FERROELECTRIC CERAMICS AND SINGLE CRYSTALS Annual Progress Report, 1 Feb. 1980 - 31 Jan. 1981
B. A. Auld Sep. 1961 26 p refs
(Contract N00014-79-C-0222)
(AD-A105110; GL-3314) Avail: NTIS HC A03/MF A01 CSCL 20/3

Experiments have been performed in ferroelectric ceramics on interface elastic wave guidance, laser probing of elastic vibration distributions, elastic attenuation, and the properties of counter-poled plates. Author (GRA)

N82-12972# State Univ. of New York at Albany. Dept. of Physics.
MEASUREMENT OF PAIR-QUASIPARTICLE INTERFERENCE IN JOSEPHSON TUNNEL JUNCTIONS Final Report
Robert I. Gayley 10 Jun. 1981 43 p refs Presented at the 1980 Appl. Superconductivity Conf.
(Contract N00014-77-C-0415)
(AD-A105251) Avail: NTIS HC A03/MF A01 CSCL 20/10

A successful program for applying the microscopic theory to the computation of the time-dependent behavior of a Josephson junction has now been developed. It was based, originally, on one due to D. MacDonald of NBS Boulder, but extensive modifications had to be made in order to bring the computation time and computer memory requirements down to levels that made it possible to deal with the kinds of problems I wished to attack. Such computations are very demanding because a junction has a long 'memory'. Its behavior at some moment is dependent on its history over a long time interval in the past. It can be shown that the length of this memory is directly related to the sharpness of the voltage jump that appears in the junction current-voltage characteristic at the gap voltage. R. Harris of NBS Boulder has pointed out that real junctions do not have as sharp a jump as theory predicts, and this implies that their memories are not as long as theory suggests. I investigated this question and found that artificially shortening the theoretical memory does indeed lead to rounding of the jump at the gap voltage. I found that the amount of shortening that is required to give a reasonable rounding is in fact enough to produce an appreciable reduction in both computation time and computer memory requirements. GRA

N82-12973# Army Electronics Research and Development Command, Fort Monmouth, N. J.
FURTHER INVESTIGATION OF ETCHANTS FOR CHEMICALLY POLISHING SC-CUT QUARTZ CRYSTALS
Ronald J. Brandmayr and John R. Vig Sep. 1981 19 p refs
(DA Proj. 1L1-62705-AH-94)
(AD-A104903; DELET-TR-81-16) Avail: NTIS HC A02/MF A01 CSCL 20/2

A series of solutions were investigated for chemically polishing SC-cut quartz crystals. Solutions of concentrations were prepared. It was determined that some of these solutions can chemically polish SC-cut crystals in less time than solutions previously reported. Shorter etching time minimizes the problem of water evaporation from the etching bath. Also, the new solutions are easier to prepare than those employing NH subscript 4 F.
Author (GRA)

N82-12974# Oregon State Univ., Corvallis. Dept. of Physics
TDPAC STUDY OF THE In2Se3 CRYSTAL STRUCTURE
Karl Krusch and John A. Gardner 17 Aug. 1981 25 p refs Submitted for publications
(Contract N00014-79-C-0668; NR Proj. 056-721)
(AD-A104729; TR-3) Avail: NTIS HC A02/MF A01 CSCL 20/2

The time-differential perturbed angular correlation (TDPAC) technique has been used to investigate the temperature dependence of the electric field gradient (EFG) at Cd impurities in the semiconducting compound In2Se3. Between room temperature and the melting point, four different phases could be observed. Most crystal structures which have been proposed for the alpha and beta phases are shown to be incorrect. The beta prime phase (550-720 C) has not been reported previously. The data suggests that the beta phase may be a Peierls distortion of the beta prime phase. The EFG in the alpha phase is well described by a simple point charge model suggesting that the electronic part of the EFG is alpha - In2Se3 is small. GRA

N82-12975# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mechanical Engineering.
OPTICAL CONSTANTS OF BORON CARBIDE Final Report
James L. Lauer 14 Aug. 1981 130 p refs
(Contract N00164-79-M-2522)
(AD-A105451; NWSC/CR-RDTR-150) Avail: NTIS HC A07/MF A01 CSCL 20/6

The optical constants n and k have been determined in the 700 - 1200 per cm wavenumber region for a boron carbide flat of compressed 2 micrometer diameter particles by the polarized reflection method. A broad absorption band has been found near 1050 per cm, where k reached values of 1 to 2 and n of lower than 1.5. The scatter of the data points was large, probably because of the demonstrated presence of up to 10% of iron oxide on the surfaces (by SEM/X-ray). More accurate procedures are suggested for future work. The suspension of the particles in one arm of a Michelson interferometer is probably the most direct and superior method for obtaining n and k for such particles. Author (GRA)

N82-12976# BDM Corp., Albuquerque, N. Mex.
ANALYSIS OF THE TEMPERATURE DEPENDENCE OF RESISTIVITY IN N-TYPE SILICON Final Report, 11 Feb. 1979 - 30 Apr. 1980
Marilyn Glaubensklee 16 Mar. 1981 35 p refs
(Contract DNA001-79-C-0138)
(AD-A105192; BDM/TAC-80-089-TR-R1; DNA-5297-F) Avail: NTIS HC A03/MF A01 CSCL 20/12

This work consists of an analytical development of the observed temperature dependence of the resistivity in n-type silicon. This is accomplished by considering the temperature dependence of each physical parameter (such as electron scattering terms) contributing to resistivity in various doping ranges. Author (GRA)

N82-12977# Hoffman (P. R.) Co., Carlisle, Pa.
AUTOMATED X-RAY ORIENTATION FOR QUARTZ CRYSTAL RESONATORS Interim Report, 1 Jul. - 31 Dec. 1980
Robert W. Birrell, Robert J. Valihura, John L. Chambers (Advanced Research and Applications Corp.), Myron A. Pugh (Advanced Research and Applications Corp.), and Thomas A. Workman (Advanced Research and Applications Corp.) Fort Monmouth, N.J. Army Electronics Research and Development Command Sep. 1981 73 p refs
(Contract DAAK20-79-C-0254; DA Proj. 1L1-62705-AH-94)
(AD-A104945; DELET-TR-79-0254-3; IR-3) Avail: NTIS HC A04/MF A01 CSCL 09/1

The objective of this program is to develop an automatic X-ray orientation system (AXROS) that is capable of measuring the angles of cut of doubly rotated (SC) quartz crystals, to an accuracy of seconds of arc, on a production basis. The technique selected for the system utilizes recognition of several major spots in a back-reflected Laue pattern in conjunction with a laser measurement of crystal surface orientation to determine the angle of cut. The pattern recognition is done via an algorithm implemented on a dedicated mini-computer. The same computer also drives servo-mechanisms used to rotate and position the crystal. A secondary objective of the program is to use the AXROS measurements to provide the input for an angle correction device to be implemented in conjunction with the AXROS.
Author (GRA)

N82-12978# Stanford Linear Accelerator Center, Calif.
FUNDAMENTAL TESTS AND MEASURES OF THE STRUCTURE OF MATTER AT SHORT DISTANCES
Stanley J. Brodsky Jul. 1981 38 p refs Presented at the 2nd Intern. Conf. on Precision Meas. and Fundamental Constants, Washington, D.C., 8-12 Jun. 1981
(Contract DE-AC03-76SF-00515)
(DE81-030644; SLAC-Pub-2776) Avail: NTIS HC A03/MF A01

Recent progress in gauge field theories has led to a perspective on the structure of matter and basic interactions of short distances. It is clear that at very high energies quantum electrodynamics, together with the weak and strong interactions, are part of a unified theory with fundamental constants, symmetries, and conservation laws. A nontechnical introduction to these topics is given, with emphasis on fundamental tests and measurements. DOE

N82-12979# Deutsches Elektronen-Synchrotron, Hamburg (West Germany).
STUDY OF Al/Si INTERFACE BY PHOTOEMISSION, AUGER ELECTRON SPECTROSCOPIES
K. L. I. Kobayashi, J. Barth, F. Gerken, and C. Kunz Jun. 1980 15 p refs
(DESY-SR-80/08) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

Photoemission, Auger electron yield, and Auger electron spectra were observed for Al/Si(111) interfaces with various Al coverage prepared by successive deposition using a moleculr beam source. The Al 3p derived states are introduced at around the top of the valence band by the Al coverage of less than one monolayer. The Al surface layer behaves as a 'metal' and the Fermi level is stabilized in the Al 3p derived states at about 0.3 eV above the top of the valence band of Si. The Schottky barrier height in this stage is about 0.8 eV and further increase in Al coverage does not change the barrier height. A covalent bonding model of the Al/Si interface based on the experimental results is proposed. The present result favors the on-top geometry of Al atoms on Si(111) surface among the geometries used in the pseudopotential calculation by Zhang and Schlueter. DOE

N82-12980# AEG-Telefunken, Heilbronn (West Germany). Geschaeftsbereich Halbleiter.
SILICON TRANSPORT EPITAXY Final Report
Peter Duro Braun Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 126 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-80-165; ISSN-0340-7608) Avail: NTIS HC A07/MF A01

Selective epitaxial deposition of silicon was obtained. The epitaxial growth of silicon and the conditions for selective deposition were investigated at temperatures as low as 600 C. During investigations of the dopant incorporation, anomalous behavior of n-type dopants was discovered, and called hyperdoping. A radiation heated horizontal reactor was developed. A fully developed production process for low voltage Zever diodes was realized. Silicon transport epitaxy also proves to function in an open tube process, and selective deposition can also be achieved under these conditions. The epitaxial growth allows the use of nitrogen as carrier gas. Author (ESA)

N82-12981# Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).

ELECTRO-OPTICAL EFFECTS IN LIQUID CRYSTALS FOR DISPLAY USE Final Report

Guenter Baur, Gerhard Meier, Hanspeter Schad, Axel Stieb, Waltraud Fehrenbach, and Friedrich Windscheid Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 119 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-80-200; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 25

Improvements of the twisted nematic liquid crystal cell are considered. The material properties of liquid crystals were investigated. The structure of the alignment defects, occurring at the edges of the electrode segments in liquid crystal layers with a small tilt angle, could be cleared up. The dependence of optical appearance on the observation angle were calculated to optimize the twisted nematic cell by variation of the material parameters. The interdependence of contrast and brightness is investigated for different types of dichroic liquid crystal cells. A figure of merit for reflective display cells is defined.

Author (ESA)

N82-12982# Wacker-Chemie G.m.b.H. Burghausen (West Germany). Bereich GA.

RESEARCH AND DEVELOPMENT ON NEW TECHNOLOGIES FOR THE PREPARATION OF III-V SEMICONDUCTOR MATERIALS AND ON METHODS FOR EVALUATION OF THE QUALITY OF THESE MATERIALS. PROJECT Ga(AsP) EXPITAXIAL LAYERS AND SUBSTRATES FOR THEM Final Report

Norbert Stath Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 70 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-020; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,50

Methods for series production of GaAs 0.6P0.4 layers on gallium arsenide and geranium substrates were developed. The influence of temperature, composition of the gas phase, and substrate preparation were examined and optimized. The layers were tested by Hall effect and photoluminescence measurements, and the quantum efficiency was determined by means of zinc diffused test diodes. Epitaxial layers were also successfully tested in the production lines of a German and an American light emitting diode manufacturer. Layers of GaAs(0.65)P(0.35) deposited on gallium phosphide substrates show good crystal quality, but the quantum efficiencies need further development. Cutting and polishing of gallium arsenide and gallium phosphide wafers were developed to production maturity. Author (ESA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

N82-12983 California Univ., San Diego.

COLLECTIVE EFFECTS IN DIFFUSE AMBIPLASMA Ph.D. Thesis

Shelley Hill Rogers 1981 172 p

Avail: Univ. Microfilms Order No. 8120539

Astronomical observations reveal no signs of antimatter on a large scale. If matter and antimatter exist in separate regions without, in effect, interacting there must be a repulsive force between the matter and antimatter that prevents them from mixing; in particular, such a force is crucial to the coexistence of large, diffuse regions akin to the galactic interstellar clouds. A previously proposed mechanism in which a thin, magnetized layer of ambiplasma keeps matter and antimatter plasmas separated with the energy released in occasional annihilation to dynamic collisions between diffuse regions and specifically to collisions between unmagnetized plasmas and between magnetized atomic clouds. A model for the generation of magnetic fields by an electromagnetic instability was developd from Vlasov and quasi-linear theories. The character of collisionless shocks driven by annihilation-electron currents was derived by matching four physical requirements self-consistently. Dissert. Abstr.

N82-12984# National Aerospace Lab., Tokyo (Japan).

ANALYTICAL EXPRESSIONS FOR SPECIFIC HEATS AND ISENTROPIC EXPONENTS OF HIGH-TEMPERATURE GASES WITH THEIR APPLICATIONS

Riichi Matsuzaki and Noriaki Hirabayashi 1981 46 p refs In JAPANESE; ENGLISH summary

(NAL-TR-671; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

Exact analytical expressions for the specific heats and isentropic exponents were obtained for several sets of high temperature gases composed of dissociated and ionized species in thermodynamic equilibrium. The sets of species considered are: monatomic gas (A, A+, A++, e-), pure diatomic gas (A2, A, A2+, A+, e-), heteronuclear diatomic gas (AB, A, B, AB+, A+, B+, e-), triatomic gas (AB2, A2, B2, A, B, AB, A2B), and a model air (O2, N2, O, N, NO, O+, N+, NO+, O2+, N2+, e-). For another model of air including Ar and Ar+, an approximate method for calculating specific heats and isentropic exponents is proposed. Second virial correction terms for thermodynamic properties are also derived analytically. The corrected values of the specific heats and isentropic exponents at high density reveal better agreement with available tables. Debye-Huckel correction can be neglected in the present ranges of temperature and pressure. Simple applications to the study of equilibrium flow of air around a corner and in a nozzle show that these analytical expressions are useful in practical purposes. R.J.F.

N82-12985# Oklahoma Univ., Norman. School of Chemical Engineering and Materials Science.

DEVELOPMENT OF A THERMODYNAMIC PROPERTIES CORRELATION FRAMEWORK FOR THE COAL CONVERSION INDUSTRY, PHASE 1A Annual Report, 1 Sep. 1980 - 31 Aug. 1981

K. E. Starling, L. L. Lee, K. H. Kumar, M. R. Brule, S. Watanasiri, V. Gupta, M. H. Li, R. McFall, W. Chang, C. K. So et al 1981 33 p ref

(Contract DE-FG22-80PC-30249)

(DE81-030363; DOE/PC-30249/T2; AR-1) Avail: NTIS HC A03/MF A01

A three-parameter corresponding states framework developed originally for light hydrocarbons was modified to rapidly develop a practical thermodynamic properties prediction capability for the coal conversion industry. The three-parameter corresponding states correlation describes the thermodynamic behavior of pure nonpolar and slightly polar nonassociating coal fluids and mixtures for which the mixture constituents are known. Characterization techniques are outlined for converting distillation analysis of underfined mixtures (with composition available in terms of broad fractions) into representative pseudo components. Empirical correlations are developed to estimate the three corresponding states characterization parameters for each fraction from measurements made on the fraction (boiling point, specific gravity, molecular weight). Results for one and two ring polar and associating coal fluids indicate that an extension of the corresponding states methodology to associating fluids using a five-parameter correlation is possible. DOE

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-12986# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN EXPLORATORY STUDY OF COSTS TO OPERATE GOVERNMENT-OWNED, CONTRACTOR-OPERATED (GOCO) FACILITIES M.S. Thesis
William O. Bennett and Mark L. Hodges, Jr. Jun. 1981 124 p refs
(AD-A104854; AFIT-LSSR-43-81) Avail: NTIS HC A06/MF A01 CSCL 05/1

During World War II, the U.S. Government recognized a need to expand the nation's industrial base. The government decision was to build production facilities and contract with private firms to operate them. In 1970 the Secretary of Defense issued a directive to sell many government facilities. As of 1980, 147 remained in government possession, being managed differently by each DOD component. The researchers sought to determine if management structure impacted upon operational costs of GOCOs. The researchers discovered that operational cost data were not readily available DOD-wide. A study of Army ammunition GOCOs was conducted to determine if sufficient correlation between costs of operating GOCOs could be found to justify the expense of data collection for hypothesis testing. The results of the study showed positive correlation between operation and maintenance costs of GOCOs and total costs of GOCOs. Production costs were not found to be significantly correlated to operation and maintenance costs. Evidence of a structural variable impacting upon production cost was found. The study recommended further study to refine the cost data, then further research into operational costs and management structure. Author (GRA)

N82-12987# Scientific Service, Inc., Redwood City, Calif.
AN APPROACH TO THE MANAGEMENT OF HAZARDOUS MATERIALS Final Report
J. V. Zaccor, H. L. Hsu, and C. Wilton Sep. 1981 103 p refs
(Contract EMW-C-0432)
(AD-A104869; SSI-8043-4) Avail: NTIS HC A06/MF A01 CSCL 13/12

This report describes an approach to hazardous material emergency management that includes organizing, relating, and keeping track of decision information being developed in the various operating sectors. Ongoing hazardous materials data collection, done by different Federal, State, local, and private agencies, is not coordinated. A simple, pragmatic decision information system with a standard data acquisition format is needed. A matrix approach, where data are acquired and developed to determine ranking problems, may be an answer. Information exchange media are examined and assessed for potential effectiveness in transferring the acquired and developed information to the area where information needs are greatest - the level of first responder. Test communities should be established to participate in information exchange programs. Author (GRA)

N82-12988# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
ASSIGNMENT TECHNIQUES FOR HEAVILY LOADED NETWORKS [TOEDELINGSTECHNIEKEN VOOR ZWAAR BELASTE NETWERKEN]
H. E. R. Meinjer Delft Netherlands Organization for Applied Scientific Research TNO Oct. 1979 38 p refs In DUTCH
(A-79-VK-45-07) Avail: NTIS HC A03/MF A01

A survey of the most important assignment methods is presented. It is based on literature reviewing, except for the equilibrium assignment method and it is limited to models for one traffic method with fixed demands, where the effects of congestion on the assignment result are taken into account. The two equilibrium methods treated use a monotonically increasing function linking current and resistance, and result in a unique solution where all the employed routes between origin and destination have the same resistance and the nonemployed routes have higher resistance. Author (ESA)

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N82-12989# Office of Technology Assessment, Washington, D. C.
COMPUTER-BASED NATIONAL INFORMATION SYSTEMS: TECHNOLOGY AND PUBLIC POLICY ISSUES
Sep. 1981 203 p refs
(OTA-CIT-146; LC-81-600144) Avail: SOD HC

Developments in computer and information management technology and their impact on society are discussed. Among the issues discussed are the following: innovation, productivity, and employment; privacy, security of computer information; government management of data processing; society's dependence on information systems; and the constitutional rights and regulatory boundaries affected by information systems. For individual titles, see N82-12990 through N82-13003.

N82-12990# Office of Technology Assessment, Washington, D. C.
COMPUTER-BASED NATIONAL INFORMATION SYSTEMS: TECHNOLOGY AND PUBLIC POLICY ISSUES. SUMMARY
In its Computer-based Natl. Inform. Systems Sep. 1981 p 3-25 (For primary document see N82-12989 03-82)
Avail: SOD HC

The structure of information policy issues was examined. Information policy, law, and regulation were studied. System issues, information issues, secondary policy impacts, and long-term societal effects are discussed. Government management of data processing and its implications are also discussed. T.M.

N82-12991# Office of Technology Assessment, Washington, D. C.
BACKGROUND AND PURPOSE OF THE STUDY
In its Computer-based Natl. Inform. Systems Sep. 1981 p 29-34 (For primary document see N82-12989 03-82)
Avail: SOD HC

As computer-based national information systems become more important to American society, particularly for Government administration, they create corresponding public policy problems. These problems are discussed and include: the design, procurement, and operation of Government data systems; the potential for Government agencies to abuse the large record systems they operate that contain personal data; the effects of computer technology on the structure and operations of the banking industry; the role of the Postal Service in providing electronic message service; problems concerned with the protection of privacy and constitutional rights presented by the use of large automated data systems; and the impact of information technologies on copyright laws. T.M.

N82-12992# Office of Technology Assessment, Washington, D. C.
INFORMATION SYSTEMS AND COMPUTERS
In its Computer-based Natl. Inform. Systems Sep. 1981 p 37-43 refs (For primary document see N82-12989 03-82)
Avail: SOD HC

Computers carry out a wide variety of tasks associated with processing information. It is important to understand the entire range of these capabilities in order to appreciate the nature and magnitude of the potential social impacts of this technology when used in information systems. Computer capabilities are discussed and include: data collection, information storage, information organization, calculations, communication, information presentation, and numerical control. T.M.

N82-12993# Office of Technology Assessment, Washington, D. C.
INFORMATION IN SOCIETY
In its Computer-based Natl. Inform. Systems Sep. 1981 p 47-54 refs (For primary document see N82-12989 03-82)
Avail: SOD HC

The nature of information is discussed. The commercial value, public value, and private value of information are considered. The role of information as an economic commodity on the development of the economy was examined. T.M.

N82-12994# Office of Technology Assessment, Washington, D. C.
THE STRUCTURE OF INFORMATION POLICY
In its Computer-based Natl. Inform. Systems Sep. 1981 p 55-61 refs (For primary document see N82-12989 03-82)
Avail: SOD HC

Current policies governing information systems are a composite of many specific regulations and laws, which are based on three main factors: the areas affected or the regulatory concerns (privacy, freedom of information, etc.); the affected sector of society (banking, education, Government, etc.); and the lawmakers and/or rulemakers (Congress, the Federal Communications Commission, State legislatures, etc.). Areas of law and regulation that affect information systems or are affected by them are discussed. T.M.

N82-12995# Office of Technology Assessment, Washington, D. C.
INNOVATION, PRODUCTIVITY, AND EMPLOYMENT
In its Computer-based Natl. Inform. Systems Sep. 1981 p 65-70 refs (For primary document see N82-12989 03-82)
Avail: SOD HC

The structure of innovation and product development in the computer industry is discussed. Basic research in computer science is based on the technology rather than on physical laws. Thus, the leadtime between a fundamental theoretical advance in computer science and a practical application is, in general, relatively short, a few years of less. The vitality of the industry is in part based on the vitality of academic computer science and industrial computer science. The competition between the university and the commercial laboratories are highlighted. T.M.

N82-12996# Office of Technology Assessment, Washington, D. C.
PRIVACY
In its Computer-based Natl. Inform. Systems Sep. 1981 p 73-78 refs (For primary document see N82-12989 03-82)
Avail: SOD HC

Policy issues related to privacy were reviewed on a historical basis. Future privacy issues are discussed and include: an omnibus versus a selective policy on recordkeeping issues, the collection of data, access, and microprocessors and surveillance. T.M.

N82-12997# Office of Technology Assessment, Washington, D. C.
THE SECURITY OF COMPUTER SYSTEMS
In its Computer-based Natl. Inform. Systems Sep. 1981 p 81-86 refs (For primary document see N82-12989 03-82)
Avail: SOD HC

The technology of security was surveyed. Threats and targets were determined and include: theft, sabotage, data alteration, blackmail, extortion, corporate espionage, systems failure, and service interruption. Future security issues are discussed with emphasis on protection of Federal systems and vital domestic information systems. T.M.

N82-12998# Office of Technology Assessment, Washington, D. C.
GOVERNMENT MANAGEMENT OF DATA PROCESSING
In its Computer-based Natl. Inform. Systems Sep. 1981 p 89-94 refs (For primary document see N82-12989 03-82)
Avail: SOD HC

The problems that arise from the Federal Government falling behind the private sector in its use and management of up to date computing technology are discussed. Potentially lost opportunities to use the newest technology to improve the efficiency and effectiveness of Government programs, and increased cost and decreased reliability resulting from operating systems that are becoming obsolete from archaic management procedures are highlighted. T.M.

N82-12999# Office of Technology Assessment, Washington, D. C.
SOCIETY'S DEPENDENCE ON INFORMATION SYSTEMS
In its Computer-based Natl. Inform. Systems Sep. 1981 p 97-102 refs (For primary document see N82-12989 03-82)
Avail: SOD HC

System failures and their implications are discussed. The calculation, assignment, and management of the risks involved with information system failures, were examined. T.M.

N82-13000# Office of Technology Assessment, Washington, D. C.
CONSTITUTIONAL RIGHTS
In its Computer-based Natl. Inform. Systems Sep. 1981 p 105-112 refs (For primary document see N82-12989 03-82)
Avail: SOD HC

Little legal precedent exists, in many cases, for applying constitutional law to the issues raised by computer based information systems. These issues will become incorporated into existing legal precedent. Five areas of constitutional law that may be affected by information systems were examined and they are the first, the fourth, the fifth, the sixth, and the fourteenth ammendment rights. T.M.

N82-13001# Office of Technology Assessment, Washington, D. C.
REGULATORY AND OTHER ISSUES
In its Computer-based Natl. Inform. Systems Sep. 1981 p 115-120 (For primary document see N82-12989 03-82)
Avail: SOD HC

As computer based information systems evolve, they challenge traditional concepts of bounderies - physical or social - that are reflected in the law and regulatory policy. The integration of computer and communication technologies form systems that cross boundaries between nations, states, and organizations. The issues of transborder data flow computer crime, computer software protection, and information gap are discussed and exemplify the kinds of problems created by such integration. T.M.

N82-13002# Office of Technology Assessment, Washington, D. C.
TRENDS IN COMPUTER TECHNOLOGY
In its Computer-based Natl. Inform. Systems Sep. 1981 p 123-143 (For primary document see N82-12989 03-82)
Avail: SOD HC

Computer technology is advancing rapidly. To assess the impacts of information systems, the current state of this technology and where it is heading must be understood. The capability that information technology puts in the hands of the computer user determines the nature of the applications that are developed. Developmental trends shaping the nature of the information based services that will be provided in the coming decade are discussed. T.M.

N82-13003# Office of Technology Assessment, Washington, D. C.
INDUSTRY STRUCTURE
In its Computer-based Natl. inform. Systems Sep. 1981 p 147-166 (For primary document see N82-12988 03-82)
Avail: SOD HC

The companies examined range widely in size. While the market is clearly dominated in terms of size by the top eight (70 percent of the total revenues), much of the significant market shifting and innovation that will affect the future of computer use are taking place among the smaller companies. The top eight companies are those marketing full lines of general purpose computers, referred to in the industry as mainframe computers. The rast succeed, in general, by focusing on a more limited market sector - very small machines, very large machines, specialized peripheral hardware, or various types of computer services. T.M.

N82-13004 California Univ., San Diego.
REDUNDANCY VERSUS QUERY TIME TRADE-OFFS FOR DATA STRUCTURES Ph.D. Thesis
Dennis James Volper 1981 168 p
Avail: Univ. Microfilms Order No. 8120546

Trade-offs and lower bounds on several data retrieval problems are exploded. The three problems considered are the Range Query problem, the Partial Mach Query problem, and the Slotted Retrieval problem. In the Range Query problem data structure which return the sum of the contents of a contguous portion of an array are studied In the Partial Match Query problem data structure which return the sum of record whose keys match a given partial pattern are studied. In the Slotted Retrieval problem are examined. Data In the Slotted Retrieval problem data structure which return the sum of all but one of the elements in an array are examined. This problem is used to illustrate a situation in which the usual method does not provide a good lower bound. It is also used to illustrate that a data problem which allows solutions that use subtraction can be solved by a more powerful data structure than one which allows only addition. Dissert. Abstr.

N82-13005 California Univ., Los Angeles.
ABSTRACT DATA TYPES AND DATA BASES Ph.D. Thesis
Paolo Paolini 1981 306 p
Avail: Univ. Microfilms Order No. 8121028

Abstract data types (ADTs) describe data through a set of operations and their properties. They are used to write specifications for data behavior and to define programming languages which treat data as abstract objects (i.e., instances of ADTs). Data models for data bases are formally specified as ADTs. Therefore the correctness of their implementation is proven, and the properties of the programs which use them is derived. A technique, based on algebraic definitions of ADTs, is useful for formal definition of data models. Transactions which operate upon a data base are described as abstract operations. A particular technique is developed to formally describe a transaction and to prove the correctness of its implementation. Dissert. Abstr.

N82-13006 Hatfield Polytechnic (England). National Reprographic Centre for Documentation.
VIDEO DISCS: THEIR APPLICATION TO INFORMATION STORAGE AND RETRIEVAL
Alan Horder Jun. 1979 42 p refs
(NRCd-12; ISBN-85267-1709) Copyright. Avail: Issuing Activity

The development of video disks is traced. The main systems are described. Specialized applications in education and industry, e.g. in libraries or advertising, are discussed. Uses in information retrieval are analyzed. Optical systems are most suitable since there is no physical contact between disk and stylus. There is less deterioration in playback quality as a result. Video files have a potential information capacity of 6 billion bits, i.e. 7000 to 8000 times more dense than microfilm.
Author (ESA)

N82-13007# Defense Technical Information Center, Alexandria, Va. Office of Information Systems and Technology.
DEFENSE TECHNICAL INFORMATION CENTER FREE TEXT EXPERIMENT: TECHNICAL REPORT FILE Final Report, Dec. 1979 - Jan. 1981
John L. Carney, Carlynn J. Thompson, and Charles D. Edmondson Oct. 1981 39 p
(AD-A106449) Avail: NTIS HC A03/MF A01 CSCL 05/2

DTIC has conducted an experiment that utilizes the free text inversion technique to retrieve records from the Technical Reports data base. It was felt that free text inversion as a form of retrieval would be beneficial in supporting DTIC's revitalized role in the transfer of technical information. The intent of this project was to determine if the free text inversion technique could be implemented on the DROLS on-line system without severely impacting the on-line system's storage capacity and to determine whether the added capability could improve upon or replace the present practice of using open-ended/identifier indexing terminology. Based on the results of the experiment, it was determined that searching of DTIC's Technical Reports data base is a viable retrieval technique that will provide searchers with an additional enhancement that can be used to augment DTIC's present retrieval methods. However, evidence that will support the use of free text in lieu of the use of identifiers and open-ended terminology remains inconclusive. Additional data collected in a 'live environment' will have to be analyzed before a conclusion can be made concerning the use of open-ended terminology. GRA

N82-13008# Oak Ridge National Lab., Tenn. Dept. of Computer Sciences.
PRELIMINARY INTERNAL DATA SCREENING: A COMPONENT OF QUANTITATIVE DATA ANALYSIS IN DATA VALIDATION
David J. Pack Sep. 1981 35 p refs
(Contract W-7405-eng-26)
(DE81-000502; ORNL/CSD-85) Avail: NTIS HC A03/MF A01

Internal data screening is validation of data by quantitative internal comparisons across records for a given variable, across variables for a given record, across time for a given variable and record, etc. Preliminary internal data screening has the objectives of producing: (1) a frozen, archived data base ready for efficient computer analysis, and (2) a general understanding of key variables, a rough cut at response meaningfulness, a qualification of the type of error present, and an assessment of the expected level of difficulty in the comprehensive validation. The first objective is defined and seen to be achievable through simple computer methodology. Methodological suggestions for accomplishing objectives centering exploratory data analysis techniques of Tukey are made, recognizing these techniques appropriateness for a general examination of a large data base that may contain numerous errors. DOE

N82-13009# Deutsche Bibliothek, Frankfurt (West Germany).
A GENERAL THESAURUS FOR THE GERMAN LIBRARY. PILOT STUDY Final Report
Ingetraut Dahlberg Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 74 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-ID-80-015; ISSN-0170-8996) Avail: NTIS HC A04/MF A01

The kind and form of the terms used by the Deutsche Bibliothek (DB) were analyzed for subject description and tested for their suitability as elements of a general library thesaurus. The possibility and fundamental principles of such a thesaurus, its necessary structure (coverage of subject fields, number of main groupings, depth of hierarchy), the necessary relationships (conceptual and terminological), possibilities of delimitation of the number of terms, the treatment of names and the possibilites of terminological control are considered. The DB terms are considered suitable for a thesaurus, but must be supplemented by terms which may partly be taken from the total of reference terms in order to establish the necessary links to hierarchically higher concepts. Author (ESA)

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N82-13010# Eurosat S.A., Geneva (Switzerland).
OVERALL ECONOMIC IMPACT OF AN OPERATIONAL METEOSAT SYSTEM Final Report
J. B. Lagarde, P. Brendle (BETA/ULP), C. Miller, and P. Cohendet (BETA/ULP) Paris ESA Jan. 1981 70 p refs
(Contract ESA-4421/80/F-FC(SC))
(ESA-CR(P)-1487) Avail: NTIS HC A04/MF A01

The METEOSAT concept through its development and well into its expected operational mode, up to 1990 was analyzed. Account was taken of the disturbance introduced by the METEOSAT 1 failure in November 1979, of the delay in the launch of METEOSAT 2, and of the uncertainties arising from the lack of decision, at the end of 1980, on the operational METEOSAT follow-on. Results show important positive economic effects both for the users community (direct benefits) and for the contracting industry concerned (induced benefits).
Author (ESA)

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-13011# Danish Research Center for Applied Electronics, Hoersholm.
PATENT LICENSING CONTRACTS IN THE ELECTRONIC INDUSTRY [PATENT-LICENSKONTRAKTER I ELEKTRONIKINDUSTRIEN]
Otto Ring Dec. 1980 50 p refs In DANISH; ENGLISH summary
(ECR-104) Avail: NTIS HC A03/MF A01

Licensing conditions are discussed and a check list provided. Licensing agreement problems for the Danish electronic industry are exposed. An annotated bibliography is provided. Use of an expert is recommended for contract negotiations.
Author (ESA)

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

N82-13012*# Stanford Univ., Calif. Cardiology Div.
BIOMEDICAL TECHNOLOGY TRANSFER. APPLICATIONS OF NASA SCIENCE AND TECHNOLOGY Semiannual Report, Jan. - Jun. 1980
Donald C. Harrison 30 Jun. 1980 68 p
(Contract NCC2-52)
(NASA-CR-164991) Avail: NTIS HC A04/MF A01 CSCL 05B

Ongoing projects described address: (1) intracranial pressure monitoring; (2) versatile portable speech prosthesis; (3) cardiovascular magnetic measurements; (4) improved EMG biotelemetry for pediatrics; (5) ultrasonic kidney stone disintegration; (6) pediatric roentgen densitometry; (7) X-ray spatial frequency multiplexing; (8) mechanical impedance determination of bone strength; (9) visual-to-tactile mobility aid for the blind; (10) Purkinje image eyetracker and stabilized photocoagulator; (11) neurological applications of NASA-SRI eyetracker; (12) ICU synthesized speech alarm; (13) NANOPHOR: microelectrophoresis instrument; (14) WRISTCOM: tactile communication system for the deaf-blind; (15) medical applications of NASA liquid-circulating garments; and (16) hip prosthesis with biotelemetry. Potential transfer projects include a person-portable versatile speech prosthesis, a critical care transport sytem, a clinical information system for cardiology, a programmable biofeedback orthosis for scoliosis a pediatric long-bone reconstruction, and spinal immobilization apparatus.
A.R.H.

N82-13013*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TEST RESULTS AND FACILITY DESCRIPTION FOR A 40-KILOWATT STIRLING ENGINE Final Report
Gary G. Kelm, James E. Cairelli, and Robert J. Walter Jun. 1981 47 p refs
(Contract DE-AI01-77CS-51040)
(NASA-TM-82620; DOE/NASA/51040-27; E-871) Avail: NTIS HC A03/MF A01 CSCL 10B

A 40 kilowatt Stirling engine, its test support facilities, and the experimental procedures used for these tests are described. Operating experience with the engine is discussed, and some initial test results are presented
S.L.

N82-13014# Systems Control, Inc., West Palm Beach, Fla. Technology Industries Div.
ANALYSIS OF INTEGRATED FUEL-EFFICIENT, LOW-NOISE PROCEDURES IN TERMINAL-AREA OPERATIONS
J. B. McKinley Jan. 1981 125 p refs
(Contract DE-AC01-80CS-50141)
(DE81-029833; DOE/CS-50141/T1) Avail: NTIS HC A06/MF A01

The specific aviation energy conservation issues, terminal area fuel conservation and airport noise level relationships, are investigated. The potential fuel savings and noise level reduction in the Los Angeles International (LAX) terminal area between 1980 and 1990 attributable to compliance with the noise requirements of FAR Part 36 were quantified. These savings are due to the retiring, retrofiting and re-engining of older narrow-body aircraft (DC-8, B707, etc.) and the growth of wide body aircraft operations (DC-10, B747, B767, etc.). Current noise abatement procedures that could be relaxed without adversely impacting current (1980) noise levels, and at the same time conserving additional fuel. Two FAA computer models were used. The Integrated Noise Model (INM) Version 2.7, was used for noise analysis, and INKMOD, a preliminary fuel burn model, for the fuel analysis. The results of this detailed analysis revealed that due to the changing aircraft mix at LAX to include more wide body aircraft and fewer narrow body aircraft operations, airport noise level will decrease by 8.5 and 9.2 square miles on the 75 Ldn contour for 1985 and 1990, respectively, from the 1980 baseline.
DOE

N82-13015# Brookhaven National Lab., Upton, N. Y. National Center for Analysis of Energy Systems.
METHOD FOR ESTIMATING TECHNOLOGICAL PENETRATION RATES IN COMMERCIAL AUTOMOBILE FLEETS
J. R. Wagner Nov. 1980 84 p refs
(Contract DE-AC02-76CH-00016)
(DE82-000433; BNL-51312) Avail: NTIS HC A05/MF A01

A technique for estimating market penetration rates of electric and hybrid cars in commercial (including police and nonfederal government) fleets is described. The approach is also applicable to other vehicle technologies in the fleet market. It employs survey data cllected from 142 fleet operators in March 1979. The data describe physical and economic criteria used by fleet operators to select vehicles. This information, together with a variety of derived relationships and constants, provides the basis for a computer simulation model called CPEN (Fleet Car Market Penetration Simulatos). The hypothetical vehicles. The CPEN then produces market penetration estimates, based on the physical capabilities, purchase prices, and discounted life-cycle costs of alternative vehicles.
DOE

N82-13016# Bayer A.G., Krefeld (West Germany). Produktionsbereich Uerdingen.
WET AIR OXIDATION OF WASTE WATER Final Report
Gerhard Friedhofen, Hans Kerres, Joerg Rosenbaum, and Reinhard Thiel Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 42 p refs In GERMAN; ENGLISH summary

Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-132; ISSN-0340-7608) Avail: NTIS HC A03/MF A01

In order to solve ecological problems, research in laboratories and technical schools on the purification of chemically contaminated waste water by wet air oxidation was carried out and resulted in the construction of a prototype technical plant. The plant is designed for purifying waste water with 12 to 15 t/day organic substances at 320 to 330 C and 160 to 180 bar, and with conversion rates of up to 97%. Inorganic substances in solution can be recycled while the heat of reaction is utilized for steam production. The plant operates at lower costs than biological waste water treatment. Author (ESA)

N82-13017# Science Research Council, Slough (England). Rutherford and Appleton Labs.
STUDY ON A REFINED IMAGE PROCESSING SYSTEM FOR SPACE ASTRONOMY
E. Golton Paris ESA Mar. 1981 258 p
(Contract ESA-4134/79/D-IM(SC))
(ESA-CR(P)-1458) Avail: NTIS HC A12/MF A01

The Madrid IUE data processing systems are reviewed. Recommendations for extending the standby experiment display system (EDS) to provide an offline interactive analysis facility are made. Software design to meet user requirements uses EDS color raster graphics hardware; it evolves in top-down fashion driven by the requirements, and is modular and open ended. It is based on a series of interacting tasks, giving the user power to intermix and overlap analytic processes, and making for maximum power and flexibility. Data and formats likely to be generated by future astronomical satellites are considered and the possibility of common standards and processing requirements is investigated. All such data can be held within a file structure, and can be processed for many applications using a common suite of display and analysis programs. Designs based on an extended EDS computer, a supermini computer, a pipeline processor, and a parallel array processor are presented. Author (ESA)

N82-13018# Corporate-Tech Planning, Inc., Waltham, Mass.
AUGMENTATION OF RESEARCH AND ANALYSIS CAPABILITIES FOR TIMELY SUPPORT OF AUTOMOTIVE FUEL ECONOMY ACTIVITIES. VOLUME 1: SUMMARY Final Report, Dec. 1977 - Nov. 1979
Theodore Taylor, Jr. Dec. 1980 43 p 3 Vol.
(Contract DOT-HS-7-01789)
(PB81-219479; DOT-HS-805903) Avail: NTIS HC A03/MF A01; also available in set of 3 reports HC E15 as PB81-219461 CSCL 13F

A series of research tasks were undertaken to assess the potential fuel economy improvements for passenger cars and light trucks during the 1980 to 1985 time frame, and later to 1990. Specific subject areas of investigation include: spark ignition engine improvements; fuel economy potential of aternate engines; reductions in tire rolling resistance, aerodynamic drag, and engine friction (through improved lubricants); weight reduction of domestic and certain import passenger vehicles, including a teardown of a Chrysler - Dodge Omni for an analysis of materials and weight and a technology assessment of carbon composites as a future substitute materials. Manufacturing and consumer costs for the fuel economy improvement areas identified, identification of unregulated diesel emission problem areas in need of research and a determination of the cost benefits of petroleum conservation by means other than fuel economy standards are included. GRA

N82-13019# Corporate-Tech Planning, Inc., Waltham, Mass.
AUGMENTATION OF RESEARCH AND ANALYSIS CAPABILITIES FOR TIMELY SUPPORT OF AUTOMOTIVE FUEL ECONOMY ACTIVITIES. VOLUME 2: APPENDICES A THROUGH C Final Report
Theodore Taylor, Jr. Dec. 1980 220 p 3 Vol.
(Contract DOT-HS-7-01789)
(PB81-219487; DOT-HS-805904) Avail: NTIS HC A10/MF A01; also available in set of 3 reports HC E15 as PB81-219461 CSCL 13F

The potential fuel economy improvements for passenger cars and light trucks during the 1980 to 1985 time frame, and later to 1990 were assessed. Automotive technology, product planning, manufacturing costs and transportation energy economics were addressed. Tire rolling resistance, aerodynamic drag, and improved lubrications are covered along with manufacturing and consumer costs, unregulated diesel emission research, and alternate means of petroleum conservation. GRA

N82-13020# Corporate-Tech Planning, Inc., Waltham, Mass.
AUGMENTATION OF RESEARCH AND ANALYSIS CAPABILITIES FOR TIMELY SUPPORT OF AUTOMOTIVE FUEL ECONOMY ACTIVITIES. VOLUME 3: APPENDIX D Final Report, Dec. 1977 - Nov. 1979
Theodore Taylor, Jr. Dec. 1980 204 p refs 3 Vol.
(Contract DOT-HS-7-01789)
(PB81-219495; DOT-HS-805905) Avail: NTIS HC A10/MF A01; also available in set of 3 reports HC E15 as PB81-219461 CSCL 13F

Alternative means of petroleum conservation were surveyed and a preliminary estimate of their possible costs and benefits was derived. The potential for petroleum conservation was analyzed for each sector of the economy. These include: electric utilities, residential and commercial buildings, selected industries, and nonautomotive industries. GRA

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-13021 Harvard Univ., Cambridge, Mass.
X-RAY IMAGING OBSERVATIONS OF THE RADIO GALAXIES CEN A, VIR A, AND 3C273 Ph.D. Thesis
Eric Dennis Feigelson 1980 252 p
Avail: Univ. Microfilms Order No. 8120241

Two dimensional X-ray images of three radio galaxies obtained with the high resolution imager and imaging proportional counter on board the Einstein X-ray Observatory (HEAO-b satellite) are reported. Several distinct sources of X-ray emission in these galaxies including the active nucleus, hot interstellar medium, stars, radio lobes and jets are revealed. X-ray jets in all three of these galaxies, demonstrate that highly energetic processes occur in the transport of energy and matter from radio galaxy nuclei to lobes. The strongest evidence to date for inverse Compton X-ray emission from extended radio lobes, and for hydrostatic (in contrast to ram) pressure confinement of radio lobes by a hot external medium is observed. Dissert. Abstr.

N82-13022*# Ohio State Univ., Cleveland. Dept. of Astronomy.
INTEGRATED FLUXES FOR EMISSION LINES IN THE ULTRAVIOLET SPECTRA OF SEVERAL PLANETARIES Final Report, 15 Apr. 1980 - 30 Jun. 1981
Kenneth G. Carpenter and Stanely J. Czyzak Nov. 1981 20 p refs
(Grant NAG5-42; RF Proj. 762100/712767)
(NASA-CR-164986) Avail: NTIS HC A02/MF A01 CSCL 03A

The IUE satellite observatory was used to obtain absolutely-calibrated emission line fluxes for diagnostic lines of multiply-ionized C, N, O, Si, Ne, and Ar which occur in the ultraviolet spectral region of planetary nebulae. These data, when combined with data from the blue, visual, and near infrared, provide improved estimates of ionic concentrations, plasma temperatures and densities, and elemental abundances. B.W.

N82-13023# Helsinki Univ. (Finland). Research Inst. for Theoretical Physics.

INSTANTON EFFECTS IN THE EQUATION OF STATE FOR DENSE NEUTRON STAR MATTER

Carl-G. Kaellman 1979 12 p refs Submitted for publication (HU-TFT-79-19; ISBN-951-45-1682-6) Avail: NTIS HC A02/MF A01

Vacuum fluctuation effects in quantum chromodynamics due to instantons were studied in dense neutron state matter. In the density region of interest to neutron star cores, a density dependence of approximately (n syb B)(-1/3) was found. DOE

N82-13024# Royal Observatory, Edinburgh (Scotland).

ALIGNMENT OF THE CASSEGRAIN AND COUDE OPTICS OF THE 3.8m UK INFRARED TELESCOPE; ASSESSMENT OF THE OPTICAL PERFORMANCE AND RESULTS OF ABERRATION CALCULATIONS

D. S. Brown (NEI Grubb Parsons), C. M. Humphries, T. E. Purkins, and R. V. Willstrop (Cambridge Univ., England) 1 Feb. 1981 39 p

(UKIRT-10; ISSN-0260-9983) Avail: NTIS HC A03/MF A01

The alignment procedures used for the f/9 and f/20 systems of the United Kingdom infrared telescope (UKIRT) are described. For the f/9 system, the primary mirror was positioned radially so that it was centered in the mirror cell by equalizing the combined signals from opposite pairs of the load cells incorporated in the mirror cell. An alignment telescope (AT) was mounted on a flange bolted to the rotatable instrument flange of UKIRT. An alignment fixture was positioned so as to provide an accurate ground surface on which the AT bullseye target reflector could be mounted. Improved performance resulted when the AT was replaced by a Hartmann camera with eyepiece and graticule. Spherical aberration is introduced into the image when the focal plane is displaced axially from the optimum position. Coma results, primarily from misalignment of the primary and secondary mirrors. Astigmation of 0.232 arc sec. are reported for the primary mirror. Author (ESA)

N82-13025# Royal Observatory, Edinburgh (Scotland).

THE REMOVAL, MECHANICAL HANDLING AND INSTALLATION PROCEDURES FOR RE-ALUMINISING THE UKIRT 3.8m PRIMARY MIRROR

Alf A. Neild 28 Jan. 1980 36 p

(UKIRT-11; ISSN-0260-9983) Avail: NTIS HC A03/MF A01

Operational procedures for observatory personnel involved in removing, handling, or installing the mirror of the United Kingdom infrared telescope are outlined. The ordering, location, etc. of chemicals, cleaning materials, safety clothing, equipment, etc. within the observatory are covered. Preparation of the telescope, pickup truck, etc., are detailed. The importance of transporting mirror trolley, mirror boxes, gases, etc., to desired location in advance of their being required is stressed. Six to eight people are required to carry out the operations. Author (ESA)

N82-13026# Royal Observatory, Edinburgh (Scotland).

METALLIC FILM THICKNESS REQUIREMENTS FOR MIRRORS IN THE INFRARED

C. M. Humphries and H. Seddon 25 Feb. 1980 14 p refs (UKIRT-13; ISSN-0260-9983) Avail: NTIS HC A02/MF A01

The thickness requirements for mirrors used at wavelengths up to 100 microns and, possibly, up to 1 mm are given. The experimental and calculated reflectance data for aluminum, gold, and nickel coatings in the infrared region are shown. The penetration depth given by d = lambda/4 pi k2 is considered a satisfactory criterion for determining the thickness required for evaporated metallic films. Aluminum coating thicknesses of 1000A give penetration depths sufficient for wavelengths up to 100 microns. Reflectance for three UKIRT mirrors in series is 97% of maximum overall reflectance. Nickel requires thicker coatings than gold, and gives lower maximum reflectances than aluminum in the 0.5 to 10 micron band. The maximum reflectance from gold is slightly higher than aluminum from 2 to 10 microns and thicker coatings are required. At 1 micron the maximum reflectance from gold is significantly higher then of aluminum, but lower at 0.5 microns. Author (ESA)

N82-13027# Royal Observatory, Edinburgh (Scotland).

THIN MIRROR TELESCOPES: EXPERIENCE GAINED WITH THE UK INFRARED TELESCOPE

C. M. Humphries 1 Mar. 1980 9 p ref Presented at Opt. and IR Telescopes for the 1990's Conf., Tuscon, Arizona, Jan. 1980

(UKIRT-14; ISSN-0260-9983) Avail: NTIS HC A02/MF A01

The United Kingdom's infrared telescope has f/q Cassegrain and f/20 coude focal planes and the additional option of an f/35 Cassegrain chopping secondary mirror. The optical system including contributions from the secondary mirror, the respective support systems, and atmospheric viewing gives a Cassegrain image of diameter 1 arcsec (90% incident radiation) and a coude image of diameter 1.25 arcsec. A thin mirror approach is used both for primary and secondary mirrors. The lightweight design concept can be applied to altazimuth as well as equatorial designs and to optical as well as to infrared ground based telescopes. It can be used in conjunction with the segmented or multiple mirror approach. Author (ESA)

N82-13028# Royal Observatory, Edinburgh (Scotland).

COMPUTER AIDED BALANCING OF UKIRT: A PRELIMINARY REPORT

A. McLachlan 14 Mar. 1980 8 p

(UKIRT-15; ISSN-0260-9983) Avail: NTIS HC A02/MF A01

A combination of mechanical and computer techniques used in balancing UKIRT is described, and the computer program used is presented. The balance in one axis of an out of balance telescope can be examined by driving the telescope along the axis towards a given point from opposite directions. At the position, for each direction of movement, the difference between the position demanded and the encoder is calculated. The sum of differences is an indication of the out of balance moment. For a perfectly balanced telescope the sum is zero. Several measurements at different positions of the telescope are necessary to determine the position of the center of gravity relative to the pivot point. Author (ESA)

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-13029 Harvard Univ., Cambridge, Mass.

TOPICS IN THE EVOLUTION OF COSMOLOGICAL PERTURBATIONS Ph.D. Thesis

Ethan Tecumseh Vishniac 1980 217 p

Avail: Univ. Microfilms Order No. 8120244

The evolution of perturbations of the standard Friedmann cosmology at early times is studied. Special emphasis is placed on those perturbations that remain regular as one approaches the initial singularity. The nature of perturbations much larger than the particle horizon are discussed. A number of widespread beliefs are shown to be incorrect and results are obtained concerning the effect of local variations in the equation of state. Next the growth of perturbations are epochs when a substantial fraction of the energy content of the universe was contained in a collisionless neutrino gas examined. Most perturbations that diverge at early times are strongly affected by the neutrinos. The effect of nonlinear interactions on the evolution of adiabatic perturbations whose scale is much less than the particle horizon. Finally, the evolution of adiabatic perturbations is followed through the era of recombination. The shortest wavelength perturbations that emerge from recombination without suffering attenuation are larger than the largest scale nonlinear clustering observed in the present universe. Dissert. Abstr.

N82-13030*# Columbia Univ., New York. Dept. of Astronomy and Physics.

DATA REDUCTION AND ANALYSIS FOR THE GRAPHITE CRYSTAL X-RAY SPECTROMETER AND POLARIMETER EXPERIMENT FLOWN ABOARD OSO-8 SPACECRAFT Final Project Report, 26 Jun. 1975 - 30 Jun. 1980

R. Novick Aug. 1980 30 p refs

(Contracts NAS5-22408; NAS5-24152)

(NASA-CR-166749; CAL-1471) Avail: NTIS

HC A03/MF A01 CSCL 03B

The documentation and software programs developed for the reception, initial processing (quickbook), and production analysis of data obtained by solar X-ray spectroscopy, stellar spectroscopy, and X-ray polarimetry experiments on OSO-8 are listed. The effectiveness and sensitivity of the Bragg crystal scattering instruments used are assessed. The polarization data polarimetric data obtained shows that some X-ray sources are polarized and that a larger polarimeter of this type is required to perform the measurements necessary to fully understand the physics of X-ray sources. The scanning Bragg crystal spectrometer was ideally suited for studying rapidly changing solar conditions. Observations of the Crab Nebula and pulsar, Cyg X-1, Cyg X-2, Cyg X-3, Sco X-1, Cen X-3, and Her X-1 are discussed as well as of 4U1656-53 and 4U1820-30. Evidence was obtained for iron line emission from Cyg X-3. A.R.H.

N82-13031*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MATTER ACCRETING NEUTRON STARS

P. Meszaros Sep. 1981 21 p refs Presented at the Symp. on Neutron Stars, 5th General Conf. of the European Phys. Soc., Istanbul, 1981 Submitted for publication

(NASA-TM-83835) Avail: NTIS HC A02/MF A01 CSCL 03B

Some of the fundamental neutron star parameters, such as the mass and the magnetic field strength, were experimentally determined in accreting neutron star systems. Some of the relevant data and the models used to derive useful information from them, are reviewed concentrating mainly on X-ray pulsars. The latest advances in our understanding of the radiation mechanisms and the transfer in the strongly magnetized polar cap regions are discussed. Author

N82-13032# University Coll., Cardiff (Wales). Dept. of Mathematics and Astronomy.

THE UNIVERSE: PAST AND PRESENT REFLECTIONS

Fred Hoyle May 1981 66 p refs

(Preprint-70) Avail: NTIS HC A04/MF A01

The age of the universe is considered. The big bang theory is attacked on the grounds that it does not allow enough time for life to develop. The chance of a random shuffling of amino acids producing a workable set of enzymes is estimated at less than 10 to the minus 40,000th power. The big bang theory postulates 10 billion years as the age of the universe. The initial stages would have been unsuitable for the generation of life because of the harmful radiation present. The biochemical structure of enzymes has changed little during the past 4 billion years. The time remaining is too short, so the Universe must be older than 10 billion years. Moreover, since the Universe is defined as 'everything' it is illogical to limit it in time. Time is part of the Universe, not one of its limiting characteristics. Author (ESA)

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-13033*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE RIGID SHELL COMPONENT FOR SUPERROTATION IN PLANETARY ATMOSPHERES: ANGULAR MOMENTUM BUDGET, MECHANICAL ANALOG AND SIMULATION OF THE SPIN UP PROCESS

H. G. Mayr and I. Harris Sep. 1981 47 p refs Presented at the 12th Ann. Meeting of the Div. for Planetary Sci. of the Am. Astron. Soc., Tucson, Ariz., Oct. 1980

(NASA-TM-83831) Avail: NTIS HC A03/MF A01 CSCL 03B

An analysis of superrotation in the atmosphere of planets, with rotation axis perpendicular to the orbital plane is presented. As the atmosphere expands, Hadley cells develop producing a redistribution of mass and angular momentum. A three dimensional thermally driven zonally symmetric spectral model and Laplace transformation simulate the time evolution of a fluid leading from corotation under globally uniform heating to superrotation under globally nonuniform heating. For high viscosities the rigid shell component of atmospheric superrotation can be understood in analogy with a pirouette. During spin up angular momentum is transferred to the planet. For low iscosities, the process is reversed. A tendency toward geostrophy, combined with increase of surface pressure toward the poles (due to meridional mass transport), induces the atmosphere to subrotate temporarily at lower altitudes. Resultant viscous shear near the surface permits angular momentum to flow from the planet into the atmosphere propagating upwards to produce high altitude superrotation rates. M.D.K.

N82-13034*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ON THE GLOBAL CIRCULATION AND THE HURRICANE SYSTEM OF THE JOVIAN ATMOSPHERE

H. G. Mayr, K. Maeda, and I. Harris Sep. 1981 22 p refs

(NASA-TM-83833) Avail: NTIS HC A02/MF A01 CSCL 03B

An argument is made to support the proposal that Jupiter's red spot and the white and brown ovals are hurricanes or cyclones. Against the background of a convectively unstable troposphere, the general condition exists for the formation of hurricanes. The energy Jupiter emits must be transported upwards through the troposphere. If that transport is accelerated by the prevailing upward motions in the solar driven multicellular meridional circulation, eastward jets develop such as observed in the I region. But if that vertical transport is impeded by the prevailing downward motions in the meridional circulation, the atmosphere reacts and tends to maintain the process through the development of hurricanes. Dynamically induced by solar differential heating, an ordered latitudinal structure with alternating stability and instability is impressed on the troposphere to form alternating zonal strata where hurricanes are forbidden and permitted, respectively. B.W.

N82-13035*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

STRUCTURE AND ORIGIN OF COMETARY NUCLEI

Bertram Donn and Jurgen Rahe Sep. 1981 39 p refs Submitted for publication

(NASA-TM-83823) Avail: NTIS HC A03/MF A01 CSCL 03B

There is strong evidence that a comet nucleus consists of a single object whose basic structure is Whipple's icy conglomerate. A number of cometary phenomena indicate that the nucleus is a low density, fragile object with a large degree of radial uniformity in structure and composition. Details of the ice-dust pattern are more uncertain. A working model is proposed which is based on theories of accumulation of larger objects from grains. This nucleus is a distorted spherical aggregate of a hierarchy of ice-dust cometesimals. These cometesimals retain some separate identity which lead to comet fragmentation when larger components break off. The outer layers of new comets were modified by cosmic ray irradiation in the Oort Cloud. The evidence for meteorite-comet association is steill controversial. Current dynamical studies do not seem to require a cometary source of meteorites. A.R.H.

N82-13036*# Cornell Univ., Ithaca, N. Y. Center for Radiophysics and Space Research.

RADAR INVESTIGATION OF ASTEROIDS Semiannual Status Report, 1 May - 31 Oct. 1981

Steven J. Ostro Nov. 1981 14 p refs

(Grant NAGw-116)

(NASA-CR-164997) Avail: NTIS HC A02/MF A01 CSCL 03B

Software to support all stages of asteroid radar observation and data analysis is developed. First-order analysis of all data in hand is complete. Estimates of radar cross sections, circular polarization ratios, and limb-to-limb echo spectral bandwidths for asteroids 7 Iris, 16 Psyche, 97 Klotho, 1862 Apollo, and 1915 Quetzalcoatl are reported. Radar observations of two previously unobserved asteroids were conducted. An Aten asteroid, 2100 Ra-Shalom, with the smallest known semimajor axis (0.83) was detected. Preliminary data reduction indicates a circular polarization ratio comparable to those of Apollo, Quetzalcoatl, and Toro. S.L.

N82-13037*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
ORBIT IMPROVEMENT OF THE SATELLITES OF THE OUTER PLANETS Final Report, 1 Nov. 1973 - 30 Apr. 1981
Kaare Aksnes and Fred Franklin Nov. 1981 7 p refs
(Grant NGR-09-015-213)
(NASA-CR-164987) Avail: NTIS HC A02/MF A01 CSCL 03B

Data reduced from 127 plates showing Jupiter's and Saturn's satellites in the interval 1972 to 1974 are available on computer cards in the form of (O-C) residuals. Initial orbit calculations and several later orbit improvements for Jupiter XIII (Leda) culminated in an extended ephemeris for Leda to the year 2000. The possible existence of several small satellites just outside Saturns rings was predicted. De Sitter's incomplete theory for the motion of the Galilean satellites was reviewed and an outline for a revised, complete theory was developed. Observations of nearly 100 relative positions of the Galilean satellite with a mean accuracy of about 100 km (0.03 arc sec) were used to improve Sampson's theory for these satellites. Results were published on (1) a long ferm upper limit to Jupiter's orbital eccentricity; (2) deviation of an accurate modern value of the ellipicity of Uranus from balloon-borne images and consequent evaluation of the planet's rotation rate; and (3) identification of features in Saturn's rings as produced by heretofore undetected tesseral harmonics of Saturn's gravitational field. A.R.H.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-13038 Harvard Univ., Cambridge, Mass.
X-RAY OBSERVATIONS OF STELLAR CORONAE Ph.D. Thesis
Kenneth Paul Topka 1980 265 p
Avail: Univ. Microfilms Order No. 8120242

Data from the 8.5 magnitude stellar survey and the Gliese survey of all nearby stars listed in either of the two catalogs of the nearest stars that accidentally fell into any Einstein observation are presented. The results of the 8.5 and Gliese survey have been integrated with those of four other Einstein surveys. A correlation of X-ray luminosity with spectral type (soft X-ray H-R diagram) is presented. The observations are explained by the presence of hot coronae around stars of nearly every spectral type. However, the data is at variance in many respects to existing theoretical coronal models based on acoustic flux dissipation. The presence of stellar outer convection zones, surface magnetic fields, and rotation rates are discussed. Dissert. Abstr.

N82-13039*# Hughes Research Labs., Malibu, Calif.
STUDY OF RADIATIVELY SUSTAINED CESIUM PLASMAS FOR SOLAR ENERGY CONVERSION Final Report, 1 Jul. 1978 - 30 Jun. 1980
A. J. Palmer and G. J. Dunning Jul. 1980 67 p refs
(Contract NAS2-10001)
(NASA-CR-166265) Avail: NTIS HC A04/MF A01 CSCL 10A

The results of a study aimed at developing a high temperature solar electric converter are reported. The converter concept is based on the use of an alkali plasma to serve as both an efficient high temperature collector of solar radiation as well as the working fluid for a high temperature working cycle. The working cycle is a simple magnetohydrodynamic (MHD) Rankine cycle employing a solid electrode Faraday MHD channel. Research milestones include the construction of a theoretical model for coupling sunlight in a cesium plasma and the experimental demonstration of cesium plasma heating with a solar simulator in excellent agreement with the theory. Analysis of a solar MHD working cycle in which excimer laser power rather than electric power is extracted is also presented. The analysis predicts a positive gain coefficient on the cesium-xenon excimer laser transition. R.J.F.

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-13040 State Univ. of New York at Stony Brook.
A STUDY OF GALACTIC LIGHT, EXTRAGALACTIC LIGHT, AND GALACTIC STRUCTURE USING PIONEER 10 OBSERVATIONS OF BACKGROUND STARLIGHT Ph.D. Thesis
Gary Neil Toller 1981 247 p
Avail: Univ. Microfilms Order No. 8120063

The diffuse astronomical background sky brightness (background starlight) was determined over 95 percent of the sky using Pioneer 10 photometric measurements in sky regions where the zodiacal light is negligible. Brightness levels are presented at blue (3950-4850A) and red (5900-6800A) wavelengths. The B-R color index distribution is established over the celestial sphere. A computer model of our galaxy was constructed which computes the emitted and observed brightness from any volume element. The relation between DGL, direct starlight, and extinction along the line of sight is established. A small influence of galactic spiral structure on surface brightness levels exists at 1 = 2 deg (Sagittarius arm), 1 = 69 deg (Orion arm), and 1 = 288 deg (Carina arm). A correlation between brightness features and interstellar extinction is established. Analysis of the distribution of brightness peaks and dips and the location of the brightness symmetry plane establishes the Sun's elevation above the galactic plane as 12.2 + or - 2.1 pc. Dissert. Abstr.

N82-13041*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ON THE NATURE OF THE COSMIC RAY POSITRON SPECTRUM
R. J. Protheroe Oct. 1981 25 p refs Submitted for publication
(NASA-TM-83834) Avail: NTIS HC A02/MF A01 CSCL 03B

A calculation was made of the flux of secondary positrons above 100 MeV expected for various propagation models. The models investigated were the leaky box or homogeneous model, a disk halo diffusion model, a dynamical halo model, and the closed galaxy model. In each case the parameters of these models were adjusted for agreement with the observed secondary or primary ratios and Be 10 abundance. The positron flux predicted for these models was compared with the available data. The possibility of a primary positron component was considered. R.J.F.

99 GENERAL

N82-13042# Office of Naval Research, Tokyo (Japan).
JAPANESE RESEARCH INSTITUTES FUNDED BY THE MINISTRY OF EDUCATION
Seikoh Sakiyama, comp. Jan. 1980 156 p
(ONRT-M2) Avail: NTIS HC A08/MF A01

The name, address, and telephone number of 317 research institutes are compiled. Exploraory notes are added where the specialty of the laboratory is not clear. The size of each laboratory, in terms of staff and budget is given. S.L.

N82-13043*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESEARCH AND TECHNOLOGY Annual Report
Nov. 1981 68 p

(NASA-TM-83221) Avail: NTIS HC A04/MF A01 CSCL 05B

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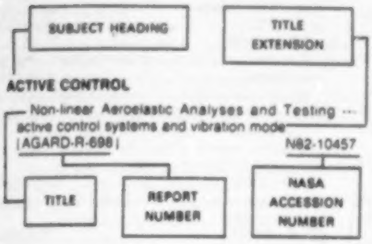

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Index of National Aviation Facilities Experimental Center technical reports 1972 - 1977
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Energy: A continuing bibliography with indexes
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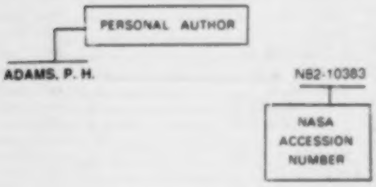

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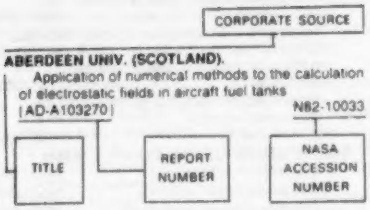
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DEPARTEMENT D'ETUDES ET DE RECHERCHES EN TECHNOLOGIE SPATIALE, TOULOUSE (FRANCE).
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DESMATICS, INC., STATE COLLEGE, PA.
A Monte Carlo study of the use of auxiliary information in the developent of an impact acceleration injury prediction model
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A general thesaurus for the German Library. Pilot study
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DEUTSCHES ELEKTRONEN-SYNCHROTRON, HAMBURG (WEST GERMANY).
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DEUTSCHES GEODAETISCHES FORSCHUNGSINSTITUT, MUNICH (WEST GERMANY).
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Boundary detection criteria for satellite altimeters
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EG & G WASHINGTON ANALYTICAL SERVICES CENTER, INC., RIVERDALE, MD.
Ionospheric propagation correction modeling for satellite altimeters
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ENERGY AND ENVIRONMENTAL ANALYSIS, INC., ARLINGTON, VA.
Impact of fuel-economy shortfall: Trends in technology-weighted EPA versus on-road MPG. Periodic analysis memorandum no. 1
[DE81-030841] N82-12667

ENERGY AND ENVIRONMENTAL RESEARCH CORP., SANTA ANA, CALIF.
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ENERGY, MINES AND RESOURCES CANADA, OTTAWA (ONTARIO).
The Manicouagan impact structure observed from Skylab
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ENGINEERING ANALYSIS, INC., HUNTSVILLE, ALA.
Advanced Shuttle Simulation Turbulence Tapes (SSTT) users guide
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ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., CONCORD, MASS.
Handbook for the estimation of microwave propagation effects: Link calculations for earth-space paths (path loss and noise estimation)
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Effects of preionization level on a stabilized Z-pinch
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FLORIDA STATE UNIV., TALLAHASSEE.
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Study of 1/f noise in solids
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FOSTER-MILLER ASSOCIATES, INC., WALTHAM, MASS.
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FRAUNHOFER INST., FREIBURG (WEST GERMANY).
Impedance probe experiment in project Polar High Atmosphere of the Sounding Rocket Program Aeronomy
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FRAUNHOFER-INST. FUER ANGEWANDTE FESTKOERPERPHYSIK, FREIBURG (WEST GERMANY).
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FRAUNHOFER-INST. FUER BAUPHYSIK, HOLTZKIRCHEN (WEST GERMANY).
The window and its heat balance considering solar radiation and additional insulation measures
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FRAUNHOFER-INST. FUER BETRIEBSFESTIGKEIT, DARMSTADT (WEST GERMANY).
Working strength of notched specimens in steel Ck45 and steel 42 Cr Mo4
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FRAUNHOFER-INST. FUER FESTKOERPERTECHNOLOGIE, MUNICH (WEST GERMANY).
Development of microprocessor compatible sensors
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FULMER RESEARCH INST. LTD., STOKE POGES (ENGLAND).
Field emission cold cathode devices based on eutectic systems
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GENERAL DYNAMICS/CONVAIR, SAN DIEGO, CALIF.
Space Construction Experiment Definition Study (SCEDS), part 1. Volume 1: Executive summary
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Space Construction Experiment Definition Study (SCEDS), part 1. Volume 2: Study results
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GENERAL ELECTRIC CO., LYNN, MASS.
Effect of a part span variable inlet guide vane on TF34 fan performance
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GENERAL ELECTRIC CO., ST. PETERSBURG, FLA.
Fundamental combustion studies of burning oil-spray flames
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GENERAL RESEARCH CORP., SANTA BARBARA, CALIF.
Test progress on the electrostatic membrane reflector
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GEOKINETICS, INC., CONCORD, CALIF.
Meteorological and climatological investigation: Review of January - June 1980 investigative report, volume 1
[DE81-030741] N82-12729
Meteorological and climatological investigation: Review of January - June 1980 investigative period, volume 2
[DE81-030742] N82-12730
Meteorological and climatological investigation: Review of January - June 1980 investigative period
[DE81-030740] N82-12731

GEOLOGICAL SURVEY, ALBANY, N.Y.
Water resources data for New York, water year 1980. Volume 1: Eastern New York excluding Long Island
[PB81-227308] N82-12534
Water resources data for New York, water year 1980. Volume 3: Western New York
[PB81-227316] N82-12535

GEOLOGICAL SURVEY, DENVER, COLO.
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Skylab 4 observations of Volcanoes. Part A: Volcanoes and volcanic landforms. Part B: Summit eruption of Fernandian Caldera, Galapagos Islands, Ecuador N82-12496

GEOLOGICAL SURVEY, MENLO PARK, CALIF.
Seismic Engineering Program Report, September - December 1979
[USGS-CIRC-818-C] N82-12884

GEOLOGICAL SURVEY, TACOMA, WASH.
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GEOLOGICAL SURVEY, WASHINGTON, D. C.
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Some aspects of ultrasonic nonspecular reflection
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GEORGIA UNIV., ATHENS.
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GERSHAM, BRICKNER AND BRATTON, INC., WASHINGTON, D.C.
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[DE82-000098] N82-12821

GESELLSCHAFT FUER KERNENERGIEVERWERTUNG IN SCHIFFBAU UND SCHIFFAHRT M.B.H., GEESTHACHT (WEST GERMANY).
Three dimensional simulation model MODIS for the propagation of air pollutants
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Remote determination of atmospheric gases with a DF laser
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GESELLSCHAFT FUER SYSTEMTECHNIK M.B.H., ESSEN (WEST GERMANY).
Basic investigations of an absorption heat pump, using heat of median temperature (heat transformer)
[BMFT-FB-T-81-013] N82-12405

GILBERT/COMMONWEALTH, READING, PA.
Magnetohydrodynamics (MHD) Engineering Test Facility (ETF) 200 MWe power plant. Conceptual Design Engineering Report (CDER). Volume 1: Executive summary
[NASA-CR-165452-VOL-1] N82-12570

GILBERT ASSOCIATES, INC., READING, PA.
Modular hydro dam approach to the economic development of ultra low-head hydropower
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HELSINKI UNIV. (FINLAND).
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Adverse weather and night capability: A call for action. Volume 2: Appendix, data base for selected important military locations
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INSTITUTE OF GAS TECHNOLOGY, CHICAGO, ILL.

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MERIX CORP., WELLESLEY, MASS.
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MISSISSIPPI UNIV., UNIVERSITY.
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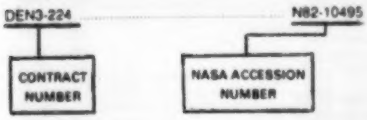

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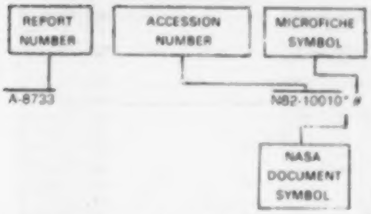

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Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

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> **AERONAUTICS**
>
> Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).
>
> For related information see also *Astronautics*.

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> **02 AERODYNAMICS**
>
> Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.
>
> For related information see also *34 Fluid Mechanics and Heat Transfer*.

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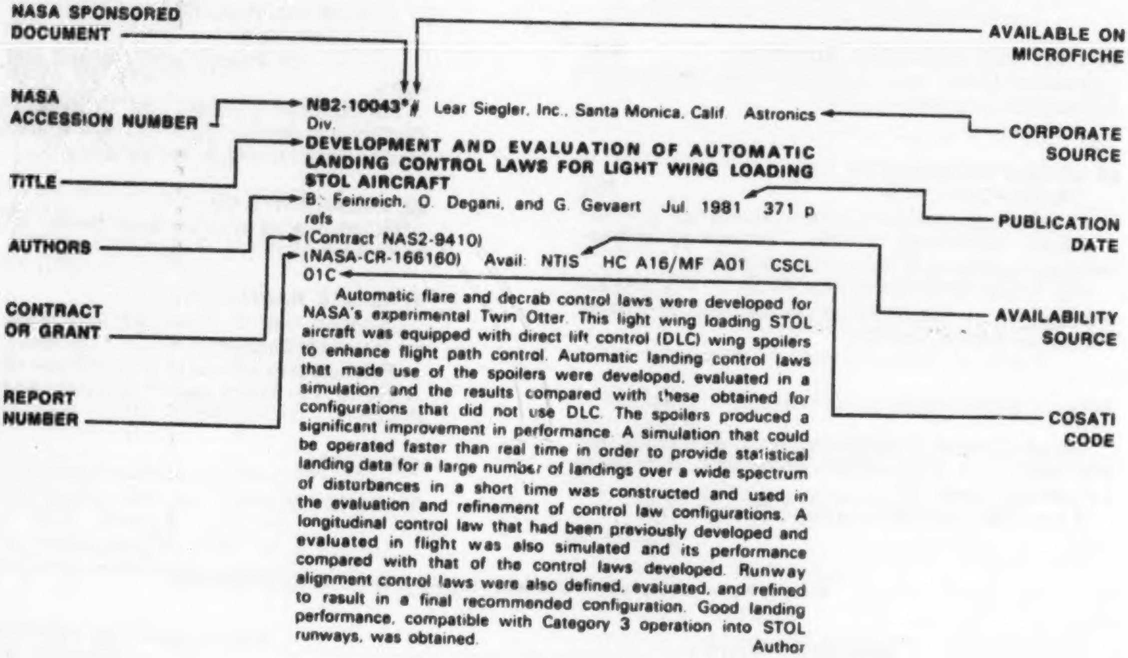
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N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.

DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT

B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs

(Contract NAS2-9410)

(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained.

Author

VOLUME 20 NUMBER 4/FEBRUARY 23, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-13044* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 140
Oct. 1981 118 p
(NASA-SP-7037(140)) Avail: NTIS HC $5.00 CSCL 01A

This bibliography lists 386 reports, articles, and other documents introduced into the NASA scientific and technical information system in September 1981. A.R.H.

N82-13045*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN APPROXIMATE ANALYTICAL METHOD FOR VORTEX-LIFT AND CENTER OF PRESSURE ON THE SLENDER WING
Yin Xieyuan (Science and Technology Univ. of China) Dec. 1981 12 p refs Transl. into ENGLISH from Acta Aeron. et Astronautica Sinica (China), v. 1, no. 1, 1980 p 1-6
(NASA-TM-83198; L-14848) Avail: NTIS HC A02/MF A01 CSCL 01B

A simplified approximate analytical method for predicting vortex lift and center of pressure on slender wings is presented. Two empirical corrections are proposed. The method is compared with experimental data and gives accurate estimates. E.A.K.

N82-13046*# Nielsen Engineering and Research, Inc., Mountain View, Calif.
CONSOLIDATION OF DATA BASE FOR ARMY GENERALIZED MISSILE MODEL Final Report
Daniel J. Klenke and Michael J. Hemsch Aug. 1980 101 p refs
(Contract NAS2-10081)
(NASA-CR-166273; NEAR-TR-221) Avail: NTIS HC A06/MF A01 CSCL 01B

Data from plume interaction tests, nose mounted canard configuration tests, and high angle of attack tests on the Army Generalized Missile model are consolidated in a computer program which makes them readily accessible for plotting, listing, and evaluation. The program is written in FORTRAN and will run on an ordinary minicomputer. It has the capability of retrieving any coefficient from the existing DATAMAN tapes and displaying it in tabular or plotted form. Comparisons of data taken in several wind tunnels and of data with the predictions of Program MISSILE2 are also presented. S.L.

N82-13047*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND-TUNNEL INVESTIGATION OF THE TAIL-SPOILER CONCEPT FOR STALL-PREVENTION ON GENERAL AVIATION AIRPLANES
Dale R. Satran Nov. 1981 40 p refs
(NASA-TM-83208; L-14703) Avail: NTIS HC A03/MF A01 CSCL 01B

The longitudinal aerodynamic characteristics of a full scale, single engine general aviation airplane equipped with an angle of attack limiting concept which used a tail mounted spoiler for stall prevention were investigated. The tail spoiler was deployed as a nonlinear function of changes in angle of attack in a narrow angle of attack range immediately preceding the stall angle. Spoiler deployment produced a nose down moment which limited the nose up trim capability of the elevator to an angle of attack below the stall angle of the airplane. The tail spoiler system produced significant increases in longitudinal stability and elevator hinge moments near the stall. The effects of power, flaps, and center of gravity position are also studied. E.A.K.

N82-13048# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE IMPACT OF NEW GUIDANCE AND CONTROL SYSTEMS ON MILITARY AIRCRAFT COCKPIT DESIGN
Aug. 1981 217 p refs In ENGLISH; partly in FRENCH Symp. held in Bad-Cannstatt, West Germany, 5-8 May 1981
(AGARD-CP-312; ISBN-92-835-0297-3) HC A10/MF A01

The requirements and technologies involved in control systems were reviewed. Topics incude; displays; controls/displays system integration; automated systems/man interface; and cockpit systems evaluation. Emphasis is placed on the design of a cockpit layout with controls and displays that maximize the overall aircraft capability while keeping the pilot's workload within bounds by the use of more automation of system management. For individual titles, see N82-13049 through N82-13064.

N82-13049# Textron Bell Helicopter, Fort Worth, Tex. Human Factors and Cockpit Arrangement Group.
HOW THE HELICOPTER COCKPIT DESIGNER USES DIGITAL AVIONICS c06
John H. Emery *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 13 p ref (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

An overview of the approaches to helicopter cockpit design made possible through the application of advanced multiplex technology to cockpit displays and controls is presented. This technology enables the pilot to have more information available while, at the same time, reducing his workload, and provides for substantially improved cockpit management. One of the major research programs through which this technology was tailored for military helicopters is ADAS (Army Digital Avionics System). This program is discussed, along with Bell helicopter cockpit designs. T.M.

N82-13050# Smiths Industries Ltd., Bishops Cleeve (England). Aerospace and Defense Systems.
ELECTRONIC FLIGHT DECK DISPLAYS FOR MILITARY TRANSPORT AIRCRAFT c06
R. A. Chorley *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 12 p refs (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

These display systems offer operational and economic advantages which can be realized in military as well as in civil aircraft. In particular, the flexibility of the display formats which can be provided, and the ease with which the information content can be changed, enable all the information required for the control of a transport aircraft to be displayed on the main panel, and go a long way towards making operation by a two-man crew possible. In addition, the flexibility of an electronic display system makes it feasible to minimize the effect of failures witin the display system to an extent which is impossible in the case of conventional instruments. Full realization of this capability, which calls for careful selection of the system architecture to be employed, may lead to a significant in mission success. A discussion of CRT displays is presented. T.M.

N82-13051# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Directorate of Avionics Engineering.
COLOR CRT DISPLAYS FOR THE COCKPIT c06
Harry L. Waruszewski *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 22 p refs (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

Color displays are currently being proposed for installation or are being installed in civilian and military aircraft cockpits. The complexity of designing a good color display is much greater than that of a monochromatic display. The human factors data and cockpit requirements needed to develop color cockpit displays so that requirements for a usable display can be generated are discussed. The color display technology was evaluated with respect to satisfying the established human factors requirements. Test methodologies need to be developed to determine compliance of the color displays to the specification requirement. Finally, the need for displays to be integrated into the cockpit using total cockpit human factors criteria to maximize the possible workload reduction and safety of the aircraft is discussed. T.M.

N82-13052# Thomson-CSF, Paris (France).
HEAD UP DISPLAYS c06
Claude Maureau *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 7 p (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

The displays present information to pilots without depriving them of a simultaneous external view. This implies that head-up dispdisplays are collimated displays. The problems involved with collimation are discussed and the possibility of head-up providing pilots with directional information is considered. T.M.

N82-13053# Army Avionics Research and Development Activity, Fort Monmouth, N. J.
INTEGRATION OF CONTROLS AND DISPLAYS IN US ARMY HELICOPTER COCKPITS c08
J. A. Dasaro and C. T. Elliott *In* AGARD The Impacts of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 19 p refs (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

Expanded missions such as anti-armor, night surveillance, and air-to-air, coupled with the survivability requirement of nap-of-the-Earth flight, dictate the approach to cockpit design. This approach must apply the latest technological innovations in the areas of controls, displays multiplexing, and microprocessors to unburden the pilot. Space, weight, and cost constraints placed on the cockpit system designers must also be satisfied. The U.S. Army completed a full scale engineering development program in the area of cockpit integration, and is currently involved in a more ambitious exploratory development effort. An overview of these efforts to integrate the helicopter cockpit, including results of similation experiments and operational flight tests, is presented. T.M.

N82-13054# Collins Radio Co., Cedar Rapids, Iowa. Government Avionics Div.
A STANDARD CONTROL DISPLAY UNIT FOR MULTI-AIRCRAFT APPLICATION c06
Ronald L. Swanson and Craig R. Scougton *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 10 p (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

The need for standardization of military hardware is well documented both within the US DOD and NATO. Standardization issues revolve mainly around interoperability, logistics, and life-cycle cost advantages. The issue of standardization and its suitability in the design of aircraft control/display units (CDU) is addressed. Potential benefits, requirements, and remaining problems associated with standardization of avionics control displays are discussed. Included is a discussion of a CDU that is currently being produced which has many of the features considered essential to the ultimate standard CDU. T.M.

N82-13055# British Aerospace Aircraft Group, Preston (England). Military Aircraft Div.
DEVELOPMENT OF A MINIATURISED DIGITAL THRUST DEMAND UNIT c07
Arthur Kaye *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 10 p (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

Present generation analogue units were analyzed in order to produce design for the line replaceable units (L.R.U.S.). The elimination of the motion conversion chain, linear to angular, angular to linear is shown to afford significant savings in weight and volume. Angular motion and compliant force throttles, while creating maximum space saving, are shown to be ergonomically inferior to a linear input. An explanation of the operating principles of the linear stepper motor chosen as the auto-pilot prime mover is given with both the inherent advantages and disadvantages used to good effect in the overall design. Digital position encoding completes the design of the prototype unit and the results to date of the testing of this unit are given with recommendations for the design of a production unit. T.M.

N82-13056# Crouzet Aerospace and Systems, Valence (France).
USING VOICE CONTROL ONBOARD COMBAT AIRCRAFT [UTILISATION DE LA COMMANDE VOCALE A BORD DES AERONEFS DE COMBAT] c06
J. R. Coster and J. M. Melocco *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpits Design Aug. 1981 5 p In FRENCH (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

The use of the voice would be a valuable tool in resolving problems associated with pilot workload, in reducing the surface of the flight instrument system and the complexity of the man machine interface in high performance combat aircraft. A program established at the Laboratory of information for Mechanics and Engineering Sciences validates in aircraft environments the methods of speech recognition and synthesis developed in research laboratories. It is merely a matter of the universal recognition, at the acoustic level of isolated words pronounced by a single speaker. The techniques used are described. These include laboratory experiments involving an aeronautical dialog in a noisy environment and experimentation with a simulator of a vocal dialog applied to an aircraft with modern weapons and to the study of human factors. Experimentation also takes place in a flight simulator. Transl. by A.R.H.

N82-13057# Smiths Industries Ltd., Bishops Cleeve (England). Aerospace and Defence Systems.
COMMAND-RESPONSE DATA TRANSMISION TO MECHANICAL SYSTEMS MANAGEMENT EFFECT ON THE CREW/SYSTEM INTERFACE c05
I. Moir (British Aerospace Aircraft Group), C. Moxey, and P. A. Lancaster (British Aerospace Aircraft Group) *In*AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 12 p (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

The availability of low cost, high reliability micro-electronic digital devices digital data transmission systems an attractive proposition for aircraft data handling systems. Apart from the advantages of accuracy and high data rates which digital devices offer, significant improvements in system performance, weight and reliability are possible. Initially the use of digital data system was confined to aircraft avionics systems embracing navigation, weapon aiming and flight control functions. More recently the application techniques extended to the centralized control of mechanical system management. A example of an engine failure and shut-down in flight is given to demonstrate the interactive nature of data handling between two data buses and the effects upon advanced cockpit displays. A.R.H.

N82-13058# Naval Air Development Center, Warminster, Pa.

THE INTELLIGENT USE OF INTELLIGENT SYSTEMS: PROBLEMS IN ENGINEERING MAN/MACHINE SYMBIOSIS c54

J. Hopson, W. Zachary (Analytics, Inc., Willow Grove, Pa.), and N. Lane *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 16 p refs (For primary document see N82-13048 04-01)

Avail: NTIS HC A10/MF A01

A methodology to structure the process of designing 'intelligent systems' was generated in the course of several specific projects undertaken to develop such systems for a variety of airborne platforms. The general goals of these projects are to improve system performance by enhancing the effectiveness of information management within the total avionics systems. Results from the studies are summarized and the knowledge gained is related to a systematic design/evaluation approach. A.R.H.

N82-13059# Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris (France).

MONOCULAR VISION AND TACTICAL FLIGHT ON THE HELICOPTER [VISION MONOCULAIRE ET VOL TACTIQUE SUR HELICOPTERE] c06

J. P. Papin, J. P. Menu, and G. Santucci *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 14 p refs In FRENCH (For primary document see N82-13048 04-01)

Avail: NTIS HC A10/MF A01

The direction of eye movement of 7 pilots and 3 navigators was recorded in 8 hour helicopter flight during flight with obstacle missions. Each subject performed the mission while having variable conditions of monocular or binocular vision, with normal visual field or with the field reduced from 60 deg to 40 deg. Analysis of visual behavior concentrated on localization of viewing in relation to the cockpit and the object looked at. The localizations were analyzed in terms of passage from one object to another or m one zone to another in terms of the number of stops in different localizations and in terms of the total duration or method of the stops. Results show that (1) for a given condition, the subjects reacted in a relatively similar manner; (2) behavior was modified according to condition of vision: the more the field was reduced, the more the pilot increased his field of exploration and looked closer to the apparatus and to the instruments; (3) during stationary flights the behavior modification became amplified; and (4) monocular vision is more degrading of behavior reduction of the visual field. Transl. by A.R.H.

N82-13060# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.

EXPERIMENTAL INVESTIGATION OF A HELMET MOUNTED SIGHT/DISPLAY FOR HELICOPTER c06

R. Beyer, E. Danneberg, E. Kohnen, and H. Stein *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 11 p (For primary document see N82-13048 04-01)

Avail: NTIS HC A10/MF A01

A helmet mounted sight/display (HMS/D) combined with an infrared camera and electronic instrument displays was investigated as a guidance aid for the low level flight of helicopters at night. The static and dynamic accuracy of the tracking mechanism which aligns the lines of sight of both the pilot and the camera was determined by means of a target and motion simulator. System performance was checked with a Bo 105 helicopter in low level flight at night. From the results obtained the importance of the HMS/D as an guidance aid becomes evident relative to other night vision/display systems. Author

N82-13061# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.

USE OF A HELMET-MOUNTED MATRIX DISPLAY FOR PRESENTING ENERGY-MANEUVERABILITY INFORMATION DURING SIMULATED CLOSE COMBAT c06

D. N. Jarrett *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 10 p refs (For primary document see N82-13048 04-01)

Avail: NTIS HC A10/MF A01

Since continuous visual contact display (HMMD) with the enemy is essential in close combat the provision of this information on a helmet-mounted diplay (HMMD) may be particularly useful. However, the (in) visibility of the image against a bright sky background, the increased helmet weight and other inconveniencing counter effects when coupled with the high attentional and physical demands of combat, may obviate any advantages of controlling the aircraft using the extra information. A series of exercises was set up to assess the HMMD in this application. The device was the subject of a flight trial in a light jet aircraft, and two studies were completed in the newly-commissioned RAE air combat simulator. These studies enabled pilots to become familiar with the device and the unusual display format, in order to assess their combined usefulness in a combat context. A.R.H.

N82-13062# Naval Air Test Center, Patuxent River, Md.

EVALUATION OF A PILOT WORKLOAD ASSESSMENT DEVICE TO TEST ALTERNATE DISPLAY FORMATS AND CONTROL HANDLING QUALITIES c54

Samuel G. Schiflett, Paul M. Linton (Naval Air Development Center, Warminster, Pa.), and Ronald J. Spicuzza (Systems Research Labs., Inc., Dayton, Ohio) *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 12 p refs (For primary document see N82-13048 04-01)

Avail: NTIS HC A10/MF A01

The utility of a workload assessment device to measure pilot workload for approach and landing formats and control stability variations was tested in in a modified NT-33 research aircraft. The feasibility of using an item-recognition task as a measure of sensory-response loading and reserve information processing capacity while flying precision approaches was established. Statistical treatment of the data indicates an appreciable increase in reaction time and errors with degraded handling qualities as compared to ground baseline measures and good handling qualities. The preliminary findings also reveal consistent trends toward the availability of more mental reserve capacity when flying predominantly pictorial/symbolic HUD configurations as compared to conventional HUD formats with scales and alphanumerics. A.R.H.

N82-13063# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

TANKER AVIONICS AND AIRCREW COMPLEMENT EVALUATION c06

Richard W. Moss and Gregory J. Barbato (Bunker-Ramo Corp., Dayton, Ohio) *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 18 p refs (For primary document see N82-13048 04-01)

Avail: NTIS HC A10/MF A01

A four phase effort addressing the control and display design issues associated with operating the SAC'S KC-135 tanker without the navigator crew position is discussed. Topics covered include the mission analysis phase during which the tanker's operational responsibilities were defined and documented; the design phase durng which alternative crew station design concepts were developed; the mockup evaluation phase which accomplished initial SAC crewmember assessment of cockpit designs; and the simulation phase which validated the usability of the crew system redesign. A recommended crew station configuration is examined and some of the philosophy underlying the selection of cockpit hardware and systems is discussed. A.R.H.

N82-13064# McDonnell Aircraft Co., St. Louis, Mo.

F/A 18 HORNET CREW STATION c06

Eugene C. Adam *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 6 p (For primary document see N82-13048 04-01)

Avail: NTIS HC A10/MF A01

The Hornet crew station design requirement was to essentially provide the capability contained in both the F-4 and A-7 weapon systems so as to perform both the fighter attack roles, make it operable by one pilot, and increase mission reliability by a combination of improved hardware reliability and functional redundancy. To put this requirement in perspective, the F/A-18 cockpit has 40% less usable area than any of its contemporaries. This area constraint necessitated extensive integration of the weapon system controls and displays. The resultant crew station features four miltipurpose cathoderay displays driven by two mission computers, an integrated upfront control panel, and numerous automatic functions on the stick and throttle. The rationale leading up to the configuration is described and a few examples of the one-man-operability features of the Hornet and how they would used by the pilot are presented. A.R.H.

N82-13065# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

AERODYNAMICS OF POWER PLANT INSTALLATION

Sep. 1981 510 p refs In ENGLISH and FRENCH Proc. of conf. held in Toulouse, 11-14 May 1981
(AGARD-CP-301; ISBN-92-835-0301-5) Avail: NTIS HC A22/MF A01

The aerodynamic problems in power plant installation are surveyed and computational and design methodologies are presented. Combat aircraft intakes, afterbodies and nozzles, testing and analysis techniques, and installation aerodynamics of transport aircraft are addressed. For individual titles, see N82-13066 through N82-13098.

N82-13066# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

PERFORMANCE OF HIGHLY INTEGRATED INLETS FOR SUPERSONIC AIRCRAFT

c02

Lewis Surber, Jan Syberg, and Joseph Koncsek *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs Prepared in cooperation with Boeing Military Airplane Co., Seattle (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

Performance data obtained on several subsonic diffusers applicable to advanced supersonic tactical aircraft configurations were used to select a forebody-inlet model for proof-of-concept wind tunnel performance evaluation. Three of the diffusers were designed for high aspect ratio inlets having throat aspect ratios greater than seven. A fourth design incorporated a low aspect ratio inlet. Two of the high aspect ratio diffusers and the low aspect ratio diffuser incorporated duct bends typical of inlets substantially offset from the engine centerline. Preliminary tests of the high aspect of ratio diffuser produced high total pressure recovery coupled with relatively low flow distortion. Furthermore, the use of longitudinal vanes in one high aspect ratio diffuser provided reductions in engine face flow distortion with very little performance degradation. Proof-of-concept tests further investigated the performance of a high aspect ratio, side-mounted external compression supersonic inlet. Tests were performed in a 16-foot supersonic propulsion wind tunnel at Mach numbers of 1.6 to 2.2 over a -5 to 12 deg angle of attack range and sideslip angles from -8 to +8 deg. The results of these tests support the use of high aspect ratio inlets with sharp duct bends as a viable design option in future supersonic aircraft designs. M.G.

N82-13067*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

TOP-MOUNTED INLET SYSTEM FEASIBILITY FOR TRANSONIC-SUBSONIC FIGHTER AIRCRAFT APPLICATIONS

c02

T. L. Williams, B. L. Hunt, D. B. Smeltzer, and W. P. Nelms *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p refs Prepared in cooperation with Northrop Corp., Hawthorne, Calif. (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01 CSCL 01A

To inlet flow field and engine inlet performance data for an advanced fighter aircraft configuration were obtained over the Mach 0.6 to 2.0 range. The studies not only provided extensive data for the baseline arrangement, but also evaluated the effects of key aircraft configuration variables (inlet location, canopy-dorsal integration, wing leading-edge extension planform area, and variable incidence canards) on top inlet performance. In order to set these data in the context of practical aircraft systems top inlet performance is compared with that of more conventional inlet/airframe integrations. The results of these evaluations show that, for the top inlet configuration tested, relatively good inlet performance and compatibility characteristics are maintained during subsonic and transonic maneuver. However, at supersonic speeds, flow expansion over the forebody and wings causes an increase in local inlet Mach number subsequently reduces inlet performance levels. These characteristics infer that although top inlets many not pose a viable design option for aircraft requiring a high degree of supersonic maneuverability, they have distinct promise for vehicles with subsonic and transonic maneuver capabilities. M.G.

N82-13068# Royal Aircraft Establishment, Bedford (England). Aerodynamics Dept.

SOME RAE RESEARCH ON SHIELDED AND UNSHIELDED FUSELAGE MOUNTED AIR INTAKES AT SUBSONIC AND SUPERSONIC SPEEDS

c02

J. A. Ross, I. McGregor, and A. J. Priest *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 16 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

The incidence performance of fuselage-mounted intakes at subsonic and supersonic speeds is examined. The effects of simple changes in intake geometry, such as increasing contraction ratio and altering lower lip shape, are first considered; it is shown that such modifications can be beneficial at subsonic speeds, but drag penalties tend to limit their use at higher Mach numbers. Two intake locations that potentially offer a good degree of incidence shielding - underfuselage and understrake - are then examined. It is concluded that satisfactory performance can be obtained with an understrake installation, but a detailed study of strake shape, slots, splitter plates and boundary layer diverters must be made if the combinaion is to be successful over the whole of the intended flight envelope. However, for the configurations tested, the underfuselage location offers generally better intake performance lower technical risk. Finally, some results for a side-mounted staggered lip intake are presented, together with some two dimensional calculations of the mutual interference effects that occur between the upper and lower lips. It is suggested that an intake of this type can be competitive with an underfuselage installation. M.G.

N82-13069# National Gas Turbine Establishment, Pyestock (England).

PREDICTION AND MEASUREMENT OF TIME-VARIANT, THREE-DIMENSIONAL FLOWS IN MILITARY AIRCRAFT INTAKES

c02

D. E. Colbourne and J. E. Flitcroft *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 18 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

The development of a computational method suitable for predicting the three dimensional flows within the diffuser sections of aircraft intakes is described. A fast method for automatic grid generation, application to ducts of any smoothly varying cross-sectional shape, is discussed. The development of a finite-volume, time-marching method for solving the flow equations is also described. The validity of the chosen techniques is discussed in the light of comparisons with analytical and empirical results. Empirical techniques were developed to examine flows in which viscous or time variant effects are dominant. A rotating yaw meter rake was developed to undertake detailed flow surveys at the exit of model diffusers, and results may be obtained from tests both in isolation and in the presence of a compressor. The development of instrumentation and data processing facilities for measuring instantaneous engine face total pressure distortion in small scale models is also described, together with the validation of this technique by comparison with results from a full-size replica of the intake tested under free-jet conditions. M.G.

N82-13070# British Aerospace Aircraft Group, Bristol (England).

EFFECTS OF INTAKE GEOMETRY ON CIRCULAR PITOT INTAKE PERFORMANCE AT ZERO AND LOW FORWARD SPEEDS

c02

A. C. Willmer, T. W. Brown, and E. L. Goldsmith (RAE, Bedford, England) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 16 p refs Sponsored in part by Ministry of Defence (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

A series of experiments on circular cross-section pitot intakes at Mach numbers from 0 to 0.21 and angles of incidence and sideslip from 0 to 40 deg are presented. Measurements were made at the engine face of 72 pitot pressures, 4 unsteady pitot pressures, swirl angle at six positions, and boundary layer profiles at four positions. Static pressure distribution around the cowl lips and along the diffusers were also measured. Five cowl lips covering a range of contraction ratios and lip shapes were tested with both a straight and an S bend diffuser. The effect of inserting parallel section spacers between the cowl lip and the front of the subsonic diffuser and between the end of the subsonic diffuser and the engine face instrumentation and the effect of a thin lip slot upstream of the intake throat were evaluated. Results indicate that, lip losses may be decreased by increasing contraction ratio, fitting a lip slot or a forward spacer. Steady state flow distortion at the engine face is decreased by increasing lip contraction ratio or by fitting an aft extension. For the S duct tested, distortion levels are set by the diffuser as much as by incidence. Sideslip, however, lessens the distortions. M.G.

N82-13071# Institut de Mecanique des Fluides de Lille (France).
TRANSONIC FLOWS IN AN AIR INLET WITH LARGE INCIDENCE AND THE EFFECT OF A BLOWING TRAP [ECOULEMENTS TRANSSONIQUES DANS UNE PRISE D'AIR EN GRANDE INCIDENCE AT EFFET DE TRAPPE DE SOUFFLAGE] **c02**
A. Dyment, P. Gryson, and J. P. Flodrops *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 13 p ref In FRENCH (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

Flow in a bidimensional air intake with large incidence was studied under conditions in which the upstream flow was subsonic and the internal flow could be regulated. The phenomena following flow separation were examined, especially the homogenization of the internal flow. A device for improving mogenization which involves a natural deflection accomplished by a scoop designed to guide the captivated air was tested. The universal aspect of internal flow was studied using probes in different sections. The unsteady phenomena were analyzed from ultra high speed visualizations and the mean flow was characterized from classic visualization. The insertion of the deflector appreciably improved the performance of the air intake. The coefficient of output (sigma) and the total mean pressure (P sub tm) were considerably improved at the level of the compressor. While the use of the scoop to guide the air towards the slot had only a weak influence on sigma and P sub tm at the compressor level, it brought an appreciable gain in the speed of homogenization of the internal flow. Transl. by A.R.H.

N82-13072# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Theoretical Aerodynamics Dept.
CALCULATION OF TRANSONIC AIR-INTAKES USING A COMPUTER PACKAGE FOR INVISCID AND BOUNDARY LAYER FLOWS **c02**
Ciro W. Lucchi *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 4 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

A finite-element method was developed to solve the full potential equation for transonic flows in a two dimensional engine intake. Since the full potential equation is expressed in the psi-formulation, a successive line over-relaxation algorithm was developed to solve the system of non-linear algebraic equations. Stability in the supersonic domain was obtained using Hafez's artificial compressibility method. Herring-Mellor's finite-difference code was incorporated to compute two dimensional compressible laminar-turbulent boundary layers. A fixed transition or Dunham's transition criterion may be chosen. The inviscid method was tested on a few single profiles, such cases having been computed exhibiting difficulties expected to occur in the calculation of two-dimensional intakes: high leading-edge suction peaks and strong shocks. Computations carried out on a two dimensional Tornado-like air-intake are discussed. A.R.H.

N82-13073# Aeritalia S.p.A., Torino (Italy). Combat Aircraft Group.
SUBSONIC MILITARY AIRCRAFT ENGINE INTAKE: AN INTEGRATED THEORETICAL EXPERIMENT DESIGN **c02**
G. Bertolone and L. Fornasier *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

Two numerical codes were developed for the simulation of the engine intake-induced flow field in two dimensional transonic and three dimensional subsonic cases. Both codes were obtained by modification of existing codes suitable for the computation of the exterior flow past airfoils (by a finite element method) and about three dimensional arbitrary configurations (by a panel method). Computed results and comparison with experimental data pertinent to the analysis of a single bifurcated intake proved usefulness of the present numerical schemes for engineering applications. Engine face auxiliary doors design and side intakes diverter shape optimization was studied. Following an extensive testing program performed on a static model, the engine face auxiliary doors with annular air admission into the primary long type duct appeared to be a good alternative to the classical solution placed at the main inlet entry. Diverter geometry influence both on aerodynamics, in terms of drag coefficient, and intake performance, in terms of distortion coefficient, was investigated by testing a low speed model. R.J.F.

N82-13074# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Unternehmensbereich Flugzeuge.
THE DESIGN AND DEVELOPMENT OF THE TORNADO ENGINE AIR INTAKE **c05**
C. P. Stocks (British Aerospace, Warton, England) and N. C. Bissinger *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 21 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

The design and development of the Tornado aircraft supersonic intake is described. Critical aerodynamic design areas are outlined with special emphasis on compatibility. The intakes were designed to satisfy the conflicting requirements of greater than Mach 2 operation and a very wide incidence operating envelope at subsonic speeds. The problem of design loads is reviewed as well as the theory and operation of the automatic control system. Propulsion system behavior in flight and some examples of intake-airframe interaction are described R.J.F.

N82-13075# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
INTEGRATION OF ADVANCED EXHAUST NOZZLES **c07**
Douglas L. Bowers and James A. Laughrey *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 14 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

Attributes of both axisymmetric and nonaxisymmetric advanced nozzles and their incorporation into an aircraft to improve cruise performance, maneuverability and short takeoff and landing operation are discussed. It was concluded that when used as a trimming device, advanced exhaust nozzles with thrust vectoring can provide significant aircraft cruise drag reduction. The aftbody/nozzle installation for advanced airframes and exhaust nozzles must be approached very carefully to demonstrate an installed drag benefit. For maneuver, advanced thrust vectoring exhaust nozzles show advantages at high angle of attack. Improved turn rate and instantaneous maneuver performance can be provided by utilizing these advanced exhaust nozzles in advanced aircraft. For short takeoff and landing aircraft advanced exhaust nozzles with both thrust vectoring and thrust reversing may be necessary. Thrust vectoring up to 60 degrees (or higher) and a propulsive lift control system may be required. R.J.F.

N82-13076# Rolls-Royce Ltd., Bristol (England). Installation Aerodynamics Group.
THE SUBSONIC PERFORMANCE OF PRACTICAL MILITARY VARIABLE AREA CONVERGENT NOZZLES **c07**
L. R. Harper IN AGARD Aerodyn. of Power Plant Installation Sep. 1981 11 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

Performance considerations involved in the selection of a variable area nozzle for reheated engines for combat aircraft are discussed. The main emphasis is on dry operation at subsonic speeds since drag, weight, leakage and other penalties in this regime can prevent an aircraft attaining its design radius of action. Zero-base nozzles are compared with a moving shroud nozzle which has a substantial annular base area in dry setting. The moving shroud nozzle, as used on the RB199 engine in the Tornado MRCA, is very competitive with zero base nozzles in terms of overall performance. It is light, mechanically simple, reliable, and its short length permits a target type thrust reverser to be used. It is concluded that this type of nozzle is the optimum choice for combat aircraft until further technology advances permit substantial improvements in the overall performace of the more sophisticated nozzles. R.J.F.

N82-13077# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).

COMPARISON OF DIFFERENT NOZZLE CONCEPTS FOR A REHEATED TURBOFAN c07

H. Grieb, R. Vedova, H. Enderle, and H. Nagel *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 15 p refs Sponsored in part by German Ministry of Defence (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

Several concepts of convergent and convergent/divergent nozzles are investigated and compared in view of performance, weight, complexity and the influence on afterbody drag of combat aircraft. The influence of different nozzle cooling concepts on thrust, with subsequent cooling air requirements, is investigated. The optimum ratio of exit area/throat area of convergent/divergent nozzles dependent on nozzle concept and nozzle pressure ratio is identified. The performance comparison shows that fully variable convergent/divergent nozzles promise some advantages against the simple convergent nozzle at high nozzle pressure ratios. However, the higher weight and complexity of convergent/divergent nozzles lead to the conclusion that the choice of convergent/divergent nozzles for reheated turbofan engines in combat aircraft is not generally justified. J.D.H.

N82-13078# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Aero Propulsion Lab.

ADVANCED EXHAUST NOZZLE TECHNOLOGY c07

Ronald J. Glidewell and Robert E. Warburton (Pratt and Whitney Aircraft Group, West Palm Beach, Fla.) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 11 p refs (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

Turbine engine exhaust nozzle technology, including nonaxisymmetric nozzles, thrust reversing, and thrust vectoring was investigated. Trade studies to determine the impact of these developments on the thrust-to-weight ratio and specific fuel consumption of an advanced high performance, augmented turbofan engine are reported. Results are presented in a manner which provides a understanding of the sources and magnitudes of differences in the basic elements of nozzle internal performance and weight as they relate to conventional axisymmetric nozzle technology. These comparisons are presented for three categories of nozzle functional capability: jet area and exit area control, thrust reversing, and thrust vectoring. J.D.H.

N82-13079# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

A NUMERICAL INVESTIGATION OF EXHAUST PLUME TEMPERATURE EFFECTS ON NONAXISYMMETRIC NOZZLE/AFTERBODY PERFORMANCE c07

K. M. Peery (Boeing Military Airplane Co., Seattle) and D. L. Russell *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 11 p refs (For primary document see N82-13065 04-01) (Contract F33615-79-C-3018)

Avail: NTIS HC A22/MF A01

A two dimensional Navier-Stokes flow analysis procedure is used to simulate the single expansion ramp nozzle (SERN) flow field in an attempt to understand the effect of exhaust total temperature on the nozzle flow field. Steady state solutions were obtained using an explicit time-dependent method utilizing efficiency-improvin techniques such as body-fitted mesh, coupled computational regions, wall functions, automatic alignment of mesh with mixing layers, and vectorized execution on a CRAY I computer. The temperature-dependent specific heat capacities and the effect of exhaust total temperature on the nozzle flow characteristics. A normal shock on the expansion ramp was evident in the SERN experimental data that was not predicted with the 2-D analysis. This shock was present whether the exhaust total temperature was hot or cold and its position was dependent on the total temperature. The capabilities and some of the problems of applying Navier-Stokes flow analysis procedure to computing viscous nozzle flows are demonstrated. The importance of measuring upstream conditions in flow experiments is emphasized if the data is to be utilized for explanation of flow variations which occur or for flow analysis validation. J.D.H.

N82-13080# Aircraft Research Association Ltd., Bedford (England).

A REVIEW OF THE EFFECT OF REYNOLDS NUMBER ON AFTERBODY DRAG c02

O. M. Pozniak *In* AGARD Aerodyn. of Power Plant Installation Sep. 1980 21 p refs (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

The reported effects of a change in Reynolds number or boundary layer thickness on the afterbody drag of axisymmetric bodies and military type aircraft are reviewed. The significance of different Mach number regimes and of boattail steepness combinations is considered. At subsonic Mach numbers and in the absence of flow separations, significant but compensating pressure changes are found such that there is little effect on the afterbody pressure drag of complete afterbodies. In the presence of flow separations, the effects of Reynolds number tend to be small when the location of the flow separation is fixed as a result of a sudden change in the boattail contour, but on afterbodies with more continuous contours, the location of the point of separation can be affected; conflicting factors are then involved and the afterbody drag can increase or decrease by modest amounts, or remain unaffected by Reynolds number changes. Significant increases in drag for increases in Reynolds number have been consistently reported for high subsonic Mach numbers above the drag rise. J.D.H.

N82-13081# Societe Nationale d'Etudes et de Construction de Moteurs d'Aviation, Moissy-Cramayel (France).

A DEVICE FOR SIMULATING AT A COMPRESSOR BENCH AN AIR INLET WITH LARGE INCIDENCE [DISPOSITIF DE SIMULATION AU BANC COMPRESSEUR D'UNE PRISE D'AIR A GRANDE INCIDENCE] c07

Bertrand Delahaye and Gerard Laruelle (ONERA, Chatillon, France) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 15 p refs In FRENCH; ENGLISH summary (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

Increased maneuverability requirements for modern fighter aircraft involve an extensive inlet-engine compatibility analysis. Therefore, during the early stages of compressor development, the engine designer must estimate the surge margin loss resulting from inlet dynamic distortion over the complete flight envelope. A bell-mouth with varying lip thickness and a level-edged duct were designed to simulate the large vortices generated in an inlet at high angle of attack in a compressor test facility; the simulator was tested in a wind tunnel at ONERA and validated in a compressor test facility at SNECMA's Villaroche test center. The flow at the inlet/engine interface plane was characterized in the wind tunnel both for a 1/4 scale cylindrical duct at a Mach number of 0.6 and angles of attack up to 40 degrees and for different versions of the simulator in static conditions. Thereafter, a 30 degree level edged duct was tested at SNECMA with a full scale transonic fan stage. Scaling rules for acquisition time and frequency are used to compare the measurement in front of the fan with the results obtained in the subscale wind tunnel model. Author

N82-13082# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).

AN ACQUISITION AND ANALYSIS SYSTEM FOR DYNAMIC TESTS OF AIR INLETS [SYSTEME D'ACQUISITION ET D'ANALYSE POUR ESSAIS DYNAMIQUES D'ENTREES D'AIR] c07

Pierre Perrier, Bertrand Delahaye (SNWCMA, Moissy Cramayel, France), and Gerard Laruelle (ONERA, Chatillon, France) *In* AGARD Aerodyn. of Power Plant Installation Aug. 1981 14 p refs In FRENCH (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

Improving the flight domain of combat aircraft leads to operations involving a much large variation of unsteady aerodynamic characteristics at the engine inlet than in the past. To determine if the augmentation will be effectively acceptable for compressors and engines of the future, sufficient knowledge of flows must be acquired. This entails measuring a sufficient number of unsteady flow characteristics; however, the number of measurements made must be limited because of cost as well as because of the possibility of instantaneous or deferred processing. This sequence of measurements takes into account necessary compromises. Cooperation is needed among the aircraft designer, the engine designer, and the research organization so that the work of each can complement that of the others, and an economy of means and a homogeneity of methods for analyzing and interpreting the results is possible. Transl. by A.R.H.

N82-13083# Volvo Flygmotor A.B., Trollhaettan (Sweden). Aerodynamics Dept.

A SYNTHESIS METHOD FOR ESTIMATING MAXIMUM INSTANTANEOUS INLET DISTORTION BASED ON MEASURED INLET STEADY STATE AND RMS PRESSURES c02

Ronald Borg *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

A synthesis method based on steady state and root mean square (RMS) pressure measurements was developed using a simple mathematical computer model which estimates the maximum value of an engine distortion index. The estimated values obtained with the computer model were correlated with actual measured maximum instantaneous distortion values from several different tests and it is indicated that the method is useful in a inlet airframe engine configuration development program. The method is a tool for screening configurations before final selection and commitment to more expensive testing. The synthesis method is also complemented with extreme value analysis of the computer generated distortion data to evaluate the likely increase in maximum distortion index with increased time of observation. E.A.K.

N82-13084# Fluidyne Engineering Corp., Minneapolis, Minn.

MODEL TESTING TECHNIQUES FOR MEASURING INLET DRAG c02

James S. Holdhusen and James L. Grunnet *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 8 p refs (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

Two methods of measuring inlet drag in transonic flow are described. In the first method, a flow through nacelle is tested in a transonic wind tunnel. Capture ratio is varied by installing individual annular blockers in the nacelle. Corrections for the drag force exerted by the captured streamtube are determined from blow through tests in a static test stand. In the second method, drag is determined directly using a special rig which has a variable loss throttle. The thrust exiting the control surface is determined by a choked ASME nozzle. The advantages and disadvantages of the two methods are compared. E.A.K.

N82-13085# National Defence Headquarters, Ottawa (Ontario). Directorate of Science and Technology.

COMPRESSOR STALL INDUCING INSTALLATION EFFECTS OF AN ENGINE CONTROL PARAMETER FOR THE CF-5 AIRCRAFT c07

W. L. Macmillan, D. M. Rudnitski, and W. Grabe *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p Prepared in cooperation with National Research Council of Canada, Ottawa (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

Compressor stall problems with CF-5 aircraft powered by two J85-CAN-15 engines were investigated. One major cause for compressor stalls as improper operation of the engines' control system under low temperature conditions was identified. It is demonstrated that this control system malfunction is the result of engine installation effects, which produce an erroneous compressor inlet temperature signal to the main fuel control unit. The degree of signal error for several flight conditions, such as level flight, high angles of attack, aircraft stalls, and weapons delivery profiles are identified. It is found that temperature errors are greater at high angles of attack where severe compressor inlet distortion acts cumulatively in reducing the stall margin under this flight condition. E.A.K.

N82-13086# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).

THE ROLE AND IMPLEMENTATION OF DIFFERENT NACELLE/ENGINE SIMULATION CONCEPTS FOR WIND-TUNNEL TESTING IN RESEARCH AND DEVELOPMENT WORK ON TRANSPORT AIRCRAFT c02

B. Ewald and R. Smyth *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 35 p refs (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

Different experimental methods and their specific roles in various stages of research and development were investigated. The main problem is the simulation and calibration of the propulsion system. Different simulation methods are: flow through nacelles, powered nacelles (blowing, turbine powered simulators (TPS), ejector powered), inlet models. The TPS represent the most advanced simulation of the high bypass ratio engine in model scale. A large part of the wind tunnel tests still have to rely upon flow through nacelles. A novel flow through nacelle with a variable plug is presented. It is shown that the combination of flow through nacelles and TPS can be efficiently used in the windtunnel investigation of propulsion system effects for transport aircraft. E.A.K.

N82-13087# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

WIND TUNNEL TESTS OF POWERED MODELS: A COMPARISON OF TWO METHODS OF SIMULATING THE JETS OF JET ENGINES [ESSAIS EN SOUFFLERIE DE MAQUETTES MOTORISEES; COMPARAISON DE DEUX METHODES DE SIMULATION DES JETS DES REACTEURS] c07

J. P. Becle and R. Perin (SNIAS, Toulouse) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 18 p ref In FRENCH (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

Two methods for simulating engine jets were developed at ONERA. The so-called blowing jets were previously mounted for studying the Concorde. The second method, which uses small air breathing turbines was recently installed for Airbus family aircraft. Tests were conducted on semi-models mounted on a balance with six components traversed by the flow from the engine. An original mounting permits the same measurement means to be used for any principle of power or type of test used (fixed point or wind tunnel test). The installations, means of measurement, and methods of using the results are described. The respective advantages of each type of power simulation are considered from the viewpoints of complexity, duration, and precision of measurements obtained. Transl. by A.R.H.

N82-13088# Aircraft Research Association Ltd., Bedford (England).

WIND TUNNEL TEST AND ANALYSIS TECHNIQUES USING POWERED SIMULATORS FOR CIVIL NACELLE INSTALLATION DRAG ASSESSMENT c02

A. E. Harris and E. C. Carter *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 16 p refs (For primary document see N82-13065 04-01)

Avail: NTIS HC A22/MF A01

Full span and semi-span wind tunnel model tests and powered nacelle calibration techniques are discussed in the context of civil nacelle installation drag assessment and optimization. In order to achieve the accuracy required for drag analysis it is necessary to determine the installed net thrust of the powered nacelle simulator to the equivalent of at least one aircraft drag count. This implies stringent control of mass flow and thrust accounting and imposes the need for consistency of approach in the wind-on and calibration tests where thrust and mass flow coefficients must be known to 0.1% to 0.2% accuracy. This need for high confidence in the data at all stages of analysis led to a methodology in which the measured data is combined in various ways to enhance confidence in its final use. Experiences

obtained in the use of a Mach simulation tank (MST) for the calibration of turbine powered simulator units are discussed. The MST is used to obtain simultaneous mass flow and thrust calibrations with representative internal nacelle conditions in the presence of a quiescent exhaust environment. Practical problems associated with the design of balance and airfeed arrangements are discussed along with the use of blown and turbine powered simulators.
B.W.

N82-13089# Rolls-Royce Ltd., Derby (England).
ESTABLISHMENT OF AN EXPERIMENTAL TECHNIQUE TO PROVIDE ACCURATE MEASUREMENT OF THE INSTALLED DRAG OF CLOSE COUPLED CIVIL NACELLE/AIRFRAME CONFIGURATIONS, USING A FULL SPAN MODEL WITH TURBINE POWERED ENGINE SIMULATORS c02
G. Pugh and A. E. Harris (Aircraft Research Association Ltd., Bedford, England) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 9 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

Definition and optimization of installed thrust/drag in civil nacelle installation design and development was studied. As a means of validating the calibration and thrust/drag analysis techniques bodied transport, Lockheed L1011, having high bypass ratio RB 211 turbofan engines with two alternative exhaust system designs was used. Wind tunnel model representation comprised a full span simulation with underwing mounted turbine powered engine simulators. Calibration techniques included the use of a Mach simulation tank in which concurrent mass flow and thrust calibrations were conducted in a quiescent exhaust environment. Data presented includes nacelle thrust and discharge coefficients, installed drag comparisons, and, finally, model to flight correlations.
B.W.

N82-13090# National Aerospace Lab., Amsterdam (Netherlands).
EVALUATION OF AN EXPERIMENTAL TECHNIQUE TO INVESTIGATE THE EFFECTS OF THE ENGINE POSITION ON ENGINE/PYLON/WING INTERFERENCE c02
J. A. J. vanEngelen, B. Munniksma, and A. Elsenaar *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 13 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

A flexible experimental technique to study the effect of a variation of engine position for a range of test conditions was evaluated. In this test an underwing mounted 3/4 fancowl engine was investigated at six different positions as a free flow nacelle and as a strut mounted blown nacelle. Pressure and balance force measurements were made. Some typical aspects of the aerodynamic interference are discussed, notably the value of free flow nacelle measurements. Also a comparison of balance weighed and integrated pressure forces is presented. Results indicate that accurate simulation of the engine nozzle geometry is of prime importance for an investigation concerning engine/airframe integration. Nevertheless, tests on a free flow nacelle may still be useful for the selection of the most favourable engine position. A reasonable correlation was established between interference forces as obtained from pressure integration and balance measurements. However, the pressure forces tend to underestimate the balance forces. For a flexible pathfinder test, interference forces derived from pressure integration only appear to be very useful for the determination of trends in interference effects.
B.W.

N82-13091# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
STUDIES OF AIR INLETS AT REYNOLDS NUMBERS COMPARABLE TO FLIGHT IN ONERA'S F1 AND S1MA WIND TUNNELS [ESSAIS DE PRISES D'AIR A DES NOMBRES DE REYNOLDS COMPARABLES AU VOL DANS LES SOUFFLERIES F1 ET S1MA DE L'ONERA] c02
J. Leynaert *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs In FRENCH (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

The pressurization of the subsonic F1 wind tunnel at ONERA's Fauga-Mauzac Center was a benefit in wind tunnel tests of the air intakes of Airbus-type aircraft on a large scale at a Reynolds number near that of flight. The same model can thus be tested up to a Mach number near 1 in the S1MA wind tunnel at the Modane Center. Air intakes of military aircraft can likewise be studied in the two wind tunnels at high Reynolds numbers. The apparatus used, the methods of measurement, and the means of calibrating and control used to assure valid results are presented.
Transl. by A.R.H.

N82-13092# British Aerospace Aircraft Group, Hertfordshire (England). Research Dept.
THE INFLUENCE OF CLOSED-COUPLED, REAR FUSELAGE MOUNTED NACELLES ON THE DESIGN OF AN ADVANCED HIGH SPEED WING c05
R. D. Laugher *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

The design approach aimed at integrating the effect of the nacelle into the basic wing design is described. Particular attention is drawn to the design risk associated with the modified inner wing supercritical flow development when nacelles are not represented in the transonic design calculations. Experimental test results are described which demonstrate the general success of the design technique. Finally, some results are presented from theoretical investigations in which an attempt was made to simulate the interference effect of the nacelle on the wing supercritical flowfield. A technique was developed whereby the nacelle and intake streamtube are replaced by an equivalent interfering body, which is derived from subcritical flow interference pressures. Results show that this technique provides a simple, cost effective tool for the supercritical design of a wing operating in the influence of a rear nacelle.
M.D.K.

N82-13093# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Aerodynamics Dept.
AERODYNAMIC ASPECTS OF A HIGH BYPASS RATIO ENGINE INSTALLATION ON A FUSELAGE AFTERBODY c02
N. Voogt, J. vanHengst, and J. Th. v.d.Kolk (NRL) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 10 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

The design process used in shaping rear fuselage mounted large diameter engine nacelles, pylons, and fuselage for a transport type aircraft is described. The objective was to suppress the local velocity levels and pressure gradients to avoid aerodynamic interference drag of the nacelle-pylon-fuselage combination in high speed cruise flight. Shapes of fuselage afterbody, nacelle, and stubwing were modified in a design-by-analysis process involving iterative and three dimensional singularity methods for inviscid subsonic flow. Windtunnel tests confirmed the adequacy of these methods.
M.D.K.

N82-13094# Societe Nationale Industrielle Aerospatiale, Toulouse (France). Service Aerodynamique Theorique.
A NUMERICAL METHOD FOR STUDYING NACELLE-JET-AIRFOIL INTERACTION IN INVISCID THREE-DIMENSIONAL FLOW [UNE METHODE NUMERIQUE POUR L'ETUDE DE L'INTERACTION NACELLE-JET-VOILURE EN ECOULEMENT TRIDIMENSIONEL NON VISQUEUX] c02
G. LeGall, J. Bousquet, and M. Yermia *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 13 p refs In FRENCH (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

The nacelle-jet-airfoil interaction is a complex three dimensional phenomena which is addressed in two simplified hypotheses: the fluid is incompressible and inviscid. Under these two hypotheses, the propulsive configuration is modeled by air intake with flow control and a propulsive jet with control of the pressure generator. A method of singularities is used which considers the sources and doublets of constant density and doublets of linear density on a flat panel. The equations which govern the problem constitute a nonlinear system which is divided into a linear part and a quadratic part. These two parts are solved iteratively by the Gauss-Seidel method and the Newton method. The free boundaries of the flow are also calculated by an iterative process which is integrated into the two preceding methods. Some practical results are proposed in two and three dimensional flow. Comparison with tests permits evaluation of the advantage of the simplified hypotheses. Transl. by A.R.H.

N82-13095# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).
CALCULATION OF WING-BODY-NACELLE INTERFERENCE IN SUBSONIC AND TRANSONIC POTENTIAL FLOW c02
K. D. Klevenhusen, H. Jakob, and H. Struck *In* AGARD Aerodyn. in Power Plant Installation Sep. 1981 8 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

A calculation method especially for transport aircraft wing design with consideration of wing/body or engine/airframe interference was developed. A hybrid method, consisting of a combination of panel method and finite difference method, is an improvement of a well proved analogy method. The panel method is of higher order using linear source and doublet distributions. The transonic flow region is removed from the entire flow field and the panel method is used for calculating boundary values for the subsequent finite difference method. The finite difference method solves the full potential equation in streamline coordinates. E.A.K.

N82-13096*# Boeing Military Airplane Development, Seattle, Wash.
PREDICTION OF SUBSONIC AIRCRAFT FLOWS WITH JET EXHAUST INTERACTIONS c02
D. W. Roberts *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs (For primary document see N82-13065 04-01)
(Contract NAS2-10100)
Avail: NTIS HC A22/MF A01 CSCL 02A

A numerical procedure to calculate the flow fields resulting from the viscous inviscid interactions that occur when a strong jet exhaust and aircraft flow field coupling exists was developed. The approach divides the interaction region into zones which are either predominantly viscous or inviscid. The flow in the inviscid zone, which surrounds most of the aircraft, is calculated using an existing potential flow code. The viscous flow zone, which encompasses the jet plume, is modeled using a parabolized Navier-Stokes code. The procedure features the coupling of the zonal solutions such that sufficient information is transferred between the zones to preserve the effects of the interactions. The zonal boundaries overlap and the boundary conditions are the information link between zones. An iteration scheme iterates the coupled analysis until convergence has been obtained. E.A.K.

N82-13097# Douglas Aircraft Co., Inc., Long Beach, Calif.
PROP-FAN INTEGRATION AT CRUISE SPEEDS c05
H. Robert Welge *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 14 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

The aerodynamic installation features of a highly loaded turboprop (prop fan) on an aircraft for flight at Mach 0.8 are discussed. The aerodynamic flow environment in which the prop fan must operate is shown for both wing and aft-fuselage installations using advanced surface panel methods. The effects of prop fan slipstream parameters on the drag of a supercritical wing are presented indicating that only small drag penalties occur. Drag reductions are possible by tailoring the local wing section to account for the rotor induced flow. Using these inputs, an integrated wing/nacelle is shown. E.A.K.

N82-13098*# Boeing Commercial Airplane Co., Seattle, Wash. New Product Development Dept.
AIRFRAME-PROPULSION SYSTEM AERODYNAMIC INTERFERENCE PREDICTIONS AT HIGH TRANSONIC MACH NUMBERS INCLUDING OFF-DESIGN ENGINE AIRFLOW EFFECTS c02
R. M. Kulfan and A. Sigalla *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 23 p refs (For primary document see N82-13065 04-01)
(Contract NAS1-14623)
Avail: NTIS HC A22/MF A01 CSCL 02A

The transonic speed regime for airplanes at conditions where inlet spillage takes place is discussed. A wind tunnel test program to evaluate aerodynamic performance penalties associated with propulsion system installation and operation at subsonic through low supersonic speeds was conducted. The accuracy of analytic methods for predicting transonic engine airframe interference effects was assessed. Study variables included Mach number, angle of attack, relative celle location, and nacelle mass flow ratio. Results include test theory comparisons of forces as well as induced pressure fields. Prediction capability of induced shock wave strength and locations is assessed. It was found that large interference forces due to engine location and flow spillage occur at transonic speeds, that theory explains these effects; and that theory can predict quantitatively these effects. E.A.K.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-13099 Georgia Inst. of Tech., Atlanta.
A NUMERICAL STUDY OF LAMINAR UNSTEADY COMPRESSIBLE FLOW OVER AIRFOILS Ph.D. Thesis
Mohamed M. El-Refaee 1981 199 p
Avail: Univ. Microfilms Order No. 8124290

An integro-differential formulation for the numerical solution of the two dimensional compressible subsonic-Navier-Stokes equations is developed and presented. This formulation utilizes vorticity and dilatation as dependent variables in the govering equations. In contrast to the prevailing finite-difference techniques, the formulation is capable of confining the computations to the region of non-negligible vorticity and non-negligible difference in dilatation between the viscous flow and the potential flow around the same configuration. The accuracy and flexibillity of the scheme are demonstrated by considering three test cases involving bodies of simple geometries. The numerical results are compared with available experimental data and finite difference solutions. Laminar compressible flow past a 9 percent thick Joukowski airfoil at 15 deg angle of attack is analyzed. The 'steamline like' lines in the compressible case show the appearance of a primary bubble. Dissert. Abstr.

N82-13100 Stanford Univ., Calif.
SOME OBSERVATIONS OF SURFACE PRESSURES AND THE NEAR WAKE OF A BLUNT TRAILING EDGE AIRFOIL Ph.D. Thesis
Ramarao Venkata Digumarthi 1981 191 p
Avail: Univ. Microfilms Order No. 8124053

Experiments with a truncated and untruncated airfoils of profiles NACA 640A10 were carried out in subsonic wind tunnels in a velocity range of 19 meters per second to 54 meters per second corresponding to Reynolds numbers of 2.0 x 10 to the 5th power to 4.68 x 10 to the 5th power based on the chord. Airfoil spanned the test section to achieve two dimensionality of the model. Chordwise static pressure distribution of the blunt trailing edge airfoil agreed with that for a smooth trailing edge airfoil except at the vicinity of the trailing edge. The boundary layer profiles in the midspan plane showed no separation as in the case of the smooth trailing edge airfoil. The spanwise distribution of the static pressure with tripped boundary layer, was found to be uniform on the upper surface of the airfoil, was found to be nonuniform as the trailing edge was approached for an untripped boundary layer configuration. Vortex shedding occurred behind blunt trailing edge airfoils and varied linearly with velocity. Although the intensity (RMS) of the base fluctuating pressure showed negligible variation in the spanwise direction, cross-correlations indicate spanwise phase variation in the base pressure. Dissert. Abstr.

N82-13101 Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
NAVIER-STOKES SOLUTIONS FOR A SUPERSONIC COFLOWING AXISYMMETRIC NOZZLE WITH A THICK ANNULUS Ph.D. Thesis
Gerald Alan Hasen 1981 158 p
Avail: Univ. Microfilms Order No. 8119138

A numerical technique is developed that is capable of accurately predicting supersonic coflowing nozzle flowfields which contain both highly viscous regions and complex shock structures typified by the Mach disc formation. Numerical solutions to the Navier-Stokes equations are obtained for a domain containing an axisymmetric coflowing nozzle with a thick base annulus. The coflowing nozzle streams consist of a Mach 3.0 jet embedded in a Mach 1.94 turbulent external flowfield. Five nozzle pressure ratio conditions ranging from a highly overexpanded case which exhibits a Mach disc shock formation, to a slightly under-expanded case are examined and solved numerically. An efficient Lax-Wendroff type differencing scheme of second order accuracy which utilizes time-splitting and two-step predictor corrector techniques is used to solve the two dimensional Navier-Stokes equations. An adaptive grip scheme is utilized in the wake of the nozzle base annulus. A fully vectorized version of the present computer code can be expected to converge within five minutes on a CRAY-1 computer. Dissert. Abstr.

N82-13102 Georgia Inst. of Tech., Atlanta.
AN EXPERIMENTAL INVESTIGATION OF THE TURBULENT FLOW IN THE JUNCTION OF A FLAT PLATE AND A BODY OF CONSTANT THICKNESS Ph.D. Thesis
Ergun Abdullah Oguz 1981 208 p
Avail: Univ. Microfilms Order No. 8124294

The incompressible turbulent flow in the streamwise junction formed by a body of constant thickness, with a semielliptic leading edge, and an effectively infinite flat plate are investigated for two values of the flat plate upstream boundary layer thickness. In order to identify the magnitude and extent of the distortion of the mean flow and the turbulence field that is associated with the secondary flow system, total pressure, surface pressure, yaw angle, and mean, and fluctuating velocity measurements (in the direction of the local mean velocity vector) are conducted at three streamwise stations. The local yaw angles are determined utilizing the single hot wire rotation technique. A vortex-like secondary flow system in the junction operating in a sense with the flow moving away from the body near the plate surface and towards the body in the outer part of the junction flow region is observed. Dissert. Abstr.

N82-13103 Florida Univ., Gainesville.
REFINEMENT OF A METHOD FOR DETERMINING THE INDUCED AND PROFILE DRAG OF A FINITE WING FROM DETAILED WAKE MEASUREMENTS Ph.D. Thesis
Robert Paul Weston 1981 302 p
Avail: Univ. Microfilms Order No. 8124463

The drag of a moderate aspect ratio wing into profile and induced drag components is considered. The axial flow in the trailing vortex system suggests that a portion of the overall drag that is currently attributed to profile drag is actually linked to the trailing vortex strength and should be associated with the induced drag component. This drag portion, designated as the vortex core drag increment, is estimated near the wing. A diffuse vortex model is proposed as a way of determining the vortex core drag increment from transverse velocity measurements in downstream cross sections of the wing wake. The sum of the integrated profile and induced drag values obtained from wake measurements show agreement with the total drag values obtained from force balance measurements. Dissert. Abstr.

N82-13104 Iowa Univ., Oakdale.
TURBULENT WAKE DEVELOPMENT BEHIND STREAMLINED BODIES Ph.D. Thesis
Sastry Suryanarayana Munukutla 1981 316 p
Avail: Univ. Microfilms Order No. 8123346

The developing turbulent wake behind streamlined bodies is reported. Detailed measurements of mean and turbulent flow properties are made in three different wake flows. The first is the symmetric wake of a flat plate, the second is the asymmetric wake of a flat plate, (asymmetry being produced by roughening on side of the plate) and the third is the curved wake of an asymmetric airfoil at incidence. It is possible to identify three important regions in the wake, namely the near wake, intermediate wake and the far wake. The performance of the existing turbulence models in the case of the symmetric flat plate wake is studied. The near and intermediate wake regions are predicted by a sophisticated turbulence model. Dissert. Abstr.

N82-13105 Stanford Univ., Calif.
AN EXPERIMENTAL INVESTIGATION OF THE FLOW PAST A FINITE CIRCULAR CYLINDER AT A LOW SUBCRITICAL REYNOLDS NUMBER Ph.D. Thesis
Muhammad Umar Budair 1981 139 p
Avail: Univ. Microfilms Order No. 8124045

Results of hot-wire measurements made in the near-wake of a finite circular of fixed aspect ratio (l/D = 37) at a Reynolds number of 9955 are reported. The measurements included the mean velocity profiles, root-mean-square values of the velocity fluctuations, frequency spectra, and velocity cross-correlations. The mean velocity profiles were used to determine the wake width, whose variation in the downstream and spanwise directions was examined. It was found that the flow over the span can be characterized by four regions: (1) A tip region where vortex shedding occurs at a lower frequency than that prevalent far away from the tip. (2) An intermediate region adjacent to the first one where a frequency component of a nonshedding character is present. (3) A third region characterized by a gradually increasing shedding frequency with increasing distance from the tip. (4) A two dimensional region where the shedding frequency is constant. The propagating character of the frequency component present in region 2 was studied. Dissert. Abstr.

N82-13106*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FORCE AND MOMENT, FLOW-VISUALIZATION, AND BOUNDARY-LAYER TESTS ON A SHUTTLE ORBITER MODEL AT MACH 6
Robert L. Calloway Dec. 1981 25 p refs
(NASA-TP-1952; L-14782) Avail: NTIS HC A02/MF A01 CSCL 01A

Force and moment, flow visualization, and boundary layer state tests were conducted using two 0.004 scale shuttle orbiter models. The force and moment tests were conducted for an angle of attack range from 20 to 40 deg and for Reynolds numbers based on reference length from 0.4 million to 3.6 million. Schlieren photographs were obtained for each angle of attack and Reynolds number. The boundary layer state tests, which were conducted using hot film sensors mounted in a separate model, were conducted over the same range of conditions as the force tests. Test results were combined to show that changes in the boundary layer on a typical hypersonic force test model affect measurement of the axial force coefficient and that the state of the local boundary layer is important for interpreting hypersonic aerodynamic test results. S.L.

N82-13107*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF BLADE TIP GEOMETRY ON THE INTERACTION OF TORSIONAL LOADS AND PERFORMANCE FOR AN ARTICULATED HELICOPTER ROTOR
William T. Yeager and Wayne R. Mantay Dec. 1981 64 p refs Prepared in cooperation with Army Aviation Research and Development Command, Hampton, Va.
(DA Proj. 1L2-62209-AH-76)
(NASA-TP-1926; AVRADCOM-TR-81-B-5; L-14674) Avail: NTIS HC A04/MF A01 CSCL 01A

The Langley transonic dynamics tunnel was used to determine the degree of correlation between rotor performance and the dynamic twist generated by changes in blade tip geometry using an articulated rotor with four different tip geometries at advance ratios of 0.20, 0.30 and 0.35. Based on the data obtained, it is concluded that: (1) there appears to be no strong correlation between blade torsion loads and rotor performance prediction; (2) for a given rotor task at each advance ratio investigated, both the azimuthal variation of torsional moment and the mean torsional moment at 81% radius are configuration dependent; (3) reducing the nose down twist on the advancing blade appears to be more important to forward flight performance than increasing the nose down twist on the retreating blade; (4) the rotor inflow model used was important in predicting the performance of the adaptive rotor; and (5) neither rigid blade solidity effects, inflow environment, nor blade torsion loads can be used alone to accurately predict active rotor performance. A.R.H.

N82-13108*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

CROSSFLOW EFFECTS ON STEADY AND FLUCTUATING PRESSURES ON AN OGIVE-CYLINDER CONE-FRUSTUM MODEL IN SUPERSONIC SEPARATED FLOW

Jules B. Dods, Jr. (Raman Aeronautics Research and Engineering, Inc., Palo Alto, Calif.) and Charles F. Coe Nov. 1981 58 p refs
(Contract NAS2-10139)
(NASA-TP-1951; A-8563) Avail: NTIS HC A04/MF A01 CSCL 01A

Wind-tunnel tests were conducted on an ogive-cylinder model with two axisymmetric protuberances having cone frustum angles of cone = 23 deg and 45 deg that were used to generate detached shock waves and the resulting separated flow areas downstream of the shock. The tests were conducted in a 9 by 7 foot supersonic wind tunnel at a free-stream Mach number of 2.0 and at Reynolds numbers of 1.5 x 1 million and 3.9 x 1 million, based on body diameter. The model had an afterbody fineness ratio of 8.3, and the ogive nose had a fineness ratio of 3.0. Two characteristics of the fluctuating pressures in surface vortex flows that result from the crossflow component, (velocity along the tunnel longitudinal axis free stream angle of attack), in combination with changes in the longitudinal pressure gradient were measured: (1) the broadband, rms-pressure coefficients and (2) the power spectral densities. Measurements are presented for various flow regions on the model such as the attached turbulent boundary layer, the detached frustum shock wave, and separated flow areas. The results indicate that the pressure fluctuations around or in the neighborhood of the foci of the vortex flows had broadband intensities and power spectral densities nearly identical to the levels previously measured in separated-flow regions at angles of attack of 0 deg. R.J.F.

N82-13109# National Aerospace Lab., Tokyo (Japan).

AN AERODYNAMIC DESIGN AND THE OVERALL STAGE PERFORMANCE OF AN AIR-COOLED AXIAL-FLOW TURBINE

Atsumasa Yamamoto, Kitao Takahara, Hiroyuki Nouse, Shigeo Inoue, Hiroschi Usui, and Fugio Mimura Jan. 1981 44 p refs
(NAL-TR-321T) Avail: NTIS HC A03/MF A01

In order to investigate air-cooled turbines for application to high-temperature engines, a single stage turbine with a 0.56-m (22-inch) tip diameter was designed. The aerodynamical design procedures of the turbine are presented. The stator and rotor blades are characterized by low blade solidity, thick blade section, blunt leading edge and trailing edge, and low blade aspect ratio. A cold air test without supply of cooling air was conducted to determine the turbine aerodynamic performance. The highest efficiency obtained over the range of conditions investigated was 0.865. The turbine satisfied the equivalent design value of specific work output at the design condition (i.e., at equivalent design speed and equivalent design pressure ratio) with an efficiency of 0.856. Detailed surveys of rotor-outlet gas flow were made with Pitot tubes and temperature sensors and the results are also presented. T.M.

N82-13110*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

PRESSURE DISTRIBUTIONS ON THREE DIFFERENT CRUCIFORM AFT-TAIL CONTROL SURFACES OF A WINGLESS MISSILE AT MACH 1.60, 2.36, AND 3.70. VOLUME 1: TRAPEZOIDAL TAIL

Milton Lamb, Wallace C. Sawyer, Donald L. Wassum, and C. Donald Babb Aug. 1979 345 p
(NASA-TM-80097; L-12993-Vol-1) Avail: NTIS HC A15/MF A01 CSCL 01A

The results of pressure distribution tests conducted in a wind tunnel are presented without analysis. The data were obtained for trapezoidal aft tail control surfaces on a wingless missile model at Mach numbers of 1.60, 2.36, and 3.70 for angles of attack from -4 to 20 deg model roll angles from 0 to 90 deg and tail deflections of 0 and -15 deg. The test Reynolds number used was 6.6 million per meter. M.D.K.

N82-13111# Indian Inst. of Science, Bangalore. Dept. of Aeronautical Engineering.

FORCE MEASUREMENTS ON A REFLEX CAMBERED DELTA WING

V. S. Holla, M. D. Aravamudhan, and P. Jagadeesha Rao 23 Jul. 1981 35 p refs Backup document for AIAA synoptic scheduled for publication in Journal of Aircraft in Mar. 1982
(LOG-C4073) Avail: NTIS HC A03/MF A01

The effect of reflex spanwise camber on the lift, drag, lift to drag ratio and the pitching moment coefficients were studied on a reflex spanwise cambered slender delta wing with conical camber and a plane delta wing. At subsonic speeds, both with and without yaw, the cambered wing has less lift at a given incidence and higher lift to drag ratio at a given lift than the plane wing. At supersonic speeds, both lift at any incidence and lift to drag ratio at a given lift coefficient were less on the cambered wing than on the plane wing. Flow visualization studies at subsonic speeds show that the spanwise camber both delays and reduces the intensity and extent of the flow separation along the leading edges. At supersonic speeds, at the design Mach number and incidence, there is good agreement between results from theory and experiment. The center of pressure position of the cambered wing is ahead of that of plane wing at subsonic speeds while the reverse is true at supersonic speeds. A.R.H.

N82-13112*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THRUST MODULATION METHODS FOR A SUBSONIC V/STOL AIRCRAFT

Richard R. Woollett 1981 18 p refs Presented at V/STOL Conf., Palo Alto, Calif., 7-9 Dec. 1981; sponsored by AIAA and NASA Ames
(NASA-TM-82747; E-1063) Avail: NTIS HC A02/MF A01 CSCL 01A

Low speed wind tunnel tests were conducted to assess four methods for attaining thrust modulation for V/STOL aircraft. The four methods were: (1) fan speed change, (2) fan nozzle exit area change, (3) variable pitch rotor (VPR) fan, and (4) variable inlet guide vanes (VIGV). The interrelationships between inlet and thrust modulation system were also investigated using a double slotted inlet and thick lip inlet. Results can be summarized as: (1) the VPR and VIGV systems were the most promising, (2) changes in blade angle to obtain changes in fan thrust have significant implications for the inlet, and (3) both systems attained required level of thrust with acceptable levels of fan blade stress. M.D.K.

N82-13113*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

COMPUTATIONAL METHODS FOR INTERNAL FLOWS WITH EMPHASIS ON TURBOMACHINERY

William D. McNally and Peter M. Sockol 1981 79 p refs Presented at the Symp. on Computers in Flow Predictions and Fluid Dyn. Exp. at the ASME Winter Ann. Meeting, Washington, D.C., 15-20 Nov. 1981
(NASA-TM-82764; E-1085) Avail: NTIS HC A05/MF A01 CSCL 01A

Current computational methods for analyzing flows in turbomachinery and other related internal propulsion components are presented. The methods are divided into two classes. The inviscid methods deal specifically with turbomachinery applications. Viscous methods, deal with generalized duct flows as well as flows in turbomachinery passages. Inviscid methods are categorized into the potential, stream function, and Euler aproaches. Viscous methods are treated in terms of parabolic, partially parabolic, and elliptic procedures. Various grids used in association with these procedures are also discussed. Author

N82-13114*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THE EFFECT OF ROTOR BLADE THICKNESS AND SURFACE FINISH ON THE PERFORMANCE OF A SMALL AXIAL FLOW TURBINE

Richard J. Roelke and Jeffrey E. Haas 1982 13 p refs Proposed for presentation at the Gas Turbine Ann. Meeting, London, 18-22 Apr. 1982; sponsored by ASME Prepared in cooperation with Army Aviation Research and Development Command, Cleveland
(Contract DE-AI01-77CS-51040)
(NASA-TM-82726; DOE/NASA/51040-34; TR-81-C-29) Avail: NTIS HC A02/MF A01 CSCL 21E

An experimental investigation was conducted to determine the effect of blade profile inaccuracies and surface finish on the aerodynamic performance of a 11.13 cm tip diameter turbine. The as-received cast rotor blades had a significantly thicker profile than the design intent and a fairly rough surface finish. Stage test results showed an increase of one point in efficieny by smoothing the surface finish and another three points by thinning the blade profiles to near the design profile. Most of the performance gain between the as-cast thick and the thinned rotor blades both with the same surface finish, was attributed to reduced trailing edge losses of the recontoured blades.Author

N82-13115# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
A CALCULATION METHOD FOR SLENDER WING-BODY CONFIGURATIONS IN SUPERSONIC FLOW AT HIGH ANGLES OF ATTACK [EIN BERECHNUNGSVERFAHREN FUER SCHLANKE FLUEGEL-RUMPFANORDNUNGEN IM UEBERSCHALL BEI HOHEN ANSTELLWINKELN]
D. Nikolitsch Bonn Bundesministerium der Verteidigung 1979 58 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-79-15) Avail: NTIS HC A04/MF A01; DOKZENTBw, Bonn DM 30

An analysis which determines nonlinear force and pitching moment characteristics of slender bodies and slender wing-body configurations at high angles of attack in supersonic flow is presented. The linear coefficients of the body are calculated by means of a singularity distribution along the body axis. The nonlinear coefficients are determined by a method based on Wardlaw's multivortex model which is modified so that it is applicable at Mach > 1. The wing characteristics are calculated with the Huerlimann prediction method; this method is limited to slender, tapered wing planforms. The mutual interference of wing and body is accounted for by Nielsen interference factors. The range of application of the analysis is exemplified by sample calculations.
Author (ESA)

N82-13116# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Unternehmensbereich Flugzeuge.
FINAL REPORT ON THE FUEFO-4 MAJOR THEME: INTERFERENCE DRAG WITH AIRFRAME/ENGINE INTEGRATION ON FIGHTER AIRCRAFT Final Report [ABSCHLUSSBEREICHT ZUM RUEFO-4 RAHMENTHEMA 'INTERFERENZWIDERSTAND BEI DER ZELLEN-/TREIBWERKSINTEGRATION VON KAMPFFLUGZEUGEN']
H. L. Weinreich and R. Smyth (Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, West Germany) Bonn Bundesministerium der Verteidigung 1979 182 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-79-20) Avail: NTIS HC A09/MF A01; DOKZENTBw, Bonn DM 40

Theoretical and experimental (wind tunnel) studies of engine nozzle characteristics as well as of engine/airframe aerodynamic interaction are summarized. Results significant to fighter aircraft configuration optimization are identified. Wind tunnel experiment design is also critically assessed. Results emphasized concern: experimental data for parameters influencing afterbody drag; theoretical and construction concepts of variable 'CONDI' nozzles; theoretical methods for the correction of wind tunnel data; the synthesis of inlet drag; and investigations of jet decay structures.
Author (ESA)

N82-13117# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
CONTRIBUTIONS TO THE AERODYNAMICS OF WING-BODY CONFIGURATIONS IN THE NONLINEAR RANGE OF ANGLES OF ATTACK [ZUR AERODYNAMISCHEN BERECHNUNG VON FLUEGELRUMPF-KONFIGURATIONEN IM NICHT-LINEAR EN ANSTELLWINKEL-BEREICH]
D. Nikolitsch and P. Hennig Bonn Bundesministerium der Verteidigung 1980 72 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-80-11) Avail: NTIS HC A04/MF A01; DOKZENTBw, Bonn DM 30

The prediction of normal force and pitching moment of cruciform wing-body configurations at subsonic speed, high angles of attack, and arbitrary roll position by means of coefficient synthesis is discussed. The aerodynamic coefficients of the exposed wing are determined, using the vortex lattice technique, assuming that the free vortices leave the wing panels inclined by half the angle of attack. The three dimensional base flow of wing-body configurations at subsonic speed was investigated theoretically. The dividing stream surface is assumed to be closed and axisymmetric and is simulated by source-sink distributions. The influence of the base flow on body and wing is verified for different wing positions, Mach numbers and angles of attack.
Author (ESA)

N82-13118# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATION OF THE VORTEX FIELD GENERATED BY AN AIRFOIL MODEL IN A WIND TUNNEL, USING ULTRASONIC PULSES
Rolf H. Engler and Dieter W. Schmidt 1979 155 p refs In GERMAN; ENGLISH summary
(MPIS-MITT-69; ISSN-0374-1257) Avail: NTIS HC A08/MF A01

The development of the tip vortex generated by a rectangular wing of aspect ratio five in the region closely behind the wing was investigated by means of ultrasonic pulses in a 3m x 3m wind tunnel. This technique does not perturb the flow field and is based on the time-of-flight variations of the ultrasonic pulses due to acceleration or deceleration by tail or head winds. Vortex position, core diameter, circumferential velocity, and circulation were measured as a function of angle of attack and of main flow velocity up to 40 m/sec at Reynolds numbers up to 400,000. The data evaluation is aided by a theoretical model based on a Hamel-Oseen vortex. The influence of spoiler configurations on the tip vortex and the near flow field upstream of the wing were also investigated.
Author (ESA)

N82-13119# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Abteilung Instationaere Aerodynamik.
AN ANALYTICAL AND EXPERIMENTAL STUDY OF THE STEADY AND UNSTEADY AIRLOADS ON A WING WITH OSCILLATING CONTROL INCLUDING A STREAMLINED GAP
Wolfgang Geissler Feb. 1981 52 p refs
(DFVLR-FB-81-18) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 13,50

A wing section with oscillation control was studied in a 3m low speed wind tunnel. In order to simulate a realistic configuration, the gap between wing and control surface was streamlined. A modified analytical surface singularity method, taking into account the exact boundary conditions and Bernoulli equation, was developed. With this method the problem is handled as an inteference problem between two lifting bodies with two Kutta conditions. Local lift distributions obtained from both experiment and theory are compared for a variety of parameters, such as aspect ratio, section incidence, steady flap deflection, oscillation frequency, wake location, and open/closed slot. Outside the gap the correspondence between the exact potential theory and the experimental data is excellent. Deviations within the gap region are attributed to viscous effects.
Author (ESA)

N82-13120 Purdue Univ., Lafayette, Ind.
AN EXPERIMENTAL STUDY OF TOLLMIEN-SCHLICHTING WAVE CANCELLATION Ph.D. Thesis
Robert Weldon Milling 1981 106 p
Avail: Univ. Microfilms Order No. 8123681

A method is proposed which would maintain laminar flow by cancelling boundary layer disturbance waves in the initial stages of growth by interference with artificially created waves of the proper amplitude and phase. An experiment was conducted to determine if the simplest possible disturbance, a Tollmien-Schlichting wave, could be cancelled by interference with an artificially generated disturbance. A flat plate with essentially zero pressure gradient in a low turbulence water channel was used. The disturbance wave and the cancellation wave were introduced artificially by electromagnetically driven wave generators located 59.5 inches and 83.5 inches, respectively, from the leading edge of the flat plate. The nominal flow velocity was

0.5 to 0.6 feet per second. Two dimensional flow was maintained over a region 3 inches to each side of the centerline of the flat plate which was 14 feet long. Cancellation of as high as 90% was shown to be possible, although, generally, absolute amplitudes of the perturbation velocity much below 0.1% of the freestream velocity were seldom obtained. Dissert. Abstr.

N82-13121 Stanford Univ., Calif.
AERODYNAMICS OF AN AIRFOIL WITH A JET ISSUING FROM ITS SURFACE Ph.D. Thesis
Domingo Armando Tavella 1981 94 p
Avail: Univ. Microfilms Order No. 8124165

A simple, two dimensional, incompressible and inviscid model for the problem posed by a two dimensional wing with a jet issuing from its lower surface is considered and a parametric analysis is carried out to observe how the aerodynamic characteristics depend on the different parameters. The mathematical problem constitutes a boundary value problem where the position of part of the boundary is not known a priori. A nonlinear optimization approach is used to solve the problem, and the analysis reveals interesting characteristics that may help to better understand the physics involved in more complex situations in connection with high-lift systems. Dissert. Abstr.

N82-13122 Stanford Univ., Calif.
UNSTEADY AEROELASTIC MODELING AND TRAILING-EDGE FLAP CONTROL OF AN EXPERIMENTAL WING IN A TWO DIMENSIONAL WIND TUNNEL Ph.D. Thesis
Paul Murray Stoltz 1981 232 p
Avail: Univ. Microfilms Order No. 8124159

Theoretical and experimental investigations into unsteady aeroelastic modeling and trailing edge flap control are presented for a wing flap system mounted in a two dimensional wind tunnel. The unsteady pressure distribution over the wing and flap is estimated from linearized potential theory, where the airflow is assumed incompressible and inviscid. An analytical model is developed which includes the wing flap structural states plus one additional state to represent the unsteady aerodynamics. A root focus of the analytical aeroelastic eigenvalues versus dynamic pressure is presented and compared with experimental behavior for dynamic pressures in the range zero to twice the flutter value. A control law is developed to stabilize the wing flap system at a dynamic pressure equal to twice the open loop flutter value. A regulator is developed which incorporates full state feedback and estimation. Theoretically predicted and experimentally measured closed loop aeroelastic eigenvalues are compared for dyamic pressures in the range zero to twice the open loop flutter value. Dissert. Abstr.

N82-13066# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
PERFORMANCE OF HIGHLY INTEGRATED INLETS FOR SUPERSONIC AIRCRAFT
Lewis Surber, Jan Syberg, and Joseph Koncsek *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs Prepared in cooperation with Boeing Military Airplane Co., Seattle (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13067*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
TOP-MOUNTED INLET SYSTEM FEASIBILITY FOR TRANSONIC-SUBSONIC FIGHTER AIRCRAFT APPLICATIONS
T. L. Williams, B. L. Hunt, D. B. Smeltzer, and W. P. Nelms *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p refs Prepared in cooperation with Northrop Corp., Hawthorne, Calif. (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01 CSCL 01A

N82-13068# Royal Aircraft Establishment, Bedford (England). Aerodynamics Dept.
SOME RAE RESEARCH ON SHIELDED AND UNSHIELDED FUSELAGE MOUNTED AIR INTAKES AT SUBSONIC AND SUPERSONIC SPEEDS
J. A. Ross, I. McGregor, and A. J. Priest *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 16 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13069# National Gas Turbine Establishment, Pyestock (England).
PREDICTION AND MEASUREMENT OF TIME-VARIANT, THREE-DIMENSIONAL FLOWS IN MILITARY AIRCRAFT INTAKES
D. E. Colbourne and J. E. Flitcroft *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 18 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13070# British Aerospace Aircraft Group, Bristol (England).
EFFECTS OF INTAKE GEOMETRY ON CIRCULAR PITOT INTAKE PERFORMANCE AT ZERO AND LOW FORWARD SPEEDS
A. C. Willmer, T. W. Brown, and E. L. Goldsmith (RAE, Bedford, England) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 16 p refs Sponsored in part by Ministry of Defence (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13071# Institut de Mecanique des Fluides de Lille (France).
TRANSONIC FLOWS IN AN AIR INLET WITH LARGE INCIDENCE AND THE EFFECT OF A BLOWING TRAP [ECOULEMENTS TRANSSONIQUES DANS UNE PRISE D'AIR EN GRANDE INCIDENCE AT EFFET DE TRAPPE DE SOUFFLAGE]
A. Dyment, P. Gryson, and J. P. Flodrops *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 13 p ref In FRENCH (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13072# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Theoretical Aerodynamics Dept.
CALCULATION OF TRANSONIC AIR-INTAKES USING A COMPUTER PACKAGE FOR INVISCID AND BOUNDARY LAYER FLOWS
Ciro W. Lucchi *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 4 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13073# Aeritalia S.p.A., Torino (Italy). Combat Aircraft Group.
SUBSONIC MILITARY AIRCRAFT ENGINE INTAKE: AN INTEGRATED THEORETICAL EXPERIMENT DESIGN
G. Bertolone and L. Fornasier *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13080# Aircraft Research Association Ltd., Bedford (England).
A REVIEW OF THE EFFECT OF REYNOLDS NUMBER ON AFTERBODY DRAG
O. M. Pozniak *In* AGARD Aerodyn. of Power Plant Installation Sep. 1980 21 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13083# Volvo Flygmotor A.B., Trollhaettan (Sweden). Aerodynamics Dept.
A SYNTHESIS METHOD FOR ESTIMATING MAXIMUM INSTANTANEOUS INLET DISTORTION BASED ON MEASURED INLET STEADY STATE AND RMS PRESSURES
Ronald Borg *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13084# Fluidyne Engineering Corp., Minneapolis, Minn.
MODEL TESTING TECHNIQUES FOR MEASURING INLET DRAG
James S. Holdhusen and James L. Grunnet *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 8 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13086# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).
THE ROLE AND IMPLEMENTATION OF DIFFERENT NACELLE/ENGINE SIMULATION CONCEPTS FOR WIND-TUNNEL TESTING IN RESEARCH AND DEVELOPMENT WORK ON TRANSPORT AIRCRAFT
B. Ewald and R. Smyth *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 35 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13088# Aircraft Research Association Ltd., Bedford (England).
WIND TUNNEL TEST AND ANALYSIS TECHNIQUES USING POWERED SIMULATORS FOR CIVIL NACELLE INSTALLATION DRAG ASSESSMENT
A. E. Harris and E. C. Carter *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 16 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13089# Rolls-Royce Ltd., Derby (England).
ESTABLISHMENT OF AN EXPERIMENTAL TECHNIQUE TO PROVIDE ACCURATE MEASUREMENT OF THE INSTALLED DRAG OF CLOSE COUPLED CIVIL NACELLE/AIRFRAME CONFIGURATIONS, USING A FULL SPAN MODEL WITH TURBINE POWERED ENGINE SIMULATORS
G. Pugh and A. E. Harris (Aircraft Research Association Ltd., Bedford, England) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 9 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13090# National Aerospace Lab., Amsterdam (Netherlands).
EVALUATION OF AN EXPERIMENTAL TECHNIQUE TO INVESTIGATE THE EFFECTS OF THE ENGINE POSITION ON ENGINE/PYLON/WING INTERFERENCE
J. A. J. vanEngelen, B. Munniksma, and A. Elsenaar *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 13 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13091# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
STUDIES OF AIR INLETS AT REYNOLDS NUMBERS COMPARABLE TO FLIGHT IN ONERA'S F1 AND S1MA WIND TUNNELS [ESSAIS DE PRISES D'AIR A DES NOMBRES DE REYNOLDS COMPARABLES AU VOL DANS LES SOUFFLERIES F1 ET S1MA DE L'ONERA]
J. Leynaert *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs In FRENCH (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13093# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Aerodynamics Dept.
AERODYNAMIC ASPECTS OF A HIGH BYPASS RATIO ENGINE INSTALLATION ON A FUSELAGE AFTERBODY
N. Voogt, J. vanHengst, and J. Th. v.d.Kolk (NRL) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 10 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13094# Societe Nationale Industrielle Aerospatiale, Toulouse (France). Service Aerodynamique Theorique.
A NUMERICAL METHOD FOR STUDYING NACELLE-JET-AIRFOIL INTERACTION IN INVISCID THREE-DIMENSIONAL FLOW [UNE METHODE NUMERIQUE POUR L'ETUDE DE L'INTERACTION NACELLE-JET-VOILURE EN ECOULEMENT TRIDIMENSIONEL NON VISQUEUX]
G. LeGall, J. Bousquet, and M. Yermia *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 13 p refs In FRENCH (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13095# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).
CALCULATION OF WING-BODY-NACELLE INTERFERENCE IN SUBSONIC AND TRANSONIC POTENTIAL FLOW
K. D. Klevenhusen, H. Jakob, and H. Struck *In* AGARD Aerodyn. in Power Plant Installation Sep. 1981 8 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13096*# Boeing Military Airplane Development, Seattle, Wash.
PREDICTION OF SUBSONIC AIRCRAFT FLOWS WITH JET EXHAUST INTERACTIONS
D. W. Roberts *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs (For primary document see N82-13065 04-01)
(Contract NAS2-10100)
Avail: NTIS HC A22/MF A01 CSCL 02A

N82-13098*# Boeing Commercial Airplane Co., Seattle, Wash. New Product Development Dept.
AIRFRAME-PROPULSION SYSTEM AERODYNAMIC INTERFERENCE PREDICTIONS AT HIGH TRANSONIC MACH NUMBERS INCLUDING OFF-DESIGN ENGINE AIRFLOW EFFECTS
R. M. Kulfan and A. Sigalla *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 23 p refs (For primary document see N82-13065 04-01)
(Contract NAS1-14623)
Avail: NTIS HC A22/MF A01 CSCL 02A

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N82-13123*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
GUIDELINES FOR LINE-ORIENTED FLIGHT TRAINING, VOLUME 2
John K. Lauber and H. Clayton Foushee 1981 156 p refs Proceedings of conf. held at NASA Ames Research Center, Calif., 13-15 Jan. 1981
(NASA-CP-2184-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 05I

Current approaches to line-oriented flight training used by six American airlines are described. This recurrent training methodology makes use of a full-crew and full-mission simulation to teach and assess resource management skills, but does not necessarily fulfill requirements for the training and manipulation of all skills. For individual titles, see N82-13124 through N82-13134.

N82-13124*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ISSUES RELATED TO LINE-ORIENTED FLIGHT TRAINING
John K. Lauber *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 14-25 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

The use of a training simulator along with carefully structured, detailed, line trip scenarios was envisioned by NASA as a means of providing a controllable, repeatable way to observe line crews in a highly realistic simulation of their working environment and obtain better understanding operationally significant human factors problems and issues. Relevant research done by the agency and the results of full-mission simulation scenarios revealed potential implications for flight training. Aspects to be considered in creating training programs closely related to the actual line environment with a total crew application in real world incident experiences include: (1) operational, environmental, equipment, and crew problems in scenario design; (2) real time line oriented flight training operation; (3) performance assessment and debriefing; (4) instructor qualification and training; and (5) other issues such as ub un initial, transition, and upgrade training; procedures development and evaluation, and equipment evaluation. A.R.H.

N82-13125*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
LINE-ORIENTED FLIGHT TRAINING: NORTHWEST AIRLINES
H. T. Nunn *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 26-42 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

An exemption from certain FAA regulations which stereotype simulator flight training was obtained and pilots with current line experience were used to prepare and develop scenarios for a program in which each crew member would be trained to recognize and properly use all available resouces. The development of the scenarios for training to proficiency and pilot reaction to the training sessions are discussed. A.R.H.

N82-13126*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
UNITED AIRLINES LOFT TRAINING
Dale Cavanagh and Bill Traub *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 43-55 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

Line oriented training is used in a broader, more generic sense that as a specific program under FAR 12.1409 and AC 120-35. A company policy was adopted more thany twenty years ago requiring that all pilot checks and recurrent training be conducted with a full crew occupying the seats they occupy on the line. Permission was obtained to reschedule the hours for recurrent proficiency training to include one and one-half hours of LOFT flight. The number of emergencies and abnormal procedures which could be undertaken were considered and the introduction of an a occasional incapacitation revealed which person is the most difficult to replace on the widebodies. By using the LOFT concept, every training period can be structured like a typical line flight. The use of LOFT in simulator syllabus development and problems that need to be refined are discussed. A.R.H.

N82-13127*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
EASTERN AIRLINES LOFT PROGRAM
Berton E. Beach *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 56-70 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

Beginning with scenario design and development issues, Eastern Airlines committed itself to the full four-hour LOFT training format without the additional time for specific maneuvers. Abnormals and emergency conditions, pacing, and quiet periods are included in the scenarios which are written for the instructor to follow verbatim. Simulator capabilities, performance assessment; training vs. checking; crew composition and scheduling; satisfactory completion; the use of video performance printouts; the number of instructors; instructor training and standardization; and initial, transition, and upgrade training are discussed. A.R.H.

N82-13128*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
TEXAS INTERNATIONAL AIRLINES LOFT PROGRAM
Jack Sommerville *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 71-78 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

A line-oriented flight training program which allows the crew to work as a team to solve all problems, abnormal or emergency, within the crew concept. A line-oriented check ride takes place every six months for the pilot as a proficiency check. There are advantages and disadvantages to this program. One disadvantage is that since it is designed as a check-ride, the scenarios must be structured so that the average pilot will complete the check-ride without complication. This system is different from a proficiency check which can be stopped at a problem area so training to proficiency can take place before proceeding with the check. A.R.H.

N82-13129*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
DELTA AIRLINES LOFT TRAINING
Jay Whitehead *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 79-91 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

A LOFT program was developed as part of the DC-9 training program which serves as a prototype for much of Delta's other aircraft training programs. The LOFT used differs little from the ideology presented in the Advisory Circular. Difficulty and experienced concerns regarding the effectiveness of LOFT as a complete training vehicle are explored. A.R.H.

N82-13130*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AMERICAN AIRLINES LOFT EVALUATION PROGRAM
Don Jensen *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 92-102 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

The development of a test program to evaluate recurrent training LOFT and a three-legged scenario used for the evaluation are highlighted. The test guidelines set up and the questionnaires sent to crew member participants are examined. A.R.H.

N82-13131*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
GROUP 1: SCENARIO DESIGN AND DEVELOPMENT ISSUES
Peter Sherwin *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 113-117 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

All LOFT scenarios and flight segments should be designed on the basis of a detailed statement of specific objectives. These objectives must state what kind of situation is to be addressed and why. The origin, routing, and destination of a particular scenario should be dictated by the specific objectives for that scenario or leg. Other factors to be considered are the desired weather, climate, etc. Simulator visual system, as well as other capabilities and limitations must be considered at a very early stage of scenario design. The simulator navigation area must be apropriate and must coincide with current Jeppeson charts. Much of the realism of LOFT is destroyed if the crew is unable to use current manuals and other materials. A.R.H.

N82-13132*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
GROUP 2: REAL TIME LOFT OPERATIONS
Dale Cavanagh *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 118-126 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

All LOFT scenarios should be constructed so as to provide the highest degree of realism that is economically, technically, and operationally feasible. The more realistic the situation, the faster the crew will adjust their thinking and provide reactions which would be typical of a line-flight orientation. The goal is to produce crew performance which would be typical of a crew on an actual line flight, given the same set of circumstances that were developed during the scenario. The briefing which is provided to the crew before entering the simulator for LOFT, the trip papers, the communications throughout the flight, the role played by the instructor, and so on, are important factors, crucial to the establishment and maintenance of a high degree of realism. Crews should have all manuals and other required equipment for a normal line-flight. A.R.H.

N82-13133*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
GROUP 3: PERFORMANCE EVALUATION AND ASSESSMENT
Al Frink *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 122-126 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

Line-oriented flight training provides a unique learning experience and an opportunity to look at aspects of performance other types of training did not provide. Areas such as crew coordination, resource management, leadership, and so forth, can be readily evaluated in such a format. While individual performance is of the utmost importance, crew performance deserves equal emphasis, therefore, these areas should be carefully observed by the instructors as an res for discussion in the same way that individual performane is observed. To be effective, it must be accepted by the crew members, and administered by the instructors as pure training-learning through experience. To keep open minds, to benefit most from the experience, both in the doing and in the follow-on discussion, it is essential that it be entered into with a feeling of freedom, openness, and enthusiasm. Reserve or defensiveness because of concern for failure must be inhibit participation. A.R.H.

N82-13134*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
GROUP 4: INSTRUCTOR TRAINING AND QUALIFICATIONS
Ron Sessa *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 127-135 (For primary document see N82-13123 04-03)
Avail: NTIS HC A08/MF A01 CSCL 05I

Each professional instructor or check airman used in LOFT training course should complete an FAA approved training course in the appropriate aircraft type. Instructors used in such courses need not be type-rated. If an instructor or check airman who is presently not line-qualified is used as a LOFT instructor, he or she should remain current in line-operational procedures by observing operating procedures from the jump seat on three typical line segments pr 90 days on the appropriate aircraft type. ('Line qualification' means completion as a flight crew member of at least three typical line segments per 90 days on the appropriate aircraft type.) The training should include the requirement of four hours of LOFT training, in lieu of actual aircraft training or line operating experience. A.R.H.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

No abstracts in this category.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-13135# SCI Systems, Inc., Huntsville, Ala.
TECHNIQUES FOR INTERFACING MULTIPLEX SYSTEMS Final Report, 10 Sep. 1979 - 10 May 1980
James P. Gross Feb. 1981 138 p
(Contract F33615-79-C-1878; AF Proj. 2003)
(AD-A101457; AFWAL-TR-80-1223) Avail: NTIS HC A07/MF A01 CSCL 17/2

Data describing the characteristics of a number of aircraft multiplex systems were collected and compiled. Although Air Force aircraft received priority, were consideration was also given to other military and commercial aircraft. The F-16, B-52 OAS, YAH-64, F-18, F-15 and ARINC 575 systems were included. MIL-STD-1553B was used as a baseline for comparison. The compiled data was analyzed to determine points of incompatibility between these systems and a feasibility study was performed to assess possible techniques to be used in achieving bus compatibility. A programmable interface module design philosophy is recommended which utilizes a distributed three-microprocessor arrangement to achieve the desired interface compatibility. The three-processor conept allows three independent software-controlled events to occur simultaneously, thus providing an extremely high degree of flexibility both for existing systems and for future growth. Author

N82-13136# Institute for Defense Analyses, Arlington, Va. Program Analysis Div.
HELICOPTER RELIABILITY AND MAINTAINABILITY TRENDS DURING DEVELOPMENT AND PRODUCTION Final Report
Norman J. Asher, Lee L. Douglas, and Ray H. Jakobovits Jul. 1981 279 p refs Revised
(Contract MDA903-79-C-0320)
(AD-A105775; AD-E500409; IDA/HQ-81-23636) Avail: NTIS HC A13/MF A01 CSCL 01/3

This study updates and extends IDA Study S-451, 'Changes in Helicopter Reliability/Maintainability Characteristics Over Time,' dated March 1975. This study presents more recent data and, based on the combined data of both studies, summarizes the observed helicopter R&M trends. Trends observed during the development phase are compared with those of the production phase. GRA

N82-13137# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Unternehmensbereich Drehfluegler und Verkehr.
SYSTEM IDENTIFICATION HELICOPTER PARAMETERS. DETERMINATION FROM FLIGHT TESTS, PHASE 2 [SYSTEMIDENTIFIZIERUNG DREHFLUEGLER KENNWERTERMITTLUNG AUS FLUGMESSUNGEN (PHASE 2)]
M. Kloster and S. Attlfellner Bonn Bundesministerium der Verteidigung 1980 92 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-80-12) Avail: NTIS HC A05/MF A01; DOKZENTw, Bonn DM 30

A parameter identification program for a hingeless rotor helicopter is considered. Flight conditions were selected with increasing instability, i.e., hover and level flight at maximum speed; with maximum weight and with a rearward center of gravity. A strap down system was chosen to provide the attitude feedback control necessary for proper identification. The control input signals were optimized for the unstabilized helicopter. Calculations in the time and frequency domains show that special distributions in the power spectrum of the input signals are needed for optimizing the closed loop system. The identified derivatives and the smoothened time histories from flight tests are compared with the identification results of linear and nonlinear simulations and of the quasistatic theory. Author (ESA)

N82-13138# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).
MANEUVER LOAD CONTROL FOR THE REDUCTION OF DESIGN LOADS AND IMPROVEMENT OF THE MANEUVERABILITY OF MODERN FIGHTER AIRCRAFT
Horst Balke Bonn Bundesministerium der Verteidigung 1981 283 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-81-2) Avail: NTIS HC A13/MF A01; DOKZENTBw, Bonn DM 50

Active control technology is applied and the feasibility of design load reduction is analyzed. The influence of direct force control on aircraft component loads and on aircraft maneuverability is seen. The deflection of secondary control surfaces in proportion with the commanded control surface was investigated in an open loop control system. Load reduction efficiency diagrams and tables are presented. A comparison of two different aircraft shows that with an open loop control system a considerable reduction in design load is possible. The loads acting on several aircraft components for different open loop control systems are compared. Several closed loop control systems with aircraft response feedback parameters were also investigated. The results are again presented as diagrams, and tables. Only in some cases does closed loop control achieve better results than open loop control. The best design load reduction is achieved with a combined open and closed loop control system. The investigation results are comprehensively evaluated and the parameters relevant for design load reduction are summarized. Author (ESA)

N82-13139 Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RAVEN AIRCRAFT FILTER-ABSORBER
Jerzy Chojnacki 26 Nov. 1980 5 p Transl. into ENGLISH from Skrzydlata Polska (Poland), Vol. 1, no. 51-52, 1979 p 7
(AD-A098962; FTD-ID(RS)T-2017-80) HC A02/MF A01 CSCL 06/11

A filter-absorber in the shape of a rectangular box and weighing 9.5 kg is mounted outside the cockpit of an agricultural aircraft. Toxic compounds given off during crop spraying are trapped by internal filters. The first, or forward filter has Anilana fibers. The second, or actual purification filter, is made from fiberglass which absorbs the finest airborne contaminants. The pesticide filter-absorber device is quaranteed for 100 hours of operation and was designed for use in Africa. A.R.H.

N82-13057# Smiths Industries Ltd., Bishops Cleeve (England). Aerospace and Defence Systems.
COMMAND-RESPONSE DATA TRANSMISION TO MECHANICAL SYSTEMS MANAGEMENT EFFECT ON THE CREW/SYSTEM INTERFACE
I. Moir (British Aerospace Aircraft Group), C. Moxey and P.A. Lancaster (British Aerospace Aircraft Group) In AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 12 p (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13064# McDonnell Aircraft Co., St. Louis, Mo.
F/A 18 HORNET CREW STATION
Eugene C. Adam *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 6 p (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13074# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Unternehmensbereich Flugzeuge.
THE DESIGN AND DEVELOPMENT OF THE TORNADO ENGINE AIR INTAKE
C. P. Stocks (British Aerospace, Warton, England) and N. C. Bissinger *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 21 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13092# British Aerospace Aircraft Group, Hertfordshire (England). Research Dept.
THE INFLUENCE OF CLOSED-COUPLED, REAR FUSELAGE MOUNTED NACELLES ON THE DESIGN OF AN ADVANCED HIGH SPEED WING
R. D. Laugher *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13097# Douglas Aircraft Co., Inc., Long Beach, Calif.
PROP-FAN INTEGRATION AT CRUISE SPEEDS
H. Robert Welge *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 14 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N82-13140*# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
PRACTICAL ASPECTS OF INSTRUMENTATION SYSTEM INSTALLATION, VOLUME 13
R. W. Borek, A. Pool, ed., and K. C. Sanderson, ed. Sep. 1981 197 p refs
(NASA-TM-84067; AGARD-AG-160-Vol-13;
ISBN-92-835-1399-1) Avail: NTIS HC A09/MF A01 CSCL 01D

A review of factors influencing installation of aircraft flight test instrumentation is presented. Requirements, including such factors as environment, reliability, maintainability, and system safety are discussed. The assessment of the mission profile is followed by an overview of electrical and mechanical installation factors with emphasis on shock/vibraion isolation systems and standardization of the electric wiring installation, two factors often overlooked by instrumentation engineers. A discussion of installation hardware reviews the performance capabilities of wiring, connectors, fuses and circuit breakers, and a guide to proper selections is provided. The discussion of the installation is primarily concerned with the electrical wire routing, shield terminations and grounding. Also inclued are some examples of installation mistakes that could affect system accuracy. System verification procedures and special considerations such as sneak circuits, pyrotechnics, aircraft antenna patterns, and lightning strikes are discussed. M.D.K.

N82-13141# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.
ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM TEST AND DEMONSTRATION REPORT Interim Report, Jan. - Jun. 1981
Jun. 1981 52 p
(Contract DAAK80-79-C-0270)
(AD-A105317; ACS-12388; AVRADCOM-TR-79-0270-5; IR-5)
Avail: NTIS HC A04/MF A01 CSCL 01/4

The hardware and software of the electronic master monitor and advisory display system are tested. The results are documented and the feasibility of the system is demonstrated. Author

N82-13049# Textron Bell Helicopter, Fort Worth, Tex. Human Factors and Cockpit Arrangement Group.
HOW THE HELICOPTER COCKPIT DESIGNER USES DIGITAL AVIONICS
John H. Emery *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 13 p ref (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13050# Smiths Industries Ltd., Bishops Cleeve (England). Aerospace and Defense Systems.
ELECTRONIC FLIGHT DECK DISPLAYS FOR MILITARY TRANSPORT AIRCRAFT
R. A. Chorley *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 12 p refs (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13051# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Directorate of Avionics Engineering.
COLOR CRT DISPLAYS FOR THE COCKPIT
Harry L. Waruszewski *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 22 p refs (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13052# Thomson-CSF, Paris (France).
HEAD UP DISPLAYS
Claude Maureau *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 7 p (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13054# Collins Radio Co., Cedar Rapids, Iowa. Government Avionics Div.
A STANDARD CONTROL DISPLAY UNIT FOR MULTI-AIRCRAFT APPLICATION
Ronald L. Swanson and Craig R. Scougton *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 10 p (For primary document see

N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13056# Crouzet Aerospace and Systems, Valence (France).
USING VOICE CONTROL ONBOARD COMBAT AIRCRAFT [UTILISATION DE LA COMMANDE VOCALE A BORD DES AERONEFS DE COMBAT]
J. R. Coster and J. M. Melocco *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpits Design Aug. 1981 5 p In FRENCH (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13059# Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris (France).
MONOCULAR VISION AND TACTICAL FLIGHT ON THE HELICOPTER [VISION MONOCULAIRE ET VOL TACTIQUE SUR HELICOPTERE]
J. P. Papin, J. P. Menu, and G. Santucci *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 14 p refs In FRENCH (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13060# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.
EXPERIMENTAL INVESTIGATION OF A HELMET MOUNTED SIGHT/DISPLAY FOR HELICOPTER
R. Beyer, E. Danneberg, E. Kohnen, and H. Stein *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 11 p (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13061# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.
USE OF A HELMET-MOUNTED MATRIX DISPLAY FOR PRESENTING ENERGY-MANEUVERABILITY INFORMATION DURING SIMULATED CLOSE COMBAT
D. N. Jarrett *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 10 p refs (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13063# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
TANKER AVIONICS AND AIRCREW COMPLEMENT EVALUATION
Richard W. Moss and Gregory J. Barbato (Bunker-Ramo Corp., Dayton, Ohio) *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 18 p refs (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-13142*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NUMERICAL ANALYSIS OF THE SCRAMJET-INLET FLOW FIELD BY USING TWO-DIMENSIONAL NAVIER-STOKES EQUATIONS
Ajay Kumar Dec. 1981 30 p refs
(NASA-TP-1940; L-14776) Avail: NTIS HC A03/MF A01 CSCL 21E

A computer code was developed to solve the full two dimensional Navier-Stokes equations in a supersonic combustion ramjet (scramjet) inlet. In order to be able to consider a general inlet geometry with embedded bodies, a numerical coordinate transformation is used which generates a set of boundary-fitted curvilinear coordinates. The explicit finite difference algorithm of MacCormack is used to solve the governing equations. An algebraic, two-layer eddy-viscosity model is used for the turbulent flow. The code can analyze both inviscid and viscous flows with no strut, one strut, or multiple struts in the flow field. The application of the two dimensional analysis in the preliminary parametric design studies of a scramjet inlet is discussed. Detailed results are presented for one model problem and for several actual scramjet-inlet configurations. R.J.F.

N82-13143*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF FUEL-AIR-RATIO NONUNIFORMITY ON EMISSIONS OF NITROGEN OXIDES
Valerie J. Lyons Nov. 1981 14 p refs
(NASA-TP-1798; E-648) Avail: NTIS HC A02/MF A01 CSCL 21E

The inlet fuel-air ratio nonuniformity is studied to deterine how nitrogen oxide (NOx) emissions are affected. An increase in NOx emissions with increased fuel-air ratio nonuniformity for average equivalence ratios less than 0.7 and a decrease in NOx emissions for average equivalence ratios near stoichiometric is predicted. The degree of uniformityy of-fuel-air ratio profiles that is necessary to achieve NOx emissions goals for actual engines that use lean, premixed, prevaporized combustion systems is determined. S.L.

N82-13144*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A REAL TIME PEGASUS PROPULSION SYSTEM MODEL FOR VSTOL PILOTED SIMULATION EVALUATION
James R. Mihaloew, Stephen P. Roth (Pratt and Whitney Aircraft Group, West Palm Beach, Fla.), and Robert Creekmore (Pratt and Whitney Aircraft Group, West Palm Beach, Fla.) 1981 18 p refs Presented at VSTOL Conf., Palo Alto, Calif., 7-9 Dec. 1981; sponsored by AIAA and NASA Ames Research Center
(NASA-TM-82770; E-1004; AIAA-81-2663) Avail: NTIS HC A02/MF A01 CSCL 21E

A real time propulsion system modeling technique suitable for use in man-in-the-loop simulator studies was developed. This technique provides the system accuracy, stability, and transient response required for integrated aircraft and propulsion control system studies. A Pegasus-Harrier propulsion system was selected as a baseline for developing mathematical modeling and simulation techniques for VSTOL. Initially, static and dynamic propulsion system characteristics were modeled in detail to form a nonlinear aerothermodynamic digital computer simulation of a Pegasus engine. From this high fidelity simulation, a real time propulsion model was formulated by applying a piece-wise linear state variable methodology. A hydromechanical and water injection control system was also simulated. The real time dynamic model includes the detail and flexibility required for the evaluation of critical control parameters and propulsion component limits over a limited flight envelope. The model was programmed for interfacing with a Harrier aircraft simulation. Typical propulsion system simulation results are presented. M.D.K.

N82-13145*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
SENSOR FAILURE DETECTION SYSTEM Final Report
E. C. Beattie, R. F. LaPrad, M. E. McGlone, S. M. Rock, and M. M. Akhter Aug. 1981 172 p refs Prepared in cooperation with Systems Control, Inc., Palo Alto, Calif.
(Contract NAS3-22481)
(NASA-CR-165515; PWA-5736-17) Avail: NTIS HC A08/MF A01 CSCL 21E

Advanced concepts for detecting, isolating, and accommodating sensor failures were studied to determine their applicability to the gas turbine control problem. Five concepts were formulated based upon such techniques as Kalman filters and a screening process led to the selection of one advanced concept for further evaluation. The selected advanced concept uses a Kalman filter to generate residuals, a weighted sum square residuals technique to detect soft failures, likelihood ratio testing of a bank of Kalman filters for isolation, and reconfiguring of the normal mode Kalman filter by eliminating the failed input to accommodate the failure. The advanced concept was compared to a baseline parameter synthesis technique. The advanced concept was shown to be a viable concept for detecting, isolating, and accommodating sensor failures for the gas turbine applications. M.G.

N82-13146*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NASA RESEARCH IN AIRCRAFT PROPULSION
Milton A. Beheim 1982 17 p Proposed for presentation at the 27th Ann. Intern. Gas Turbine Conf., London, 18-22 Apr. 1982; sponsored by ASME
(NASA-TM-82771; E-1096) Avail: NTIS HC A02/MF A01 CSCL 21E

A broad overview of the scope of research presently being supported by NASA in aircraft propulsion is presented with emphasis on Lewis Research Center activities related to civil air transports, CTOL and V/STOL systems. Aircraft systems work is performed to identify the requirements for the propulsion system that enhance the mission capabilities of the aircraft. This important source of innovation and creativity drives the direction of propulsion research. In a companion effort, component research of a generic nature is performed to provide a better basis for design and provides an evolutionary process for technological growth that increases the capabilities of all types of aircraft. Both are important. A.R.H.

N82-13055# British Aerospace Aircraft Group, Preston (England). Military Aircraft Div.
DEVELOPMENT OF A MINIATURISED DIGITAL THRUST DEMAND UNIT
Arthur Kaye *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 10 p (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13075# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
INTEGRATION OF ADVANCED EXHAUST NOZZLES
Douglas L. Bowers and James A. Laughrey *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 14 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13076# Rolls-Royce Ltd., Bristol (England). Installation Aerodynamics Group.
THE SUBSONIC PERFORMANCE OF PRACTICAL MILITARY VARIABLE AREA CONVERGENT NOZZLES
L. R. Harper IN AGARD Aerodyn. of Power Plant Installation Sep. 1981 11 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13077# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
COMPARISON OF DIFFERENT NOZZLE CONCEPTS FOR A REHEATED TURBOFAN
H. Grieb, R. Vedova, H. Enderle, and H. Nagel *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 15 p refs Sponsored in part by German Ministry of Defence (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13078# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Aero Propulsion Lab.
ADVANCED EXHAUST NOZZLE TECHNOLOGY
Ronald J. Glidewell and Robert E. Warburton (Pratt and Whitney Aircraft Group, West Palm Beach, Fla.) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 11 p refs (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13079# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
A NUMERICAL INVESTIGATION OF EXHAUST PLUME TEMPERATURE EFFECTS ON NONAXISYMMETRIC NOZZLE/AFTERBODY PERFORMANCE
K. M. Peery (Boeing Military Airplane Co., Seattle) and D. L. Russell *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 11 p refs (For primary document see N82-13065 04-01) (Contract F33615-79-C-3018)
Avail: NTIS HC A22/MF A01

N82-13081# Societe Nationale d'Etudes et de Construction de Moteurs d'Aviation, Moissy-Cramayel (France).
A DEVICE FOR SIMULATING AT A COMPRESSOR BENCH AN AIR INLET WITH LARGE INCIDENCE [DISPOSITIF DE SIMULATION AU BANC COMPRESSEUR D'UNE PRISE D'AIR A GRANDE INCIDENCE]
Bertrand Delahaye and Gerard Laruelle (ONERA, Chatillon, France) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 15 p refs In FRENCH; ENGLISH summary (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13082# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
AN ACQUISITION AND ANALYSIS SYSTEM FOR DYNAMIC TESTS OF AIR INLETS [SYSTEME D'ACQUISITION ET D'ANALYSE POUR ESSAIS DYNAMIQUES D'ENTREES D'AIR]
Pierre Perrier, Bertrand Delahaye (SNWCMA, Moissy Cramayel, France), and Gerard Laruelle (ONERA, Chatillon, France) *In* AGARD Aerodyn. of Power Plant Installation Aug. 1981 14 p refs In FRENCH (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13085# National Defence Headquarters, Ottawa (Ontario). Directorate of Science and Technology.
COMPRESSOR STALL INDUCING INSTALLATION EFFECTS OF AN ENGINE CONTROL PARAMETER FOR THE CF-5 AIRCRAFT
W. L. Macmillan, D. M. Rudnitski, and W. Grabe *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p Prepared in cooperation with National Research Council of Canada, Ottawa (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

N82-13087# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
WIND TUNNEL TESTS OF POWERED MODELS: A COMPARISON OF TWO METHODS OF SIMULATING THE JETS OF JET ENGINES [ESSAIS EN SOUFFLERIE DE MAQUETTES MOTORISEES; COMPARAISON DE DEUX METHODES DE SIMULATION DES JETS DES REACTEURS]
J. P. Becle and R. Perin (SNIAS, Toulouse) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 18 p ref In FRENCH (For primary document see N82-13065 04-01)
Avail: NTIS HC A22/MF A01

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-13147*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
DESIGN FOR ACTIVE AND PASSIVE FLUTTER SUPPRESSION AND GUST ALLEVIATION Ph.D. Thesis
Mordechay Karpel Washington NASA Nov. 1981 117 p refs
(Grant NGL-05-020-243)
(NASA-CR-3482) Avail: NTIS HC A06/MF A01 CSCL 01C

Analytical design techniques for active and passive control of aeroelastic systems are based on a rational approximation of the unsteady aerodynamic loads in the entire Laplace domain, which yields matrix equations of motion with constant coefficients. Some existing schemes are reviewed, the matrix Pade approximant is modified, and a technique which yields a minimal number of augmented states for a desired accuracy is presented. The state-space aeroelastic model is used to design an active control

system for simultaneous flutter suppression and gust alleviation. The design target is for a continuous controller which transfers some measurements taken on the vehicle to a control command applied to a control surface. Structural modifications are formulated in a way which enables the treatment of passive flutter suppression system with the same procedures by which active control systems are designed.
A.R.H.

N82-13148*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LIMITED EVALUATION OF AN F-14A AIRPLANE UTILIZING AN AILERON-RUDDER INTERCONNECT CONTROL SYSTEM IN THE LANDING CONFIGURATION
Wendell W. Kelley and Einar K. Enevoldson (NASA. Dryden Flight Research Center) Dec. 1981 39 p refs
(NASA-TM-81972; L-14756) Avail: NTIS HC A03/MF A01 CSCL 01C

A flight test was conducted for preliminary evaluation of an aileron-rudder interconnect (ARI) control system for the F-14A airplane in the landing configuration. Two ARI configurations were tested in addition to the standard F-14 flight control system. Results of the flight test showed marked improvement in handling qualities when the ARI systems were used. Sideslip due to adverse yaw was considerably reduced, and airplane turn rate was more responsive to pilot lateral control inputs. Pilot comments substantiated the flight data and indicated that the ARI systems were superior to the standard control system in terms of pilot capability to make lateral offset corrections and heading changes on final approach.
Author

N82-13149*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
ANALYSIS OF A LONGITUDINAL PILOT-INDUCED OSCILLATION EXPERIENCED ON THE APPROACH AND LANDING TEST OF THE SPACE SHUTTLE
John W. Smith Dec. 1981 45 p refs
(NASA-TM-81366) Avail: NTIS HC A03/MF A01 CSCL 05H

During the final free flight (FF-5) of the shuttle's approach and landing tests, the vehicle experienced pilot-induced oscillations near touchdown. The light test data showed that pilot inputs to the hand controller reached peak-to-peak amplitudes of 20 deg at a frequency between 3 and 3.5 radians per second. The controller inputs were sufficient to exceed the priority rate limit set in the pitch axis. A nonlinear analytical study was conducted to investigate the combined effects of pilot input, rate limiting, and time delays. The frequency response of the total system is presented parametrically as a function of the three variables. In general, with no dead time, for controller inputs of 5 deg or less, the total system behaves in a linear fashion. For 10 deg of controller input, independent of the delay time, the elevon loop will be rate saturated above a frequency of 4 radians per second.
Author

N82-13150*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
INTERACTIVE AIRCRAFT FLIGHT CONTROL AND AEROELASTIC STABILIZATION Interim Report
Terrence A. Weisshaar and David K. Schmidt 31 Oct. 1981 39 p refs
(Grant NAG1-157)
(NASA-CR-165036) Avail: NTIS HC A03/MF A01 CSCL 01C

Several examples are presented in which flutter involving interaction between flight mechanics modes and elastic wind bending occurs for a forward swept wing flight vehicle. These results show the basic mechanism by which the instability occurs and form the basis for attempts to actively control such a vehicle.
A.R.H.

N82-13053# Army Avionics Research and Development Activity, Fort Monmouth, N. J.
INTEGRATION OF CONTROLS AND DISPLAYS IN US ARMY HELICOPTER COCKPITS
J. A. Dasaro and C. T. Elliott *In* AGARD The Impacts of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 19 p refs (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-13151# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
ON A DUSTY-GAS SHOCK TUBE
H. Miura (Osaka Prefecture, Japan) and I. I. Glass May 1981 80 p refs Sponsored in part by Natural Sciences and Engineering Research Council of Canada, U.S. Army, and Defence Research Establishment, Suffield
(Grant AF-AFOSR-3303-77)
(UTIAS-250; CN-ISSN-0082-5255) Avail: NTIS HC A05/MF A01

Analytical and numerical methods were used to investigate the flow induced by a shock wave in a shock-tube channel containing air laden with suspended small solid particles. Exact results are given for the frozen and equilibrium shock wave properties as a function of diaphragm-pressure ratio and shock-wave Mach numbers. The driver contained air at high pressure. A modified random-choice method together with an operator-splitting technique show the decay of a discontinuous frozen shock wave, a contact discontinuity, formation of a stationary shock structure, and an effective contact front of finite thickness. The effects of particle diameter, particle-number density, and diaphragm-pressure ratio on the transitional behavior of the flow are investigated in detail. The alteration of flow properties due to the presence of particles is discussed in detail and compared with classical shock-tube flows.
Author

N82-13152# State Univ. of New York, Albany. Dept. of Chemistry.
CONSTRUCTION AND MAINTENANCE OF SUNY FACILITIES AT THE NATIONAL SYNCHROTRON LIGHT SOURCE Progress Report, 1 Oct. 1980 - 30 Sep. 1981
Jacob Bigeleisen, Philip Coppens, and Peter Stephens 1981 20 p refs
(Contract DE-AC02-80ER-10759)
(DE81-027855; DOE/ER-10759/1) Avail: NTIS HC A02/MF A01

The research program is described, including/synchrotron radiation/beamline construction, equipment acquisitions, and synchrotron experiments. Beamline components including the monochromator and mirror system, experimental and control equipment, and the computer system are discussed.
DOE

N82-13153# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Hamburg (West Germany). Inst. fuer Flugmedizin.
RESULTS AND EXPERIENCE WITH A SMALL MULTIPURPOSE TRACKING SIMULATOR [ERGEBNISSE UND ERFAHRUNGEN MIT EINEM KLEINSIMULATOR FUER TRACKING- UND MEHRFACHARBEITSUNTERSUCHUNGEN]
S. Fichtbauer 1980 33 p refs In GERMAN; ENGLISH Summary Presented at 12th Conf. of the West European Soc. for Aviation Psychology, Kollekolle, Denmark, 24-28 Sep. 1979
Avail: NTIS HC A03/MF A01

The performance results on three prototype tracking simulators are reported, compared and supplemented by a factor analytical study. Test results on motor coordination and on performance under multiple-tasks conditions are discussed. The performance structure analysis reveals a five-factors solution with interpretation as to error, numerical thinking, observation speed, spatial relations receptivity, and psychomotor coordination. Its relation to other psychomotor apparatus tests used in pilot selection is discussed.
Author (ESA)

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-13154*# Westinghouse Research and Development Center, Pittsburgh, Pa.

A PRELIMINARY ANALYSIS OF THE DATA FROM EXPERIMENT 77-13 AND FINAL REPORT ON GLASS FINING EXPERIMENTS IN ZERO GRAVITY Final Report

W. R. Wilcox, R. S. Subramanian (Clarkson Coll., Potsdam, N.Y.), M. Meyyappan (Clarkson Coll., Potsdam, N.Y.), H. D. Smith, D. M. Mattox, and D. P. Partlow [1981] 64 p refs

(Contract NAS8-33017)

(NASA-CR-161884) Avail: NTIS HC A04/MF A01 CSCL 22A

Thermal fining, thermal migration of bubbles under reduced gravity conditions, and data to verify current theoretical models of bubble location and temperatures as a function of time are discussed. A sample, sodium borate glass, was tested during 5 to 6 minutes of zero gravity during rocket flight. The test cell contained a heater strip; thermocouples were in the sample. At present quantitative data are insufficient to confirm results of theoretical calculations. M.D.K.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N82-13155# Virginia Polytechnic Inst. and State Univ., Blacksburg.

REGULARIZED INTEGRATION OF GRAVITY-PERTURBED TRAJECTORIES: A NUMERICAL EFFICIENCY STUDY

L. Glenn Kraige, J. L. Junkins, and L. D. Ziems Nov. 1980 221 p refs Backup document for AIAA synoptic scheduled for publication in Journal of Spacecraft and Rockets on Jan./Feb. 1982

Avail: NTIS HC A10/MF A01

It was demonstrated that regularizing transformations can form the basis of highly efficient trajectory approximations. Eight algorithms for predicting the motion of a particle in a perturbed gravity field were brought to final completion for comparison with the Naval Surface Weapons Center Vacuum program. Several methods were found to be more efficient than the Vacuum Encke solution for the cases tested, particularly the Eulr parameter asymptotic expansion, the KS Cowell, the KS Encke, and the Rectangular Encke methods. All but the latter can be characterized as regularized methods. Several of the methods would become even more efficient (relative to Cowell integration schemes) for spacecraft in higher and/or less eccentric trajectories or orbits than the trajectories tested. Three algorithms for the solution of the Lambert problem were developed. Over the twelve cases studies, a straightforward differential correction scheme coupled with the Rectangular Encke motion predictor proved to be more efficient than a more analytical KS Variation of Parameters Approach. N.W.

N82-13156# Defence Research Establishment, Ottawa (Ontario). Defence Electronics Div.

SEASAT EQUATOR CROSSING PROGRAM

B. G. Young and D. L. Desaulniers Jun. 1980 31 p refs

(AD-A099442; DREO-TN-80-19) Avail: NTIS HC A03/MF A01 CSCL 09/2

A programmable pocket calculator is used to extrapolate the Seasat orbit from the equator crossing to the position at which the synthetic aperture radar images a given target. The coordinates of the satellite at image time, the Azimuth direction of the image at the target, and the time elapsed between equator crossing and imaging are predicted. Predictions are compared with measured Seasat data from the definitive attitude-orbit files. Author

N82-13157# National Telecommunications and Information Administration, Boulder, Colo. Inst for Telecommunication Sciences.

EFFECTS OF THE SATELLITE POWER SYSTEM ON LOW EARTH ORBIT AND GEOSYNCHRONOUS SATELLITES

W. B. Grant, E. L. Morrison, and J. R. Juroshek Jun. 1981 86 p refs

(Contracts DE-AI06-79RL-10077; DE-AI01-80ER-10160)

(PB81-232019; NTIA/Rept-81/75) Avail: NTIS HC A05/MF A01 CSCL 22A

The large amount of power contained in the main beam and principal sidelobes of the proposed Solar Power System (SPS), now under study by DOE and NASA, potentially presents an EMC problem for other satellite systems. This report examines selected geosynchronous orbit (GEO) satellites in adjacent slots to an SPS, GEO satellites on a chord passing an Earth horizon, and low-earth-orbit (LEO) satellites which may pass throught the SPS power beam. Potential functional and operational impacts to on-board systems are analyzed. Mitigation techniques for SPS effects are examined, and recommendations summarized to allow satellites to operate satisfactorily in an SPS environment. GRA

N82-13158 Purdue Univ., Lafayette, Ind.

CONTROL DESIGN FOR PARAMETER SENSITIVITY REDUCTION IN LINEAR REGULATORS: APPLICATION TO LARGE FLEXIBLE SPACE STRUCTURES Ph.D. Thesis

RamaKrishna Yedavalli 1981 236 p

Avail: Univ. Microfilms Order No. 8123729

The problem of control design for linear systems having parameter uncertainty is addressed from two viewpoint: viewpoints to minimize or reduce the trajectory and/or performance cost dispersion from the nominal values in the presence of small variations in the system parameters, and to maintain some optimal or satisfactory level of performance in the presence of small variations in the system parameters subject to model/controller truncation. It is shown that the minimization of a modified performance index that includes a quadratic term of trajectory sensitivity (state, output or control) subject to the augmented sensitivity system dynamics causes reduction not only in trajectory sensitivity but also in cost sensitivity. The control of large flexible space structures where there is large uncertainty associated with the modal data and constraints on the controller order, model reduction is required before linear multivariable theory can be applied to design controllers. The preliminary step taken in this direction is to use the concepts of open loop 'modal cost analysis' to derive explicit analytical formulae for 'modal costs' and 'parameter costs' for specific performance objectives. Dissert. Abstr.

N82-13159 Stanford Univ., Calif.

TECHNICAL BASIS FOR EFFICIENT MANAGEMENT OF GEOSTATIONARY SATELLITE ORBIT/SPECTRUM Ph.D. Thesis

Mohammad K. Samarkandy 1981 311 p

Avail: Univ. Microfilms Order No. 8124146

The technical factors for efficient and effective management of the orbit and radio frequency spectrum is established. Concepts of available isolation and required isolation between interfering satellites are introduced to solve inhomogeneous orbit congestion problems that arise between broadcasting and/or fixed satellite systems using different Earth station sizes and transmitting different modulating signals. Methods for reducing this interference are described that employ frequency coordination, polarization isolation, satellite beams separation, and modulation selection. Dissert. Abstr.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

No abstracts in this category.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-13160# Academia Sinica, Peking (China). Space Science and Technology Center.

SATELLITE ATTITUDE CONTROL WITH DECOMPOSED CONTROLLER

Yu Shao-hua 1 Jul. 1981 22 p refs Backup document for AIAA synoptic scheduled for publication in Journal of Guidance and Control on Jan./Feb. 1982

(LOG-G668) Avail: NTIS HC A02/MF A01

A concept is presented to solve the gyroscopic coupling problem of satellite attitude control. Control theory is used in the problem formulation and solution. Optimal decoupling control, wheel momentum tracking, and stochastic correction control and estimation are features of the concept. The systems structure of the concept is recommended for various attitude control and estimation problems. The performance obtained from computer simulation showed potential for practical application. N.W.

N82-13161*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

LAUNCH MISSION SUMMARY: INTELSAT 5 (F3) ATLAS/CENTAUR-56

30 Nov. 1981 14 p refs

(NASA-TM-84068; KSC-GP-15-23) Avail: NTIS HC A02/MF A01 CSCL 22B

Intelsat 5 (F3) spacecraft, launch vehicle, and mission are described. Information relative to launch windows, flight plan, radar and telemetry coverage, selected trajectory information, and a brief sequence of flight events is provided. S.L.

N82-13162*# National Aeronautics and Space Administration, Washington, D. C.

MISSION OPERATION REPORT: INTELSAT V-C(F-3)

[1981] 22 p

(NASA-TM-84072; O-491-203-81-03) Avail: NTIS HC A02/MF A01 CSCL 22B

This third in a series of improved INTELSAT commercial communication satellites has a cpaa capacity of 12,000 voice circuits plus two television channels. An Atlas-Centaur vehicle inserts the satellite into a transfer orbit which enables the spacecraft apogee motor to inject the satellite into a synchronous orbit. The dimensions, general characteristics, and communications features are summarized. The maritime communications subsystems and the communications payload are described. Telemetry, tracking and command, propulsion, electric power, and the launch vehicle characteristics are also discussed. A.R.H.

N82-13163# Erprobungsstelle der Bundeswehr, Meppen (West Germany).

TRANSITIONAL BALLISTICS OF HYPERVELOCITY PROJECTILES

Joachim K. Biele Bonn Bundesministerium der Verteidigung 1980 57 p refs Partly in GERMAN and ENGLISH Sponsored by Bundesministerium der Verteidigung

(BMVg-FBWT-80-1) Avail: NTIS HC A04/MF A01; DOKZENTw, Bonn DM 30

The state of the art of transitional ballistics of hypervelocity fin-stabilized projectiles is described, particularly sabot launching from smoothbore guns. The influence of gun-tube vibration and aerodynamic jump on near-muzzle flight direction errors and dispersion is established whereas the gas dynamical effects are shown to be negligible. Detection techniques for gun-tube vibration are discussed and it is shown that muzzle contact and sabot separation induced trajectory perturbations can be observed by means of an electromechanical method, using (nontouching) inductive gages as well as strain gages. Results describing the firing of an 105 mm smoothbore tank gun are presented and analyzed for muzzle influence on free flight behavior. Author (ESA)

N82-13164# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).

CONCEPT AND FEASIBILITY STUDY (PHASE A) FOR THE X-RAY SATELLITE ROBISAT. EXECUTIVE SUMMARY Final Report

Gerhard Barthel, Wolfgang Brunner, Jochen Doenecke, Edelbert Eichhorn, Heinrich Hufnagel, Kent oKelly, Gert Leibold, Werner Nagl, Horst Richter, Ernst Sach et al Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 72 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-W-80-027; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,10

The feasibility of launching a reusable satellite from a space shuttle which meets high performance characteristics connected with a one-year sky mapping mission of soft X-ray sources in the spectral range between 0.1 and 2.0 keV is studied. The core instrument of the satellite is an 80 cm Wolter telescope. Possible concept alternatives for the telescope, satellite design, orbit parameters, and telemetry are discussed. An optimized concept is presented and its integration and test program are indicated. The cost analysis indicates that this satellite can be built within the limits set by the low program cost requirements. Author (ESA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

No abstracts in this category.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N82-13165# Harry Diamond Labs., Adelphi, Md.

TWO-CHANNEL TELEMETER FOR USE IN A 3-INCH SPIN AIR GUN

Floyd Allen Jun. 1981 22 p

(AD-A102566; HDL-TR-1961) Avail: NTIS HC A02/MF A01 CSCL 09/6

A special two-channel telemeter-projectile system designed and built for use in a 3-in. spin air gun is described. The system allows batteries to be tested at a far lower cost than field testing. The telemeter projectile is unusually gun rugged an reusable in a simulated artillery environment. Test-battery current and voltage is continuously monitored by subcarrier oscillators. The fuze simulator contains logic components for controlling the battery land program, rather than using steady-state loads for the full flight. This telemeter system has potential applications in remote voltage monitoring over long periods of time. Author

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-13166*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SHAPE DETERMINATION AND CONTROL FOR LARGE SPACE STRUCTURES

Connie J. Weeks 1 Oct. 1981 175 p refs

(Contract NAS7-100)

(JPL-Pub-81-71) Avail: NTIS HC A08/MF A01 CSCL 22B

An integral operator approach is used to derive solutions to static shape determination and control problems associated with large space structures. Problem assumptions include a linear self-adjoint system model, observations and control forces at discrete points, and performance criteria for the comparison of estimates or control forms. Results are illustrated by simulations in the one dimensional case with a flexible beam model, and in the multidimensional case with a finite model of a large space antenna. Modal expansions for terms in the solution algorithms are presented, using modes from the static or associated dynamic mode. These expansions provide approximated solutions in the event that a used form analytical solution to the system boundary value problem is not available. Author

N82-13167# IRT Corp., San Diego, Calif.

CONDUCTION AND CHARGE STORAGE IN ELECTRON IRRADIATED SPACECRAFT INSULATORS Final Technical Report, Sep. 1977 - Sep. 1980

J. Wilkenfeld, C. Mallon, and J. Horne Griffiss AFB, New York RADC Jul. 1981 121 p refs

(Contract F19628-77-C-0245; AF Proj. 4600)

(AD-A104796; IRT-8172-008; RADC-TR-81-198) Avail: NTIS HC A06/MF A01 CSCL 22/2

Charge, storage and conduction processes were studies in four spacecraft insulators, FEP Teflon, Kapton, Mylar and fused quartz exposed to monoenergetic electron beams with energies of 5-27 keV as a function of particle flux, sample thickness, applied external bias and temperature. The experimental data was used to determine some of the parameters which control the deposition and transport of keV electrons in representative spacecraft insulators found on the surface of communication and other satellites placed in geostationary orbits. Properties determined include location of the charge deposition centroid, dark, radiation, delayed and surface conductivities. These parameters were then used in the phenomenological transport model to interpret the observed charge leakage behavior under various exposure conditions. In the model, the sample is divided into two regions. In the irradiated region, radiation-induced conductivity is the predominant conduction mechanism. In the nonirradiated region, space-charge limited currents predominate. Author (GRA)

N82-13168 Stanford Univ., Calif.

ON THE MODELING AND CONTROL OF FLEXIBLE SPACE STRUCTURES Ph.D. Thesis

Bong Wie 1981 216 p

Avail: Univ. Microfilms Order No. 8124171

The development of generic models of flexible space structures for control analysis and synthesis is discussed. Transfer functions with exact poles and zeros are derived for some simple generic models such as bars, beams, membranes, toroids, a triangular truss, and a triangular frame. In the first two models (bars and beams), transfer functions for the separated actuator and sensor pairs are also discussed. A comparison is made between the two lumped parameter transfer functions obtained by (1) truncating the exact partial fraction expansion, and (2) truncating the exact infinite product expansion of an infinite dimensional transfer function. The significance of near pole zero cancellations and inherent structural damping in designing control logic for infinite dimensional systems is shown. Attitude control of flexible space structures with an infinite number of vibration modes is investigated by using the exact infinite - dimensional transfer functions. Dissert. Abstr.

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

N82-13169# Fraunhofer Inst., Freiburg (West Germany).

JASPIC-DIP: THE DIGITAL IMPEDANCE PROBE IN THE JASPIC PROJECT Final Report

Eugen Neske and Josef Molnar Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 48 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-W-80-034; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,10

A digital impedance probe (DIP) was developed to be used in the Joint American Soviet Particle Inter-Calibration (JASPIC) program. It is capable on the one hand of providing fast and reliable estimates of the electron density height profiles in the nocturnal ionosphere, and on the other hand, of delivering density data with high accuracy during the subsequent analysis. Two techniques were developed: (1) fast scanning automatic resonance detection, and (2) slow scanning frequency-magnitude transmission. Apparatus and electronics are described. Results of rocket-borne experiments indicate DIP to be superior to three other diagnostical techniques, or to be necessary for their calibration. Author (ESA)

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

No abstracts in this category.

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-13170# National Research Council of Canada, Ottawa (Ontario). Inst. for Scientific and Technical Information.

CONSTITUTION OF SILICATE ANIONS IN TETRAETHYLAMMONIUM SILICATES AND THEIR AQUEOUS SOLUTIONS

D. Hoebbel 1981 26 p refs Transl. into ENGLISH from Z. Anorg. Allg. Chem. (East Germany), no. 465, 1980 p 15-33

(NRC/CNR-TT-2004) Avail: NTIS HC A03/MF A01

Studies aided by paper chromatography, Si-29 NMR, and trimethylsilylation methods show that in concentrated tetraethyl ammonium silicate solutions with molar TEA:Si ratios of 2.8 to 1, for the most part double three-ring silicate anions are present, along with small concentrations of mono-, di-, tri-, tetra-, cyclotri-, cyclotetra-, double four-ring, and other polycyclic silicate anions. At low temperatures a double three-ring silicate with the formula [N(C2H5)4]6 [Si6O15].57H2O crystallizes out. Concentrated solutions with TEA:Si = 0.8 to 0.6 contain predominantly double three-, double four-, and probably also double six-ring silicate anions. From these solutions the TEA-double four-ring silicate always crystallizes out. The possible reasons for the preferential formation of double-ring silicate anions in TEA-silicate solutions and their crystallization are discussed. Author

N82-13171*# Massachusetts Univ., Amherst. Dept. of Polymer Science and Engineering.
GRAFTING OF 2 (2-HYDROXY-5-VINYLPHENYL) 2H-BENZOTRIAZOLE ONTO POLYMERS WITH ALIPHATIC GROUPS. SYNTHESIS AND POLYMERIZATION OF 2 (2-HYDROXY-5-ISOPROPENYLPHENYL)
LE AND A NEW SYNTHESIS OF 2 (2-HYDROXY-5-VINYLPHENYL) 2H-BENZOTRIAZOLE Annual Report, 1980 - 1981
W. Pradellok, Zohar Nir, and Otto Vogl 15 Aug. 1981 30 p
Prepared for JPL
(Contract JPL-955531)
(NASA-CR-165016; JPL-9950-608; DOE/JPL-955531-81/1)
Avail: NTIS HC A03/MF A01 CSCL 07C

Successful grafting of 2(2-hydroxy-5-vinylphenyl)2H-benzotriazole onto saturated aliphatic C-H groups of polymers has been accomplished. When the grafting reaction was carried out in chlorobenzene at 150 C - 160 C with di-tertiarybutylperoxide as the grafting initiator, grafts as high as 20 percent - 30 percent at a grafting efficiency of 50 percent and 80 percent have readily been obtained. The grafting reaction was carried out in tubes sealed under high vacuum since trace amounts of oxygen cause complete inhibition of the grafting reaction by the phenolic monomer. On a variety of different polymers including atactic polypropylene, ethylene/vinyl acetate copolymer, poly(methyl methacrylate), poly(butyl acrylate), and polycarbonate were used. A.R.H.

24 COMPOSITE MATERIALS

Includes laminates.

N82-13172 Georgia Inst. of Tech., Atlanta.
EFFECTS OF HYGROTHERMAL CONDITIONING ON THE DYNAMIC BEHAVIOR OF RESIN MATRIX COMPOSITES Ph.D. Thesis
Ronald Patrick Briley 1981 121 p
Avail: Univ. Microfilms Order No. 8124282

The effects of hostile, hygrothermal environments on the dynamic behavior of graphite/epoxy composites were investigated. Flexural vibration tests were performed on Narmco 5208/T300 beam specimens of four distinct layups. Dynamic behavior in the dry, room temperature state is contrasted with five other environmental states, including moisture saturation and temperatures up to 93 C. The properties determined are fundamental natural frequency and damping. The measured natural frequency is directly related to an effective dynamic modulus in flexure. These properties reflect the consequences of plasticization of the epoxy matrix material hydrothermal environments. The experimental results, after correction for parasitic damping contributions, are consistent with behavioral trends. The glass transition temperature for the material in its moisture saturated state appears to be between 82 C and 93 C which is somewhat lower than expected. Dissert. Abstr.

N82-13173 Virginia Polytechnic Inst. and State Univ., Blacksburg.
CREEP AND CREEP RUPTURE OF LAMINATED GRAPHITE/EPOXY COMPOSITES Ph.D. Thesis
David A. Dillard 1981 245 p
Avail: Univ. Microfilms Order No. 8121498

Graphite epoxy composite material exhibit creep and delayed failures. An incremental numerical procedure based on lamination theory was developed to predict creep and creep rupture of general laminates. Existing unidirectional creep compliance and delayed failure data were used to develop analytical models for lamina response. The compliance model is based on a procedure proposed by Findley which incorporates the power law for creep into a nonlinear constitutive relationship. The matrix octahedral shear stress is assumed to control the stress interaction effect. A modified superposition principle is used to account for the varying stress level effect on the creep strain. The lamina failure model is based on a modification of the Tsai-Hill theory which includes the time dependent creep rupture strength. A linear cumulative damage law is used to monitor the remaining lifetime in each ply. Creep compliance and delayed failure data are presented for several general laminates along with the numerical predictions. Dissert. Abstr.

N82-13280# Bath Univ. (England). School of Materials Science.
FATIGUE TESTING OF FIBRE COMPOSITES
Bryan Harris *In* AGARD Fatigue Test Methodology Oct. 1981 18 p refs (for primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

N82-13284# Bath Univ. (England). School of Materials Science.
MONITORING OF DAMAGE IN FIBRE COMPOSITES
Bryan Harris *In* AGARD Fatigue Test Methodology Oct. 1981 23 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-13174 Purdue Univ., Lafayette, Ind.
GAS TURBINE COMBUSTOR SOOT AND RADIATION Ph.D. Thesis
Jim Alan Clark 1981 197 p
Avail: Univ. Microfilms Order No. 8123652

Gas turbine combustor soot and radiation were studied using two distinct methods which depend on experimental measurements of soot concentration and flame radiation in a model gas turbine combustor. A strong empirical relationship between the primary zone radiation intensity and two fuel properties-percent hydrogen and percent polycyclic aromaticity was found. The effective hydrogen content was found to be the tendency of a fuel. The second study used temperature and soot concentration mappings of the combustor flowfield to make predictions of radiation intensity and emissivity of a DF-2 flame. A comparison of the predicted and measured intensities and emissivities showed agree poorly, and the lack of agreement was attributed to errors in soot mass concentration measurements. The radiative transfer equation was used to deduce the approximate average soot concentration, and from this deduction the magnitude of soot error was estimated. Dissert. Abstr.

N82-13175 Northwestern Univ., Evanston, Ill.
SURFACE ENHANCED RAMAN SPECTROSCOPY FOR INTERFACIAL CHARACTERIZATION Ph.D. Thesis
Steven George Schultz 1981 158 p
Avail: Univ. Microfilms Order No. 8125008

Surface enhanced Raman spectroscopy (SERS) is developed as a useful tool for the characterization of the interface between a solid metal (silver) electrode and the bulk (liquid) electrolyte. Some metal surfaces, especially silver, enhance the Raman scattering intensity by a factor of at least one million above normal Raman intensities. Exceptionally intense Raman signals are obtained from electrode surfaces if the adsorbate is also enhanced with resonance Raman (RR) processes. The total scattering cross section is increased by the product of the SERS and RRS enhancements. The power of this combination shows excellent quality Raman spectra from water soluble porphyrins adsorbed to the silver electrode even at porphyrin concentrations in the nanomolar range. The SERS intensity dependence with potential is sensitive to minor substituents on the porphyrin ring. Dissert. Abstr.

N82-13176 Northwestern Univ., Evanston, Ill.
RESONANCE RAMAN SPECTROSCOPIC INVESTIGATIONS OF THE ACTIVE SITE STRUCTURES OF HEMOGLOBIN AND

HEMERYTHRIN Ph.D. Thesis
Lori London Duff Weddell 1981 225 p
Avail: Univ. Microfilms Order No. 8125037

Resonance Raman spectroscopy is used to probe the active sites of hemoglobin and hemerythrin. For oxyhemoglobin oxygenated with O16O18, the resonance Raman spectrum in the FeO_2 stretching region demonstrates end on O_2 geometry, like the Pauling structure, and rules out the symmetric side on geometry of the Griffith structure. Several methemerythrins are studied including sulfido methemerythrin and semimetazido hemerythrin. Many methemerythrins have a Raman band at approximately 50 cm which is assigned to an iron oxygen stretch. The identity of the oxygen ligand and exchange behavior with H2O18 are studied. Oxygen isotope exchange with solvent water is observed only when oxyhemerythrin in H2O18 is converted to methemerythrin by addition of azide, cyanate or cyanide ions. Dissert. Abstr.

N82-13177 Seton Hall Univ., South Orange, N. J.
SURFACE CHARACTERIZATION OF DISPERSED SUPPORTED METAL CATALYSTS USING A 'TIME LAPSE' DYNAMIC PULSE TECHNIQUE Ph.D. Thesis
Robert William Warner 1981 127 p
Avail: Univ. Microfilms Order No. 8122399

A dynamic pulse vapor phase 'time lapse' procedure was used to investigate the initial turnovers occurring in the hydrogenation of a double bond over supported platinum and palladium catalysts. With the platinum catalysts, the product compositions obtained in olefin hydrogenation reactions were used to characterize the relative amounts of the various types of reactive sites present on the catalyst surface, leading to the development of a surface site model for these supported catalysts. Initial treatment of the palladium catalyst with an olefin resulted in a change in its reaction characteristics. Presaturation of either catalyst with hydrogen results in the storage of hydrogen. Surface site modifiers such as alcohols and benzene were used to study the competition between an olefin substrate and hydrogen for adsorption on each reactive site type. Dissert. Abstr.

N82-13178 Tennessee Univ., Knoxville.
THE CHEMISTRY OF SALINE WATER CHLORINATION Ph.D. Thesis
Werner Robert Haag 1981 161 p
Avail: Univ. Microfilms Order No. 8123155

Natural water chlorination chemistry is reviewed with particular reference to saline waters. Some experimental work led to the isolation of the first known pure solution of a N-bromo N chloroamine, namely, methyl bromochloramine. Physical and chemical properties of these compounds [illegible] characterized, in both concentrated CCl_4 solution and dil[illegible] aqueous solution. Bromochloramines can readily form under conditions of power plant cooling water chlorination, if saline water is used. Chlorine losses at very high doses in seawater are simply the result of chlorate and bromate formation which is negligible at normal doses. The important chlorine produced oxidants, along with the relevant chemical reactions, are chosen as a basis for a kinetic model of saline water chlorination chemistry. Dissert. Abstr.

N82-13179 Duke Univ., Durham, N. C.
APPLICATION OF ELECTROCHEMISTRY TO BIOCHEMICAL PROBLEMS Ph.D. Thesis
Billy Gene Bennett 1981 91 p
Avail: Univ. Microfilms Order No. 8124789

An immunoassay technique using differential pulse anodic stripping voltammetry (DPASV) detection was demonstrated. The voltammetric immunoassay (VIA) technique is based on the competition of antigen with electrochemically labelled antigen for binding sites on a selective antibody. Estriol, used as a model system was labelled with the electroactive group, cadmium acetate. Addition of estriol antibody diminished the peak current due to binding of the electrochemically labelled estriol with the antibody. Subsequent addition of unlabelled estriol increased the peak current due to competitive displacement of the labelled estriol from the antibody. This competitive equilibrium was the basis of the technique that could be used as a sensitive immunoassay for estriol. Electrochemical labelling of a species can provide for quantitative measurements to be made on protein-ligand systems. Dissert. Abstr.

N82-13180 Georgia Univ., Athens.
DOUBLE BEAM-IN-TIME PHOTOACOUSTIC SPECTROSCOPY Ph.D. Thesis
Michael Franklin Cox 1981 149 p
Avail: Univ. Microfilms Order No. 8123045

A unique double beam-in-time photoacoustic spectrometer was constructed which utilizes a vibrating mirror to alternately illuminate sample and reference materials contained in a single cell. Fundamental studies of the photoacoustic signal generated by a single pulse of light were performed. The results demonstrate that the photoacoustic signal deviates from the predicted sawtooth waveform when the pulse duration exceeds approximately 15 milliseconds; primarily due to the response characteristics of the condensor microphone employed. The use of inductively-driven linear scanners in spectroscopic systems, including the double beam-in-time photoacoustic spectrometer, was examined. The presence of chemically-interfering caroxyl groups in a dextran gel, a chromatograhic packing material, was also investigated to demonstrate the utility of the photoacoustic spectrometer. Results indicate that carboxyl groups are likely present in the gel but cannot be effectively eliminated through chemical reduction. Dissert. Abstr.

N82-13181 Washington State Univ., Pullman.
DETERMINATION OF RADIONUCLIDE SPECIES BY ON-LINE RADIOCHROMATOGRAPHY USING HIGH RESOLUTION GAMMA RAY SPECTROSCOPY Ph.D Thesis
Asok Kumar Dasgupta 1981 192 p
Avail: Univ. Microfilms Order No. 8122412

A high resolution Ge(II) gamma-ray spectroscopy detector for the on-line multielement monitoring of liquid chromatography column effluents containing mixtures of gamma-emitting radionuclides is described. During the chromatogaphic experiments, sequential 0-2048 keV gamma-ray spectra were collected. This technique was successfully applied to the separation and determination of Ni-65(II),Mn-56(II), Co-60(II)Cu-64(II), and diethyldithiocarbamate, oxinated and acetylacetonate of Cr-51(III), CO-60(III),Cu-64(II) and, Mn-56(II) and diethyldithiocarbamate, oxinate, and acetylacetonate of Cu-64(II) by silica gel adsorption chromatography. Dissert. Abstr.

N82-13182 Tennessee Univ., Knoxville.
ELECTROCHEMICAL AND SPECTROSCOPIC STUDIES OF SOME LESS STABLE OXIDATION STATES OF SELECTED LANTHANIDE AND ACTINIDE ELEMENTS Ph.D. Thesis
David Edward Hobart 1981 168 p
Avail: Univ. Microfilms Order No. 8123158

Simultaneous observation of electrochemical and spectroscopic properties (spectroelectrochemistry) at optically transparent electrodes (OTE') is applied to the generation and characterization of some less stable oxidation states of selected lanthanide and actinide elements (Ce, Pr, Sm, Eu, Tb, Yb, U, Np, Am, and Cm) in complexing and noncomplexing aqueous solutions. Optically transparent electrodes used include reticulated vitreous carbon, metal screen OTE's and an OTE made from porous metal foam. Cyclic voltammetry at microelectrodes is used in conjunction with spectroelectrochemistry for the study of oxidation reduction couples. Dissert. Abstr.

N82-13183 Tennessee Univ., Knoxville.
SPECTROELECTROCHEMICAL INVESTIGATIONS IN MOLTEN SALT AND AQUEOUS MEDIA Ph.D. Thesis
Vincent Eugene Norvell 1981 203 p
Avail: Univ. Microfilms Order No. 8123171

The electroreduction of the manganese oxyanions in alkaline solutions and the electrooxidation of elemental sulfur and electroreduction of Nb(V) in molten $AlCl_3$ NaCl mixtures was investigated in situ by means of spectroelectrochemical techniques and thin layer coulometry at optically transparent electrodes. The reduction of the maganese oxyanions in alkaline solutions was found to consist of simple reversible one electron transfers when carried out in solutions in which the reduction product is stable. One or more soluble intermediate species, probably containing Mn(IV) and possibly Mn(V) are formed when reduction is carried out in solutions where the product is unstable and undergoes disproportionation. The effect of varying the pH of the solution of the overall reduction process is discussed. Spectral data on the reduction products are presented. Dissert. Abstr.

N82-13184 Wisconsin Univ. - Madison.
QUANTITATIVE INVESTIGATIONS OF MIXED OXIDATION STATES OF SOME FIRST ROW TRANSITION METALS IN INSULATOR MATRICES BY PHOTOELECTRON SPECTROSCOPY Ph.D. Thesis
Thomas Michael Rosseel 1981 221 p
Avail: Univ. Microfilms Order No. 8117531

A method using photoelectron spectroscopy quantitatively to determine the oxidation states of titanium, chromium, and manganese in insulator matrices is developed. Metal oxide mixtures which serve as model systems for other types of samples such as lunar basalts and transition metal catalysts were emphasized. It was determined that an extension of the Swartz and Hercules procedure involving standard curves of mixtures of different oxidation states in conjunction with a deconvolution technique. Could sucessfully determine the concentration of oxidation states differing in binding energy by not less than 1.5 eV using the 3P transition if the sensitivity of the measurement could be improved. On approach to improving the sensitivity was to construct and evaluate an electron energy analyzer with a high luminosity. A second approach was qualitatively to map the energy dependence of the 3p photoelectron cross section of determine the energy of maximum atomic sensitivity. In addition to the qualitative energy mapping, the relative 3p photoelectron cross sections, internally referenced to the O 2s cross section, were also determined from 100-150 eV. The relative error of the cross section measurements is estimated to be less than 15%. Dissert. Abstr.

N82-13185 Cincinnati Univ., Ohio.
METAL ION MODIFICATION OF POLYMERIC SULFUR NITRIDE, (SN) SUBX, ELECTRODES AND ELECTROCHEMICAL REDUCTION OF ACETYLENE AT A MOLYBDENUM MODIFIED (SN)SUB X ELECTRODE Ph.D. Thesis
Judith Faye Rubinson 1981 142 p
Avail: Univ. Microfilms Order No. 8123779

The surfaces of electrodes made from the polymeric conductor polymeric sulfur nitride (also known as polythiazyl or (SN) sub x is modified with the metal ions chromium, iron, and molybdenum. Using molybdenum modified (SN) sub x, the direct electrochemical conversion of acetylene to ethylene is accomplished, and the effects of variation of reaction conditions on the rate of conversion is investigated. Also a method for the assembly of film electrodes is developed, thereby enabling the electrode areas to be dramatically increased. The conversion of acetylene to ethylene in aqueous solution, with small amounts of ethane also being produced, is accomplished at (SN) sub x that has been dipped in a concentrated aqueous solution of sodium molybdate. A negative electrode potential of -1.3 V vs the standard calomel electrode is necessary for measurable rates of conversion, with more negative potentials increasing the rate. Dissert. Abstr.

N82-13186*# San Jose State Univ., Calif.
DEVELOPMENT AND TESTING OF DRY CHEMICALS IN ADVANCED EXTINGUISHING SYSTEMS FOR JET ENGINE NACELLE FIRES Final Report
Robert L. Altman, A. Campbell Ling, ed., Ludwig A. Mayer, and Donald J. Myronik Sep. 1979 314 p
(Grant NsG-2165)
(NASA-CR-165011) Avail: NTIS HC A14/MF A01 CSCL 21B

The effectiveness of dry chemical in extinguishing and delaying reignition of fires resulting from hydrocarbon fuel leaking onto heated surfaces such as can occur in jet engine nacelles is studied. The commercial fire extinguishant dry chemical tried are sodium and potassium bicarbonate, carbonate, chloride, carbamate (Monnex), metal halogen, and metal hydroxycarbonate compounds. Synthetic and preparative procedures for new materials developed, a new concept of fire control by dry chemical agents, descriptions of experiment assemblages to test dry chemical fire extinguishant efficiencies in controlling fuel fires initiated by hot surfaces, comparative testing data for more than 25 chemical systems in a 'static' assemblage with no air flow across the heated surface, and similar comparative data for more than ten compounds in a dynamic system with air flows up to 350 ft/sec are presented. S.L.

N82-13187# SRI International Corp., Menlo Park, Calif.
ENERGY LEVELS IN AND ON AN OXIDE FILM AS MEASURED BY ELECTROCHEMICAL METHODS Final Report, 14 Jul. 1978 - 14 Aug. 1981
S. R. Morrison Aug. 1981 7 p
(Contract DAAG29-78-C-0025; SRI Proj. 7592)
(AD-A103704; Rept-15521.6-C) Avail: NTIS HC A02/MF A01 CSCL 07/4

The oxide layer over silicon was studied using electrochemical methods (supplemented at times by MOS measurements). The most important conclusion was that alkali ion diffuse readily into SiO2 from solution. GRA

N82-13188# Virginia Univ., Charlottesville. Dept. of Physics.
TRAPPED ION RESEARCH
Daniel J. Larson 30 Apr. 1981 4 p
(Contract N00014-78-C-0772)
(AD-A098648) Avail: NTIS HC A02/MF A01 CSCL 20/3

Trapped negative ions are investigated using high resolution spectroscopy. Microwave transitions are observed in S(-) ions; The g sub j factor of ground state S(-) ions is measured. Laser and wavelength measurement improvements are implemented. This spectroscopy is applicable to improved frequency standards. GRA

N82-13189# Amherst Coll., Mass.
SOLUBILITIES OF DISSOLVED GASES IN SEA WATER Final Technical Report
Bruce B. Benson and Daniel Krause, Jr. 18 Nov. 1980 15 p refs
(Contract N00014-78-C-0198)
(AD-A100675) Avail: NTIS HC A02/MF A01 CSCL 08/10

The concentration of an atmospheric gas in water in equilibrium with air was measured making corrections for molecular interactions in the vapor phase. The results for oxygen show that the UNESCO tables for the solubility of oxygen give values in freshwater that are low by from 0.15% to 0.35% depending upon temperature. The solubility of hydrogen was determination in pure water and is sea water. Results give very accurate values of oceanograhic and limnological work and are expeciia especially significant becuase of the information provided about the properties of liquid water. The dependence of solubility on salinity and the functional dependence of the salting-out coefficient upon temperature are discussed. J.M.S.

N82-13190# Sandia Labs., Albuquerque, N. Mex.
PROPERTIES OF MATTER AT ULTRA-HIGH PRESSURES
F. C. Perry, M. A. Sweeney, and J. R. Asay 1981 4 p refs Presented at the 8th AIRAPT Conf. and the 19th EHPRG Conf., Uppsala, 17 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-026504; SAND-81-0365C; CONF-810827-2) Avail: NTIS HC A02/MF A01

Some recent experiments using the precision impact technique to study the shock-induced vaporization of lead (Pb) are described. Previous experiments utilized strong shock waves to investigate the equation of state of lead and other metals. Emphasis is on the possibility of direct observation of rate or kinetic effects in such phase transitions, and it is believed that the highly resolved diagnostics are capable of revealing these effects. DOE

N82-13191# Ames Lab., Iowa.
POWER-PLANT FLY-ASH UTILIZATION: A CHEMICAL-PROCESSING PERSPECTIVE
G. Burnet and M. J. Murtha 1981 12 p refs Presented at the Portland Cement Assoc. Conf. on Manufacturing Process, Albuquerque, N. Mex., 14-15 Jan. 1981 Prepared jointly with Iowa State Univ. of Science and Technology
(Contract W-7504-eng-82)
(DE81-025452; IS-M-321; CONF-810151-1) Avail: NTIS HC A02/MF A01

Solid wastes from coal combustion, including fly ash, are classified as hazardous under present EPA definitions. Research on fly ash utilization including extraction of metals and uses for process residues is discussed. One process investigated uses a lime-soda sinter method to form soluble aluminate compounds from mixtures of fly ash, limestone, and soda ash. The aluminates are extracted, treated to remove silicates, and precipitated: the precipitate is calcined to metallurgical grade alumina. The extract residue shows promise as a raw material for the production of Portland cement. Process economics, effects of alumina and silica contents of the fly ash, sintering temperatures and time, and sales credits for by-products are discussed. DOE

N82-13192# AeroChem Research Labs., Inc., Princeton, N. J.
RATE COEFFICIENTS OF COMBUSTION/FUEL CONVERSION REACTIONS BY HIGH-TEMPERATURE PHOTOCHEMISTRY Progress Report, 1 Sep. 1980 - 30 Jun. 1981
William Felder Jul. 1981 7 p refs
(Contract DE-AC02-77ER-04169)
(DE81-027965; DOE/ER-04169/T1; AeroChem-TN-219; COO-4169-6) Avail: NTIS HC A02/MF A01

Reliable kinetic data on isolated elemetary combustion reactions spanning a broad temperature range are required for modeling and scaling studies and reducing the pollutant formation from fossil-fuel burning devices. A new technique, High Temperature Photochemistry (HTP) combines the technology of the High-Temperature Fast-Flow Reactors developed to study kinetics of metal atom/oxide reactions with the flash photolysis technique. Aspect of a partially complete HTP study on chemical reactions CH3 oxidation by O2 and O atoms are presented. DOE

N82-13193# Department of Energy, Morgantown, W. Va.
HIGH-TEMPERATURE MEASUREMENTS OF ALKALI LEVELS IN AN EXPERIMENTAL 6-INCH AFBC
R. J. Anderson, U. Grimm, and R. R. Romanosky Feb. 1981 15 p refs
(DE81-023632; DOE/METC/RI-188) Avail: NTIS HC A02/MF A01

Alkali metals (K and Na) were measured with an on-line atomic emission (AE) spectrometer in the effluent stream of an atmospheric fluidized-bed combustor (AFBC). To simulate performance of a pressurized fluidized-bed combustor dolomite was used for the bed material and Pittswick coal was burned. The on-line AE unit monitored a representative fraction of the effluent stream. The sample stream was provided by a specially designed system fabricated of Hastalloy X. To control particle size the sample system contained a cyclone having a cut-off diameter of 1 micron. Flow was regulated by controlling the pressure of the freeboard from 0 to 20 inches of water. In all tests a ratio of K to Na of about 3 to 1 was observed. This ratio was verified by analysis of aerosol samples. Concentrations of alkali were about an order of magnitude higher than those measured by the AE unit. Alkali levels (K and Na) on the order of 10 ppM were measured on the sample stream. DOE

N82-13194# Oak Ridge National Lab., Tenn. Atomic, Molecular, and High Voltage Physics Group.
STUDIES OF PHOTOIONIZATION IN LIQUIDS USING A LASER TWO-PHOTON IONIZATION CONDUCTIVITY TECHNIQUE
K. Siomos (Tennessee Univ., Knoxville) and L. G. Christophorou (Tennessee Univ., Knoxville) 1981 5 p refs Presented at the 7th Intern. Conf. on Conduction and Breakdown in Dielectric Liquids, Berlin, 27 Jul. 1981
(Contract W-7405-eng-26)
(DE81-026514; CONF-810734-2) Avail: NTIS HC A02/MF A01

One-photon ionization studies of solute molecules in a liquid medium are limited by the absorption of the medium. A laser two-photon ionization technique using a frequency tunable dye laser was developed, whereby the photoionization threshold of a solute molecular was determined from the induced conductivity in a liquid-medium due to electron-ion pair formation solute. The two-photon induced electron-ion current is measured as a function of the laser wavelength. The photoionization of N,N,N,N-tetramethyl-p-phenylendiamine pyrene and fluoranthene in liquid n-pentane are discussed. DOE

N82-13195# Rockwell International Corp., Golden, Colo.
DYNAMIC MASS SPECTROMETRY: A RESIDUAL GAS ANALYSIS METHOD AND SOME APPLICATIONS
Tom L. McFeeters 1981 18 p Presented at Vacuum Brazing Conf., Santa Barbara, Calif., 2-4 Jun. 1981
(Contract DE-AC04-76DP-03533)
(DE81-026230; RFP-3228; CONF-8106106-1) Avail: NTIS HC A02/MF A01

Dynamic mass spectrometry is a unique method of residual gas analysis used to monitor and trouble-shoot industrial vacuum process operations. Applications and results of the method, and descriptions and analytical method developed are presented. DOE

N82-13196# Occidental Research Corp., Irvine, Calif.
CONTROLLED-FLASH PYROLYSIS Quarterly Technical Progress Report, Apr. - Jun. 1981
K. Durai-Swamy, S. C. Che, C. B. Chen, R. Jain, S. S. Kim, and H. VonSchonfeldt Aug. 1981 55 p refs
(Contract DE-AC22-80PC-30264)
(DE82-000284; DOE/PC-30264/09; QTPR-3) Avail: NTIS HC A04/MF A01

Thirteen runs were made in the controlled flash pyrolysis unit with a coal feed rate of about 2 kg/hour. Preliminary material balance for these tests is presented. The laboratory scale (1 gm/min.) pyrolysis reactor was used to evaluate several model compounds as quench solvents. Free radical pyrolysis studies, using an electron spin resonance spectrometer, show that vapor phase radicals from coal pyrolysis resemble phenalenyl radical and that char placed on top of the pyrolyzing coal absorbs these vapor phase radicals effectively. DOE

N82-13197# Naval Weapons Center, China Lake, Calif.
PREPARATION AND CHARACTERIZATION OF HYDROGENATED AMORPHOUS SILICON Final Technical Report, 1 Jun. 1980 - 31 May 1981
T. M. Donovan 21 Aug. 1981 22 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contract DE-AC02-77CH-00178)
(DE81-030973; SERI/TR-8142-4-T3) Avail: NTIS HC A02/MF A01

The deposition and characterization of dc magnetron sputtered amorphous silicon hydride and an evaluation of its potential as a solar material is summarized. Infrared vibrational spectra of films deposited in the 200 to 3000C temperature range show that hydrogen incorporated mainly as SiH. Doping with nitrogen or phosphorus is ineffective in increasing conductivity or photoconductivity. During deposition, dc bias of the substrate is successful in reducing interface contamination and improving the coalescence of the condensing Si. High levels of defects or dangling bonds are inferred from both optical and transport measurements made on bias deposited, single mode, structurally homogeneous SiH films. DOE

N82-13198# West Virginia Univ., Morgantown. Dept. of Chemical Engineering.
REDUCTION OF NITRIC OXIDE IN A FLUIDIZED BED Final Report
Z. Huang, G. T. Chen, and C. Yi. Wen Jul. 1981 69 p refs
(Contract DE-AT21-79MC-11284)
(DE81-030488; DOE/MC-11284/1100) Avail: NTIS HC A04/MF A01

Reduction of nitric oxide (NO) by two kinds of char, coke, carbon monoxide and methane was investigated in a bed of glass sand fluidized by nitrogen containing a small amount of nitric oxide. The bed was heated externally by an electric heater and the effect of char loading on NO reduction was studied over a wide range of temperatures. Reactivities of different chars and coke depend upon such physical properties as surface area, porosity, type of char, and carbon content. The reduction of NO with carbon monoxide was also investigated. Results showed that the stainless steel wall exerted a significant catalytic effect on this reaction. To obtain information for design and operation of fluidized-bed combustors, kinetic evaluation of the reaction of NO with Char 1 was performed. Data based on the two-phase bubble model were analyzed to formulated the reaction rate expression, activation energy, and the frequency factor. DOE

N82-13199# Bureau of Mines, Avondale, Md.
WEAR PROPERTIES OF ELECTRODEPOSITED TITANIUM DIBORIDE COATINGS
David R. Flinn, James A. Kirk, Michael J. Lynch, and Bruce G.

VanStratum Jun. 1981 37 p refs
(PB81-233314; BM-RI-8537) Avail: NTIS HC A03/MF A01
CSCL 11C

A chemical conditioning technique, which greatly simplifies the preparation of plating baths for the electrodeposition of titanium diboride (TiB2) coatings, is described. The plating technique was used to prepare samples of titanium diboride (TiB2) coatings on three types of substrate materials. These samples were then evaluated in both low and high speed wear-test programs to determine the wear resistance, microhardness, and adhesion of the coatings. GRA

N82-13200 Stanford Univ., Calif.
A MINIATURE, THIN-FILM THERMAL CONDUCTIVITY DETECTOR FOR AN INTEGRATED GAS CHROMATOGRAPH Ph.D. Thesis
John Hallock Jerman 1981 135 p
Avail: Univ. Microfilms Order No. 8124086

A miniature thermal conductivity detector developed for use in an integrated gas chromatography system is described. The miniature detector is fabricated using integrated circuit processing techniques, and consists of a thin film nickel resistor supported on a Pyrex glass membrane. The Pyrex membrane is supported on its periphery by a silicon substrate chip, which is clamped over an etched detector channel to form the detection volume. The detector volume is more than 5 orders of magnitude smaller than conventional GC thermal conductivity detectors. Nickel is used as the sensing element in the detectors. The detector is preferably operated in a constant temperature configuration in order to reduce the temperature effects of gases and the detector support and to protect the detector from thermal runaway. In the miniature GC system, the detector is capable of detecting gases at less than 1 ppm concentration, in 20 nl samples. Dissert. Abstr.

N82-13201 Northwestern Univ., Evanston, Ill.
A STUDY OF THE FORMATION AND STRUCTURE OF SMALL CLUSTERS OF NOBLE GASES AND SULFUR HEXAFLUORIDE FORMED IN LAVAL NOZZLE MOLECULAR BEAMS Ph.D. Thesis
Sang Soo Kim 1981 242 p
Avail: Univ. Microfilms Order No. 8124925

Extremely small clusters of the rare gases Ar, Kr, and Xe are studied using electron diffraction. Each gas is expanded in a He carrier gas through a small Laval nozzle. The nozzle is the first stage of a molecular beam. As the gas expands the condensable vapor highly supersaturates and clusters are formed. The structure and properties of very small clusters are significantly different from those of the bulk phase. All cluster formed from mixtures with 6% Kr and 6% Xe in the He carrier gas are icosahedron, with the range of sizes 100 to approximately 300 atoms per cluster. Also, all of the experiments using 6%, to 12.5%, and part of 25% Ar, with He carrier, produce clusters which are icosahedral structures. However, strong patterns at 25% Ar in He (i.e., larger cluster sizes), and 100% Ar expansions produce mixed patterns of the two structures. The cluster temperature range from 20 to 60 K and the cluster beam contains 20 to approximately 50% free atoms. Dissert. Abstr.

N82-13202 Delaware Univ., Newark.
SALT REMOVAL FROM BRACKISH WATER BY CONTINUOUS PROCESSES WITH AMPHOTERIC, THERMALLY REGENERABLE ION-EXCHANGE RESINS Ph.D. Thesis
Tah-Ben Hsu 1981 363 p
Avail: Univ. Microfilms Order No. 8123816

Two amphoteric, thermally regenerable ion exchange resins, Amberlite XD 2 and Amberlite XD 5, are utilized to remove salt from brackish water by continouous processes. The physical and chemical properties of both resins are studied, including their resin capacity, density, porosity and swelling phenomena. The kinetic reaction of mass transfer in these resins is studied by means of frequency analysis during forced temperature cycling and also by fixed bed breakthrough experiments. Amberlite XD 2 has a higher mass transfer rate than Amberlite XD 5. A truly countercurrent, continuous adsorption process to remove salt from water is evaluated using theoretical simulation and experimental results. Amberlite XD 2 shows better separation performance than Amberlite XD 5 under the same operation conditions. The linear equilibrium line case, which may be important for dilute concentrations, also is simulated theoretically. Dissert. Abstr.

N82-13203 Stanford Univ., Calif.
TWO STUDIES OF FLUIDIZED BEDS: HEAT TRANSFER AND GRID JETS Ph.D. Thesis
Walter Thompson Ropchan 1981 162 p
Avail: Univ. Microfilms Order No. 8124144

A videotape system as used to record the rise of an injected hot bubble into an incipiently-fluidized bed at ambient conditions. Both the initial temperature and that at a given height were measured for several bubbles. When extrapolated, the data indicate that over 99 percent of the excess heat above ambient is lost within one bubble diameter away from the point of injection. In addition to visual observation, cine-photography was used to record high-speed phenomena around a jet. Three regimes of jet behavior were observed: periodic, meandering, and unstable. A rather elongated bubble in the shape of a jet first pinches off just barely above the orifice. The pinching frequency was found to be determined solely by the gas flowrate. These pinched structures, in turn, break up into bubbles, sometimes coalescing into doublets, triplets, etc. As coalescence phenomena dominate the resulting bubble frequency, a lack of an apparent preference for the type of bubble formed was found. Dissert. Abstr.

N82-13204 Georgia Inst. of Tech., Atlanta.
PREPARATION, CHARACTERIZATION AND PERFORMANCE OF NON-UNIFORM METAL CATALYSTS Ph.D. Thesis
Yen-Shin Shyr 1980 485 p
Avail: Univ. Microfilms Order No. 8124643

Nonuniformly distributed supported Pt catalyst is prepared by adding NaBr, and/or Ca to chloroplatinic acid impregnating solution. The effect of chemical competitors in the adsorption of the impregnation process was studied. Coingredients included the following acids and salts HCl, HF, HNO3, acetic acid, citric acid, tartaric acid AlCl3, NaCl, NaF, NaBr, NaNO3, NaPO4, Na benzoate, and Na Citrate. Radial Pt profiles were analyzed by electron probe microanalysis. Five catalysts--two with monotonically increasing profiles from bead center to surface, two with monotincally decreasing profiles and one with a uniform profile on the gamma alumina support, and two catalyst-- one with an increasing profile and one with a uniform profile on silica alumina support, were prepared and characterized by electron probe microanalysis and hydrogen chemisorption. The Pt contents ranged from 0.5% to 1.1% as measured by a spectrophotometric method. The Pt particle sizes were determined by H2 chemisorption. Dissert. Abstr.

N82-13205 Missouri Univ. -Rolla.
SOLUBILITIES IN MULTICOMPONENT SYSTEMS OF NONSPECIFIC INTERACTIONS Ph.D. Thesis
William Eugene Acree, Jr. 1981 155 p
Avail: Univ. Microfilms Order No. 8123580

Solubilities are reported for (1) iodine at 25 C in binary mixtures of carbon tetrachloride with cyclohexane, n-hexane, n-heptane, and octamethycyclotetrasiloxane (OMCTS), mixtures of cyclohexane with n-hexane and with OMCTS, and mixtures of n-hexadecane with n-heptane and with isooctane; (2) benzil in binary mixtures of carbon tetrachloride with cyclohexane, n-hexane, and n-heptane, mixtures of n-hexane cyclohexane and with n-heptane; (3) benzene with cyclohexane and with toluene; (4) stannic iodide in mixtures of carbon tetrachloride and cyclohexane, and (5) benzoic acid in binary mixtures of carbon tetrachloride with cyclohexane n-hexane, and n-heptane, binary mixtures of cyclohexane n-hexane and n-heptane; and for ternary mixtures of carbon tetrachloride + cyclohexane n n-hexane, + n heptane. Solubilites are also reported for benzoic acid in several binary solvent mixtures at 30 C and for m-toluic acid at 25 C in binary mixtures of cyclohexane and n-hexane. Dissert. Abstr.

N82-13206 Missouri Univ. -Rolla.
MOLECULAR INTERACTIONS IN AMPHIPHILIC ASSOCIATION STRUCTURES Ph.D. Thesis
Beverly Bendiksen 1981 115 p
Avail: Univ. Microfilms Order No. 8123586

The interactions of water, a surfactant, and cosurfactant in microemulsion systems were studied by experimental and theoretical means. Intermolecular bond strengths in pre-micellar aggregates of surfactant, cosurfactant, and water were calculated using semiempirical molecular orbital theory by the method of the CNDO/2 program. The stability of pre-micellar aggregates in a nonpolar continuous medium was estimated using a thermocycle, and the onset of inverse micelle formation was predicted. The four component phase diagram of water - octanoic acid - sodium octanoate - carbon tetrachloride was explored and the phase behavior of the inverse micellar region explained using infrared spectrophotometry and molecular weight determinations. Dissert. Abstr.

N82-13207 Polytechnic Inst. of New York, Brooklyn.
POTENTIAL USE OF THE MINICOMPUTER CONTROLLED POWDER DIFFRACTOMETER FOR THE STRUCTURE DETERMINATION OF SMALL QUANTITIES OF RATHER IMPURE MATERIALS Ph.D. Thesis
Ronald Jenkins 1981 157 p
Avail: Univ. Microfilms Order No. 8118879

Minicomputer controlled diffractometer for routine powder diffractometry is investigated. Mixed tetra-fluorides of Europium, Magnesium and Strontium are used. Structures are determined on 50 mg. aliquots of EuMgF4, SmMgF4 and SrMgFd4 with sample purity generally in the 80 percent to 90 percent region. Cell parameters are determined to about 6 parts in 10,000. All three materials are found to be isostructural, each being orthorhombic with four formula units per unit cell. Dissert. Abstr.

N82-13208 Rensselaer Polytechnic Inst., Troy, N. Y.
SPECTROELECTROCHEMISTRY, FLASH PHOTOLYSIS AND PHOTOGALVANIC EFFECT OF METHYLENE BLUE AND SAFRANIN-O Ph.D. Thesis
Charles Edward Baumgartner 1981 275 p
Avail: Univ. Microfilms Order No. 8121137

Organic dyes are often employed in chemical, photochemical, or electrochemical redox reactions which require a visible color change between reactant and product. Two such dyes, methylene blue (3,7-dimethyl-amino-phenothiazine chloride) and safranin-O (2,8-dimethyl-3,7-diamine-phenazinium chloride) were investigated; their photochemistry being characterized by xenon flash photolysis and electrochemistry being monitored by various spectroelectrochemical techniques. In addition, the photogalvanic effect in the safranin-O/ethylenediaminetetraacetic acid photosystem was characterized with respect to participant concentrations. Spectroelectrochemical techniques of attenuated total reflectance spectroscopy, optically transparent thin layer electrochemical spectroscopy, and multiple specular reflection spectroscopy were employed to optically monitor dye reduction and leucodye oxidation. Xenon flash photolysis was employed to dye triplet states and semireduced free radicals resulting from photoreduction with various reducing agents. Dissert. Abstr.

N82-13209 Georgia Inst. of Tech., Atlanta.
STUDIES OF SAMPLE INTRODUCTION FOR INDUCTIVELY COUPLED PLASMA EMISSION SPECTROMETRY Ph.D. Thesis
Andrew William Boorn 1981 224 p
Avail: Univ. Microfilms Order No. 8124281

Pneumatic nebulization of a liquid sample, to produce an aerosol which is injected into the plasma is the most commonly employed method of sample introduction for the ICP, and was investigated in detail. It is found that the pneumatic nebulization process is approximately 1% efficient, and that the mechanism of aerosol transport to the plasma is not well characterized. If the efficiency of nebulization, an hence detection limit, is to be improved, the aerosol transport mechanism must be known. This mechanism was studied by use of Andersen cascade impactor to collect the aerosols produced by pneumatic nebuilzers. It was found that while the nebulizers produce droplets having a median diameter in the rate 50-150 micrometer, the median droplet size reaching the plasma is 2-4 micrometers. The major process influencing droplet transport efficiency are found to be gravitational setting an impaction, which reduce transport efficiency, and evaporation, which increases the amount of sample reaching the plasma. Dissert. Abstr.

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-13210 Ohio State Univ., Columbus.
FATIGUE CRACK INITIATION AND ELECTROCHEMICAL BEHAVIOR OF 403 STAINLESS STEEL IN AQUEOUS ENVIRONMENTS Ph.D. Thesis
Hamdy Mohamed Mourad Shalaby 1981 315 p
Avail: Univ. Microfilms Order No. 8121854

The fatigue crack initiation characteristics and the electrochemical behavior of quenched and tempered Type 403 stainless steel is studied in several environments. The tests are conducted in air, in deaerated distilled water, and in deaerated aqueous solutions of chloride, sulphate, phosphate, hydroxide, and silicate anions across a range of pH levels. Slight pitting occurs on the electrode surface after measurement of anodic polarization curves in 0.01M sulphate solutions, while crevice attack occurs in 1.0M solutions of pH's 7 and 10 at 100 C. The pitting corrosion in neutral and alkaline solutions of sodium sulphate has the same character as pitting of steel in sodium chloride solutions. Crevices are preferred sites for pitting, which later transform into severe crevice corrosion. Surface preparation factors have a profound effect on the nucleation of localized attack on 403 stainless steel in sodium sulphate solutions at 100 C. Dissert. Abstr.

N82-13211 Stanford Univ., Calif.
ACOUSTIC NONDESTRUCTIVE EVALUATION OF MICROSTRUCTURE Ph.D. Thesis
Nasser Bozorg-Grayeli 1981 221 p
Avail: Univ. Microfilms Order No. 8124042

Acoustic velocity and attenuation was measured in pure copper specimens with different grain sizes. The attenuation was found to be a mixture of stochastic and Rayleigh grain scattering. The measured acoustic attenuation was in good agreement with quantitative predictions based on the scattering theories of Lifshits and Parkhomovski. These experiments demonstrated the feasibility of grain size assessment by nondestructive acoustic attenuation measurement. Velocity and attenuation measurements were made on plain carbon and low alloy steels heat treated to have pearlite/ferrite, bainite, and martensite microstructures. For any given steel composition, velocity was lowest in martensite, inintermediate in bainite, and highest in pearlite/ferrite. In a 76mm round bar of 304 stainless steel, variations in acoustic velocity and attenuation depended upon grain size and texture as predicted by acoustic theory. The acoustoelastic constant varied with radial position apparently because of the texture gradient.
Dissert. Abstr.

N82-13212 Northwestern Univ., Evanston, Ill.
CYCLIC DEFORMATION AND FATIGUE CRACK INITIATION OF A COHERENTLY PRECIPITATING Ni-14.4 AT % Al ALLOY Ph.D. Thesis
Donald Louis Anton 1981 222 p
Avail: Univ. Microfilms Order No. 8124843

An inverse exponential equation was found to model the transient cyclic hardening behavior of all specimens tested. An empirical constant, R, was observed to change significantly with precipitate size, having a maximum value for the peak aged specimen and decreasing substantially as both under and over aging became more severe. Further analysis of this equation showed that the cyclic hardening rate was proportional to the term R. Microstructural examination illustrated that more uniform plastic deformation occurred during early cyclic straining of the peak aged material than in either the under or over aged cases. Furthermore, initial paired dislocation motion was replaced by unpaired tangles and a mottling of the dark field images of the precipitates. A mechanism, conforming with the microstructural evidence, is proposed to explain the substantial cyclic hardening based on the accumulated back and forth motion of dislocations through the precipitates. Dissert. Abstr.

N82-13213 Northwestern Univ., Evanston, Ill.
FATIGUE CRACK PROPAGATION STUDIES IN TWO CRYOGENIC STEELS Ph.D. Thesis
Hyong Jun Choi 1981 176 p

Avail: Univ. Microfilms Order No. 8124867

Fatigue crack growth rates were studied at low and intermediate stress intensity levels for two intercritically tempered cryogenic steels, Fe-5Ni-0.1C and Fe-4Mn-0.15C. Propagation rates were determined for varying intercritical tempering time corresponding to varying amounts of retained austenite, untempered martensite and varying degree of ferrite matrix recovery. In stage 2, the law da/dN = C (delta K)(m) was observed for all cases with coefficient m aprox. = 3.5. It was found that the heat treatments that optimize impact fracture properties in these steels are also beneficial with respect to da/dN in stage 1, while no beneficial effect at all was observed for stage 2. Moessbauer spectroscopy results indicate that the retained austenite in the rack path is transformed to martensite as was earlier shown for Charpy specimens. Auger composition analysis indicate a tendency for a stage 1 crack tip to avoid the mechanically induced brittle untempered martensite while no such preference was observed for stage 2 or when the microstructure had a less distinct seperation of hard and soft phases. Dissert. Abstr.

N82-13214 Cincinnati Univ., Ohio.

AN INVESTIGATION OF NOTCH LOW CYCLE FATIGUE LIFE BEHAVIOR OF RENE' 80 AT HIGH TEMPERATURE Ph.D. Thesis

Paul Allen Domas 1981 243 p
Avail: Univ. Microfilms Order No. 8123748

The cyclic stress-strain behavior of circumferentially notched bars was an elastic-plastic finite element computer model analyzed using to investigate cyclic material response at the notch roof. Low cycle fatigue tests on smooth and notched bars of the cast nickel-base superalloy, Rene'80 in the temperature range of 760 C to 982 C (1400 F to 1800 F) were conducted to provide test data for comparison to analytic predictions and the failed specimens were studied by optical, scanning, and transmission electron microscopy. A predictive technique incorporating the parameter of strain energy density integrated over a dissipative volume at the notch root was developed. Correlation of predicted results for circumferentially notched cylindrical bars and experimental data was found. The influence of material behavior as manifest in damage/deformation mechanisms was particularly evident in that an oxidation process was identified as the principal cause of failure at 982 C (1800 F). Dissert. Abstr.

N82-13215 Cincinnati Univ., Ohio.

SUBSTRUCTURE OF 316 STAINLESS STEEL PIPE WELDMENTS Ph.D. Thesis

Jude Reynold Foulds 1981 264 p
Avail: Univ. Microfilms Order No. 8123752

Weldment sections from 'formed and welded' large diameter 316 stainless steel pipe for structural use in the hot-leg of the liquid metal fast breeder reactor (LMFBR) were characterized microstructurally primarily through TEM. The weld metal dendritic substructure appears as a dislocation substructure with low-angle boundaries (< misorientation) demonstrated to be stable on reannealing and built up on interdendritic planes of mismatch. The weld and parent metal exhibit distinctly different elevated temperature recovery characteristics proposed to be chiefly responsible for the generally observed weld/parent metal differences in elevated temperature time-independent and-dependent mechanical behavior. The GTA weld shows a low ferrite content (-2%) with globular morphology uncharged on reannealing. The SA weld shoes no ferrite (susceptible to hot-cracking), an undesirable large columnar grain size, a distinct weld centerine at least on the inside bead, and the extensive occurrence of slag inclusion. Dissert. Abstr.

N82-13216*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

AN IMPROVED STRESS CORROSION TEST MEDIUM FOR ALUMINUM ALLOYS

T. S. Humphries and J. E. Coston Nov. 1981 11 p refs
(NASA-TM-82452) Avail: NTIS HC A02/MF A01 CSCL 11F

A laboratory test method that is only mildly corrosive to aluminum and discriminating for use in classifying the stress corrosion cracking resistance of aluminum alloys is presented along with the method used in evaluating the media selected for testing. The proposed medium is easier to prepare and less expensive than substitute ocean water. Author

N82-13217*# Pittsburg Univ., Pa. Dept. of Metallurgical and Materials Engineering.

INVESTIGATION INTO THE ROLE OF NaCl DEPOSITED ON OXIDE AND METAL SUBSTRATES IN THE INITIATION OF HOT CORROSION Semiannual Report, 1 Apr. - 1 Oct. 1981

N. Birks 1 Oct. 1981 24 p
(Grant NAG3-44)
(NASA-CR-165029; SAR-3) Avail: NTIS HC A02/MF A01 CSCL 11F

Morphological aspects of the conversion to Na_2SO_4 of NaCl deposits over the temperature range 500-700 C, in air with added SO_2 and H_2O. Progress of the reaction was observed by withdrawing samples at various times and examining them under the scanning electron microscope using EDAX to assess the extent of chloride to sulfate conversion. These initial results show that the conversion to Na_2SO_4 proceeds directly on the sodium chloride surface as well as on the surrounding substrate due to evaporation of NaCl from the solid particle. The mechanism of this reaction could involve reaction in the vapor to produce Na_2SO_4 which then deposits, alternatively Na_2SO_4 could form directly on the substrate surface due to direct reaction there between the vapors NaCl, SO_2 and O_2. A.R.H.

N82-13218*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

A QUANTITATIVE STUDY OF FACTORS INFLUENCING LAMELLAR EUTECTIC MORPHOLOGY DURING SOLIDIFICATION

W. F. S. Kaukler Nov. 1981 263 p refs
(NASA-TM-82451) Avail: NTIS HC A12/MF A01 CSCL 11F

The factors that influence the shape of the solid-liquid interface of a lamellar binary eutectic alloy are evaluated. Alloys of carbon tetrabromide and hexachloroethane which serve as a transparent analogue of lamellar metallic eutectics are used. The observed interface shapes are analyzed by computer-aided methods. The solid-liquid interfacial free energies of each of the individual phases comprising the eutectic system are measured as a function of composition using a 'grain boundary groove' technique. The solid-liquid interfacial free energy of the two phases are evaluated directly from the eutectic interface. The phase diagram for the system, the heat of fusion as a function of composition, and the density as a function of composition are measured. The shape of the eutectic interface is controlled mainly by the solid-liquid and solid-solid interfacial free energy relationships at the interface and by the temperature gradient present, rather than by interlamellar diffusion in the liquid at the interface, over the range of growth rates studied. S.L.

N82-13219# Rockwell International Science Center, Thousand Oaks, Calif.

LASER HEAT TREATMENT OF TRACK COMPONENTS IN COMBAT VEHICLES, PHASE 1 Final Report, 26 Sep. 1979 - 25 Sep. 1980

D. S. Gnanamuthu and R. J. Moores Jun. 1981 98 p
(Contract DAAK30-79-C-0136)
(AD-A102761; SC5248.12FR) Avail: NTIS HC A05/MF A01 CSCL 11/6

Abrasive wear locations in end connectors and center guides used in combat vehicles were precision heat treated with a continuous wave CO_2 laser beam. Self quenched casings 3 to 4 mm deep, with predominantly martensitic microstructure of hardness between Rc 50 to 54, were observed. Coverage rates up to 90 mm/s were obtained. Abrasive wear tests revealed that laser heat treated specimens had smaller wear scar dimensions than untreated specimens. In a 9 mm thick AISI 4140 steel plate, case depth of 6.5 mm was obtained. Heat treatment was conducted with laser beam power of 4000 to 5000 W, with the beam shaped by a three-mirror optical tooling to provide a uniformly intense beam of size 19 x 19 mm. with this optical tooling, a stand-off distance of 445 mm between beam directing mirror and work surface was available. Laser heat treating cost estimates for an end connector were found to be $0.60 and for a center guide $0.69. Specifications and cost estimates for a prototype laser heat treating facility were developed. Author

N82-13220# Acurex Corp., Mountain View, Calif. Aerotherm Div.
TITANIUM RESPONSE TO A NUCLEAR RADIATION ENVIRONMENT Final Report, 1 Nov. 1979 - 31 Oct. 1980
K. Triebes and G. Liu 20 Jan. 1981 42 p refs
(Contract DNA001-79-C-0158)
(AD-A102516; DNA-5596F; FR-81-10/AS) Avail: NTIS HC A03/MF A01 CSCL 11/6

Titanium response under a nuclear encounter environment was modeled and incorporated into a computer program. Predictions were compared with experimental results under simulated laboratory environments. Excellent agreement were obtained for all test cases. While no evidence of sustained combustion was observed for the missile shroud under potential flight environments, it was demonstrated that titanium failed catastrophically under certain simulated conditions. Author

N82-13221# Rockwell International Science Center, Thousand Oaks, Calif. Science Center.
MECHANISMS BY WHICH HUMIDITY ALTERS DUCTILITY Annual Technical Report, 15 Apr. 1980 - 14 Apr. 1981
W. L. Morris, M. R. James, and R. V. Inman Sep. 1981 56 p refs
(Contract N00014-79-C-0034)
(AD-A105530; SC5211.2AR) Avail: NTIS HC A04/MF A01 CSCL 11/6

The ductility of surface of Al 2219-T851 has been measured in two regimes of plastic strain. In the small strain regime, we determined the microplastic strain which develops within individual grains, at the surface, during fatigue at cyclic stress amplitudes substantially below the bulk yield strength. Initially the deformation is elastic; but, with increasing fatigue, local plastic strains under tensile load develop within individual grains and can approach 0.5%. It is these plastic strains which lead to crack initiation at the surface. The measurement technique is described, and data are presented for two different heats of 2219 taken in dry and in humid air. These materials are thought to differ substantially in as-received hydrogen content. It appears from our results that internal hydrogen increases the rate of development of microplasticity at the surface during fatigue, accelerating crack initiation. The role of surface oxide in determining surface ductility is complex, and is apparently a function of the internal hydrogen content of the alloy. In the large strain regime, the ductility of the surface is assessed by measuring the opening displacements of the tips (CTOD) of small surface cracks. GRA

N82-13222# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
EFFECT OF LOW-TEMPERATURE IRRADIATION WITH (n, ALPHA) HELIUM PRODUCTION ON TENSILE PROPERTIES OF 12 Cr-1 Mo VW-TYPE STEELS
R. L. Klueh, J. M. Vitek, and M. L. Grossbeck 1981 5 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028578; CONF-810831-10) Avail: NTIS HC A02/MF A01

Tensile specimens for small heats of ferritic (martensitic) steel irradiated in the High Flux Isotope Reactor (HFIR) to displacement damage levels. Transmutation of Ni by thermal neutrons during irradiation in HFIR leads to helium production rates similar to those anticipated in a fusion reactor. Displacement damage is produced simultaneously by fast neutron flux in the reactor. After irradiation, specimens were tested at room temperature and 3000 C. Yield strength and ultimate tensile strength of irradiated samples displayed considerable hardening over the unirradiated condition. DOE

N82-13223# Los Alamos Scinntific Lab., N. Mex.
NEW WAYS OF LOOKING FOR PHASE TRANSITIONS AT MULTI-MEGABAR DYNAMIC PRESSURES
J. W. Shaner 1981 11 p refs Presented at the Conf. on High Pressure Phys., Bad Honnef, West Germany, Aug. 1981
(Contract W-7405-eng-36)
(DE81-028771; LA-UR-81-2062; CONF-810828-4) Avail: NTIS HC A02/MF A01

Three new techniques were applied to thermodynamic measurements behind a shock wave. Optical pyrometry was used to measure the temperature of shocked SiO2. A temperature anomaly was found, indicating a phase change, probably melting, between 0.6 and 1.1 Mbar. Magnetic probes were used to measure the velocity of sound in shock compressed metals. Loss of a longitudinal elastic component of the sound wave is indicative of melting. An optical analyzer technique, exploiting the sensitivity of thermal radiation to small temperature changes, was used to measure sound velocity in shock compressed metals. With this derivative measurement both solid-solid and melting transitions of iron were detected. DOE

N82-13224# Los Alamos Scientific Lab., N. Mex.
THEORETICAL EQUATIONS OF STATE FOR METALS
G. I. Kerley 1981 6 p refs Presented at APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract W-7405-eng-36)
(DE81-028743; LA-UR-81-2124; CONF-810684-42) Avail: NTIS HC A02/MF A01

Equation of state (EOS) calculations for xenon, iron, and beryllium are described and shown to give good agreement with shock wave experiments. The theory includes models for both solid and fluid phases, calculation of the melting curve, and effects of atomic shell structure on thermal electronic contributions to the EOS. DOE

N82-13225# California Univ., Livermore. Lawrence Livermore Lab.
OPTICAL POLISHING OF METALS
N. J. Brown, P. C. Baker, and R. T. Maney 29 Jul. 1981 16 p refs Presented at SPIE Intern. Symp., San Diego, 24 Aug. 1981
(Contract W-7405-eng-48)
(DE81-028690; UCRL-86514; CONF-810810-17) Avail: NTIS HC A02/MF A01

Metal polishing and fixed charge lap models are presented. Surface roughness of metals simultaneously polished on the same lap tended to vary inversely with Young's modulus. Electroless nickel wear rates with diamond, silicone oil, and pitch varied linearly with pressure and abrasive travel. Wear rates for the few samples run did not necessarily vary with just Young's modulus or hardness. It was not clear whether rates vary linearly with particle size. There was a distinct difference in the behavior of diamond and alumina on pitch laps. Alumina produced rougher surfaces than the corresponding size diamond on electroless nickel. There was a distinct difference between water and silicone oil as fluid lubricants on pitch laps. Roughness distributions on metals yielded Gaussian histograms for depth even on the smoothest specimens measured (similar effects are seen in glass). Data to support the above are provided. DOE

N82-13226# Electric Power Research Inst., Palo Alto, Calif.
WORKSHOP PROCEEDINGS: CORROSION OF INCONEL 600 STEAM GENERATOR TUBING IN THE TUBESHEET CREVICE
C. V. Hultman, R. G. Lucas, and J. P. N. Pane May 1981 362 p Workshop held in Palo Alto, Calif., 9-10 Sep. 1980
(DE81-903554; EPRI-WS-80-157; CONF-8009163) Avail: NTIS HC A16/MF A01

The proceedings of a workshop on the problem of the cracking and intergranular attack of Inconel 600 tubing in tubesheet crevices in nuclear reactor steam generators are presented. Objectives of the workshop were to: (1) focus on the problem; (2) identify and prioritize possible mechanisms; (3) focus on the testing necessary to analyze and describe the problem; (4) determine what remedial actions should be taken in the plants; (5) determine what else can be observed from plant data; and (6) attempt to treat the problem and not a symptom of the problem. A summary is presented along with each participant's material. DOE

N82-13227# Bureau of Mines, Rolla, Mo.
INSOLUBLE ANODES FOR ELECTROWINNING ZINC AND OTHER METALS
E. R. Cole, Jr. and T. J. OKeefe May 1981 31 p refs

(PB81-227365; BM-RI-8531) Avail: NTIS HC A03/MF A01 CSCL 11F

The polarization behavior of Pb-Ag anodes in H2SO4 and fluoride solutions was determined as the first step in the development of such an anode. A Luggin capillary, dc power supply, high-impedance voltmeter, and other equipment standard to an electrochemical laboratory were used. During polarization, a relatively hard, stable coating of PbO2 was formed on the surface of the lead-silver anode. The rate of formation was enhanced by the presence of fluoride ions in solution. Subsequent investigations resulted in the development of a PbO2-coated titanium anode. Additional data resulting from extensive testing of the anodes, as well as process improvements and innovations, are included. GRA

N82-13228 Ohio State Univ., Columbus.

STRESS CORROSION CRACKING OF TYPE 304 STAINLESS STEEL IN HIGH TEMPERATURE DILUTE CHLORIDE SOLUTION Ph.D. Thesis

Lifun Lin 1981 142 p

Avail: Univ. Microfilms Order No. 8121821

The susceptibility of sensitized type 304 stainless steel to stress corrosion cracking (SCC) in high temperature dilute chloride solution was studied using slow strain rate technique. When the electrode potential was more noble than a critical potential, intergranular stress corrosion cracking (IGSCC) was observed. At temperatures equal to or higher than 150 C simultaneous IGSCC and TGSCC occurs when the potential was above that for passivation breakdown. At temperatures below 150 C, IGSCC is accompanied by the occurrence of pitting potential. The activation energy for intergranular crack propagation is equal to 7 + or - 3 Kcal/mole. This indicates that the crack growth is controlled by mass transport process. It was found that using slow strain rate test, the total time to failure for a sensitized type 304 stainless steel was predominated by the initiation of an active crack. The threshold potential for arresting a propagating crack coincides with the critical potential for IGSCC obtained on originally smooth specimens. Dissert. Abstr.

N82-13229 Stanford Univ., Calif.

STRENGTHENING PHASES AND DEFORMATION MECHANISMS IN DISPERSION STRENGTHENED SOLID SOLUTIONS AND PURE METALS Ph.D. Thesis

Warren Carl Oliver 1981 150 p

Avail: Univ. Microfilms Order No. 8124124

The processing of aluminum powders to produce dispersion strengthened (DS) aluminum is studied. The dispersoid structures that form during mechanical alloying of aluminum is investigated, and structural changes that occur during subsequent heating are observed. Aluminum is produced by mechanical alloying (high energy ball milling) and subsequent hydrostatic extrusion. Mechanical properties of DS aluminum alloys, DS AlMg alloy, in particular are studied to observe the combined effects of dispersion strengthening and solute strengthening. The deformation characteristics of DS Al and DS AMg determined using constant crosshead speed compression tests and constant stress creep tests. Hard particles eliminate solute drag conrolled dislocation motion as a rate controlling mechanism for deformation. Even at relatively low temperature, the oxide particles in these alloys may deform and the deformation of the particles controls the deformation of the alloy. Dissert. Abstr.

N82-13230 Northwestern Univ., Evanston, Ill.

CYCLIC DEFORMATION AND FATIGUE MICROCRACK INITIATION IN PEARLITIC EUTECTOID STEEL Ph.D. Thesis

Hyun Sunwoo 1981 147 p

Avail: Univ. Microfilms Order No. 8125018

The cyclic softening and hardening behavior and the dislocation structural changes during cyclic deformation in a pearlitic eutectoid steel with variable interlamellar spacing is investigated, using controlled strain aging experiments. Transmission electron microscopic (TEM) observations are made on foils prepared from uncycled and cycled specimens. The initiation modes of surface fatigue microcracks are also examined by TEM using replicas and directly with scanning electron microscopy. The cyclic deformation behavior strongly depends on the interlamellar spacing with cyclic softening in the fine pearlite, cyclic hardening in the coarse pearlite, and both cyclic softening and hardening at low and high strain amplitudes, respectively, in the medium pearlite. Dissert. Abstr.

N82-13231 Northwestern Univ., Evanston, Ill.

DEFORMATION-ENHANCED PHOTOEMISSION FROM METALS Ph.D. Thesis

Tiruchengodu Krishna Ganapathy Swami 1981 145 p

Avail: Univ. Microfilms Order No. 8125019

Plastic deformation enhanced UV photoemission from oriented single crystal surfaces of aluminum is studied. Clean aluminum single crystals oriented in /111/direction are flexurally fatigued under ultrahigh vacuum conditions and for the first time photoelectron energy distribution curves are obtained as a function of fatigue cycles using the HeII(21.2 eV) and the HeII(40.8 eV) photon lines. A progressive decrease in work function is observed as the specimen is subjected to increasing number of fatigue cycles. Deformation enhanced photoemission behavior of oxide covered aluminum and other metals is also investigated using photons from a mercury arc lamp (photon energy 5.0, 5.1 or 5.2 eV). Initially, Al(100) and Al(111) faces are exposed to oxygen and the photocurrent measured as a function of exposure. On both the faces photocurrent increases initially, reaches a maximum and then starts to fall very slowly with oxygen exposure. Dissert. Abstr.

N82-13232 Florida Univ., Gainesville.

MATHEMATICAL MODEL OF DIFFERENTIAL REFLECTOMETRY FOR USE IN THE INVESTIGATION OF THIN FILM CORROSION PRODUCTS Ph.D. Thesis

Frank Karl Urban, III 1981 173 p

Avail: Univ. Microfilms Order No. 8124460

Maxwell's equations without any simplifying assumptions were used in a model developed to produce computer calculated differential reflectograms (difference in reflectivity as a function of photon energy) which were compared with experimentally obtained reflectograms. The calculated differential reflectograms are distinguished by a sequence of interference peaks if the product of film thickness and index of refraction of the corrosion product film is greater than 40 nanometers. For an oxide film thickness below this critical value, no interference peaks are expected. High purity tungsten was chosen for the primary experimental thrust. Chromium, molybdenum, zinc, magnesium and copper also were investigated. Matching the calculated and experimental reflectograms leads to the identification of the source of each peak, the establishment of the interband peak energies and the determination of optical constants and thicknesses of the film. Dissert. Abstr.

N82-13233 Stanford Univ., Calif.

A STUDY OF THE SURFACE REACTIVITY OF SILVER: AN ACID BASE CHARACTERIZATION OF OXIDATION REACTIONS Ph.D. Thesis

Mark Alan Barteau 1981 474 p

Avail: Univ. Microfilms Order No. 8124031

The absorption of oxygen on the Ag(110) surface and the reactions of oxygen with organic compounds were examined. Above 150K oxygen was dissociatively adsorbed on the surface, below this temperature an adsorbed molecular species was also present. The reactivity of adsorbed oxygen atoms was characteristics of an acid-base reaction. Adsorbed bases included formate, acetate, mono-dentate acetylide, bi-dentate acetylide, and hydroxyl. These species could be stoichiometrically titrated from the surface by stronger acids to yield the parent acids plus the adsorbed conjugate base of the stronger acid. The order of acidity on the Ag(110) surface was determined to be: 1,2 formic acid, acetic acid; 3 ethanol; 4 acetylene; 5 methanol; 6,7 water, propylene; 8,9,10 hydrogen ethylene, ethane. Little perturbation of the orbitals expected for gas phase anions was observed to arise from the interaction with the surface. Dissert. Abstr.

N82-13281*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ELEVATED TEMPERATURE FATIGUE TESTING OF METALS

Marvin H. Hirschberg *In* AGARD Fatigue Test Methodology

Oct. 1981 18 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

N82-13283# Royal Aircraft Establishment, Farnborough (England). Structures Dept.
METHODS OF OBTAINING CRACK GROWTH DATA IN METALS
P. R. Edwards *In* AGARD Fatigue Test Methodology Oct. 1981 22 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

N82-13285# Waterloo Univ. (Ontario). Dept. of Civil Engineering.
CYCLIC STRAIN APPROACH TO FATIGUE IN METALS
T. H. Topper and P. Au *In* AGARD Fatigue Test Methodology Oct. 1981 25 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-13234 Lowell Univ., Mass.
POLYMERS WITH MESOMORPHIC ORGANIZATION IN THE SIDE CHAINS FROM VINYL MONOMERS WITH MESOGENIC OR POTENTIALLY MESOGENIC ELEMENTS Ph.D. Thesis
Lee-Kiat Lim 1981 172 p
Avail: Univ. Microfilms Order No. 8124825

Monomers and their saturated analogs containing mesogenic or potentially mesogenic elements in the side chains were synthesized. Polymerization of the monomers was carried out in the mesomorphic and isotropic melt states and in solution. The polymers prepared were characterized by means of IR, viscometry, TMA, C13-NMR, X-ray diffraction and polarizing microscopy. Polymerization of MBABA in the mesomorphic phase was found to influence polymer tacticity. Polymerization of non-mesomorphic MBnBA resulted in a polymer exhibiting enantiotropic mesomorphism. Differential scanning calorimetry was evaluated and found to be a useful new tool for the determination of polymerization rate. Dissert. Abstr.

N82-13235 Polytechnic Inst. of New York, Brooklyn.
STUDIES OF POLYMER COMPATIBILITY BY NONRADIATIVE ENERGY TRANSFER Ph.D. Thesis
Ju-Ming Hung 1980 135 p
Avail: Univ. Microfilms Order No. 8118877

The excitation energy of a donor can be transferred to an acceptor when the emission spectrum of the donor overlaps the absorption spectrum of the acceptor. Polymers were prepared containing the comonomers, 2-(N-carbazolyl)ethyl methacrylate and 9-anthrylmethyl methacrylate as fluroescence donors and acceptors, respectively. The mutual interpenetration of the polymer chains carrying the donor and the acceptor led to a sharp increase of excitation energy transfer characterized by the relative emission intensities at 347 nm and 413 nm, the emission maxima of the carbazolyl and the anthryl chromophores, when the system was irradiated at 296 nm. The critical transfer distance RO = 2.7 nm to 2.9 nm was calculated from spectroscopic parameters. However RO = 3.6 nm was obtained from the quenching of the donor fluorescence at increasing acceptor concentrations when 2-(N-carbazolyl)ethyl acetate and 9-anthryl methyl acetate were incorporated in polymer films. The polymer blends of poly(styrene co acrylonitrile) with poly(methyl methacrylate) were studied by energy transfer method. The angle of compatibility indicated by the fluroescence technique was similar, but slightly narrower then estimated from the optical clarity. Dissert. Abstr.

N82-13236 Polytechnic Inst. of New York, Brooklyn.
FLAMMABILITY AND PHOTO-STABILITY OF SELECTED POLYMER SYSTEMS Ph.D. Thesis
Jeelin Lo 1981 142 p
Avail: Univ. Microfilms Order No. 8118883

A systematic approach to the improvement of the flammability of epoxy resins, bisphenol-A polycarbonate, poly(butylene terephthalate), and Nylon 6.6 by introducing halogens and loop functionality into the flame retardants is described. The investigation of the thermal properties of the char-forming phenol-formaldehyde resins was conducted to provide information for the systematic design of high temperature flame-resistant phenolics. The differences in structure of the cured resins were observed from the FT-IR spectra. The s-trioxane cured resins contain long chain ethers and cyclic acetals along with the methylene linkages. In the study of the photo-Fries rearrangement the fluorene-based polyarylates prepared included 9,9-bis (4-hydroxy phenly) fluorene isophthalate (BPF-I), 9,9-biscresol fluorene isophthalate (BCF-I), and 9,9-bis (3,5-dimethyl-4-hydroxy phenyl) fluorene isophthalate (BDMPFI). Dissert. Abstr.

N82-13237 Seton Hall Univ., South Orange, N. J.
GAS-SOLID CHROMATOGRAPHY ON CATION FORMS OF LIGHTLY SULFONATED POROUS POLYMERS Ph.D. Thesis
Robert John Gaydosh 1981 266 p
Avail: Univ. Microfilms Order No. 8122397

Porapak Q, an ethyl vinyl benzene - divinyl benzene copolymer resin, lightly sulfonated and converted to various cationic forms for use as a packing in gas-solid chromatography (GC). These packings are an improvement over regular ion exchange resins for GC work. These resins are easily prepared, are stable at high temperatures, and the various metal forms of the resins offer a variety of diversified packings. The sulfonic acid content of the resin is closely controlled and with it, the amount of metal exchanged onto the resin. The stability of the silver form of the resin is particularly advantageous because this metal's strong affinity for unsaturated centers is utillized to seperate these type compounds, and to study the physical interactions between the two. Dissert. Abstr.

N82-13238 North Carolina State Univ. at Raleigh.
EFFECT OF SOLVENTS ON THE RADIATION-INDUCED POLYMERIZATION OF ETHYL AND ISOPROPYL VINYL ETHERS Ph.D. Thesis
Wen-Chyi Hsieh 1981 112 p
Avail: Univ. Microfilms Order No. 8121731

The effect of solvents on the radiation-induced cationic polymerization of ethyl and isopropyl vinyl ethers (EVE and IPVE, respectively) was investigated. EVE and IPVE polymerizations were carried out in bulk and in solution under superdry conditions in which polar impurities, especially water, were reduced to negligible levels. Plots of the monomer conversions and irradiation times were obtained for EVE and IPVE polymerizations in bulk and in benzene solution at constant monomer concentrations. The results show that solvation of the propagating cation by the monomer molecules is insignificant. The monomer concentration dependence of the polymerization rate was studied for EVE polymerization in bulk and in benzene, diethyl ether, diglyme and methylene chloride, and for IPVE polymerization in bulk and in benzene. Solvent effect on the estimated propagating rate constants was examined for EVE and IPVE polymerization in bulk and in solution. The Laidler-Eyring theory, through evaluation of electrostatic forces of reaction media, could better predict the effect of polar solvents in IPVE polymerization than in EVE polymerization. The effect of temperature on the polymerization rate was also investigated. Dissert. Abstr.

N82-13239 Michigan Univ., Ann Arbor.
STRAIN-INDUCED CRYSTALLIZATION OF POLYMERS Ph.D. Thesis
Kuo-Zong Hong 1981 282 p
Avail: Univ. Microfilms Order No. 8122777

A nucleation theory was formulated to account for the behavior of polymer crystallization under molecular strain or orientation. The enhancement of nucleation rate, the elevation of melting temperature, and the decrease in critical nucleus size were quantitatively predicted as a function of molecular strain. Crystalline kinetics, melting behavior, and morphology were experimentally determined and the interrelationships were explored. Effects of shear rate, crystallization temperature, molecular weight, and chemical structure were investigated. It was found that the nucleation rate, in terms of the reciprocal of

induction time, increases with shear rate and decreases with temperature. The findings in kinetics, melting behavior, and morphology are consistent with each other in terms of the proposed theory, indicating that they all stem from the same origin: molecular strain, and thus entropy reduction.
Dissert. Abstr.

N82-13240 Wisconsin Univ. - Madison.
STRUCTURE-PROPERTY RELATIONSHIPS IN SEGMENTED ELASTOMERS: SMALL ANGLE X-RAY SCATTERING, THERMAL, AND MECHANICAL STUDIES Ph.D. Thesis
John William Chapman VanBogart 1981 566 p
Avail: Univ. Microfilms Order No. 8117545

The structure-property relationships of a series of polyether and polyester polyurethanes and polyether-polyester segmented copolymers were studied as a function of hard-segment type, soft-segment type, segment length, hard-segment content, segment length polydispersity, and material thermal history. The model presented for the morphology of the semi-crystalline polyurethane materials suggests cylindrical or parallelipiped-shaped hard-segment crystallies with low axial ratios. The model for the H12 MDI-based polyurethanes involves spherical regions of amorphous hard-segments. Polyether polyurethanes were shown to have more complete phase separation than equivalent polyester-based polyurethanes. Annealing was shown to improve the degree of phase separation in more compatible systems of segmented polyurethane elastomers. Hard-segment domain size and interfacial thickness were roughly twice as large the direction of stretch than transverse to it in semicrystalline materials. In genera, annealing resulted in an endothermic peak at a temperature 20 deg to 50 deg above that of the temperature of annealing in both semicrystalline and amorphous materials. Dissert. Abstr.

N82-13241 Northwestern Univ., Evanston, Ill.
A STUDY OF THE DYNAMIC AND TRANSIENT PROPERTIES OF POLYMER SOLUTIONS Ph.D. Thesis
Christine Mary Jarzebski Vrentas 1981 211 p
Avail: Univ. Microfilms Order No. 8125028

A rheometrics mechanical spectrometer was used to study the dynamic and transient properties of polymer solutions. Dynamic moduli were measured using both a parallel plate oscillatory experiment and a stead state experiment conducted with an eccentric rotating disk (ERD) apparatus. Shear stress and normal stress relaxation data on polymer solutions were obtained with a cone and plate step shear strain experiment. These data were used to test nonlinear phenomenological and molecular constitutive theories. These experiments were conducted primarily linear and branched polybutadienes and their solutions. A computerized oscillatory experiment was developed to produce dynamic data against which ERD results could be compared. A computerized stress relaxation experiment was developed to produce reliable shear stress and normal stress relaxation data. The applicability of simple fluid theory to the rheology of polymer solutions was confirmed.
Dissert. Abstr.

N82-13242 Wisconsin Univ. - Madison.
ELECTROSTATIC AND HYDRODYNAMIC INTERACTIONS OF · CHARGED MACROMOLECULAR SYSTEMS Ph.D. Thesis
David Michael Piatt 1981 271 p
Avail: Univ..Microfilms Order No. 8120325

A variety of light scattering techniques, elastic, quasielastic, and electrophoretic quasielastic is used to characterize charged macromeolecular systems. The use of these techniques to characterize several biological and synthetic macromolecules is described. These samples include amphoteric latex particles, bovine rod outer segment disk membranes, concentrated protein solutions, and DNA dependent RNA polymerase. An amphoteric latex system was prepared by a surfactant free emulsion polymerization of styrene, methacrylic acid, and beta-N,Ndiethy amino ethyl methacrylate. It is found that the radius varies from 101 to 124 nm as the pH is varied from 7 to either 3 or 11. A similar, but smaller, change is observed in the Stokes radius, as determined by quasielastic light scattering. Electrophoretic quasielastic light scattering shows that the change in the magnitude of the electrophotoretic mobility is symmetric about a pH slightly less than 7 (6.7-6.8). A simple concentric sphere model is presented which can qualitatively account for these changes.
Dissert. Abstr.

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-13243*# Engineering Societies Commission on Energy, Inc., Washington, D. C.
BARRIERS TO THE UTILIZATION OF SYNTHETIC FUELS FOR TRANSPORTATION Final Report
Harry W. Parker and Matthew J. Reilly Oct. 1981 25 p
(NASA Order C-57307-D; Contract DE-AI01-81CS-50006)
(NASA-CR-165517; DOE/NASA-7307/1) Avail: NTIS HC A02/MF A01 CSCL 21D

The principal types of engines for transportation uses are reviewed and the specifications for conventional fuels are compared with specifications for synthetic fuels. Synfuel processes nearing the commercialization phase are reviewed. The barriers to using synfuels can be classified into four groups: technical, such as the uncertainty that a new engine design can satisfy the desired performance criteria; environmental, such as the risk that the engine emissions cannot meet the applicable environmental standards; economic, including the cost of using a synfuel relative to conventional transportation fuels; and market, involving market penetration by offering new engines, establishing new distribution systems and/or changing user expectations.
T.M.

N82-13244# California Univ., Livermore. Lawrence Livermore Lab.
SOVIET UCG EXPERIENCE SPECIFICALLY RELATED TO FIELD EXPERIMENTS IN THE UNITED STATES
D. U. Olness 8 Jul. 1981 6 p refs Presented at 7th Underground Coal Conversion Symp., Fallen Leaf Lake, Calif., 8 Sep. 1981
(Contract W-7405-eng-48)
(DE81-028642; UCRL-85919; CONF-810923-6) Avail: NTIS HC A02/MF A01

Soviet experiences with problems in underground coal gasification experiments reveal similarities to problems encountered in the United States. Aerodynamic considerations and problems with hole failure, override, reverse burn links, and other coal conversion/extraction related difficulties are discussed.
M.D.K.

N82-13245# Oak Ridge National Lab., Tenn.
H-COAL PRODUCT PHYSICAL PROPERTIES MEASUREMENT Final Report
D. D. Lee Aug. 1981 21 p refs
(Contract W-7405-eng-26)
(DE81-029095; ORNL/TM-7915) Avail: NTIS HC A02/MF A01

Rheological and density measurements have been made on the H-Coal PDU reactor effluent samples, which used Wyodak coal. Characterization was done in the ORNL Coal Liquids Flow System. Apparent viscosities and shear rates were observed. The rheological data were fitted to both power law and Bingham plastic models. The apparent viscosities appeared to correlate to the amount of solids in the samples. DOE

N82-13246# Battelle Columbus Labs., Ohio.
SYNTHETIC FUEL AROMATICITY AND STAGED COMBUSTION Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
A. Levy, J. R. Longanbach, and L. K. Chan 30 Jul. 1981 24 p refs
(Contract DE-AC22-80PC-30302)
(DE81-024205; DOE/PC-30302/3; QTPR-3) Avail: NTIS HC A02/MF A01

Analytical data for narrow solvent refined coal (SRC 2) distillation cuts were compared and found to show similar trends. The precision of the basic nitrogen procedure was found to be within + or - 1% of the basic nitrogen content. A nuclear magnetic

resonance method for structural parameter characterization was implemented. An aromatic gas chromatograph (GC) standard was prepared for use in the simulated distillation by GC analyses. A GC column was used to show the sample changes which occur during pyrolysis. Exploratory experiments, carried out to determine the conditions of time and temperature under which the SRC 2 distillation cuts would pyrolyze, were conducted by vaporizing the SRC 2 cut, mixing the fuel vapor with helium, and then passing the mixture into the heated reaction zone. A set of analyses was obtained on the liquid products from pyrolysis at 800 C of 200 to 250 C SRC 2 distillation cut using two different residence times. Time and temperature exposure difficulties complicated data interpretation. Gas analyses showed the presence of hydrocarbon, HCN, NH3, and N2 in the gas phase.
DOE

N82-13247# Burns and Roe Industrial Services Corp., Paramus, N. J.
LOW/MEDIUM BTU COAL GASIFICATION ASSESSMENT PROGRAM FOR POTENTIAL USERS IN NEW JERSEY: EXECUTIVE SUMMARY
May 1981 21 p refs
(Contract DE-AC01-79RA-20216)
(DE81-025475; DOE/FE-20216/1) Avail: NTIS HC A02/MF A01

The production of medium Btu quality gas (MBG) for use as fuel for on-site power plant boilers or for distribution to industrial customers appeared to be economically attractive, dependent upon the proximity of sufficient numbers of industrial customers and upon high plant utilization. The Texaco Coal Gasification Process (TCGP) was selected, being a pressurized process capable of supplying the gas without downstream compression. The TCGP could handle the high sulfur eastern coals chosen as a feedstock. All equipment downstream of the gasifier was commercially proven. The integration of the gasification process with a methanol synthesis plant, consuming up to 25% of the MBG produced, was desirable in order to allow storage of MBG during low demand and thereby increase the gasifier capacity factor and minimize its turndown requirements.
DOE

N82-13248# Combustion Engineering, Inc., Windsor, Conn.
LOW-BTU GASIFICATION OF COAL FOR ELECTRIC POWER GENERATION, PHASE 1, 2, AND 3 Monthly Progress Report, 1 Apr. - 30 Apr. 1981
16 Aug. 1981 46 p refs
(Contract DE-AC01-76ET-10204)
(DE81-029482; DOE/ET-10204/T1; FE-1545-89) Avail: NTIS HC A03/MF A01

Oxygen-enriched operation of the Pressure Distribution Unit was initiated on April 1, 1981. Eleven oxygen enriched gasmaking tests were made during the month. These tests were interrupted upon eight occasions by slag tap pluggage or imminent pluggage. A 15 to 20 day opuations text was begun during the month, but not successfully completed owing to the tap hole pluaggage problems. Iron reduced from the slag due to the low oxygen concentration in this region was the most obvious explanation for the tap hole pluggages.
DOE

N82-13249# Mason and Hanger-Silas Mason Co., Inc., Amarillo, Tex.
EVALUATION OF LOW-CHLORINE TATB FROM A PRODUCTION SOURCE
T. L. Stallings, A. Gordon Osborn, Herb D. Johnson, Arnie A. Duncan, and Clifford L. Schaffer Aug. 1981 25 p
(Contract DE-AC04-76DP-00487)
(DE81-025474; MHSMP-81-34; PDE-208; SANL-905-002) Avail: NTIS HC A02/MF A01

Six production lots of low-chlorine TATB powder were evaluated. Five of the lots were made by a wet-amination process and the other was made by an emulsion-amination process. LX-17 physical properties specimens made from the five wet-aminated TATB lots were exceptionally strong and comparable to dry-aminated TATB, while the emulsion-aminated lot of TATB had lower strength.
DOE

N82-13250# Sandia Labs., Albuquerque, N. Mex. Initiating and Pyrotechnic Components Div.
REVIEW OF LOW-VOLTAGE CP DETONATORS
M. L. Lieberman, F. J. Villa, D. L. Marchi, A. L. Lause, D. Yates, and J. W. Fronabarger 1981 25 p refs Presented at the 11th Symp. on Explosives and Pyrotechn., Philadelphia, 15 Sep. 1981 Prepared jointly with Unidynamics/Phoenix, Inc.
(Contract DE-AC04-76DP-00789)
(DE81-025837; SAND-81-0245C; CONF-810926-1) Avail: NTIS HC A02/MF A01

The compound 2-(5-cyano tetrazolato) penta ammine cobalt(III) perchlorate (CP) was developed to provide a relatively safe explosive material for low-voltage, hot-wire detonators. The design and development of CP detonators, and data on their performance are presented. Explosive CP was incorporated into a variety of low voltage deflagration-to-detonation transition (DDT) type detonators designed to have high density powder in the ignition region and low density powder in the DDT region. Devices were developed which meet 1 amp/1 watt no-fire and 3.5 amp all-fire requirements with high reliability. Detonation is achieved with high reliability at distances from the bridgewire of < 1/4 inch. Specific detonators were fabricated that are small and capable of withstanding high shock loads, long-term temperature extremes, and short-term high-temperature excursions.
DOE

N82-13251# Sandia Labs., Albuquerque, N. Mex. Initiating and Pyrotechnics Div.
PERFORMANCE OF CHEMICAL ANALOGS OF THE EXPLOSIVE CP
J. W. Fronabarger, W. Fleming, and M. L. Lieberman 1981 31 p refs Prepared jointly with Unidynamics/Phoenix
(Contract DE-AC04-76DP-00789)
(DE81-025836; SAND-81-0246C; CONF-810926-2) Avail: NTIS HC A03/MF A01

The development and weapons systems application of 2-(5-cyano tetrazolato) penta ammine cobalt (III) perchlorate, designated CP, for low voltage detonators, was studied to arrive at materials superior to CP in performance and sensitivity characteristics. Desired improvements included shorter deflagration-to-detonation transition (DDT) distances and lower electrostatic discharge (ESD) sensitivity in the confined, pressed state. Synthesis, analytical, and explosive testing activities, using 12 materials are presented. Several substituted (CP and CP analogs) undergo DDT directly from hot wire ignition. Some of the CP analogs exhibit DDT tendencies equivalent or superior to CP. The degree of DDT for the analogs is inversely proportional to density; none of the analogs studied were ESD sensitive, however, for the confined pressed form, the materials were ignitable from ESD. Many analogs showed lower ESD sensitivity than CP which suggests that safer detonators can be developed. Thermal response characteristics of the analogs varied somewhat, with exothermic activities.
DOE

N82-13252# Ultrasystems, Inc., Irvine, Calif.
FEASIBILITY STUDY REPORT FOR THE IMPERIAL VALLEY ETHANOL REFINERY: A 14.9-MILLION-GALLON-PER-YEAR ETHANOL SYNFUEL REFINERY UTILIZING GEOTHERMAL ENERGY
Mar. 1981 202 p Prepared in cooperation with U.S. Alcohol Fuels, East Mesa, Calif.
(Contract DE-FG07-80RA-50308; Proj. 1013)
(DE82-000288; DOE/RA-50308/1) Avail: NTIS HC A10/MF A01

The construction and operation of a 14,980,000 gallon per year fuel ethanol from grain refinery is proposed. The refinery will use hot geothermal fluid from geothermal resources as the source of process energy. In order to evaluate the economic viability of the proposed project, exhaustive engineering, cost analysis, and financial studies were undertaken. The results of feasibility studies undertaken in geothermal resource, engineering, marketing financing, management, environment, and permits and approvals are presented. The project was found to be economically viable.
DOE

N82-13253# Staatliches Forschungsinstitut fuer Geochemie, Bamberg (West Germany).
INVESTIGATIONS TOWARDS THE UNDERSTANDING OF SURFACE TREATMENT OF PROPELLANT GRAINS BY MEANS OF TRACE ELEMENTS (UNTERSUCHUNGEN ZUR ERFASSUNG DER OBERFLAECHENBEHANDLUNG VON

TREIBLADUNGSPULVERN MITTELS MARKIERTER SUBSTANZEN]
H. Meier, D. Boesche, G. Zeitler, E. Zimmerhackl, W. Hecker, and U. Tschirwitz Bonn Bundesministerium der Verteidigung 1979 101 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVG-FBWT-79-14) Avail: NTIS HC A06/MF A01; DOKZENTW, Bonn DM 30

The migration of deterrants into nitrocellulose grains is studied by means of the carbon 14 radiotracer technique. Such deterrents improve the internal ballistic properties of propellants and influence barrel erosion. The distribution of the deterrent compounds was measured by profile sectioning in conjunction with beta scintillation metering. The measurements yield values for diffusion coefficients, activation energies, and frequency factors as well as for scaling laws of the migration behavior with respect to temperature, time and concentration. A model of the migration mechanism, assuming a moving boundary, is established consistent with the available data. Author (ESA)

N82-13254# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
TEST NUMBER 2 OF PROPELLANTS FOR ROCKET MOTOR E573
Anders Schwartz May 1981 51 p refs In SWEDISH; ENGLISH summary
(FOA-C-20411-D1) Avail: NTIS HC A04/MF A01

The propellants tested are 85 months old. Properties were compared with properties from the first test on 32 months old propellants. Chemical stability is good. Tensile tests show small changes at low temperatures and high strain rates. The propellants possibly become a little stiffer. The adhesion of the inhibitor decreases considerably, especially the adhesion to propellant D23 where a decrease of about 43% was measured. The adhesion to propellant D28 decreases about 17%. Hardness and burning rate are not altered. Author (ESA)

N82-13255# Comptroller General of the United States, Washington, D.C.
NATURAL GAS PLAN NEEDED TO PROVIDE GREATER PROTECTION FOR HIGH-PRIORITY AND CRITICAL USES Report to the Congress
23 Mar. 1981 57 p
(PB81-228488; EMD-81-27) Avail: NTIS HC A04/MF A01 CSCL 21D

Natural gas legislation and programs implemented over the past decade and currently ongoing at the Federal, state, and local levels are discussed. Some of the shortcomings, inconsistencies, and incompatibilities between legislative intent and program implementation at the various levels are highlighted. GRA

N82-13256# Bechtel Power Corp., San Francisco, Calif.
ENVIRONMENTAL AND ECONOMIC COMPARISON OF ADVANCED PROCESSES FOR CONVERSION OF COAL AND BIOMASS INTO CLEAN ENERGY Final Report, Sep. 1977 - Dec. 1978
R. A. Stenzel, B. T. Kown, M. C. Weekes, J. D. Ruby, B. R. Gilbert, C. M. Harper, Y. G. Yim, and R. T. Milligan Aug. 1981 402 p refs
(Contract EPA-68-02-2616)
(PB81-234239; EPA-600/7-81-133) Avail: NTIS HC A16/MF A01 CSCL 21D

Biomass and coal conversion into clean energy is compared on an economic and environmental basis in three regional scenarios: (1) electric power from direct combustion of wood versus conventional coal combustion; (2) synthetic pipeline gas from anaerobic digestion of wheat straw and manure versus high-Btu gasification of coal (HYGAS); and (3) synthetic fuel oil from wood liquefaction versus coal liquefaction (H-Coal). Conceptual commercial-scale plants are described. Capital and operating costs are presented for each of the six plants, and the biomass versus coal economics are compared. General environmental impacts of biomass and coal resource collection are assessed and compared in the scenario contexts. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-13257 Northwestern Univ., Evanston, Ill.
EFFECTIVE STRESS-STRAIN-STRENGTH BEHAVIOR OF SILICATE-GROUTED SAND Ph.D. Thesis
Mohamed Adel Benltayf 1981 257 p
Avail: Univ. Microfilms Order No. 8124852

The effective stress concept was used to interpret the results of drained and undrained triaxial compression tests on grouted sand specimens which were grouted under at-rest conditions or under a confining stress. The behavior of grouted and ungrouted sand in drained and undrained shear was documented in terms of stress-strain, volume change, pore pressure, shearing resistance, and shear strength characteristics. The behavior of grouted sand in unconfined compression was analyzed. Specimens tested in triaxial compression after curing for six or more days exhibit no appreciable differences in stress-strain, volume change, pore pressure, and shear strength behavior. Grouting improves the stiffness and strength of ungrouted sand. The shearing resistance of silicate grouted sand is generated by cohesion and friction components which vary as a function of axial strain. The strength of grouted sand is greatly affected by drainage conditions and pore pressures. Dissert. Abstr.

N82-13258 Stanford Univ., Calif.
MICROMECHANICS OF EXPANSIVE MECHANISMS IN EXPANSIVE CEMENT CONCRETES Ph.D. Thesis
Menashi David Cohen 1981 219 p
Avail: Univ. Microfilms Order No. 8124049

The kinetics of hydration were studied by monitoring the presence of various compounds by X-ray diffractometer, a chemical extraction method, and scanning electron microscope. These studies indicated that the rates of depletion of the expanding particles and sulfates are higher in the finer blends, which is why expansion stops earlier in these blends. It is shown that the double curvature phenomenon (strength-drop and sudden increase in the rate of expansion) is caused by mechanical failure (e.g., microcracking) of the matrix surrounding the expanding particles that are producing ettringite crystals. The theory of protective and partial protective coating is reviewed. A hypothesis is introduced which assumes that monosulfate is not formed immediately when ettringite stops forming but is preceded by an intermediate phase. Shrinkage studies show that expansive cements shrink more than portland cements. The results of these studies were used to develop a modified model of the expansive process. It was shown theoretically that the time of expansion is inversely proportional to the surface area of the expansive clinker and directly proportional to the amount of sulfate used. Dissert. Abstr.

N82-13259 Missouri Univ. -Rolla.
PARAMETRIC STUDY OF SILO-MATERIAL INTERACTION Ph.D. Thesis
Ghazi Saleh Hasanain 1981 169 p
Avail: Univ. Microfilms Order No. 8123583

The methods for determination of pressures and the analysis of silos for storage of granular materials are reviewed. A finite element procedure for linear analysis and an initial-strain analysis of hoop forces and horizontal bending moments in circular concrete silos with bisymmetric outlets is presented, and these methods are compared with the hoop steel areas obtained using current practice. A concrete coal silo is designed by these methods and compared with one designed by standard methods. Dissert. Abstr.

N82-13260# Drexel Univ., Philadelphia, Pa. Dept. of Materials Engineering.
RAPID CYCLE CASTING OF STEEL Final Report, 1 Jul. 1977 - 31 Aug. 1980
Diran Apelian and G. Langford Jul. 1981 533 p refs
(Contract DAAG29-77-C-0028; ARPA Order 3397)
(AD-A103567) Avail: NTIS HC A23/MF A01 CSCL 13/8

A rapid cycle casting process for steel via diffusion solidification (SD) is developed. Solidification takes place by carbon

redistribution between iron saturated high carbon liquid iron and low carbon preexisting solid iron in a refractory mold. The solidification time is shorter and the economic scaling law is less dependent on the size of the casting than in conventional casting processes. The metallurgical and processing aspects of SD casting are addressed and the necessary parameters are developed to design a rapid cycle casting machine. These process parameters in addition to the metallurgical quality variables are included in an economic feasibility analysis of the SD process.
GRA

N82-13261# Naval Research Lab., Washington, D. C. Thermostructural Materials Branch.
PRELIMINARY EVALUATION OF ION IMPLANTATION AS A SURFACE TREATMENT TO REDUCE WEAR OF TOOL BITS Interim Report
F. A. Smidt, J. K. Hirvonen (Georgia Inst. of Technology, Atlanta), and S. Ramalingam 25 Sep. 1981 57 p refs
(RR0221141)
(AD-A105053; NRL-MR-4616) Avail: NTIS HC A04/MF A01 CSCL 13/8

The process of ion implantation is reviewed and concepts for use as a surface hardening technique for extending the life of machine tools are explored. It is concluded that for high speed steel tool materials a system based on implantation of Ti ions with subsequent reaction to form TiC in the surface layers should have merit. Exploratory tests showed that in machining tests of 4140 steel, an implanted M2 lathe tool bit required about 10 percent less power and has a wear rate approximately one half that of the unimplanted tool. Tests of end mills proved inconclusive because the optimum Ti level for the implant was not reached.
Author

N82-13262# Naval Civil Engineering Lab., Port Hueneme, Calif.
COMPUTER PROGRAM FOR OPTIMUM NONLINEAR DYNAMIC DESIGN OF REINFORCED CONCRETE SLABS UNDER BLAST LOADING (CBARCS) Final Report
John M. Ferritto, Robert M. Wamsley (Army Engineer Div., Huntsville, Ala.), and Paul K. Senter (Army Engineer Waterways Experiment Station, Vicksburg, Miss.) Mar. 1981 85 p refs
(AD-A104253; WES-INSTRUCTION-K-81-6) Avail: NTIS HC A05/MF A01 CSCL 13/13

The user's guide for CBARCS, a computer program for optimum nonlinear dynamic design of reinforced concrete slabs under blast loading, is presented. Given the explosive parameters and geometry of the slab, CBARCS computes the blast environment and the structural resistance, mass, and stiffness of the slab and solves for the dynamic response. The program contains optimization subroutines that provide for automatic optimum design of least cost structural slabs. CBARCS will assist engineers in the design and analysis of facilities that are intended to contain the effects of accidental explosion.
Author

N82-13263# California Univ., Livermore. Lawrence Livermore Lab.
ULTIMATE IN BUILDING ENERGY ANALYSIS: DOE-2 AND BLAST
B. D. Hunn 1981 33 p refs Presented at the Symp. Energy and Big Building Design, Philadelphia, 25-26 May 1981 Submitted for publication
(Contract W-7405-eng-36)
(DE81-028703; LA-UR-81-2288; CONF-8105107-1) Avail: NTIS HC A03/MF A01

The DOE-2 and BLAST computer programs are investigated in terms of their usefulness in building energy analysis. DOE-2 and BLAST are generally classed as high-level, computer-dynamic methods that are based on hour-by-hour computation. The characteristics of DOE-2 and BLAST are discussed with emphasis on their solar simulation features, and their capabilities are contrasted and related. Typical applications of the programs to the retrofit of existing buildings and the design of new buildings, are presented. The passive solar retrofit of an office building, the use of DOE-2 as a predesign analysis tool, and the use of BLAST in a research and development application are all described. Future directions in research and development needs for high level building energy analysis tools and the progress being made toward increased use of these tools are discussed.
DOE

N82-13264# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
ELECTRIC COHEATING EXPERIMENT TO DETERMINE THE HEAT-LOSS COEFFICIENT OF A DOUBLE-ENVELOPE HOUSE
Joseph K. E. Ortega, John V. Anderson, J. Michael Connolly, and Carl E. Bingham Jul. 1981 7 p refs Presented at the AS/ISES 6th Natl. Passive Solar Conf., Portland, Oreg., 8-12 Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-027937; SERI/TP-1316; CONF-810925-11) Avail: NTIS HC A02/MF A01

An electric coheating experiment was conducted on a double envelope house to determine the total test loss coefficient of the double shelled structure, as well as the heat loss coefficients of the inner and outer shells. Electric coheating is fairly well established as an experimental method for determining the total heat loss coefficient in conventional residential buildings. However, special problems were introduced with passive and double envelope buildings. A methodology was developed to meet these problems. That methodology and the results of the experimental investigation are presented and discussed.
DOE

N82-13265# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
APPLIANCE EFFICIENCY AND THE SOLAR BUILDING
Joel Swisher Jun. 1981 30 p refs
(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178)
(DE81-029073; SERI/TR-721-1119) Avail: NTIS HC A03/MF A01

Energy use in residential appliances is examined. Current appliance energy use was evaluated and technologically feasible improvements were studied. A typical set of household appliances was developed, and modified by three classes of efficiency improvements. Significant energy saving potential was found in all major appliance energy uses, with the largest savings in water heaters and refrigerators. Costs of the improvements are relatively low, providing short payback times. The effects of the improvements on building thermal loads and electricity demand profiles were also examined.
DOE

N82-13266# Louisiana Dept. of Transportation and Development, Baton Rouge.
EVALUATION OF REEF SHELL EMBANKMENT Final Report, Aug. 1976 - Dec. 1980
James L. Melancon and Steve G. Bokun Dec. 1980 75 p refs Sponsored in part by DOT
(PB81-232761; LA-77-1S-B; FHWA/LA-81/129) Avail: NTIS HC A04/MF A01 CSCL 13B

A method of constructing an embankment over marshland soils by end-dumping reef shell directly onto the marshland with no other major subgrade preparation is discussed. The dumped reef shell is then spread out to form a 'floating' embankment over the soft marshland. The subsidence characteristics of a reef shell embankment are compared with those of a clam shell embankment to determine if such a reef shell embankment would provide adequate structural support for traffic. Results show it is physically and economically feasible to construct a reef shell embankment on soft organic marshland soils. A properly constructed reef shell embankment develops into a homogeneous floating slab of substantial stability and strength capable of supporting allowable traffic loads.
GRA

N82-13267# Connecticut Dept. of Transportation, Wethersfield.
CONSTRUCTION OF A RECYCLED PORTLAND CEMENT CONCRETE PAVEMENT Construction Report, Oct. 1979 - May 1980
Keith R. Lane Sep. 1980 43 p refs
(HPR Proj. 646)
(PB81-233553; FHWA/CT-80/12; Rept-646-1-80-12) Avail: NTIS HC A03/MF A01 CSCL 13B

Connecticut's first experience with Portland cement concrete recycling is described. The test location was on I-84 in Waterbury, a major expressway which required extensive realignment and widening. The primary concern was to obtain the technical expertise to design and place a recycled pavement. Secondary factors also investigated were the analysis of environmental, economic and energy factors relative to the option

of recycling or new construction of a portland cement concrete pavement.
GRA

N82-13268# Purdue Univ., Lafayette, Ind. School of Civil Engineering.
THE EFFECTS OF ADDED SOFTENING AGENTS UPON THE BEHAVIOR OF COLD RECYCLED ASPHALT MIXTURES
Akio Lida 1 Oct. 1980 471 p refs
(PB81-231417; JHRP-80-13; FHWA/IN/JHRP-80/13) Avail: NTIS HC A20/MF A01 CSCL 13C

The long-term behavior of recycled mixtures, especially when the recycling is done cold is reported. The long-term properties of laboratory specimens prepared with different softening agents were evaluated by means of a creep test. A design procedure for cold recycled mixtures is proposed which recommends that blending curves be developed and that a creep test be used to determine mixture properties over a period of time.
GRA

N82-13269# Louisiana Dept. of Transportation and Development, Baton Rouge.
A LABORATORY EVALUATION OF MODIFIED ASPHALT Final Report, Nov. 1979 - Nov. 1980
Donald E. Carey and Harold R. Paul Jan. 1981 53 p Sponsored by the Federal Highway Administration, Washington, D.C.
(PB81-231615; LA-80-1B-B; FHWA/LA-81/142) Avail: NTIS HC A04/MF A01 CSCL 13C

The structural properties of sand mixes incorporating Chem-Crete binder compare favorably with densegraded asphaltic concrete. This binder, processed according to a new refinery technique, is purported to improve asphalt properties such as strength, durability, temperature susceptibility and water resistance. These attributes and other properties of sand/Chem-Crete mixes are examined. Generally, upon curing, sand mixes utilizing Chem-Crete binder demonstrate properties equal to or superior to Louisiana's dense-graded Type 1 asphaltic concrete (1200-lb. stability).
GRA

N82-13270# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.
PILOT-SCALE DEVELOPMENT OF A LOW-NOX COAL-FIRED TANGENTIAL SYSTEM Final Report, Sep. 1978 - Feb. 1981
J. T. Kelly, R. A. Brown, E. K. Chu, J. B. Wightman, R. L. Pam, E. L. Swenson, E. B. Merrick, and C. F. Busch Aug. 1981 239 p refs
(Contract EPA-68-02-1885)
(PB81-242513; EPA-600/7-81-137; IERL-RTP-1233) Avail: NTIS HC A11/MF A01 CSCL 13A

A 293 kWt (1 million Btu/hr) pilot scale facility is used to develop a low NOx pulverized coal fired tangential system. A burner concept is developed which achieves low NOx by directing the fuel and a fraction of the secondary combustion air into the center of the furnace, with the remaining secondary combustion air directed horizontally and parallel to the furnance walls. Such separation of secondary combustion air creates a fuel rich zone in the center of the furnace where NOx production is minimized. This combustion modification technique lowers NOx 64%, relative to conventional tangential firing, by injecting 85% of the secondary air along the furnace walls. Under these conditions, NO emissions are 180 ppm corrected to 0% 02. Also at these conditions, CO, UHC, and unburned carbon emissions are less than 40 ppm, 3 ppm, and 2.4%, respectively, comparable to conventional tangentially fired pilot scale results.
GRA

N82-13271# Missouri Univ. -Rolla. Dept. of Civil Engineering.
OPTIMUM DESIGN OF STATIC, EARTHQUAKE, AND WIND STEEL STRUCTURES (ODSEWS-2D)
Franklin Y. Cheng, D. Srifuengfung, and L. H. Sheng Jan. 1981 314 p refs
(Grant NSF PFR-78-05694)
(PB81-232736; CIVIL-ENGINEERING-STUDY-81-10) Avail: NTIS HC A14/MF A01 CSCL 13M

A design technique is presented for trusses and braced and unbraced frames with consideration of various constraints of stresses, displacements, natural frequencies, member sizes, and upper- and lower-bounds of member stiffnesses. A computer program ODSEWS (Optimum Design of Static, Earthquake, and Wind Structures) was developed for which the dynamic input may be response spectra or code provisions. More than 80 cases were designed in which the frames were varied from one story to 30 stories for examining various response parameters. Among them the particular interests are in the effect of the interacting ground motions including P-Delta on the stiffness distribution at critical regions and at the entire system as well as in the assessment of structural systems and their serviceability.
GRA

N82-13272# National Bureau of Standards, Washington, D.C. National Engineering Lab.
REVIEW OF FIRE TEST METHODS AND INCIDENT DATA FOR PORTABLE ELECTRIC CABLES IN UNDERGROUND COAL MINES Final Report
Emil Braun Jun. 1981 23 p refs
(PB81-227878; NBSIR-81-2292) Avail: NTIS HC A02/MF A01 CSCL 13L

Electrically powered underground coal mining machinery is connected to a load center or distribution box by electric cables. The connecting cables used on mobile machines are required to meet fire performance requirements defined in the Code of Federal Regulations. This report reviews Mine Safety and Health Administration's (MSHA) current test method and compares it to British practices. Incident data for fires caused by trailing cable failures and splice failures were also reviewed. It was found that the MSHA test method is more severe than the British but that neither evaluated grouped cable fire performance. The incident data indicated that the grouped configuration of cables on a reel accounted for a majority of the fires since 1970.
GRA

N82-13273# Council for Scientific and Industrial Research, Pretoria (South Africa).
MINI-SEMINARS ON MACHINING TECHNOLOGY
L. Webster, P. H. H. Trendler, C. C. Shearer, P. N. Tomlinson, and A. T. Notter May 1980 96 p refs
(PB81-223034; ISBN-0-7988-1774-7) Avail: NTIS HC A05/MF A01 CSCL 13H

The development of the modern machine tool, optimizing machining conditions, grinding with amber boron nitride, the comparative performance of various cutting fluids, experience with the use of indexable tips, and selection and evaluation of cutting tools are discussed.
GRA

N82-13274# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.
FATIGUE TEST METHODOLOGY
Oct. 1981 255 p refs Proc. of Lecture Series held at Lyngby, Denmark, 19-20 Oct. 1981; Lisbon, 22-23 Oct. 1981; Athens, 26-27 Oct. 1981
(AGARD-LS-118; ISBN-92-835-1401-7) Avail: NTIS HC A12/MF A01

Laboratory fatigue testing of small components and specimens is considered with the emphasis on: testing philosophies, hardware systems required to carry out these philosophies, and the associated test specimens. For individual titles, see N82-13275 through N82-13285.

N82-13275# Royal Aircraft Establishment, Farnborough (England). Structures Dept.
THE ROLE OF FATIGUE TESTING c39
P. R. Edwards *In* AGARD Fatigue Test Methodology Oct. 1981 15 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

Fatigue testing which involves proving and developing components, materials and processes, investigating particularly factors such as corrosion which can be damaging and those such as fatigue resistant fasteners which are beneficial to fatigue is discussed. Modern electrohydraulic machines and computers allow application of more representative loading conditions, tests to be monitored, and efficient data analyses. Use of standard loading sequences offers considerable benefits to fatigue programs. The monitoring of fatigue damage through the life since these techniques are very different between metals and composites is emphasized. Metals test techniques which determine cyclic stresses and strains at points of fatigue initiation have led to considerable improvements in accuracy of life prediction. Author

N82-13276# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).
PLANNING AND ANALYSIS OF A FATIGUE TEST PROGRAMME c39
D. Schuetz *In* AGARD Fatigue Test Methodology Oct. 1981 22 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

Advances in fatigue testing methods are presented. The increasing amount of service load data, the use of fracture mechanics, and the application of prediction methods which emphasize local stresses and/or strains are discussed. It is suggested that fatigue tests are still imperative in determining the fatigue performance of components or built up structures. Fatigue tests are the most important part of a fatigue life evaluation in spite of the current level of knowledge of fatigue mechanisms. E.A.K.

N82-13277# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Werkstoff-Forschung.
FATIGUE TEST MACHINES c39
H. Nowack *In* AGARD Fatigue Test Methodology Oct. 1981 23 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

Conventional and servohydraulic testing machines are reviewed. The main ranges in application of the systems are described. Servohydraulic resonance machines enable both, random tests and constant amplitude tests. For component and full scale tests of structures sophisticated test systems become necessary, which have to fulfill numerous specific requirements. The testing machines devices for the control, monitoring, and recording of the test parameters are described. It is concluded that online computers are a most efficient tool for the performance of fatigue tests. E.A.K.

N82-13278# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).
VARIABLE AMPLITUDE FATIGUE TESTING c39
D. Schuetz *In* AGARD Fatigue Test Methodology Oct. 1981 31 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

The blocked program tests made possible through the introduction of a testing machine with a hybrid loading system consisting of a resonant type frequency device for blocks of loads with many cycles, and a hydraulic device for load blocks with a small number of cycles and single load cycles with differing amplitudes are discussed. It is pointed out that it is the introduction of electroservohydraulic closed loop testing machines which marked the first real breakthrough. The machines allow a component to be loaded in any load sequence at relatively high frequencies. Advancements are also made in the field of servohydraulics. Machines on which complicated load sequences can be applied are used for a large variety of variable amplitude loading sequences. E.A.K.

N82-13279# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Werkstoff-Forschung.
ON-LINE COMPUTERS IN FATIGUE TESTING c39
H. Nowack *In* AGARD Fatigue Test Methodology Oct. 1981 11 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

The introduction of online computer systems into fatigue testing are discussed. Different application schemes of computerized systems are described: dedicated systems, multiple purpose systems, and maximum flexibility systems. Essential viewpoints of the development of computerized systems are given. It is shown, that professional systems can offer significant advantages in many cases. Various aspects and examples for the practical work with computerized systems are given. E.A.K.

N82-13280# Bath Univ. (England). School of Materials Science.
FATIGUE TESTING OF FIBRE COMPOSITES c24
Bryan Harris *In* AGARD Fatigue Test Methodology Oct. 1981 18 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

The progress of fatigue in composites was monitored by most of the usual methods: the determination of S/N curves and master diagrams using constant stress or strain amplitude or random fluctuations, the determination of residual strength, and the observation of crack growth rates. The interpretation of these results and their translation to the design process demand consideration of the mode of failure, the definition of failure used in any given instance, and the relevance of the test procedure to practical applications. E.A.K.

N82-13281*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ELEVATED TEMPERATURE FATIGUE TESTING OF METALS c26
Marvin H. Hirschberg *In* AGARD Fatigue Test Methodology Oct. 1981 18 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

Material characterization and evaluation conducted for the purpose of calculating fatigue crack initiation lives of components operating at elevated temperatures are discussed. The major technology areas needed to perform a life prediction of an aircraft turbine engine hot section component and the steps required for life prediction are outlined. These include: the determination of the operating environment, the calculation of the thermal and mechanical loading of the component, the cyclic stress strain and creep behavior of the material required for structural analysis, the structural analysis to determine the local stress strain temperature time response of the material at the critical location in the component, and from a knowledge of the fatigue, creep, and failure resistance of the material, a prediction of the life of the component. E.A.K.

N82-13282# Royal Aircraft Establishment, Farnborough (England). Materials Dept.
FATIGUE TESTS WITH A CORROSIVE ENVIRONMENT c39
R. N. Wilson *In* AGARD Fatigue Test Methodology Oct. 1981 20 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

The techniques used to study the fatigue behavior of metals and alloys in vacuum, gas and liquid environments are outlined. The methods used to simulate service conditions in the laboratory are described and the variables which must be considered when planning a corrosion fatigue test programme are discussed. An attempt to control or eliminate some of the experimental variables is illustrated. The fatigue performance of a fully protected 1.5 dog bone aluminium alloy test piece which is prestressed at low temperature and exposed to a corrosive environment prior to fatigue testing in salt fog is evaluated. E.A.K.

N82-13283# Royal Aircraft Establishment, Farnborough (England). Structures Dept.
METHODS OF OBTAINING CRACK GROWTH DATA IN METALS c26
P. R. Edwards *In* AGARD Fatigue Test Methodology Oct. 1981 22 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

Methods of obtaining crack growth data in metals are subdivided into several groups. Crack length is determined by measuring compliance which changes as a crack grows. Compliance is measured across the faces of the crack with a clip gauge. Optical methods include surface crack length measurement techniques. With electrical methods a DC, pulsed DC or AC electric current is passed through the specimen and, across any crack, a potential drop is created indicating the crack size. Sonic methods include ultrasonics and acoustic emission, the former measuring crack length by interpreting reflected or transmitted ultrasonic beams and the latter obtaining an indication of crack rate by recording stress waves emitted as energy is released when the tip of the crack advances. Mechanical devices which fracture with the crack are used either as individual conductors bonded across the crack path or as a foil which changes in resistance as the crack grows through it. It is feasible to design specimens in which cracks occur in an area favorable for accurate or simple measurement. Fracture surface readback is the only method which offers the possibility of determining crack rates on a specimen retrospectively after failure. E.A.K.

N82-13284# Bath Univ. (England). School of Materials Science.

MONITORING OF DAMAGE IN FIBRE COMPOSITES c24

Bryan Harris *In* AGARD Fatigue Test Methodology Oct. 1981 23 p refs (For primary document see N82-13274 04-31)

Avail: NTIS HC A12/MF A01

Various techniques were used to study the accumulation of damage in composite subjected to fatigue. Optical methods, x-radiography, ultrasonic techniques, thermal imaging, and acoustic emission analysis are all methods which are capable of revealing certain aspects of the development of damaged regions in a composite, but the usefulness of most of these is limited to certain types of material or specific structural situations. E.A.K.

N82-13285# Waterloo Univ. (Ontario). Dept. of Civil Engineering.

CYCLIC STRAIN APPROACH TO FATIGUE IN METALS c26

T. H. Topper and P. Au *In* AGARD Fatigue Test Methodology Oct. 1981 25 p refs (For primary document see N82-13274 04-31)

Avail: NTIS HC A12/MF A01

The progress of a crack from its initiation in a notch root through the notch stress field was simulated based on local notch root strains. Strains at the notch root or at the tip of the advancing crack are simulated or calculated and used to describe crack growth. These approaches are mainly applicable to blunt notches in which threshold stress continuously increases with crack length, while fracture mechanics approaches are adequate for sharp notches in which the maximum threshold stress occurs inside the material rather than at the surface. Methods of simulating cyclic plastic notch strains and the resulting crack advance and methods of simulating the effect of variable amplitude loading and biaxial stress states are described. E.A.K.

N82-13286 Duke Univ., Durham, N. C.

ANALYSIS AND BEHAVIOR OF STRUCTURES ON DISCRETE TENSIONLESS FOUNDATIONS Ph.D. Thesis

Mustafa Yousif Al-Mandil 1981 161 p

Avail: Univ. Microfilms Order No. 8124797

The behavior of a discrete tensionless foundation system is analyzed. Subsequently, seven general theorems regarding the nature of this class of problems are proven. Thirteen pure and mixed strategy algorithms are reviewed and their application to a typical illustrative problem is studied. Nonlinear boundary properties which give rise to multiple solutions are modelled, and a new algorithm is presented. The reliability of this algorithm in obtaining a second equilibrium configuration is discussed. The governing equations for the conventional foundations problem have a unique solution. Modifying the Newton-Raphson algorithm, adding adaptive updating, load stopping, and extrapolation leads to an excellent equation solving algorithm. When more than one solution exists, the reliability of the deflation technique for educing an alternate root for the system is improved by use of a new adaptive under-relaxation of a Newton-Raphson process. Dissert. Abstr.

N82-13287 Northwestern Univ., Evanston, Ill.

INJECTION AND DISTRIBUTION OF SILICATE GROUT IN SAND Ph.D. Thesis

Talat Abdul-Aziz Bader 1981 191 p

Avail: Univ. Microfilms Order No. 8124848

A laboratory model study to relate the effects of grout composition, silicate concentration, dilution, viscosity, temperature, and mechanical agitation to the actual pumping of the grout into the soil mass is described. Three experimental models, each with a different geometry, were studied: the basic difference between these models is the rate at which the grout front advances as the grout is injected at a constant flow rate. The magnitude and distribution of the pore fluid pressures developed during the grout injection process were measured, and the results indicate a very rapid decrease in pore fluid pressure with distance from the injection point. The strength and modulus of the grouted soil mass showed a tendency to decrease with distance from the injection point. Upon injection, the grout appears to flow progressively into the soil, with the fresher grout displacing the older grout toward the exterior of the grounded mass. There was no conclusive evidence of soil fracturing due to grout gelation in any of the tests. Dissert. Abstr.

N82-13288 Ohio State Univ., Columbus.

GEOMETRIC PROGRAMMING FOR ENGINEERING DESIGN OPTIMIZATION Ph.D. Thesis

Guri Singh Brar 1981 271 p

Avail: Univ. Microfilms Order No. 8121770

A computer program with the capabilities to handle generalized polynomial optimization problems was developed. Geometric programming theory for posynomial problems is used as the basis for this work. Signomial problems are converted to posynomial form through condensation. In the preparation of the program, features are built-in such that the user can control output by specifying input variables. An example is included to illustrate the step-by-step procedure for the use of this program. Several civil engineering optimization problems are formulated and solved using the algorithm GPALL. Practical suggestions are made to reduce the large size problems to a manageable size for an efficient solution. Convergence of the algorithm and its drawbacks are discussed. Dissert. Abstr.

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-13289 Ohio State Univ., Cleveland.

A DIGITAL TV SYSTEM FOR THE DETECTION OF HIGH SPEED HUMAN MOTION Ph.D. Thesis

Rong Chin Fang 1981 298 p

Avail: Univ. Microfilms Order No. 8121787

Two array cameras and a force plate were linked to a PDP-11/34 minicomputer for an on-line recording of high speed human motion. A microprocessor-based interface system was constructed to allow preprocessing and coordinating of the video data before being transferred to the minicomputer. Control programs of the interface system are stored in the disk and loaded into the program storage areas of the microprocessor before the interface system starts its operation. Software programs for collecting and processing video and force data have been written. Experiments on the detection of human jumping have been carried out. Normal gait and amputee gait have also been recorded and analyzed. Dissert. Abstr.

N82-13290 Purdue Univ., Lafayette, Ind.

DIGITAL VIDEO BANDWIDTH COMPRESSION SYSTEMS EMPLOYING BLOCK TRUNCATION CODING Ph.D. Thesis

Donald Joseph Healy 1981 134 p

Avail: Univ. Microfilms Order No. 8123650

A technique for bandwidth compression coding of sequential digitized video imagery is presented. The method uses adaptive one bit quantization over small blocks of space and time. The system includes global registration and motion detection for optimal bit assignments. A comparison is made with a conditional replenishment technique using a motion compensated predictor described in the literature. The method presented produces reconstructed video sequences filmed from low altitude aircraft with negligible degradation at 0.9 bit per pixel data rate. Robust behavior in the presence of channel noise is demonstrated. Dissert. Abstr.

N82-13291 Ohio State Univ., Cleveland.

HIGH FREQUENCY SCATTERING FROM MULTIPLE FINITE ELLIPTIC CYLINDERS Ph.D. Thesis

Eric Dale Greer 1981 196 p

Avail: Univ. Microfilms Order No. 8121795

The near and far zone radiation patterns of high frequency antennas in the presence of one or more finite length perfectly conducting elliptic cylinders was analyzed. The finite length perfectly conducting elliptic cylinder can be used to model many curved surfaces found in shipboard, aircraft, and other complex electromagnetic environments. The near zone portion of this solution is useful for analyzing the coupling between antennas and for calculating radiation hazards in addition to verifying near field pattern measurements. The scattered fields of one or more elliptic cylinders are analyzed using the uniform geometrical theory of diffraction. The validity of this solution is shown by comparing the results with an exact modal solution, moment method solutions, and measured results. The examples studied indicate that this analysis will provide a useful solution within engineering accuracy to problems of practical interest to antenna designers. Dissert. Abstr.

N82-13292 Arizona State Univ., Tempe.
TWO-PATH MODEL OF FADING IN A HIGH DATA RATE COMMUNICATION CHANNEL Ph.D. Thesis
Pou-Tou Sun 1981 113 p
Avail: Univ. Microfilms Order No. 8124498

In order to simulate the properties of channel fading in high data rate communications, two new techniques have been devised to develop two new fading channel models. One method is a nondispersed fading channel model and the other is a dispersed fading channel model. The usefulness of these two models has been demonstrated and the effect of channel fading can be easily analyzed and understood at the input and output of the matched filter in the receiver. The difficulty in the simulation of channel fading, due to cross interference for Quadriphase-Shift Keying (QPSK) by the freqency domain analysis, is also solved by these models. The models have been applied to two commonly used communication systems, one being the Binary Phase-Shift Keying (BPSK) and the other being the Quadriphase-Shift Keying. The channel fading can be characterized and compared from the average probabilities of error of the system. The results show that the system performance of QPSK is more influenced by channel fading than BPSK. Dissert. Abstr.

N82-13293 Stanford Univ., Calif.
ENERGY SPECTRAL ANALYSIS IN PROJECTION RADIOGRAPHY Ph.D. Thesis
Bruno Strul 1981 97 p
Avail: Univ. Microfilms Order No. 8124163

Two topics related to the visualization of low contrast details in projection radiography are considered. The Compton scatter component in a given radiological study is quantitatively determined. Knowledge of the scatter fraction is important in the design of imaging systems and evaluation of their performance. A mathematical model for deriving the scatter fraction and the effectiveness of scatter reduction through separation of the object from the detector plane is presented. Experimental data are presented to substantiate the theoretical results. Second, a spatial frequency multiplexing method which enables recording of two images of an object, each at a different X-ray energy, on a single radiographic transparency is presented. This method is especially useful for K edge detection of low concentrations of iodinated contrast agents. Experimental results demonstrating the encoding and decoding techniques are presented. Dissert. Abstr.

N82-13294# Joint Publications Research Service, Arlington, Va. Foreign Technology Div.
ANTENNA (SELECTED ARTICLES)
8 Oct. 1981 22 p refs Transl. into ENGLISH from Antenny (USSR), no. 12, 1971 p 13-14, 65-76
(AD-A106476; FTD-ID(RS)T-0936-81) Avail: NTIS HC A02/MF A01 CSCL 20/14

The asymptotic solution of a problem of the diffraction of a plane wave is presented, and the design of wave splitters using dielectric waveguides is described. For individual titles, see N82-13295 through N82-13296.

N82-13295# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE USE OF THE KIRCHOFF METHOD FOR ASYMPTOTIC SOLUTION OF A PROBLEM OF THE DIFFRACTION OF A PLANE WAVE ON DIELECTRIC BODIES OF REVOLUTION
F. F. Izmaylov *In* AFSC Antenna (Selected Articles) (FTD-ID(RS)T-0936-81) 8 Oct. 1981 p 1-3 Transl. into ENGLISH from Antenny (USSR), no. 12, 1971 p 13-14, 65-76 (For primary document see N82-13294 04-32)
Avail: NTIS HC A02/MF A01 CSCL 20/14

Methods for computing a electromagnetic field vector after the passage of a plane wave through the dielectric walls of a surface of revolution are presented. An algorithm of geometric optics is given for a three dimensional problem, and the diffraction field component which emerges due to the acute nose of the cone is taken into account by means of the Kirchhoff method. The calculation results are compared to experimental data. Author

N82-13296# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COPHASED DIRECTED SURFACE WAVE SPLITTERS USING DIELECTRIC WAVEGUIDES
D. I. Mirovitskiy, V. F. Dubrovin, and V. V. Baskakov *In* AFSC Antenna (Selected Articles) (FTD-ID(RS)T-T-0936-81) 8 Oct. 1981 p 4-18 refs Transl. into ENGLISH from Antenny (USSR), no. 12, 1971 p 13-14, 65-76 (For primary document see N82-13294 04-32)
Avail: NTIS HC A02/MF A01 CSCL 20/14

Methods for constructing functional units for UHF and integral optics equipment using single mode and dielectric waveguides are presented. Four-armed and three-armed directed splitters constructed using rectangular polystyrene wave-guides according to symmetric and nonsymmetric designs are investigated. J.D.H.

N82-13297# Joint Publications Research Service, Arlington, Va. Foreign Technolgy Div.
ANTENNA (SELECTED ARTICLES)
16 Oct. 1981 28 p refs Transl. into ENGLISH from Antenny (USSR), no. 3, 1968 p 3-8, 142-155
(AD-A106522; FTD-ID(RS)T-0944-81) Avail: NTIS HC A03/MF A01 CSCL 20/14

Meter wavelength radio astronomy antennas and automatic measurement of antenna radiation patterns are described. For individual titles, see N82-13298 through N82-13299.

N82-13298# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RADIO ASTRONOMICAL ANTENNAS OF METER WAVELENGTHS
V. V. Vitkevich, Yu. P. Ilyasov, S. M. Kutuzov, and M. M. Tyaptin *In* AFSC Antenna (Selected Articles) (FTD-ID(RS)T-0944-81) 16 Oct. 1981 p 1-8 refs Transl. into ENGLISH from Antenny (USSR), no. 3, 1968 p 3-8, 142-155 (For primary document see N82-13297 04-32)
Avail: NTIS HC A03/MF A01 CSCL 20/14

A description of radioastronomic antennas operating simultaneously on waves of 3.5 m and 7 m is given. The effective area of one antenna is about 1000 sq m. Author

N82-13299# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
METHODS OF AUTOMATIC MEASUREMENT OF ANTENNA PARAMETERS
V. A. Torgovanov *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0944-81) 16 Oct. 1981 p 9-24 refs Transl. into ENGLISH from Antenny (USSR), no. 3, 1968 p 3-8, 142-155 (For primary document see N82-13297 04-32)
Avail: NTIS HC A03/MF A01 CSCL 20/14

The concept of generalized complex radiation patterns of antennas is introduced. A series of patterns is measured at different frequencies and polarizations. An automatic method for recording generalized antenna radiation patterns is proposed. J.D.H.

N82-13300*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MICROWAVE ATTENUATION AND BRIGHTNESS TEMPERATURE DUE TO THE GASEOUS ATMOSPHERE: A COMPARISON OF JPL AND CCIR VALUES
Ernest K. Smith and Joe W. Waters 15 Aug. 1981 55 p refs
(Contract NAS7-100)
(NASA-CR-165027; JPL-Pub-81-81) Avail: NTIS HC A04/MF A01 CSCL 20N

A sophisticated but flexible radiative transfer program designed to assure internal consistency was used to produce brightness temperature (sky noise temperature in a given direction) and gaseous attenuation curves. The curves, derived from atmospheric models, were compared and a new set was derived for a specified frequency range. M.D.K.

N82-13301*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

MODULATION/DEMODULATION TECHNIQUES FOR SATELLITE COMMUNICATIONS. PART 1: BACKGROUND

Jim K. Omura and Marvin K. Simon 15 Nov. 1981 111 p refs
(Contract NAS7-100)
(NASA-CR-165020; JPL-Pub-81-73) Avail: NTIS HC A06/MF A01 CSCL 17B

Basic characteristics of digital data transmission systems described include the physical communication links, the notion of bandwidth, FCC regulations, and performance measurements such as bit rates, bit error probabilities, throughputs, and delays. The error probability performance and spectral characteristics of various modulation/demodulation techniques commonly used or proposed for use in radio and satellite communication links are summarized. Forward error correction with block or convolutional codes is also discussed along with the important coding parameter, channel cutoff rate. A.R.H.

N82-13302*# Arinc Research Corp., Annapolis, Md.

THE 30/20 GHz COMMUNICATIONS SATELLITE TRUNKING NETWORK STUDY

William Kolb Oct. 1981 65 p
(Contract NAS3-22496)
(NASA-CR-165467) Avail: NTIS HC A04/MF A01 CSCL 17B

Alternative transmission media for a CONUS-wide trunking network in the years 1990 and 2000 are examined. The alternative technologies comprised fiber optic cable, conventional C- and Ku-band satellites, and 30/20 GHz satellites. Three levels of implementation were considered - a 10-city network, a 20-city network, and a 40-city network. The cities selected were the major metropolitan areas with the greatest communications demand. All intercity voice, data, and video traffic carried more than 40 miles was included in the analysis. In the optimized network, traffic transmitted less than 500 miles was found to be better served by fiber optic cable in 1990. By the year 2000, the crossover point would be down to 200 miles, assuming availability of 30/20 GHz satellites. Author

N82-13303# Defense Communications Engineering Center, Reston, Va.

FIBER OPTICS (OPTICAL WAVEGUIDES) TECHNOLOGY: POTENTIAL APPLICATION IN THE DCS

Harris A. Stover Feb. 1981 51 p
(AD-A104740; DCEC-TN-9-81) Avail: NTIS HC A04/MF A01 CSCL 17/2

This report is intended to introduce the reader to this new technology in sufficient detail to permit meaningful and reasonable consideration of potential applications in the DCS. Historical background is provided along with a brief discussion of the fundamental physics involved. A summary of the state-of-the-art in fiber optics cables is provided, which when considered along with related discussions of cable losses, light sources, light detectors, splices, connectors, and commercial applications of fiber optics should give the reader a good understanding of the present state of the fiber optics technology. A section is given on the properties of fiber optics that make them attractive for military communications. It will provide insight into functional and technical advantages of applying the technology in the DCS in addition to economic advantages of some applications. A brief section discusses current military fiber optics systems applicable to the DCS. The section on survivability of fiber optics communications introduces and discusses survivability of fiber optics communications, and indicates many possibilities where fiber optics might significantly enhance the survivability of the DCS. GRA

N82-13304# Joint Publications Research Service, Arlington, Va.

ANTENNA (SELECTED ARTICLES)

13 Oct. 1981 31 p refs Transl. into ENGLISH from Antenny (USSR), no. 5, 1969 p 82-107
(AD-A106523; ; FTD-ID(RS)T-0960-81) Avail: NTIS HC A03/MF A01 CSCL 20/14

The radiation pattern of arc antennas in a plane orthogonal to the plane of an arc is formulated. The formula is dependent on the radius of the arc and amplitude distribution in the orthogonal plane. The efficiency and output coefficient of power, directive gain, and gain factor of a linear periodic array are investigated. For individual titles, see N82-13305 through N82-13306.

N82-13305# Joint Publications Research Service, Arlington, Va.

THE FORMATION OF RADIATION PATTERNS OF ARC ANTENNAS

V. M. Golovachev and A. A. Kuzmin *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0960-81) 13 Oct. 1981 p 1-13 refs Transl. into ENGLISH from Antenny (USSR), no. 5, 1969 (For primary document see N82-13304 04-32)
Avail: NTIS HC A03/MF A01 CSCL 20/14

The radiation pattern of arc antennas in a plane orthogonal to the plane of an arc is formulated. The formula of the radiation pattern depends on the radius of the arc and amplitude distribution in the orthogonal plane. Characteristics of the forming of the radiation pattern of an arc antenna in a plane normal to the plane of an arc are examined. S.L.

N82-13306# Joint Publications Research Service, Arlington, Va.

ENERGY CHARACTERISTICS OF PERIODIC SYSTEMS OF RADIATORS: EFFICIENCY AND OUTPUT COEFFICIENT OF POWER, DIRECTIVE GAIN, AND GAIN FACTOR

I. V. Guzeyev and A. B. Kolot *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0960-81) 13 Oct. 1981 p 14-27 refs Transl. into ENGLISH from Antenny (USSR), no. 5, 1969 (For primary document see N82-13304 04-32)
Avail: NTIS HC A03/MF A01 CSCL 20/14

The efficiency and output of power directive gain, and gain factor of a linear periodic array are investigated. The matrix of scattering and partial gain of the array element is established. S.L.

N82-13307# Joint Publications Research Service, Arlington, Va.

ANTENNA (SELECTED ARTICLES)

15 Oct. 1981 99 p refs Transl. into ENGLISH from Antenny (USSR), no. 7, 1979 p 1-50
(AD-B060598; FTD-ID(RS)T-0820-81; FTD-81-C-000943)
Avail: NTIS HC A05/MF A01 CSCL 20/14

Results of experimental studies on two-mirror antenna systems for radio relay communication are summarized. The system, having displaced focal axis and high electrical parameters, can also be applied to space communication. The following antenna system parameters are discussed; structural design criteria; system schematics; equipment specifications for the parabolic and horn antennas; economic considerations; mathematical methods for describing antenna radiation patterns and solving problems of discrete emitters in radiating systems; amplification, polarization, displacement, and reflection factors. For individual titles, see N82-13308 through N82-13310.

N82-13308# Joint Publications Research Service, Arlington, Va.

TWO-MIRROR ANTENNA FOR RADIO RELAY COMMUNICATION

Yu. A. Yerukhimovich, S. N. Zimin, and A. A. Metrikin *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0820-81) 15 Oct. 1981 p 2-39 refs Transl. into ENGLISH from Antenny (USSR), no. 7, 1970 p 3-21 (For primary document see N82-13307 04-32)
Avail: NTIS HC A05/MF A01 CSCL 20/14

The following design specifications and operational considerations for a two-mirror antenna radio relay system, having a displaced focal axis, are discussed: amplification, polarization, frequency, and reflection of radio waves; economic factors in design/construction of horn and parabolic antennas and their components; system's schematics; and, sidelobe parameters. Specifics of the phase center, focal ring, and mirror edge configurations are detailed. System's advantages/disadvantages are also presented. M.D.K.

N82-13309# Joint Publications Research Service, Arlington, Va.

USE OF PRINCIPLE OF REGULARIZATION IN DIRECT AND MIXED PROBLEMS OF THE THEORY OF THE SYNTHESIS OF RADIATING SYSTEMS

L. D. Bakhras, S. D. Kremenetskiy, and M. Ye. Zhukovima *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0820-81) 15 Oct. 1981 p 40-75 refs Transl. into ENGLISH from Antenny (USSR), no. 7, 1970 p 22-40 (For primary document see N82-13307 04-32)

Avail: NTIS HC A05/MF A01 CSCL 20/14

Methods of regularization and quasi-solutions theory are applied in solving problems related to synthesis of radiating systems. Mathematical methods for and computer applications in describing antenna radiation patterns and parameters of wave amplification, displacement, energy distribution, and frequency are outlined. M.D.K.

N82-13310# Joint Publications Research Service, Arlington, Va.

SYNTHESIS OF A PLANE SYSTEM OF DISCRETE EMITTERS

S. D. Kremenetskiy *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0820-81) 15 Oct. 1981 p 76-95 refs Transl. into ENGLISH from Antenny (USSR), no. 7, 1970 p 41-50 (For primary document see N82-13307 04-32)

Avail: NTIS HC A05/MF A01 CSCL 20/14

Mathematical methods for describing antenna radiation patterns and solving problems of digital emitters in radiating systems are presented. The following methods were utilized: Fourier transformations; orthonormal and linear functions; vector analysis; quadratures; and Jacobi matrix methods. M.D.K.

N82-13311# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ANTENNA (SELECTED ARTICLES)

15 Oct. 1981 164 p refs Transl. into ENGLISH from Antenny (USSR), no. 5, 1969 p 20-34, 47-60, 108-162
(AD-A106474; FTD-ID(RS)T-0821-81) Avail: NTIS HC A08/MF A01 CSCL 20/14

A collection of selected articles on telecommunication with emphasis on antennas is presented. The following topics are discussed: (1) radiation aperture superdirectionality properties; (2) antenna synthesis by optical systems; (3) thin magnetic impedance antennas; (4) open resonators; (5) complex waveguide junctions; and (6) shot wave receiving antennas. For individual titles, see N82-13312 through N82-13317.

N82-13312# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SOME PROPERTIES OF THE RADIATING APERTURE SUPERDIRECTIONALITY

L. A. Vengrovich *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0821-81) 15 Oct. 1981 p 1-27 refs Transl. into ENGLISH from Antenny (USSR), no. 5, 1969 p 20-34 (For primary document see N82-13311 04-32)

Avail: NTIS HC A08/MF A01 CSCL 20/14

Radiating aperture superdirectionality, to assess the physical limitations of radiation was studied. An integral equation which connects the excitable in the aperture electric field with the transverse component of the magnetic field is derived. Solution of the integral equation and introduction of equivalent outlines allows computation of the total power flux through the slot and the energy accumulated in its vicinity. E.A.K.

N82-13313# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SOLUTION OF THE PROBLEM OF THE SYNTHESIS OF ANTENNAS WITH THE AID OF A COHERENT OPTICAL SYSTEM

L. D. Bakhrakh, Yu. A. Kolosov, A. P. Kurochkin, and V. I. Troitskiy *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0821-81) 15 Oct. 1981 p 28-56 refs Transl. into ENGLISH from Antenny (USSR), no. 5, 1969 p 47-60 (For primary document see N82-13311 04-32)

Avail: NTIS HC A08/MF A01 CSCL 20/14

The synthesis of plane aperture with the use of a coherent optical system was studied. Optical simulation methods of antennas in by synthesis and the special features/peculiarities of the recording of the transparencies which imitate the preset composite radiation patterns are examined. A diagram of optical installation for the synthesis of antennas with the plane aperture and the results of the synthesis of some radiation patterns is provided. E.A.K.

N82-13314# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THIN MAGNETIC IMPEDANCE ANTENNAS

E. A. Glushkovskiy, B. M. Levin, and Ye. Ya. Rabinovich *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0821-81) 15 Oct. 1981 p 57-80 refs Transl. into ENGLISH from Antenny (USSR), no. 5, 1969 p 108-120 (For primary document see N82-13311 04-32)

Avail: NTIS HC A08/MF A01 CSCL 20/14

Application of impedance boundary conditions to the solution of excitation of thin magnetic radiators was investigated. The thin ferrite of the finite length, excited by the framework, and the narrow slot, gashed in the conducting cylinder is discussed. E.A.K.

N82-13315# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

OPEN RESONATORS, FORMED BY CONFOCAL MIRRORS WITH THE VARIABLE REFLECTION COEFFICIENT AND THE GENERALIZED HYPER-SPHEROIDAL FUNCTIONS

N. S. Kosmodamianskaya and V. F. Los *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0821-81) 15 Oct. 1981 p 81-111 refs Transl. into ENGLISH from Antenny (USSR), no. 5, 1969 p 121-139 (For primary document see N82-13311 04-32)

Avail: NTIS HC A08/MF A01 CSCL 20/14

The characteristics of a confocal resonator with rectangular and circular mirrors from which transparency is changed by the specific law were examined. It is shown that for the mirrors with the ideal reflection the problem is reduced to the examination of a differential equation in which the solution is expressed as the generalized hyperspheroidal function. The asymptotic representations of this function is obtained and the results of the calculations are given. E.A.K.

N82-13316# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

METHOD OF THE STUDY OF COMPLEX WAVEGUIDE JUNCTIONS WITH ONE OR SEVERAL REGIONS OF COMMUNICATION

S. V. Butakova *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0821-81) 15 Oct. 1981 p 112-142 refs Transl. into ENGLISH from Antenny (USSR), no. 5, 1969 p 140-154 (For primary document see N82-13311 04-32)

Avail: NTIS HC A08/MF A01 CSCL 20/14

Complex waveguide junctions with several regions of communication were studied. The formula of the scattering matrix of the connections of regular waveguides with the heterogeneities, which calculate different plumbings by using a computer is obtained. Formulas of the scattering matrices of several devices SVCH in rectangular waveguide with H sub MO waves are presented. E.A.K.

N82-13317# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THREE-STAGE COMMUTATION FIELD OF THE SYSTEM OF THE REPEATED USE OF SHORT-WAVE RECEIVING ANTENNAS

V. D. Chelyshev *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0821-81) 15 Oct. 1981 p 143-160 refs Transl. into ENGLISH from Antenny (USSR), no. 5, 1969 p 154-162 (For primary document see N82-13311 04-32)

Avail: NTIS HC A08/MF A01 CSCL 20/14

Three stage commutation systems were examined. The special features which ensue from the admissibility of simultaneous connection to one antenna of the group of receivers are considered. The fundamental characteristics of three to stage commutation fields are given in the comparison with the single stage field of the same capacity. E.A.K.

N82-13318# Joint Publications Research Service, Arlington, Va. Foreign Technology Div.

ANTENNA (SELECTED ARTICLES)

19 Oct. 1981 98 p refs Transl. into ENGLISH from Antenny (USSR), no. 2, 1967 p 4-32, 55-70, 117-130, and 166-178 (AD-B060573; FTD-ID(RS)T-0937-81) Avail: NTIS HC A05/MF A01 CSCL 20/14

Television antenna technology, image discrimination, antenna radiation patterns, and antenna phase correction are discussed. For individual titles, see N82-13319 through N82-13322.

N82-13319# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE DEVELOPMENT OF DOMESTIC TECHNOLOGY FOR TELEVISION TRANSMITTING ANTENNAS

D. M. Truskanov *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0937-81) 19 Oct. 1981 p 1-37 refs Transl. into ENGLISH from Antenny (USSR), no. 2, 1967 p 4-32 (For primary document see N82-13318 04-32)

Avail: NTIS HC A05/MF A01 CSCL 20/14

The history of the development of Russian technology for television transmission antennas and the current state of the art are reviewed. The principles of construction of antenna feed circuits are described. Multiprogram antenna systems mounted on masts 235 and 350 m high, a 316 m high tower antenna system in Leningrad, and the 533 m high Ostankino tower antenna in Moscow are described. J.D.H.

N82-13320# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

DISCRIMINATION OF HOLOGRAM AND ANTENNA THEORY

A. A. Pistolkors *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0937-81) 19 Oct. 1981 p 38-57 refs Transl. into ENGLISH for Antenny (USSR), no. 2, 1967 p 55-70 (For primary document see N82-13318 04-32)

Avail: NTIS HC A05/MF A01 CSCL 20/14

A theoretical examination of image discrimination of the hologram during image reproduction is presented. A two dimensional electrodynamic problem is examined. With the use of planar and cylindrical reference flows, conditions for the correct reproduction of the image of a luminous line are established. The discrimination of the hologram in the direction parallel to its plane is investigated. A similarity is noted between the obtained expression and the integral equation of a linear antenna, making possible utilization of the theory of the directional effect of antennas in determining the solution. It is shown that the maximum resolution in the plane parallel to the hologram is equal to the wave length. Discrimination in the direction perpendicular to the plane is much worse than in the parallel. J.D.H.

N82-13321# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

RADIATION OF AN ANTENNA IN THE FORM OF A RIBBED SHAFT OF FINITE LENGTH

G. D. Malushkov *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0937-81) 19 Oct. 1981 p 58-74 refs Transl. into ENGLISH from Antenny (USSR), no. 2, 1967 p 117-130 (For primary document see N82-13318 04-32)

Avail: NTIS HC A05/MF A01 CSCL 20/14

The method of integral equations of the first order is used to solve the problem of excitation of an impedance cylinder of finite length by a short symmetrical electrical dipole with sinusoidal distribution of the outside current. The dipole is located on the axis of rotation of the cylinder, and is perpendicular to it. Also given are the procedure and some results of calculation of the current distributions on the surface of the impedance cylinder, and the beam patterns for constant and variable (linearly-increasing) impedances. The calculated and experimental beam patterns are analyzed as a function of the length, the radius of the cylinder and the magnitude of the surface impedance. Author

N82-13322# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

POSSIBILITIES OF PHASE CORRECTION ON THE SMALL REFLECTOR IN A TWO-REFLECTOR ANTENNA

A. L. Ayzenberg *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0937-81) 19 Oct. 1981 p 75-91 refs Transl. into ENGLISH from Antenny (USSR), no. 2, 1967 p 166-178 (For primary document see N82-13318 04-32)

Avail: NTIS HC A05/MF A01 CSCL 20/14

The effect of redistribution of energy in a two-reflector system on the directive gain and noise temperature of the antenna is analyzed. Phase errors are compensated for by flexures of the basic (large) reflector, through automatic correction of the shape of the auxiliary (small) reflector. The calculations determine the maximum permissible deformations of the reflectors possible with given impairments of the antenna characteristics. J.D.H.

N82-13323# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ANTENNA (SELECTED ARTICLES)

16 Oct. 1981 64 p refs Transl. into ENGLISH from Antenny (USSR), no. 9, 1970 p 53-80 (AD-A106499; FTD-ID(RS)T-0822-81) Avail: NTIS HC A04/MF A01 CSCL 20/14

Irregular quasi-optical lines (beam guides) are statistically analyzed using computerized simulation. The statistical theory of antennas is used to determine the statistical characteristics of the 'noise' of transparent dielectric films. Frequency dividers for metal dielectric waveguides with high electrical characteristics in the broadband are developed. For individual titles, see N82-13324 through N82-13326.

N82-13324# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A STATISTICAL ANALYSIS OF IRREGULAR QUASI-OPTICAL LINES (BEAM GUIDES) WITH THE AID OF COMPUTER(S)

In its Antenna (Selected Articles) (FTD-ID(RS)T-0822-81) 16 Oct. 1981 p 1-20 refs Transl. into ENGLISH from Antenny (USSR), no. 9, 1970 p 53-61 (For primary document see N82-13323 04-32)

Avail: NTIS HC A04/MF A01 CSCL 20/14

Irregular quasi-optical lines (beam guides) are statistically analyzed using computerized simulation. The qualitative difference between the multimode and one mode beam guides is developed. Beam guides with different means of heterogeneities are investigated. S.L.

N82-13325# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ONE USE OF METHODS OF THE STATISTICAL THEORY OF ANTENNAS

G. S. Bogoslovskiy and V. A. Usin *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0822-81) 16 Oct. 1981 p 21-39 refs Transl. into ENGLISH from Antenny (USSR), no. 9, 1970 p 62-71 (For primary document see N82-13323 04-32)

Avail: NTIS HC A04/MF A01 CSCL 20/14

Methods and apparatus for the statistical theory of antennas are used for determining the statistical characteristics of the 'noise' of transparent dielectric films. Film frequently characterized by dispersion and by a radius of the correlation of distortions is considered, as is the quantitative evaluation of the degree of the distortion of information. S.L.

N82-13326# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

DIRECTED DIVIDERS ON THE METAL-DIELECTRIC WAVEGUIDES

V. F. Dubrovin, D. I. Mirovitskiy, and L. S. Osipov *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0822-81) 16 Oct. 1981 p 40-60 refs Transl. into ENGLISH from Antenny (USSR), no. 9, 1970 p 72-80 (For primary document see N82-13323 04-32)

Avail: NTIS HC A04/MF A01 CSCL 20/14

Structurally simple waveguide frequency dividers of metal dielectrics were developed based on the principle of beam communication to ensure high electrical characteristics in the breadband. The dividers were fabricated in series using methods of printed technology. Electrical and structural characteristics are given for a two channel centimeter wave guide frequency divider. S.L.

N82-13327# Joint Publications Research Service, Arlington, Va.
ANTENNA (SELECTED ARTICLES)
16 Oct. 1981 126 p refs Transl. into ENGLISH from Antenny (USSR), no. 11, 1971 p 1-59
(AD-A106500; FTD-ID(RS)T-0826-81) Avail: NTIS HC A07/MF A01 CSCL 20/14

The electromagnetic characteristics of various antenna configurations are investigated. Particular emphasis is given to slot antenna and antenna array designs. For individual titles, see N82-13328 through N82-13332.

N82-13328# Joint Publications Research Service, Arlington, Va.
EXCITATION OF RADIAL RESONATOR WITH ANNULAR SLOT
V. A. Poperechenko *In its* Antenna (Selected Articles) (FTD-ID(RS) T-0826-81) 16 Oct. 1981 p 2-24 refs Transl. into ENGLISH from Antenny (USSR), no. 11, 1971 p 3-14 (For primary document see N82-13327 04-32)
Avail: NTIS HC A07/MF A01 CSCL 20/14

The problem of the external and internal excitation of a radial resonator with a narrow annular slot, which radiates into a half space is considered. A question is raised about the completeness of a set of functions which describe the fields within the resonator during the excitation only by its alternating outside currents. A method of addition and integration of poorly converging series and integrals is applied. A technique for the strict solution of the electrodynamic problem is presented along with calculations of the fundamental parameters of the antenna: the distribution of voltage along the slot, the radiation pattern, polarizational characteristic, composite conductivity of the radiation, and input resistance. M.G.

N82-13329# Joint Publications Research Service, Arlington, Va.
SYNTHESIS OF NONEQUIDISTANT LINE-SOURCE ANTENNA BY THE STATISTICAL METHODS OF SEARCH
O. I. Levin *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0826-81) 16 Oct. 1981 p 25-51 refs Transl. into ENGLISH from Antenny (USSR), no. 11, 1971 p 15-26 (For primary document see N82-13327 04-32)
Avail: NTIS HC A07/MF A01 CSCL 20/14

The application of statistical optimization methods to the task of synthesizing nonequidistant rarefied gratings is examined. The task is comprised of stochastic system differential equations, the point of stable equilibrium of which is the point of the location of the unknown extremum of the functional of the mismatch of preset and synthesized diagrams. The results of the calculations of nonequidistant antenna arrays by the method are given. M.G.

N82-13330# Joint Publications Research Service, Arlington, Va.
PRINCIPLES OF THE CONSTRUCTION OF SYSTEMS, WHICH POSSESS POTENTIAL FREQUENCY INDEPENDENCE
B. I. Molodov *In* is Antenna (Selected Articles) (FTD-ID(RS)T-0826-81) 16 Oct. 1981 p 52-88 refs Transl. into ENGLISH from Antenny (USSR), no. 11, 1971 p 27-42 (For primary document see N82-13327 04-32)
Avail: NTIS HC A07/MF A01 CSCL 20/14

The development of design models for the construction of antennas with weak frequency dependence is discussed and related to broadband and super broadband equipment. The conditions for the similarity of fields are obtained from the Maxwell equations (which contain outside currents) by the methods of similitude theory. On the basis of these conditions, the general principles for the construction of systems which possess potential frequency independence are formulated. M.G.

N82-13331# Joint Publications Research Service, Arlington, Va.
NATURAL AND MUTUAL CONDUCTIVITIES OF HALF-WAVE SLOTS, ARBITRARILY ORIENTED ON THE CONDUCTING SURFACE OF CIRCULAR CYLINDER
I. F. Dobrovolskiy, V. M. Klyuyev, and A. I. Rogachev *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0826-81) 16 Oct. 1981 p 89-102 refs Transl. into ENGLISH from Antenny (USSR), no. 11, 1971 p 43-50 (For primary document see N82-13327 04-32)
Avail: NTIS HC A07/MF A01 CSCL 20/14

The asymptotic expression of an improper integral, giving tangential components of the field on the surface of an ideally conducting cylinder excited by magnetic current is found on the base of the representation of the functions of Hankel with Airy's functions. The obtained analytical expressions are applied for the calculation of natural and mutual conductivities of the arbitrarily oriented half-wave slots on a cylinder of comparatively large radius (ka > 10). The results of numerical calculations are given for different orientations of slots. M.G.

N82-13332# Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF ANTENNAS WITH FREQUENCY BEAM SWINGING
D. B. Aimin and Y. S. Losev *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0826-81) 16 Oct. 1981 p 103-122 refs Transl. into ENGLISH from Antenny (USSR), no. 11, 1971 p 50-59 (For primary document see N82-13327 04-32)
Avail: NTIS HC A07/MF A01 CSCL 20/14

The characteristics of line-source antennas with frequency beam swinging, intended for the use in the flat antennas with wide-angle beam swinging in two planes, are determined. It is claimed that for obtaining the high electrical characteristics in the flat plane antenna arrays it is expedient to utilizc the line-source antennas, constructed on the base of waveguide kite circuits with the waveguide bends in the plane of the magnetic field. M.G.

N82-13333# Naval Postgraduate School, Monterey, Calif.
THE MESSAGE PROCESSING AND DISTRIBUTION SYSTEM DEVELOPMENT M.S. Thesis
Kenneth Lee Whitten Jun. 1981 55 p refs
(AD-A104585) Avail: NTIS HC A04/MF A01 CSCL 17/2

A historical approach is used in presenting the life cycle development of the Navy's message processing and distribution system beginning with the planning phase and ending with the integrated logistic support phase. Several maintenance problems which occurred after the system was accepted for fleet use were examined to determine if they resulted from errors in the acquisition process. The critical decision points of the acquisition process are examined and constructive recommendations are made for avoiding the problems which hindered the successful development of this system. Author

N82-13334# Varian Associates, Palo Alto, Calif.
THREE-5 HETEROSTRUCTURE AVALANCHE PHOTODIODE MODULES FOR FIBER OPTIC COMMUNICATION LINKS IN THE 1.0 TO 1.3 MICROMETER SPECTRAL RANGE Final Report, Feb. 1978 - May 1980
R. Yeats and K. VonDessonneck Fort Monmouth, N.J. Army Communications Research and Development Command 1 Jan. 1981 69 p refs
(Contract DAAB07-78-C-2402; DA Proj. 1L1-62701-AH-92)
(AD-A099506; CORADCOM-78-2402-F) Avail: NTIS HC A04/MF A01 CSCL 17/2

Hybrid-structure InP-InGaAsP APDs have been fabricated which have negligible dark current I sub D < (6 nA at M = 30). The excess noise factor, F, for a hole initiated avalanche, has been determined to be F/M = 0.42 plus or minus 0.10 for 5 < or = M < or = 35. Conventional-structure high-bandgap (1.27 eV) InGaAsP APDs have been fabricated. These resemble low-leakage InP APDs rather than the high-leakage low-bandgap (1.00 eV) InGaAsP APDs. Low-noise bipolar transimpedance preamps have been designed and fabricated. These have bandwidths out to 500 MHz (for R sub f = 1 K Omega). The sensitivity of the best hybrid APDs used with these preamps is estimated to be - 46.6 dBm for a 100 Mbit/set, 10 to the minus 9th power bit error rate system, operating at a wavelength of 1.1 microns. Author

N82-13335# Air Force Geophysics Lab., Hanscom AFB, Mass.
JOINT AGENCY DOPPLER TECHNOLOGY TESTS Scientific Final Report
Ralph J. Donaldson, Jr. and Kenneth M. Glover 21 Nov. 1980

33 p refs
(AF Proj. 6670)
(AD-A100208; AFGL-TR-80-0357; AFGL-ERP-720) Avail: NTIS HC A03/MF A01 CSCL 17/9

Doppler weather radar technology is evaluated. The decisive superiority of Doppler techniques for reliable identification and early warning of tornadoes and other severe thunderstorm hazards was demonstrated. The format and effectiveness of manually aided automatic display products transmitted in near-real time to operational agencies remotely located from the radar were evaluated. Author

N82-13336# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.

SURFACE-PATCH TECHNIQUES FOR MODELING THREE-DIMENSIONAL RADIATING OR SCATTERING OBJECTS Final Technical Report, 15 Sep. 1978 - 15 Sep. 1980

Johnson J. H. Wang Griffiss AFB, N.Y. RADC Apr. 1981 76 p refs
(Contract F19628-78-C-0224; AF Proj. 2305)
(AD-A100212; RADC-TR-81-41) Avail: NTIS HC A03/MF A01 CSCL 20/3

A theoretical study of the surface patch technique for solving the electromagnetic fields of three-dimensional scattering and radiating geometries was conducted. Improved techniques for the numerical calculations were also developed. In particular, the Georgia Tech surface-patch algorithm was improved and tested for conducting prolate spheroids, circular and rectangular cylinders, and cubes. The numerical results were good even for the finite cyclinders with sharp edges. An electric field integral equation algorithm was also developed and tested satisfactorily on thin plate scattering problems. The merits of the triangular surface-patch for solving the general three-dimensional electromagnetic problems have thus been demonstrated. Author

N82-13337# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

FLOW CONTROL AND ROUTING IN AN INTEGRATED VOICE AND DATA COMMUNICATION NETWORK Ph.D. Thesis

Oliver Chukwudi Ibe Aug. 1981 118 p refs
(Contract N00014-75-C-1183; ARPA Order 3045)
(AD-A103342; LIDS-TH-1115) Avail: NTIS HC A06/MF A01 CSCL 17/2

A model of an integrated voice and data network, lending itself to analytic and algorithmic solution, and formulated as a convex optimization problem is considered. The model can be generalized to solve problems of networks which handle n types of traffic that have different levels of delay, sensitivity, where $n < 2$. A joint flow control and routing algorithm is constructed which uses short term average information on the network utilization to set the voice packet lengths and data input rates, and to determine the routes for each conversation. The voice packet lengths and data input rates are set in such a way as to achieve an optimal tradeoff between each user's satisfaction and the cost of network congestion. Additional protocols are specified for dealing with such issues as congestion avoidance and control, and for implementing flow control on a dynamic basis. Author

N82-13338# Army Electronic Proving Ground, Fort Huachuca, Ariz.

STANDARD BIT ERROR RATE (BER) VERSUS RECEIVED SIGNAL LEVEL TESTING Final Report

1 Sep. 1981 15 p refs
(AD-A104573; TOP-6-2-570) Avail: NTIS HC A02/MF A01 CSCL 17/2

Bit error rate (BER) bench testing of digital radios in a back-to-back mode determines hardware characteristics independent of external anomalies such as impulse noise, fading, and interfering signals. This method employs the statistic of a characteristic theoretical curve of a long term BER versus received signal level (RSL). The attenuation is initially set to produce a BER of approximately .0001 at a corresponding RSL. When this point on the curve is statistically valid long term BERs can be predicted to correspond with the RSL. Author

N82-13339# Harris Corp., Melbourne, Fla. Government Communications Systems Div.

MILLIMETER WAVE ALTERNATE ROUTE STUDY Final Technical Report, 18 Dec. 1978 - 18 Feb. 1980

W. C. Adams, J. J. Pan, W. C. Whitehead, E. T. Horton, Jr., J. W. Reid, and G. P. Martin Griffiss AFB, N.Y. RADC Apr. 1981 380 p refs
(Contract F30602-79-C-0055; AF Proj. 4519)
(AD-A102303; RADC-TR-81-42) Avail: NTIS HC A17/MF A01 CSCL 17/2

Millimeter wave applications and millimeter component technology is assessed for both tactical and strategic applications. Antijam techniques and multiple path diversity for improving reliability are investigated. A detailed hardware and propagation analysis to determine the millimeter bands which most effectively satisfy system requirements from a cost/implementation and system availability tradeoff point of view is conducted for various potential applications. GRA

N82-13340# Ohio State Univ., Columbus. Dept. of Electrical Engineering.

A HYBRID METHOD WHICH COMBINES A MOMENT METHOD CURRENT WITH AN ASYMPTOTIC CURRENT Interim Report

T. J. Kim and G. A. Thiele Griffiss AFB, New York RADC May 1981 150 p refs
(Contract F19628-78-C-0198)
(AD-A102199; RADC-TR-81-91; ESL-7113553-2) Avail: NTIS HC A07/MF A01 CSCL 20/14

A technique is considered for combining a moment method current and an asymptotic current in both two and three dimensions. No a priori knowledge of the current form away from the moment method region is needed nor is there need to follow ray paths on the surface of a conductor as in the geometric theory of diffraction method. A.R.H.

N82-13341# Bundesministerium der Verteidigung, Bonn (West Germany).

EXPERIMENTAL AND THEORETICAL INVESTIGATIONS WITH LABORATORY MODELS OF PHASED ARRAY ANTENNA

H. Lueg 1979 70 p refs In GERMAN; ENGLISH summary
(BMVg-FBWT-79-21) Avail: NTIS HC A04/MF A01; DOKZENTBw, Bonn DM 30

Phased arrays in the X band frequency range are studied. A theory is introduced, leading to the calculation of a conformal array of waveguide-fed aperture antennas. To test the theory, an antenna model was constructed. Printed antennas were considered for array application. Simple resonant, microstrip antennas were investigated. Theory and measurement agree. Dynamic theory leads to improvement in the design of mutually coupled active modules. Beam scanning of an active spherical antenna array was examined with respect to these results. An antenna array was set up with eight active elements and tested under computer control. For application of pulsed active modules in phased array antennas, measurement and compensation of frequency chirp are demonstrated feasible. Author (ESA)

N82-13342# AEG-Telefunken, Backnang (West Germany). Fachbereich Raumfahrt.

INVESTIGATION OF MODULATION METHODS AND SYSTEM ASPECTS FOR REGENERATIVE SATELLITE-REPEATER Final Report

Sander Rasmussen, Werner Schreitmueller, and Rudolf Wrzesinsky Bonn Bundesministerium fuer Forschung und Technologie Sep. 1980 115 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-80-024; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 24.20

Various modulation methods are compared by means of a simulation program for carrier recovery circuits. This program incorporates Q phase shift keying with offset, real carrier and clock recovery systems, adjacent channel interference, and multipath effects. Applications are given for quadrature amplitude modulation systems envisaged for satellites, Q phase shift keying with and without offset, and coherent modulation and demodulation of frequency shift keying. Regenerative repeaters for satellite communication are shown to present many advantages and a special solution is proposed for effective control of fading on the downlink and the uplink of a satellite system. A fundamental concept of a regenerative satellite repeater is defined, allowing system variants to be chosen in function of the number and size of the ground stations. Author (ESA)

N82-13343# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
ENVIRONMENT SIMULATOR FOR RADAR SIGNALS ON THE DIGITAL LEVEL [RADARSIGNALMILJOESIMULATOR PAA DIGITAL NIVAA]
Bo Karlsson Mar. 1981 100 p refs In SWEDISH
(FOA-A-30025-E4) Avail: NTIS HC A05/MF A01

Environment simulation of radar signals on the HF and video level is generally done with digitally driven analog generators. For simulation on the digital level, the same analog generators may be used with analog to digital conversion of output signals. Theoretically a diversion is implied when only the digital output signal is desired. A test simulating device on the digital level is described with the aid of multiprocessing techniques and without the use of analog generators. Author (ESA)

N82-13344 Northwestern Univ., Evanston, Ill.
SHORT-RANGE COMMUNICATIONS USING DIFFUSELY SCATTERED INFRARED RADIATION Ph.D. Thesis
Michael D. Kotzin 1981 87 p
Avail: Univ. Microfilms Order No. 8124832

Short range optical communication using diffusely scattered infrared radiation is examined. Aspects which relate to providing multichannel and duplex capability when one end of the link is not fixed, are considered. A link comparison is made between optical and microwave systems of similar complexity. Although it is shown that the optical system is not as sensitive as its microwave counterpart for typical ambient infrared backgrounds, it is advantageous with regard to spectrum availability and reuse, immunity from multipath distortion, and the maturity of the technology. Characteristics of the optical scatter propagation path are investigated using a static analytical model. Measurements of dynamic path loss provide data for the portable application. A signal to noise ratio enhancement is obtained by the use of short high power optical pulses. Selection of a digital modulation format permits the application of time division multiplex techniques to achieve the desired duplex and multichannel capability. System capabilities are demonstrated to be strongly influenced by device limitations, especially the light emitting diode (led) sources. A method of obtained receiver gain using detector optics is described and explained. Finally, the analysis and measured data are used to guide the design of a prototype portable telephone system providing two full duplex audio channels using digitally encoded speech is described. Dissert. Abstr.

N82-13345 Stanford Univ., Calif.
SPECTRAL EFFICIENCY OF AMPLITUDE COMPANDED SIDEBAND SYSTEMS Ph.D. Thesis
Mark Alan Harro 1981 177 p
Avail: Univ. Microfilms Order No. 8124083

A computer model which incorporates the various factors affecting the performance of a mobile radio system in an interference dominated environment is used to compare the efficiency and service quality of both FM and amplitude companded sideband (ACSB) radios in different types of land mobile services. Techniques for modeling the adjacent channel performance and the effect of frequency error between two radios are developed. The ACSB radios have 1.5 to 2 times the range of the FM radio with equal power. With regards to adjacent channel interference, ACSB with 5 kHz channel separation performs as well as FM with 20 or 25 kHz separation. When both co-channel and adjacent channel interference are taken into account, ACSB is about 6 to 8 times more efficient than FM as far as maximizing the number of users supported per MHz per square kilometer in any given service area. Dissert. Abstr.

N82-13346 Stanford Univ., Calif.
TOPICS IN DIGITAL SIGNAL PROCESSING Ph.D. Thesis
Shankar Seshagiri Rao Narayan 1981 135 p
Avail: Univ. Microfilms Order No. 8124116

Three discrete Fourier transform (DFT) algorithms, namely, the fast Fourier transform algorithm (FFT), the prime factor algorithm (PFA) and the Winograd Fourier transform algorithm (WFTA) are analyzed and compared. A new set of short-length DFT algorithms well-suited for special purpose hardware implementations, employing monolithic multiplier-accumulators and microprocessors, are presented. Architectural considerations in designing DFT processors based on these algorithms are discussed. Efficient hardware structures for implementing the FFT and the PFA are presented. A digital implementation for performing linear-FM (LFM) pulse compression by using bandpass filter banks is presented. The concept of transform domain adaptive filtering is introduced. The DFT and the discrete cosine transform (DFT) domain adaptive filtering algorithm are considered. Applications of these in the areas of speech processing and adaptive line enhancers are discussed. A simple waveform coding algorithm capable of providing good quality speech at about 1.5 bits per sample is presented. Dissert. Abstr.

N82-13347 New Mexico Univ., Albuquerque.
ESTIMATION OF VARIABLE LATENCY SIGNALS VIA UNWRAPPED PHASE AVERAGING WITH APPLICATION TO VISUAL EVOKED POTENTIALS Ph.D. Thesis
Michael Antonio Rodriguez 1980 89 p
Avail: Univ. Microfilms Order No. 8123966

A formula for phase estimation via unwrapped phase averaging is developed empirically using simulations where signal and noise have similar spectral densities. The result is a phase estimator in which the parameters depend only on the signal-to-noise ratio. A relationship between signal phase error and signal waveform error is derived to assist in the selection of estimator parameters and to evaluate subsequent performance of the phase estimation procedure. A new cepstral function, the delay phase cepstrum, is also introduced and found to be useful in estimating the mean delay of a known signal waveform which has a variable latency in an ensemble of measurements. Extensive simulations indicate that estimation via unwrapped phase averaging can recover variable latency signals under very poor signal-to-noise conditions. Application of the new technique to the estimation of visual evoked potentials is presented and discussed. Dissert. Abstr.

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-13348 Wisconsin Univ. - Madison.
AC HARMONIC FILTERING USING CONTROLLED CURRENT INJECTION Ph.D. Thesis
Gary Roy Dreifuerst 1981 238 p
Avail: Univ. Microfilms Order No. 8117511

Development of a test model demonstrating the feasibility of an active tracking filter for power system harmonics. The sources of power system harmonics are reviewed, including the effects harmonic have on communication and control systems. The standard harmonic filtering technique and converter control schemes which minimize harmonic production are discussed. Four approaches for harmonic filtering are considered. The active tracking filter theory is presented to a standard passive filter and compared using steady state simulation. A state-of-the-art multi-processor controlled model is designed and constructed. The model incorporates an extensive data acquisition unit which allows great flexibility for experimental work. The model test results are presented illustrating protection functions, steady-state operation, and dynamic responses which show that the active tracking filter approach is feasible. Dissert. Abstr.

N82-13349 Wisconsin Univ. - Madison.
DEVELOPMENT, ANALYSIS AND CONTROL OF THE INDUCTOR-CONVERTER BRIDGE Ph.D. Thesis
Mehrdad Ehsani 1981 357 p
Avail: Univ. Microfilms Order No. 8117512

The inductor-converter bridge (ICB) is a solid state DC-AC-DC power converter system for bidirectional, controllable, energy transfer between two high Q magnet coils. The analysis and control of the ICB system was investigated. The process of energy transfer between the coils is explained on the basis of a simple one line equivalent circuit. The changes in the average power, average coil currents, and voltages, as functions of time, are calculated by the conventional Fourier method of analysis. A method of analyzing the ICB circuit by the use of quadrometric functions and identities is presented. The method delivers closed form expressions in finite series form. Since the power in the ICB is controlled by phase and/or frequency modulation, a methodical way of executing phase frequency shifting transients, without upsetting the normal operating conditions of the system was developed. A time optimal, load current feedback, control algorithm was developed, based on the analytically understood behavior of the system. Testing and experimental evaluation of the control algorithm are described. Dissert. Abstr.

N82-13350 Stanford Univ., Calif.
CHARGE-BASED MODELING OF CAPACITANCE IN MOS TRANSISTORS Ph.D. Thesis
Donald Edward Ward 1981 162 p
Avail: Univ. Microfilms Order No. 8124169

Conventional transistor models for the transient simulation of MOS circuits are formulated in terms of nonlinear capacitors. A charge-based model was developed to overcome errors and to account for the bulk charge. It is shown that the capacitances between any pair of terminals are nonreciprocal. Bulk-source, bulk-drain, and drain-source couplings are modeled, as are gate-to-bulk capacitances in saturation. The drain-source capacitances are negative. The capacitance characteristics of the model verified experimentally. The impact of the charge-based model on simulation of practical circuits was considered. Although the model is particularly useful in simulating silicon-on-insulator circuits, it gives improved simulation of bulk MOS technologies as well. Although the derivations are strictly valid only for long-channel devices operating at low speed, the model should prove useful for the simulation of practical circuits using state-of-the-art technology. Extensions of the model to short-channel devices and high-speed operation are discussed.
Dissert. Abstr.

N82-13351 Northwestern Univ., Evanston, Ill.
CONDUCTIVITY AND PERMITTIVITY MEASUREMENTS OF FAST ION CONDUCTORS IN THE MICROWAVE REGION Ph.D. Thesis
Thomas Tang Yum Wong 1981 216 p
Avail: Univ. Microfilms Order No. 8125042

The conduction and dielectric properties of fast ion conductors in the microwave and radio frequency regions are investigated. Techniques of microwave dielectric spectroscopy pertinent to fast ion conductors are studied. Special effort is devoted to polycrystalline materials. Ag2HgI4 is chosen as the model material. Observed spectra and thermal activation effects reveal distinctive features separating the ionic conducting alpha-phase (above 50 C) from the electronic conducting beta-phase (below 50 C). Transport processes in the former can be described by hopping models whereas those in the latter can be accounted for as the remains of the infrared oscillator mode. Based on rate theory, a simple model giving the dielectric response associated with hopping conduction is constructed. It is demonstrated that in order to give a realistic description of ionic motion in the dc limit, one must consider the flux of ion across the potential barrier rather than the rate of change of polarization or the continuity equation. Explicit equations relating the complex conductivity to lattice parameters and temperature are derived. Dissert. Abstr.

N82-13352 Stanford Univ., Calif.
LINEAR ACOUSTO-OPTIC FILTERING WITH HETERODYNE AND FREQUENCY-PLANE CONTROL Ph.D. Thesis
Jerry Lee Erickson 1981 306 p
Avail: Univ. Microfilms Order No. 8124059

The basic principles, characteristics and limitations of the linear, acousto-optic, heterodyne, frequency plane (LAHF) filter are described. The related area of phase distortion introduced by the acousto-optic interaction is also examined. A general LAHF filter response is derived. A specific LAHF filter response form useful for narrowband frequency rejection is studied with computer simulation and verified experimentally. Tradeoffs among window apodization, frequency rejection notch width, and filter time delay are discussed. The properties of heterodyne detection with a large-area photodetector in relation to the LAHF filter are examined. The dynamic range of the LAHF filter is calculated and optimized. The signal-to-noise ratio is seen to be inversely proportional to the filter time-bandwidth product. Acousto-optic phase distortion is also studied and related to phase distortion in the LAHF filter response. One source of potential phase distortion is shown to be the planar, acousto-optic-medium-to-air boundary. Another source of acousto-optic phase distortion is shown to be the acousto-optic diffraction process. To demonstrate this, a new highly accurate model for weak acousto-optic diffraction in isotropic media is derived. Dissert. Abstr.

N82-13353 Stanford Univ., Calif.
A RELATIVISTIC MAGNETRON WITH A THERMIONIC CATHODE Ph.D. Thesis
William Parker Ballard 1981 165 p
Avail: Univ. Microfilms Order No. 8124030

The design and development of a relativistic magnetron are described. Target pulse lengths of one microsecond and mean pulse powers of one gigawatt were selected and an oxide cathode was chosen because the space-charge should inhibit vacuum dc breakdown between the anode and cathode, thus allowing longer pulses than are achieved with other relativistic designs employing cold, field-emitting cathodes. A high power tube was nonrelativistically scaled to an operating voltage of 500 kilovolts. The resulting anode has twelve resonators and was operated with one end short-circuited to rf. An impregnated tungsten matrix cathode and a coated cathode were tested. The coated cathode, which was found to be more tolerant of the poor vacuum, emitted successfully. A rf measurement technique provided simultaneous power and frequency information during each pulse. The magnetron operated in the desired mode at power levels of about 20 megawatts for pulse lengths of about 35 nanoseconds. Dissert. Abstr.

N82-13354 Stanford Univ., Calif.
FREQUENCY SAMPLING FILTERS, DESIGN AND APPLICATIONS Ph.D. Thesis
Amnon Aliphas 1981 126 p
Avail: Univ. Microfilms Order No. 8124027

A linear programming method of reduced complexity is developed for the design of FIR frequency sampling digital filters. The frequency sampling method can be used directly in the frequency domain when implementing filtering by fast convolution using discrete Fourier transforms. For narrowband filters or filter banks, methods are shown which significantly reduce the required multiplication operations per data point in filter implementations. A general result is presented on the problem of finding the zeros of the transfer function of an FIR filter. This problem arises when it is necessary to convert a linear phase digital filter design into a minimum phase design. It also arises if it is desired to implement a high order filter by the cascading of a number of low order filters. A method is developed for the computation of the zeros of filters which have been designed by the frequency sampling technique. For such designs the locations of all zeros on the unit circle are known. Dissert. Abstr.

N82-13355 Wisconsin Univ. - Madison.
DIRECT DIGITAL SIMULATION OF POWER SEMICONDUCTOR-CONTROLLED ELECTRICAL MACHINES Ph.D. Thesis
Hamdy Mohamad Bahnassy 1981 605 p
Avail: Univ. Microfilms Order No. 8120296

Generalized computer programming techniques for simulating power semiconductor-controlled electric machines in coil-variable representation are presented. These techniques are developed primarily for implementation in large scale general purpose computer-aided design and analysis (CADA) circuit programs. To demonstrate the validity of the developed techniques, a coil-variable model of a brushless synchronous generator with an ac exciter and rotating rectifiers was constructed. The performance of the control system (thyristor voltage regulator) is represented by a transfer function block diagram model. The CADA circuit program used is the recently developed SUPER SCEPTRE program. The model is validated using the design data and test results of a 60 kVA brushless generator. Numerous computer simulation cases are presented including the steady state and transient conditions. Brushless generator performance under diode failure faults (opened-diode, shorted-diode) is simulated. The effects of the external faults, at the main generator terminals, on the main generator, as well as its excitation system currents, are simulated. Dissert. Abstr.

N82-13356*# Santa Barbara Research Center, Goleta, Calif.
ADVANCED INDIUM ANTIMONIDE MONOLITHIC CHARGE COUPLED INFRARED IMAGING ARRAYS Final Report
T. L. Koch, C. A. Merilainen, and R. D. Thom Nov. 1981 66 p refs
(Contract NAS1-16383)
(NASA-CR-165799) Avail: NTIS HC A04/MF A01 CSCL 09A

The continued process development of SiO2 insulators for use in advanced InSb monolithic charge coupled infrared imaging arrays is described. Specific investigations into the use of plasma enhanced chemical vapor deposited (PECVD) SiO2 as a gate insulator for InSb charge coupled devices is discussed, as are investigations of other chemical vapor deposited SiO2 materials. Author

N82-13357*# Westinghouse Electric Corp., Lima, Ohio. Electrical Systems Div.
HIGH VOLTAGE DC SWITCHGEAR DEVELOPMENT FOR MULTI-KW SPACE POWER SYSTEM: AEROSPACE TECHNOLOGY DEVELOPMENT OF THREE TYPES OF SOLID STATE POWER CONTROLLERS FOR 200-1100VDC WITH CURRENT RATINGS OF 25, 50, AND 80 AMPERES WITH ONE TYPE UTILIZING AN ELECTROMECHANICAL DEVICE Final Report
W. W. Billings Nov. 1981 187 p
(Contract NAS3-21755)
(NASA-CR-165413; WAED-81-05E) Avail: NTIS HC A09/MF A01 CSCL 09C

Three types of solid state power controllers (SSPC's) for high voltage, high power DC system applications were developed. The first type utilizes a SCR power switch. The second type employes an electromechanical power switch element with solid state commutation. The third type utilizes a transistor power switch. Significant accomplishments include high operating efficiencies, fault clearing, high/low temperature performance and vacuum operation. E.A.K.

N82-13358# Naval Surface Weapons Center, White Oak, Md. Underwater Systems Dept.
MAGNETICALLY UNDETECTABLE ELECTRONIC CIRCUIT ASSEMBLIES
Hayden Morris 3 Oct. 1980 26 p refs
(AD-A100669; NSWC/TR-80-441) Avail: NTIS HC A03/MF A01 CSCL 17/4

A technique was devised for the fabrication of a nonmagnetic hermetic package to house nonmagnetic hybrid microelectronic circuits. The technique relies on the use of a standard type of metallized alumina ceramic flat package. Conductor metallization was modified to eliminate the nickel layer. Gold-plated copper was used for the external leads, using thermocompression bonding techniques. Media for hermetically sealing the cover to the circuit substrate holder include low temperature glass or solder, epoxy, or welding. N.W.

N82-13359# IBM Watson Research Center, Yorktown Heights, N.Y.
STUDY OF THE PHYSICS OF INSULATING FILMS AS RELATED TO THE RELIABILITY OF METAL-OXIDE SEMICONDUCTOR DEVICES Final Report, 1 Sep. 1978 - 30 Nov. 1980
John M. Aitken, J. Calise, Roger F. DeKeersmaecker, K. DeMeyer, and D. J. DiMaria Griffiss AFB, N. Y. RADC Jul. 1981 204 p refs
(Contract F19628-78-C-0225; ARPA Order 2180; AF Proj. 2180)
(AD-A105030; RADC-TR-81-113) Avail: NTIS HC A10/MF A01 CSCL 20/12

These papers discuss electron trapping on sites related to H2O, the subsequent interface states generated by the trapping, and the reduction of these traps by high temperature nitrogen annealing. Radiation induced neutral trapping centers are discussed in relation to electron or hole capital on them. A new electrically alterable memory device using a dual electron injector structure composed of silicon-rich silicon dioxide and silicon dioxide layers is described. Material characterization is the Fi-rich SiO subscript 2 film, discussed using attenuated total reflectance, raman scattering, and optical absorption measurements. Detection of trap impurities, on Fi surfaces is studied using electron trapping character techniques. Author (GRA)

N82-13360# SRI International Corp., Menlo Park, Calif.
THE CHEMICAL VAPOR DEPOSITION OF IRIDIUM Final Report
John B. Mooney, Robert T. Rewick, Daniel L. Haynes, Thomas E. Gray, and David M. Vandenberg Jul. 1981 34 p refs
(Contract N00014-79-C-0880; SRI Proj. 1013)
(AD-A104582) Avail: NTIS HC A03/MF A01 CSCL 09/1

The preparation of iridium films for thermionic cathodes by chemical vapor deposition is described. The deposition from IrC13/H2/CO atmospheres was very inefficient; however, iridium was deposited from IrF3/H2/CO at 465 C + or - 25 C with reasonable efficiency. The majority of the deposits were porous or loose powders. An attempt to deposit iridium on a substrate designed to produce a microporous film was unsuccessful because of the poor throwing-power of the process. Author

N82-13361# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
EXPLOSIVE-METAL COMPOSITES AND ELECTRICAL SWITCH TECHNOLOGY Final Report
M. J. Frankel and P. J. DiBona 13 Apr. 1981 21 p refs
Sponsored in part by AF
(AD-A099476; NSWC/TR-80-497) Avail: NTIS HC A02/MF A01 CSCL 11/4

A number of different explosive opening switch concepts were investigated. The fabrication of a composite material by the impregnation of a porous metallic matrix by an explosive utilizing a vacuum melt cast technique was demonstrated. Successful initiation and steady detonation wave propagation was demonstrated with use of the Jacobs rapid framing camera while the electrical conductivity through the sample was measured with an oscilloscope. This type of switch is shown to have the potential of switching large electrical currents in times on the order of 10 microns with savings in weight and volume as compared to the geometries used in other explosive switches. Author

N82-13362# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
BOUNDING SIGNAL LEVELS AT TERMINATIONS OF MULTICONDUCTOR TRANSMISSION LINE BEHIND AN APERTURE Scientific Final Report, 1 Feb. 1980 - 15 Apr. 1981
W. A. Davis and Sistanizadeh 4 Jun. 1981 128 p refs
(Grant AF-AFOSR-0138-80)
(AD-A102031; AFOSR-81-0587TR) Avail: NTIS HC A07/MF A01 CSCL 09/1

A technique for bounding the maximum voltages and currents at terminations of a multiconductor transmission line located behind an aperture-perforated conducting screen excited by an electromagnetic pulse is developed. The electromagnetic field is coupled through a small aperture to provide the excitation of a multiconductor transmission line behind the aperture. A model is presented in terms of external and internal sources which in turn creates traveling waves on the multiconductor transmission line. Upper bounds are obtained using vector norms and associated matrix norms. The frequency domain is formulated and transformed to the time domain to obtain useful upper bounds for transient analysis of multiconductor transmission line geometries with aperture excitation. S.L.

N82-13363# Army Missile Command, Redstone Arsenal, Ala. Directed Energy Directorate.
SOME EXPERIENCES WITH THE USE OF CASTOR OIL AS A DIELECTRIC
Vernon A. Niebarlein Jan. 1981 23 p refs
(AD-A102348; AD-E950151) Avail: NTIS HC A02/MF A01

CSCL 11/8

The use of large volumes of castor oil for dielectric purposes is reported. The experiences include corrosion of brass parts by the oil, drying of the oil, and the determination of water in the two-phase system of caster oil in contact with mineral oil. A detailed design of a packed column for drying castor is also presented. Author

N82-13364# Raytheon Co., Bedford, Mass.

DESIGN AND FABRICATE A CCD ANALOG MULTIPLIER Final Technical Report, 30 Sep. 1977 - 31 Oct. 1980

Jay P. Sage and Douglas E. Greetham Griffiss AFB, N.Y. RADC Aug. 1981 136 p refs
(Contract F19628-77-C-0260; AF Proj. 2305)
(AD-A105557; BR12597; RADC-TR-81-155) Avail: NTIS HC A07/MF A01 CSCL 09/5

A CCD-based correlator/convolver having 256 stages at which two analog signals are multiplied and summed has been designed, fabricated and tested. The design employs two dual-channel (surface channel) CCD's, source-follower buffered switched floating gate taps at each stage, diode injection input; and as the key 'breakthrough' element in the design, the analog multipliers are configured as four-transistor MOSFET balanced bridges. Various elements in the design were chosen and tested in isolation and combination both by means of computer simulations, and by a series of test 'pattern mask measurements in three wafer fabrication phases. Despite the size and complexity of the chip (8.7 Mn x 3.25 Mn, 4128 CCD cells and 4132 transistors), a good yield of 256 stage devices that functioned satisfactorily as correlators was obtained. On the basis of limited testing, the level of performance, however, fell short of that expected from previous component tests notably in the area of linearity of correlation (+ or - 5% rather than + or - 1%) and in speed (< or = 1 MHz rather than 10 MHz). Suggestions for further tests and experiments are given. Author (GRA)

N82-13365# Sandia Labs., Albuquerque, N. Mex.

PHOTON-ELECTRON CORRELATION IN THE LABORATORY TESTING OF ELECTRONIC COMPONENTS. PART 2: BEAM CONDITIONING AND DIAGNOSTICS

L. D. Posey and W. Beezhold 1981 104 p refs Presented at the AWRE/SNLA/DNA Joint Conf., Aldermaston, England, 6 Mar. 1981
(Contract DE-AC04-76DP-00789)
(DE81-026606; SAND-81-1578C-Pt-2; CONF-810388-1) Avail: NTIS HC A06/MF A01

The limitations of using electrons to simulate the effects of high dose rate flash X-ray irradiations for TREE studies were determined. Diagnostic testing techniques were developed for such simulation and are described. The use of suitable dosimetry techniques for high total dose/dose-rate irradiations was demonstrated. T.M.

N82-13366# Sandia Labs., Albuquerque, N. Mex. IC Process Development and Control Div.

EFFECT OF GATE OXIDE THICKNESS ON THE RADIATION HARDNESS OF SILICON-GATE CMOS

T. V. Nordstrom and C. F. Gibbon 1981 24 p refs Presented at the IEEE Conf. on Nucl. Sci. and Space Radiation, Seattle, 21 Jul. 1981
(Contract DE-AC04-76DP-00789)
(DE81-027202; SAND-81-1680C; CONF-810797-7) Avail: NTIS HC A02/MF A01

Significant improvements have been made in the radiation hardness of silicon-gate CMOS by reducing the gate oxide thickness. The device studied is an 8-bit arithmetic logic unit designed with Sandia's Expanded Linear Array standard cells. Devices with gate oxide thickness of 400, 570 (standard), and 700 A were fabricated. N- and P-channel maximum threshold shifts were reduced by 0.3 and 1.2 volts, respectively, for the thinnest oxide. Approximately, a linear relationship is found for threshold shift versus thickness. The functional radiation hardness of the full integrated circuit was also measured. DOE

N82-13367# Tennessee Univ. Space Inst., Tullahoma. Energy Conversion Div.

TWO-DIMENSIONAL EFFECTS IN POWER TAKE-OFF REGION

M. Ishikawa and Y. C. L. Wu May 1981 29 p refs
(Contract DE-AC02-79ET-10815)
(DE82-000091; DOE/ET-10815/55) Avail: NTIS HC A03/MF A01

A two-dimensional analytical model of the power take-off (PTO) region of a diagonal conducting wall MHD generator is presented and compared with experimental results. Reasonable agreement was found in both voltage and current distributions from the two-dimensional analysis, while similar comparison of experimental data with one-dimensional calculations with experiments was not satisfactory. Power take-off from mid-channel was also investigated. It was found that larger current was carried by these electrodes. In addition, large circulating current was found in the sidewalls resulting from diagonalization. Therefore ballast resistors are required to equalize the current. A general PTO resistor design was proposed. Trade-off considerations between power output and protection of over-current were made. DOE

N82-13368# General Electric Co., St. Petersburg, Fla. Corporate Research and Development Dept.

EVALUATION OF ADVANCED TECHNOLOGIES FOR POWER TRANSFORMERS Final Report

Jan. 1981 173 p refs
(Contract DE-AC01-77ET-29069)
(DE82-000793; NYSERDA-81-8) Avail: NTIS HC A08/MF A01

The high insulating strength of certain gases, such as sulfur hexafluoride, when used at high pressure, suggests that there may be advantages to compressed gases as the insulating fluid in power transformers. However, simply exchanging the oil for compressed gas in an otherwise conventional transformer design will not yield a significant overall advantage. Compressed gases present the engineer with properties which are quite different from mineral oil. If gases are to be used as the major insulating fluid in power transformers, then virtually all aspects of the insulation and cooling of the apparatus must be reconsidered, affording an opportunity to introduce new design concepts, new materials, and new construction techniques. In this program, the feasibility of using the following principal design concepts has been explored: sheet conductors for the windings; a system of sealed, self-contained, annular cooling ducts containing circulating cooling fluid to cool the windings; polymer film for turn-to-turn insulation; and compressed gas insulation. Experimental and analytical studies, described in this report, indicate that the sheet-wound, compressed-gas-insulated design should result in power transformers of significantly smaller size and weight when compared with oil-filled units of equivalent rating. These advanced technologies offer the opportunity for the design of more efficient power transformers. DOE

N82-13369# Siemens A.G., Munich (West Germany). Component Div.

FURTHER DEVELOPMENTS IN INTEGRATED CIRCUIT ASSEMBLING TECHNOLOGY Final Report

Hans Ullrich Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 62 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-178; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13

Recent developments aiming at full automation in the assembling technology of plastic encapsulated integrated circuits (IC) are described, covering die separation, chip adhesion and wire bonding. For IC die separation in individual chips, a diamond sawing procedure which replaces the traditional scratch and break technique is proposed. Die attachment by means of a silver-filled adhesive was extended to MOS and power devices. A half-automated universal chip adhesion machine was designed and tested. A positioning system based on chip edge pattern recognition was developed. The prototype of a fully automated wire bonding system was successfully tested. The technical and economical advantages of these improved technologies are discussed. Author (ESA)

N82-13370# Centre d'Etudes et de Recherches, Toulouse (France). Dept. d'Etudes et de Recherches en Automatique

VALIDATION, MODELING, AND COMPUTER ASSISTED DESIGN PROGRAM FOR POWER CONVERTERS Final Report [VALIDATION, MODELISATION ET LOGICIEL DE CONCEPTION ASSISTEE DES CONVERTISSEURS DE PUISSANCE]
M. Clique and A. J. Fossard Paris ESA Jun. 1981 82 p refs In FRENCH
(Contract ESTEC-3652/78/NL-AK(SC))
(ESTEC/DERA-8/7208; ESA-CR(P)-1454) Avail: NTIS HC A05/MF A01

Work carried out in order to determine the dynamic performance of dc/dc converters is summarized. The modeling of limit cycling current control as well as maximum current control (buck; boost) is briefly discussed, emphasizing the adaptability of the method. The computerized design program used in describing the systems in which the converters operate is mentioned, again pointing out its flexibility. The recording and processing of measurement data from breadboard model converters is then reported on. Least squares was employed as an identification method with all converters. Measured results and predicted results agree well up to approximately 2 or 3 KHz. At higher frequencies the introduction of parasite effects into the program and the precise modeling of certain complex filters remains problematic. Author (ESA)

N82-13371 Drexel Univ., Philadelphia, Pa.
ANAMOLOUS LOSS IN TRANSFORMER STEELS Ph.D. Thesis
Bryen Edward Lorenz 1981 103 p
Avail: Univ. Microfilms Order No. 8118932

Energy losses in transformer steels, specifically silicon-iron, are investigated. In the model proposed discontinuous magnetization transition, is introduced as a loss mechanism, in addition to the continuous magnetization change produced through domain wall motion. This extra mechanism is in the form of discrete sites, distributed randomly throughout the sample, which are statistically activated to switch through the action of the wall in depinning the sites. Once unpinned the sites have a relaxation time that is independent of the frequency of magnetization. The effect of two such sites is computed by using standard boundary value techniques to yield the generated eddy currents. By averaging both spacially and temporally over a cycle, the effect of an ensemble of these sites can be determined. Dissert. Abstr.

N82-13372 Stanford Univ., Calif.
A SIMPLIFIED TWO-DIMENSIONAL NUMERICAL ANALYSIS OF MOS DEVICES INCLUDING TRANSIENT PHENOMENA Ph.D. Thesis
Soo-Young Oh 1981 162 p
Avail: Univ. Microfilms Order No. 8124123

A two-dimensional approached for steady state analysis based on the boundary-value (BV) method is described. It solves the current-continuity equations numerically along the channel, with appropriate two-dimensional field coupling to the boundary conditions to include the two-dimensional and distributed-circuit effects. Because the nodes are allocated only along the boundaries and channel, their number is nearly two orders of magnitude smaller and the calculation speed is one order of magnitude faster than those obtained by either the finite-difference or finite-element method. The BV method was employed to analyze the transient characteristics of MOS transistors. The accuracy of the quasi-static model was studied and important transient phenomena such as the delay time caused by channel transit and charge pumping current were investigated through both measurements and simulation. Short-channel effects were also simulated and predicted by the new method. Dissert. Abstr.

N82-13373 Florida Univ., Gainesville.
BIPOLAR CONDUCTION WITH a.c. EXCITATION Ph.D. Thesis
Walter Devaun Stanaland 1981 361 p
Avail: Univ. Microfilms Order No. 8124457

A mathematical model of the bipolar drift dominated conduction process utilizing ac voltage excitation in dielectric liquids was developed to obtain numerical solutions for the time dependence of the spatial electric field and charge density distributions along with terminal current. The disagreement between theory and measurement is investigated by a refined conduction model based on charged particle transport, an equivalent circuit based on particle characteristics and an orientational polarization model of the particles. Since the collection of particles on an electrode during a half cycle depends on particle mobility and half cycle time, the number of particles collecting on the electrodes undergoing orientational polarization increases with decreasing frequency. Particle mobility is shown to be proportional to charge. It is concluded that the modeling and measurement processes which explain the electric field and charge density distributions depend on particle characteristics such as number density, size, mass, charge, mobility, and viscous drag coefficient. Dissert. Abstr.

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N82-13374 Purdue Univ., Lafayette, Ind.
APPLICATION OF THE METHOD OF WEIGHTED RESIDUALS TO THE BOUNDARY LAYER MOMENTUM AND TURBULENT STRESS TRANSPORT EQUATIONS Ph.D. Thesis
Donald William Davis, Jr. 1981 181 p
Avail: Univ. Microfilms Order No. 8123631

A method for the analysis of the turbulent boundary layer under the influence of a pressure gradient is developed. The governing equations are the continuity equation, the boundary layer mean momentum equation, and the boundary layer turbulent kinetic energy equation. The kinetic energy equation is transformed into an equation which governs the transport of turbulent shear stress. This transformation is accomplished through the use of three empirical functions which relate the turbulent kinetic energy, the turbulent energy diffusion, and the turbulent energy dissipation to the Reynolds stress. These empirical functions are determined completely from zero pressure gradient boundary layers. The method is applied to several sets of experimental data including flows with zero pressure gradient, favorable pressure gradient, and adverse pressure gradient. Results are given for comparisons of skin friction coefficient, thickness parameters, mean velocity profiles, and Reynolds stress profiles. Dissert. Abstr.

N82-13375 Georgia Inst. of Tech., Atlanta.
SEPARATE NUMERICAL TREATMENT OF ATTACHED AND DETACHED FLOW REGIONS IN GENERAL VISCOUS FLOWS Ph.D. Thesis
Ulgen Gulcat 1981 134 p
Avail: Univ. Microfilms Order No. 8124291

A method for the separate computation of the attached and detached region in a general viscous flow is presented. The method is mainly based on a general kinematic relationship between the velocity and the vorticity fields. This relationship permits the needed boundary conditions for the boundary layer region to be determined accurately and uniquely from a knowledge of the vorticity distribution. The kinetic part of the flow deals with the vorticity transport equation. The method yields a numerical procedure treating the boundary layer equations in the attached and Navier-Stokes equations in the detached regions of the flow. The accuracy and the versatility of the method is demonstrated by treating some simple flow geometries, namely flow past a finite plate and flow past a circular cylinder. The results obtained are in good agreement with the available solutions and with the experimental data. Finally, the flow past a 9 percent thick symmetric Jouskowski airfoil at 15 deg angle of attack is investigated. The results are presented in terms of streamlines, equi-vorticity contours, surface pressure and surface vorticity distributions at various time levels. Dissert. Abstr.

N82-13376* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CONTROLLED OVERSPRAY SPRAY NOZZLE Patent
Willibald P. Prasthofer, inventor (to NASA) Issued 17 Nov. 1981

6 p Filed 29 Feb. 1980 Supersedes N80-20528 (18 - 11, p 1415)
(NASA-Case-MFS-25139-1; US-Patent-4,300,723;
US-Patent-Appl-SN-126138; US-Patent-Class-239-499;
US-Patent-Class-239-589; US-Patent-Class-239-601) Avail: US Patent and Trademark Office CSCL 20D

A spray system for a multi-ingredient ablative material wherein a nozzle A is utilized for suppressing overspray is described. The nozzle includes a cyclindrical inlet which converges to a restricted throat. A curved juncture between the cylindrical inlet and the convergent portion affords unrestricted and uninterrupted flow of the ablative material. A divergent bell-shaped chamber and adjustable nozzle exit B is utilized which provides a highly effective spray pattern in suppressing overspray to an acceptable level and producing a homogeneous jet of material that adheres well to the substrate.

Official Gazette of the U.S. Patent and Trademark Office

N82-13377 Purdue Univ., Lafayette, Ind.

APPLICATION OF A GRAVITY-DRIVEN WICKLESS HEAT PIPE FOR ICE PRODUCTION IN A COLD ENERGY STORAGE SYSTEM Ph.D. Thesis

Shun-Lung Chao 1981 255 p
Avail: Univ. Microfilms Order No. 8123621

Use of seasonal cold storage for space cooling is considered. A simplified analytical model, simulated by a computer program, was developed to predict the system performance. Experiments were performed to study the effects of various parameters on the ice formation. Parameters studied include the quantity of working fluid, condenser length, coolant inlet temperature, cooling time, type of working fluid, and inclination of the heat pipe. The effects of these parameters on the volume and shape of the resulting ice formation and on the wall temperature distribution along the heat pipe are illustrated. Evaporation and condensation phenomena within the heat pipe were investigated. The influence of natural convection on the geometry and structure of the ice is also discussed. The analytical model was found to be adequate for predicting the rate of ice formation and the geometry associated with the ice-water interface, and was verified by comparisons with experimental observations. Dissert. Abstr.

N82-13378 California Univ., Los Angeles.

THE RELATIONSHIP BETWEEN THE ACOUSTIC IMPEDANCE AND UNSTEADY FLOW FIELD NEAR THE ORIFICE OF A TWO DIMENSIONAL HELMHOLTZ RESONATOR IN GRAZING FLOW Ph.D. Thesis

Bruce Eliot Walker 1981 161 p
Avail: Univ. Microfilms Order No. 8122878

The acoustic impedance of single and multiple orifice Helmholtz resonators which changes from its nominal value when the resonator is exposed to a steady grazing flow across its orifice(s) is discussed. The acoustic resistance rises, approximately proportionally to the speed of the grazing flow, while the acoustic reactance decreases. To understand better the physical mechanisms responsible for these changes, the unsteady flow of field within and near the orifice of a two dimensional single orifice Helmholtz resonator was measured on a microscopic scale. The data were displayed as waveforms, Fourier Series, perturbation velocity vector maps and pathline traces. Two models of the flow are suggested. Dissert. Abstr.

N82-13379 Northwestern Univ., Evanston, Ill.

ENERGETICS AND DYNAMICS OF DROPLET EVAPORATION IN HIGH TEMPERATURE INTERMEDIATE REYNOLDS NUMBER FLOWS Ph.D. Thesis

Metin Renksizbulut 1981 236 p
Avail: Univ. Microfilms Order No. 8124988

Nusselt Numbers and drag coefficients of single-component liquid droplets and solid spheres in high temperature, intermediate Reynolds Number flows were investigated. The evaporation of suspended water, Methanol and n-Heptane droplets were followed in laminar air streams up to 1059 K in temperature using a steady-state measurement technique. It is found that the dynamic blowing effect of evaporation causes large reductions in heat transfer rates, and that the film conditions constitute an appropriate reference state for the evaluation of thermophysical properties. The numerical results indicate that the blowing effect of evaporation on momentum transfer is to reduce friction drag very significantly but at the same time increase pressure drag by almost an equal amount; the net effect on the total drag force being only a marginal reduction. In all cases, it is found that thermophysical property variations play a very dominant role in reducing the drag forces acting on cold particles. Results are analysed and a correlation for stagnation-point heat transfer is also presented. Dissert. Abstr.

N82-13380 Nevada Univ., Reno.

EXPERIMENTAL DETERMINATION OF THE EFFECT OF PHYSICAL PROPERTIES ON THE DRAG OF LIQUID DROPS Ph.D. Thesis

Phillip Hugh Gillaspy 1981 70 p
Avail: Univ. Microfilms Order No. 8123955

The drag coefficient of drops of various liquids falling in air was measured experimentally. In one series of measurements the viscosity was changed while the surface tension was held constant, thus isolating the effects of liquid viscosity. It was found that the drag increased as the viscosity increased up to a value of 50 centipoises when essentially infinite viscosity was reached and there was no further increase in drag. Differences in the properties of Newtonian and non-Newtonian liquids were tested by thickening liquids with different agents. No difference in the drag due to the inherent rheological properties of Newtonian and non-Newtonian liquids were measured. With the effect of viscosity isolated, the effect of surface tension alone was then determined. All measurements were analyzed and empirical formulas expressing the drag coefficient in terms of the viscosity, surface tension, and Reynolds number were deduced.

Dissert. Abstr.

N82-13381 Northwestern Univ., Evanston, Ill.

NUMERICAL METHODS FOR THE ANALYSIS OF FLUID-STRUCTURE INTERACTION PROBLEMS Ph.D. Thesis

Robert Louis Mullen 1981 240 p
Avail: Univ. Microfilms Order No. 8124961

Numerical methods for the solution of transient two-dimensional and axisymmetric three-dimensional fluid solid interaction problems are developed and analyzed. Conservation laws for this kinematic description are developed in both differential and variational forms. The use of an arbitrary moving reference frame for the kinematic description allows the interior of the fluid region to be modeled by a conventional Eulerian description while the solid region is modeled using a Lagrangian description. Since the arbitrary moving frame includes both Eulerian and Lagrangian descriptions as subsets, the interface condition between the fluid and solid can be determined from the kinematics and conservation laws. An implicit finite element approximation is constructed for the governing equations. The properties of the discrete formulation are studied for perturbation and spectral methods. The treatment of impact problems by discrete methods is also examined. Methods to mitigate the additional errors associated with impact problems are given. Dissert. Abstr.

N82-13382 Stanford Univ., Calif.

IMPACTS OF VERTICAL SCALE DISTORTION ON TURBULENT MIXING IN HYDRAULIC MODELS Ph.D. Thesis

Benjamin Rush Roberts 1981 239 p
Avail: Univ. Microfilms Order No. 8124141

A variable distortion physical modeling facility representing a typical cooling pond or lake with a surface jet discharge and submerged power plant intake was used to investigate vertical scale distortion. The primary goals of the study were to establish a quantitative relationship between model scale distortion and turbulent mixing, and to develop a data base (including mean and turbulent quantities, density variations, and flow patterns) which can be used to test and calibrate three-dimensional numerical models. An analytical study of the full equations governing mean and turbulent processes in open water bodies is used to produce, using dimensional analysis techniques, a set of non-dimensional equations which show the impacts of distortion on the terms in the equations. The ultimate result is a set of theoretical predictions for distortion-related impacts on turbulence and mixing. The analytic and experimental results demonstrate a consistent under-prediction of turbulence intensities, vertical mixing rates, and jet dilution by distorted physical models. The far-field impacts of distortion which are observed include modification of advective flow patterns, reduction in boundary friction effects, and increased transverse and longitudinal dispersion. Dissert. Abstr.

N82-13383*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AERODYNAMIC HEATING ON THE CORRUGATED SURFACE OF A 10.2 DEG HALF-ANGLE BLUNTED CONE AT MACH 6.7

Irving Weinstein, Don E. Avery, and L. Roane Hunt Dec. 1981 45 p refs

(NASA-TP-1928; L-14679) Avail: NTIS HC A03/MF A01 CSCL 20D

A 10.2 deg half-angle blunted cone with corrugated surfaces was tested in the Langley 8-foot high-temperature structures tunnel to measure the aerodynamic heating of its surfaces. The tests were made in a turbulent boundary layer at angles of attack of 0 deg, 5 deg, and 10 deg. Heating of the windward side was in reasonable agreement with theoretical turbulent predictions for a smooth cone, while heating on the leeward side was between laminar and turbulent predictions as a result of local transitional flow or flow separation produced by high lee-side pressures. Localized heating measurements indicated a significant increase in heating at large cross-flow angles, with the maximum heating rates occurring where the flow reattaches on the upstream side of the corrugation crest and the minimum occurring on the downstream side where the flow is separated. Author

N82-13384# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

TECHNICAL EVALUATION REPORT ON THE FLUID DYNAMICS PANEL SYMPOSIUM ON COMPUTATION OF VISCOUS-INVISCID INTERACTIONS

J. C. LeBalleur Oct. 1981 21 p refs Partly in ENGLISH; Partly in FRENCH Symp. held at Colorado Springs 29 Sep. - 1 Oct. 1980

(AGARD-AR-171; ISBN-92-835-0300-7) Avail: NTIS HC A02/MF A01

The status of current research in computational aerodynamics based on methods solving a viscous-inviscid interaction problem is surveyed. In spite of limitation in the models or numerical techniques for shock wave boundary layer interaction or trailing edge problems, the situation is well advanced in unseparated, steady two-dimensional flow, with the potential approximation for the inviscid part. Progress has advanced in the computation of separations, based on strong interaction models. It would be fruitful to make use of the complete Euler equations in transonic flow. Progress toward strong interaction methods is much less advanced in unsteady or three-dimensional flow, but seems likely. The development of strong interaction methods, highly connected with that of Inviscid and Navier-Stokes numerical techniques, appears as mandatory to having access to practical application needs. Author

N82-13385# Centre National de la Recherche Scientifique, Meudon (France). Lab. d'Aerothermique.

UNDEREXPANDED FREE JETS AND THEIR INTERACTION WITH ADJACENT SURFACES

Jean-Claude Lengrand, Jean Allegre (Societe d'Etudes, de Constructions et de Services pour Souffleries et Installations Aerothermodynamiques), and Michel Riffin (Societe d'Etudes, de Constructions et de Services pour Souffleries et Installations Aerothermodynamiques) 29 Jun. 1981 34 p refs Backup document for AIAA synoptic scheduled for publication in AIAA Journal on Jan. 1982

(LOG-J12276) Avail: NTIS HC A03/MF A01

Based on semiempirical considerations, simple formulas are proposed to describe the flowfield of a highly underexpanded jet exhausting from a sonic or supersonic nozzle. Correlations for density distribution and Mach disc distance include the influence of all governing parameters in the continuum regime. Regarding pressure distribution on a wall impinged by a jet, non-dimensional quantities are defined that greatly reduce the number of parameters involved in the correlations. Formulas and correlations are compared with original as well as previously published experimental results. The degree of rarefaction is discussed. Results on jet-wall interaction are thought to be of practical interest for the design of spacecrafts or launch vehicles. Author

N82-13386*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF A FLUIDIC POWER GENERATOR

V. Sarohia, L. Bernal, and R. B. Beauchamp 15 Nov. 1981 81 p refs

(Contract NAS7-100)

(JPL-Pub-81-100) Avail: NTIS HC A05/MF A01 CSCL 20D

A combined experimental and analytical investigation was performed to understand the various fluid processes associated with the conversion of flow energy into electric power in a fluidic generator. Experiments were performed under flight-simulated laboratory conditions and results were compared with those obtained in the free-flight conditions. It is concluded that the mean mass flow critically controlled the output of the fluidic generator. Cross-correlation of the outputs of transducer data indicate the presence of a standing wave in the tube; the mechanism of oscillation is an acoustic resonance tube phenomenon. A linearized model was constructed coupling the flow behavior of the jet, the jet-layer, the tube, the cavity, and the holes of the fluidic generator. The analytical results also show that the mode of the fluidic power generator is an acoustical resonance phenomenon with the frequency of operation given by f approx = a/4L, where f is the frequency of jet swallowing, a is the average speed of sound in the tube, and L is the length of the tube. Analytical results further indicated that oscillations in the fluidic generator are always damped and consequently there is a forcing of the system in operation. M.D.K.

N82-13387# Naval Postgraduate School, Monterey, Calif.

FLOW CHARACTERISTICS OF A MULTIPLE NOZZLE EXHAUST GAS EDUCTOR SYSTEM M.S. Thesis

Dennis Leo Ryan, III Mar. 1981 167 p refs

(AD-A104072) Avail: NTIS HC A08/MF A01 CSCL 21/2

Cold flow tests of a four nozzle eductor system evaluating the flow characteristics of several mixing stack configurations are presented. Flow visualization was used to determine the flow pattern in the stack. The results of the visualization runs were then used to modify the mixing stack geometry. The eductor system flow characteristics were evaluated in terms of non-dimensional parameters governing the flow phenomena from a one dimensional analysis of a simple eductor system. The eductor system's pumping capacity was improved over that of the previously tested unmodified mixing stack. Author

N82-13388# Texas Univ. at Arlington. Dept. of Aerospace Engineering and Engineering Mechanics.

THE TRANSONIC FLOW FIELD FOR A FLUIDIC-GENERATOR FUZE ASSEMBLY

John J. Bertin, Timothy E. Hayden, and Richard L. Goodyear Adelphi, Md. Harry Diamond Labs. May 1981 65 p refs

(Contract DAAK21-80-P-5171)

(AD-A099616; HDL-CR-81-171-1) Avail: NTIS HC A04/MF A01 CSCL 20/4

Static-pressure measurements and Pitot-pressure measurements were obtained for different nose configurations during wind tunnel tests. The test conditions included free-stream Mach numbers from .95 to 1.3 over a range of free-stream densities simulating altitudes from 15,240 m to 21,030 m. The pressure data from these tests were analyzed to describe the internal and the external flow fields. The pressures measured at the inlet hole for the fluidic-generator assembly is in close agreement with that given by the normal shock relations. The experimentally determined pressure ratio decreased as the free-stream Mach number increased for all external orifices from x = 0.030 x sub o to 1.000 x sub o. Since flow through the fluidic-generator assembly is choked by the nozzle centerbody, the mass-flow rate can be correlated in terms of the external flow conditions. Author

N82-13389# Aberdeen Proving Ground, Md.

ELECTRONIC MEASUREMENT OF AIRBLAST OVERPRESSURE Final Report

28 Sep. 1981 27 p refs

(AD-A105379; TOP-4-2-822) Avail: NTIS HC A03/MF A01 CSCL 19/4

The direct-pressure method and the shock wave velocity method for measuring airblast overpressures above 170 dB (1 psi or 6.9 kPa), resulting from detonation of explosives or firing of guns are described. Techniques for calibrating transducers used for measuring airblast overpressure are also considered. Author

N82-13390# United Technologies Research Center, East Hartford, Conn.

FLOW DISTRIBUTION CONTROL CHARACTERISTICS IN MARINE GAS TURBINE WASTE-HEAT RECOVERY SYSTEMS. PHASE 1: FLOW DISTRIBUTION CHARACTERISTICS AND CONTROL IN DIFFUSERS Annual Technical Report, Jul. 1980 - Jul. 1981

Simion C. Kuo and Ho-Tien Shu Aug. 1981 121 p refs
(Contract N00014-80-C-0476; NR Proj. 097-411)
(AD-A104560; UTRC/R81-955200-4) Avail: NTIS HC A06/MF A01

Flow distribution problems have become increasingly important in the design of modern fluid flow and heat transfer systems. Flow distribution characteristics and control of marine gas turbine exhaust flow is studied. Major technical problems associated with nonuniform flow distribution are reviewed and various flow distribution control methods are evaluated. A two dimensional, turbulent flow model is developed for investigating flow distribution characteristics and diffuser performance. Actual flow distribution data from marine gas turbine exhaust flows is used. A more uniformly distributed flow is obtained by using flow guide vanes combined with flow injection, and an improvement of approximately 20 to 36 percentage points in diffuser efficiency is expected depending on the diffuser geometry considered. GRA

N82-13391# R and D Associates, Marina Del Rey, Calif.

MODELING OF TURBULENT MIXING AT DENSITY DISCONTINUITIES IN NONSTEADY COMPRESSIBLE FLOWS Final Report

R. I. Issa Kirtland AFB, N. Mex. AFWL Sep. 1981 35 p refs
(Contract F29601-78-C-0006; AF Proj. 8809)
(AD-A105564; RDA-TR-107605-001) Avail: NTIS HC A03/MF A01 CSCL 20/4

This document describes a theoretical modeling of turbulent mixing at density discontinuities in nonsteady compressible flows. It is shown that when density and pressure gradients are large and have opposite signs (e.g., near the combustion products/air contact surface in blast waves driven by high-explosive sources), flow perturbations will be amplified, leading to local turbulent mixing. The applicability of using a turbulence model to simulate this process is examined. The conservation laws (for mass, momentum, energy and species) are presented in mass-averaged form, the k-epsilon model of turbulence is applied. The relevant term for the generation of turbulent kinetic energy, the term of dominant importance in this problem, is derived by two independent approaches. This generation term is driven by gradients of pressure and density normal to the interface between the high-explosive products of combustion and the shocked air, and not by shear. The present work is thought to represent the first description of a turbulence model for flows driven by such normal gradients. Author (GRA)

N82-13392# Foster-Miller Associates, Inc., Waltham, Mass.

DESIGN AND DEVELOPMENT OF A RECIPROCATING LOW-TEMPERATURE FREON EXPANDER

S. J. Hynek, A. C. Harvey, R. L. Demler, D. H. Walker, and H. H. Fuller 1981 17 p Presented at the Inter-Soc. Energy Conversion Eng. Conf., Atlanta, 9-14 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028609; CONF-810812-34) Avail: NTIS HC A02/MF A01

The design and development of a 20-ton refrigeration system to be powered by 140 F waste hot water is described. The system consists of a Rankine cycle driving a reverse-Rankine cycle, integrated in that they share a common working fluid, a common condenser, and a common crankcase housing the expander and compressor. A reciprocating single-acting counterflow expander provides a combination of high efficiency in the desired capacity range, modularity, and adaptability to existing compressors. Because the temperatures and pressures of the Rankine cycle fell within the design envelope of a standard refrigeration compressor, the compressor and expander could be housed within the same crankcase by converting some of the compressor cylinders to expander cylinders by replacing the cylinder heads. DOE

N82-13393# Los Alamos Scientific Lab., N. Mex.

LAGRANGIAN FLUID DYNAMICS USING THE VORONOI-DELAUNAY MESH

John K. Dukowicz 1981 30 p refs Presented at the Intern. Conf. on Numerical Methods for Coupled Problems, Swansea, England, Sep. 1981
(Contract W-7405-eng-36)
(LA-UR-81-1421; CONF-810916-1) Avail: NTIS HC A03/MF A01

A Lagrangian technique for numerical fluid dynamics is described which makes use of the Voronoi mesh to efficiently locate new neighbors, and it uses the dual (Delaunay) triangulation to define computational cells. This removes all topological restrictions and facilitates the solution of problems containing interfaces and multiple materials. To improve computational accuracy a mesh smoothing procedure is employed. DOE

N82-13394# Los Alamos Scientific Lab., N. Mex.

RAYLEIGH-TAYLOR STABILITY FOR A SHOCK WAVE-DENSITY DISCONTINUITY INTERACTION

Gary S. Fraley 1981 32 p Presented at the Topical Conf. on Symmetry Aspects of Inertial Fusion Implosions, Washington, D.C., 27 May 1981 Submitted for publication
(Contract W-7405-eng-36)
(DE81-028707; LA-UR-81-2263; CONF-810576-3) Avail: NTIS HC A03/MF A01

The analytic solution for perturbation growth of a shock wave striking a density discontinuity in an inviscid fluid is investigated. The Laplace transform of the solution results in a functional equation, which has a simple solution for weak shock waves. The solution for strong shock waves may be given by a power series. The four independent parameters of the solution are the gamma values on each side of the material interface, the density ratio at the interface, and the shock strength. The asymptotic behavior (for large distances and times) of the perturbation velocity is given. The asymptotic value is given by a constant term and a number of slowly decaying discreet frequencies. The asymptotic velocity at the interface is tabulated for representative values of the independent parameters. For weak shocks the solution is compared with results for an incompressible fluid. The range of density ratios with possible zero asymptotic velocities is given. DOE

N82-13395# California Univ., Livermore. Lawrence Livermore Lab.

FORMULAS FOR ONE-DIMENSIONAL LOCAL PROPERTIES FOR MOLECULAR-DYNAMICS SIMULATIONS OF SHOCK WAVES

R. J. Hardy 8 Jan. 1981 14 p refs
(Contract W-7405-eng-48)
(DE82-000906; UCRL-52972) Avail: NTIS HC A02/MF A01

Formulas are derived for the mass, momentum, and energy densities, the xx component of the pressure tensor P to the xx power, and the x component of the heat flux Q to the x power. The formulas relate these local properties to the masses, positions, and velocities of the constituent particles making up the system and are in a usable form for molecular-dynamics simulations without approximation. The formulas for P to the xx power and Q to the x power avoid the infinite series found in the formulas of Irving and Kirkwood. DOE

N82-13396# Technische Universitaet, Munich (West Germany). Inst. fuer Luft- und Raumfahrt.

INFLUENCE OF WALL ROUGHNESS, ADVERSE PRESSURE GRADIENT AND HEAT TRANSFER ON WALL SHEAR STRESS MEASUREMENTS WITH PRESTON TUBES

Wolfgang Nitsche and Christoph Haberland 1980 45 p refs In GERMAN; ENGLISH summary
(ILR-50; ISSN-0341-0587; ISBN-3-7983-0735-0) Avail: NTIS HC A03/MF A01

Correction functions to the Preston tube calibration curve, accounting for wall roughness, adverse pressure gradient, and heat transfer, were derived, allowing quantitative measurements of local wall shear stress and skin friction in boundary layer flows modified by these parameters. The correction functions were calculated from analytical boundary layer laws and are compiled in tables. Experiments in rough tubes, on plates with positive pressure gradients, and on heated and cooled surfaces confirm theoretical results. Author (ESA)

N82-13397# Research Inst. of National Defence, Stockholm (Sweden).

TESTING OF A WORK BENCH FOR HANDLING OF EXPLOSIVES IN THE LABORATORY [TEST AV ARBETSBAENK FOER HANTERING AV EXPLOSIVAHEMEN PAA LABORATORIER]

Rune Hank, Kjell Johansson, and Leif Lagman Jan. 1981 32 p refs In SWEDISH
(FOA-C-20393-D1) Avail: NTIS HC A03/MF A01

A prototype work station was developed at which jobs can be carried out with explosives up to 10 gr and deflagrating products up to 50 gr. Tests were made to investigate the consequences of a spontaneous accident during work. Conclusions are: the workbench offers good protection against splinters provided the inside walls are coated with a shock absorber; the carbonate glass should be a minimum of eight mm thick; the risk of burns, except on arms and hands, is very low; the bench withstands the explosion with the given weight of explosives (10 gr); the risk of lesions on the lung are very low, for the operator as well as for somebody nearby. Author (ESA)

N82-13398# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

A SOLUTION OF THE NAVIER-STOKES EQUATIONS BY A MIXED FINITE ELEMENT METHOD Ph.D. Thesis - Paris Univ.

Marc Bredif 1981 135 p refs In FRENCH; ENGLISH summary Report will also be announced as translation (ESA-TT-720)
(ONERA-NT-1981-1; ISSN-0078-3781) Avail: NTIS HC A07/MF A01

The numerical treatment of steady state, two-dimensional Navier-Stokes equations in the incompressible case is studied. The approximation method retained is the 'mixed' finite element method, as regards stream function and vortex function. The improvements to this formulation are: possibility of choice of boundary conditions of various types; introduction of a finite element formulation of the stagnation pressure calculation; definition of a corrected formulation with a view to studying laminar flows in the case of large Reynolds numbers. The chosen formulation is discussed theoretically, encompassing the aspects mentioned. A solution algorithm is presented, based on a general conjugate gradient method; numerical results are presented for various cases of viscous, incompressible, laminar flows: (1) in a square cavity; (2) around a circular cylinder; and (3) around a NACA 0018 profile at zero angle of attack for Reynolds numbers up to 5000. Author (ESA)

N82-13399# National Bureau of Standards, Washington, D.C. National Engineering Lab.

AN INITIAL STUDY OF THE APPLICATION OF THE NUMERICAL METHOD OF CHARACTERISTICS TO UNSTEADY FLOW ANALYSIS IN PARTIALLY FILLED GRAVITY DRAINAGE SIZED PIPES

John A. Swaffield Jul. 1981 65 p refs Prepared jointly with Brunel Univ. Sponsored in part by HUD
(PB81-229189; NBSIR-81-2308) Avail: NTIS HC A04/MF A01 CSCL 13C

The application of the numerical method of characteristics to the solution of the differential equations defining unsteady flow in partially filled drainage system sized pipes is outlined. The derivation of the flow equations is presented, together with the necessary boundary equation formulation to represent variable inflow, system discharge and leakage flow past a stationary deposited solid. A computer program, written in FORTRAN, is included, together with typical output, that establishes the applicability of this computational method to unsteady flow analysis in gravity flow drainage systems. Proposals for the extension of the described techniques to the prediction of solid transport and flow attenuation in long pipes are also presented. GRA

N82-13400 Georgia Inst. of Tech., Atlanta.

HEAT PIPE STARTUP FROM THE SUPERCRITICAL STATE Ph.D. Thesis

Won Soon Chang 1981 212 p
Avail: Univ. Microfilms Order No. 8124285

The transient operation of a Freon-11 heat pipe at temperatures below and near the critical point is studied theoretically and experimentally. A well instrumented test section was designed and fabricated. In the heat pipe regimes the device operated very stably under transient and steady conditions. All inside temperatures in the capillary structure and the vapor space were almost uniform (within 1 K). When high heat load and coolant temperature were applied to the heat pipe, very large temperature gradients occurred throughout, internally and externally. Part of the evaporator was eventually dried out and with more thermal loading the whole capillary structure of the evaporator was dried. The internal temperature distribution, thereafter, diverged along the length of the pipe with increased evaporator temperature exceeding the critical and with decreased condenser temperature approaching the sink temperature. Experiments on cooldown from the supercritical state were carried out to determine the rewetting characteristics of the capillary structure. A computational model for predicting the transient operating characteristics of low-temperature heat pipes is presented. To simulate startup from the supercritical state, a simplified cooldown model was developed using bulk fluid movement with phase-change at the liquid front. Dissert. Abstr.

N82-13401 Purdue Univ., Lafayette, Ind.

COMPUTATION OF UNSTEADY TWO-DIMENSIONAL INVISCID FLOW IN TURBOMACHINERY CASCADES Ph.D. Thesis

Mahmoud Mohamed Kemry 1981 313 p
Avail: Univ. Microfilms Order No. 8123664

A numerical technique was developed to solve the governing equations of motion for unsteady two-dimensional inviscid flow in turbomachinery cascades and applied to the analysis of steady transonic flows in turbine cascades with the steady state solution computed as the asymptotic limit in time of the unsteady solution. The physical plane was transformed to a computational plane to eliminate nonuniform mesh intervals and to simplify the application of the boundary conditions. The full method of characteristics was employed for the boundaries in the leading edge region; the reference plane characteristics method was employed for all other boundaries; MacCormack's method was employed for all interior points. Two cases of turbine cascade flows were solved. The first case involved subsonic flow through the cascade. The second case involved subsonic inlet and discharge flows, but with transonic flow over a portion of the cascade passage. Dissert. Abstr.

N82-13402 California Univ., Los Angeles.

NUMERICAL EXPERIMENTS ON TWO-PHASE LIQUID-VAPOR MIST TRANSPORT Ph.D. Thesis

Jin Young Lee 1981 179 p
Avail: Univ. Microfilms Order No. 8122821

A numerical model of vertical two phase flow of liquid drops in vapor was developed for application to the ocean thermal energy conversion (OTEC) cycle which is proposed to avoid the need of unusually large heat exchangers and/or huge turbines. The analysis consists of three major parts. A one dimensional two fluid model was developed that is able to show the effects of thermal nonequilibrium between vapor and drops. The model was extended to account for collision and coalescence among the drops and can be easily adjusted to the variations in the parameters which enter the collisional model. Two dimensional nonlinear coupled partial differential equations are solved by a finite difference shooting method in parallel with Monte Carlo simulation of drop phase behaviors. Results are obtained for the flow with a periodic disturbance of mist density at injection. Numerical experiments with the model show that the practical maximum net lift for OTEC conditions is about 30 m which is significantly lower than the height obtained from an equilibrium flow analysis and from a collisionless two fluid flow analysis. Dissert. Abstr.

N82-13403 Ohio State Univ., Cleveland.
NUMERICAL STUDY OF MULTICELLULAR NATURAL CONVECTION IN VERTICAL CAVITIES Ph.D. Thesis
Yee Lee 1981 142 p
Avail: Univ. Microfilms Order No. 8121818

The structure of the multicellular convection resulting from the hydrodynamic instability of a flow in both a tall vertical rectangular and a tall annular cavity was calculated by finite difference methods. The effects on the flow structure and the average Nusselt number of varying the Prandtl number of the fluid, the aspect ratio of the cavity and the Grashof number were studied. How the curvature of the walls influences the flow patterns in an annulus was also studied. In addition to predicting the right multicellular flow structure at low Prandtl numbers in a rectangular cavity, travelling wave solutions were obtained for water. The results for the flow of a low Prandtl number fluid in an annulus show a multicellular flow structure which drifts upward with a speed which compares well with the experimentally observed value. The heat transfer results for air in tall rectangular cavities have application to double glazed windows and provide a guide to establishing the proper gap width for best insulation. Dissert. Abstr.

N82-13404 Kansas State Univ., Manhattan.
SIMULTANEOUS HEAT AND MASS TRANSFER IN A POROUS MEDIUM Ph.D. Thesis
Hwanghwei Siang 1981 214 p
Avail: Univ. Microfilms Order No. 8122035

Based upon the principle of irreversible thermodynamics, the macroscopic conservation laws of mass, momentum and energy, and equilibrium sorption of the porous concrete system, a set of basic equations for simultaneous mass and heat transfer is developed. An implicit finite difference technique is employed to solve this set of nonlinear partial differential equations. Numerical examples, using the theory developed, are illustrated to deepen the general understanding of the drying, thermal characteristics and related phenomena of hydrated concrete. The developed theoretical model is made nondimensional and an order of magnitude analysis is performed to elucidate the transport phenomenum of heat and mass occurring in a concrete body. In addition to diffusion, both the capillary and evaporation-condensation mechanisms, which are strongly affected by the topology of the porous concrete system, are important in the heat and mass transfer processes. Dissert. Abstr.

N82-13405 Stanford Univ., Calif.
MIXING OF A PASSIVE SCALAR IN ISOTROPIC AND SHEARED HOMOGENEOUS TURBULENCE Ph.D. Thesis
Ebrahim Shirani-Chaharsughi 1981 177 p
Avail: Univ. Microfilms Order No. 8124152

In order to calculate the velocity and passive scalar fields in homogeneous turbulent flows, the three-dimensional [illegible]e-dependent equations of motion and the diffusion equat[illegible] are solved numerically. Isotropic, homogeneous turbulence with decay of a passive scalar, and homogeneous turbulent shear flow with a passive scalar whose mean varies linearly in the spanwise direction were investigated. The solutions were obtained at relatively low Reynolds numbers so that all of the turbulent scales could be resolved without modeling. The numerical simulations were carried out on the ILLIAC-4. The pseudospectral method was used for space differencing and the second-order Adams-Bashforth method for time differencing. Turbulent statistics such as integral length scales, Taylor microscales, Kolmogorov length scale, one and two point correlations of velocity-velocity and velocity-scalar, turbulent Prandtl/Schmidt number, r.m.s. values of velocities, the scalar quantity and pressure, skewness, decay rates, and decay exponents were calculated. Also, one and three dimensional spectra of velocity components and scalar quantity, three dimensional spectra of production, dissipation and transfer terms, pressure, Reynolds stress, and heat flux terms were calculated. Some of the results are compared with the available experimental results, and good agreement is obtained. Dissert. Abstr.

N82-13406 Oregon State Univ., Corvallis.
AN EXPERIMENTAL STUDY OF HEAT TRANSFER TO A HORIZONTAL TUBE IN A LARGE PARTICLE FLUIDIZED BED AT ELEVATED TEMPERATURE Ph.D. Thesis
Alan Herbert George 1981 76 p
Avail: Univ. Microfilms Order No. 8124329

Experimental data for the time-average local heat transfer coefficient to a single horizontal tube in a large particle fluidized bed at elevated temperature, are presented. Refractory particles with surface mean diameter 2.14 mm and 3.23 mm were fluidized by combustion products of propane at bed temperatures of 810 K and 1053 K. The particle sizes are near the largest presently used in pilot plant fluidized bed coal combustors. The superficial gas velocity ranged from that required for minimum fluidization, or slightly packed, to the velocity where slugging first occurred, or the highest velocity air blower capacity would allow. Heat transfer results indicate that a stack of defluidized particles remain on top of the tube at low superficial gas velocities. A very low local heat transfer coefficient was obtained under these conditions. There was less than 10 percent difference in the maximum spatial average heat transfer coefficients for the two particle sizes considered. Dissert. Abstr.

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-13407# California Univ., Livermore. Lawrence Livermore Lab.
LOW ENERGY X-RAY SPECTROMETER
Wayne R. Woodruff 5 Jun. 1981 6 p refs Presented at the Topical Conf. on Low Energy X-Ray Diagnostics, Monterey, Calif., 8-10 Jun. 1981
(Contract W-7405-eng-48)
(DE81-025824; UCRL-85684; CONF-810651-3) Avail: NTIS HC A02/MF A01

A subkilovolt spectrometer was produced to permit high-energy-resolution, time-dependent X-ray intensity measurements. The diffracting element is a curved mica crystal. A carbon X-ray mirror that reflects photons is utilized ahead of the diffracting element. The nominal energy range of interest is 800 to 900 eV. Diffracted photons are detected by a gold-surface photoelectric diode and recorded on an oscilloscope. A thin, aluminum light barrier between diffracting crystal and photoelectric diode detector prevents any uv generated on or scattered by the crystal from illuminating the detector. High spectral energy resolution is provided by photocathodes. The spectrometer was calibrated using Ni L sub alpha 1 2 lines and a molybdenum target X-ray tube. For the latter calibration the carbon mirror was replaced by one surfaced with rhodium to raise the cut-off energy to about 3 keV. The carbon mirror reflection dependence on energy and curved mica crystal diffraction efficiency were measured using X-ray machines. DOE

N82-13408# California Univ., Livermore. Lawrence Livermore Lab.
ON-BOARD DATA RECORDER FOR HARD-TARGET WEAPONS
W. A. Niven and M. F. Jaroska 16 Mar. 1981 14 p refs Presented at Fuze Section Ann. Meeting (ADPA), San Diego, 17 Mar. 1981
(Contract W-7405-eng-48)
(DE81-028645; UCRL-85730-Rev-1; CONF-810367-2-Rev-1)
Avail: NTIS HC A02/MF A01

A small, rugged, solid state on-board recorder to capture dynamic data for testing hard target penetration weapons is described. A hydrodynamic computer is used to calculate the response of a warhead to typical ship target. DOE

N82-13409# Pacific Northwest Lab., Richland, Wash.
DEVELOPMENT OF THE HIGH-TEMPERATURE REDOX ELECTRODE AND IMPROVED CORROSION RATE METER Interim Report

M. J. Danielson and O. H. Koski Sep. 1981 38 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000933; PNL-3592) Avail: NTIS HC A03/MF A01

The oxidation-reduction (redox) electrode studies at Pacific Northwest Laboratory (PNL) were completed with the examination of the sulfide-sulfate system. This system is extremely reducing, and it was concluded that the redox electrode would still respond to the entry of oxygen even though sulfide is an oxygen getter. The corrosion rate of platinum in oxygenated brine was determined at 2500 C. It was concluded that the mechanism of response to oxygen fits a mixed potential model. Work began on the improved corrosion rate meter (ICR). A potentiostat and programmer were constructed and successfully tested. Corrosion tests were carried out in 250 C brine with and without oxygen, and the ICR response was very good when compared to corrosion rates determined by weight loss. DOE

N82-13411# AEG-Telefunken, Warstein (West Germany). Fachbereich Leistungshalbleiter.
IMAGING SYSTEMS FOR FAST ELECTROPHOTOGRAPHIC PROCESSES Final Report
Manfred Lutz, Bernd Reimer, Guenter Baumann, Hans Scheuermann, Harald Stausberg, and Hubert Walsdorfer Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 160 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-183; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 33,60

Image carriers based on amorphous Se-alloys and inorganic-organic multilayer systems were developed for applications in fast electrophotographic processing. The combination of Se photoconductive layers doped with 0.5% As or up to 15% Te with a strain reducing metallic interlayer on a flexible endless Ni-belt is demonstrated to provide the photographical quality and bending strength required by fast reprography. The addition of Te is shown to significantly extend the spectral sensitivity range. Thin flexible foils and belts can also be made out of multilayered systems using Se-alloys and polyrinylcarbazole. It is expected that it will be possible to extend the spectral sensitivity to the near infrared, thereby opening a new area of applications in communication and information systems. Author (ESA)

N82-13410# Research Inst. of National Defence, Stockholm (Sweden).
FOA 27 CONTROL INSTRUMENTS DATA SYSTEM. CONTROL INSTRUMENTS AND THEIR FUNCTIONS [FOA INSTITUTION 27 MAETDATORSYSTEM. MAETINSTRUMENTEN OCH DERAS FUNKTIONER]
Sven Wahlstroem and Bertil Sandberg Feb. 1981 62 p refs In SWEDISH
(FOA-C-20394-D3) Avail: NTIS HC A04/MF A01

Computerized control posts using analog processing with digital conversion capability are discussed. The functioning of the different instruments, performance, and experience gained after a certain period with the system is reviewed. Topics covered amplifiers, filters, converters, transient recorders, temperature measuring instruments, and signal processing devices. Author (ESA)

N82-13412# Bureau of Mines, Pittsburgh, Pa.
THREE BUREAU OF MINES OPTICAL DUST PROBES
Kenneth L. Cashdollar, Israel Liebman, and Ronald S. Conti Jun. 1981 72 p refs
(PB81-231441; BM-RI-8542) Avail: NTIS HC A04/MF A01 CSCL 14B

Three types of optical dust probes are designed, built, and tested. The probes measure dust cloud concentrations by the attenuation of light. A single path length probe, a double path length probe, a single path length probe that employs jets of air to keep the windows of the light source and detector free from dust coating are described. The theory of operation and the calibration procedures for the probes are described. GRA

N82-13413# Bureau of Mines, Amarillo, Tex. Helium Operations.
AN APPARATUS AND PROCEDURE FOR CALIBRATING A WATER VAPOR ANALYZER IN THE 0.1- TO 15-PPM RANGE
Harold L. Rhodes Jun. 1981 14 p refs
(PB81-231185; BM-RI-8548) Avail: NTIS HC A02/MF A01 CSCL 14B

This method uses the quantitative chemical reaction of H2O with CaH2, which produces 1 mole of hydrogen for each mole of H2O in the sample. A gas chromatography is then used to determine the concentration of hydrogen in the product. The precision of the H2O analysis is + or - 0.05 ppm at a concentration of 1 ppm. This method is used to calibrate a commercial platinum-phosphorus pentoxide (Pt-P2O5) electrolytic water vapor analyzer that has an improved inlet system and digital voltmeter readout. GRA

N82-13414# National Bureau of Standards, Washington, D.C.
REQUIREMENTS FOR AN EFFECTIVE NATIONAL NONIONIZING RADIATION MEASUREMENT SYSTEM Final Report
Howard E. Clark Jun. 1981 45 p refs
(PB81-223455; NBS-SP-613; LC-81-600070) Avail: NTIS HC A03/MF A01 CSCL 14B

A detailed assessment of the capabilities, limitations, and requirements of the national nonionizing radiation measurement system is provided. The priorities of these measurement requirements are assessed according to their ability to contribute: to the core competence of determining the electric and magnetic fields of a source; or to the associated capabilities for generating and applying reference fields, characterizing sources and reflectors, or recording exposure histories. These measurement capabilities at all frequencies between dc and 300 GHz were examined. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-13516* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARGE VOLUME MULTIPLE-PATH NUCLEAR PUMPED LASER Patent
Frank Hohl and Russell J. DeYoung, inventors (to NASA) (Miami Univ., Oxford, Ohio) Issued 10 Nov. 1981 4 p Filed 21 May 1979 Supersedes N79-26385 (17 - 17, p 2266)
(NASA-Case-LAR-12592-1; US-Patent-4,300,106; US-Patent-Appl-SN-041141; US-Patent-Class-331-94.5C; US-Patent-Class-331-94.5P; US-Patent-Class-331-94.5D) Avail: US Patent and Trademark Office CSCL 20E

Large volumes of gas are excited by using internal high reflectance mirrors that are arranged so that the optical path crosses back and forth through the excited gaseous medium. By adjusting the external dielectric mirrors of the laser, the number of paths through the laser cavity can be varied. Output powers were obtained that are substantially higher than the output powers of previous nuclear laser systems.
Official Gazette of the U.S. Patent and Trademark Office

N82-13416 Michigan Univ., Ann Arbor.
THREE LASER EXPERIMENTS IN GASES Ph.D. Thesis
Michael Toubert Myers 1981 157 p
Avail: Univ. Microfilms Order No. 8125176

Three laser experiments performed in gases are reported. Four wave degenerate mixing in cesium vapor is described. Its basis in nonlinear optics is explained and a simple set of equations are derived, which predict the resonant behavior, density dependence, and the power dependence of the signal. Inelastic scattering cross sections for the 9D and 10D states of cesium were measured. The observation of cancellation of rotational effects in the intensity of ultraviolet bands of OH are reported. The band oscillator strength for transition in the band of OH was measured and was independent of rotational excitation. This independence is explained in terms of the cancellation of a rotationally induced increase in the Franck-Condon factor by an equivalent decrease in the electronic transition moment. Dissert. Abstr.

N82-13417 Stanford Univ., Calif.
ATOMIC PAIR PROCESSES AND LASER APPLICATIONS Ph.D. Thesis
George Andrew Zdasiuk 1981 129 p
Avail: Univ. Microfilms Order No. 8124180

Several mechanisms for the emission and absorption of light by atoms and molecules are described. These processes, which are termed pair emission and pair absorption, respectively, enable two colliding atoms (or molecules, ions, etc.) to simultaneously emit or absorb a single quantum of electromagnetic radiation. The photon energy is equal to the sum of the internal energy changes of the colliding partners. The corresponding wavelength is unrelated to the emission or absorption spectrum of the isolated atoms. Explicit expressions are derived for the linear absorption coefficient for pair absorption and the effective Einstein A coefficient for pair emission. Stimulated pair emission and optical gain on pair absorption transitions are also considered. An experiment which demonstrates the use of optically pumped pair absorption transitions in metal vapors for constructing 'pair absorption pumped lasers' is described. This technique may be useful for constructing active optical frequency conversion devices. Dissert. Abstr.

N82-13418 Stanford Univ., Calif.
LASER INDUCED CHARGE TRANSFER COLLISIONS Ph.D. Thesis
Michael Dean Wright 1981 81 p
Avail: Univ. Microfilms Order No. 8124177

Two laser induced charge transfer reactions involving calcium and strontium were studied. In both reactions, a ground state calcium ion collides with a ground state strontium neutral in the presence of a laser field to produce a ground state calcium neutral and an excited strontium ion. The two reactions differ in the final state of the strontium species. The collision cross sections are studied as functions of applied laser frequency and power density. A laser induced charge transfer collisions analysis which follows the Landau-Zener formalism is presented. Dissert. Abstr.

N82-13419 Rochester Univ., N. Y.
INVESTIGATION OF FLUCTUATION PHENOMENA IN DYE LASERS Ph.D. Thesis
Rajarshi Roy 1981 206 p
Avail: Univ. Microfilms Order No. 8124001

The fluctuation phenomena in single mode and two mode dye lasers were studied. A quantum theory of the single mode c.w. dye laser is presented and the connection between the dye laser and the laser with a saturable absorber is examined. The results of photon counting and correlation measurements on the single mode dye laser are discussed. The effect of flow velocity on the photon statistics is also investigated. Photon counting measurements performed on a two mode ring dye laser which verify some of the theoretical predictions are described. Experiments on both the ring dye laser and a two mode standing wave laser are described in which both the average dwell times and their distributions are measured. A comparison of theoretical and experimental results is made. Dissert. Abstr.

N82-13420# Defence Research Establishment Valcartier (Quebec).
LONG-TERM OPERATION OF A SEALED WAVEGUIDE CO SUB 2 LASER
P. Pace and J. Cruickshank Apr. 1981 21 p refs
(AD-A105261; DREV-R-4207/81) Avail: NTIS HC A02/MF A01 CSCL 20/5

A mass spectrometer has been utilized to study the gas composition during operation of a CO2 laser using a BeO waveguide. The results of this study have allowed us to construct sealed waveguide lasers with predicted lifetimes in excess of 7000 h. Author (GRA)

N82-13421# Defence Research Establishment Valcartier (Quebec). Research and Development Branch.
SURFACE FAILURE OF CO2 LASER IRRADIATED GLASS
R. W. MacPherson and J.-C. Anctil Apr. 1981 23 p refs
(AD-A105454; DREV-R-4202/81) Avail: NTIS HC A02/MF A01 CSCL 20/5

The possibility of failure of laser heated glass has important implications in experiments on the thermal shock resistance of materials and in the potential applications of lasers to the machining and heat treating of glass. We describe a method of measuring the damage probability distribution function for laser irradiated glass and develop a model to predict the temperature and stress distributions as a function of time. The experiments and model show that for CO2 laser pulse lengths inferior to 1 ms, the mode of failure is by fracture under tensile stress induced during cooling after heating a thin layer near the surface beyond the annealing point. Author (GRA)

N82-13422# Los Alamos Scientific Lab., N. Mex.
IMPEDANCE-MATCH EXPERIMENTS USING HIGH INTENSITY LASERS
N. C. Holmes, R. J. Trainor, R. A. Anderson, L. R. Veeser, and G. A. Reeves 1981 4 p refs Presented at the Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23-25 Jun. 1981 Prepared in cooperation with California Univ., Lawrence Livermore Lab.
(Contract W-7405-eng-36)
(DE81-025802; LA-UR-81-2257; CONF-810684-43) Avail: NTIS HC A02/MF A01

The results of a series of impedance-match experiments using copper-aluminum targets irradiated using the Janus Laser Facility are discussed. The results are compared to extrapolations of data obtained at lower pressures using impact techniques. The sources of errors are described and evaluated. The potential of lasers for high accuracy equation -of state investigations are discussed. DOE

N82-13423# Los Alamos Scientific Lab., N. Mex.
IMPEDANCE-MATCHING EXPERIMENTS USING HIGH-PRESSURE, LASER-DRIVEN SHOCK WAVES
L. R. Veeser, G. A. Reeves, N. C. Holmes, R. J. Trainor, and R. A. Anderson 1981 5 p refs Presented at the AIRAPT Conf. on High Pressure in Res. and Ind., Uppsala, Sweden, Aug. 1981 Prepared in cooperation with California Univ., Lawrence Livermore Lab.
(Contract W-7405-eng-36)
(DE81-028732; LA-UR-81-2367; CONF-810827-4) Avail: NTIS HC A02/MF A01

A high-power laser was used to produce shock waves with pressures of 300 to 700 GPa. A series of impedance-matching experiments on aluminum-copper systems with 10% accuracy indicate several areas in which the experiment can be improved to reduce the errors. Several such improvements are now being made, including upgrading both the laser and recording systems and modifying the target characterization techniques. DOE

N82-13424# Los Alamos Scientific Lab., N. Mex.
SIMPLIFIED EXTENSION OF THE LSI-11 Q-BUS FOR A HIGH ENERGY LASER CONTROL APPLICATION
Leonard Burczyk 1981 7 p Presented at the 24th Midwest Symp. on Circuits and Systems, Albuquerque, N. Mex., 29 Jun. 1981 Prepared jointly with Nelson and Johnson Engineering, Inc.
(Contract W-7405-eng-36)
(DE81-027001; LA-UR-81-2192; CONF-810623-12) Avail: NTIS HC A02/MF A01

Antares, a large, experimental laser fusion facility under construction at Los Alamos National Laboratory in New Mexico, is controlled by a network of PDP-11 minicomputers and micoprocessors. The remote nodes of the Antares control network are based on an LIS-11/2 microcomputer interfaced to an STD Bus. This machine interface or MI forms the intelligent process controller located directly adjacent to the many diverse laser subsystem devices. The STD Bus, linked to the LIS-11/2 microcomputer, offers a standardized, cost effective means for the development of the specialized interface functions required for the high energy laser environment. DOE

N82-13425 Stanford Univ., Calif.
INVERSE CERENKOV INTERACTION BETWEEN RELATIVISTIC ELECTRONS AND LASER LIGHT Ph.D. Thesis
Wayne Dell Kimura 1981 128 p
Avail: Univ. Microfilms Order No. 8124096

An analysis and experimental verification of momentum modulation of relativistic electrons by laser light using the inverse Cerenkov effect is presented. The laser-induced change in particle momentum; the electron energy density spectrum as a function of the electron and laser beam characteristics; and the dependence of the interaction on the index of refraction are included. A Monte Carlo computer simulation of the interaction process is also given. In the experiment, light at 1.06 micron from a 30 megawatt neodymium yttrium aluminum garnet laser intersected 102 megavolt electrons at an angle of 18 milliradians in hydrogen gas. Possible applications include laser-driven particle accelerators and coherent Cerenkov devices, such as optical klystrons and optical traveling wave tubes. Dissert. Abstr.

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-13426 South Carolina Univ., Columbia.
STUDY OF CORRUGATED PLATES Ph.D. Thesis
Chih-Hung Lee 1981 76 p
Avail: Univ. Microfilms Order No. 8123426

A strain energy development of corrugated plates based on material and geometric properties, along with experimental verification of Huber's results, is presented. All deformations are related to the vertical deflection of the mid-plane, yielding a relationship between the stress and the mid-plane displacement which is absent in the Huber model. Based on these assumptions and thin shell theory, the strain energy was expressed in terms of the mid-plane displacement function. The dynamic equations of motion were then derived utilizing the variational energy principle. These equations were then applied to rectangular, simply supported plates with different height to wave length ratios and solved to determine the natural frequencies and mode shapes. The results were dominated by the unexpected second order derivative term, which determined the failure of this theory. The orthotropic plate equation using the coefficients given by Huber was solved to determine the natural frequencies and mode shapes by utilizing a finite element method. Experimentally, the natural frequencies and mode shapes of the corrugated plate specimens have also been established by a sine sweep excitation of the plate. These experiments used magnetic excitation and an acoustic transducer pickup. Reasonably good agreement was shown between the Huber model and the experimental results. Dissert. Abstr.

N82-13427*# Aerojet Nuclear Systems Co., Sacramento, Calif.
LOW-THRUST CHEMICAL PROPULSION SYSTEM PUMP TECHNOLOGY Final Report
R. L. Sabiers and A. Siebenhaar Mar. 1981 201 p refs
(Contract NAS3-21960)
(NASA-CR-165219) Avail: NTIS HC A10/MF A01 CSCL 13K

Candidate pump and driver systems for low thrust cargo orbit transfer vehicle engines which deliver large space structures to geosynchronous equatorial orbit and beyond are evaluated. The pumps operate to 68 atmospheres (1000 psi) discharge pressure and flowrates suited to cryogenic engines using either LOX/methane or LOX/hydrogen propellants in thrust ranges from 445 to 8900 N (100 to 2000 lb F). Analysis of the various pumps and drivers indicate that the low specific speed requirement will make high fluid efficiencies difficult to achieve. As such, multiple stages are required. In addition, all pumps require inducer stages. The most attractive main pumps are the multistage centrifugal pumps. S.L.

N82-13428*# Battelle Columbus Labs., Ohio.
STUDY OF METHODS FOR APPLYING AND ENHANCING TRANSFER FILM COATINGS OF POLYTETRAFLUOROETHYLENE (PTEE) TO SPACE SHUTTLE MAIN ENGINE (SSME) HIGH PRESSURE OXYGEN TURBO PUMP (HPOTP) BEARINGS Final Report
J. W. Kannel, K. F. Dufrane, and F. F. Zugaro 25 Nov. 1981 19 p refs
(Contract NAS8-33576)
(NASA-CR-161916) Avail: NTIS HC A02/MF A01 CSCL 13I

Machines were constructed and evaluated for burnishing polytetrafluoroethylene on balls for use in the high pressure oxygen turbopump (HPOTP). The most positive performance was obtained with single-ball burnishing, but one technique for burnishing three balls simultaneously holds promise. Evaluations of the coatings in a HPOTP bearing of earlier design (employed smaller diameter balls) showed very little life enhancement before high torque and ball and race wear initiated. Other coating techniques, such as molybdenum disulfide combined with PTFE transfer films, hold promise for providing the more durable quantities of solid lubricant needed for the bearings. A.R.H.

N82-13429# California Univ., Livermore. Lawrence Livermore Lab.
WELDING OF AUSTENITIC STAINLESS STEELS FOR LIQUID-HELIUM SERVICE
E. N. C. Dalder Jun. 1981 15 p refs Presented at the Conf. on MHD Magnets, Boston, 10 Mar 1980
(Contract W-7405-eng-48)
(DE81-025602; UCRL-85818; CONF-8003144-1) Avail: NTIS HC A02/MF A01

The 4 K mechanical and metallurgical behavior of austenitic stainless steel weldments is presented, with emphasis on the problems inherent in the production of defect free welds in structures up to 5 inches thick. Austenitic CrNI, CrNIN2, and CrNiMnN2 stainless steels are the most widely used structural materials in superconducting magnets. These materials show useful combinations of toughness, stiffness, and strength at 4K. DOE

N82-13430# Mechanical Technology, Inc., Latham, N. Y.
ASSESSMENT OF ROTOR-BEARING DYNAMICS: A PLANNING STUDY FOR THE UTILITY INDUSTRY Final Report
J. A. Tecza and E. S. Zorzi Aug. 1981 150 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1648-2)
(DE82-900378; EPRI-CS-1990) Avail: NTIS HC A07/MF A01

The current state of the art regarding the rotor bearing analysis of large steam turbine generators, the needs of American utilities regarding rotor vibration problems and the development of an R and D plan to fulfill those needs was reported. The overall goal is to be able to provide utilities with needed analysis tools and techniques to reduce machine downtime and associated outage costs. The need for improved analysis methods, a summary of current American capabilities and practices, the needs of the utility industry in this area which appear most pressing and a plan for addressing them are discussed. DOE

N82-13431# Akron Univ., Ohio.
DEVELOPMENT OF ADVANCED ROTOR-BEARING SYSTEMS FOR FEEDWATER PUMPS, PHASE 2 Final Report
Maurice L. Adams, Jr. and Elemer Makay (Energy Research and Consultants Corp.) Sep. 1981 71 p refs Sponsored in part by EPRI
(EPRI Proj. 1266-7-1)
(DE82-900376; EPRI-CS-2027) Avail: NTIS HC A04/MF A01

Improvements in the reduction of feed pump vibration problems are reported. It is suggested that the right approach to the problem is to devise high damped rotor bearing configurations. Two important components to this approach are: the development of squeeze film dampers for feed pump applications and the search for interstage sealing configurations which provide additional vibration damping at mid span locations between the journal bearings. DOE

N82-13432# Staatliches Forschungsinstitut fuer Geochemie, Bamberg (West Germany).
EXAMINATION OF EARLY WEAR DETECTION IN DIESEL ENGINES BY ENERGY DISPERSIVE RADIOISOTOPE X RAY FLUORESCENCE ANALYSIS [UNTERSUCHUNGEN ZUR SCHADENSFRUEHERKENNUNG BEI DIESELMOTOREN MIT HILFE DER ENERGIEDISPERSIVEN RADIONUKLID-ROENTGENFLUORESZENZANALYSE]
H. Meier, E. Unger, W. Albrecht, N. Geheeb, W. Hecker, U. Tschirwitz, and D. Boesche Bonn Bundesministerium der Verteidigung 1979 152 p refs In GERMAN; ENGLISH summary

Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-79-19) Avail: NTIS HC A08/MF A01; DOKZENTBw, Bonn DM 40

The application of X-ray spectroscopy for monitoring wear-metal particles in lubricating oils is considered. The principles of an energy dispersive X-ray analytical arrangement consisting of radioistope sources or small, thin target, X-ray tubes for excitation in connection with detection for selection of fluorescent X-rays, are explained. Analytical relationships, basic equations, parameters for optimizing the spectroscope setup, and problems concerning the preparation of oil samples are discussed. Experiments with organometallic compounds as standards show that by using radioisotopes and portable, thin target, X-ray tubes, respectively in combination with solid state detectors, wear metals can be directly analyzed in lubricating oil samples at the 1.5 to 20 ppm level (Fe: 1.4 ppm; Pb: 5.0 ppm; Cr: 2.2 ppm; Ni: 3.6 ppm). After collecting thin layers of wear particles on filters, detection limits at the 0.2 to 1 ppm level (10 ml oil samples) can be obtained. Author (ESA)

N82-13433# Valeo/Societe Anonyme Francaise du Ferodo (France). Direction des Etudes Centrales.
THE INFLUENCE OF HIGH TEMPERATURE ON BRAKING [INFLUENCE DE LA HAUTE TEMPERATURE SUR LE FREINAGE]
Ricco 1981 21 p refs In FRENCH
Avail: NTIS HC A02/MF A01

Temperatures encountered in brakes are cited, and the importance of the temperature factor to the behavior of brake materials is discussed. Macroscopic aspects of diminishing braking torque are described for certain thermic stages, i.e., failures known as 'low point' and 'fading'. The fundamental causes of these failures are analyzed, linking the thermomechanical properties of brake materials (rigidity and internal damping) to the amount of friction and to instantaneous fluctuations in the tangential force of friction. Results show the effect of a transfer film which forms in function of the thermal stage attained, the material composition, and of the nature of the brake surface. Author (ESA)

N82-13434# Cambridge Univ. (England). Dept. of Engineering.
CYCLIC COMPRESSION, COMBUSTION AND EXPANSION OF A FUEL AND AIR MIXTURE IN A CYLINDER CONTAINING A CATALYST
H. Daneshyar and J. R. Orme 1981 75 p refs
(PB81-232480; CUED/A-THERMO/TR-5) Avail: NTIS HC A04/MF A01 CSCL 13B

The utilization of catalytic ignition and oxidation of a hydrocarbon fuel and air mixture in a four stroke engine was investigated. The effects of the method of aspiration, the cylinder-head design, the catalyst quality and the design of the catalyst mounting structure upon the performance of the engine with specific attention to cylinder pressure diagrams are ellucidated. High speed color photography was employed to provide a recording of the visual observations of the combustion phenomenon present in the cylinder. Measurements of the levels of emissions of carbon monoxide, carbon dioxide, low hydrocarbons and nitric oxide by the infra-red method were made. Interest was centered upon the ability of the engine to operate using very lean air fuel ratios precluded by spark ignition which is advantageous from the viewpoint of emission levels of carbon monoxide, hydrocarbons and nitric oxide. GRA

N82-13435# Department of Energy, Bartlesville, Okla.
PERFORMANCE CHARACTERISTICS OF AUTOMOTIVE ENGINES IN THE UNITED STATES, THIRD SERIES: 1977 CHRYSLER 318 CID (5.2L), 2V Interim Report
D. E. Koehler, W. F. Marshall, and K. R. Stamper Jun. 1981 60 p
(PB81-233025; DOT-TSC-NHTSA-81-6; BETC/OP-79/2; DOT-HS-805814; Rept-13) Avail: NTIS HC A04/MF A01 CSCL 21G

Dynamometer tests of a 1977 Chrysler 318 CID engine to determine fuel consumption and emissions (hydrocarbon, carbon monoxide, oxides of nitrogen) at steady state engine operating modes were performed. Engine performance data for estimating emissions and fuel economy for varied engine service and duty were obtained. Basic engine characteristic data required as input for engineering calculations involving ground transportation are provided. GRA

N82-13436 Northwestern Univ., Evanston, Ill.
THERMOELASTIC INSTABILITY IN A SEAL-LIKE CONFIGURATION Ph.D. Thesis
Sarveswara Rao Kilaparti 1981 136 p
Avail: Univ. Microfilms Order No. 8124923

Thermoelastic instabilities in rubbing contact was studied for simple contact geometries. Thermoelastic instability in sliding contact is shown to be a consequence of interaction of frictional heating, thermal expansion, conduction of heat from the contact zone and wear. Seal-like configuration is investigated for thermoelastic instabilities. Because of the complexity of the problem, it is studied by breaking into subproblems and solutions are obtained for each case. Effects of material properties on critical speed for instability are presented in nondimensional parameters for general applications. Critical speeds for onset of instability are obtained for nominally flat contacting surfaces in the absence of wear. Nonlinear algebraic equations are obtained in terms of material properties and critical speeds which are solved numerically for different hypothetical values of friction coefficients and properties of materials. Materials contacting their own kind are less prone to instability than materials of different kind. Solutions are obtained for stationary configuration with partially contacting surfaces. Dissert. Abstr.

N82-13437 Wisconsin Univ. - Madison.
ANALYSIS OF MULTICYLINDER IC-ENGINE CRANKSHAFTS WITH HYDRODYNAMIC BEARINGS USING A FINITE ELEMENT-TRANSFER MATRIX APPROACH Ph.D. Thesis
Victor Hugo Mucino-Quintero 1981 224 p
Avail: Univ. Microfilms Order No. 8124230

A new approach for the load-displacement analysis of IC-Engine crankshaft-bearing systems is described. The analytical model incorporates the elastic and inertial properties of the crankshaft, the flexibility of the supports and the hydrodynamic nature of the journal-bearing systems. The structure of the crankshaft is first macrodiscretized into a number of substructures (crankthrows), which are connected in a chain-like manner. Each substructure is subsequently discretized using a finite element formulation, and the synthesis is made through a new finite element-transfer matrix condensation procedure which eliminates the need to arbitrarily designate the master and slave degrees of freedom typically required in most condensation procedures. The hydrodynamic characteristics of the journal-bearing systems are described using an approximate solution of the governing Reynolds Equation, which is applicable to bearings of finite length. The analysis yields the bearing performance coupled to the crankshaft elastic response for a full load cycle. Dissert. Abstr.

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-13438# Naval Ocean Systems Center, San Diego, Calif.
FUTURE DIRECTIONS IN NAVY ELECTRONIC SYSTEM RELIABILITY AND SURVIVABILITY
Maniel Vineberg and Reeve D. Peterson Jun. 1981 12 p refs
(AD-A102460; NOSC/TD-448) Avail: NTIS HC A02/MF A01 CSCL 09/5

Primary objectives of a framework for production specifications for Navy electronics systems are outlined. Elements discussed in the design of an interchip network are: system's reliability, monitoring, survivability, feasibility, cost constraints, and support facility design. M.D.K.

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N82-13439 Oklahoma State Univ., Stillwater.
A METHOD FOR ACCELERATING CONVERGENCE TO THE SOLUTION OF NONLINEAR STRUCTURAL EQUATIONS BY REDUCING RESIDUAL WORK Ph.D. Thesis
Cline Turner Young, II 1981 86 p
Avail: Univ. Microfilms Order No. 8123478

Two extrapolation techniques for reducing the number of iterations required for convergence to solution by minimizing the work done by the residual loads are presented. The first technique, a linear scalar extrapolation, is a moderately sophisticated form of line search. The second technique, a multiple search extrapolation, has the capability of changing the direction of search without the expense of factoring the global stiffness matrix. It is possible to reduce the number of iterations required to satisfy convergence for nonlinear structural analysis problems using the linear scalar extrapolation. Furthermore, the cost of each iteration is significantly less due to simplification of the determination of the displacements. It is also possible to increase the level of accuracy for a given number of iterations by superimposing the multiple search extrapolation on the linear scalar extrapolation. The net result of this is to allow a greater incremental load step for fixed convergence criteria. Dissert. Abstr.

N82-13440 Lehigh Univ., Bethlehem, Pa.
INELASTIC OVERLOAD ANALYSIS OF CONTINUOUS STEEL MULTI-GIRDER HIGHWAY BRIDGES BY THE FINITE-ELEMENT METHOD Ph.D. Thesis
Jeffrey Craig Hall 1981 202 p
Avail: Univ. Microfilms Order No. 8118835

An analytical technique for predicting the response to overloads of simple span and continuous multigirder beam slab type highway bridge superstructures made of steel beams and reinforced concrete slabs is described. The nonlinear overload response is obtained by using a tangent stiffness solution process. The analysis scheme also employs the displacement based finite element method of structural analysis, where the superstructure is discretized into a series of beam and slab finite elements, and, in addition, where the elements are further subdivided into a series of layers through their depth. The nonlinearities included in the model are: inelastic stress strain relationships, cracking and crushing of concrete, yielding and strain hardening of steel, buckling of beam compression flanges, and buckling of plate girder webs and compression flanges.
Dissert. Abstr.

N82-13441 California Univ., Riverside.
AN EXTENSION TO N DIMENSIONS OF THE VON KARMAN EQUATIONS Ph.D. Thesis
Dave R. Holmes 1981 71 p
Avail: Univ. Microfilms Order No. 8122907

The Von Karman equations for the buckling of a thin elastic plate to three dimensions were extended. The behavior of the three dimensional equations is the same as that of the two dimensional equations with respect to bifurcation from the trivial solution. The equations are extended to n-dimensions and it is shown that their behavior is basically the same as in the two and the three dimensional cases with some minor changes. It is established that an existence theorem for the nonhomogeneous n-dimensional equation does not depend on lambda, the bifurcation parameter, or on the size of the nonhomogeneous term $P(x)$, as long as $P(x)$ is in L2 (omega). Dissert. Abstr.

N82-13442 Purdue Univ., Lafayette, Ind.
MEASURED PAVEMENT RESPONSE TO TRANSIENT AIRCRAFT LOADINGS Ph.D. Thesis
Thomas Dale White 1981 243 p
Avail: Univ. Microfilms Order No. 8123723

Pavement deformation response to aircraft traffic was studied. Linear variable differential transducers (LVDT's) were installed in an active taxiway. The LVDT's were attached to reference rods anchored at 16, 36, 120, and 209 in. Basic pavement responses, information on how pavement layers accommodate dynamic loads, as well as data to compare vertical deformations predicted by a theoretical model were examined. A finite difference solution was used to predict pavement temperatures. The solution is shown to have limited application for predicting pavement temperatures. The pavement response phenomena reported are significant. They expose pavement responses that have been minimized in past research but must now be considered. Current theoretical models used in pavement analysis or design are limited in predicting pavement response phenomena. They do not represent the observed compression and extension in a pavement under and away from actual aircraft loads.
Dissert. Abstr.

N82-13443 Purdue Univ., Lafayette, Ind.
AN EXPERIMENTAL STUDY OF A REINFORCED CONCRETE FOLDED PLATE STRUCTURE WITH EDGE BEAMS Ph.D. Thesis
Musa Rahmoun Resheidat 1981 287 p
Avail: Univ. Microfilms Order No. 8123695

An experimental reinforced concrete folded plate structure with edge beams was studied. The influence of edge beams on the structural response is given specific attention. Two models, alike in every respect except for quantity and arrangement of the steel reinforcement are developd and tested. The two reinforcement models designed utilizing the results of an 'exact' linear-elastic analysis method and a slightly modified system based on the same analytical results augmented by limited allowances for traction redistribution at incipient failure. The results of the exact linear-elastic method of analysis provided the basis for a safe, but conservative, design and accurate predictions of structural response for loads in the service load range. Both models failed at load levels well in excess of that required by contemporary strength design criteria. The experimental results indicate that edge beams significantly increased the stiffness of the structure and its load-carrying capacity. Dissert. Abstr.

N82-13444 Purdue Univ., Lafayette, Ind.
ANALYSIS OF STEEL BEAM-TO-COLUMN MOMENT CONNECTIONS Ph.D. Thesis
Kirit Vallabhbhai Patel 1981 212 p
Avail: Univ. Microfilms Order No. 8123688

A study of both beam-to-column flange connections as well as web connections was carried out. Results of tests were used as a bench mark to validate the analytical procedure. An analytical procedure involved modelling of connection using finite element technique for predicting the behavior of the connection. In case of flange moment connections, an analytical procedure was developed to predict the overall behavior of the connections. Calibration of the finite element model of bolted joint was carried out using pilot test on the same joint to justify the model. Analysis results of load-deflection behavior, the stress distribution in the panel zone, and spread of yield zones at different stages of loading were compared with test results. It is shown that the connection behavior can be predicted analytically. In case of web moment connections, the flange connection plate area is analyzed with the help of nonlinear finite element method taking suitable free body out of the connection semblage.
Dissert. Abstr.

N82-13445 Stanford Univ., Calif.
A CONTINUUM MODEL FOR FRICTION WITH APPLICATIONS IN METAL FORMING PLASTICITY Ph.D. Thesis
Ibrahim Mahdi AL-Khattat 1981 168 p
Avail: Univ. Microfilms Order No. 8124028

A unified model for the mechanics of generalized friction and a rational treatment of the general solid contact problem in mechanics are developed. A local surface 'strength measure' in terms of geometry-independent limiting shear stress is recognized as the natural measure of generalized friction. An experimental procedure is proposed to determine this measure under controlled levels of uniform loading, temperature, surface roughness and texture, and interface motion, leading to a physically sound basis for standardized tests to measure the frictional properties of solid surfaces, the mechanical properties of lubricants, and the strength properties of adhesives. The physical and operational drawbacks of the Coulomb friction law are discussed and a new formulation of the elastic, viscoelastic, or elastic-plastic discretized boundary value problem involving friction is proposed. At every point of the interface, the boundary conditons are explicitly prescribed either as displacement or traction increments, resulting in a symmetric stiffness matrix in the finite element formulation. Implementation of the proposed frictional model in the increment analysis determines a discretized approximation to the complete state of stress and displacement everywhere on a solid contact surface at every stage of deformation. Three problems in metal forming plasticity are solved with the aid of the frictional model. Dissert. Abstr.

N82-13446# Army Armament Research and Development Command, Watervliet, N. Y.
MOMENT-STRAIN RELATIONSHIPS IN ELASTIC-PLASTIC BENDING OF BEAMS
R. V. Milligan Jun. 1981 30 p
(DA Proj. 1L1-62105-AH-84)
(AD-A101722; ARLCB-TR-81025) Avail: NTIS
HC A03/MF A01 CSCL 20/11

Bending moment versus depth of elastic plastic interface for both rectangular, tubular, and solid circular beams were developed. Expressions for strain as a function of geometry and depth of elastic plastic interface for each type of cross section are derived. Strain singularity occurring as the elastic plastic interface approaches the neutral axis is pointed out. The assumption that 'planes remain plane' is examined. The basis for determining residual or permanent strains and expressions for their calculation are given. Author

N82-13447# Ballistic Research Labs., Aberdeen Proving Ground, Md.
NONLINEAR WAVES IN RODS
Thomas W. Wright May 1981 44 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A101333; ARBRL-TR-02324) Avail: NTIS
HC A03/MF A01 CSCL 20/11

A one dimensional continuum theory with one internal, scalar variable to be used for modeling a solid rod with longitudinal waves is discussed. Rods are simple structures that are often regarded as one dimensional continua, but because of finite transverse dimensions, propagating waves are subject to dispersion, which may mask other effects. The material is assumed to be homogeneous, isotropic, and hyperelastic. The linear theory is reviewed to exhibit the multiple wave hierarchy that exists in a rod; expansion and scaling techniques are used in the fully nonlinear case to examine the main pulse; steady nonlinear waves are examined and it is found that both solitary waves and periodic waves do exist. Results are compared to the wave solutions from the most elementary one dimensional nonlinear theory for rods. Author

N82-13448# Dayton Univ., Ohio.
MAGNA: A FINITE ELEMENT PROGRAM FOR THE MATERIALLY AND GEOMETRICALLY NONLINEAR ANALYSIS OF THREE-DIMENSIONAL STRUCTURES SUBJECTED TO STATIC AND TRANSIENT LOADING Interim Report, Mar. - Sep. 1980
Robert A. Brockman Wright-Patterson AFB, Ohio AFWAL Jan. 1981 513 p refs
(Contract F33615-80-C-3403; AF Proj. 2402)
(AD-A099454; UDR-TR-80-107; AFWAL-TR-80-3152) Avail: NTIS HC A22/MF A01 CSCL 20/11

A finite element program MAGNA (materially and geometrically nonlinear analysis), developed for nonlinear static and dynamic analysis of complex three-dimensional structures, is described. This program is applicable to large structural response problems involving bars, membrane, plates, shells, and three-dimensional solids, experiencing large displacements, finite strains, large rotating, and plastic deformation. The theoretical basis of MAGNA and numerical procedures employed are described in detail. Sample analyses are presented. Instructions are provided for operating the program, modifying storage capacity, preparing input data, estimating computer run times, and interpreting the output. Computer graphics utilities available for the display of input data and analysis results are also described. Author (GRA)

N82-13449# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
HYDRODYNAMIC COMPUTATIONS OF PRESSURES GENERATED BY STEAM PIPE RUPTURE Final Report, 6 Mar. 1978 - 30 Sep. 1978
D. L. Lehto and J. M. Ward 23 Feb. 1981 55 p refs
(Contract NRC-03-78-148)
(AD-A102046; NSWC/TR-80-229) Avail: NTIS
HC A04/MF A01 CSCL 20/11

Calculations were made to determine the pressure loads generated by the impact of steam jets from a broken process pipe upon the inner wall of a surrounding concentric guard pipe. Longitudinal and circumferential breaks were considered, with various guard pipe diameters. The data obtained can be used in designing guard pipes for high-pressure steam process pipes. Circumferential and longitudinal 12.7 mm (0.5 in) and 50.8 mm (2.0 in) wide breaks in a 0.914 m (36 in) outside diameter process pipe carrying 8.3 MPa (1200 psia) process pipe and the guard pipe ranged from 12.7 mm (0.5 in) to 152.4 mm (6 in). The entire flow fields, including shock waves, were calculated with a two-dimensional hydrocode. The main loading on the guard pipe was determined to be the steady-flow pressure generated subsequent to the process pipe rupture. This pressure drops rapidly as the pipe spacing is increased, so from the standpoint of steam jets, pipe spacings of several inches are desirable. N.W.

N82-13450# SRI International Corp., Menlo Park, Calif.
LARGE AMPLITUDE COMPRESSION AND SHEAR WAVE PROPAGATION IN IMPACT-LOADED PMMA Final Report, 1 Jul. 1978 - 30 Sep. 1981
Y. M. Gupta Oct. 1981 7 p
(Contract DAAG29-78-C-0030)
(AD-A105953; ARO-15513.2-E) Avail: NTIS
HC A02/MF A01 CSCL 20/11

The goal of this research was to develop an improved understanding of the high strain rate material response of polymers by studying the propagation of large-amplitude, one-dimensional compression and shear waves in impact-loaded polymethyl methacrylate (PMMA). Experimental techniques were designed and developed to permit measurement of large-amplitude shear waves. Measurements were made of the shear particle velocity at the impact surface and in the sample interior. The measurement of shear wave velocities permitted the first determination of the shear and bulk modulus in the shocked state. The shear wave profiles measured at several gage locations in the sample were integrated (using a Lagrangian analysis for compression and shear waves) to provide shear stress-strain response in the shocked state. These results are the first of their kind and provide an important constraint on the shear (or deviator) response of the material. Author (GRA)

N82-13451# California Univ., Los Angeles. School of Engineering and Applied Science.
ASYMMETRIC STRESS AND FAILURE ANALYSIS
J. Yu and R. Westmann [1981] 6 p refs
(Contract DE-AT03-76SF-74016)
(DE81-026842; DOE/SF-74016/T3) Avail: NTIS
HC A02/MF A01

The cladding failure due to asymmetric structural response of the fuel cell is studied. The fracture and cracking patterns prior to the development of fuel-cladding contact and the forces in the cladding after fuel-cladding contact has been made are investigated. DOE

N82-13452# Sandia Labs., Albuquerque, N. Mex.
APPLICATION OF THE THEORY OF LINEAR ELASTIC MATERIALS WITH VOIDS
Stephen C. Cowin, Jaco W. Nunziato, and Pratap Puri (New Orleans Univ.) 1981 12 p refs Presented at the 4th Intern. Conf. on Continuum Models of Discrete Systems, Stockholm, 29 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-027903; SAND-81-1139C; CONF-8106133-1) Avail: NTIS HC A02/MF A01

The linear theory of elastic materials with voids is summarized and some applications are sketched. The theory differs from classical linear elasticity in that the volume fraction corresponding to the void volume is taken as an independent kinematic variable. The following applications of the theory are described briefly: response to homogeneous deformations, inflation of a cylinder and sphere due to internal pressure, pure bending of a beam, and small amplitude acoustic waves. In each of these applications, the change in the void volume induced by the deformation is determined. DOE

N82-13453# Sandia Labs., Albuquerque, N. Mex.
ANALYSIS OF STRESS DROP IN MULTISTAGE CREEP EXPERIMENTS: PREDICTIONS OF EXPONENTIAL CREEP LAW
W. Herrmann and H. S. Lauson Aug. 1981 22 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029279; SAND-81-1612) Avail: NTIS HC A02/MF A01

Multistage creep experiments in which the stress or temperature are increased stepwise were successfully analyzed using an exponential transient creep law. The analysis is generalized and implemented for an arbitrary number of stages including stress and temperature drops. Under certain conditions the simple exponential creep law, evaluated from data for stages following increases in stress and temperature, predicts inverted transients for stages following decreases in stress or temperature. Comparisons of predictions with limited experimental data suggest that the simple exponential creep law is inadequate, and that separate hardening and recovery processes need to be modeled to handle stress or temperature drops. DOE

N82-13454# Los Alamos Scientific Lab., N. Mex.
PRESSURE MEASUREMENTS OF NON-PLANAR STRESS WAVES
G. H. Carlson and J. A. Charest (Dynasen, Inc.) 1981 24 p refs Presented at the 1st Symp. on Gages and Piezoresistive Mater., Archon, France, 29 Sep. - 1 Oct. 1981
(Contract W-7405-eng-36)
(DE81-028729; LA-UR-81-2343; CONF-810931-1) Avail: NTIS HC A02/MF A01

Nonplanar stress wave pressure measurement using thin piezoresistive gages requires correcting for induced strain parallel to the sensing elements. A dual element gage is developed that permits such measurements. Manganin is sensitive to parallel and perpendicular to the sensing element. Constantan is change is sensitive to stress parallel to the sensing element. The change in resistance in the Constantan element is used to correct for the strain effect parallel to the Manganin element axis. The Manganin-Constantan dual element gage is used in the differential recording mode to yield pressure. The gage is a strain compensating gage in this mode. DOE

N82-13455# Hamburg Univ. (West Germany). Inst. fuer Schiffbau.
BEHAVIOR OF PLANE PANELS IN SHIP STRUCTURES WITH LOCAL INITIAL DEFLECTIONS [TRAGFAEHIGKEIT VON E BENEN SCHIFFBAULICHEN FLAECHENTRAGWERKEN MIT OERTLICHEN VORVERFORMUNGEN]
H. Petershagen Bonn Bundesministerium der Verteidigung 1980 156 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-80-18) Avail: NTIS HC A08/MF A01; DOKZENTw, Bonn DM 40

The influence of deformations resulting from welding stresses on the carrying capacity of plate panels were studied theoretically and experimentally. Buckling tests were made with two longitudinally and transversally stiffened plates under longitudinal compression combined with inplane shear and lateral load. The test results are compared with the predictions from nonlinear plate theory. The theoretical stress analysis is based on a model: one involving application of the energy method, and a model using finite element techniques. Results show that the initial deformations affined to the buckling modes have the greatest influence. The finite element idealizations do not lead to improvements as compared to the results from the energy method. Author (ESA)

N82-13456# Technical Research Centre of Finland, Espoo. Lab. of Structural Engineering.
THIN-WALLED STRUCTURES. TRAPEZOIDAL SHEET BENDING AND UNDER SHEAR STRESSES
Lars-Henrik Heselius Jul. 1980 145 p refs In FINNISH; ENGLISH summary
(VTT-11; ISBN-951-38-1123-0; ISSN-0357-7031) Avail: NTIS HC A07/MF A01

The bending capacity of trapezoidal sheets provided with intermediate stiffeners, and the support reaction capacity with oversized support lengths were determined. A model which allows use of wide supports in the dimensioning of continuous trapezoidal sheets is presented. The effect of cylindrical curvature of the planes of trapezoidal sheets on the bending capacity was examined. The stiffening capacity of the frame of the trapezoidal sheets in different failures cases is reported. The effect of increasing bending capacity of the longitudinal joint in a trapezoidal sheet slab was also tested. The interaction of local and global buckling of columns constructed of thin walled rectangular hollow sections and the bending capacity of light profiled beams with both flanges continuously braced are analyzed. Author (ESA)

N82-13457# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
STRUCTURAL DYNAMICS: MODIFIED CALCULATIONS
G. Hornung and H. Roehrle Bonn Bundesministerium der Verteidigung 1981 83 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-81-1) Avail: NTIS HC A05/MF A01; DOKZENTBw, Bonn DM 30

Calculation methods which give natural and harmonically excited vibrations of modified structures, using the results of the original systems, are presented and tested. Most of the methods are based on a linear approximation, i.e., the individual terms of the equations of motion are subdivided into those of the original system and into corresponding difference terms whose products are subsequently neglected. Tests are carried out for simple models as well as for three-dimensionally idealized wing and aircraft structures. Concerning natural vibrations, it is difficult to estimate the achieved accuracy without knowing the exact results. The applied methods are Wielandt iteration and subspace iteration. Using the original natural modes as starting vectors leads to a considerable reduction in computation cost, even with severe modifications. Application of the linear approximation is shown for the reduction of the number of degrees of freedom, which precedes dynamic analysis. Author (ESA)

N82-13458# Cambridge Univ. (England). Dept. of Engineering.
RESIDUAL STRESS AND DEFORMATION IN CIRCUMFERENTIAL PIPE-JOINT WELDS
A. A. Scaramangas 1980 96 p refs
(PB81-232464; CUED/D-STRUCT/TR-87-1980;
ISSN-0309-7447) Avail: NTIS HC A05/MF A01 CSCL 13E

A simplified model for the analysis of a single-pass circumferential pipe-joint weld is presented. It is deduced that the hoop shrinkage (tendon) force has essentially the same value as that for a similar weld in flat plate. Limited experimental evidence reported by other workers is consistent with the proposition that the hoop stress in the weld region is at tensile yield although its magnitude locally is determined by the material yield surface and the bending compressive axial stresses due to radial pipe deformation. GRA

N82-13459 Nebraska Univ. - Lincoln.
AN INTEGRAL EQUATION METHOD FOR CUTOUT PROBLEMS IN SHELLS Ph.D. Thesis
Richard Lloyd Grover 1981 114 p
Avail: Univ. Microfilms Order No. 8124512

A method is described for the determination of the state of stress in a shallow shell with a single curvilinear hole. A system of two coupled integral equations is obtained using the Green's function method. Each of these equations includes a contour integral associated with the corresponding plate solution and a surface integral which yields the correction to the plate solution. A complex variable method is presented for the derivation of the Green's functions appearing in the integral equations. These functions are the Green's functions for plane stress and plate bending which satisfy the boundary conditions on the hole which eliminate the unknown boundary values from the contour integrals. Although the method is applicable to holes of arbitrary

shape, the case of a circular hole with tractions prescribed on the edge is shown as an example. The formulation yields the direct solution to plate problems by simple contour integration. Closed form solutions are obtained for three selected plate problems.
Dissert. Abstr.

N82-13460 California Univ., Los Angeles.
DYNAMIC ANALYSIS OF FLEXIBLE SPATIAL MECHANISMS AND ROBOTIC MANIPULATORS Ph.D. Thesis
Wallace Hikaru Sunada 1981 313 p
Avail: Univ. Microfilms Order No. 8122862

The distributed flexibility and mass of geometrically complex links in high speed industrial machines and manipulators is described using the 4 x 4 matrix approach and is fully compatible with existing commercially available finite element structural analysis programs such as NASTRAN STARDYNE, or SAP. These programs, while unable to analyze high speed, flexible spatial mechanisms, are effectively used as link preprocessors to a mechanism analysis program. A procedure called component mode synthesis was used to reduce the dynamic degrees of freedom to a size suitable for incorporation into a mechanism program. The SALEM computer program for the spatial analysis of linkages with plastic members combines the finite element description of the link flexibility and mass with the 4 x 4 matrix description of the mechanism kinematics. The method is applied to three representative mechanisms, a co-planar four par linkage with flexible offset coupler and output links, a spatial slider crank mechanism with a flexible, helical coil coupler link, and, finally an industrial robotic manipulator system.
Dissert. Abstr.

N82-13461 Tennessee Univ., Knoxville.
EFFECTS OF RESTRAINED THERMAL MOVEMENT IN A CONTINUOUS, PRESTRESSED CONCRETE BRIDGE WITHOUT INTERIOR EXPANSION JOINTS Ph.D. Thesis
Ramzi Behnam Abdul-Ahad 1981 162 p
Avail: Univ. Microfilms Order No. 8123138

A theoretical method for calculating thermal stresses and movements in continuous bridge structures was developed. Experimental data obtained from strain gages and thermocouples were conducted and field data obtained with those predicted from theory were compared. The nonlinear distribution of temperature throughout the depth of superstructure was divided into two parts: a linear temperature distribution which causes deformation; and nonlinear which results in self equilibrating stresses which do not cause any deformation of the structure. It is shown that the thermal stresses are typically greater than dead load stresses, and that the movements of the deck are proportional to middeck temperature.
Dissert. Abstr.

N82-13462 Purdue Univ., Lafayette, Ind.
ELASTIC-PLASTIC-FRACTURE ANALYSIS OF CONCRETE STRUCTURES Ph.D. Thesis
Shyi-Shing Hsieh 1981 146 p
Avail: Univ. Microfilms Order No. 8123654

Elastic-Plastic Fracture model and solution methods for finite element analysis to study progressive failures of plain concrete structures under short term triaxial loading conditions were studied. For the material modeling, a four parameter fractural (or yielding) critèrion was proposed. Three different types of concrete fracture modes were considered. All the matrix formulations of the constitutive relationships were derived and their implementation for numerical analysis was illustrated by three sample problems using nonlinear finite element methods. To obtain nonlinear finite element solutions, some numerical schemes were introduced and validated. The solution techniques and the material model were coded in two computer programs. The program EFCP was developed for the study of crack propagation procedures, and the program EL T2D6 was developed in subroutine form to integrate with a general structural nonlinear finite element program.
Dissert. Abstr.

N82-13463 Northwestern Univ., Evanston, Ill.
DYNAMIC EFFECTS ON FRACTURE OF ELASTIC - PLASTIC MATERIALS Ph.D. Thesis
Victor Arkady Ounayevsky 1981 115 p
Avail: Univ. Microfilms Order No. 8124877

In terms of a steady-state formulation, mode 1 and mode 3 crack propagation were considered. For the elastic perfectly-plastic material it was found that the dynamic effects give rise to a crack-tip zone in the immediate vicinity of the rapidly propagating crack-tip. In this zone, which shrinks on the crack tip in the quasi-static limit, the fields can be described by a combination of a centered fan field and a uniform field. The transition from dynamic to quasi-static conditions for the mode 3 case was studied in the plane of crack. Because of the effect of the crack-tip zone there is a significant difference between the strain fields in the dynamic and quasi-static solutions. Asymptotic expressions (for a small range of the parameter of hardening) of stresses and strains were obtained for the strain-hardening material. The hardening effect results in the appearance of a singular factor whose power tends to zero when the parameter of hardening vanishes. In that case the solution reduces to the one for the elastic perfectly-plastic material.
Dissert. Abstr.

N82-13464 Missouri Univ. -Rolla.
LOAD AND RESISTANCE FACTOR DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS Ph.D. Thesis
Boonsong Supornsilaphachai 1981 265 p
Avail: Univ. Microfilms Order No. 8123579

Design criteria for cold-formed steel structural members was studied. This study included the selection of a probabilistic model, the evaluation of load factors, the calibration of safety indexes for the allowable stress design criteria issued by the American Iron and Steel Institute, and the determination of resistance factors. Based on the safety indexes selected for cold-formed steel structural members and connections, the load and resistance factor design criteria for cold-formed steel were developed by using the first order probabilistic theory and the statistical data on mechanical properties of materials and the test results obtained from previous research. In this method, appropriate load factors and resistance factors are applied to specified loads and nominal resistance to ensure that the limit state is not exceeded. This design method can provide a more uniform overall safety and structural reliability because uncertainties are accounted for.
Dissert. Abstr.

N82-13275# Royal Aircraft Establishment, Farnborough (England). Structures Dept.
THE ROLE OF FATIGUE TESTING
P. R. Edwards *In* AGARD Fatigue Test Methodology Oct. 1981 15 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

N82-13276# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).
PLANNING AND ANALYSIS OF A FATIGUE TEST PROGRAMME
D. Schuetz *In* AGARD Fatigue Test Methodology Oct. 1981 22 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

N82-13277# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Werkstoff-Fogschung.
FATIGUE TEST MACHINES
H. Nowack *In* AGARD Fatigue Test Methodology Oct. 1981 23 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

N82-13278# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).
VARIABLE AMPLITUDE FATIGUE TESTING
D. Schuetz *In* AGARD Fatigue Test Methodology Oct. 1981 31 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

N82-13279# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Werkstoff-Forschung.
ON-LINE COMPUTERS IN FATIGUE TESTING
H. Nowack *In* AGARD Fatigue Test Methodology Oct. 1981 11 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

N82-13282# Royal Aircraft Establishment, Farnborough (England). Materials Dept.
FATIGUE TESTS WITH A CORROSIVE ENVIRONMENT
R. N. Wilson *In* AGARD Fatigue Test Methodology Oct. 1981 20 p refs (For primary document see N82-13274 04-31)
Avail: NTIS HC A12/MF A01

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N82-13465* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SCANNER Patent
Robert F. Hummer (Santa Barbara Research Center) and Deane T. Upton, inventors (to NASA) (Santa Barbara Research Center) Issued 10 Nov. 1981 12 p Filed 19 May 1975 Supersedes N76-19408 (14 - 10, p 1252) Continuation of abandoned US Patent Appl. SN-583219, filed 30 Sep. 1966 Sponsored by NASA
(NASA-Case-GSC-12032-2; US-Patent-4,300,159; US-Patent-Appl-SN-578700; US-Patent-Appl-SN-583219; US-Patent-Class-356-109; US-Patent-Class-250-235; US-Patent-Class-250-236) Avail: US Patent and Trademark Office CSCL 20F

An aerial vehicle rotating in gyroscopic fashion about one of its axes has an optical system which scans an area below the vehicle in determined relation to vehicle rotation. A sensing device is provided to sense the physical condition of the area of scan and optical means are associated to direct the physical intelligence received from the scan area to the sensing means. Means are provided to incrementally move the optical means through a series of steps to effect sequential line scan of the area being viewed keyed to the rotational rate of the vehicle.
Official Gazette of the U.S. Patent and Trademark Office

N82-13466 Stanford Univ., Calif.
THE OCCURRENCE AND CONTROL OF LAND SUBSIDENCE DUE TO GROUND WATER WITHDRAWAL WITH SPECIAL REFERENCE TO THE SAN JOAQUIN AND SANTA CLARA VALLEYS, CALIFORNIA Ph.D. Thesis
Joseph Fairfield Poland 1981 172 p
Avail: Univ. Microfilms Order No. 8124135

The San Joaquin Valley in California is the area of the most intensive land subsidence in the United States Subsidence which affects 4,200 sq mi (10,875 sq km), reached 28 ft (8 m) in 1969. The total volume of subsidence to 1970 was about 15.5 million acre ft. Surface water imports to subsiding areas reduced ground water extractions and raised the artesian head, causing subsidence rates to decrease. In the Santa Clara Valley, excessive pumping of ground water between 1917 and 1967 caused as much as 180 ft (50 m) of artesian head decline and maximum and subsidence of 13 ft (4 m). A fourfold increase in surface water imports in 5 years achieved a dramatic rise of artesian head -- 70 ft (20 m) in 4 years. Subsidence rates decreased from as much as 1 ft (0.3 m) per year in 1961 to a few humdredths of a foot in 1970. If fluid pressures in the aquifers in a compacting, confined system increased sufficiently to equal or exceed pore pressures in the fine grained sediments, subsidence will stop.
Dissert. Abstr.

N82-13467 Wisconsin Univ. - Madison.
REGIONAL HYDROLOGIC MODELS FOR CLIMATOLOGY: AN APPLICATION TO THREE WISCONSIN WATERSHEDS Ph.D. Thesis
Douglas Robison Clark 1981 105 p
Avail: Univ. Microfilms Order No. 8117508

Two hydrologic models were applied to three watersheds in south central Wisconsin (Black Earth Creek, Sugar River, Crawfish River) over a thirty year period (1948-1977). Model parameter values were obtained by calibration of model runoff to observed streamflow. Model storage levels were compared to water table observations in one watershed. The two storage model simulated streamflow just as well as the three-storage model. A flexible parameterization scheme enables the two-storage model to assimilate the additional runoff component generated by the three-storage model. However, the uppermost storage element in the three-storage model provides a useful regional soil moisture indicator not available in the simpler model. The parameters controlling evapotranspiration have the greatest influence on the models' ability to reproduce river runoff and the overall seasonal water balance, followed by the storage capacity parameters.
Dissert. Abstr.

N82-13468*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LABORATORY MEASUREMENTS OF PHYSICAL, CHEMICAL, AND OPTICAL CHARACTERISTICS OF LAKE CHICOT SEDIMENT WATERS
William G. Witte, Charles H. Whitlock, J. W. Usry, W. Douglas Morris, and E. A. Gurganus Dec. 1981 30 p refs
(NASA-TP-1941; L-14714) Avail: NTIS HC A03/MF A01 CSCL 08H

Reflectance, chromaticity, diffuse attenuation, beam attenuation, and several other physical and chemical properties were measured for various water mixtures of lake bottom sediment. Mixture concentrations range from 5 ppm to 700 ppm by weight of total suspended solids in filtered deionized tap water. Upwelled reflectance is a nonlinear function of remote sensing wave lengths. Near-infrared wavelengths are useful for monitoring highly turbid waters with sediment concentrations above 100 ppm. It is found that both visible and near infrared wavelengths, beam attenuation correlates well with total suspended solids ranging over two orders of magnitude.
E.A.K.

N82-13469*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTERPOLATING FOR THE LOCATION OF REMOTE SENSOR DATA
Edward F. Puccinelli and Jack Kornfield (NSF) Jul. 1981 23 p refs
(NASA-TM-82169) Avail: NTIS HC A02/MF A01 CSCL 05B

An interpolation algorithm is presented as a practical alternative to common interpolation and approximation methods when applied to the problem of determining the location of remote sensor data. This algorithm is based upon knowledge of the geometry of the problem and is shown to be inherently more accurate than common interpolation schemes which may be applied to all types of data. A practical location problem is used to demonstrate its accuracy and computational cost.
Author

N82-13470*# Environmental Research and Technology, Inc., Concord, Mass.
ANALYSIS OF SOIL MOISTURE EXTRACTION ALGORITHM USING DATA FROM AIRCRAFT EXPERIMENTS Final Report
Hsiao-hue K. Burke and Jean-Hsien Ho Jun. 1981 37 p refs
(Contract NAS5-26361)
(NASA-CR-166719; P-A826) Avail: NTIS HC A03/MF A01 CSCL 08M

A soil moisture extraction algorithm is developed using a statistical parameter inversion method. Data sets from two aircraft experiments are utilized for the test. Multifrequency microwave radiometric data surface temperature, and soil moisture information are contained in the data sets. The surface and near surface (< or = 5 cm) soil moisture content can be extracted with accuracy of approximately 5% to 6% for bare fields and fields with grass cover by using L, C, and X band radiometer data.

This technique is used for handling large amounts of remote sensing data from space S.L.

N82-13471# Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.

INVESTIGATION OF THE ACOUSTIC EMISSION AND DEFORMATION RESPONSE OF FINITE ICE PLATES

P. C. Xirouchakis and W. F. St.Lawrence (Army Cold Regions Research and Engineering Lab., Hanover, N.H.) Apr. 1981 26 p refs

(DA Proj. 4A1-61102-AT-24)

(AD-A103731; CRREL-81-6) Avail: NTIS HC A03/MF A01 CSCL 08/12

A procedure is described for monitoring the microfracturing activity in ice plates subjected to constant loads. Sample time records of freshwater ice plate deflections as well as corresponding total acoustic emission activities are presented. The linear elastic as well as viscoelastic response for a simply supported rectangular ice plate is given. Suggested future work using the procedure is discussed. Author

N82-13472# Army Cold Regions Research and Engineering Lab., Hanover, N. H.

ON THE BUCKLING FORCE OF FLOATING ICE PLATES

Arnold D. Kerr Jun. 1981 13 p refs

(AD-A103733; CRREL-81-9) Avail: NTIS HC A02/MF A01 CSCL 20/11

The calculation of the largest horizontal force a relatively thin floating ice plate may exert on a structure requires the knowledge of the buckling load for this floating plate. It is shown that, depending on the ratio of the rigidities of the liquid and plate, the post buckling branch may rise or drop away from the bifurcation point. It is also shown that when lift-off of plate from the liquid takes place, the actual buckling load may drop substantially. A floating compressed semi-infinite plate with a straight free edge, assuming that there is no lift-off, is analyzed. It is found that for this case there always exists a buckling load that is lower than p sub cr. It is suggested that the buckling load be determined using the post-buckling equilibrium branch of the plate, taking into consideration the possibility of lift-off of the ice cover from the liquid base. Author

N82-13473# Los Alamos Scientific Lab., N. Mex. Dept. of Meteorology.

SPECTRA OVER COMPLEX TERRAIN

H. A. Panofsky, D. Larko (Research and Data Systems, Inc.), R. Lipschutz (NOAA, Boulder, Colo.), and G. Stone 1981 18 p refs Presented at the 4th U.S. Natl. Conf. on Wind Eng. Res., Seattle, 26-29 Jul. 1981 Submitted for publication

(Contract W-7405-eng-36)

(DE81-028734; LA-UR-81-2380; CONF-810742-1) Avail: NTIS HC A02/MF A01

Spectra were measured over land downwind of a water surface over hilltops escarpments, and over rolling farmland. The following hypotheses are used to explain the differences between these spectra: (1) wavelengths short compared to the fetch over the new terrain, spectral densities are in equilibrium with the new terrain; (2) wavelengths long compared to this fetch, spectral densities remain unchanged if the ground is horizontal. If the flow is over a steep hill, the low frequency structure is modified by distortion of the mean flow, with the longitudinal component losing energy relative to the lateral and vertical components. It is found that vertical velocity spectra contain relatively less low frequency energy than horizontal velocity spectra, energetic vertical velocity fluctuations tend to be in equilibrium with local terrain. DOE

N82-13474# Alaska Univ., Fairbanks. Inst. of Marine Science.

TRANSPORT AND REACTION OF HEAVY METALS IN ALASKAN FJORD ESTUARIES Annual Report, 1 Jul. 1980 - 31 May 1981

D. C. Burrell May 1981 82 p refs

(Contract DE-AT06-76EV-0001)

(DE81-028319; DOE/EV-70001/60) Avail: NTIS HC A05/MF A01

The potential effects of energy related chemical pollution in Alaskan fjords was investigated. The chemical, physical, and biological processes responsible for the transport and reaction of heavy metals in sub arctic estuaries. The physical circulation and mixing processes, the nature and reactions of terrigenous organics and particulate sediment within the mixing zone, and aspects of the basin sediment oxygen, carbon and nutrient budgets in addition to study of individual metals are investigated. Mainly copper, iron and manganese are studied since these provide information on physical-chemical processes common to, or greatly affecting, a much wider range of metals. DOE

N82-13475# Minnesota Univ., Minneapolis. Limnological Research Center.

DEVELOPMENT OF PEATLANDS IN NORTHERN MINNESOTA Technical Progress Report

H. E. Wright, Jr. Sep. 1981 5 p refs

(Contract DE-AC02-80EV-10414)

(DE82-000873; DOE/EV-10414/T1) Avail: NTIS HC A02/MF A01

The extensive peatlands in northern Minnesota, which are considered as an energy resource through the development of a gasification operation were studied. Problems of peat mining, draining, reclamation, economic impact, wildlife, and vegetation are discussed. The history of formation of the major peatlands in northern Minnesota, and their relationship distribution and composition, to the modern and past climate and to the various natural factors and processes prevailing in the region are investigated. The following factors are considered: the formation of vegetation patterns that seem to be unique for North American peatlands, regional differences from east to west that may reflect trends in postglacial climate and forest composition, rates of peat formation in different environmental settings, and the record of atmospheric pollution (industrial contaminations, agricultural dust) that may be contained in short cores of peat. DOE

N82-13476# Georgia Inst. of Tech., Atlanta. Environmental Resources Center.

ANALYSIS OF THE DEVELOPMENT OF SHALLOW GROUNDWATER SUPPLIES BY PUMPING FROM PONDS

Mustafa M. Aral, T. W. Sturm, and J. M. Fulford Feb. 1981 102 p refs

(OWRT Proj. A-089-GA(1))

(PB81-231904; ERC-02-81; W81-04311) Avail: NTIS HC A06/MF A01 CSCL 13B

The use of the shallow aquifer as a direct water source through development of large diameter, shallow wells or ponds was explored. Continued pumping from the principal artesian aquifer in coastal Georgia has led to a general decline of the piezometric surface. With the decline of the groundwater level saline intrudes into freshwater zones. A shallow, unconfirmed aquifer overlays the artesian aquifer and receives surface recharge. A numerical model to study the hydraulics of flow to a pond in an unconfined aquifer is employed. The groundwater hydraulics problem is solved by finite element method for two dimensional pits and axisymmetric ponds in phreatic aquifers for steady state and transient cases. GRA

N82-13477# Alaska Univ., Fairbanks. Inst. of Water Resources.

ALASKA'S WATER RESOURCES PROBLEMS AND RESEARCH NEEDS: INSTITUTE OF WATER RESOURCES, FIVE-YEAR RESEARCH PLAN

Jun. 1980 32 p refs

(PB81-231920) Avail: NTIS HC A03/MF A01 CSCL 13B

A nine point program for water resource development in industrial and urban resource needs is reported. The plan which covers flood plain management, frozen soils, water supply, waste disposal, toxic trace element management, aquatic resource management, and coastal zone management is summarized. GRA

N82-13478# Hawaii Univ. at Manoa, Honolulu. Water Resources Research Center.

FIVE-YEAR HAWAII WATER RESEARCH AGENDA, 1982-1987

Oct. 1980 91 p refs

(PB81-231912; W81-04313) Avail: NTIS HC A05/MF A01 CSCL 13B

The water supply, especially the near overdraft conditions of the basal groundwater aquifers in Hawaii is addressed. The water quality, especially in the coastal areas, identifying proper values for instream uses, such as recreation and aesthetics, and flora and fauna habitats and legislation concerning water allocation are discussed. GRA

N82-13479# Iowa State Water Resources Research Inst., Ames.
FIVE-YEAR WATER RESOURCES RESEARCH PLAN, 1982-1987
Merwin D. Dougal and T. Al Austin Oct. 1980 70 p
(PB81-231938; ISWRRI-116; W81-04315) Avail: NTIS HC A04/MF A01 CSCL 13B

The fracture decrease of water resources in Iowa is discussed. Projected water withdrawal will rise from 3.88 billion gallons per day (1975) to 27.5 billion gallons per day (2020). A large water user is agriculture, in which Iowa is one of the leading states. Average annual precipitation varies from 34 inches in the southeast to 25 inches in the northwest, with 70% occurring during the growing season. Shallow groundwater quality and quantity have been declining, especially in the southwest and west. The largest pollutant is sediment from topsoil erosion; an estimated 50% of valuable topsoil has been lost in the last 100 years. Seven aspects of water resources are evaluated. GRA

N82-13480# Massachusetts Univ., Amherst. Water Resources Research Center.
MASSACHUSETTS' FIVE-YEAR WATER RESOURCES RESEARCH NEEDS, 1982-1987
Edward L. Goldstein, Joseph S. Larson, and Paul J. Godfrey 1980 83 p refs
(Contract DI-14-34-0001-0131)
(PB81-231961; PUB-122; W81-04318) Avail: NTIS HC A05/MF A01 CSCL 13B

Three major needs for water resources for the next 5 years are examined and a contribution is made to a coordinated research effort by Federal, State, and academic institutions as well as an attempt educate the public to the critical nature of the water resources problem. Massachusetts has no single, dramatic water resource problem; instead, there is a patchwork of local and regional problems of water quality, water quantity, and conflicts over the use of water. The following categories are considered: ground-water development and protection, conservation, water quality and quantity, modernization of supply systems, drinking water quality and treatment, information transfer and management, resource administration, and water resource policy and programs development. GRA

N82-13481# Geological Survey, Albany, N.Y. Water Resources Div.
PRELIMINARY INVESTIGATION OF A SHALLOW GROUND-WATER FLOW SYSTEM ASSOCIATED WITH CONNETQUOT BROOK, LONG ISLAND, NEW YORK Final Report
Keith R. Prince Nov. 1980 42 p refs
(PB81-228751; USGS/WRD-WRI-81-069; USGS/WRI-80-47) Avail: NTIS HC A03/MF A01 CSCL 08H

Under natural conditions, about 95 percent of the flow in Long Island streams is derived from ground-water seepage. The ground-water system that feeds the streams is a shallow subsystem that overlies the regional subsurface flow system. The Connetquot Brook basin was selected for study because it has not been appreciably affected by urbanization. Studies in the basin indicate that the shallow ground-water flow system circulates to a depth of less than 30 feet below the stream channel. Directly beneath The stream, shallow ground-water flow is upward toward the stream channel, but elsewhere in the basin it is predominantly horizontal. GRA

N82-13482# District of Columbia Univ., Washington, D. C. Water Resources Research Center.
THE DISTRICT OF COLUMBIA FIVE-YEAR WATER RESOURCES RESEARCH PROGRAM PLAN, 1982-1987
Mamadou H. Watt Nov. 1980 248 p refs Sponsored by the U.S. Dept. of the Interior
(PB81-234882; WRRC-24) Avail: NTIS HC A11/MF A01 CSCL 08H

The water resources situaton in the District of Columbia is described. Research needs are identified and a 5 year research and development program plan for the D.C. Water Resources Research Center is presented. Geological, meteorological, biological and hydrological characteristics are described as well as surface and groundwater resources. Water resources problems are categorized and prioritized, and related agency activities are presented. GRA

N82-13483# Bureau of Mines, Pittsburgh, Pa. Research Center.
HIGH-PRESSURE SHROUDED WATER SPRAYS FOR DUST CONTROL
N. I. Jayaraman, F. N. Kissell, W. Cross, and J. Janosik Jun. 1981 22 p refs
(PB81-231458; BM-RI-8536) Avail: NTIS HC A02/MF A01 CSCL 08I

High pressure shrouded sprays were tested for air moving capability and dust collection efficiency. It is indicated that at 500 psi and above, the dust collection efficiency, when sampled downstream of a water eliminator, is about 99% for two types of nozzles. However, for the same water flow, the induced airflow was about three times greater in one type than in another. Model mine tests are conducted to determine the reduction in dust concentration behind the line curtain and at the operator position produced by high pressure sprays in a shroud. GRA

N82-13484# National Oceanic and Atmospheric Administration, Rockville, Md. Office of Marine Pollution Assessment.
DEEP OCEAN MINING ENVIRONMENTAL STUDY. ENVIRONMENTAL EFFECTS OF COMMERCIAL-SCALE MINING
Nov. 1980 319 p refs
(PB81-227753; NOAA-81052103) Avail: NTIS HC A14/MF A01 CSCL 08I

Papers on deep ocean mining environmental study are presented. The titles are: estimated discharge characteristics of a commercial nodule mining operation; dissolved components of the discharge; increased oxygen demand and microbial biomass; trace metal exchange between ferromanganese nodules and artificial seawater; dispersion of deep sea mining particulates and their effect on light in ocean surface layer; environmental investigation of the effect of deep sea mining on marine phytoplankton and primary productivity in the tropical eastern north Pacific ocean; potential effects on deep sea minerals mining on macrozooplankton in the north equatorial Pacific; dispersal and resedimentation of the benthic plume from deep sea mining operations; and limits in prediction and detecting benthic community response to manganese nodule mining. GRA

N82-13485# Bureau of Mines, Twin Cities, Minn.
BENEFICATION WITH MAGNETIC FLUIDS
S. E. Khalafalla and G. W. Reimers May 1981 27 p refs
(PB81-227126; BM-RI-8532) Avail: NTIS HC A03/MF A01 CSCL 08I

A new magnetic separation technique that does not rely on the inherent magnetic susceptibility, but rather on the specific gravity of the separated functions is described be applied to segregate a typical waste product for materials recycle and to beneficiate a mineral to recover its precious content. GRA

N82-13486# Pittsburg Univ., Pa. Dept. of Chemical and Petroleum Engineering.
WATER AND ENERGY USAGE IN COAL PREPARATION Final Report
S. H. Chiang and Robert E. Douglas May 1981 575 p refs Sponsored by the Geological Survey
(PB81-238248) Avail: NTIS HC A24/MF A01 CSCL 08I

The demand for water and energy by those industries physically beneficiating Eastern American coals was analyzed and predicted. Both the method and equipment utilized in cleaning coarse and fine coals were evaluated for their respective water and energy requirements. Five typical coal cleaning facilities employing various cleaning, comminution, screening, dewatering and drying equipment were simulated with a computer. Seven characteristic eastern coals (with ash and sulfur concentrations of 19-36 percent and 0.5-8.5 percent, respectively) were systematically evaluated in the conceptual coal preparation plants. GRA

N82-13487# Bureau of Mines, Pittsburgh, Pa. Research Center.

CONTROL OF METHANE BY VENTILATION OF SHAFTS DURING RAISE DRILLING

Slavoljub D. Maksimovic Jun. 1981 17 p refs

(PB81-234502; BM-IC-8847) Avail: NTIS HC A02/MF A01 CSCL 08I

Ventilation surveys at raise drill sites to assess various methods of reducing methane concentration were conducted. It is indicated that raise drill shaft cavities are ventilated by air compressors, vacuum pumps, auxiliary blower fans, and free intake air from the surface. At the bottom of the shaft cavities, ventilation is controlled by regulators and airlocks. Methane is monitored, measured, and periodically sampled on the surface, at the bottom and at different levels in the shaft cavities. It is recommended that the best way to ventilate shaft cavities is through the simultaneous use of air compressors and vacuum pumps. GRA

N82-13488# Bureau of Mines, Pittsburgh, Pa.

CREATING A SAFER ENVIRONMENT IN US COAL MINES: THE BUREAU OF MINES METHANE CONTROL PROGRAM, 1964-79

Milford L. Skow, A. G. Kim, and M. Deul May 1981 57 p refs

(PB81-233918; BM-SP-5-81) Avail: NTIS HC A04/MF A01 CSCL 08I

The principal activities and results of 15 years of research on methane control in coal mines are summarized. Fundamental factors regarding the occurrence and movement of methane in coalbeds, removal of methane prior to mining, and control of methane during mining were investigated. Publications on methane control program, a section on methane recovery and use, a look at the upcoming Bureau of Mines research program, and a brief review of methane drainage practices in other coal producing countries are included. GRA

N82-13489# Bureau of Mines, Pittsburgh, Pa. Research Center.

SUPPRESSION OF COAL DUST EXPLOSION BY WATER BARRIER IN A CONVEYOR BELT ENTRY

I. Liebman and J. K. Richmond Jun. 1981 34 p refs

(PB81-233306; BM-RI-8538) Avail: NTIS HC A03/MF A01 CSCL 08I

Experiments on coal dust explosion suppression were conducted in a simulated working mine environment. It was shown that a coal dust explosion can be readily initiated in a conveyor belt entry and the explosion can spread into adjacent entries through opened crosscuts to propagate for long distances even though the adjacent entries are rock ducted. Passive water barriers are effective in suppressing explosions on a beltway; however, barrier efficiency is reduced by opened crosscuts. It is indicated that the beltway barrier should have continuous rows of water filled tubs covering long distances along the entry. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-13490*# Engelhard Industries, Inc., Edison, N.J.

DEVELOP AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEM. PHASE 3: FULL-SCALE POWER PLANT DEVELOPMENT Quarterly Report, Feb. - Apr. 1981

A. Kaufman 24 Jun. 1981 60 p

(Contract DEN3-241)

(NASA-CR-165328; DOE/NASA/0241-1; QR-1) Avail: NTIS HC A03/MF A01 CSCL 10B

An integrated 5 kW power system based upon methanol fuel and a phosphoric acid fuel cell operating at about 473 K is described. Description includes test results of advanced fuel cell catalysts, a semiautomatic acid replenishment system and a completed 5 kW methanol/system reformer. The results of a preliminary system test on a reformer/stack/inverter combination are reported. An initial design for a 25 kW stack is presented. Experimental plans are outlined for data acquisition necessary for design of a 50 kW methanol/steam reformer. Activities related to complete mathematical modelling of the integrated power system, including wasteheat utilization, are described. E.A.K.

N82-13491*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SPACE APPLICABLE DOE PHOTOVOLTAIC TECHNOLOGY: AN UPDATE

J. Scott-Monck, P. Stella, and P. Berman 15 Nov. 1981 25 p refs

(Contract NAS7-100)

(NASA-CR-165021; JPL-Pub-81-91) Avail: NTIS HC A02/MF A01 CSCL 10A

Photovoltaic development projects applicable to space power are identified. When appropriate, the type of NASA support that would be necessary to implement these technologies for space use is indicated. It is conducted that the relatively small market and divergent operational requirements for space power are mainly responsible for the limited transfer of terrestrial technology to space applications. Information on the factors which control the cost and type of technology is provided. Terrestrial modules using semiconductor materials are investigated. S.L.

N82-13492*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DISTRIBUTED PHOTOVOLTAIC SYSTEMS: UTILITY INTERFACE ISSUES AND THEIR PRESENT STATUS

M. Hassan and J. Klein 15 Sep. 1981 166 p refs

(Contracts NAS7-100; DE-AI01-76ET-20356; JPL Proj. 5240-11)

(NASA-CR-165019; JPL-Pub-81-89; DOE/ET-20356/3) Avail: NTIS HC A08/MF A01 CSCL 10A

Major technical issues involving the integration of distributed photovoltaics (PV) into electric utility systems are defined and their impacts are described quantitatively. An extensive literature search, interviews, and analysis yielded information about the work in progress and highlighted problem areas in which additional work and research are needed. The findings from the literature search were used to determine whether satisfactory solutions to the problems exist or whether satisfactory approaches to a solution are underway. It was discovered that very few standards, specifications, or guidelines currently exist that will aid industry in integrating PV into the utility system. Specific areas of concern identified are: (1) protection, (2) stability, (3) system unbalance, (4) voltage regulation and reactive power requirements, (5) harmonics, (6) utility operations, (7) safety, (8) metering, and (9) distribution system planning and design. Author

N82-13493*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

A PRELIMINARY ESTIMATE OF FUTURE COMMUNICATIONS TRAFFIC FOR THE ELECTRIC POWER SYSTEM

Roger M. Barnett 15 Oct. 1981 73 p refs

(Contracts NAS7-100; DE-AI01-79ET-29372)

(NASA-CR-165015; JPL-Pub-81-41; DOE/ET-29372/2) Avail: NTIS HC A04/MF A01 CSCL 10B

Diverse new generator technologies using renewable energy, and to improve operational efficiency throughout the existing electric power systems are presented. A description of a model utility and the information transfer requirements imposed by incorporation of dispersed storage and generation technologies and implementation of more extensive energy management are estimated. An example of possible traffic for an assumed system, and an approach that can be applied to other systems, control configurations, or dispersed storage and generation penetrations is provided. E.A.K.

N82-13494*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

MEASUREMENT OF SURFACE RECOMBINATION VELOC-

ITY FOR SILICON SOLAR CELLS USING A SCANNING ELECTRON MICROSCOPE WITH PULSED BEAM
Taher Daud and Li-Jen Cheng 1 Nov. 1981 36 p refs
(Contracts NAS7-100; EX-76-A-29-1012;
DE-AI01-76ET-20356; JPL Proj. 5101-176)
(JPL-Pub-81-64; DOE/JPL-1012-56) Avail: NTIS
HC A03/MF A01 CSCL 10A

The role of surface recombination velocity in the design and fabrication of silicon solar cells is discussed. A scanning electron microscope with pulsed electron beam was used to measure this parameter of silicon surfaces. It is shown that the surface recombination velocity, s, increases by an order of magnitude when an etched surface degrades, probably as a result of environmental reaction. A textured front-surface-field cell with a high-low junction near the surface shows the effect of minority carrier reflection and an apparent reduction of s, whereas a tandem-junction cell shows an increasing s value. Electric fields at junction interfaces in front-surface-field and tandem-junction cells acting as minority carrier reflectors or sinks tend to alter the value of effective surface recombination velocity for different beam penetration depths. A range of values of s was calculated for different surfaces. M.D.K.

N82-13495*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DISH STIRLING SOLAR RECEIVER COMBUSTOR TEST PROGRAM
C. P. Bankston and L. H. Back 15 Aug. 1981 45 p refs
(Contracts NAS7-100; DE-AI01-81ET-20307; JPL Proj. 5105-76)
(NASA-CR-165017; JPL-Pub-81-23; DOE/JPL-1060-41) Avail: NTIS HC A03/MF A01 CSCL 10A

The operational and energy transfer characteristics of the Dish Stirling Solar Receiver (DSSR) combustor/heat exchanger system was evaluated. The DSSR is designed to operate with fossil fuel augmentation utilizing a swirl combustor and cross flow heat exchanger consisting of a single row of 4 closely spaced tubes that are curved into a conical shape. The performance of the combustor/heat exchanger system without a Stirling engine was studied over a range of operating conditions and output levels using water as the working fluid. Results show that the combustor may be started under cold conditions, controlled safety, and operated at a constant air/fuel ratio (10 percent excess air) over the required range of firing rates. Furthermore, nondimensional heat transfer coefficients based on total heat transfer are plotted versus Reynolds number and compared with literature data taken for single rows of closely spaced tubes perpendicular to cross flow. The data show enhanced heat transfer for the present geometry and test conditions. Analysis of the results shows that the present system meets specified thermal requirements, thus verifying the feasibility of the DSSR combustor design for final prototype fabrication. J.M.S.

N82-13496*# Solarex Corp., Rockville, Md.
A MODULE EXPERIMENTAL PROCESS SYSTEM DEVELOPMENT UNIT (MEPSDU) Quarterly Report, 1 May - 31 Aug. 1981
31 Aug. 1981 57 p refs Sponsored in part by DOE Prepared for JPL, Pasadena
(Contract JPL-955902)
(NASA-CR-165014; QR-3; JPL-9950-603;
DOE/JPL-955902-81/3) Avail: NTIS HC A04/MF A01 CSCL 10A

A cost effective process sequence and machinery for the production of flat plate photovoltaic modules are described. Cells were fabricated using the process sequence which was optimized, as was a lamination procedure. Insulator tapes and edge seal material were identified and tested. Encapsulation materials were evaluated. S.L.

N82-13497*# Westinghouse Research and Development Center, Pittsburgh, Pa.
LARGE AREA SHEET TASK: ADVANCED DENDRITIC WEB GROWTH DEVELOPMENT Quarterly Report, 1 Apr. - 30 Jun.
C. S. Duncan, R. G. Seidensticker, J. P. McHugh, R. H. Hopkins, D. Meier, and J. Schruben 6 Oct. 1981 39 p refs Sponsored in part by DOE Prepared for JPL, Pasadena
(Contract JPL-955843)
(NASA-CR-165013; JPL-9950-605; DOE/JPL-955843-81/3)
Avail: NTIS HC A03/MF A01 CSCL 10A

The growth of silicon dendritic web for photovoltaic applications was investigated. The application of a thermal model for calculating buckling stresses as a function of temperature profile in the web is discussed. Lid and shield concepts were evaluated to provide the data base for enhancing growth velocity. An experimental web growth machine which embodies in one unit the mechanical and electronic features developed in previous work was developed. In addition, evaluation of a melt level control system was begun, along with preliminary tests of an elongated crucibl design. The economic analysis was also updated to incorporate some minor cost changes. The initial applications of the thermal model to a specific configuration gave results consistent with experimental observation in terms of the initiation of buckling vs. width for a given crystal thickness. B.W.

N82-13498*# Union Carbide Corp., Oak Ridge, Tenn.
FLAT-PLATE SOLAR ARRAY PROJECT: EXPERIMENTAL PROCESS SYSTEM DEVELOPMENT UNIT FOR PRODUCING SEMICONDUCTOR-GRADE SILICON USING THE SILANE-TO-SILICON PROCESS Quarterly Progress Report, Jul. - Sep. 1981
Sep. 1981 56 p Sponsored in part by DOE Prepared for JPL, Pasadena, Calif.
(Contract JPL-954334)
(NASA-CR-165022; JPL-9950-606; DOE/JPL-954334/20)
Avail: NTIS HC A04/MF A01 CSCL 10A

The engineering design, fabrication, assembly, operation, economic analysis, and process support research and development for an Experimental Process System Development Unit for producing semiconductor-grade silicon using the slane-to-silicon process are reported. The design activity was completed. About 95% of purchased equipment was received. The draft of the operations manual was about 50% complete and the design of the free-space system continued. The system using silicon power transfer, melting, and shotting on a psuedocontinuous basis was demonstrated. Author

N82-13499*# Photowatt International, Inc., Tempe, Ariz.
DEVELOPMENT OF TECHNIQUE FOR AR COATING AND NICKEL AND COPPER METALLIZATION OF SOLAR CELLS: FPS PROJECT, PRODUCT DEVELOPMENT Quarterly Technical Report, 15 May - 30 Sep. 1981
C. G. Rominger 15 Oct. 1981 26 p Prepared for JPL, Pasadena
(Contract JPL-955986)
(NASA-CR-165033; QTR-1; JPL-9950-609;
DOE/JPL-955986-1) Avail: NTIS HC A03/MF A01 CSCL 10A

Silicon nitride and nickel pastes are investigated in conjunction with a brush copper plating process for the purpose of identifying one or more fabrication sequences which yield at least 10 percent efficient N(+)/P(+) flat plate solar cells. The adhesion of all nickel pastes is reduced significantly when subjected to acidic and alkaline brush copper plating solutions as a result of a combination of thermally induced stress and chemical attack of the frit, which occurs at the interface with the silicon solar cell. The AgF is penetrating the 800 a of Si3N4 and ohmic contact is occurring at all fire-in tempertures. During the brush plating process, fingers and buss bars tend to spread. S.L.

N82-13500*# Kayex Corp., Rochester, N. Y.
CONTINUOUS CZOCHRALSKI GROWTH: SILICON SHEET GROWTH DEVELOPMENT OF THE LARGE AREA SHEET TASK OF THE LOW COST SILICON SOLAR ARRAY PROJECT Final Report, 1 Oct. 1977 - 31 Mar. 1980
C. Moody Johnson Dec. 1980 292 p refs Sponsored in part by DOE Prepared for JPL, Pasadena, Calif.
(Contract JPL-954888)
(NASA-CR-165030; JPL-9950-610; DOE/JPL-954888-80/12)
Avail: NTIS HC A13/MF A01 CSCL 10A

The growth of 100 kg of silicon single crystal material, ten cm in diameter or greater, and 150 kg of silicon single crystal material 15 cm or greater utilizing one common silicon container material (one crucible) is investigated. A crystal grower that is recharged with a new supply of polysilicon material while still under vacuum and at temperatures above the melting point of silicon is developed. It accepts large polysilicon charges up to 30 kg, grows large crystal ingots (to 15 cm diameter and 25 kg in weight), and holds polysilicon material for recharging (rod or lump) while, at the same time, growing crystal ingots. Special equipment is designed to recharge polysilicon rods, recharge polysilicon lumps, and handle and store large, hot silicon crystal ingots. Many continuous crystal growth runs were performed lasting as long as 109 hours and producing as many as ten crystal ingots, 15 cm with weights progressing to 27 kg. S.L.

N82-13501*# Spectrolab, Inc., Sylmar, Calif.
HIGH RESOLUTION, LOW COST SOLAR CELL CONTACT DEVELOPMENT Final Report
N. Mardesich [1981] 82 p Sponsored in part by DOE Prepared for JPL, Pasadena, Calif.
(Contract JPL-955725)
(NASA-CR-165032; JPL-9950-611; DOE/JPL-955725-81/1) Avail: NTIS HC A05/MF A01 CSCL 10A

The MIDFILM cell fabrication and encapsulation processes were demonstrated as a means of applying low-cost solar cell collector metallization. The average cell efficiency of 12.0 percent (AM1, 28 C) was achieved with fritted silver metallization with a demonstration run of 500 starting wafers. A 98 percent mechanical yield and 80 percent electrical yield were achieved through the MIDFILM process. High series resistance was responsible for over 90 percent of the electrical failures and was the major factor causing the low average cell efficiency. Environmental evaluations suggest that the MIDFILM cells do not degrade. A slight degradation in power was experienced in the MIDFILM minimodules when the AMP Solarlok connector delaminated during the environmental testing. T.M.

N82-13502*# Solarex Corp., Rockville, Md.
DESIGN, FABRICATION, TEST, QUALIFICATION, AND PRICE ANALYSIS OF THIRD GENEFATION DESIGN SOLAR CELL MODULES Final Design Report
15 Oct. 1981 33 p Sponsored in part by DOE Prepared for JPL, Pasadena
(Contract JPL-955404)
(NASA-CR-165007; JPL-9950-612; DOE/JPL-955404-81/1) Avail: NTIS HC A03/MF A01 CSCL 10A

The fabrication of solar cell modules is detailed with emphasis upon laminating and interconnecting the panels that hold the simicrystalline silicon cells. Design problems and enviromental tests are described as well as performance characteristics. R.J.F.

N82-13503*# Springborn Labs., Inc., Enfield, Conn.
INVESTIGATION OF TEST METHODS, MATERIAL PROPERTIES, AND PROCESSES FOR SOLAR CELL ENCAPSULANTS Annual Report
P. B. Willis Jun. 1981 128 p refs Sponsored in part by DOE Prepared for JPL, Pasadena, Calif.
(Contract JPL-954527)
(NASA-CR-165031; JPL-9950-613; DOE/JPL-954527-81/19) Avail: NTIS HC A07/MF A01 CSCL 10A

Encapsulant materials and processes for the production of cost effective, long life solar cell modules are identified, and evaluated. Ethylene vinyl acetate lamination pottant studies are conducted with respect to the time/temperature cure requirements for successful use of this compound. The time needed to produce successful gel contents are redetermined at a variety of temperatures and are related to the peroxide half life temperature curve. Formulation of the butyl acrylate syrup casting pottant is complete. The formulation contains an ultraviolet stabilizer system and is cured with an initiator that presents no shipping or handling hazards. The catalyzed syrup is stable at room temperature and has a pot life of at least an eight hour period of time. The syrup cures to a transparent rubber in 18 minutes at a temperature of 60 C. S.L.

N82-13504*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CATALYTIC COMBUSTION OF RESIDUAL FUELS
Daniel L. Bulzan and Robert R. Tacina 1981 20 p refs Presented at 5th Workshop on Catalytic Combustion, San Antonio, Tex., 15-16 Sep. 1981
(Contract DE-AI01-77ET-10350)
(NASA-TM-82731; E-1040) Avail: NTIS HC A02/MF A01 CSCL 21B

A noble metal catalytic reactor was tested using two grades of petroleum derived residual fuels at specified inlet air temperatures, pressures, and reference velocities. Combustion efficiencies greater than 99.5 percent were obtained. Steady state operation of the catalytic reactor required inlet air temperatures of at least 800 K. At lower inlet air temperatures, upstream burning in the premixing zone occurred which was probably caused by fuel deposition and accumulation on the premixing zone walls. Increasing the inlet air temperature prevented this occurrence. Both residual fuels contained about 0.5 percent nitrogen by weight. NO sub x emissions ranged from 50 to 110 ppm by volume at 15 percent excess O2. Conversion of fuel-bound nitrogen to NO sub x ranged from 25 to 50 percent. M.D.K.

N82-13505*# Paragon Pacific, Inc., El Segundo, Calif.
DEVELOPMENT REPORT: AUTOMATIC SYSTEM TEST AND CALIBRATION (ASTAC) EQUIPMENT Final Report
Robert J. Thoren Jul. 1981 25 p ref
(Contracts DEN3-203; DE-AI01-76ET-20320)
(NASA-CR-165403; DOE/NASA/0203-1; PPI-3009-4) Avail: NTIS HC A02/MF A01 CSCL 10A

A microcomputer based automatic test system was developed for the daily performance monitoring of wind energy system time domain (WEST) analyzer. The test system consists of a microprocessor based controller and hybrid interface unit which are used for inputing prescribed test signals into all WEST subsystems and for monitoring WEST responses to these signals. Performance is compared to theoretically correct performance levels calculated off line on a large general purpose digital computer. Results are displayed on a cathode ray tube or are available from a line printer. Excessive drift and/or lack of repeatability of the high speed analog sections within WEST is easily detected and the malfunctioning hardware identified using this system. E.A.K.

N82-13506*# Eaton Engineering and Research Center, Southfield, Mich.
THE ac PROPULSION SYSTEM FOR AN ELECTRIC VEHICLE, PHASE 1 Final Report
Steven Geppert Aug. 1981 307 p refs
(Contracts DEN3-125; DE-AI01-77CS-51044)
(NASA-CR-165480; DOE/NASA/0125-1; ERC-TR-8101) Avail: NTIS HC A14/MF A01 CSCL 10B

A functional prototype of an electric vehicle ac propulsion system was built consisting of a 18.65 kW rated ac induction traction motor, pulse width modulated (PWM) transistorized inverter, two speed mechanically shifted automatic transmission, and an overall drive/vehicle controller. Design developmental steps, and test results of individual components and the complex system on an instrumented test frame are described. Computer models were developed for the inverter, motor and a representative vehicle. A preliminary reliability model and failure modes effects analysis are given. E.A.K.

N82-13507*# Case Western Reserve Univ., Cleveland, Ohio.
TRANSIENT CATALYTIC COMBUSTOR MODEL Final Report
James S. Tien May 1981 87 p refs
(Grant NsG-3230; Contract DE-AI01-77CS-51040)
(NASA-CR-165324; DOE/NASA/3230-1) Avail: NTIS HC A05/MF A01 CSCL 10B

A quasi-steady gas phase and thermally thin substrate model is used to analyze the transient behavior of catalytic monolith combustors in fuel lean operation. The combustor response delay is due to the substrate thermal inertia. Fast response is favored by thin substrate, short catalytic bed length, high combustor inlet and final temperatures, and small gas channel diameters. The calculated gas and substrate temperature time history at different axial positions provides an understanding of how the catalytic combustor responds to an upstream condition change. The computed results also suggest that the gas residence times in the catalytic bed in the after bed space are correlatable with the nondimensional combustor response time. The model also performs steady state combustion calculations; and the computed steady state emission characteristics show agreement with available experimental data in the range of parameters covered.

A catalytic combustor design for automotive gas turbine engine which has reasonably fast response (< 1 second) and can satisfy the emission goals in an acceptable total combustor length is possible. S.L.

N82-13508*# Life Systems, Inc., Cleveland, Ohio.
ENDURANCE TEST AND EVALUATION OF ALKALINE WATER ELECTROLYSIS CELLS Annual Report
K. A. Burke and F. H. Schubert Nov. 1981 46 p refs
(Contract NAS3-21287)
(NASA-CR-165424; TR-376-16) Avail: NTIS HC A03/MF A01 CSCL 10C

Utilization in the development of multi-kW low orbit power systems is discussed. The following technological developments of alkaline water electrolysis cells for space power application were demonstrated: (1) four 92.9 cm2 single water electrolysis cells, two using LST's advanced anodes and two using LST's super anodes; (2) four single cell endurance test stands for life testing of alkaline water electrolyte cells; (3) the solid performance of the advanced electrode and 355 K; (4) the breakthrough performance of the super electrode; (5) the four single cells for over 5,000 hours each significant cell deterioration or cell failure. It is concluded that the static feed water electrolysis concept is reliable and due to the inherent simplicity of the passive water feed mechanism coupled with the use of alkaline electrolyte has greater potential for regenerative fuel cell system applications than alternative electrolyzers. A rise in cell voltage occur after 2,000-3,000 hours which was attributed to deflection of the polysulfone end plates due to creepage of the thermoplastic. More end plate support was added, and the performance of the cells was restored to the initial performance level. E.A.K.

N82-13509*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
GAS-TURBINE CRITICAL RESEARCH AND ADVANCED TECHNOLOGY SUPPORT PROJECT Annual Report
John S. Clark, Philip E. Hodge, Carl E. Lowell, David N. Anderson, and Donald F. Schultz Mar. 1981 50 p refs
(Contract DE-AI01-77ET-10350)
(NASA-TM-81708; DOE/NASA/2593-24; E-737) Avail: NTIS HC A03/MF A01 CSCL 10B

A technology data base for utility gas turbine systems capable of burning coal derived fuels was developed. The following areas are investigated: combustion; materials; and system studies. A two stage test rig is designed to study the conversion of fuel bound nitrogen to NOx. The feasibility of using heavy fuels in catalytic combustors is evaluated. A statistically designed series of hot corrosion burner rig tests was conducted to measure the corrosion rates of typical gas turbine alloys with several fuel contaminants. Fuel additives and several advanced thermal barrier coatings are tested. Thermal barrier coatings used in conjunction with low critical alloys and those used in a combined cycle system in which the stack temperature was maintained above the acid corrosion temperature are also studied. E.A.K.

N82-13510*# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.
DEVELOPMENT OF A HIGH-TEMPERATURE DURABLE CATALYST FOR USE IN CATALYTIC COMBUSTORS FOR ADVANCED AUTOMOTIVE GAS TURBINE ENGINES Final Report
H. Tong, G. C. Snow, E. K. Chu, R. L. S. Chang, M. J. Angwin, and S. L. Pessagno Sep. 1981 169 p refs
(Contracts DEN3-83; DE-AI01-77CS-51040)
(NASA-CR-165388; DOE/NASA/0083-1) Avail: NTIS HC A08/MF A01 CSCL 10B

Durable catalytic reactors for advanced gas turbine engines were developed. Objectives were: to evaluate furnace aging as a cost effective catalytic reactor screening test, measure reactor degradation as a function of furnace aging, demonstrate 1,000 hours of combustion durability, and define a catalytic reactor system with a high probability of successful integration into an automotive gas turbine engine. Fourteen different catalytic reactor concepts were evaluated, leading to the selection of one for a durability combustion test with diesel fuel for combustion conditions. Eight additional catalytic reactors were evaluated and one of these was successfully combustion tested on propane fuel. This durability reactor used graded cell honeycombs and a combination of noble metal and metal oxide catalysts. The reactor was catalytically active and structurally sound at the end of the durability test. E.A.K.

N82-13511*# Westinghouse Research and Development Center, Pittsburgh, Pa.
CELL MODULE AND FUEL CONDITIONER DEVELOPMENT Quarterly Report, Jul. - Sep. 1981
D. Q. Hoover, Jr. Oct. 1981 59 p
(Contracts DEN3-161; DE-AI01-80ET-17088)
(NASA-CR-165462; DOE/NASA/0161-9; Rept-81-9D1-MARED-R1) Avail: NTIS HC A04/MF A01 CSCL 10A

The results of pretesting and performance testing of Stack 564 are reported. The design features, progress in fabrication and plans for assembly of Stack 800 are given. The status of endurance testing of Stack 560 is reported. The design, fabrication, test procedures and preliminary tests of the 10 kW double counterflow reformer and the reformer test stand are described. Results of vendor contacts to define the performance and cost of fuel conditioning system components are reported. The results of burner tests and continuing development of the BOLTAR program are reported. T.M.

N82-13512# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
ALTERNATE HYBRID POWER SOURCES FOR REMOTE SITE APPLICATIONS Final Report, Feb. 1980 - Feb. 1981
W. Richard Powell, Robert J. Taylor, J. L. Baron, E. E. Mengel, and J. C. Ray Feb. 1981 229 p refs
(Contracts N00024-78-C-5384; MIPR-Z-70099)
(AD-A099471; USCG-D-06-81) Avail: NTIS HC A11/MF A01 CSCL 10/2

Operation of diesel electric generators at remote Coast Guard sites are discussed. The electric power required by modules and subsystems in a modern lighthouse was investigated. The availability of wind power, solar energy, and other renewable energy sources in the local environment at remote lighthouses and other sites is discussed. A life cycle cost analysis methodology applicable to continuously variable life expectancies is developed and illustrated. Diesel generator costs, including service visit expenses, are modeled. Other factors relating to the analysis of alternate energy systems as supplements to diesel electric generators at remote sites are discussed. Author

N82-13513# Harry Diamond Labs., Adelphi, Md.
CAMELOT: A NOVEL CONCEPT FOR A MULTITERAWATT PULSE POWER GENERATOR FOR SINGLE PULSE BURST OR REPETITION RATE OPERATION
Alexander G. Stewart Apr. 1981 19 p refs
(DA Proj. 1L1-61101-A-91-A)
(AD-A103024; HDL-SR-81-1) Avail: NTIS HC A02/MF A01 CSCL 10/2

Superpower pulse generators are fast establishing themselves internationally as candidates for employment in a wide variety of military applications including electronic warfare and jamming, high energy beam weapons, and nuclear weapons effects simulation. Unfortunately, existing multimegajoule pulse power generators such as AURORA do not satisfy many Department of Defense goals fo field-adaptable weapon systems-for example, repetition (rep) rate operation, high reliability, long life, ease of operation, and low maintenance. The Camelot concept is a multiterawatt rep ratable pulse power source, adaptable to a wide range of output parameters - both charged particles and photons. An analytical computer model has been developed to predict the power flowing through the device. A 5-year development program, culminating in a source region electromagnetic pulse simulator, is presented. Author

N82-13514# Solarex Corp., Rockville, Md.
SILICON SOLAR CELL OPTIMIZATION Final Report, 15 Aug. 1978 - 15 Feb. 1981
Alan L. Scheinine, John H. Wohlgemuth, and Eileen Sparks Wright-Patterson AFB, Ohio AFWAL Jun. 1981 99 p refs
(Contract F33615-78-C-2039; AF Proj. 3145)
(AD-A106005; AFWAL-TR-81-2052) Avail: NTIS HC A05/MF A01 CSCL 10/2

This research program has resulted in improvements in vertical

junction solar cell techniques leading to higher efficiencies and improved handleability. Vertical junction solar cells have now been fabricated with AMO conversion efficiency greater than 15% (25 C). A variety of cells have been fabricated including different groove depths, substrate thicknesses and bulk resistivities. Cell performance has been measured both before and after irradiation. Theoretical analyses has been performed to generate computer models of I-V curves for various cell geometries.
Author (GRA)

N82-13515# Electric Power Research Inst., Palo Alto, Calif. Steam Generator Project Office.
WORKSHOP PROCEEDINGS: U-BEND TUBE CRACKING IN STEAM GENERATORS
Carl E. Shoemaker, ed. Jun. 1981 343 p refs Workshop held at Denver, 20-21 Aug. 1980
(DE81-903765; EPRI-WS-80-136; CONF-8008122) Avail: NTIS HC A15/MF A01

A design to reduce the rate of tube failure in high pressure feedwater heaters, a number of failed drawn and stress relieved Monel 400 U-bend tubes removed from three high pressure feedwater heaters was examined. Steam extracted from the turbine is used to preheat the boiler feedwater in fossil fuel fired steam plants to improve thermal efficiency. This is accomplished in a series of heaters between the condenser hot well and the boiler. The heaters closest to the boiler handle water at high pressure and temperature. Because of the severe service conditions, high pressure feedwater heaters are frequently tubed with drawn and stress relieved Monel 400.
DOE

N82-13516# Oak Ridge National Lab., Tenn.
DC DIELECTRIC STRENGTHS OF FLUORINATED BENZENES AND THE STORED-ENERGY THEORY
D. H. Smith, D. W. Bouldin, and L. G. Christophorou 1981 5 p refs Presented at 7th Intern. Conf. on Conduction and Breakdown in Dielectric Liquids, Berlin, 27 Jul. 1981
(Contract W-7405-eng-26)
(DE81-026515; CONF-810734-1) Avail: NTIS HC A02/MF A01

A systematic study of the hydrofluorobenzenes to quantify the effect of liquid polarity on the dielectric strength is described. Two important relationships are introduced: dielectric strength decreased as the number of fluorines increased; and dielectric strength decreased as the dielectric constant (or capacitance) increased. The second relationship is based on a postulate that breakdown occurs at a critical value of the energy stored in the test apparatus, which is the same for all of hydrofluorobenzenes.
T.M.

N82-13517# Brookhaven National Lab., Upton, N. Y.
CRYOGENIC TESTING OF 100-M SUPERCONDUCTING POWER TRANSMISSION TEST FACILITY
R. J. Gibbs, J. E. Jensen, and R. A. Thomas 1981 8 p refs Presented at 1981 Cryogenic Engr. Conf., San Diego, 10 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-028331; BNL-29900; CONF-810835-2) Avail: NTIS HC A02/MF A01

The system was designed to cool the test facility for transmission cables. The system was modified to incorporate a fourth turbine placed remotely from the refrigerator at the far end of the load. In this configuration the load, consisting of the superconducting cables and their containment vessel, becomes a long counterflow heat exchanger with internal heat generation. The results of these tests are presented with discussion of the operation, equipment performance, and possible areas for improvement.
T.M.

N82-13518# Oregon State Univ., Corvallis. Dept. of Atmospheric Science.
NETWORK WIND POWER OVER THE PACIFIC NORTHWEST. APPENDIX 1: WIND STATISTICS SUMMARIES FOR THE WIND POWER DATA STATIONS Progress Report, Oct. 1979 - Sep. 1980
R. W. Baker and E. W. Hewson Oct. 1980 122 p refs
(DE81-029291; DOE/BP-60) Avail: NTIS HC A06/MF A01

Tables and graphs are presented concerning monthly wind speed summaries; wind spectrum analyzer summaries; high wind speed summaries; and six hourly speed and direction plots for selected wind power sites. Wind flow plots in the Goodnoe Hills MOD-2 wind turbine area and wind flow plots in the Goodnoe Hills and Juniper Point area are included.
DOE

N82-13519# Oregon State Univ., Corvallis. Dept. of Atmospheric Science.
WIND POWER: RESEARCH ON NETWORK WIND POWER OVER THE PACIFIC NORTHWEST. EXECUTIVE SUMMARY Progress Report, Oct. 1979 - Sep. 1980
R. W. Baker and E. W. Hewson Oct. 1980 23 p refs
(DE81-029360; DOE/BP-58) Avail: NTIS HC A02/MF A01

The research in FY-80 is composed of six primary tasks. These tasks include data collection and analysis, wind flow studies around an operational wind turbine generator (WTG), kite anemometer calibration, wind flow analysis and prediction, the Klickitat County small wind energy conversion system (SWECS) program, and network wind power analysis. The data collection and analysis task consists of four sections, three of which deal with wind flow site surveys and the fourth with collecting and analyzing wind data from existing data stations.
DOE

N82-13520# Sandia Labs., Albuquerque, N. Mex.
GEOTHERMAL-RESOURCE VERIFICATION FOR AIR FORCE BASES
P. R. Grant, Jr. Jun. 1981 56 p refs
(Contract DE-AC04-76DP-00789)
(DE81-027482; SAND-81-7123) Avail: NTIS HC A04/MF A01

The various type of geothermal energy and legal uncertainties of the resource are summarized. A methodology to evaluate geothermal resources for applications to US Air Force bases is described. Estimates suggest that exploration costs will be $50,000 to $300,000 which, if favorable, would lead to drilling a $500,000 exploration well. Successful identification and development of a geothermal resource could provide all base, fixed system needs with an inexpensive, renewable energy source.
T.M.

N82-13521# Los Alamos Scientific Lab., N. Mex.
COMPUTER-AUTOMATED CONTROLS FOR SUPERCONDUCTING MAGNETIC ENERGY STORAGE
Alphonse L. Criscuolo 1981 6 p refs Presented at the Mech., Magnetic, and Underground Energy Storage Ann. Contractors' Rev., Washington, D.C., 24-26 Aug. 1981
(Contract W-7405-eng-36)
(DE81-028697; LA-UR-81-2307; CONF-810833-6) Avail: NTIS HC A02/MF A01

A computer automated control system that allows unmanned operation of the superconducting magnetic energy storage (SMES) system was designed. In addition to unmanned operation the computer offers continual monitoring and recording of all the important SMES signals, operator guidance in starting up and maintaining SMES, emergency shutdown control, and high speed data acquisition for failure diagnosis. The major components of the computer automated control system are two slave computers that perform the data acquisition and a master computer that performs the control.
DOE

N82-13522# Department of Energy, Oak Ridge, Tenn. Technical Information Center.
INFORMATION RESOURCES IN THE USA ON NEW AND RENEWABLE ENERGY. A DESCRIPTION AND DIRECTORY
1 Jun. 1981 81 p Presented at the United Nations Conf., Nairobi, Kenya, Aug. 1981
(DE81-028867; CONF-810802-2) Avail: NTIS HC A05/MF A01

The production dissemination, and availability of US scientific and technical information about new and renewable energy resources, the policy framework within which the technologies are developed, and the roles of public and private sectors are reported. A directory of sources of additional information, printed material, computerized data bases, institutional services, personal contacts, about the use of new and renewable energy is included.
DOE

N82-13523# Oak Ridge National Lab., Tenn. Energy Div.
ANNUAL CYCLE ENERGY SYSTEM EXPERIMENTAL PERFORMANCE AND NATIONAL APPLICABILITY
Van D. Baxter 1981 6 p refs Presented at the IECEC Conf., Atlanta, 9 Aug. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-028570; CONF-810812-32) Avail: NTIS HC A02/MF A01

The energy conserving potential of the annual cycle energy system (ACES) was demonstrated. The performance of the ACES was compared with that of two different air to air heat pumps in an identical house, the control house. The ACES achieved nearly all of its theoretical performance predictions and verified its design criteria. The system delivered residential heating and cooling services while consuming only 57 percent as much electricity as the best conventional alternative tested. Computer studies show the ACES to be applicable to all US climatic zones except those with very low heating needs. DOE

N82-13524# California Univ., Berkeley. Lawrence Berkeley Lab.
THERMAL PERFORMANCE OF WINDOWS HAVING HIGH SOLAR TRANSMITTANCE
Michael Rubin and Stephen Selkowitz Jul. 1981 6 p refs Presented at the Am. Section of the Intern. Solar Energy Soc., 6th Natl. Passive Solar Conf., Portland, Oreg., 8-10 Sep. 1981
(Contract W-7405-eng-48)
(DE81-028672; LBL-12288; CONF-810925-16) Avail: NTIS HC A02/MF A01

The optical and thermal properties of antireflected polyester films and low iron glass sheets are discussed, and the solar and thermal characteristics of windows incorporating high transmittance glazing layers are derived. The plastic films utilize coatings to reduce loses due to surface reflectance and the glass is made with low levels of impurities to reduce adsorption within the material itself. Comparisons among these and other types of windows are made for net energy use for residential buildings in winter. DOE

N82-13525# South Carolina Energy Research Inst., Columbia.
RESIDUAL-ENERGY-APPLICATIONS PROGRAM ENVIRONMENTAL ANALYSIS REPORT
Torgny J. Vigerstad and F. J. McCrosson Oct. 1980 48 p refs
(Contract DE-AC09-77ET-12866)
(DE81-027538; DOE/ET-12866/5) Avail: NTIS HC A03/MF A01

Environmental analysis performance support of a facility to test industrial scale waste heat recovery equipment and utilization are documented. Topics covered include: legal requirements, likely sites, and operating characteristics of equipment to be tested. Environmental issues surrounding the use of the P-reactor and Par Pond as sources of heating and cooling water are addressed. The Par Pond cooling system is considered for siting of the Energy Applied Systems Tests (EAST) Facility. The Par Pond system has the potential to confine all potential environmental impacts of the construction and operation of the EAST Facility within the boundaries of the Savannah River Plant. Characteristics of the EAST Facility are described and a general description of Par Pond is given. DOE

N82-13526# South Carolina Energy Research Inst., Columbia.
RESIDUAL-ENERGY-APPLICATION PROGRAM: EAST FACILITY REQUIREMENTS DOCUMENT, VOLUME 1
P. W. Yngve, F. H. Zander, and F. J. McCrosson 31 Jul. 1981 85 p refs
(Contract DE-AC09-77ET-12866)
(DE81-027536; DOE/ET-12866/8-Vol-1) Avail: NTIS HC A05/MF A01

The objectives of the EAST Facility are to perform research and development on heat energy recovery and conversion equipment; establish high confidence in system performance, system availaility, and system operating, maintenance, and material costs; and provide a national competence in technologies required for the installation and operation of heat recovery systems. An initial testing capability recommended for EAST is presented and design specifications are provided for the physical plant and major test support systems. Five options are included for tailoring the full-up testing capability to reduce costs of the core facility. T.M.

N82-13527# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
PROGRAM PLANNER'S GUIDE TO GEOTHERMAL DEVELOPMENT IN CALIFORNIA
W. W. S. Yen, David M. Chambers, Jon F. Elliott, John P. Whittier, J. Jeffrey Schnoor, and Susan Blachman 30 Sep. 1980 314 p refs
(Contract W-7405-eng-48)
(DE82-000700; LBL-12961) Avail: NTIS HC A14/MF A01

The resource base, status of geothermal development activities, and the state's energy flow are summarized. The present and projected geothermal share of the energy market is discussed. The public and private sector initiatives supporting geothermal development in California are described. These include legislation to provide economic incentives, streamline regulation, and provide planning assistance to local communities. Private sector investment, research, and development activities are also described. The appendices provide a ready reference of financial incentives. DOE

N82-13528# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
INEXPENSIVE THERMOGRAPHIC TECHNIQUES FOR DETERMINING RELIABLE SOLAR-COLLECTOR-ARRAY PERFORMANCE
A. Eden and T. Haverty Sep. 1981 35 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-001151; SERI/TR-721-1161) Avail: NTIS HC A03/MF A01

Thermographic equipment, capable of detecting flow blockages, flow imbalances, and total array shutdown in residential and commercial solar energy collector systems is investigated. The abilities of inexpensive thermographic equipment to perform solar array examinations in the field environment are described. It was found that less expensive instruments, in combinations to enhance the capabilities of each general type, can be used to examine solar collector arrays. Expert infrared equipment operators are not required to obtain some conclusions on system problems. A combination of pot radiation thermometers with either a hand-held imager or thermoprofile instrument is a viable inspection tool. Assessment of reliable flow control components, blocked collectors, unbalanced flow distribution, and reversed flow can all be observed with the combination of instruments. DOE

N82-13529# Sandia Labs., Livermore, Calif. Materials Development.
EVALUATION OF CREEP-FATIGUE LIFE-PREDICTION MODELS FOR THE SOLAR CENTRAL RECEIVER
J. M. Hyzak and Darcy A. Hughes Sep. 1981 55 p refs
(Contract DE-AC04-76DP-00789)
(DE82-000942; SAND-81-8220) Avail: NTIS HC A04/MF A01

The applicability of several creep fatigue models to life prediction of boiler tubes in a solar central receiver (SCR) was evaluated. The SCR boiler tubes will experience compressive strain dwell loading with hold times up to 6 to 8 hours at temperatures where time dependent deformation will occur. The evaluation criteria include the ability of the model to account for mean stress effects and to be practical in the long life, small strain range regime. A correlation between maximum tensile stress and fatigue life is presented. Using this correlation, compressive dwell behavior is predicted based on continuous cycling data. The limits of this predictive scheme are addressed. DOE

N82-13530# Sandia Labs., Livermore, Calif.
SOLAR-CENTRAL-RECEIVER FUELS AND CHEMICALS Project Status Report, Oct. 1980 - Jun. 1981
R. W. Carling, J. D. Fish, L. G. Radosevich, and J. Vitko, Jr. Aug. 1981 22 p refs
(Contract DE-AC04-76DP-00789)
(DE82-000941; SAND-81-8232) Avail: NTIS HC A02/MF A01

Solar central receiver fuels and chemicals processes were studied. Ethane pyrolysis and steam reforming of methane were investigated in-depth in addition to coal gasification, oil shale retorting, and biomass flash pyrolysis. The study criteria, status of ongoing work, and future activities are described. DOE

N82-13531# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
SOLAR THERMAL ENERGY SYSTEMS Annual Technical Progress Report
Jul. 1981 157 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-1012)
(DE81-029296; DOE/CS-4042/2) Avail: NTIS HC A08/MF A01

Technical progress in the solar thermal energy systems program is summarized. Each project description includes a brief history, significant achievements, future activities, and a forecast of anticipated achievements. Point focus, central receiver and line focus technologies, research and advanced development components, materials, fuels and chemicals, and solar ponds are discussed. DOE

N82-13532# Sandia Labs., Albuquerque, N. Mex.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 2 FOR BEVERLY HIGH SCHOOL, BEVERLY, MASS.
Sep. 1981 21 p Prepared in cooperation with Boeing Computer Services Co., Seattle, Wash.
(Contract DE-AC04-76DP-00789)
(DE82-000811; SAND-81-7068-2) Avail: NTIS HC A02/MF A01

Performance data were listed and graphed for an intermediate photovoltaic system at a high school in Massachusetts for the month of July 1981. The energy production, incident solar energy and efficiency are given, and the daily energy production and efficiency, and energy production as a function of power and voltage are graphed. The output of the power conditioner, insolation, heating and cooling loads, temperature and wind data, and the number of freeze thaw cycles are presented. DOE

N82-13533# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DATA REPORT FOR THE NORTHEAST RESIDENTIAL EXPERIMENT STATION, JUNE 1981
M. C. Russell, P. Raghuraman, and J. J. Farrell Aug. 1981 14 p
(Contract DE-AC02-76ET-20279)
(DE82-000068; DOE/ET-20279/154) Avail: NTIS HC A02/MF A01

Five prototype residential photovoltaic systems consisting of a roof-mounted array, sized to meet at least 50 percent of the annual electrical demand of an energy-conserving house, and an enclosed structure to house the remainder of the photovoltaic equipment, test instrumentation, and work space are being monitored to provide authoritative and accurate information concerning system performance and the typical loads which they serve. One month of physical data is presented for each system as well as an hour-by-hour tabulation for an average day of the month. A common feature of all the systems is that excess solar-generated electric energy is fed back to the utility grid, thus eliminating the need for on-site storage. A.R.H.

N82-13534# Arizona State Univ., Tempe. Coll. of Engineering and Applied Sciences.
EXPERIMENTAL AND ANALYTICAL SYSTEMS STUDIES OF A COMBINED THERMAL-PHOTOVOLTAIC RESIDENTIAL SOLAR SYSTEM Technical Status Report, 1 Jan. - 29 Feb. 1980
Byard D. Wood 1980 10 p
(Contract DE-AC03-79CS-30203)
(DE81-029539; DOE/CS-303203/T5; TSR-3) Avail: NTIS HC A02/MF A01

A combined thermal photovoltaic residential solar system was examined. The reported technical progress includes: testing of the corrosion resistance of a turbine flow meter and parametric studies using computerized simulation of a combined thermal photovoltaic concentrating collector, thermal storage tank, absorption air conditioner with auxiliary heater, and a load. Test facility work, including data processing equipment and a cooling load simulator, is reported. DOE

N82-13535# Pacific Northwest Lab., Richland, Wash.
TECHNOLOGY ASSESSMENT OF SOLAR ENERGY SYSTEMS: AVAILABILITY AND IMPACTS OF WOODY BIOMASS UTILIZATION IN THE PACIFIC NORTHWEST
W. J. Hopp, A. D. Chockie, and K. J. Allwine Sep. 1981 57 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000705; PNL-3933) Avail: NTIS HC A04/MF A01

The biomass resource base in the Northwest were estimated. Scenarios and a preliminary analysis in the collection and use of forest residues as an energy resource are presented. Four issues that may serve to constrain the total amount of wood residues available for use as fuel are reviewed. DOE

N82-13536# Oak Ridge National Lab., Tenn. Energy Div.
BUILDING A CONSENSUS ABOUT ENERGY TECHNOLOGIES
T. J. Wilbanks Sep. 1981 12 p refs
(Contract W-7405-eng-26)
(DE82-000501; ORNL-5784) Avail: NTIS HC A02/MF A01

The making and sustaining of major energy policy decisions are considered. The major policy alternatives for making energy decision-making more effective are outlined. The focus is on relatively large decisions about energy technologies. The policy alternatives are characterized as being either focused on technology or on social action. Technology focused options include technology choices and improvements. Social action focused options include information, incentives, legitimacy, and institutional changes. But it is clear that they pose several basic philosophical questions, such as whether to base decisions on strong central leadership or on broad consensus formation. And it is clear that the options vary in being best suited for business as usual situations or emergency decision making situations. DOE

N82-13537# Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
TECHNIQUES FOR ENERGY CONSERVATION IN AC MOTOR-DRIVEN SYSTEMS Final Report
N. Mohan Sep. 1981 169 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1201-13)
(DE82-900356; EPRI-EM-2037) Avail: NTIS HC A08/MF A01

Techniques for energy conservation of reducing losses in ac motor driven systems were compared. The impact on electric utility system as a harmonics, power factor of operation, and Electro Magnetic Interference (EMI) is considered. The techniques evaluated are: (1) the NASA Power Factor Controller, a simple device for reducing power losses in lightly loaded ac motors; (2) wanless motor modification, a scheme of reconnecting motor windings with capacitors in series, to improve the motor efficiencies under all loading conditions; (3) conventional variable frequency solid state inverters which control the speed of ac motors by producing adjustable frequency ac voltage; and (4) frequency drives and schemes including cycloconverters, slip recovery scheme, Exxon Alternating Current Synthesizer, Venturini conversion technique, permanent magnet synchronous motors, and the Phase Liner device. DOE

N82-13538# Oak Ridge Associated Universities, Tenn. Labor and Policy Studies Program.
BIOMASS ENERGY SYSTEMS: DESCRIPTIONS AND EMPLOYMENT REQUIREMENTS FOR TYPICAL OPERATIONS
S. E. Bell and Joanna R. Little Sep. 1981 90 p
(Contract DE-AC05-76OR-00033)
(DE82-000236; ORAU-185) Avail: NTIS HC A05/MF A01

Operations related to biomass energy feasibility studies, and expert opinion which as the basis for the typical facility description and employment estimates are reported. Biomass energy facilities are small by comparison to other energy sector operations, they have a sizable impacts on the communities and regions in which they are located. The employment and earnings generated during construction, operation, and maintenance provide an important stimulus to local economies. The facility descriptions estimated employment and earnings implications provide a first approximation of what is expected as the use of biomass energy systems increases. DOE

N82-13539# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
NEW AND RENEWABLE ENERGY IN THE UNITED STATES OF AMERICA
Jun. 1981 115 p To be presented at the 1981 United Nations Conf. on New and Renewable Sources of Energy Sponsored in part by the State Dept.
(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178)
(DE81-030887; DOE/S-00012) Avail: NTIS HC A06/MF A01

The current technical and economic status of technologies and with and expectations for new and renewable energy sources in the United States are described. The roles of the public and private sectors in developing and using these energy sources are outlined. Specific technologies discussed are: low, intermediate, and high temperature solar collectors; biomass, wind, and ocean energy systems; hydropower; geothermal systems; oil shale; and tar sands. DOE

N82-13540# Midwest Research Inst., Golden, Colo.
DEVELOPMENT OF HIGH-EFFICIENCY CASCADE SOLAR CELLS Annual Report, Jul. 1980 - Jun. 1981
M. L. Timmons, S. M. Bedair, J. A. Hutchby, J. R. Hauser, and M. Simons Jul. 1981 89 p refs Prepared in cooperation with Research Triangle Inst., Research Triangle Park, N.C. and North Carolina State Univ., Raleigh
(Contract DE-AC02-77CH-00178)
(DE81-029633; SERI/PR-8136-1-T5) Avail: NTIS HC A05/MF A01

Two junction cascade solar cells in two different semiconductor mateials systems: AlGaAs/GaAs and AlGaAsSb/GaAsSb are developed. Liquid phase epitaxy is used to fabricate experimental cascade cells in both of these materials systems. Organometallic/chemical vapor deposition growth technology is studied. DOE

N82-13541# Dynatech Corp., Cambridge, Mass.
BIOMETHANATION OF BIOMASS PYROLYSIS GASES Final Report
C. A. Tracy and E. Ashare Aug. 1981 130 p
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-000238; SERI/TR-98356-1) Avail: NTIS HC A07/MF A01

The development of the biological methanation process and conditions for maximum performane were studied. Gasification processes have the potential to produce a synthesis gas from biomass. The advantage of such processes is that all organic components of the biomass may be converted to synthesis gas. However, this low Btu value gas is of limited use as a fuel gas. To convert the synthesis gas into pipeline qulity methane, a methanation process is necessary. A more economical alternative to catalytic methanation at high temperature and pressure is the utilization of a biological system to carry out the conversion of biomass pyrolysis gases to methane. DOE

N82-13542# Arkansas Univ., Fayetteville. Dept. of Chemical Engineering.
ECONOMIC AND KINETIC STUDIES OF THE BIOLOGICAL PRODUCTION OF FARM ENERGY AND CHEMICALS FROM BIOMASS Annual Progress Report, Mar. 1979 - Aug. 1980
J. L. Gaddy Aug. 1981 119 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-000044; SERI/TR-98020-1) Avail: NTIS HC A06/MF A01

The technical and economic feasibility of producing farm energy from cellulosic residues is investigated. The system has the capacity to produce 1300 CF of biogas and 180 kwh per day, using four parallel batch anaerobic digesters which are agitated mechanically and heated with waste heat from the generator. This system utilizes native grasses as the raw material. Laboratory reactors are operated to determine the proper innoculation ratio for starting batch cultures with cellulosic raw materials. Procedures for startup and operation of batch digestion systems are presented. Energy and economic analyses of the operation of the test unit are performed. The fertilizer potential of anaerobic digester sludge (from agricultural residues) is determined. The feasibility of separating the stages of anaerobic digestion, the production of acetic and propionic acids by the microorganism Propionibacterium acidi-propionici, the production of methane from acid hydrolyzates, and the kinetics of the continuous digestion of corn stover are studied. DOE

N82-13543# California Univ., Livermore. Lawrence Livermore Lab.
DESIGN AND TEST OF TWO-STEP SOLAR OIL SHALE RETORT
D. W. Gregg, R. W. Taylor, W. R. Aiman, and R. Ruiz 24 Sep. 1981 35 p refs
(Contract W-7405-eng-48)
(DE82-000964; UCID-19199) Avail: NTIS HC A03/MF A01

A design of a two step solar retort, the logic for the design, and the results from a preliminary test of the design at the White Sands Solar Furnace, New Mexico are presented. Solar retorting of oil shale is a technically feasible process where focused solar energy can displace fossil energy in the production of liquid fuels. The predicted result is a 10 to 40% improvement in the exportable fuel (oil + gas) production per ton of raw shale. Greater improvements are achieved with the lower grade shales where with nonsolar processes a larger fraction of the fuel content has to be used in the processing. DOE

N82-13544# Public Service Co. of Indiana, Plainfield.
COMPRESSED AIR ENERGY STORAGE: PRELIMINARY DESIGN AND SITE DEVELOPMENT PROGRAM IN AN AQUIFER. VOLUME 2: UTILITY SYSTEM PLANNING Final Report
31 Jul. 1981 112 p refs Sponsored in part by EPRI
(Contracts DE-AC02-78ET-29232; ET-78-C-01-2159; EPRI Proj. 1081-3)
(DE82-000466; DOE/ET-29232/T4-Vol-2) Avail: NTIS HC A06/MF A01

The performance of an aquifer compressed air energy storage system was studied. The benefits derived from the integration of a compressed air energy storage facility with a hypothetical electrical network are analyzed. Scenarios of 100 percent coal, 50 percent coal and 50 percent nuclear, and 100 percent nuclear base load capacity additions were examined. Favorable economics are indicated when compressed air energy storage is installed as an alternative to combustion turbine peaking capacity on a system with a significant amount of oil fired generation. DOE

N82-13545# Pau Univ. (France).
MICROEMULSIONS, EMULSIONS AND RELATED SYSTEMS: ENERGY APPLICATIONS [MICROEMULSIONS, EMULSIONS ET SYSTEMES CONNEXES: APPLICATIONS ENERGETIQUES]
1980 29 p refs In FRENCH Presented at Journee d'Etudes on Emulsions, Microemulsions et Systemes Connexes, Agents de Recuperation, de Stockage et de Transformation d'Energie, Pau, France, 25 Jan. 1980
Avail: NTIS HC A03/MF A01

Summaries of 16 lectures are presented. Topics include: oil recovery, thermodynamics of surface-active agents and microemulsions, interpretation of properties particular to alcohols in water-alcohol-oil ternary systems, phase diagrams and interfacial properties of the system water-dodecane-pentanol-sodium octlybenzene sulfonate, and modeling structural inversion in microemulsions. Other subjects are: numerical study of diphasic one and two dimensional flow in a porous medium, storage and transport of low temperature thermal energy as latent heat in dispersed systems, and the dynamics of nonNewtonian solutions. Author (ESA)

N82-13546# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
DEVELOPMENT AND OPTIMIZATION OF HYDROGEN STORAGE MATERIALS USING SURFACE ANALYTICAL TECHNIQUES [ENTWICKLUNG UND OPTIMIERUNG VON HYRIDSPEICHER-MATERIALIEN UNTER EINSATZ GRENZFLAECHENPHYSIKALISCHER ANALYSEVERFAHREN]
E. Hamer, W. Gerhard, C. Plog, and H. W. Schroeder Bonn Bundesministerium der Verteidigung 1980 96 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium

der Verteidigung
(BMVg-FBWT-80-6) Avail: NTIS HC A05/MF A01; DOK-ZENTBw, Bonn DM 30

The role of surface characteristics and properties in the hydrogen storage capability of various materials is studied and optimization proposals are formulated. The hydration properties of FeTi, LaNi5 and Mg/Ni-alloys are correlated with surface data from secondary ion mass spectroscopy and Auger electron spectroscopy as well as with a complementary volume characterization. The hydrogen dissociation catalysis at the surface provoked by oxygen-induced segregation is confirmed. The uptake of CO by the surface is investigated and the expected poisoning influence of contamination is discussed. Among the optimization proposals, the influence of palladium coating and selection through correlation between hydration properties and magnetic properties of the different materials were experimentally assessed. Author (ESA)

N82-13547# Horstmann G.m.b.H., Heiligenhaus (West Germany).
A CENTRAL MICROPROCESSOR CONTROLLED ELECTRICAL STORAGE HEATING SYSTEM Final Report
Hendrik Horstmann Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 26 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-182; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5,50

The use of a microprocessor to control the reloading of electrical storage heaters not only during the night, but whenever the electrical grid is cycled down, was tested. The test setup, used to control a total of about 10 MW installed storage heating in 96 dwellings, is described. It is demonstrated that additional consumers can be connected to the system without demand for more power stations. Author (ESA)

N82-13548# Swedish Inst. for Materials Testing, Boras. Lab. foer Ytskydd och Korrosion.
AGING AND CORROSION PROBLEMS WITH FLAT SOLAR ENERGY ABSORBERS. STUDY BASED UPON LITERATURE AND EXPERIMENT EXCHANGES [AALDRINGS-OCH KORROSIONS-PROBLEM HOS PLANA TERMISKA SOLFAANGARE. EN STUDIE BASERAD PAA LITTERATUR OCH ERFARENHETSUTBYTE]
Hans Wennerholm and Knut-Olof Lagerkvist 1979 72 p refs In SWEDISH
(SP-RAPP-1979/4) Avail: NTIS HC A04/MF A01

The construction and the causes of damage to solar energy absorbers are reviewed. Aging is due to ultraviolet radiation, temperature, humidity, oxygen, impurities in the air and other effects. A literature review is given about the constituent parts. The coverplate may be of glass, several types of plastics, fluoro-compounds, fiberglass, or silicones. For the absorbing surface, sintered chromium oxide, black nickel, black iron, copper oxide, manganese oxides, or selective coated alumimium are used. The insulation is often made of mineral wool or polyurethane resins. Inspection data are reported for nine solar flat-shaped energy absorbers. Most of them are used for the production of warm water and have been in use between three months and three years. Nearly all coverplates bore important deposits caused by condensation. Some of the nine aborbers show corrosion on the aborbing surface and/or on insulation. Author (ESA)

N82-13549# National Bureau of Standards, Washington, D.C.
PASSIVE/HYBRID SOLAR COMPONENTS: AN APPROACH TO STANDARD THERMAL TEST METHODS
M. E. McCabe, W. Ducas, M. J. Orloski, and K. N. Decorte Jul. 1981 87 p refs Sponsored in part by DOE
(PB81-227826; NBSIR-81-2300) Avail: NTIS HC A05/MF A01 CSCL 14B

A survey of passive solar products currently available or under development enabled the development of an interim classification system consisting of ten component classifications for purposes of thermal testing. A survey of currently available thermal test procedures was performed to assess the applicability of these test methods for passive/hybrid solar components. Existing test procedures that are useful for the direct gain fenestration system classification are identified, and recommendations are made for evaluation of these laboratory-based procedures by comparison with field-based testing of components under controlled interior conditions. Recommendations are also made for the development of new test procedures for passive/hybrid components classifications for which existing test methods are not applicable. GRA

N82-13550 Stanford Univ., Calif.
ELECTRICAL EFFECTS OF SLAG IN A DIFFUSE MODE MAGNETOHYDRODYNAMIC GENERATOR Ph.D. Thesis
Ron Michael Nelson 1981 181 p
Avail: Univ. Microfilms Order No. 8124118

A high temperature (1900 K) platinum-rhodium capped magnesia electrode was developed and successfully tested in a slagging MHD generator. Diffuse mode (non-arcing) operation of high temperature anodes was achieved at current densities up to 3 amps sq cm2. The problem of cathode shorting caused by the ionic nature of slag electrical conductivity (with iron as the major mobile species) was not substantially alleviated by high temperature operation. A computer code was developed which solves the governing electrical equations along with slag energy and thickness equations for a two dimensional, periodic electrode pair in a slagging MHD generator. The numerical results compare favorably with the experimental results including cases with shorted cathode walls. The computer model was used to assess the effects of slag and other operating parameters on generator performance. Dissert. Abstr.

N82-13551 Delaware Univ., Newark.
DESIGN PROCEDURES FOR A COMMERCIAL SCALE THERMAL EVAPORATION SYSTEM TO DEPOSIT CdS FOR SOLAR CELL MANUFACTURE Ph.D. Thesis
Richard Edward Rocheleau 1981 422 p
Avail: Univ. Microfilms Order No. 8123800

The detailed process and equipment design of a pilot scale system for continuous deposition of photovoltaic quality cadmium sulfide on a flexible moving substrate was carried out. The unit was built to the design specifications, and operated to demonstrate the feasibility of continuously depositing the semiconductor layer for solar cell manufacture. Model equations and constitutive flow equations describing the effusion of CdS from a source used for solar cell fabrication were verified by experiment. Dissert. Abstr.

N82-13552 Delaware Univ., Newark.
ELECTRON BEAM-INDUCED CURRENT (EBIC) MEASUREMENTS OF HEAT TREATED POLYCRYSTALLINE CUPROUS SULFIDE/CADIMUM SULFIDE SOLAR CELLS Ph.D. Thesis
Stephen Patrick Shea 1981 121 p
Avail: Univ. Microfilms Order No. 8123801

The EBIC response was measured after the samples were heat treated in hydrogen at 170 C for times between zero and 225 hours. The magnitude of the EBIC varied greatly, in some cases by as much as three orders of magnitude, across the active surface of the heat treated samples. Also, the EBIC was not a linear function of the electron beam power, as predicted by a simple theory of the experiment. These observations are explained by a model which accounts for the effects of copper diffusion from the CU2 sub s into the CdS during heat treatment. The rate of diffusion is found to be different in different areas of each sample, possibly because of a variation in the diffusion constant in grains with different crystallographic orientations. Models of both the EBIC and the dark, zero-bias capacitance of these devices are presented which support this interpretation of the data. Dissert. Abstr.

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-13553# Finnish Meteorological Inst., Helsinki.
SULFUR IN THE AIR IN THE CAPITAL (HELSINKI) METROPOLITAN AREA: ITASAT-PROJECT Final Report [PAEAEKAUPUNKISEUDUN ILMAN RIKKI ITASAT-PROJEKTIN LOPPURAPORTTI]

Markku Wallin, Eija Lumme, Markku Hietamaeki, and Erkki Rantakrans 1981 86 p refs In FINNISH
(RR-614.71) Avail: NTIS HC A05/MF A01

Methods for regionally producing and processing information about air quality, air protection measures, and determining alternative examples for air protection solutions are assessed. The sulfur dioxide content of air is predicted. The effects of various air protection measures and their cost (flue gas desulfurization, use of low sulfur heavy fuel oil) are compared. S.L.

N82-13554*# United Air Lines, Inc., San Francisco, Calif. Maintenance Operations Center.
AN AUTOMATED SYSTEM FOR GLOBAL ATMOSPHERIC SAMPLING USING B-747 AIRLINERS Final Report
Ken Q. Lew, Ulf R. C. Gustafsson, and Robert E. Johnson Oct. 1981 31 p refs
(Contract NAS3-17867)
(NASA-CR-165264; UAL-C-80-31-33) Avail: NTIS HC A03/MF A01 CSCL 13B

The global air sampling program utilizes commercial aircrafts in scheduled service to measure atmospheric constituents. A fully automated system designed for the 747 aircraft is described. Airline operational constraints and data and control subsystems are treated. The overall program management, system monitoring, and data retrieval from four aircraft in global service is described. E.A.K.

N82-13555# Naval Postgraduate School, Monterey, Calif. Dept. of Oceanography.
ECOLOGY AND DISTRIBUTION OF THE BENTHIC COMMUNITY ON THE MONTEREY BREAKWATER, MONTEREY, CALIFORNIA M.S. Thesis
Steven J. Busch Mar. 1981 130 p refs
(AD-A102047) Avail: NTIS HC A07/MF A01 CSCL 06/6

The Monterey breakwater was studied to determine an ecological baseline. The plants and animals occupying meter square quadrats along a cross sectional transect covering the breakwater and the adjacent mud bottom out to depths of 13 meters was surveyed qualitatively and quantitatively. It is found that the differences between the populations of the inner and outer parts of the breakwater is minor and those differences are in the relative abundance of only a few species. Author

N82-13556# Oak Ridge National Lab., Tenn. Chemical Technology Div.
CONCENTRATION OF ORGANIC COMPOUNDS IN WATER: A LITERATURE SURVEY
R. L. Jolley 1980 23 p refs Presented at the Workshop on Protocol Develop.: Criteria and Standards for Potable Reuse and Feasible Alternatives, Warrenton, Va., 29-31 Jul. 1980
(Contracts EPA-IAG-D7-01027; W-7405-eng-26)
(DE81-026517; CONF-8007111-1) Avail: NTIS HC A02/MF A01

Because of the large variety of chemical compounds present either naturally or as industrial contaminants is water samples, no single concentration method currently available is adequate for concentrating all organics in the water sample. Consequently, in an attempt to concentrate or isolate as much of the organic matter as possible, most researches have combined several methods that may become quite complex and technically difficult to achieve. Most of the current practical methods are summarized in a table and the utility of each method along with major advantage and disadvantages are presented. T.M.

N82-13557# Brigham Young Univ., Provo, Utah. Dept. of Chemistry.
PROTON-INDUCED X-RAY EMISSION ANALYSIS: A COMPLEMENT TO ANALYTICAL METHODS USED IN ENVIRONMENTAL STUDIES
N. F. Mangelson, D. J. Eatough, N. L. Eatough, L. D. Hansen, M. W. Hill, M. L. Lee, L. R. Phillips, M. E. Post, B. E. Richter, and J. F. Ryder 1980 5 p refs Presented at the 6th Conf. on the Appl. of Accelerators in Res. and Ind., Denton, Tex., 3-5 Nov. 1980 Submitted for publication
(Contract DE-AC02-80EV-10405)
(DE81-029012; DOE/EV-10405/4; CONF-801111-50) Avail: NTIS HC A02/MF A01

Two projects where particle induced X-ray emission was used in conjunction with titration calorimetry, ion chromatography, atomic absorption spectroscopy, gas chromatography/mass spectrometry, X-ray fluorescence spectroscopy are reported. Sulfur chemistry in a copper smelter was explored. Arsenic is a conservative tracer of the plume and is used for calculation of plume dilution. Calcium is characteristic of the background or ambient aerosol aerosol and is used to correct particulate data for the background contribution, was also studied. The scrubber water and particulate matter entrained in the scrubber water and in the product gas are analyzed by PIXE. It is found that scrubber water has low elemental concentrations. DOE

N82-13558# Oak Ridge Associated Universities, Tenn. Inst. for Energy Analysis.
RESPONSE OF THE OCEANS TO INCREASING ATMOSPHERIC CARBON DIOXIDE
C. F. Baes, Jr. Aug. 1981 72 p refs
(Contract DE-AC05-76OR-00033)
(DE81-028178; ORAU/IEA-81-6(M)) Avail: NTIS HC A04/MF A01

The relevant physical and chemical features of the ocean, the observational evidence of its response to increasing atmospheric carbon dioxide, and the uncertainties involved in modeling this response are considered. The deep oceans are near saturation with calcite. The pressure dependence of this solubility and ocean circulation produces calcite supersaturation of the upper ocean. This condition is maintained by photosynthesis and the biogenically controlled precipitation of calcium carbonate. After correcting the effects of biological processes on the composition of seawater, it is evident that the increasing carbon dioxide content of the atmosphere affects the distribution of carbon in the upper ocean. DOE

N82-13559# Mathtech, Inc., Princeton, N. J.
ENVIRONMENTAL IMPACTS OF ENERGY TRANSPORTATION Final Report
J. P. Price Electric Power Research Inst. Sep. 1981 243 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. TPS-78-661)
(DE82-900316; EPRI-EA-2039) Avail: NTIS HC A11/MF A01

The environmental impacts of fuel transportation for the electric utility industry are reviewed. The transportation of coal, oil, natural gas, liquified natural gas methanol and hydrogen are covered. The major impacts coal unit trains are: the creation physical barriers, potential accidents, and noise. It is indicated that more emphasis should be placed on the evaluation of the environmental socio-economic impacts of fuel transportation. DOE

N82-13560# Oak Ridge National Lab., Tenn.
CONTROL OF HYDROCARBONS AND CARBON MONOXIDE VIA CATALYTIC INCINERATION
C. H. Brown, Jr. and J. A. Klein Sep. 1981 113 p refs
(Contract W-7405-eng-26)
(DE82-000508; ORNL/TM-7787) Avail: NTIS HC A06/MF A01

Eight commercially available incineration catalysts are evaluated experimentally to assess their application to control hydrocarbon and carbon monoxide emissions in the tail gases from a Lurgi substitute natural gas plant, which is simulated using bottled gas mixtures. Catalysts are evaluated with respect to the effects of temperature, space velocity, and the presence of hydrogen sulfide and carbonyl sulfide on hydrocarbon and carbon monoxide conversion. The most effective catalysts are a precious metal based catalyst on a monolithic substrate and a nonprecious metal oxide deposited on a solid substrate formed into 3.2 mm diameter spheres. DOE

N82-13561# California Univ., Berkeley. Lawrence Berkeley Lab. Energy an Environment Div.
INFILTRATION AND INDOOR AIR QUALITY IN ENERGY EFFICIENT HOUSES IN EUGENE, OREGON
R. D. Lipschutz, J. R. Girman, J. E. Dickinson, J. R. Allen, and G. W. Traynor Aug. 1981 50 p refs
(Contract W-7405-eng-48)
(DE82-000971; LBL-12924) Avail: NTIS HC A03/MF A01

Infiltration rates and indoor pollutant levels in houses incorporating energy conserving measures which provide information about the effectiveness and health effects were measured. Twelve energy efficient houses were measured for effective leakage area using blower door fan pressurization. Air exchange rates were determined by tracer gas decay analysis. The measurements were used in conjunction with the LBL infiltration model to predict average annual and heating season infiltration rates. Indoor concentrations of radon, formaldehyde, and nitrogen dioxide were measured. DOE

N82-13562# Wisconsin Univ., Madison. Dept. of Bacteriology.
ENERGY GENERATION AND THE SULFUR-CARBON CYCLE Progress Report
1981 3 p refs
(Contract DE-AS02-76EV-02161)
(DE81-030949; DOE/EV-02161/T1) Avail: NTIS HC A02/MF A01

The dynamics of sulfate and sulfide water chemistry are compared. Approximately 50 percent of the reduced endogenous carbon (i.e. algal biomass) is mineralized via sulfate reduction and 50 percent via methanogenesis. Radioactive tracer studies with (S-35)O4(=) establish that most of the endogenous carbon mineralized via sulfate reduction occur in the surface sediments (1-4 cm). The quantitative importance of SO4(=) reduction in carbon mineralization (i.e., 50 percent of endogenous carbon is mineralized anaerobically via sulfate reduction) is confirmed. Sulfate reduction is not limited by in situ sulfate concentration (i.e., 1 mM) in suface sediments. S.L.

N82-13563# Meteorology Research, Inc., Santa Rosa, Calif.
AIRCRAFT DATA SUMMARIES FOR THE SURE INTENSIVES, VOLUME 6 Final Report
W. S. Keifer, D. L. Blumenthal, J. B. Tommerdahl, J. A. McDonald, R. B. Strong, and J. H. White Sep. 1981 184 p Sponsored by Electric Power Research Inst. Prepared in cooperation with Research Triangle Inst., Research Triangle Park, N.C.
(EPRI Proj. 862)
(DE82-900355; EPRI-EA-1910-Vol-6) Avail: NTIS HC A09/MF A01

As part of the EPRI sulfate regional experiment (SURE), six air quality sampling programs were conducted in the eastern United States using instrumented aircraft. The air quality and meteorological data was obtained during the October 1978 sampling. Sampling data are presented for all measured parameters. T.M.

N82-13564 Meteorology Research, Inc., Santa Rosa, Calif.
TABLES OF STATISTICAL SUMMARIES FOR THE SURE AIRCRAFT MEASUREMENTS Final Report
D. L. Blumenthal, W. S. Keifer, and J. A. McDonald Sep. 1981 213 p Sponsored by Electric Power Research Inst.
(EPRI Proj. 862)
(DE82-900317; EPRI-EA-1911) Avail: NTIS HC A10/MF A01

During the sulfate regional experiment (SURE), two aircraft simultaneously measured the vertical distribution of air pollutants and meteorological parameters for a total of six two-week periods in the vicinity of various SURE air monitoring stations in the notheast US. During all periods, the aircraft were based at least 200 km apart. In general, flights consisted of a set of three spirals between the surface (or minimum legal flight altitude) and 3000 m msl. For each vertical spiral, statistics were calculated seperately for those data above and below 1500 m msl. For each pollutant parameter and spiral segment, the mean value (anti x), the standard deviation (S), and the coefficient of variation (S/anti x) have been calculated. DOE

N82-13565# Los Alamos Scientific Lab., N. Mex.
ENVIRONMENTAL AND RADIOLOGICAL SAFETY STUDIES: INTERACTION OF (238) PuO2 HEAT SOURCES WITH TERRESTRIAL AND AQUATIC ENVIRONMENTS Quarterly Progress Report, 1 Jan. - 31 Mar. 1981
Glenn R. Waterbury (comp.) Sep. 1981 42 p refs
(Contract W-7405-eng-36)
(DE81-032019; LA-8932-PR) Avail: NTIS HC A03/MF A01

The effects on the heat source of terrestrial and aquatic environments to obtain data for design of even safer systems were studied. Data obtained in several ongoing experiments are presented and include data from environmental chamber experiments that simulate terrestrial conditions, experiments to measure PuO2 dissolution rates, soil column experiments to measure sorption of plutonium by soils, and aquatic experiments. DOE

N82-13566# Pacific Northwest Lab., Richland, Wash.
TREATMENT OF BIOMASS GASIFICATION WASTEWATERS USING REVERSE OSMOSIS
S. E. Petty, S. D. Eliason, and M. M. Laegreid Sep. 1981 44 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000696; PNL-4018) Avail: NTIS HC A03/MF A01

Reverse osmosis (RO) as a treatment technology for the removal of organics from biomass gasification wastewaters (BGW) generated from an experimental biomass gasifier was evaluated. Since RO is normally considered a complementary treatment technology, wastewaters were pretreated by biological or wet air oxidation (WAO) processes. This membrane is similar to the NS-100, a membrane which is effective in the separation of organics from solution. Seperation of organics from solution was determined by COD removal. Membrane degradation was observed when using full strength and WAO pretreated feeds, but not when using feeds that had undergone biological pretreatment. Color removal was computed for the majority of experiments completed. DOE

N82-13567# Pacific Northwest Lab., Richland, Wash.
TREATMENT OF BIOMASS-GASIFICATION WASTEWATERS BY WET-AIR OXIDATION
C. J. English Sep. 1981 30 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000935; PNL-4013) Avail: NTIS HC A03/MF A01

Production of synthetic natural gas from gasification of biomass results in the generation of a high strength wastewater that is difficult to treat by conventional means. The use of wet air oxidation (WAO) as a treatment method for wastewaters was studied. It is suggested that oxidation of biomass gasification wastewaters (BGW) organics by WAO occurs in a stepwise fashion with large organic molecules first beng hydrolyzed and then partially oxidized to low molecular weight intermediates. Complete oxidation of these intermediates is more difficult and most easily accomplished at high reaction temperatures. The best application of WAO to treatment of BGW appears to be as a pretreatment to biological treatment. DOE

N82-13568# Meteorology Research, Inc., Santa Rosa, Calif. Environmental Physics and Chemistry Program.
AIRCRAFT DATA SUMMARIES FOR THE SURE INTENSIVES, VOLUME 1 Final Report
D. L. Blumenthal Sep. 1981 160 p Sponsored by Electric Power Research Inst. Prepared in cooperation with Research Triangle Inst., Research Triangle Park, N. C.
(EPRI Proj. 862)
(DE82-900314; EPRI-EA-1910-Vol-1) Avail: NTIS HC A08/MF A01

Six air quality sampling programs in the eastern United States using instrumented aircraft were conducted as part of the sulfate regional experiment. The air quality and meteorological data were obtained from samples near the Rockport, Indiana and near the Duncan Falls, Ohio. Sampling data are presented for all measured parameters. DOE

N82-13569# Meteorology Research, Inc., Santa Rosa, Calif.
AIRCRAFT DATA SUMMARIES OF THE SURE INTENSIVES, VOLUME 4 Final Report
W. S. Keifer, D. L. Blumenthal, J. B. Tommerdahl, J. A. Anderson, J. A. McDonald, R. B. Strong, and J. H. White Sep. 1981 190 p Sponsored by Electric Power Research Inst. Prepared in cooperation with Research Triangle Inst., Research Triangle Park, N.C.
(EPRI Proj. RP-862)
(DE82-900311; EPRI-EA-1019-Vol-4) Avail: NTIS HC A09/MF A01

As part of the sulfate regional experient (SURE), six air quality sampling programs were conducted in the eastern United States using instrumented aircraft. The air quality and meteorological samples were taken near the Duncan Falls, Ohio sulfate regional experiment (SURE) Station and near the Research Triangle Park, North Carolina, SURE Station. Sampling data are presented for all measured parameters. DOE

N82-13570# Meteorology Research, Inc., Santa Rosa, Calif. Environmental Physics and Chemistry Program.
AIRCRAFT DATA SUMMARIES OF THE SURE INTENSIVES, VOLUME 5 Final Report
W. S. Keifer, D. L. Blumenthal, J. B. Tommerdahl, J. A. McDonald, R. B. Strong, and R. H. White Sep. 1981 275 p Sponsored by Electric Power Research Inst. Prepared in cooperation with Research Triangle Inst., Research Triangle Park, N.C.
(EPRI Proj. 862)
(DE82-900310; EPRI-EA-1910-Vol-5) Avail: NTIS HC A12/MF A01

Six air quality sampling programs in the eastern United States using instrumented aircraft were conducted. The air quality and meteorological data were obtained during the July 1978 Intensive sampled near the Duncan Falls, Ohio, and near Scranton, Pennsylvania. Aircrafts participated in a large regional scale sampling program during the last part of the July 1978 sampling period. DOE

N82-13571# Service de la Programmation de la Politique Scientifique, Brussels (Belgium).
NATIONAL RESEARCH AND DEVELOPMENT PROGRAM: ENVIRONMENTAL AIR. SUMMARY Final Report, 1976-1978 [PROGRAMME NATIONAL R-D: ENVIRONNEMENT AIR]
1979 40 p In FRENCH Original contains color illustrations
Avail: NTIS HC A03/MF A01

The air quality in and around Gent, Belgium, was studied. Results presented cover pollution transport, epidemiology (pulmonary and respiratory diseases), and measures of interior versus exterior contaminant concentrations. Modeling software for meteorology, emissions monitoring, methodology of environment monitoring, and the economic implications of the fight against air pollution are also discussed. Author (ESA)

N82-13572# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
ENVIRONMENTAL EFFECTS OF POLLUTANTS FROM COAL COMBUSTION. 1: THE FOUR CORNERS POWER PLANT, FARMINGTON, N.M.
R. F. Pueschel, Y. Mamane, C. C. VanValin, W. E. Cobb, F. P. Parungo, and D. L. Wellman Apr. 1981 86 p refs 2 Vol.
(Contract EPA-IAG-D5-E693)
(PB81-230427; NOAA-TM-ERL-OWRM-2; NOAA-81062606)
Avail: NTIS HC A05/MF A01 CSCL 13B

Cloud condensation nuclei (CCN) were formed in the plume of a power plant and CCN concentrations were found to increase with increasing distance of up to 80 km from the power plant. Condensation nuclei (CN) were also formed. The greatest concentrations of CN were found at distances of less than 40 km downwind, although the total CN population was greater at the greater distances. The size distribution measurements show a gradually increasing modal radius and increasing concentrations of the accumulation mode with increasing distances. Most particles are sulfates, and most larger particles are fly ash. It is suggested that there is a relationship between concentration of surface deposited sulfate and inverse particle diameter and that sulfur is adsorbed and oxidized on refractory fly ash in the high temperature zone of the boiler. GRA

N82-13573# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
ENVIRONMENTAL EFFECTS OF POLLUTANTS FROM COAL COMBUSTION. 2: THE COLSTRIP, MONTANA POWER PLANT
C. C. VanValin, R. F. Pueschel, and D. L. Wellman Apr. 1981 70 p refs 2 Vol.
(Contract EPA-IAG-D5-E693)
(PB81-234114; NOAA-TM-ERL-OWRM-3; NOAA-81062609)
Avail: NTIS HC A04/MF A01 CSCL 13B

Aerosol samples from the plume of a power plant were analyzed for the presence of sulfates and nitrates with the transmission electron microscope using the BaCl2 and Nitron tests. Plume profile were measured for width and thickness. Tracking of the plume of the Colstrip power plant plume with the aircraft provided plume trajectories that were influenced by the underlying terrain by being diverted by as much as 20 from the wind direction at plume altitude, or by being ducted along a valley. It is indicated that there is no difference in ice nucleus concentrations between plume and ambient atmosphere, and the latter shows an increase of an order of magnitude. GRA

N82-13574# Louisiana State Univ. and A&M Coll., Baton Rouge. Lab. for Wetland Soils and Sediments.
NITROGEN AND PHOSPHORUS REACTIONS IN OVERLAND FLOW OF WASTEWATER Final Report, Mar. 1975 - Jun. 1979
R. A. Khalid, I. C. R. Holford, M. N. Mixon, and W. H. Patrick, Jr. Aug. 1981 192 p refs
(Grant EPA-R-803612)
(PB81-239311; EPA-600/2-81-150) Avail: NTIS HC A09/MF A01 CSCL 13B

Biochemical transformations of labelled ammonium-nitrogen and nitrate-nitrogen resulting from the overland flow treatment of simulated wastewater were studied. The factors controlling the nitrification and denitrification are discussed and the ultimate fate of the nitrogen species are determined. The mechanisms of phoshorus sorption and desorption are investigated under both laboratory an overland flow conditions. GRA

N82-13575# Monsanto Research Corp., Dayton, Ohio.
HIGH ALTITUDE TESTING OF RESIDENTIAL WOOD-FIRED COMBUSTION EQUIPMENT Final Report
J. A. Peters and D. G. DeAngelis Jan. 1981 48 p refs
(Contract EPA-68-03-2550)
(PB81-226151; EPA-600/2-81-127) Avail: NTIS HC A03/MF A01 CSCL 13B

A high altitude sampling program was conducted which was compared to previously collected low altitude data. To determine whether emissions from operating a wood stove at high altitude differ from those at low altitude. Emission tests were conducted in the identical model stove using the same type of wood with the same moisture content, amount of wood charged, burning rate, air flow rate, and identical sampling intervals and port locations. Particulate emissions, carbon monoxide, and polycyclic organic matter were analyzed. GRA

N82-13576# Research Triangle Inst., Research Triangle Park, N. C.
ENVIRONMENTAL HAZARD RANKINGS OF POLLUTANTS GENERATED IN COAL GASIFICATION PROCESSES Final Report, Feb. - Apr. 1980
J. G. Cleland Jun. 1981 400 p refs
(Contract EPA-68-02-3170)
(PB81-231698; EPA-600/7-81-101) Avail: NTIS HC A17/MF A01 CSCL 13B

An evaluation and ranking of environmental hazards associated with coal gasification is reported. Applied chemical analytical data were provided by: (1) research with an experimental gasifier; and (2) sampling of four commercial gasification processes. Gas, liquid, tar, and solid streams were analyzed for 300 substances. Hazard potential was measured. Coals tested range from lignite to anthracite. Approximately 50 representative pollutants are emphasized and ranked according to relative environmental hazard potential. GRA

N82-13577 Pennsylvania State Univ., University Park.
AIRCRAFT MEASUREMENTS AND MATHEMATICAL MODELING OF THE REMOVAL OF GASEOUS AIR POLLUTANTS AT NATURAL AIR-LAND AND AIR-WATER INTERFACES Ph.D. Thesis
Anthony Joseph DeCaria 1981 444 p
Avail: Univ. Microfilms Order No. 8120415

Natural removal mechanisms play an important role in determining the ultimate fate of gaseous air pollutants emitted into the Earth's atmosphere. One of the more important natural removal mechanisms is absorption at the Earth's surface. Absorption at the Earth's surface was investigated by field measurements, theoretical developments, and comparative interpretation of the measurements and mathematical models. The field program consisted of aircraft measurements of the concentration profiles of SO2 in a plume from a coal-fired power plant on the southern shore at Lake Erie. The measurements were restricted to 20 kilometers from the source. These measurements were conducted in an attempt to differentiate removal at air-land and air-water interfaces. There were no apparent differences in measured concentration profiles obtained over land when compared with profiles obtained over water.

Dissert. Abstr.

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation*.

N82-13578 West Virginia Univ., Morgantown.
PYROLYTIC CHARACTERIZATION OF THE ORGANIC MATTER IN SELECTED COALS AND IN THE DEVONIAN SHALES OF SOUTHERN WEST VIRGINIA Ph.D. Thesis
Peter Alexander Kelley 1980 275 p
Avail: Univ. Microfilms Order No. 8123953

Selected whole coal samples from the coal sequence in West Virginia and shale samples of the Devonian black shales collected throughout southern West Virginia were subjected to pyrolytic analysis. Pyrograms characteristically showed two main groups of peaks, the first group of peaks representing the volume of hydrocarbons already present in the samples which are volatilized during the heating interval 40 C to 405 C, while the second group of peaks represents the hydrocarbons and related compounds generated during the 405 C to 700 C interval. All coal pyrograms gave a maximum in the pyrolysis curve which occurred in 400 C to 600 C temperature range. The degree of maturation of the organics in the Devonian shale samples was evaluated using the temperature of the maximum hydrocarbon generation during pyrolysis from 405 C to 700 C and the transformation ratio. The peak area units and relative values were used to evaluate the organic richness genetic potential, and hydrocarbon proportions in the Devonian shale samples.

Dissert. Abstr.

N82-13579 California Univ., Los Angeles.
THE TRACE METAL STRATIGRAPHY AND RECENT SEDIMENTARY HISTORY OF ANTHROGENOUS PARTICULATES ON THE SAN PEDRO SHELF, CALIFORNIA Ph.D. Thesis
Kenneth Norman Kettenring, Jr. 1981 173 p
Avail: Univ. Microfilms Order No. 8122820

The County of Los Angeles operates a sewage outfall on the western San Pedro Shelf, with the discharge at 60 meters depth and approximately 2.5 kilometers off White's Point. The outfall provides a point source of metal rich organic debris that is deposited on the shelf in an elongate field running northwest and southeast from the discharger. There are two conflicting hypotheses concerning the fate of outfall particulates and associated elements. The first hypothesis is that more than 60% of the particulates remain on the shelf, but that some of the metals are remobilized after deposition. The second hypothesis is that only a small fraction (less than 1% of the organic carbon) of the particulates is retained on the shelf, and that there is no remobilization. The present study strongly supports the first hypothesis. Sediment samples were collected along the 60 meter contour northwest of the outfall using a box-corer with 29.8 x 20.8 x 61 cm. boxes. Each box was subcored, and the subcores were frozen, cut into 1 cm. segments, and freeze-dried. Concentrations of carbon, copper, cadmium, chromium, nickel, zinc, and lead were measured. Dissert. Abstr.

N82-13580 South Carolina Univ., Columbia.
A DEPOSITIONAL MODEL FOR MAJOR COAL SEAMS IN THE ROCK SPRINGS FORMATION, UPPER CRETACEOUS, SOUTHWEST WYOMING Ph.D. Thesis
Raymond Allen Levey 1981 585 p
Avail: Univ. Microfilms Order No. 8123428

Data from coal exploration drill holes, measured sections, and deep mine maps, in conjunction with cursory examination of oil and gas logs and seismic sections, were used to reconstruct the depositional settings of the Rock Springs Formation in southwestern Wyoming. Depositional regression represented by extensive sheet sandstones are inferred to be delta-front deposits which reflect the cuspate to arcuate geometry of wave-dominated delta deposits. Coal seam discontinuities, represented by areas of reduced coal thickness or by wedges of sediment producing multiple benches or rider coals, are caused by sediment influx from distributary channels, fluvial channels, and splays. Correlation of several members of the Rock Springs Formation is extended along the outcrop and into the subsurface on the west flank, north rim, and northeast flank of the Rock Springs uplift. Analysis of the geometries and spatial distributions of coal seams was used to develop a detailed geologic model. Dissert. Abstr.

N82-13581 California Univ., Santa Cruz.
RECURRENCE INTERVALS AND RECENCY OF FAULTING ALONG THE SAN GREGORIO FAULT ZONE, SAN MATEO COUNTY, CALIFORNIA Ph.D. Thesis
Gerald Eric Weber 1980 277 p
Avail: Univ. Microfilms Order No. 8123250

The San Gregorio fault branches off of the San Andreas fault zone at Bolinas Lagoon, north of the Golden Gate extending in a south-southeasterly direction to the vicinity of Point Sur where it may possibly connect with the Sur-Nacimiento fault that in turn connects with the San, Simeon, and Hosgri faults forming a 450 km long coastal boundary fault. Near Point Ano Nuevo in San Mateo County the numerous faults form a zone greater than 3 km in width. Analysis of the Pleistocene faulting near Point Ano Nuevo indicates that the San Gregorio fault zone consists of two primary fault strands, the Frijoles fault and Coastways fault, and numerous small secondary and branch faults. It is suggested tht 240-280 moderate to large faulting events have occurred along the San Gregorio during the past 105,000 years. The recurrence interval for 7.0-7.5 magnitude earthquakes is, therefore, between 325-440 years, a recurrence interval tht compares favorably with the recurrence interval determined from the long term slip rate. Dissert. Abstr.

N82-13582 Northwestern Univ., Evanston, Ill.
THERMAL CONTRACTION AND FLEXURE OF INTRACRATONIC BASINS: A THREE DIMENSIONAL STUDY OF THE MICHIGAN BASIN Ph.D. Thesis
Jeffrey Allen Nunn 1981 363 p
Avail: Univ. Microfilms Order No. 8124965

Surface cooling of heated continental crust imposes a load on the lithosphere which subsides as the basement rocks contract. Accumulation of sediments in the resulting depression forms a sedimentary basin. Studies of the geometry of sedimentary basins with horizontal dimensions of a few hundred kilometers suggests the lithosphere responds to loads by regional flexure of a strong elastic or viscoelastic upper lithosphere. Two and three dimensional models for flexure of the lithosphere due to thermal contraction were applied to the Michigan basin. Lithostratigraphic data were used to quantitatively determine the contribution of the weight of sediment overburden to the subsidence. Thermal contraction load was calculated from the load necessary to produce the observed deflection of the lithosphere minus sediment load. Gravity effects of the models were computed and compared to the observed free air gravity anomalies. Dissert. Abstr.

N82-13583 Stanford Univ., Calif.
THE CRUSTAL STRUCTURE OF KILAUEA AND MAUNA LOA VOLCANOES, HAWAII, FROM SEISMIC REFRACTION AND GRAVITY DATA Ph.D. Thesis
John Justin Zucca 1981 136 p
Avail: Univ. Microfilms Order No. 8124182

Two 100-km-long, on-shore/off-shore seismic refraction profiles were established for Hawaii's two most active volcanoes, Mauna Loa and Kilauea. Combined analysis of these profiles along with the gravity data and teleseismic P-wave residuals for the profiles suggest a complicated crustal and upper mantle structure for the island. The total vertical displacement of the Moho is about 6 km beneath a point near the summit of Mauna Loa. The unreversed Pn velocity is 7.9 km/sec beneath the Kau-Puna coast and 8.2 km/sec beneath the Kona coast. Analysis of the profiles suggests that the volcanic rift zones of Mauna Loa and Kilauea are cored with high velocity, high density rocks (Vp about 6.9 km/sec, density about 2.9 g/cc), which reach to within a few kilometers of the surface of the island. The rift zones widen with depth and coalesce such that a large part of the volcnic pile is composed of high velocity and high density rift zone rock. Dissert. Abstr.

N82-13584 Stanford Univ., Calif.
SURFACE WAVES IN STRONG GROUND MOTION WITH APPLICATION TO OFFSHORE ENVIRONMENTS Ph.D. Thesis
Henry Jay Swanger 1981 155 p
Avail: Univ. Microfilms Order No. 8124164

Synthetic seismogram techniques are used to determine the characteristics of one to ten second period strong ground motion due to seismic surface waves. Of particlar interest is the response of offshore geologies, for which little or no strong ground motion data exist. Theoretical responses were computed for a continental shelf-like crustal model and an onshore crustal model and compared. The synthetic offshore motions have larger peak velocities, longer durations and larger spectral response. Over much of the period range of interest, the large response is independent of the site soil characteristics and due to the velocity gradients of the rock structure. This suggests that the use of average onshore response characteristics adjusted only for local soil conditions may not be adequate for specifying design characteristics offshore. Site specific studies accounting for both the local rock and soil properties are probably necessary.
Dissert. Abstr.

N82-13585 Polytechnic Inst. of New York, Brooklyn.
IONOSPHERIC SCINTILLATION Ph.D. Thesis
David Ming-Whei Wu 1981 223 p
Avail: Univ. Microfilms Order No. 8118903

A renomalization technique, employed in the spirit of the formal theory of scattering, is applied to the problem of ionospheric scintillation. The forward scattering approximation for wave propagation and a Markov approximation for ionospheric fluctuations are used to derive renomalized moment equations descriptive of the wave statistics. The scintillaton index for the case of a plane wave propagating thru the ionosphere is studied for the case of an arbitrary power spectrum of ionospheric fluctuations. An experimental power spectrum, corresponding to relative density fluctuations of about 20% as obtained from in situ measurements by the Atmospheric Explorer-E satellite, is used to calculate the corresponding index for night time equatorial scintillations. For an ionospheric slab model with a thickness of 200 Km and an altitude of 300 Km numerical calculations yield an almost saturated scintillation index of about 1.1.
Dissert. Abstr.

N82-13586 Delaware Univ., Newark.
TURBULENT TRANSFERS IN THE ATMOSPHERIC SURFACE LAYER UNDER VARIED STABILITY CONDITIONS. A LABORATORY STUDY Ph.D. Thesis
Yuen-Huang Lawrence Hsu 1981 176 p
Avail: Univ. Microfilms Order No. 8123798

Rates of momentum, heat, and mass transfers across the air-water interface under different stability conditions are measured in a wind wave tank. A complete instrumentation system is developed to measure mean and fluctuating quantities of wind velocity and air temperature, mean air humidity, and surface waves. A data processing system, including amplifiers, low and high bass filters and multipliers, is also developed. The mean quantities are processed in real time on a computer, which is also used to digitize and to process the turbulence data stored on magnetic tapes. Dissert. Abstr.

N82-13587 Northwestern Univ., Evanston, Ill.
PLASTIC FLOW AND UNSTABLE DEFORMATION OF GEOLOGICAL MATERIALS Ph.D. Thesis
James Frank Dorris 1981 125 p
Avai: Univ. Microfilms Order No. 8124675

A plasticity theory to describe the flow of granular materials was developed. The theory accounts for true stress triaxiality, pressure sensitivity, and dilatancy. The unstable deformation of a layer on a half space under the action of compressive forces parallel to the free surface are considered. The material properties considered for the layer and the half space are various combinations of elasticity an plasticity. Both the flow and the total deformation plasticity models are used. It is concluded that results are relevent to the folding of geological formations and crustal buckling under tectonic stresses. Dissert. Abstr.

N82-13588 Stanford Univ., Calif.
THEORY AND APPLICATION OF EXPERIMENTAL MODEL ANALYSIS IN EARTHQUAKE ENGINEERING Ph.D. Thesis
Piotr Daniel Moncarz 1981 279 p
Avail: Univ. Microfilms Order No. 8124110

The feasibility and limitations of small-scale model studies in earthquake engineering research and practice is considered with emphasis on dynamic modeling theory, a study of the mechanical properties of model materials, the development of suitable model construction techniques and an evaluation of the accuracy of prototype response prediction through model case studies on components and simple steel and reinforced concrete structures. It is demonstrated that model analysis can be used in many cases to obtain quantitative information on the seismic behavior of complex structures which cannot be analyzed confidently by conventional techniques. Methodologies for model testing and response evaluation are developed in the project and applications of model analysis in seismic response studies on various types of civil engineering structures (buildings, bridges, dams, etc.) are evaluated. Dissert. Abstr.

N82-13589 Institut d'Aeronomie Spatiale de Belgique, Brussels.
THE INTERNAL STRUCTURE OF THE MAGNETOPAUSE Ph.D. Thesis - Univ. Libre de Brussels [LA STRUCTURE INTERNE DE LA MAGNETOPAUSE]
M. Roth 1980 345 p refs In FRENCH; ENGLISH summary
(Aeronomica-Acta-A-221-1980) Avail: Issuing Activity

A kinetic model which describes the internal structure of the magnetopause is developed. Among other factors, the model takes into account the interplanetary magnetic field and the thermal motion of the particles. The structure of a tangential discontinuity in a multicomponent collisionless plasma is described. From consideration of the two-stream instabilities, a minimum magnetopause thickness is deduced. In a hydrogen plasma, this structure corresponds to an ionic layer in which the electric current is only the result of a displacement of ions. The tangential discontinuities observed at the magnetopause are likened to regions where magnetosheath and magnetospheric plasmas are interpenetrated. Quantitative results show that the variations of the different physical factors are analogous to those of satellite observations. More generally, the parameters characterizing this model make it appropriate to describe many types of tangential discontinuities which are likely to appear in other cosmic collisionless plasmas. Author (ESA)

N82-13590# Finnish Meteorological Inst., Helsinki.
MAGNETIC RESULTS FROM NURMIJAERVI GEOPHYSICAL OBSERVATORY 1980, NO. 22
1981 34 p
(ISBN-951-697-155-5; ISSN-0071-5212) Avail: NTIS HC A03/MF A01

Magnetic disturbance measurements are presented in tabular form. Variometers and proton magnetometers are used. S.L.

N82-13591# Finnish Meteorological Inst., Helsinki.
THREE-DIMENSIONAL MAPPING OF THE AURORA FROM DIGITIZED ALL-SKY PICTURES
Kari U. Kaila Apr. 1981 42 p refs
(Rept-550.388.8; TR-25; ISBN-95-697-148-22;
ISSN-0355-1733) Avail: NTIS HC A03/MF A01

A mathematical method of calculating the altitudes and geographical positions of discrete auroral forms is presented. It is based on pairs of simultaneous all-sky frames taken at two stations and requires knowledge of the positions, orientation errors and scale functions of the all-sky cameras. The corresponding points of the aurora need not be known. After the corrections, any point in the sky can be determined with an accuracy of about 0.2 deg. The accuracy that can be reached is of the order of 1 km in altitude and 2 km in position. Author

N82-13592*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL, VOLUME 1: OCTOBER TO APRIL 1979

M. Patrick McCormick Dec. 1981 78 p refs
(NASA-RP-1081) Avail: NTIS HC A05/MF A01 CSCL 04A

Weekly averages of Antarctic and Arctic stratnspheric aerosol data as well as corresponding temperature profiles for the time and place of each stratospheric aerosol measurement (SAM) II measurement during the first 6 months of satellite flight are presented. From the aerosol extinction profile data, contours of aerosol extinction as a function of altitude and longitude or time are plotted. Aerosol optical depths are calculated for each week. Polar stratospheric clouds at altitudes of about 22 km were observed during the Arctic winter at various times and locations. A representative sample of the first 6 months of data to be used in atmospheric and climatic studies is outlined.
E.A.K.

N82-13593*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MAGNETIC CLOUDS BETWEEN 2-4 AU: VOYAGER OBSERVATIONS
L. F. Burlaga and Kenneth W. Behannon Oct. 1981 26 p refs Submitted for publication
(NASA-TM-83849) Avail: NTIS HC A03/MF A01 CSCL 04A

Magnetic clouds were observed in the solar wind between 2-4 AU. It was shown that they are stable enough to persist without major changes out to such distances. It is estimated that the clouds expand at a speed of the order of 45 km/s. The average Alfven speed at the front and rear boundaries is 104 km/s, the expension speed is estimated to be nearly half of the Alfven speed, which is consistent with an earlier estimate of the expansion speed of clouds between the Sun and 1 AU. The magnetic field configuration is highly ordered and consistent with the passage of some kind of loop.
E.A.K.

N82-13594*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LARGE-SCALE VARIATIONS OF THE INTERPLANETARY MAGNETIC FIELD: VOYAGER 1 AND 2 OBSERVATIONS BETWEEN 1-5 AU
L. F. Burlaga, R. P. Lepping, K. W. Behannon, L. W. Klein (Computer Sciences Corp., Silver Spring, Md.), and F. M. Neubauer (Technische Univ., Brunswick) Oct. 1981 38 p refs Submitted for publication
(NASA-TM-83850) Avail: NTIS HC A03/MF A01 CSCL 04A

Observations by the Voyager 1 and 2 spacecraft of the interplanetary magnetic field between 1 and 5 AU were used to investigate the large scale structure of the IMF in a period of increasing solar activity. The Voyager spacecraft found notable deviations from the Parker axial model. These deviations are attributed both to temporal variations associated with increasing solar activity, and to the effects of fluctuations of the field in the radial direction. The amplitude of the latter fluctuations were found to be large relative to the magnitude of the radial field component itself beyond approximately 3 AU. Both Voyager 1 and Voyager 2 observed decreases with increasing heliocentric distance in the amplitude of transverse fluctuations in the averaged field strength (B) which are consistent with the presence of predominantly undamped Alfven waves in the solar wind, although and necessarily implying the presence of them. Fluctuations in the strength of B (relative to mean field strength) were found to be small in amplitude, with a RMS which is approximately one third of that for the transverse fluctuations and they are essentially independent of distance from the Sun.
M.G.

N82-13595*# Lunar and Planetary Inst., Houston, Tex.
PAPERS PRESENTED TO THE CONFERENCE ON THE PROCESSES OF PLANETARY RIFTING
1981 218 p refs Conf. held in Napa Valley, Calif., 3-5 Dec. 1981; sponsored by NASA, and NSF and American Geophysical Union
(LPI-CONTRIB-457; NASA-CR-165034) Avail: NTIS HC A10/MF A01 CSCL 08G

The basic problems of processes of planetary rifting are addressed from the following viewpoints: (1) speculation as to the origin and development of rifts; (2) rifts on other planets; (3) tectonics; (4) geology; (5) chemistry of the lithosphere; (6) physics of the lithosphere; and (7) resources associated with rifting. The state of ignorance on the subject and its remedy is debated.
A.R.H.

N82-13596*# Pennsylvania Univ., Philadelphia. Dept. of Geology and Planetary Science.
BASEMENT ROCKS OF THE MAIN INTERIOR BASINS OF THE MIDCONTINENT
Edward G. Lidiak [1981] 43 p refs
(Grant NsG-5270)
(NASA-CR-164935) HC A03/MF A01 CSCL 08G

The Precambrian framework of the Michigan, Illinois, Williston, Salina-Forest City, and Arkoma basins are discussed. The basins were categorized according to types that occur in the midcontinent and adjacent areas. Intracratonic basins were contrasted to foreland basins and aulacogens. The possible origins of intracratonic basins of the midcontinent are discussed.
R.J.F.

N82-13597# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Ice Engineering Research Branch.
METHOD FOR MEASURING BRASH ICE THICKNESS WITH IMPULSE RADAR
Carl R. Martinson and Arnold M. Dean, Jr. Jun. 1981 14 p refs
(Contract Z51100-00003)
(AD-A103738; CRREL-SR-81-11) Avail: NTIS HC A02/MF A01 CSCL 08/12

A subsurface impulse radar system on board a cutter was used to measure brash ice thickness in the Great Lakes. Manual ice thickness measurements were made in the test area to calibrate the radar data and to determine radar range settings. Radar collected data were recorded on magnetic tape and later played back to a graphic recorder for interpretation.
Author

N82-13598# Sierra Geophysics, Inc., Arcadia, Calif.
TIME DOMAIN WAVEFORM INVERSION OF SHORT-PERIOD P-WAVES FOR NUCLEAR EXPLOSION SOURCE TIME FUNCTIONS Final Report
Larry J. Ruff 9 Jan. 1981 46 p refs
(Contract F49620-79-C-0012)
(AD-A101123; SGI-R-80-034) Avail: NTIS HC A03/MF A01 CSCL 18/3

The source time parameters of underground nuclear explosions from the waveforms of short period teleseismic P-waves was estimated. Three source parameters, two that describe the source time function and one for the delay time of the (P)p are discussed. The effect on the waveforms of a decreased (P)p amplitude are considered. Another parameter which has a significant influence upon the observed waveforms is t (t = travel time/ Q(av)). The variation in the source parameter estimates due to a varying t are addressed.
Author

N82-13599# Hawaii Inst. of Geophysics, Honolulu.
PROGRESS IN THE GLOBAL STANDARIZATION OF GRAVITY: AN ANALYSIS OF THE WOOLLARD AND ROSE INTERNATIONAL GRAVITY VALUES
George P. Woollard and Valerie M. Godley Dec. 1980 156 p refs
(Contract N00014-75-C-0209; Grant NSF EAR-77-28552; NR Proj. 083-603)
(AD-A099459; HIG-80-2) Avail: NTIS HC A08/MF A01 CSCL 08/14

Standardization since the advent of high range gravimeters in 1948 was reviewed. The gravity base values given in 'International Gravity Measurements' are evaluated against the most recent set of standardized gravity base values. Adjunct IGSN 71 values are also used to give a more comprehensive worldwide comparison of values. The results for 787 comparisons of Woollard and Rose values and IGSN 71 values for the same sites indicate that, in general, there is no difference in gravity standard represented.
T.M.

N82-13600# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
MEASUREMENTS OF HEAVY IONS IN THE LOW ALTITUDE REGIONS OF THE OUTER ZONE Interim Report
J. B. Blake, J. F. Fennell, and D. Hovestadt (Max-Planck-Inst. fuer Physik und Astrophysik, Garching, West Germany) 15 Apr.

1981 35 p refs
(Contract F04701-80-C-0081)
(AD-A099453; TR-0081(6960-05)-8; SD-TR-81-25) Avail: NTIS HC A03/MF A01 CSCL 04/1

Measurements of heavy ions in the low altitude outer zone are discussed. Data were acquired with a heavy ion sensor aboard the S3-2 satellite. Equatorial measurements gave a large He/CNO ratio; clearly magnetospheric processes strongly discriminate against populating the low altitude regions with ions of increasing mass in the energy range of hundreds of keV. It is indicated that the low altitude CNO/He ratio is strongly time dependent.
Author

N82-13601# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
TWO-SATELLITE STUDY OF PROTON DRIFT ON QUIET DAYS
A. Korth, G. Kremser, and K. F. Fennell 30 Jul. 1981 15 p refs Prepared in cooperation with Max-Planck-Institut fuer Aeronomie, Datlenburg-Lindau
(Contract F04701-80-C-0081)
(AD-A104736; TR-0081(6960-05)-2; SD-TR-81-59) Avail: NTIS HC A02/MF A01 CSCL 04/1

The drift shells of protons in a model magnetic field were calculated. The radial gradient of the protons is combined with calculated drift shells to predict the flux levels at several local times for different pitch angles and energies. The field model is a three term Mead model, which is fit to the observed B-values at synchronous orbit. The predicted local time dependent fluxes match the observed fluxes, and correctly predict the pitch angle dependencies.
Author

N82-13602# Naval Research Lab., Washington, D. C. Atmospheric Physics Branch.
ATMOSPHERIC 222RN MEASUREMENTS AT SAN NICOLAS ISLAND DURING 1980 Interim Report
R. E. Larson and R. K. Jeck 13 Oct. 1981 10 p refs
(AD-A104802; NRL-MR-4649) Avail: NTIS HC A02/MF A01 CSCL 04/1

Radon concentration in the near surface air at San Nicolas Island, California, was measured. Unreported results for January and July 1980 are emphasized. For six of eight days during the January session the measured radon concentration was greater than 40 picocuries/cubic m corresponding to a continential air mass. Only the first day involved a maritime air mass with radon concentration less than about 6 picocuries/cubic m. In contrast to all the previous sessions, maritimes, air dominated the ten day session in July 1980, with radon concentrations generally less than about 5 picocuries/cubic m.
Author

N82-13603# Norwegian Defence Research Establishment, Kjeller.
HIGH LATITUDE MEASUREMENTS OF THE TOTAL ELECTRON CONTENT (TEC) USING THE FARADAY TECHNIQUE AND COMPARISONS WITH TEC ESTIMATES FROM NAVSTAR-GPS DATA Final Technical Report, Apr. 1980 - Apr. 1981
Kaare Akanes Jun. 1981 6 p refs
(Contract DAJA37-80-C-0193)
(AD-A103042) Avail: NTIS HC A02/MF A01 CSCL 04/1

A VHF electronic polarimeter for total electron content (TEC) measurements is in operation at Tromso Telemetry Station in Norway. The polarimeter is receiving data from the geostationary satellite SIRIO, which is situated almost due south of Tromso at 8 deg elevation. Except for loss of data during periods when the satellite was eclipsed by the Earth's shadow, continuous data coverage is maintained. Preliminary analysis of the obtained TEC data and similar data deduced from NAVSTAR-GPS measurements reveal agreement.
GRA

N82-13604# Research Inst. of National Defence, Stockholm (Sweden).
INTERNATIONAL SEISMOLOGICAL DATA CENTER. INPUT DATA FOR AN EXPERIMENTAL DATA BASE
Gunnel Berkeby Nov. 1980 269 p refs
(FOA-C-20380-T1) Avail: NTIS HC A13/MF A01

Temporary international seismological data center facilities were set up at Hagfors Laboratory, (1) to demonstrate one way of carrying out the main tasks of a global monitoring system which would be necessary to verify an international test ban treaty and (2) to facilitate experimental studies into the technical and scientific details of the functions which would be performed by such a center. The facilities include the compilation of an experimental data base. The input part of data base is listed together with information on the use of the observations in automatic analysis, either defining, or being associated with, events. The available parameters are divided into those obtained from short period and from long period instruments.
Author (ESA)

N82-13605# Bonn Univ. (West Germany). Inst. fuer Astrophysik und Extraterrestische Forschung.
TEMPERATURE AND DENSITY OF GEOCORONAL HELIUM DERIVED FROM A ROCKET-BORNE He RESONANCE CELL EXPERIMENT Final Report
Peter B. Seidl Bundesministerium fuer Forschung und Technologie Dec. 1980 99 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-80-015; ISSN-0170-1339) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20,80

The helium resonance radiation intensity of 58.4 nm was observed with a helium resonance cell photometer aboard a Black Brant 4b rocket during a daytime flight up to a height of 720 km. The height dependence of the optically thin part of resonance emission permits the deduction of the geocoronal helium temperature and density. A procedure is explained which allows the optically thin from the optically thick contribution to be distinguished and analyzes them separately. At 700 km the temperature found attains 1130 K and the density 1.35 X 10 to the 5/cucm. Whereas the temperature obtained is in reasonable agreement with current model values, the density is considerably lower than theoretically predicted. Author (ESA)

N82-13606# National Geodetic Survey, Rockville, Md.
REPORT OF SURVEY FOR MCDONALD OBSERVATORY, HARVARD RADIO ASTRONOMY STATION, AND VICINITY
William E. Carter and James E. Pettey May 1981 91 p refs
(PB81-234338; NOAA-TM-NOS-NGS-32; NOAA-81062603)
Avail: NTIS HC A05/MF A01 CSCL 08E

A special purpose three dimensional geodetic survey was conducted near Ft. Davis, Texas. The observing program included astronomic positions and azimuths, zenith distances, electromagnetic distance measurements, leveling, gravity measurements, Doppler satellite positioning, and a variety of ancillary measurements. Information on the methods employed in the collection, reduction, and analysis of the survey data, tabulations of the observational data, and numorical and interpretive results is reported.
GRA

N82-13607# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
ENVIRONMENTAL ASSESSMENT OF THE ALASKAN CONTINENTAL SHELF: ANNUAL REPORTS OF PRINCIPAL INVESTIGATORS FOR THE YEAR ENDING MARCH 1980. VOLUME 5: HAZARDS Annual Report
Feb. 1981 665 p refs Sponsored in part by the Bureau of Land Management
(PB81-225732; NOAA-81052107) Avail: NTIS HC A99/MF A01 CSCL 08G

Hazards caused by the environmental conditions are reported. Environmental pollution resulting from the development of oil and gas resources in Alaskan waters was investigated. T.M.

N82-13608 Northwestern Univ., Evanston, Ill.
THE EFFECTS OF ATMOSPHERIC TURBULENCE ON THE ATMOSPHERIC TRANSMITTANCE AT OPTICAL FREQUENCIES Ph.D. Thesis
Chii-Feng Ouyang 1981 162 p
Avail: Univ. Microfilms Order No. 8124972

A detailed treatment of optical wave propagation in the atmosphere using the extended Huygens-Fresnel principle and the theory of atmospheric turbulence is presented. The average intensity and deviation of intensity for ocean waves due to the turbulence effect was calculated. Spatially partially coherent sources were used. The effects of a finite aperture receiver are included. Starting with the time independent stochastic wave equation (the slow time dependence of the field fluctuations is suppressed by using Taylor's frozen in hypothesis), the second moment and fourth moment nutual coherence equation were derived using the Kolmogorov spectrum of turbulence. Intensity distribution and scintillation index was then found.Dissert. Abstr.

N82-13609 California Univ., Riverside.

COLLOIDAL PROPERTIES OF COAGULATED CALCIUM-MONTMORILLONITE SUSPENSIONS Ph.D. Thesis

Nancy Beatrice Ball 1981 145 p
Avail: Univ. Microfilms Order No. 8122834

Changes in clay particle shape, size and structure were studied as the concentration of calcium electrolyte in clay suspensions increased to 1 M and as the complexing capability of the anion increased. The viscosity turbidity and sedimentation rate of Ca montmorillonite suspensions containing CaCl2, (NO3)2 or Ca(ClO4)2 were measured. Chloride and nitrate anions were assumed to form the species, CaCl(+) and CaNO3(+) whereas the perchlorate anion was assumed to form calcium complex. The viscosities of the suspensions, measured using a capillary viscometer, were regressed on both clay and salt concentrations. The limiting viscosity number, or intrinsic viscosity, calculated from the regression equations is shown to be related to the axial ratio of the clay particles and the amount of occluded solution within the particles. Dissert. Abstr.

N82-13610 California Univ., Santa Cruz.

PETROLOGY AND GEOCHEMISTRY OF OPHIOLITE FRAGMENTS IN A TECTONIC MELANGE, KODIAK ISLANDS, ALASKA Ph.D. Thesis

Betsy Jo Beyer 1980 231 p
Avail: Univ. Microfilms Order No. 8123245

The results of a study of five small ultramafic and bodies in the Kodiak Islands, part of a belt of such rocks tectonically included within the Crestaceous Uyak Complex and correlative rocks of southern Alaska are presented. A pivotal aspect of this project was to determine whether these isolated fragments of a presumed ophiolite sequence might be shown to be related to each other in the absence of such definitive field evidence as is commonly found in continuous ophiolite sequences. Based on the strong similarities of their constituent rock types, the blocks of the Kodiak dismembered ophiolite were probably formed in the same or similar environments. Four of the five bodies contain nearly identical layered clinopyroxenites and dunites; two of these bodies also contain identical layered gabbronorites. Ferrogabbro, quartz gabbro, tonalite, and basaltic dikes are the major constituents of only one ophiolite fragment, but minor feldspathic wehrites occur in both this fragment and one other.
Dissert. Abstr.

N82-13611 Northwestern Univ., Evanston, Ill.

THE NITROGEN CYCLE AND HEAT BUDGET OF A SUBTROPICAL LAGOON, DEVILS HOLE, HARRINGTON SOUND, BERMUDA: IMPLICATIONS FOR NITROUS OXIDE PRODUCTION AND CONSUMPTION IN MARINE ENVIRONMENTS Ph.D. Thesis

Irving Foster Brown 1981 338 p
Avail: Univ. Microfilms Order No. 8124858

From May to September, 1978, the vertical and temporal patterns of ammonium, nitrite, nitrate, nitrous oxide, and oxygen concentrations were investigation during development of thermal stratification in the subtropical oligotrophic lagoon of oceanic salinity, Devil's Hole (32.33 deg N,64.70W). The objective of the study was to resolve the time-dependent response of processes governing the inorganic components of the marine nitrogen cycle to thermocline development and declining oxygen concentrations in a subthermocline region. During this period differential absorption of solar irradiance with depth together with wind-induced vertical mixing resulted in the partitioning of the water column into three regions: surface mixed layer (0m. 12 m depth), thermocline region (12 m - 20m), and subthermocline region (29 m- 24.5m). Dissert. Abstr.

N82-13612 Ohio State Univ., Columbus.

SIMULATION STUDIES ON THE COMPUTATION OF THE GRAVITY VECTOR IN SPACE FROM SURFACE DATA CONSIDERING THE TOPOGRAPHY OF THE EARTH Ph.D. Thesis

Kostas Evangelos Katsambalos 1981 146 p
Avail: Univ. Microfilms Order No. 8121810

Three approaches for the computation of the components of the gravity vector in space considering the topography of the Earth were investigated: (1) a numerical integration based on the appliction of Green's third identity; (2) the discrete dirac; and (3) the least-squares collocation. Under a spherical approximation, the surface of the Earth is assumed to be known through the elevations of its points above a reference sphere. The first technique requires as data gravity disturbances and disturbing potentials on the Earth's surface, while the other two techniques require as data surface gravity anomalies. The agreement between the rigorously computed vectors and those from the three techniques, is analyzed. It is indicated that in comparing the techniques with the classical approach (the Direct Integration Method), the consideration of the topography improves significantly the accuracy of the computations. Dissert. Abstr.

N82-13613 Missouri Univ. -Rolla.

AN INVESTIGATION OF THE NICKEL-COBALT OCCURRENCE IN THE SOUTHEAST MISSOURI MINING DISTRICT Ph.D. Thesis

David Ray Jessey 1981 230 p
Avail: Univ. Microfilms Order No. 8123585

A study of the occurrence of nickel and cobalt in the Southeast Missouri Mining District revealed several significant geochemical trends and mineralogical relationships. Regional geochemical studies indicate that the greatest concentration of nickel and cobalt occurs in the Fredericktown area. Mines in the Viburnum Trend also have significant concentrations of these metals. Studies of the Viburnum Trend have established that both nickel and cobalt decrease in concentration southward from the Magmont mine to the Brushy Creek mine, increase at the Fletcher mine, and decrease again at the Sweetwater mine. A detailed geochemical study of the Buick mine shows that this same decrease southward is more pronounced at the mine level and that copper trends very closely mimic those of nickel and cobalt. The north-south zoning is also substantiated by an observed decrease in silicification from north to south within the Magmont and Buick mines. Studies of the individual ore bodies reveal differences in metal zoning which indicate that they may not be contemporaneous. Nickel/cobalt ratios also show significant patterns. Dissert. Abstr.

N82-13614# South Carolina Univ., Columbia.

STRUCTURAL AND STRATIGRAPHIC ANALYSIS OF THE PALEOZOIC MURZUK AND GHADAMES BASINS, WESTERN LIBYA Ph.D. Thesis

Richard Mark Karasek 1981 164 p
Avail: Univ. Microfilms Order No. 8123422

The intracratonic basins in western Libya are characterized by extensional basement controlled faulting along northwest and northeast trends. The northwest southeast trending Tripoli-Soda, Ben Ghenma and Hasi Atshan subsurface arches were uplifted from Cambian through Devonian time. The anomalous west-southwest trending Gargaf Arch acted as a hinge line from Silurian through Devonian time, with consequent paleoslopes to the northwest (Ghadames Basin) and southeast (Murzuk Basin). Paleozoic detrital sediments are up to 1500 m thick in the Murzuk Basin and 2500 m thick in the Ghadames Basin. Five depositional sequences comprise transgressive-regressive cycles of deposition from parallic (coarse grained) to marine (fine-grained). Detailed environmental interpretation of the sequences is based on outcrop models for the Middle Devonian-Lower Carboniferous Aouinet Ouenine and Shatti Formations. Dissert. Abstr.

N82-13615 Emory Univ., Atlanta, Ga.

RATES AND MECHANISMS OF CHEMICAL WEATHERING IN AN ORGANIC ENVIRONMENT AT PANOLO MOUNTAIN, GEORGIA Ph.D. Thesis

Roy Arthur Nixon, III 1981 182 p
Avail: Univ. Microfilms Order No. 8110018

Chemical weathering consists of alteration of micas and feldspars to halloysite through intermediate gibbsite and allophane. Gibbsite is the first mineral produced from chemical weathering.

Allophane results from the reaction of gibbsite with dissolved silica. Analyses of more than 600 published water analyses were used to calculate a free energy of formation for allophane of -896.79 kcal/mole based on the kaolin formula and disregarding the effects of structural water. A trend surface plot of the data using least squares gave a surface which represents equilibrium, and has a minimum solubility of aluminum at pH 6.7. The Gibbs free energy of formation for the ion Al(OH)2(+) is calculated to be -216.8 kcal/mole. Dissert. Abstr.

N82-13616 Stanford Univ., Calif.
STUDIES OF NATURAL FRACTURES, FAULT ZONE PERMEABILITY, AND A PORE SPACE-PERMEABILITY MODEL Ph.D. Thesis
Donald Alan Seeburger 1981 243 p
Avail: Univ. Microfilms Order No. 8124147

The natural fracture distribution encountered in boreholes is presented. The distribution an orientation of fractures in these wells were determined using an ultrasonic borehole televiewer. The number of fractures observed was relatively independent of depth. The characteristics of fluid flow around fault zones are described. Faults are often described as conduits or barriers to fluid flow. In cases for which faults appear to act as both barriers and conduits, the required permeability is highly anisotropic. A network model of pore space from which permeability and bulk modulus can be calculated as a function of confining pressure is presented. Pores are modeled as straight conduits of circular, elliptic, or tapered section. Flow through each conduit is modeled using Poiseuille flow. Dissert. Abstr.

N82-13617 Stanford Univ., Calif.
TWO DETAILED SEISMIC STUDIES IN CENTRAL CALIFORNIA. PART 1: EARTHQUAKE CLUSTERING AND CRUSTAL STRUCTURE STUDIES OF THE SAN ANDREA FAULT NEAR SAN JUAN BAUTISTA. PART 2: SEISMIC VELOCITY STRUCTURE ALONG THE SIERRA FOOTHILLS NEAR OROVILLE, CALIFORNIA Ph.D. Thesis
Mary Ann Spieth 1981 174 p
Avail: Univ. Microfilms Order No. 8124157

A study was made of the spatial and temporal patterns of seismicity and the mechanics of faulting during a two-and-one-half year period along a 15 km segment of the San Andreas fault. Analysis of waveforms filtered from 0.5-5.0 Hz and precise relative locations from phase arrival times show that there are discrete patches on the fault which rupture repeatedly. First-motion focal mechanisms display a consistent pattern of right-lateral strike-slip motion. Analysis of traveltimes from a reversed active seismic refraction experiment in the western foothills of the Sierra Nevada reveals a localized layer of high velocity material within 10 km of the surface. This layer, a remnant of buried oceanic crust, has a five-fold increse in dip approximately 25 km south of the epicenter of the 1 August 1975 magnitude 5.7 earthquake near Oroville, California. Dissert. Abstr.

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-13618 North Carolina State Univ. at Raleigh.
AN EXPERIMENTAL STUDY OF TURBULENCE IN AN URBAN ENVIRONMENT Ph.D. Thesis
John Francis Clarke 1981 163 p
Avail: Univ. Microfilms Order No. 8121716

The structure of turbulence in the urban surface boundary layer is discussed. Wind and temperature fluctuations were measured with fast response sensors at a height of 31 m in four areas of varied land use in the St. Louis environs (a rural and three urban sites). The second moments of the fluctuations were computed for one hour time series and analyzed within the framework of Monin-Obukhov similarity theory (i.e., normalized by appropriate velocity and temperature scales). The results are discussed relative to observed land use features and calculated surface roughness lengths for each of the sites. Dissert. Abstr.

N82-13619 Northwestern Univ., Evanston, Ill.
APPLICATION OF BAYESIAN ANALYSIS FOR WIND ENERGY SITE EVALUATION Ph.D. Thesis
Harish Govinda Rao 1981 142 p
Avail: Univ. Microfilms Order No. 8124887

Extensive research had indicated that the wind speed is well modelled by the single-parameter Rayleigh distribution. The site mean wind speed is given a prior distribution obtained from historical National Weather Service data of sites in the region. The prior distribution is updated to a posterior each time observed data become available. The posterior distribution is combined with the Rayleigh distribution to obtain the Bayesian distribution of wind speed. This distribution can be used in conjunction with the turbine power characteristics of different machines to make rational decisions, based oh the expected maximum utility criterion, for selecting the best turbine for a given site or the best site for a given turbine. Dissert. Abstr.

N82-13620*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPARISON OF DATA INVERSION TECHNIQUES FOR REMOTELY SENSED WIDE-ANGLE OBSERVATIONS OF EARTH EMITTED RADIATION
Richard N. Green Dec. 1981 46 p refs
(NASA-TP-1924; L-14591) Avail: NTIS HC A03/MF A01 CSCL 04B

The shape factor, parameter estimation, and deconvolution data analysis techniques were applied to the same set of Earth emitted radiation measurements to determine the effects of different techniques on the estimated radiation field. All three techniques are defined and their assumptions, advantages, and disadvantages are discussed. Their results are compared globally, zonally, regionally, and on a spatial spectrum basis. The standard deviations of the regional differences in the derived radiant exitance varied from 7.4 W-m/2 to 13.5 W-m/2. A.R.H.

N82-13621*# FWG Associates, Inc., Tullahoma, Tenn.
FEASIBILITY STUDY OF A PROCEDURE TO DETECT AND WARN OF LOW LEVEL WIND SHEAR Final Report
Barry S. Turkel, Philip A. Kessel, and Walter Frost Washington NASA Nov. 1981 82 p refs
(Contract NAS8-33458)
(NASA-CR-3480; M-365) Avail: NTIS HC A05/MF A01 CSCL 04B

A Doppler radar system which provides an aircraft with advanced warning of longitudinal wind shear is described. This system uses a Doppler radar beamed along the glide slope linked with an on line microprocessor containing a two dimensional, three degree of freedom model of the motion of an aircraft including pilot/autopilot control. The Doppler measured longitudinal glide slope winds are entered into the aircraft motion model, and a simulated controlled aircraft trajectory is calculated. Several flight path deterioration parameters are calculated from the computed aircraft trajectory information. The aircraft trajectory program, pilot control models, and the flight path deterioration parameters are discussed. The performance of the computer model and a test pilot in a flight simulator through longitudinal and vertical wind fields characteristic of a thunderstorm wind field are compared. E.A.K.

N82-13622*# Systems Applications, Inc., San Rafael, Calif.
DEVELOPMENT OF AN INFRARED RADIATIVE HEATING MODEL Final Report
Robert W. Bergstrom and Leland C. Helmle Apr. 1979 53 p refs
(Contract NAS2-10019)
(NASA-CR-166272; SAI-EF79-56) Avail: NTIS HC A04/MF A01 CSCL 04B

Infrared radiative transfer solution algorithms used in global circulation models were assessed. Computation techniques applicable to the Ames circulation model are identified. Transmission properties of gaseous CO2, H2O, and O3 are gathered, and a computer program is developed, using the line parameter tape and Voight profile subroutine, which computes the transmission of CO2, H2O, and O3. A computer code designed to compute atmospheric cooling rates was developed. E.A.K.

N82-13623*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COMPENSATION FOR USE OF MONTHLY-AVERAGED WINDS IN NUMERICAL MODELING
Claire L. Parkinson Nov. 1981 95 p refs
(NASA-TM-83855) Avail: NTIS HC A05/MF A01 CSCL 04B

Ratios R of the monthly averaged wind speeds to the magnitudes of the monthly averaged wind vectors are presented over a 41 x 41 grid covering the southern Ocean and the Antarctic continent. The ratio is found to vary from 1 to over 1000, with an average value of 1.86. These ratios R are relevant for converting from sensible and latent heats calculated with mean monthly data to those calculated with 12 hourly data. The corresponding ratios alpha for wind stress, along with the angle deviations involved, are also presented over the same 41 x 41 grid. The values of alpha generally exceed those for R and average 2.66. Regions in zones of variable wind directions have larger R and alpha ratios, over the ice-covered portions of the southern Ocean averaging 2.74 and 4.35 for R and alpha respectively. Thus adjustments to compensate for the use of mean monthly wind velocities should be stronger for wind stress than for turbulent heats and stronger over ice covered regions than over regions with more persistent wind directions, e.g., those in the belt of mid-latitude westerlies. S.L.

N82-13624# Air Force Geophysics Lab., Hanscom AFB, Mass.
FIELD TESTS OF A SURFACE ICE ACCRETION MEASUREMENT SYSTEM Final Scientific Report
Paul Tattelman 23 Dec. 1980 23 p
(AF Proj. 6670)
(AD-A100282; AFGL-TR-81-0007; AFSG-435) Avail: NTIS HC A02/MF A01 CSCL 04/2

Rosemount ice detectors were installed at four New England locations to collect information on their response to icing near the Earth's surface. Data included, for each icing event, the recorded output of the ice detectors, the mass, thickness and physica properties of the ice on a control cylinder, and meteorological conditions pertinent to the field tests. Results indicated that the detector is excellent for objectively estimating icing amounts on a cylinder for in cloud icing on mountaintops. A method for making standardized observations of the mass and thickness of ice cylinders with varying diameters is presented Author

N82-13625# Air Force Geophysics Lab., Hanscom AFB, Mass. Optical Physics Div.
DMSP WATER VAPOR RADIANCES: A PRELIMINARY EVALUATION Scientific Interim Report
Francis R. Valovcin 6 Oct. 1980 30 p refs
(AD-A099305; AFGL-TR-80-0313; AFGL-AFSG-432) Avail: NTIS HC A03/MF A01 CSCL 04/2

Second stage hydralics (SSH) were analyzed. Middle and/or high troposheric cloudiness is determined by spectra radiances measured by the various water vapor channels. Clear or cloudy conditions determined the slope of the spectral radiance of only three SSH Channels. Many of the cloud free radiance/radiosonde sets are cloud contaminated. E.A.K.

N82-13626# Air Weather Service, Scott AFB, Ill.
FORECASTING SKILL
Kenneth E. German Jan. 1981 51 p refs
(AD-A099778; AD-E850057) Avail: NTIS HC A04/MF A01 CSCL 04/2

The accuracy of centrally produced prognoses improved throughout the past 20 years; however, several studies show negligible improvement in weather forecasting. Available data in more than 100 journal articles were reviewed to independently evaluate weather forecasting improvement. Overall forecasting skill improved for most weather elements; however, improvement was not obtained by all. A 'review' of other factors (education, experience, interest, and procedures) that might be important in determining forecasting skill shows that basic education and experience were achieved (2-3 months), the main factor contributing to forecasting skill is forecaster motivation. The AWS emphasis on accurate weather forecasting apparently is effective, and should be continued. Author

N82-13627# Pacific Northwest Lab., Richland, Wash.
NUMERICAL WIND-SPEED SIMULATION MODEL
J. V. Ramsdell, G. F. Athey, and M. Y. Ballinger Sep. 1981 88 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000956; PNL-3864) Avail: NTIS HC A05/MF A01

A stochastic model for simulating wind speed time series that can be used as an alternative to time series from representative locations is described. The model incorporates systematic seasonal variation of the mean wind, its standard deviation, and the correlation speeds. It also incorporates systematic diurnal variation of the mean speed and standard deviation. Model capabilities, are simulated and results of analysis of simulated and actual data are compared. DOE

N82-13628# National Severe Storms Lab., Norman, Okla.
SPRING PROGRAM SUMMARY, 1980
R. J. Doviak Apr. 1981 142 p refs
(PB81-234940; NOAA-TM-ERL-NSSL-91; NOAA-81052901) Avail: NTIS HC A07/MF A01 CSCL 04B

A program summary on severe storm data to inform data analysts is presented. Principal objectives of the 1980 observations are: (1) to emphasize coordination of storm electricity measurements; (2) to observe the prestorm environment with Doppler radars modified for this purpose; (3) to support data collection for FAA and NASA experiments on storm hazards to aircraft; and (4) to support the hail collection experiment. GRA

N82-13629# Water and Power Resources Service, Denver, Colo. Office of Atmospheric Resources Research.
PROJECT SKYWATER: FISCAL YEAR 1979 REPORT. ATMOSPHERIC RESOURCES RESEARCH PROGRAM Annual Progress Report
Mar. 1981 105 p refs
(PB81-234494) Avail: NTIS HC A06/MF A01 CSCL 04B

Project Skywater, the water and power resources service percipitation management program is summarized; the program's goals and scopes are outlined. Equipment developed in support of general atmospheric research is discussed. Project activities and summaries of individual contracts are reviewed. Contract summaries are included. Listings of contractor and in-house reports and papers published during the fiscal period and a glossary of pertinent terms are appended. GRA

N82-13630# Water and Power Resources Service, Denver, Colo.
THE SIERRA COOPERATIVE PILOT PROJECT: PRECIPITATION MANAGEMENT RESEARCH IN THE SIERRA NEVADA Status Report
Dec. 1980 69 p
(PB81-234452) Avail: NTIS HC A04/MF A01 CSCL 04B

Research, design, environmental, coordination, and public involvement activities of the Water and Power Resources Service SCPP (Sierra Cooperative Pilot Project) are reported. The SCPP is an investigation of the technical feasibility and social acceptability of winter cloud seeding in the Sierra Nevada to supplement the region's future water supply. The results of the 1979-80 winter field season and reviews research undertaken by the SCPP in previous seasons are explained. GRA

N82-13631# National Oceanic and Atmospheric Administration, Boulder, Colo.
GEOPHYSICAL MONITORING FOR CLIMATIC CHANGE, NUMBER 8: SUMMARY REPORT, 1979
Gary A. Herbert Dec. 1980 129 p refs
(PB81-233355; NOAA-81062615) Avail: NTIS HC A07/MF A01 CSCL 04B

Continuous measurement of CO2 and aerosol scattering at four wavelengths, using a nephelometer, began at the South Pole station. A filter collection system was installed at the Barrow station to make possible the determination of the mass of the carbonaceous aerosols. It is shown that graphic carbon makes up a significant part of the arctic haze, and because of its optical absorptivity, it may cause a significant contribution to the radiative energy budget. At the Mauna Loa Observatory a cooperative measurement program to obscure the chemical composition of aerosols was initiated. GRA

N82-13632# National Weather Service, Silver Spring, Md
NATIONAL WEATHER SERVICE PUBLIC FORECAST VERIFICATION Summary Report, Apr. 1973 - Mar. 1978
Duane S. Cooley, Frederick S. Zbar, Dean F. Dubofsky, and A. Kristine Campbell Mar. 1981 143 p refs
(PB81-231714; NOAA-TM-NWS-FCST-25; NOAA-81062605)
Avail: NTIS HC A07/MF A01 CSCL 04B

Forecasting methods of general interest and wide application are reported. Forecasts of temperature and precipitation improved during the 5 year period from 1973 to 1977. One notable exception occurred during 1977, when the percent correct for precipitation decreased to the 1975 level after rising sharply during 1976. GRA

N82-13633# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.
HAWAII MESOSCALE ENERGY AND CLIMATE PROJECT (HAMEC). 3: ATMOSPHERIC AEROSOL AND CLOUD MICROPHYSICS MEASUREMENTS
F. Parungo, C. Nagamoto, R. Schnell, I. Nolt, E. Nickerson, and W. Caldwell Mar. 1981 81 p refs
(PB81-231482; NOAA-81052910-Pt-3) Avail: NTIS HC A05/MF A01 CSCL 04B

Atmospheric aerosols and cloud microphysics over Hawaii using modern airborne instrumentation are investigated. Measurements of aerosol concentration, particle composition; cloud condensation nucleus and ice nucleus concentration; cloud droplet size distribution and cloud water chemistry are presented. GRA

N82-13634# National Weather Service, Honolulu, Hawaii.
SOME MEAN CHARACTERISTICS OF CENTRAL NORTH PACIFIC TROPICAL CYCLONES
Hans E. Rosendal Jun. 1981 18 p ref
(PB81-230492; NOAA-81062606; NOAA-NWS-TM-PR-23)
Avail: NTIS HC A02/MF A01 CSCL 04B

Ninety-nine tropical cyclone tracks traversing the Central Pacific Hurricane Center region during the period 1832-1979 were completed. Climatic data base with several mean characteristics of these cyclones were computed. Of the 99 listed cyclones, 81 occurred on the presatellite era before 1960. GRA

N82-13635# National Oceanic and Atmospheric Administration, Silver Spring, Md.
ATMOSPHERIC DISPERSION FORECASTS AT SELECTED LOCATIONS IN THE UNITED STATES
Roland R. Draxler Apr. 1981 17 p refs
(PB81-230443; NOAA-TM-ERL-ARL-100; NOAA-81062607)
Avail: NTIS HC A02/MF A01 CSCL 04B

Forecasts of atmospheric dispersion up to 48 hours after observation times are calculated by combining the techniques of estimating dispersion with NOAA numerical weather forecasts of wind direction, wind speed, cloud cover, and ceiling. The variables used to estimate dispersion are part of the routine forecast from the Techniques Development Laboratory's Model Output Statistics. GRA

N82-13636# National Weather Service, Salt Lake City, Utah.
ANNUAL DATA AND VERIFICATION TABULATION, EASTERN NORTH PACIFIC TROPICAL STORMS AND HURRICANES 1980
Emil B. Gunther et al May 1981 18 p refs
(PB81-230336; NOAA-TM-NWS-WR-165; NOAA-81052903)
Avail: NTIS HC A02/MF A01 CSCL 04B

Annual data on eastern North Pacific tropical cyclone activity are presented. Data are provided by the National Weather Service; the National Earth Satellite Service Field Station, San Francisco, California, and the Chief, Aerial Reconnaissance Coordination, All Hurricanes (CARCAH), Miami, Florida. A summary of 1980 eastern North Pacific tropical cyclone statistics is given in tabular form. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-13637*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
BIOLOGICAL AND PHYSICAL OCEANOGRAPHIC OBSERVATIONS PERTAINING TO THE TRAWL FISHERY IN A REGION OF PERSISTENT COASTAL UPWELLING
John T. Howe, David B. Gibson (Seeadler Co., Morgan Hill, Calif.), Travis O. Evans (Trawler Bountiful, Port of Avila, Calif.), Larry Breaker (National Earth Satellite Service, Redwood City, Calif.), Robert C. Wrigley, and William W. Broenkow (Moss Landing Marine Labs, Moss Landing, Calif.) Nov. 1981 19 p refs
(NASA-TM-81332; A-8745) Avail: NTIS HC A02/MF A01 CSCL 08A

An upwelling episode in the Point Sal region of the central California coast is examined by using data obtained by a data buoy. The episodes was interrupted by the abrupt abatement of the strong wind which promotes coastal upwelling. The mean hourly upwelling index is calculated to be higher than the 20 year mean monthly value. During 3 days of light wind commercial bottom trawl operations were possible. Shipboard estimates of chlorophyll content in surface waters during trawling show the high concentrations that are indicative of a rich biomass of phytoplankton, a result of the upwelling episode. Satellite imagery shows the extent of the upwelling water to be of the order of 100 km offshore; the result of many upwelling episodes. Shipboard echo sounder data show the presence of various delmersal species and of zooplakton; the latter graze on the phytoplankton in the upper euphotic layers. The fish catch data are recorded according to species for 2 days of trawling, and the catch per trawl hour is recorded. S.L.

N82-13638# Texas Univ. at Arlington. Applied Research Labs.
ACOUSTICAL PROPERTIES OF SEDIMENTS Annual Report, 1 Jan. - 31 Dec. 1980
Donald J. Shirley 11 May 1981 159 p refs
(Contract N00014-76-C-0117)
(AD-A103726; ARL-TR-81-20) Avail: NTIS HC A08/MF A01 CSCL 08/10

The in situ acoustic measuring system was configured to enable concurrent measurement of compressional wave velocity and attenuation, shear wave velocity and attenuation acoustic impedance, static shear strength, and corer acceleration. The recording instrument and transducers were successfully tested in the laboratory and were prepared for field testing. A laboratory experiment was concluded to test predictions of the analytical model. Viscosity of the pore fluid in an artificial sediment of spherical glass beads was varied by mixing various concentrations of glycerin with water. Results of the experiment indicate that predictions of the model do not match measured data. The updated electronic circuits and the software required for the microprocessor playback unit are provided. Author

N82-13639# SACLANT ASW Research Center, La Spezia (Italy).
THE SACLANTCEN OCEANOGRAPHIC DATA BASE. VOLUME 1: DESIGN CRITERIA AND DATA STRUCTURE AND CONTENT
Richard F. J. Winterburn 15 Jun. 1981 30 p refs
(AD-A103277; SACLANTCEN-SM-150-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 08/10

An oceanographic data base established at SACLANTCEN on a UNIVAC 1106 computer system is described. The design criteria used in setting up the data base, its structure and content, how data, were acquired either from outside institutions or from SACLANTCEN experiments are reformatted and entered are discussed. Data are accessed, interrogated, and display, including the plotting of charts with coastlines and of contoured data are described. Author

N82-13640# SACLANT ASW Research Center, La Spezia (Italy).
A REVIEW OF ONE-DIMENSIONAL OCEANIC MIXED-LAYER MODELS
Jon Moen 1 May 1981 50 p refs
(AD-A103279; SACLANTCEN-SR-47) Avail: NTIS HC A03/MF A01 CSCL 20/4

Available one dimensional mixed layer models are reviewed. A number of specific models, developed from a common set of basic equations, are discussed and compared. It is pointed out that no particular mechanism has emerged to fully explain observations of 'slab like' (vertically uniform) flow in the mixed layer and so, despite the use of slab flow in simplifying bulk model equations, its cause has not been properly recognized. The results of the differential models do not predict slab-like flow unless the wind subsides. Author

N82-13641# Naval Oceanographic Office, Bay St. Louis, Miss. Environmental Systems Div.

ICAPS OCEANOGRAPHIC DATA FOR THE INDIAN OCEAN Final Report

Dec. 1980 93 p refs

(AD-A103173; NOO-RP-32C) Avail: NTIS HC A05/MF A01 CSCL 08/10

The integrated command ASW prodiction system (ICAPS) oceanographic data files for the Indian Ocean are presented. Graphic displays provide an illustration of the historical data stored within the ICAPS data base. Depth, temperature and salinity values are shown on a split-depth scale providing a depiction of the near surface strucutre and a less detailed picture of the slowly varying deeper structure. The corresponding oceanograhic data for the Atlantic Ocean and Mediterranean Sea and Pacific Ocean are presented in companion publications. Author

N82-13642# Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology.

SURFACE SIGNS OF INTERNAL OCEAN DYNAMICS

Erik Mollo-Christensen 1980 8 p refs

(Contract N00014-80-C-0273)

(AD-A101380) Avail: NTIS HC A02/MF A01 CSCL 08/3

There are various processes internal to the ocean that can interact with the surface. The resulting interaction causes changes in the surface wave structure that may well be recognizable by remote sensing systems. Vertical motion occurs when a wind driven surface Ekman layer is set up. Such 'pumping' can also take place in deeper Ekman layers especially over sloping bottom surfaces. Internal waves, topographic waves, and current shear can also cause changes in the surface wave field. A combination of ship, buoy, and remote sensors like those aboard LANDSAT and Seasat, coupled with the output of modeling analyses, can immeasurably improve our knowledge of ocean dynamics. Author

N82-13643# Stockholm Univ. (Sweden). Dept. of Meteorology.

ON THE INADEQUACY OF ONE DIMENSIONAL OCEAN MODELS FOR THE GLOBAL CARBON CYCLE

Anders Bjoerkstroem 18 Feb. 1981 29 p refs

(CM-51) Avail: NTIS HC A03/MF A01

An attempt is made to estimate the free parameters in a model of the oceanic carbon cycle, using GEOSECS data. It turns out to be impossible to set the parameters in a way that is compatible with the observed distributions of carbon and oxygen simultaneously. The result indicates that it may not be possible for any horizontally homogeneous ocean model to depict the carbon cycle in a satisfactory way. A model where Antarctic water is treated separately is required. Author (ESA)

N82-13644# Florida Univ., Gainesville. Sea Grant College Program.

ARTIFICIAL REEFS: PROCEEDINGS OF A CONFERENCE

Donald Y. Aska, ed. Feb. 1981 240 p Conf. held at Daytona Beach, Fla., 13-15 Sep. 1979

(PB81-227779; FSG-R-41; NOAA-81052001; Rept-41) Avail: NTIS HC A11/MF A01 CSCL 08A

The conference dealt with a variety of perspectives on artificial reefs as an improvement on the natural habitat of fish, in various coastal areas. Subjects considered were: site selection, construction materials, economical and social aspects as well as planning and management for multiple use of such resources. Procedures for obtaining construction and use permits and relevant regulations are also given consideration. GRA

N82-13645 Delaware Univ., Newark.

THE PROPAGATION OF INERTIAL-INTERNAL WAVES IN COASTAL UPWELLING REGIONS Ph.D. Thesis

Walter Robertson Johnson 1981 311 p

Avail: Univ. Microfilms Order No. 8123817

It is hypothesized that near-inertial waves are responsible for propagation of significant amount of energy from the ocean surface mixed layer into the interior in coastal upwelling regions. It is suggested that these waves may impart some or all of their energy to other forms of oceanic motions, especially: mean flow at or near so-called critical surfaces, turbulent flow produced when the wave shear reduces the gradient Richardson number to less than a critical value, or turbulent flow produced through frictional dissipation at the shelf bottom. To investigate these effects, inertial-internal wave propagation was examined with ray calculations. The frequency and horizontal wave numbers were specified in the calculations, with the remainder of the propagation parameters, including vertical wave number, phase and group velocities calculated. Dissert. Abstr.

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-13646 Kansas State Univ., Manhattan.

ANALYTICAL DETECTION OF ORGANIC SPECIES BY MEANS OF LASER-INDUCED MULTIPHOTON IONIZATION Ph.D. Thesis

Richard Kenneth Simon, Jr. 1980 189 p

Avail: Univ. Microfilms Order No. 8122036

Multiphoton ionization (MP) is spectrometric technique which was developed for the the analysis of trace amounts of both atomic and molecules species. The methods is based on two or more photons being absorbed by the the analyte which results in the analyte being ionized. The intense photoexcitation of the analysis is achieved by focussing the output of a pulsed tunable dye laser in an ionization chamber. The ionization chamber serves as the analyte reservoir and allows detection of the resulting MP1 current pulse. The non-optical nature of the signal detection makes MP1 a novelspectroscopic technique: no optical collection, dispersion, and/or detection is required; scattered and stray light are irrelevant; vacuum ultraviolet spectroscopy in air possible without special optics. Dissert. Abstr.

N82-13647# Calspan Advanced Technology Center, Buffalo, N.Y.

MITIGATION OF BIOFOULING USING COATINGS Quarterly Progress Report

A. E. Meyer and R. W. King 22 Jun. 1981 13 p refs

(Contract DE-AC02-80ER-10766)

(DE81-027900; DOE/ER-10766/3; QPR-3) Avail: NTIS HC A02/MF A01

Progress is reported in a project in which the objectives are to evaluate benefits associated with control of the surface energetic properties of materials used in heat exchangers, and to identify preferred ranges of these surface conditions that minimize deposits of biological fouling known to deteriorate heat exchange efficiencis in seawater, brackish water and freshwater systems. The technical approach employed uses special diagnostic plates in novel flow cells where fluid flow conditions can be well-controlled, modifying the surface chemistry and surface energy of the plates with very thin coatings and examining the earliest events of biofouling caused by macromolecules and microbial organisms. Information is included on exposure experiments and results and heat exchange experiments. DOE

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-13648 Stanford Univ., Calif.

SUPERCONDUCTING MAGNETOMETRY FOR CARDIOVASCULAR STUDIES AND AN APPLICATION OF ADAPTIVE FILTERING Ph.D. Thesis

Mark Curtis Leifer 1981 174 p

Avail: Univ. Microfilms Order No. 8124101

Sensitive magnetic detectors utilizing Superconducting

Quantum interference Devices, studying the cardiovascular system were developed. The theory of magnetic detection of cardiac currents is discussed, and experimental data supporting the validity of the theory is presented. Measurements on both humans and dogs, in both healthy and diseased states, are presented using the technique, which is termed vector magnetocardiography. Performance of the actual device displays significantly improved sensitivity in this frequency range, and the ability to measure currents in intact, in vivo biological fibers. The theoretical operation of a digital self-optimizing filter is reviewed and a four-channel software implementation of the system is presented. The application of the adaptive filter to enhancement of geomagnetic signals for earthquake forecasting is discussed, and the adaptive filter is shown to outperform existing techniques in suppressing noise from geomagnetic records. Dissert. Abstr.

N82-13649# Armed Forces Radiobiology Research Inst., Bethesda, Md.

NEUROTRANSMITTER FUNCTION IN THE BASAL GANGLIA AFTER ACUTE AND CHRONIC ETHANOL TREATMENT

Walter A. Hunt Jul. 1981 10 p refs
(AD-A103744; AFRRI-SR81-19) Avail: NTIS HC A02/MF A01 CSCL 06/15

Acute and chronic administration of ethanol has multiple effects on several neurotransmitters in the basal ganglia. Dopamine is the transmitter predominantly affected. Acceleration of dopaminergic activity is observed at low doses of ethanol. However, at high doses the reverse is observed. During the ethanol withdrawal syndrome that develops after chronic treatment, dopaminergic responses are reduced, whether from presynaptic or postsynaptic origins. Ethanol induces a variety of alterations in neurotransmitter function as a result of its disruption of membrane structure and associated electrical properties. GRA

N82-13650# Naval Biodynamics Lab., New Orleans, La.

DETERMINATION OF EFFICIENT METHODS OF LIFT BY COMPARING TRAINED AND UNTRAINED MALE AND FEMALE LIFTERS Final Report

Richard H. Shannon 3 Dec. 1980 141 p refs
(AD-A100349; NBDL-M004) Avail: NTIS HC A07/MF A01 CSCL 06/14

The effects of sex and training variables during nonrepetitive, short duration lifts in the sagittal plane were analyzed. One half of each sex subsample was part of a lifting training program, while the other half was used as a control group. The effects of body movements by these subjects in the height ranges from the floor to the knuckle and the knuckle to the shoulder were ascertained with 10, 25, 40 pound weight loads. Muscular strain, stroboscopic photography to calculate differences in displacement time vectors, and the force platform to specify force changes at the feet were determined. The various statistical techniques applied were: factor analysis, regression analysis, analysis of variance, t-test and nonparametric statistics. The results are a five factor biomechanical model, regression equations predicting inertial forces at the hands, and significant differences between the untrained and trained conditions, and males and females. It is concluded that manual handling training programs are necessary in the work environment if women are expected to lift loads of approximately 40 pounds. Author

N82-13651# Australian Radiation Lab., Melbourne.

ABSORBED DOSE TO ACTIVE RED BONE MARROW FROM DIAGNOSTIC AND THERAPEUTIC USES OF RADIATION

S. B. Solomon and N. D. Morris Jun. 1980 34 p refs
(ARL-TR-021; ISSN-0157-1400) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

The method of calculation of the radiation doses to the active bone marrow from diagnostic radiography, fluoroscopy and radiotherapy is described. The bone marrow dose arising from radiological procedures Australia was determined as part of a survey of population doses. The results of the calculations are compared with the results of other models of bone marrow dose for a number of diagnostic X-ray procedures. DOE

N82-13652# Oak Ridge National Lab., Tenn.

HEALTH AND SAFETY RESEARCH DIVISION Progress Report, 1 Oct. 1979 - 31 Mar. 1981

Aug. 1981 109 p refs
(Contract W-7405-eng-26)
(DE81-026088; ORNL-5750) Avail: NTIS HC A06/MF A01

Progress in health and safety research is reported. A summary of the major fields covered includes: basic research in physical sciences, life sciences research and assessment, and multidisciplinary studies on the impact of alternative energy technology and policy options. E.A.K.

N82-13653# Ingenieurbuero fuer Ergonomie, Munich (West Germany).

INFLUENCE OF SINE, AND RANDOM, WHOLE-BODY VIBRATION ON VISUAL ACUITY [EINFLUSS SINUSFOERMIGER UND REGELLOSER GANZKOERPERSCHWINGUNGEN AUF DIE VISUELLE INFORMATIONSAUFNAHME]

Norbert May Bonn Bundesministerium der Verteidigung 1979 101 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-79-17) Avail: NTIS HC A06/MF A01; DOKZENTBw, Bonn DM 30

The far, visual acuity of people subjected to vertical whole-body vibration (different vibration types and loads) was tested. A total of 110 subjects of both sexes, either exposed to sine vibration in the range from 2 to 18 cycles/sec or to random vibrations in the same frequency range, participated. The rms accelerations on the heads of subjects were 0.17, 0.3 and 0.43 m/sec squared. The subjects sat erect on an uncushioned seat, mounted on a hydromechanical vibration apparatus. Results show that relative visual acuity diminishes with sine vibrations while increasing frequency and/or accelerations (from 6% minimum to 37.5 % maximum of visual acuity under static conditions). With random vibrations there is also an acuity decrease although smaller, while increasing the vibration frequency as well as with increasing acceleration load. Author (ESA)

N82-13654# Freie Univ., Berlin (West Germany). Physiologisches Inst.

THE MEASUREMENTS OF FLUID SHIFTS AND OF THE TISSUE COMPLIANCE ALONG BODY AXIS IN MAN Final Report

Karl Kirsch Bonn Bundesministerium fuer Forschung und Technologie Sep. 1980 41 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-80-011; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8,60

Tissue volume changes on different parts of the body were simultaneously measured by ultrasonic techniques in order to monitor the shift of fluid volumes along the body axis. Once fully established, the method could be used for measuring the shift of blood and interstitial fluid from the lower to the cephalic part of the body, occurring under zero-gravity conditions. Proof of principle tests were carried out under orthostatis, immersion and heat exposure conditions were confirmed by post mortem comparisons. By mounting the measuring probe in an airtight chamber, the tissue compliance C = dV/dP was also determined. The results found are consistent with previous investigations and with clinical tests. Application in space and as a circulation diagnostic method is advocated. Author (ESA)

N82-13655# Environmental Protection Agency, Washington, D.C. Dept. of Biology.

METABOLISM SUMMARIES OF SELECTED HALOGENATED ORGANIC COMPOUNDS IN HUMAN AND ENVIRONMENTAL MEDIA, A LITERATURE SURVEY: FIRST UPDATE Final Report

Syed M. Naqvi and Marion C. Blois Dec. 1980 44 p refs
(PB81-232811; EPA-560/13-79-018) Avail: NTIS HC A03/MF A01 CSCL 06T

Metabolism summaries as well as basic information on the physical properties of 19 halocarbons are presented. Molecular and structural formulas, the Chemical Astracts Registry number, accepted synomyns, molecular weight, boiling point, and vapor pressure are included. Information on the uptake and retention of the compound, its subsequent distribution and elimination patterns, the identification and observed concentrations of

metabolites, and the metabolic pathways involved is provided.
S.L.

N82-13656 California Univ., Los Angeles.
A MONITOR FOR NONINVASIVE ESTIMATION OF PULMONARY BLOOD FLOW Ph.D. Thesis
Luigi Arena 1981 224 p
Avail: Univ. Microfilms Order No. 8122798

The design and the evaluation of a digital based monitoring device implementing a technique for the noninvasive estimation of pulmonary perfusion are described. This technique proved reliable in preliminary off-line experiments, however many engineering questions must be resolved before this principle can be transformed into a clinically useful device. Three main aspects of this study were identified model simulation, development and test of the instrumentation and clinical experiments.
Dissert. Abstr.

N82-13657 Northeastern Univ., Boston, Mass.
LINGUISTIC AND HUMAN PERFORMANCE CONSIDERATIONS IN THE DESIGN OF AN ANTICIPATORY COMMUNICATION AID Ph.D. Thesis
Clinton David Gibler 1981 365 p
Avail: Univ. Microfilms Order No. 8124891

A communication aid is a device that assists a disabled person with the generation of messages. A scanning aid presents language elements (e.g., letters, words) in a sequential fashion to accommodate those whose disability does not permit the direct selection of language elements. Anticipatory methods utilize statistical characteristics of language to shorten the average sequential access time to each language element. The study is restricted to those aids having the capacity for English text generation. The research yielded two developments: a small, general purpose dictionary that accounts for a high percentage of a person's vocabulary; and a human performance model that accurately predicts communication rates for the transcription task, given basic human performance data about the user.
Dissert. Abstr.

N82-13658 Stanford Univ., Calif.
A SYSTEMS ANALYSIS OF THE MATURATION OF SLEEP USING A SEMI-MARKOV MODEL Ph.D. Thesis
Thomas Raymond Bowe 1981 122 p
Avail: Univ. Microfilms Order No. 8124040

An approach to analyze the sleep process in human infants is presented. In particular it formulates phase varying semi-Markov models for infants at 2, 4, 8, 20, 24, 36, and 52 weeks of age. The Bayesian estimation procedure employed allows the uncertainty in the estimated parameters to be quantitized. The parameters of the models represent the basic building blocks of the sleep process and can be used to predict any statistic of interest. The models were used to investigate the rhythmic nature of the sleep process. The concept that sleep develops a periodic tendency was mathematically investigated and defined.
Dissert. Abstr.

N82-13659 Syracuse Univ., N. Y.
DEPOSITION OF AEROSOL PARTICLES IN THE HUMAN RESPIRATORY TRACT Ph.D. Thesis
Shii-Pyng Shiah 1981 192 p
Avail: Univ. Microfilms Order No. 8123939

The dispersion and deposition of aerosol particles in human lungs are investigated. The development of a three dimensional airway model, the dispersion of half micrometer particles in the respiratory tract, and deposition of aerosol particles in the respiratory tract are studied. A model of the upper tracheobronchial tree is constructed to account for the three dimensional nature of the airway system. A mathematical model is developed for predicting the percentage of inhaled hygrocopic particles which deposit in each generation of the repeatedly bifurcating tubes in an airway tree. A theoretical model of aerosol dispersion in the human lungs is extended to the alveolated regions by considering the expansion and contraction of the alveoli. The percentage of inhaled paticles which deposit in each generation of tubes is calculated for all generations reached by the inhaled aerosols.
Dissert. Abstr.

N82-13660 Northwestern Univ., Evanston, Ill.
DYNAMIC MEASUREMENT OF HUMAN VERTICAL FUSIONAL RESPONSE Ph.D. Thesis
Arye Lipa Perlmutter 1981 88 p
Avail: Univ. Microfilms Order No. 8124975

The response was studied in order to explore the relationship between its sensory and motor components. Two SRI Double Purkinje Image Eyetrackers were used for binocular recordings of eye movements in response to the presentations of vertical disparities. The binocular coordination of vertical fusional responses were studied through the presentations of asymmetrical disparities as well as predictable and unpredictable symmetrical sinusoidal disparities. The motor response to asymmetrical disparity presentation is found to be incomplete, thus allowing for the existence of a significant sensory component. When ramp disparities were presented only the eye whose monocular image moved followed the stimulus closely while the other eye did not move or moved by a small amount.
Dissert. Abstr.

N82-13661 Stanford Univ., Calif.
ALGORITHMS FOR IMAGING MYOCARDIAL BLOOD FLOW USING X-RAY COMPUTED TOMOGRAPHY Ph.D. Thesis
Menahem Nassi-F 1981 136 p
Avail: Univ. Microfilms Order No. 8124117

Algorithms are proposed to remove degradation of contrast and spatial resolution produced by the motion of the heart in X-ray computed tomography. A mathematical model is derived for regional myocardial blood flow (RMBF) estimation which uses a classical, deterministic formulation to describe tracer dynamics in the myocardium. Based upon the perfect mixing assumption, this theory removes the requirement for intra-arterial bolus injection of tracer (diatrizoate radiographic contrast). Regional partition coefficients are estimated, which render absolute RMBF estimates [ml/(min x gr)]. The requirement for curve extrapolation (zeroth and first moment computation) in the presence of recirculation, and the considerable measurement noise which is unaccounted for, are both removed by the proposed alternative stochastic formulation.
Dissert. Abstr.

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

No abstracts in this category.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-13662*# Ohio State Univ., Columbus. Dept. of Industrial and Systems Engineering.
AN INVESTIGATION INTO PILOT AND SYSTEM RESPONSE TO CRITICAL IN-FLIGHT EVENTS, VOLUME 1 Final Report, 27 Oct. 1978 - 26 Jun. 1981
Thomas H. Rockwell and Walter C. Giffin Jun. 1981 200 p refs 2 Vol.
(Contract NAS2-10047; Grant NAG2-75; RF Proj. 761415/711621; RF Proj. 762501/713447)
(NASA-CR-166243-Vol-1) Avail: NTIS HC A09/MF A01 CSCL 05H

The scope of a critical in-flight event (CIFE) with emphasis on pilot management of available resources is described. Detailed scenarios for both full mission simulation and written testing of pilot responses to CIFE's, and statistical relationships among pilot characteristics and observed responses are developed. A model developed to described pilot response to CIFE and an analysis of professional fight crews compliance with specified operating procedures and the relationships with in-flight errors are included. S.L.

N82-13663*# Ohio State Univ., Columbus. Dept. of Industrial and Systems Engineering.

AN INVESTIGATION INTO PILOT AND SYSTEM RESPONSE TO CRITICAL IN-FLIGHT EVENTS, VOLUME 2 Final Report, 27 Oct. 1978 - 26 Jun. 1981

Thomas H. Rockwell and Walter C. Giffin Jun. 1981 151 p 2 Vol.
(Contract NAS2-10047; Grant NAG2-75; RF Proj. 761415/711621; RF Proj. 762501/713447)
(NASA-CR-166243-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 05H

Critical in-flight event is studied using mission simulation and written tests of pilot responses. Materials and procedures used in knowledge tests, written tests, and mission simulations are included. S.L.

N82-13664*# Computer Sciences Corp., Mountain View, Calif.

VISUAL/MOTION CUE MISMATCH IN A COORDINATED ROLL MANEUVER

Douglas K. Shirachi and Richard S. Shirley May 1981 51 p
(Contract NAS2-9741)
(NASA-CR-166259; CSCR-9) Avail: NTIS HC A04/MF A01 CSCL 05H

The effects of bandwidth differences between visual and motion cueing systems on pilot performance for a coordinated roll task were investigated. Visual and motion cue configurations which were acceptable and the effects of reduced motion cue scaling on pilot performance were studied to determine the scale reduction threshold for which pilot performance was significantly different from full scale pilot performance. It is concluded that: (1) the presence or absence of high frequency error information in the visual and/or motion display systems significantly affects pilot performance; and (2) the attenuation of motion scaling while maintaining other display dynamic characteristics constant, affects pilot performance. E.A.K.

N82-13665*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

PROCEEDINGS OF THE SEVENTEENTH ANNUAL CONFERENCE ON MANUAL CONTROL

15 Oct. 1981 693 p refs Conf. held in Los Angeles, 16-18 Jun. 1981; sponsored by NASA and ONR
(Contract NAS7-100)
(NASA-CR-165005; JPL-Pub-81-95) Avail: NTIS HC A99/MF A01 CSCL 05H

Manual control is considered, with concentration on perceptive/cognitive man-machine interaction and interface. For individual titles, see N82-13666 through N82-13723.

N82-13666*# California Univ., Los Angeles. Brain Research Inst.

PUPILLOMETRIC MEASUREMENT OF OPERATOR WORKLOAD

Jackson Beatty *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 1-6 refs (For primary document see N82-13665 04-54)
(Contract N00014-76-C-0616)
Avail: NTIS HC A99/MF A01 CSCL 05/4

Pupillometry as a method of measuring workload is described. Pupillometric measures provide an indication of momentary fluctuations in central nervous system excitability that occur as cognitive operations are performed; the magnitude of these changes may serve as a sensitive indicator of the workload imposed by cognitive tasks. J.D.H.

N82-13667*# Illinois Univ., Champaign. Dept. of Psychology.

THE COGNITIVE DEMANDS OF SECOND ORDER MANUAL CONTROL: APPLICATIONS OF THE EVENT RELATED BRAIN POTENTIAL

Christopher Wickens, Richard Gill, Arthur Kramer, William Ross, and Emanuel Donchin *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 7-16 refs (For primary document see N82-13665 04-54)
(Contract F49620-79-C-0233)
Avail: NTIS HC A99/MF A01 CSCL 05H

Three experiments are described in which tracking difficulty is varied in the presence of a covert tone discrimination task. Event related brain potentials (ERPs) elicited by the tones are employed as an index of the resource demands of tracking. The ERP measure reflected the control order variation, and this variable was thereby assumed to compete for perceptual/central processing resources. A fine-grained analysis of the results suggested that the primary demands of second order tracking involve the central processing operations of maintaining a more complex internal model of the dynamic system, rather than the perceptual demands of higher derivative perception. Experiment 3 varied tracking bandwidth in random input tracking, and the ERP was unaffected. Bandwidth was then inferred to compete for response-related processing resources that are independent of the ERP. J.D.H.

N82-13668*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

A STUDY ON TASK DIFFICULTY AND ACCELERATION STRESS

D. W. Repperger and D. B. Rogers *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 17-31 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The results of two experiments which relate to task difficulty and the effects of environmental stress on tracking performance are discussed and compared to subjective evaluations. The first experiment involved five different sum of sine tracking tasks which humans tracked both in a static condition and under a 5 Gz acceleration stress condition. The second experiment involved similar environmental stress conditions but in this case the tasks were constructed from deterministic functions with specially designed velocity and acceleration profiles. Phase Plane performance analysis was conducted to study potential measures of workload or tracking difficulty. J.D.H.

N82-13669*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SUBJECTIVE RATING SCALES AS A WORKLOAD

Kathleen L. Bird (Virginia Polytechnic Inst. and State Univ.) *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 33-39 refs (For primary document see N82-13665 04-54)
(Contract NAG1-217)
Avail: NTIS HC A99/MF A01 CSCL 05H

A multidimensional bipolar-adjective rating scale is employed as a subjective measure of operator workload in the performance of a one-axis tracking task. The rating scale addressed several dimensions of workload, including cognitive, physical, and perceptual task loading as well as fatigue and stress effects. Eight subjects performed a one-axis tracking task (with six levels of difficulty) and rated these tasks on several workload dimensions. Performance measures were tracking error RMS (root-mean square) and the standard deviation of control stick output. Significant relationships were observed between these performance measures and skill required, task complexity, attention level, task difficulty, task demands, and stress level. Author

N82-13670*# California Univ., Los Angeles.

PHYSIOLOGICAL ASSESSMENT OF OPERATOR WORKLOAD DURING MANUAL TRACKING. 1: PUPILLARY RESPONSES

Quiyan Jiang, Raja Parasuraman, and Jackson Beatty *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 41-46 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The feasibility of pupillometry as an indicator for assessing operator workload during manual tracking was studied. The mean and maximum pupillary responses of 12 subjects performing tracking tasks with three levels of difficulty (bandwidth of the forcing function were 0.15, 0.30 and 0.50 Hz respectively) were analysed. The results showed that pupillary dilation increased significantly as a function of the tracking difficulty which was reflected by the significant increase of tracking error (RMS). The present study supplies additional evidence that pupillary response is a sensitive and reliable index which may serve as an indicator for assessing operator workload in man-machine systems. Author

N82-13671*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

HORIZONTAL CONFLICT RESOLUTION MANEUVERS WITH A COCKPIT DISPLAY OF TRAFFIC INFORMATION

Evertt Palmer, Sharon Jago, and Myrna DuBord *In* JPL Proc. of the 17th Ann. Conf. on Manual control 15 Oct. 1981 p 51-62 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Pilot resolution of potential conflicts in the horizontal plane when the only information available on the other aircraft was presented on a Cockpit Display of Traffic Information (CDTI) is investigated. The pilot's task was to assess the situation and if necessary maneuver so as to avoid the other aircraft. No instructions were given on evasive strategy or on what was considered to be an acceptable minimum separation. The results indicate that pilots had a strong bias of turning toward the intruder aircraft in order to pass behind it. In more than 50% of the encounters with a 90 degree crossing angle in which the intruder aircraft was programmed to pass behind the aircraft, the pilots maneuvered so as to pass behind the intruder. This bias was not as strong with the display which showed a prediction of the intruder's relative velocity. The average miss distance for all encounters was about 4500 feet. J.D.H.

N82-13672*# Grumman Aerospace Corp., Bethpage, N.Y.

SOME EFFECTS OF FIELD OF VIEW (FOV) AND TARGET SIZE ON LATERAL TRACKING AT HOVER

Harry T. Breul *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 63-75 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

An exploratory flight-simulator experiment examined the gross effects of several factors potentially important to the design of a visual display system for aiding VTOL pilots in the difficult task of landing on a small sea-control ship. Field of view (FOV) and target size were the primary variables examined for a lateral tracking task in a full motion 5 degree-of-freedom hover simulation. The mean absolute value of tracking error was used to measure tracking performance, and cross spectral transfer function analysis was performed to determine the pilot's ability to generate good open-loop transfer function characteristics as a function of the experimental variables. It was found that FOV and target size can have a large effect on the pilot's ability to generate open-loop gain, and on his tracking performance. J.D.H.

N82-13673*# Linkabit Corp., San Diego, Calif.

VIDEO FRAMERATE, RESOLUTION AND GRAYSCALE TRADEOFFS FOR UNDERSEA TELEMANIPULATOR

Vivek Ranadive and Thomas B. Sheridan *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 77-88 refs Prepared in cooperation with MIT, Cambridge (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The product of Frame Rate (F) in frames per second, Resolution (R) in total pixels and grayscale in bits (G) equals the transmission band rate in bits per second. Thus for a fixed channel capacity there are tradeoffs between F, R and G in the actual sampling of the picture for a particular manual control task in the present case remote undersea manipulation. A manipulator was used in the MASTER/SLAVE mode to study these tradeoffs. Images were systematically degraded from 28 frames per second, 128 x 128 pixels and 16 levels (4 bits) grayscale, with various FRG combinations constructed from a real-time digitized (charge-injection) video camera. It was found that frame rate, resolution and grayscale could be independently reduced without preventing the operator from accomplishing his/her task. Threshold points were found beyond which degradation would prevent any successful performance. A general conclusion is that a well trained operator can perform familiar remote manipulator tasks with a considerably degrade picture, down to 50 K bits/ sec. J.D.H.

N82-13674*# Technion - Israel Inst. of Tech., Haifa.

PREDICTOR SYMBOLOGY IN COMPUTER-GENERATED PERSPECTIVE DISPLAYS

Arthur J. Grunwald *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 89-94 ref (For primary document see N82-13665 04-54)
(Contract NASw-3302)
Avail: NTIS HC A99/MF A01 CSCL 05H

An advanced diplay format for the four dimensional commercial aircraft approach-to-landing is evaluated. The desired curved and descending approach path is presented by displaying the perspective image of a tunnel. Attention is focussed on the predictor symbology, superimposed on the tunnel image. A perspective three dimensional predictor symbol, providing future position, as well as future attitude information, is compared with a flat two dimensional version, which only provides the future position. In addition to this, the predictor displays the actual airspeed as well as the desired airspeed, prescribed by the four dimensional path. Results show that the three dimensional predictor symbol outperforms the two dimensional predictor in following the trajectory in a moderate-to-heavy turbulent environment, which is manifested in accurate manual true airspeed control was obtained without affecting the main task performance significantly. Author

N82-13675*# New Mexico Univ., Albuquerque. Dept. of Mechanical Engineering.

SUPERVISORY CONTROL OF REMOTE MANIPULATION: A PRELIMINARY EVALUATION

Gregory P. Starr *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 95-107 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

A system for supervisory control is described, and preliminary results are presented. Supervisory control, where control is traded between man and computer, offers benefits in the control of a remote manipulator. The system has the potential to accomplish sophisticated tasks. It is indicated that supervisory control yields lower task completion times and is preferred over manual control. E.A.K.

N82-13676*# California Univ., Los Angeles. Dept. of Engineering Systems.

RESEARCH ISSUES IN IMPLEMENTING REMOTE PRESENCE IN TELEOPERATOR CONTROL

Kevin Corker, Andrew H. Mishkin, and John Lyman *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 109-126 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The concept of remote presence in telemanipulation is presented. A conceptual design of a prototype teleoperator system incorporating remote presence is described. The design is presented in functional terms, sensor, display, and control subsystem. An intermediate environment, in which the human operator is made to feel present, is explicated. The intermediate environment differs from the task environment due to the quantity and type of information presented to an operator and due to scaling factors protecting the operator from the hazards of the task environment. Potential benefits of remote presence systems, both for manipulation and for the study of human cognition and preception are discussed. E.A.K.

N82-13677*# Paris XII Univ., Evry (France).

THE PERSISTENCE OF A VISUAL DOMINANCE EFFECT IN A TELEMANIPULATOR TASK: A COMPARISON BETWEEN VISUAL AND ELECTROTACTILE FEEDBACK

J. P. Gaillard *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 127-138 refs Sponsored in part by Direction de la Recherche des Equipements Techniques (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The possibility to use an electrotactile stimulation in teleoperation and to observe the interpretation of such information as a feedback to the operator was investigated. It is proposed that visual feedback is more informative than an electrotactile one; and that complex electrotactile feedback slows down both the motor decision and motor response processes, is processed as an all or nothing signal, and bypasses the receptive structure and accesses directly in a working memory where information is sequentially processed and where memory is limited in treatment capacity. The electrotactile stimulation is used as an alerting signal. It is suggested that the visual dominance effect is the result of the advantage of both a transfer function and a sensory memory register where information is pretreated and memorized for a short time. It is found that dividing attention has an effect on the acquisition of the information but not on the subsequent decision processes. E.A.K.

N82-13678*# Oak Ridge National Lab., Tenn. Fuel Recycle Div.

MAN/MACHINE INTERFACE DEVELOPMENT FOR THE REMOTEX CONCEPT

J. Garin and M. M. Clarke (Oak Ridge Associated Universities) *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 139-144 refs (For primary document see N82-13665 04-54)

(Contract W-7405-eng-26)

Avail: NTIS HC A99/MF A01 CSCL 05H

The development of a man/machine interface system that can be used to remotely control a system composed of a transporter base and a force-reflecting, survocontrolled manipulator is reported. The concept features the incorporation of totally remote operation. A simulator is build to optimize man/machine interface requirements. E.A.K.

N82-13679*# Oak Ridge Associated Universities, Tenn.

IDENTIFICATION OF COGNITIVE FACTORS RELATED TO REMOTE WORK PERFORMANCE USING CLOSED CIRCUIT TV DISPLAYS

M. M. Clarke and J. Garin (ORNL) *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 145-148 refs (For primary document see N82-13665 04-54)

(Contract W-7405-eng-26)

Avail: NTIS HC A99/MF A01 CSCL 05H

Operator perceptual cognitive styles as predictors of remote task performance were identified. Remote tasks which require the use of servo controlled master/slave manipulators and closed circuit television for teleoperator repair and maintenance of nuclear fuel recycling systems are examined. A useful procedure for identifying such perceptual styles is described. E.A.K.

N82-13680*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

SIMPLE GEOMETRIC ALGORITHMS TO AID IN CLEARANCE MANAGEMENT FOR ROBOTIC MECHANISMS

E. L. Copeland, L. D. Ray, and J. D. Peticolas *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 149-155 (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

Global geometric shapes such as lines, planes, circles, spheres, cylinders, and the associated computational algorithms which provide relatively inexpensive estimates of minimum spatial clearance for safe operations were selected. The Space Shuttle, remote manipulator system, and the Power Extension Package are used as an example. Robotic mechanisms operate in quarters limited by external structures and the problem of clearance is often of considerable interest. Safe clearance management is simple and suited to real time calculation, whereas contact prediction requires more precision, sophistication, and computational overhead. E.A.K.

N82-13681*# General Motors Research Labs., Warren, Mich. Engineering Mechanics Dept.

THE INFLUENCE OF MOTION CUES ON DRIVER-VEHICLE PERFORMANCE IN A SIMULATOR

Brian S. Repa, Philip M. Leucht, and Walter W. Wierwille (Virginia Polytechnic Inst. and State Univ.) *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 157-169 refs (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

Four different motion base configurations were studied on driving simulator. Differently responding vehicles were simulated on each motion configurations and the effects of the vehicle characteristics on driver vehicle system performance, driver control activity, and driver opinion ratings of vehicle performance during driving are compared for different motion configurations. Data show that: (1)) the effects of changes in vehicle characteristics on the different objective and subjective measures of driver vehicle performance are not disguised by the lack of physical motion; (2) fixed base simulator can be used to draw inferences despite the lack of motion; (3) the presence of motion tends to reduce path keeping errors and driver control activity; (4) roll and yaw motions are recommended because of their marked influence on driver vehicle performance (5) the importance of motion increases as the driving maneuvers become more extreme. E.A.K.

N82-13682*# Lockheed-California Co., Burbank.

MULTIPLE MAN-MACHINE INTERFACES

Lillian Stanton and Creighton W. Cook *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 171-186 refs (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

The multiple man machine interfaces inherent in military pilot training, their social implications, and the issue of possible negative feedback were explored. Modern technology has produced machines which can see, hear, and touch with greater accuracy and precision than human beings. Consequently, the military pilot is more a systems manager, often doing battle against a target he never sees. It is concluded that unquantifiable human activity requires motivation that is not intrinsic in a machine. E.A.K.

N82-13683*# Perceptronics, Inc., Woodland Hills, Calif.

DECISION AIDS FOR AIRBORNE INTERCEPT OPERATIONS IN ADVANCED AIRCRAFTS

Azad Madni and Amos Freedy *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 187-209 refs (For primary document see N82-13665 04-54)

(Contract N62269-79-C-0496)

Avail: NTIS HC A99/MF A01 CSCL 05H

A tactical decision aid (TDA) for the F-14 aircrew, i.e., the naval flight officer and pilot, in conducting a multitarget attack during the performance of a Combat Air Patrol (CAP) role is presented. The TDA employs hierarchical multiattribute utility models for characterizing mission objectives in operationally measurable terms, rule based AI-models for tactical posture selection, and fast time simulation for maneuver consequence prediction. The TDA makes aspect maneuver recommendations, selects and displays the optimum mission posture, evaluates attackable and potentially attackable subsets, and recommends the 'best' attackable subset along with the required course perturbation. E.A.K.

N82-13684*# Systems Technology, Inc., Hawthorne, Calif.

USING REWARDS AND PENALTIES TO OBTAIN DESIRED SUBJECT PERFORMANCE

Marcia Cook, Henry R. Jex, Anthony C. Stein, and R. Wade Allen *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Dec. 1981 p 211-222 refs (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

Operant conditioning procedures, specifically the use of negative reinforcement, in achieving stable learning behavior is described. The critical tracking test (CTT) a method of detecting human operator impairment was tested. A pass level is set for each subject, based on that subject's asymptotic skill level while sober. It is critical that complete training take place before the individualized pass level is set in order that the impairment can be detected. The results provide a more general basis for the application of reward/penalty structures in manual control research. E.A.K.

N82-13685*# Systems Technology, Inc., Mountain View, Calif.

A COMPARISON OF LANDING MANEUVER PILOTING TECHNIQUE BASED ON MEASUREMENTS MADE IN AN AIRLINE TRAINING SIMULATOR AND IN ACTUAL FLIGHT

Robert K. Heffley and Ted M. Schulman *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 223-234 refs (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

An emphasis is placed on developing a mathematical model in order to identify useful metrics, quantify piloting technique, and define simulator fidelity. On the basis of DC-10 flight measurements recorded for 32 pilots, 13 flight-trained and the remainder simulator trained, a revised model of the landing flare is hypothesized which accounts for reduction of sink rate and perference for touchdown point along the runway. The flare maneuver and touchdown point adjustment can be described by a pitch attitude command pilot guidance law consisting of altitude and vertical velocity feedbacks. In flight pilots exhibit a significant vertical velocity feedback which is essential for well controlled sink rate reduction at the desired level of response (bandwidth). In the simulator, however, the vertical velocity feedback appears ineffectual and leads to substantially inferior landing performance. T.M.

N82-13686*# Systems Technology, Inc., Mountain View, Calif.
IDENTIFICATION OF MULTILOOP PILOT DESCRIBING FUNCTIONS OBTAINED FROM SIMULATED APPROACHES TO AN AIRCRAFT CARRIER
Wayne F. Jewell *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 239-244 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Predicted results of a simulation of the pilot's approach control strategy in the presence of pilot remnant are presented. The aircraft dynamics and the turbulence environment are representative of a trainer-type aircraft. The non-intrusive pilot identification program (NIPIP) was used to identify the pilot's control strategy required by this highly-coupled, multiloop control task. The results are presented in terms of frequency responses of the individual elements of the pilot's control strategy and indicate that NIPIP can identify the pilot's describing functions even in the presence of significant amounts of pilot remnant. T.M.

N82-13687*# Douglas Aircraft Co., Inc., Long Beach, Calif.
FURTHER TESTS OF A MODEL-BASED SCHEME FOR PREDICTING PILOT OPINION RATINGS FOR LARGE COMMERCIAL TRANSPORTS
W. W. Rickard and W. H. Levison (Bolt, Beranek and Newman, Inc., Cambridge, Mass.) *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 245-254 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

A methodology was demonstrated for assessing longitudinal-axis handling qualities of transport aircraft on the basis of closed-loop criteria. Six longitudinal-axis approach configurations were studied covering a range of handling quality problems that included the presence of flexible aircraft modes. Using closed-loop performance requirements derived from task analyses and pilot interviews, predictions of performance/workload tradeoffs were obtained using an analytical pilot/vehicle model. A subsequent manned simulation study yielded objective performance measures and Cooper-Harper pilot ratings that were largely consistent with each other and with analytic predictions. T.M.

N82-13688*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN ANALYTICAL APPROACH FOR PREDICTING PILOT INDUCED OSCILLATIONS
Ronald A. Hess *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 235-269 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The optimal control model (OCM) of the human pilot is applied to the study of aircraft handling qualities. Attention is focused primarily on longitudinal tasks. The modeling technique differs from previous applications of the OCM in that considerable effort is expended in simplifying the pilot/vehicle analysis. After briefly reviewing the OCM, a technique for modeling the pilot controlling higher order systems is introduced. Following this, a simple criterion or determining the susceptability of an aircraft to pilot induced oscillations (PIO) is formulated. Finally, a model-based metric for pilot rating prediction is discussed. The resulting modeling procedure provides a relatively simple, yet unified approach to the study of a variety of handling qualities problems. T.M.

N82-13689*# Operations Research, Inc., Bethesda, Md.
A MODEL FOR THE SUBMARINE DEPTHKEEPING TEAM
John R. Ware, John F. Best, Pamela J. Bozzi, and David W. Kleinman (Connecticut Univ., Storrs) *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 271-282 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The most difficult task the depthkeeping team must face occurs during periscope-depth operations during which they may be required to maintain a submarine several hundred feet long within a foot of ordered depth and within one-half degree of ordered pitch. The difficulty is compounded by the facts that wave generated forces are extremely high, depth and pitch signals are very noisy and submarine speed is such that overall dynamics are slow. A mathematical simulation of the depthkeeping team based on the optimal control models is described. A solution of the optimal team control problem with an output control restriction (limited display to each controller) is presented. T.M.

N82-13690*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
MODELING OF THE AIRCRAFT IN-TRAIL-FOLLOWING TASK DURING PROFILE DESCENT
T. Goka, J. A. Sorensen, and A. V. Phatak *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 283-294 refs (For primary document see N82-13665 04-54)
(Contract NAS1-16135)
Avail: NTIS HC A99/MF A01 CSCL 05H

The cockpit display of traffic information (CDTI) system concepts enable the pilot to observe the surrounding air traffic pattern. The impact of such a system is far reaching in terms of improved safety, pilot and controller workload, and aircraft fuel efficiency. One direct payoff is the ability to distribute the ATC workload to the pilot in such tasks as merging and spacing. The CDTI application of spacing approach aircraft in the terminal area is addressed. In-trail-following/CDTI experiments were performed using realistic cockpit simulators and profile descent approach scenarios. Based on collected experimental simulator data, pilot models were developed which include state estimation, decision making and flight control aspects. These models were coupled with models of aircraft and CDTI equipment to study the dynamic phenomena and stability of strings of aircraft along various approach patterns. T.M.

N82-13691*# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
COMPARISON OF CLOSED LOOP MODEL WITH FLIGHT TEST RESULTS
Frank L. George *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 295-300 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

An analytic technique capable of predicting the landing characteristics of proposed aircraft configurations in the early stages of design was developed. In this analysis, a linear pilot-aircraft closed loop model was evaluated using experimental data generated with the NT-33 variable stability in-flight simulator. The pilot dynamics are modeled as inner and outer servo loop closures around aircraft pitch attitude, and altitude rate-of-change respectively. The landing flare maneuver is of particular interest as recent experience with military and other highly augmented vehicles shows this task to be relatively demanding, and potentially a critical design point. A unique feature of the pilot model is the incorporation of an internal model of the pilot's desired flight path for the flare maneuver. T.M.

N82-13692*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
FUNCTIONAL STRUCTURE AND DYNAMICS OF THE HUMAN NERVOUS SYSTEM
Joseph A. Lawrence *In its* Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 301-304 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The status of an effort to define the directions needed to take in extending pilot models is reported. These models are needed to perform closed-loop (man-in-the-loop) feedback flight control system designs and to develop cockpit display requirements. The approach taken is to develop a hypothetical working model of the human nervous system by reviewing the current literature in neurology and psychology and to develop a computer model of this hypothetical working model. T.M.

N82-13693*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
ON THE USE OF THE OCM'S QUADRATIC OBJECTIVE FUNCTION AS A PILOT RATING METRIC

David K. Schmidt *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 305-313 refs (For primary document see N82-13665 04-54)
(Grant NAG4-1)
Avail: NTIS HC A99/MF A01 CSCL 05H

A correlation between the magnitude of the quadratic objective function from an optimal control pilot model and the subjective rating of the vehicle and task provides a valuable tool for handling qualities research and flight control synthesis. An analysis of simulation results for fourteen aircraft configurations flight tested earlier was conducted. A fixed set of pilot model parameters, are found for all cases in modeling the simulated regulation task. The agreement obtained between performance statistics is shown and a strong correlation was obtained between the cost function and rating. T.M.

N82-13694*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
A QUASI-NEWTON PROCEDURE FOR IDENTIFYING PILOT-RELATED PARAMETERS OF THE OPTIMAL CONTROL MODEL
William H. Levison *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 315-328 refs (For primary document see N82-13665 04-54)
(Contract F49620-8-C-0073)
Avail: NTIS HC A99/MF A01 CSCL 05H

The development and application of a quasi-Newton gradient search procedure for identifying independent pilot related parameters of the optimal control model for pilot/vehicle systems is reported. A sensitivity analysis procedure which determines whether a given model parameter is required to match a specific experimental result, and which experimentally induced parameter changes are required to account for behavioral and performance differences, is described. Application of the identification scheme to training effects in a manual control task is described. S.L.

N82-13695*# Connecticut Univ., Storrs.
INFORMATION AND DISPLAY REQUIREMENTS FOR AIRCRAFT TERRAIN FOLLOWING
D. L. Kleinman and J. Korn (ALPHATECH, Inc., Burlington, Mass.) *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 329-331 refs (For primary document see N82-13665 04-54)
(Contract F33615-80-C-0528)
Avail: NTIS HC A99/MF A01 CSCL 05H

The display design procedure for manned vehicle systems, is applied and validated, for a particular scenario. The scenario chosen is that of zero visibility high speed terrain following (V = 466 ft/sec, H = 200 ft) with an A-10 aircraft. The longitudal (linearized) dynamics are considered. The variations in (command path over) terrain pi(t) are modeled as a third order random process. The display design methodology is based on the optimal control model of pilot response, and employs this model in various ways in different phases of the design process. The overall methodology indicates that the design process is intended as a precursor to manned simulation. It provides a rank ordering of candidate displays through a three level process. S.L.

N82-13696*# Texas A&M Univ., College Station.
A DATA COLLECTION SCHEME FOR IDENTIFICATION OF PARAMETERS IN A DRIVER MODEL
B. W. Mooring, M. McDermott, and Je-Mang Su *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 333-343 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

A high gain steering controller to compensate for limitations in a handicapped driver's range of motion is employed when adapting vehicle to his use. A driver/vehicle system can become unstable as vehicle speed is increased, therefore it is desirable to use a computer simulation of the driver/vehicle combination as a design tool to investigate the system response prior to construction of a controller and road testing. Unknown driver parameters must be identified prior to use of the model for system analysis. A means to collect the data necessary for identification of these driver model parameters without extensive instrumentation of a vehicle to measure and record vehicle states is addressed. Initial tests of the procedure identified all of the driver parameters with errors of 6% or less. S.L.

N82-13697*# Massachusetts Inst. of Tech., Cambridge. Man-Machine Lab.
TWO-D RESULTS ON HUMAN OPERATOR PERCEPTION
Alex A. Siapkara (Hellenic Technology Center, Athens) and Thomas B. Sheridan *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 345-359 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The application of multidimensional scaling methodology in human factors engineering is presented. The nonorthogonality of internally perceived task variables is exhibited for first and second order plants with both dependent and independent task variables. Directions of operator preference are shown for actual performance, pilot opinion rating, and subjective measures of fatigue, adaptability, and system recognition. Improvement of performance in second order systems is exhibited by the use of bang-bang feedback information. Dissimilarity measures for system comparison are suggested in order to account for human operator rotations and subjective sense of time. S.L.

N82-13698*# Illinois Univ. at Chicago Circle, Chicago. Coll. of Engineering.
COMPUTATIONAL PROBLEMS IN AUTOREGRESSIVE MOVING AVERAGE (ARMA) MODELS
Gyan C. Agarwal, Sherin M. Goodarzi, William D. ONeill, and Gerald L. Gottlieb *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 361-377 refs Prepared in cooperation with Rush Medical Center, Chicago (For primary document see N82-13665 04-54)
(Grants NSF ENG-76-08754; NS-12877)
Avail: NTIS HC A99/MF A01 CSCL 05H

The choice of the sampling interval and the selection of the order of the model in time series analysis are considered. Band limited (up to 15 Hz) random torque perturbations are applied to the human ankle joint. The applied torque input, the angular rotation output, and the electromyographic activity using surface electrodes from the extensor and flexor muscles of the ankle joint are recorded. Autoregressive moving average models are developed. A parameter constraining technique is applied to develop more reliable models. The asymptotic behavior of the system must be taken into account during parameter optimization to develop predictive models. S.L.

N82-13699*# ALPHATECH, Inc., Burlington, Mass.
MODELING HUMAN TRACKING ERROR IN SEVERAL DIFFERENT ANTI-TANK SYSTEMS
David L. Kleinman *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 379-392 refs Prepared in cooperation with Connecticut Univ., Storrs (For primary document see N82-13665 04-54)
(Contract DAAK11-80-C-0050)
Avail: NTIS HC A99/MF A01 CSCL 05H

An optimal control model for generating time histories of human tracking errors in antitank systems is outlined. Monte Carlo simulations of human operator responses for three Army antitank systems are compared. System/manipulator dependent data comparisons reflecting human operator limitations in perceiving displayed quantities and executing intended control motions are presented. Motor noise parameters are also discussed. M.D.K.

N82-13700*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
ON THE INTERNAL TARGET MODEL IN A TRACKING TASK
Alper K. Caglayan and Sheldon Baron *In* JPL Proc. of the 17th Conf. on Manual Control 15 Oct. 1981 p 393-397 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

An optimal control model for predicting operator's dynamic responses and errors in target tracking ability is summarized. The model, which predicts asymmetry in the tracking data, is dependent on target maneuvers and trajectories. Gunners perception, decision making, control, and estimate of target positions and velocity related to crossover intervals are discussed.

The model provides estimates for means, standard deviations, and variances for variables investigated and for operator estimates of future target positions and velocities. M.D.K.

N82-13701*# CAE Electronics Ltd., Montreal (Quebec).

MULTI-AXIS MANUAL CONTROLLERS: A STATE-OF-THE-ART REPORT

A. Lippay, G. M. McKinnon, and M. L. King *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 401-405 (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

A literature search was carried out to examine the feasibility of a six degree of freedom hand controller. Factors addressed included related areas, approaches to manual control, applications of manual controllers, and selected studies of the human neuromuscular system. Results are presented. J.M.S.

N82-13702*# Messerschmidt-Boelkow G.m.b.H., Munich (West Germany).

THEORETICAL LINEAR APPROACH TO THE COMBINED MAN-MANIPULATOR SYSTEM IN MANUAL CONTROL OF AN AIRCRAFT

Klaus Brauser *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 407-418 refs (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

An approach to the calculation of the dynamic characteristics of the combined man manipulator system in manual aircraft control was derived from a model of the neuromuscular system. This model combines the neuromuscular properties of man with the physical properties of the manipulator system which is introduced as pilot manipulator model into the manual aircraft control. The assumption of man as a quasilinear and time invariant control operator adapted to operating states, depending on the flight phases, of the control system gives rise to interesting solutions of the frequency domain transfer functions of both the man manipulator system and the closed loop pilot aircraft control system. It is shown that it is necessary to introduce the complete precision pilot manipulator model into the closed loop pilot aircraft transfer function in order to understand the well known handling quality criteria, and to derive these criteria directly from human operator properties. J.M.S.

N82-13703*# MRC Applied Psychology Unit, Cambridge (England).

THE INFLUENCE OF SHIP MOTION OF MANUAL CONTROL SKILLS

Peter McLeod, Christopher Poulton, Howard DuRoss (RAE, Farnborough, Engl.), and Wynn Lewis (WSL, Stevenage, Engl.) *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 419-430 refs (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

The effects of ship motion on a range of typical manual control skills were examined on the Warren Spring ship motion simulator driven in heave, pitch, and roll by signals taken from the frigate HMS Avenger at 13 m/s (25 knots) into a force 4 wind. The motion produced a vertical r.m.s. acceleration of 0.024g, mostly between 0.1 and 0.3 Hz, with comparatively little pitch or roll. A task involving unsupported arm movements was seriously affected by the motion; a pursuit tracking task showed a reliable decrement although it was still performed reasonably well (pressure and free moving tracking controls were affected equally by the motion); a digit keying task requiring ballistic hand movements was unaffected. There was no evidence that these effects were caused by sea sickness. The differing response to motion of the different tasks, from virtual destruction to no effect, suggests that a major benefit could come from an attempt to design the man/control interface onboard ship around motion resistant tasks. Author

N82-13704*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE ROLE OF MANIPULATOR CHARACTERISTICS IN SELECTING THE IDEAL EFFECTIVE VEHICLE

Ronald A. Hess *In* JPL Proc. of the 17th Ann. Conf. Manual Control 15 Oct. 1981 p 431-448 refs (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

A structural model of the human pilot is introduced and discussed. The model is used to provide a rationale for certain nonlinear pilot control behavior such as stick pulsing and serves as a framework for studying aspects of motor skill development. In light of the theoretical background provided by the model, some past empirical pilot response phenomena are analyzed and shown to be attributable to manipulator or control stick characteristics. In particular, some recent problems associated with pilot/vehicle performance in glideslope tracking in short takeoff and landing (STOL) aircraft are analyzed. The apparent contribution of the cockpit manipulator (throttle) characteristics to these problems are outlined and a solution proposed and evaluated in both simulation and flight test. J.M.S.

N82-13705*# General Dynamics/Pomona, Calif.

COMPUTER AIDED MANUAL TRACKING

Yung-Koh Yin and Russell F. Berg *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 449-454 ref (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

A scheme was developed to assist the human operator by augmenting an optic sight manual tracking loop with target rate estimates from a computer control algorithm which can either be a Kalman Filter or an alpha, beta, gamma filter. The idea is for the computer to provide rate tracking while the human operator is responsible for nullifying the tracking error. A simple schematic is shown to illustrate the implementation of this concept. A hybrid real-time man-in-loop simulation was used to compare the tracking performance of the same flight trajectory with or without this form of computer-aided track. Preliminary results show the advantage of computer-aided track against high speed aircraft at close range. However, good tracking before target state estimator maturity becomes more critical for aided track than without. Results are presented for a constant velocity flight trajectory. J.M.S.

N82-13706*# CAE Electronics Ltd., Montreal (Quebec). Human Factors Engineering.

DESIGN AND DEVELOPMENT OF A SIX DEGREE OF FREEDOM HAND CONTROLLER

M. L. King, G. M. McKinnon, and A. Lippay *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 455-463 (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

The design objectives of a six degree of freedom manual controller are discussed with emphasis on a space environment. Details covered include problems associated with a zero-g environment, the need to accommodate both 'shirt sleeve' and space suited astronauts, the combination of both manipulator operation and spacecraft flight control in a single device, and to accommodate restraints in space. A variable configuration device designed as a development tool in which rotational axes can be moved relative to one another, is described and its limitations discussed. Two additional devices were developed for concept testing. Each device combines the need for good quality with its ability achieve a wide range of adjustments. J.M.S.

N82-13707*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

EXPERIMENTAL RESULTS WITH A SIX-DEGREE-OF-FREEDOM FORCE-REFLECTING HAND CONTROLLER

A. K. Bejczy and M. Handlykken (Technical Univ. of Norway, Trondheim) *In its* Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 465-477 refs (For primary document see N82-13665 04-54)

(Contract NAS7-100)

Avail: NTIS HC A99/MF A01 CSCL 05H

Control experiments performed using an isotonic joystick connected to a six degree-of-freedom manipulator equipped with a six dimensional force-torque sensor at the base of the manipulator end effector are described. The preliminary control experiments were aimed at the investigation of the human operators' ability to command and control forces in different directions by varying the information conditions and the values of the feedforward and feedback command gains in the bilateral control loop. The main conclusions are: (1) a quantified graphic display of force-torque information can considerably enhance the operator's ability to perform a quantitatively sharp force-torque control, and (2) there seems to be a task dependent optimal combination of the feedforward and feedback command gain values which provide a dynamically smooth and stable bilateral control performance. J.M.S.

N82-13708*# Illinois Univ. at Chicago Circle, Chicago. Bioengineering Program.

LOAD COMPENSATING REACTIONS TO PERTURBATIONS AT WRIST JOINT IN NORMAL MAN

R. J. Jaeger, G. C. Agarwell, and G. L. Gottlieb *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 479-501 refs Prepared jointly with Rush Medical Coll. (For primary document see N82-13665 04-54)
(Grants NSF ENG-76-08754; NIH-NS-00196; NIH-NS-12877)
Avail: NTIS HC A99/MF A01 CSCL 05H

The electromyographic responses to step torque loads were studied in flexors and extensors at the human wrist. Based on temporal bursting patterns and functional behavior, the response was divided into four temporal components. Two early components, the myotatic (30-60 ms) late myotatic (60-120 ms) appears to be reflex response. The third postmyotatic component (120-200 ms) appear to be a triggered reaction, preceeding the fourth, stabilizing component (200-400 ms). A comparison of response at the wrist with similar data at the ankle provides the basis for a generalized classification of the response in various muscles to torque step perturbations. Author

N82-13709*# Southern California Research Inst., Los Angeles.

MANUAL CONTROL ANALYSIS OF DRUG EFFECTS ON DRIVING PERFORMANCE

Alison Smiley, Kenneth Ziedman, and Herbert Moskowitz *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 503-514 refs (For primary document see N82-13665 04-54)
(Contract NIDA-271-76-3316)
Avail: NTIS HC A99/MF A01 CSCL 05H

The effects of secobarbital, diazepam, alcohol, and marihuana on car-driver transfer functions obtained using a driving simulator were studied. The first three substances, all CNS depressants, reduced gain, crossover frequency, and coherence which resulted in poorer tracking performance. Marihuana also impaired tracking performance but the only effect on the transfer function parameters was to reduce coherence. Author

N82-13710*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

PILOT SCANNING PATTERNS WHILE VIEWING COCKPIT DISPLAYS OF TRAFFIC INFORMATION

Stephen R. Ellis and Lawrence Stark *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 517-524 refs Prepared jointly with California Univ., Berkeley (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Scanning eye movements of airline pilots were recorded while they judged air traffic situations displayed on cockpit displays of traffic information (CDTI). The observed 1st order transition patterns between points of interest on the display showed reliable deviation from those patterns predicted by the assumption of statistical independence. However, both patterns of transitions correlated quite well with each other. Accordingly, the assumption of independence provided a surprisingly good model of the results. Nevertheless, the deviation between the observed patterns of transition and that based on the assumption of independence was for all subjects in the direction of increased determinism. Thus, the results provide objective evidence consistent with the existence of 'scanpaths' in the data. Author

N82-13711*# California Univ., Berkeley.

PUPILLOMETRY, A BIOENGINEERING OVERVIEW

G. Myers, J. Anchetta, B. Hannaford, P. Peng, K. Sherman, L. Stark, F. Sun, and S. Usui *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 525-536 refs Sponsored by NIH (For primary document see N82-13665 04-54)
(Contract NCC2-86)
Avail: NTIS HC A99/MF A01 CSCL 05H

The pupillary control system is examined using a microprocessor based integrative pupillometer. The real time software functions of the microprocessor include: data collection, stimulus generation and area to diameter conversion. Results of an analysis of linear and nonlinear phenomena are presented. J.M.S.

N82-13712*# California Univ., Berkeley.

MODEL SIMULATION STUDIES TO CLARIFY THE EFFECT ON SACCADIC EYE MOVEMENTS OF INITIAL CONDITION VELOCITIES SET BY THE VESTIBULAR OCULAR REFLEX (VOR)

Moon-Hyon Nam, Jack M. Winters, and Lawrence Stark *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 537-548 refs Sponsored by the Korean Ministry of Education (For primary document see N82-13665 04-54)
(Contract NCC2-86)
Avail: NTIS HC A99/MF A01 CSCL 05H

Voluntary active head rotations produced vestibulo-ocular reflex eye movements (VOR) with the subject viewing a fixation target. When this target jumped, the size of the refixation saccades were a function of the ongoing initial velocity of the eye. Saccades made against the VOR were larger in magnitude. Simulation of a reciprocally innervated model eye movement provided results comparable to the experimental data. Most of the experimental effect appeared to be due to linear summation for saccades of 5 and 10 degree magnitude. For small saccades of 2.5 degrees, peripheral nonlinear interaction of state variables in the neuromuscular plant also played a role as proven by comparable behavior in the simulated model with known controller signals. Author

N82-13713*# California Univ., Berkeley.

BENEFITS OF DETAILED MODELS OF MUSCLE ACTIVATION AND MECHANICS

Steven L. Lehman and Lawrence Stark *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 546-556 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Recent biophysical and physiological studies identified some of the detailed mechanisms involved in excitation-contraction coupling, muscle contraction, and deactivation. Mathematical models incorporating these mechanisms allow independent estimates of key parameters, direct interplay between basic muscle research and the study of motor control, and realistic model behaviors, some of which are not accessible to previous, simpler, models. The existence of previously unmodeled behaviors has important implications for strategies of motor control and identification of neural signals. New developments in the analysis of differential equations make the more detailed models feasible for simulation in realistic experimental situations. Author

N82-13714*# National Aerospace Lab., Amsterdam (Netherlands).

A MODEL OF THE HUMAN OBSERVER AND DECISION MAKER

P. H. Wewerinke *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 557-570 refs (For primary document see N82-13665 04-54)
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The decision process is described in terms of classical sequential decision theory by considering the hypothesis that an abnormal condition has occurred by means of a generalized likelihood ratio test. For this, a sufficient statistic is provided by the innovation sequence which is the result of the perception an information processing submodel of the human observer. On the basis of only two model parameters, the model predicts the decision speed/accuracy trade-off and various attentional characteristics. A preliminary test of the model for single variable failure detection tasks resulted in a very good fit of the experimental data. In a formal validation program, a variety of multivariable failure detection tasks was investigated and the predictive capability of the model was demonstrated. A.R.H.

N82-13715*# Lockheed Electronics Co., Plainfield, N. J.

HUMAN SUPERVISION AND MICROPROCESSOR CONTROL OF AN OPTICAL TRACKING SYSTEM

William J. Bigley and John D. Vandenberg *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 571-582 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Gunners using small calibre anti-aircraft systems have not been able to track high-speed air targets effectively. Substantial improvement in the accuracy of surface fire against attacking aircraft has been realized through the design of a director-type weapon control system. This system concept frees the gunner to exercise a supervisory/monitoring role while the computer takes over continuous target tracking. This change capitalizes on a key consideration of human factors engineering while increasing system accuracy. The advanced system design, which uses distributed microprocessor control, is discussed at the block diagram level and is contrasted with the previous implementation. Author

N82-13716*# Systems Technology, Inc., Hawthorne, Calif.

A THEORY OF HUMAN ERROR

Duane T. McRuer, Warren F. Clement, and R. Wade Allen *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 583-594 refs (For primary document see N82-13665 04-54)

(Contract NAS2-10400)

Avail: NTIS HC A99/MF A01 CSCL 05H

Human errors tend to be treated in terms of clinical and anecdotal descriptions, from which remedial measures are difficult to derive. Correction of the sources of human error requires an attempt to reconstruct underlying and contributing causes of error from the circumstantial causes cited in official investigative reports. A comprehensive analytical theory of the cause-effect relationships governing propagation of human error is indispensable to a reconstruction of the underlying and contributing causes. A validated analytical theory of the input-output behavior of human operators involving manual control, communication, supervisory, and monitoring tasks which are relevant to aviation, maritime, automotive, and process control operations is highlighted. This theory of behavior, both appropriate and inappropriate, provides an insightful basis for investigating, classifying, and quantifying the needed cause-effect relationships governing propagation of human error. A.R.H.

N82-13717*# Systems Technology, Inc., Hawthorne, Calif.

STABILITY ANALYSIS OF AUTOMOBILE DRIVER STEERING CONTROL

R. Wade Allen *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 597-609 refs Sponsored in part by the Ford Motor Co. (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

In steering an automobile, the driver must basically control the direction of the car's trajectory (heading angle) and the lateral deviation of the car relative to a delineated pathway. A previously published linear control model of driver steering behavior which is analyzed from a stability point of view is considered. A simple approximate expression for a stability parameter, phase margin, is derived in terms of various driver and vehicle control parameters, and boundaries for stability are discussed. A field test study is reviewed that includes the measurement of driver steering control parameters. Phase margins derived for a range of vehicle characteristics are found to be generally consistent with known adaptive properties of the human operator. The implications of these results are discussed in terms of driver adaptive behavior. Author

N82-13718*# Systems Technology, Inc., Hawthorne, Calif.

DETECTING HUMAN OPERATOR IMPAIRMENT WITH A PSYCHOMOTOR TASK

R. Wade Allen, Anthony C. Stein, and Henry R. Jex *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 611-625 refs (For primary document see N82-13665 04-54)

(Contract DOT-HS-8-02052)

Avail: NTIS HC A99/MF A01 CSCL 05H

Psychomotor tasks have long been used as instruments for measuring human operator behavior and have often been proposed as selection and training devices. The application of the 'Critical-instability Tracking Test' (CTT) in the detection of alcohol impaired human operators is discussed. The detection problem wherein statistical decision theory is used to optimize the test's ability to discriminate impaired operators in the face of inherent variability in human performance is considered. Testing strategy is examined including setting performance criteria levels and determining the number of attempts permitted in order to pass the test. Also, the task's ability to detect operator impairment is compared to performance measures obtained in a driving simulator. A.R.H.

N82-13719*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

VOICE CONTROL OF THE SPACE SHUTTLE VIDEO SYSTEM

A. K. Bejczy, R. S. Dotson, J. W. Brown, and J. L. Lewis *In its* Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 627-640 Prepared in cooperation with NASA, Johnson Space Center (For primary document see N82-13665 04-54)

(Contract NAS7-100)

Avail: NTIS HC A99/MF A01 CSCL 05H

A pilot voice control system developed at the Jet Propulsion Laboratory (JPL) to test and evaluate the feasibility of controlling the shuttle TV cameras and monitors by voice commands utilizes a commercially available discrete word speech recognizer which can be trained to the individual utterances of each operator. Successful ground tests were conducted using a simulated full-scale space shuttle manipulator. The test configuration involved the berthing, maneuvering and deploying a simulated science payload in the shuttle bay. The handling task typically required 15 to 20 minutes and 60 to 80 commands to 4 TV cameras and 2 TV monitors. The best test runs show 96 to 100 percent voice recognition accuracy. A.R.H.

N82-13720*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

A COMPARISON OF HEAD AND MANUAL CONTROL FOR A POSITION-CONTROL PURSUIT TRACKING TASK

William H. Levison, Greg L. Zacharias, James L. Porterfield, Donald Monk, and Christopher Arbak *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 641-652 refs Prepared jointly with Aerospace Medical Div., Aerospace Medical Research Labs. (6570th) (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

Head control was compared with manual control in a pursuit tracking task involving proportional controlled-element dynamics. An integrated control/display system was used to explore tracking effectiveness in horizontal and vertical axes tracked singly and concurrently. Compared with manual tracking, head tracking resulted in a 50 percent greater rms error score, lower pilot gain, greater high-frequency phase lag and greater low-frequency remnant. These differences were statistically significant, but differences between horizontal- and vertical-axis tracking and between 1- and 2-axis tracking were generally small and not highly significant. Manual tracking results were matched with the optimal control model using pilot-related parameters typical of those found in previous manual control studies. Head tracking performance was predicted with good accuracy using the manual tracking model plus a model for head/neck response dynamics obtained from the literature. Author

N82-13721*# Tufts Univ., Medford, Mass. Dept. of Engineering Design.

INTERRUPTION AS A TEST OF THE USER-COMPUTER INTERFACE

John G. Kreifeldt and Mary E. McCarthy *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 655-667 refs (For primary document see N82-13665 04-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

In order to study the effects different logic systems might have on interrupted operation, an algebraic calculator and a reverse polish notation calculator were compared when trained users were interrupted during problem entry. The RPN calculator showed markedly superior resistance to interruption effects compared to the AN calculator although no significant differences were found when the users were not interrupted. Causes and possible remedies for interruption effects are speculated. It is proposed that because interruption is such a common occurrence, it be incorporated into comparative evaluation tests of different logic system and control/display system and that interruption resistance be adopted as a specific design criteria for such design. A.R.H.

N82-13722*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

A MODEL FOR THE CONTROL MODE MAN-COMPUTER

INTERFACE DIALOGUE
Roy L. Chafin *In its* Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 669-682 refs (For primary document see N82-13665 04-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

A four stage model is presented for the control mode man-computer interface dialogue. It consists of context development, semantic development syntactic development, and command execution. Each stage is discussed in terms of the operator skill levels (naive, novice, competent, and expert) and pertinent human factors issues. These issues are human problem solving, human memory, and schemata. The execution stage is discussed in terms of the operators typing skills. This model provides an understanding of the human process in command mode activity for computer systems and a foundation for relating system characteristics to operator characteristics. Author

N82-13723*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
STRUCTURE OF THE KNOWLEDGE BASE FOR AN EXPERT LABELING SYSTEM
N. S. Rajaram *In* JPL Proc. of the 17th Ann. Conf. on Manual Control 15 Oct. 1981 p 683-688 refs (For primary document see N82-13665 04-54)
(Contract NAS9-15800)
Avail: NTIS HC A99/MF A01 CSCL 05H

One of the principal objectives of the NASA AgRISTARS program is the inventory of global crop resources using remotely sensed data gathered by Land Satellites (LANDSAT). A central problem in any such crop inventory procedure is the interpretation of LANDSAT images and identification of parts of each image which are covered by a particular crop of interest. This task of labeling is largely a manual one done by trained human analysts and consequently presents obstacles to the development of totally automated crop inventory systems. However, development in knowledge engineering as well as widespread availability of inexpensive hardware and software for artificial intelligence work offers possibilities for developing expert systems for labeling of crops. Such a knowledge based approach to labeling is presented. Author

N82-13724# Anthropology Research Project, Yellow Springs, Ohio.
ANTHROPOMETRIC SIZING SYSTEMS FOR ARMY WOMEN'S FIELD CLOTHING
Kathleen Robinette, Thomas Churchill, and John T. McConville Natick, Mass. Army Research and Development Lab. Mar. 1981 231 p
(Contract DAAK60-79-C-0097)
(AD-A102104; NATICK-TR-81/026; CEMEL-233) Avail: NTIS HC A11/MF A01 CSCL 05/1

A series of anthropometricaly based sizing programs and tariffs for Army women's field clothing are reported are size systems for upper body, lower body and total body garments are included. Sizing tables on which recommended values for some 59 dimensions relevant to garment construction are highlighted for easy identification are presented. Regression equations, rather than more traditional methods, were used to develop the sizing data and supportive material to permit designers to modify suggested dimensional values or to compute alternative sizing programs. A visual index accompanied by measurement descriptions, and bivariate distribution tables on which size categories have been graphically superimposed serve as visual references for users. Author

N82-13725# Air Force Human Resources Lab., Brooks AFB, Tex. Manpower and Personnel Div.
WEIGHTING OF APTITUDE COMPONENTS BASED ON DIFFERENCES IN TECHNICAL SCHOOL DIFFICULTY Interim Report, 1 Jun. 1980 - 1 Apr. 1981
C. J. Mullins, James A. Earles, and Malcolm Ree Jul. 1981 20 p refs
(AD-A102045; AFHRL-TR-81-19) Avail: NTIS HC A02/MF A01 CSCL 05/9

A method of adjusting technical school grades issued by schools of varying difficulty so that a new criterion is formed with all school grades adusted to the same metric was evaluated. This new criterion was used to recompute aptitude indexes which were compared with aptitude indexes computed in the conventional manner. It is found that the new aptitude indexes predict school grades in a cross validation sample better than the conventional aptitude indexes. Author

N82-13726# Carl-Cranz-Gesellschaft e.V., Brunswick (West Germany). Lehrgangsreihe Flugtechnik.
TAXONOMY OF THE HUMAN FACTORS IN MAN MACHINE SYSTEMS [TAXONOMIE DER HUMANFAKTOREN IN MENSCH-MASCHINE-SYSTEMEN]
K. Steininger (DFVLR, Hamburg) 1980 30 p refs In GERMAN
Avail: NTIS HC A03/MF A01

The human factors in man-machine systems are presented in a global model showing the manifold interplay between man, technical system and management. The psychic and social constraints involved are stressed. The nature of human error is also treated by means of a classification and the relation between work load and perceived stress is discussed. On the basis of these classifications, ergonometric methods and concepts for human factor engineering are derived and proposed for further investigations are formulated. Author (ESA)

N82-13058# Naval Air Development Center, Warminster, Pa.
THE INTELLIGENT USE OF INTELLIGENT SYSTEMS: PROBLEMS IN ENGINEERING MAN/MACHINE SYMBIOSIS
J. Hopson, W. Zachary (Analytics, Inc., Willow Grove, Pa.), and N. Lane *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 16 p refs (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

N82-13062# Naval Air Test Center, Patuxent River, Md.
EVALUATION OF A PILOT WORKLOAD ASSESSMENT DEVICE TO TEST ALTERNATE DISPLAY FORMATS AND CONTROL HANDLING QUALITIES
Samuel G. Schiflett, Paul M. Linton (Naval Air Development Center, Warminster, Pa.), and Ronald J. Spicuzza (Systems Research Labs., Inc., Dayton, Ohio) *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 12 p refs (For primary document see N82-13048 04-01)
Avail: NTIS HC A10/MF A01

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N82-13727# Army Research Office, Research Triangle Park, N. C.
PROCEEDINGS OF THE 1981 ARMY NUMERICAL ANALYSIS AND COMPUTERS CONFERENCE
Aug. 1981 632 p refs Conf. held at Redstone Arsenal, Alabama, 26-27 Feb. 1981
(AD-A103175; ARO-81-3) Avail: NTIS HC A99/MF A01 CSCL 12/1

These proceedings preserve in print most of the invited addresses and contributed papers of the 1981 Army Numerical Analysis and Computers Conference. The theme of this year's conference was Mathematical Software. Not only did the invited speakers treat this important area but many of the contributed

papers emphasized it. Preceding the conference a tutorial on Software Reliability was offered. Another special event was an evening session on the UNIX Operating System for certain computers manufactured by the Digital Equipment Corporation.
L.F.M.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N82-13728 Purdue Univ., Lafayette, Ind.
AN ANALYTICAL STUDY OF MULTIPROCESSOR SYSTEM RELIABILITY Ph.D. Thesis
Tian-Pong Chang 1981 200 p
Avail: Univ. Microfilms Order No. 8123620

The reliability performance of multiprocessor architectures is studied. A formal probabilistic graph is proposed to model multiprocessor systems. The Multi-partite graph is used to model multiprocessor architectures. Three categories of multiprocessor systems are considered according to their interconnection structures, (i.e., configurations with crossbar switch, time shared busses, and multiport memories). The multiprocessing performance level is defined by the resources demanding threshold. Combinatorial enumeration techniques are used to find the reliability expressions. Closed formulations are obtained to evaluate the system reliability/availability of all three multiprocessor architectures at different performance levels. The reliability sensitivity of various multiprocessor systems are studied to determine the most critical components in a given system. Two optimization techniques were developed to maximize the system reliability under a given cost constraint. Dissert. Abstr.

N82-13729 Ohio State Univ., Cleveland.
SYSTEM DESIGN OF THE DISTRIBUTED LOOP DATA BASE SYSTEM (BLDBS) Ph.D. Thesis
Chuen-Pu J. Chou 1981 313 p
Avail: Univ. Microfilms Order No. 8121774

The distributed double loop computer network (DDLCN) is designed as a fault tolerant distributed processing system that interconnects midi, mini, and micro computers using a double loop structure. It serves as a means of investigating fundamental problems in distributed processing and local networking. One of the major distributed services provided by DDLCN is a distributed data base system. In the distributed data base system, the user has logically integrated access to a collection of data which is managed on a network of geographically dispersed computers. Users' requests to the data base can be satisfied independently of the physical location of the data base, data base definitions, and the data base management system (DBMS). A method for designing such a distributed data base system for distributed processing systems in general and for DDLCN in particular is presented. Dissert. Abstr.

N82-13730 Northwestern Univ., Evanston, Ill.
AN INTEGRATED APPROACH FOR THE SPECIFICATION AND THE DESIGN OF THE CONCEPTUAL LEVEL IN DATABASE SYSTEMS Ph.D. Thesis
Sabah Saleh Al-Fedaghi 1981 257 p
Avail: Univ. Microfilms Order No. 8124838

A unifying conceptual model called the (k) model and a systematic design methodology called the intersection methodology are described. The (k) model is built on a type of recursive graph called the high order graph. The basic characteristics of the (k) graph are studied and their potential use for the modelling of large scale systems is presented. The (k) model is proposed as an integrated 'knowledge' repository of the enterprise, and at the same time, as a mapping tool for associating conceptual elements with those at the internal level. The (k) graph, the definitional formulae, the conceptual mappings and the intersection methodology are utilized to build a canonical representation of the conceptual level of database systems. Each element in the (k) graph is considered as a module (i.e. declarative/ procedural unit). A nucleus of a language for the specification of these modules is presented. Dissert. Abstr.

N82-13731 Northwestern Univ., Evanston, Ill.
AN APPROACH FOR NUMERICAL DATABASE MANAGEMENT Ph.D. Thesis
Ola-Olu Adeniyi Daini 1981 205 p
Avail: Univ. Microfilms Order No. 8124870

An approach for a numerical database manaagement system (NDBMS) that would promote physical data independence by relieving users from the need for knowledge of the physical data organization on the secondary devices is described. The approach is to describe each of the storage techniques by a physical scheme, which encompasses the corresponding access path, the encoding to storage structures, and the file access method. The numerical physical schemes are classified into three encoding groups which are discriminated according to the access path into direct, indirect and linked schemes. A generalized facility for describing any kink of numerical database and its mapping to storage is provided via nonprocedural Stored Data Description and Mapping Languages (SDDL and SDML). A Data Manipulator Language (DML) provides an interface between the application users and the NDBMS via a set of higher level commands embedded in FORTRAN. The feasibility of the generalized approach is shown by a prototype implementation of a translation program. Dissert. Abstr.

N82-13732 Stanford Univ., Calif.
INFORMATION STORAGE IN A DECENTRALIZED COMPUTER SYSTEM Ph.D. Thesis
David Kenneth Gifford 1981 143 p
Avail: Univ. Microfilms Order No. 8124072

An architecture for shared information storage in a decentralized computer system is described. Naming of files and other objects (naming), reliable storage of data (stable storage), coordinated access to shared storage (transactional storage), location of objects (location), use of multiple copies to increase performance, reliability and availability (replication), dynamic modification of object representations (reconfiguration), and storage security and authentication (protection) are addressed. A complete model of the architecture is presented, which describes the interface to the facilities provided, and the mechanisms for implementing them. Dissert. Abstr.

N82-13733# Ford Aerospace and Communications Corp., Sunnyvale, Calif. Engineering Services Div.
AN INFORMATION PROCESSING MODEL FOR PREDICTING ERROR DETECTION AND CORRECTION: AN ANALYSIS OF OPERATOR PERFORMANCE Final Report, Jun. 1979 - May 1981
Robert A. Goldbeck and Felice M. Ferrante Jul. 1981 73 p refs
(Contract F47620-79-C-0147)
(AD-A105079; ESD-SCFO-TR-6210; AFOSR-81-0681TR) Avail: NTIS HC A04/MF A01 CSCL 05/9

The overall objective of this research was to develop the capability to predict operator performance at a system console. To be useful in industry, this prediction should be available prior to production of a prototype or simulator. The value of such predictions is the opportunity for an analyst to select a design that meets system performance requirements while optimizing human performance, and to be able to make this selection before hardware and software design and development activities commence. For this study, three models were examined to determine how each could contribute to the formulation of an integrated model for predicting human performance. GRA

N82-13734# Minnesota Univ., Minneapolis. Dept. of Computer Science.
PREEMPTIVE SCHEDULING OF A MULTIPROCESSOR SYSTEM WITH MEMORIES TO MINIMIZE L SUB MAX
Ten Hwang Lai and Sartaj Sahni Jun. 1981 36 p refs
(Contract N00014-80-C-0650; Grant NSF MCS-80-005856)
(AD-A103795; TR-81-20) Avail: NTIS HC A03/MF A01 CSCL 09/2

An O(k square n + nlogn) algorithm is developed to obtain a preemptive schedule that minimizes Lmax when n jobs with given memory requirements are to be scheduled on m processors of given memory sizes and k is the number of distinct due dates. The value of the minimum Lmax can itself be found in O(kn + nlogn) time. Author

N82-13735# Purdue Univ., Lafayette, Ind. Dept. of Computer Science.

INTRODUCTION TO THE CONFIGURABLE HIGHLY PARALLEL COMPUTER, REVISION Interim Technical Report

Lawrence Snyder 18 May 1981 35 p refs
(Contracts N00014-80-K-0816; N00014-81-K-0360)
(AD-A099776; CSD-TR-351) Avail: NTIS HC A03/MF A01 CSCL 09/2

The Configurable highly parallel (CHip) computer family was introduced. Architectures are built around a lattice of programmable switches and data paths that permit processing elements to be connected in arbitrary patterns. The approach preserves locality. The parameters that determine various family members and switch configuration storage capacity, switch and processor element degrees and corridor width are discussed. An efficient embedding of a complete binary tree in presented to illustrate interconnection pattern programming. An algorithm for solving a system of linear equations is given. Author

N82-13736# Michigan State Univ., East Lansing. Dept. of Chemistry.

BEYOND MERE AUTOMATION Interim Technical Report

Christie G. Enke 1 Sep. 1981 15 p refs
(Contract N00014-76-C-1092)
(AD-A103838; TR-6) Avail: NTIS HC A02/MF A01 CSCL 09/2

The impact of the microprocessor on intelligent chemical instrumentation is addressed. Fundamentals of microprocessor control systems are ellucidated. The software problem is included. Examples of laboratory equipment are discussed, including the intelligent management of a linear diode array detector, a multiple microprocessor system for simultaneous execution of related tasks in a triple quadrupole mass spectrometer, a hierarchical system of minicomputers, and single and multiple microcomputers. Microprocessor capabilities are presented, including multiple variable processing, adaptation to a large variety of transducers, control of high speed operations, and complex data interpretation. The effect of microprocessor technology on chemical instrumentation is forecast, not only in automation and intelligent control, but also in design concepts and enhanced measuring capabilities. Some likely directions for future development are explored. Author

N82-13737# Naval Ocean Systems Center, San Diego, Calif. Sensor Processing and Analysis Div.

DIGITAL DATA COMPRESSION ALGORITHM PERFORMANCE COMPARISIONS: PROPOSED NATO STANDARD ALGORITHM PROVIDES BETTER FACSIMILE IN A NOISY COMMUNICATIONS ENVIRONMENT THAN PRESENT TACTICAL DIGITAL FACSIMILE ALGORITHM

C. E. Winterbauer 30 Apr. 1981 68 p
(AD-A103159; NOSC/TR-686) Avail: NTIS HC A04/MF A01 CSCL 09/2

Performance of the NATO data compression algorithm in a noisy communication channel is superior to that of the present TDF data compression algorithm, provided that the noise channel is not too harsh. Text is legible in a noise channel that has a bite error probability on the order 1 x 1/10 cubed (single bit errors). Multiple (burst) error are not a problem provided the burst length does not exceed ten bits. Where actual burst length greatly exceeds ten-bit (maximum) average expected in tactical situation noise, data compression algorithm performance may be poor, as with most data compression algorithm without a poweful noise protection algorthm. The NATO algorithm has enough compression to meet current TDF performance specification, but its compression efficiency is lower than that of the TDF. The two algorithms have about the same complexity. Author

N82-13738# Maryland Univ., College Park. Dept. of Computer Science.

ON THE FORMAL SPECIFICATION OF COMPUTER COMMUNICATION PROTOCOLS

Kenneth F. Shotting Dec. 1980 101 p refs
(Grant AF-AFOSR-3654-78)
(AD-A100189; TR-973; AFOSR-81-0491TR) Avail: NTIS HC A06/MF A01 CSCL 09/2

A framework to specify and verify communications protocols is presented. It views a communication system as a hierarchy of abstract machines using the hierarchical development methodology. A framework for formally specifying protocols, the formal specification of a particular protocol and an evaluation of the applicability of HDM to protocol specifications is discussed. A specification of the internet protocol developed as a sample use of the methods is included. Author

N82-13739# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.

DISTRIBUTED AND DECENTRALIZED CONTROL IN FULLY DISTRIBUTED PROCESSING SYSTEMS Final Technical Report, 15 Jan. - 30 Sep. 1980

Philip H. Enslow, Jr. and Timothy G. Saponas Jun. 1981 116 p refs
(Contract F30602-78-C-0120)
(AD-A104379; GIT-ICS-81/02; RADC-TR-81-127) Avail: NTIS HC A06/MF A01 CSCL 09B

Problems regarding the design and implementation of distributed and decentralized control are examined with particular reference to parallel processing. The general philosophies of control for the 'fully' distributed system are then presented along with the notation developed to describe the control actions of such processing activities. M.G.

N82-13740# Connecticut Univ., Storrs. Dept. of Electrical Engineering and Computer Science.

DYNAMIC DECISION-MAKING IN MULTI-TASK ENVIRONMENTS: THEORY AND EXPERIMENTAL RESULTS Final Scientific Report, 1 Oct. 1978 - 15 Jan. 1981

Krishna R. Pattipati and David L. Kleinman 15 Mar. 1981 129 p refs
(Grant AF-AFOSR-3733-78)
(AD-A102055; AFOSR-81-0586TR; EECS-TR-81-9) Avail: NTIS HC A07/MF A01 CSCL 09/2

Human monitoring, information processing, and task selection procedures in dynamic multitask environments, as a preliminary step towards analyzing and evaluating the human component of a supervisory control system is studied. A computer representation of the supervisory decision situation is developed. The human is presented with a dynamic situation wherein tasks of different value, time requirement and deadline compete for his attention. The effects of various task related variables on the human decision processes are studied. A normative dynamic decision model (DDM) of human task sequencing performance is developed. The analytic framework of the DDM is based on modern control, estimation and semi-Markov decision process theories, which provide a general methodology for analyzing dynamic decision making under uncertainty. Several time, history, and scalar measures of performance are proposed in order to validate the model. Excellent model data agreement is obtained for all the experimental conditions studied. GRA

N82-13741# Naval Ship Research and Development Center, Bethesda, Md. Computation, Mathematics and Logistics Dept.

PLAYBK-ROUTINES TO DRIVE A DIGITAL-TO-ANALOG CONVERTER

James R. Carlberg Jan. 1981 14 p
(SR0140301)
(AD-A102049; DTNSRDC/CMLD-81/02) Avail: NTIS HC A02/MF A01 CSCL 09/2

Two software drivers were written to control a digital-to-analog (D/A) converter on a PDP-11/45 minicomputer. One driver is a stand-alone program which outputs user specified data to the D/A converter at a user specified rate and scale factor. The second driver is a FORTRAN callable controller where the calling program specifies the data buffer, rate, and sale factor. This report is a user's document describing the procedure for using the controllers. Author

N82-13742# Georgia Inst. of Tech., Atlanta. Information and Computer Science.

A DIFFERENCE IN EFFICIENCY BETWEEN SYNCHRONOUS

AND ASYNCHRONOUS SYSTEMS
Eshrat Arjomandi (York Univ., Ontario), Michael J. Fischer (Washington Univ., Seattle), and Nancy A. Lynch Jun. 1981 8 p refs
(Contracts DAAG29-79-C-0155; N00014-79-C-0873; N00014-80-C-0221; Grants NSF MCS-77-15628; NSF MCS-79-24370)
(AD-A102280; GIT-ICS-81/07; ARO-16451.6-EL) Avail: NTIS HC A02/MF A01 CSCL 09/2

A system of parallel processes is said to be synchronous if all processes run using the same clock, and it is asynchronous if each process has its own independent clock. For any s, n, a particular distributed problem is defined involving system behavior at n 'ports'. This problem can be solved in time s by a synchronous system but requires time at least (s-l) log n on any asynchronous system. Author

N82-13743# Los Alamos Scientific Lab., N. Mex.
APPLICATION OF COMPUTER VOICE INPUT/OUTPUT
W. Ford and D. G. Shirk 1981 7 p refs Presented at the 22nd Ann. Meeting of the Inst. of Nucl. Mater. Management, San Francisco, 13-15 Jul. 1981
(Contract W-7405-eng-36)
(DE81-028769; LA-UR-81-2052; CONF-810706-27) Avail: NTIS HC A02/MF A01

Two simple voice controlled systems were designed for nuclear safeguards applications. Each can easily be expanded as time allows. The first system is for instrument control that accepts voice commands and issues audible operator prompts. The second system is for access control. The speaker's voice is used to verify his identity and to actuate external devices. DOE

N82-13744# National Bureau of Standards, Washington, D.C.
COMPUTER SCIENCE AND TECHNOLOGY: NBS PROGRAMMING ENVIRONMENT WORKSHOP REPORT Final Report
Martha A. Branstad, ed. and W. Richards Adrion, ed. Jun. 1981 111 p refs
(PB81-237869; NBS-SP-500-78; LC-81-600068) Avail: NTIS HC A06/MF A01 CSCL 09B

In May of 1980, NBS hosted a workshop to assess the state-of-the-art in programming environment technology and to determine the key questions and issues that must be addressed to use these techniques to improve software quality and productivity within the Federal Government. The results of the workshop are presented. GRA

N82-13745# Federal Compiler Testing Center, Washington, D.C.
DIGITAL EQUIPMENT CORPORATION VAX-11 FORTRAN, VERSION 2 Validation Summary Report
21 Jul. 1981 13 p
(PB81-232431; FCVS78-VSR806) Avail: NTIS HC A02/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the DEC VAX-11 FORTRAN Compiler Version 2 (VAX/VMS Version 2) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 FORTRAN Standard (X3.9-1978). The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies; a section relating the categories of discrepancies to the language; and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-13746# Federal Compiler Testing Center, Washington, D.C.
DIGITAL EQUATION CORPORATION PDP-11 COBOL, VERSION 4.1 Validation Summary Report
21 Jul. 1981 50 p
(PB81-232423; CCVS74-VSR805) Avail: NTIS HC A03/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the DEC PDP-11 COBOL Compiler Version 4.1 (RSX-11M+ Version 1.0) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing o discrepancies together with the tests which were failed. GRA

N82-13747# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
DIGITAL EQUIPMENT CORPORATION, PDP-11 COBOL VERSION, 4.1 INDEXED 1-0 MODULE
21 Jul. 1981 11 p
(PB81-232415; FCTC/TR-81/21) Avail: NTIS HC A02/MF A01 CSCL 09B

The FCTC Technical Report for the indexed I-O Module of the DEC PDP-11 COBOL Compiler Version 4.1 (RSX-11M+ Version 1.0) provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed I-O Module of the 1974 COBOL Standard (x3.23-1974/FIPS PUB 21-1). This Technical Report is made up of several sections showing the discrepancies found. A companion report (Validation Summary Report CCVS74-VRSR805) provides information regarding the validation of the Compiler at the low Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

N82-13748*# Federal Compiler Testing Center, Falls Church, Va.
SPERRY UNIVAC ASCII COBOL LEVEL 5R2 Validation Summary Report
29 Jun. 1981 67 p
(PB81-228892; CCVS74-VSR815) Avail: NTIS HC A04/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the Sperry Univac ASCII COBOL Compiler Version 5R2 (1100 OS Version 37R2) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the HIGH level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language, and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-13749# Federal Compiler Testing Center, Falls Church, Va.
COBOL COMPILER: NORTHERN TELECOM, INC. NTI COBOL/3 Validation Summary Report
29 Jun. 1981 50 p
(PB81-226417; CCVS74-VSR780) Avail: NTIS HC A03/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the Northern Telecom, Inc. COBOL Compiler Version COBOL/3 (NTI Version 4.1) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language, and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-13750 Stanford Univ., Calif.
CAPACITY AND CODING FOR COMPUTER MEMORY WITH DEFECTS Ph.D. Thesis
Chris Douglas Heegard 1981 101 p
Avail: Univ. Microfilms Order No. 8124080

The problem of reliable message storage in an imperfect computer memory is investigated. The information that describes the state of the defects can be used to aid the encoding or decoding of messages. First, a probablistic model for computer memory with defects and noise is introduced. Algorithms are presented that can be used to compute the capacity of these memories. Next, computer memory with stuck-at defects and additive errors are examined from an algebraic viewpoint. A class of modified linear block codes is introduced to correct defects and errors when the location and nature of the stuck-at cells is given to the encoder. Two theorems are stated that are used to prove that the class of modified linear block codes achieve capacity for these memories. Finally, the class of modified cyclic block codes is introduced. Parameters of binary codes for several block lengths are tabulated. Dissert. Abstr.

N82-13751 Stanford Univ., Calif.
CONCURRENT TESTING AND CHECKING IN COMPUTER SYSTEMS Ph.D. Thesis
David Jun Lu 1981 168 p
Avail: Univ. Microfilms Order No. 8124103

Improved techniques for designing concurrent testing and checking in computer systems are given. At the logic circuit level the design of self-checking circuits by introducing quantitative measures and figures of merit for self-checking is studied. At the computer system level, the use of watchdog processors for error-detection performed during the executive of computer programs is studied. The quantitative measures testing input fraction and secure input fraction, are defined to provide comparison of self-checking circuit designs. Figures of self-checking merit are defined to summarize data from evaluation of these measures. Three designs for self-checking implementations of linear feedback shift registers used as cyclic redundancy code encoders are evaluated. The applications of watchdog processors in concurrent testing at the system level is studied. Structural integrity checking (SIC), an error-detection technique that recognizes high level control flow structures in programs, is introduced. Dissert. Abstr.

N82-13752 Stanford Univ., Calif.
AUTOMATED PARTITIONING OF HIERARCHICALLY SPECIFIED DIGITAL SYSTEMS Ph.D. Thesis
Thomas Stephen Payne 1981 144 p
Avail: Univ. Microfilms Order No. 8124130

A methodology for automating the partitioning of the logic into physical blocks is based on information available in a hierarchically specified design. This methodology uses sets of identical logic, identified in a hierarchical design, to produce multiple used parts. Functional group information is used to increase testability and to make the physical realization more understandable. The compact nature of the hierarchical design is utilized to increase the efficiency of the partitioning process. A model of the partitioning process is presented, including a quality function for evaluating the quality of the physical design produced. Several existing algorithms are described and evaluated. The hierarchical partitioning algorithm is heuristic and uses a constructive approach which produces results significantly better than results produced by existing algorithms. Physical designs, containing significant repeated usage of part types were produced. Dissert. Abstr.

N82-13753 Syracuse Univ., N. Y.
DIRECT EXECUTION STRING PROCESSOR Ph.D. Thesis
Daniel Joseph Pease 1981 249 p refs
Avail: Univ. Microfilms Order No. 8123932

A modular, data driven, reorganizable multiprocessor which is configured by a high order string processing language was developed. Its design is based on an applicative model of string processing. This gives rise to a non-Von Neumann model providing primitives for parsing, searching, manipulating, and modification of strings. In addition operators are defined for creating new functions from the base set. From the model on high order string processing language is developed. An architecture, which becomes the basis for the implementation is designed from the model and language. The Direct Execution String Processing (DESP) system which implements the architecture is developed. It has two basic processing modules, one for parsing/searching and one for manipulation and modification. A search/parsing memory is developed which is a linear pattern recognition structure capable of detecting variable length partially specified queries that can be overtapped. A queue memory is also developed which is a multiport memory structure supporting simultaneous read and write to variable sized partitions of the manipulation and modification modules. Dissert. Abstr.

N82-13754 Kansas State Univ., Manhattan.
DESCRIPTIVE TECHNIQUES FOR DIGITAL SYSTEM CONTAINING COMPLEX HARDWARE COMPONENTS Ph.D. Thesis
Anil Kumar Singh 1981 210 p
Avail: Univ. Microfilms Order No. 8122038

Descriptive Technique for Modules and Systems (DTMS) is a Hardware Description Language that was developed for the description of modern digital modules and systems consisting of interconnected modules. Descriptions can represent behavior or they can represent hardware parallelism. Descriptions organized in a procedural framework include one or more concurrently executing processes. The language can be used for the description of systems with synchronous, asynchronous or mixed timing modes. The Hardware Description Net (HD Net) is a model that can be used for alternative graphical representation of the processes in DTMS module descriptions. Hardware Specification Net (HS Net) was developed for graphical representation of conceptual design. A procedure was developed for the realization of control hardware for synchronous systems from HS Net specifications. Dissert. Abstr.

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-13755 Carnegie-Mellon Univ., Pittsburgh, Pa.
MULTI-SENSOR IMAGE REGISTRATION Ph.D. Thesis
Yair Barniv 1981 249 p refs
Avail: Univ. Microfilms Order No. 8118425

Registration of multi-sensor imagery (MSI) is considered. This scene matching problem is dominated by intensity disparity and contrast reversal differences in parts of the image. A new MSI model is advanced in which the intensity transmittances of all objectst are independent random variables and the edges in the scene are modeled as a low density Poisson process. A communcation analogy is used to arrive at the general MSI processor with several processing operators and a correlator output stages. The correlation coefficient of the data is used to determine the need for linear and nonlinear MSI preprocessing operators. Magnitude gradient, historgram shaping, spectrum whitening, and threshold selection are considered. Experimental simulations on six data bases are used to verify the MSI processing theory for different classes of MSI data. Dissert. Abstr.

N82-13756 Rochester Univ., N. Y.
A SPECIFICATION AND PROOF TECHNIQUE FOR MESSAGE-BASED SYSTEMS AND ITS APPLICATION TO DISTRIBUTED DATABASE ALGORITHMS Ph.D. Thesis
Anil Nigam 1981 279 p
Avail: Univ. Microfilms Order No. 8123996

Distributed computing with widely separated machines is an area of growing theoretical and practical interest. A distributed algorithm is abstracted as a collection of processes that communicate exclusively through message passing. Each participating process is specific as an abstract state-transition table. Various kinds of failures, relevant to distributed algorithms are discussed. An incremental design approach is demonstrated or extending tables to encode failure and recovery components. Proofs for these extended tables are also developed; some axioms characterizing process failure and recovery are proposed and validated. The specification technique is applied to several variations of the population Two-Phase Commit Protocol for atomic updates in a distributed database. Proofs are developed for the relevant properties, and failure and recovery aspects are also addressed. Finally some directions are provided about the applicability of the specification technique to database algorithms. Dissert. Abstr.

N82-13757 Rochester Univ., N. Y.
LANGUAGE, COMPUTATION, AND REALITY Ph.D. Thesis
Donald Richard Perlis 1981 202 p
Avail: Univ. Microfilms Order No. 8123998

The interplay of assertion and meaning, or quotation and unquotation, in reasoning entities is considered. The notion of possibility is analyzed in several contexts, most specifically in

relation to resource-limited computational models of belief and inference, and in the philosophy of science. A first-order treatment of quotation and unquotation is given that allows broad and paradox-free expression of syntax and semantics. It is argued that this makes unnecessary the usual hierarchical constructions for notions such as default reasoning, theory subsumption, concepts, beliefs, and self-reference. This is then applied to a model of belief and inference in which focus of attention is a key element. Effort is made to isolate certain automatic inferences apparently part of the very meaning of propositional beliefs, and then base more sophisticated thinking on these. The relationship of resource-limited computation to the notion of possibility in the foundations of physics and modal logic is discussed.
Dissert. Abstr.

N82-13758 Northwestern Univ., Evanston, Ill.

PROBABILISTIC ERROR ANALYSIS OF FLOATING POINT AND CRD ARITHMETICS Ph.D. Thesis

Jesse Louis Barlow 1981 116 p
Avail: Univ. Microfilms Order No. 8124850

The longstanding, unsolved problem of the probability distribution of roundoff errors in computer arithmetics is discussed. Probabilistic models of floating point and logarithmic arithmetic were constructed using assumptions with both theoretical and empirical justification. A probabilistic roundoff error model for fixed point arithmetic was developed. The models for floating point and logarithmic arithmetic were applied to the error from sums, extended products, polynomials in one variable, inner products, matrix computations, linear equation solving procedures both direct and iterative, and linear multistep methods for the solution of ordinary differential equations. A comparison was made of the error analysis properties of floating point and logarithmic computers. It is concluded that the logarithmic computers have smaller error confidence intervals for roundoff errors than a floating point computer with the same computer word size and approximately the same number range in any numerical computation.
Dissert. Abstr.

N82-13759 Kansas State Univ., Manhattan.

COMPILER GENERATION FROM LAMBDA CALCULUS DEFINITIONS OF PROGRAMMING LANGUAGES Ph.D. Thesis

David Arlen Schmidt 1981 134 p
Avail: Univ. Microfilms Order No. 8122033

The foundations of automated compiler construction based upon lambda calculus definitions of programming languages are studied. A Scott-Strachey denotational definition written in SLAMBDA, a variant of Scott's LAMBDA notation, is utilized by an algorithm to produce a translation scheme from a source to a predefined target language. The produce translator accepts as input a correctly parsed source program (an abstract syntax tree) and produces code in the target language; the target language used in the exposition is a flowchart language extension called STM (state transition machines). Correctness of the translation scheme is facilitated by defining a semantic model for SLAMBDA: a Scott-model retract of the universal domain Pw, and a quotient model based upon a relation describing operational equivalence with respect to the term rewriting rules of the SLAMBDA system are given. The simplification of existing techniques for showing the proof of correctness of the intermediate to target translator is discussed.
Dissert. Abstr.

N82-13760 Georgia Inst. of Tech., Atlanta.

COMPLEXITY OF COMMUNICATION AMONG ASYNCHRONOUS PARALLEL PROCESSES Ph.D. Thesis

James Edward Burns 1981 137 p
Avail: Univ. Microfilms Order No. 8124283

Certain problems of synchronization for systems of processes which execute asynchronously were investigated. In a system of asynchronous parallel processes, the speed of execution of each process is independent of that of all the other processes in the system and may vary as the process executes. Communication through shared variables and communication by passing messages are considered. Results using the shared variable model developed in the investigation are discussed.
Dissert. Abstr.

N82-13761 Stanford Univ., Calif.

SYMBOLIC REASONING AMONG 3-D MODELS AND 2-D IMAGES Ph.D. Thesis

Rodney Allen Brooks 1981 181 p
Avail: Univ. Microfilms Order No. 8124043

An implemented and operational model-based vision system is described. Examples are given of its interpretation of images, including extraction of three dimensional parameters from monocular images. Advances are presented in representation for geometric modeling of objects and objects classes, in techniques for manipulating nonlinear symbolic algebraic constraints, in geometric reasoning incompletely specified situations, and in constructing algebraic constraints from image measurements. Both generic object classes and specific objects are represented by volume models which are independent of viewpoint. Complex real word object classes are modeled. Variations in size, structure and spatial relations within object classes can be modeled. Spatial reasoning techniques are described which are useful both for prediction within a vision system, and for planning within a manipulation system. Approaches to prediction and interpretation are introduced, based on the propagation of symbolic constraint.
Dissert. Abstr.

N82-13762 Stanford Univ., Calif.

QUERY OPTIMIZATION BY SEMANTIC REASONING Ph.D. Thesis

Jonathan Jay King 1981 117 p
Avail: Univ. Microfilms Order No. 8124097

Semantic query optimization is a method which produces a semantically equivalent query that is less expensive to process than the original query. It transforms the original query into a new one by means of a process of inference. The transformations are limited to those that yield a semantically equivalent query, that is guaranteed to produce the same answer as the original query in any permitted state of the data base. A problem reformulation step for problem solving programs is investigated. Equivalent statements of the original problem are sought, one of which may have a better solution than the original problem. Semantic query optimization applies knowledge of problem domain and of the capabilities and limitations of the data base to pose the most effective and easily processed queries to solve a user's problem.
Dissert. Abstr.

N82-13763 Wisconsin Univ. - Madison.

ALGORITHMS FOR THE GEOMETRY OF SEMI-ALGEBRAIC SETS Ph.D. Thesis

Dennis Soule Arnon 1981 197 p
Avail: Univ. Microfilms Order No. 8120294

Let A be a set of polynomials in r variables with integer coefficients. An A-invariant cylindrical algebraic decomposition (cad) of r-dimensional Euclidean space is a certain cellular decomposition of r-space, such that each cell is a semi-algebraic set, the polynomials of A are sign-invariant on each cell, and the cells are arranged into cylinders. The cad algorithm given by Collins provides, among other applications, the fastest known decision procedure for real closed fields, a cellular decomposition algorithm for semialgebraic sets, and a method of solving nonlinear (polynomial) optimization problems exactly. A new version of the cad algorithm is presented for r less than 3, in which one works with maximal connected A-invariant collections of cells, in such a way as to often avoid the most time-consuming algebraic number calculations. Essential to this new cad algorithm is an algorithm presented for determination of adjacenies among the cells of a cad. Computer programs for the cad and adjacency algorithms have been written.
Dissert. Abstr.

N82-13764*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.

STATISTICAL ENERGY ANALYSIS COMPUTER PROGRAM, USER'S GUIDE

R. W. Trudell and L. I. Yano Nov. 1981 118 p refs
(Contract NAS8-33191)
(NASA-CR-161913; MDC-G9915) Avail: NTIS HC A06/MF A01 CSCL 09B

A high frequency random vibration analysis, (statistical energy analysis (SEA) method) is examined. The SEA method accomplishs high frequency prediction of arbitrary structural configurations. A general SEA computer program is described. A summary of SEA theory, example problems of SEA program application, and complete program listing are presented.
S.L.

N82-13765*# Intermetrics, Inc., Huntsville, Ala.
SEPAC SOFTWARE CONFIGURATION CONTROL PLAN AND PROCEDURES, REVISION 1
15 May 1981 40 p
(Contract NAS8-33806)
(NASA-CR-161915; IR-634-1) Avail: NTIS HC A03/MF A01 CSCL 09B

SEPAC Software Configuration Control Plan and Procedures are presented. The objective of the software configuration control is to establish the process for maintaining configuration control of the SEPAC software beginning with the baselining of SEPAC Flight Software Version 1 and encompass the integration and verification tests through Spacelab Level IV Integration. They are designed to provide a simplified but complete configuration control process. The intent is to require a minimum amount of paperwork but provide total traceability of SEPAC software. L.F.M.

N82-13766*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SURVEY OF STANDARDS APPLICABLE TO A DATABASE MANAGEMENT SYSTEM
Jose L. Urena 15 Oct. 1981 51 p refs
(Contract NAS7-100)
(NASA-CR-165009; JPL-Pub-81-88) Avail: NTIS HC A04/MF A01 CSCL 09B

Industry, government, and NASA standards, and the status of standardization activities of standards setting organizations applicable to the design, implementation and operation of a data base management system for space related applications are identified. The applicability of the standards to a general purpose, multimission data base management system is addressed. S.L.

N82-13767*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SOFTWARE DESIGN AND DOCUMENTATION LANGUAGE: USER'S GUIDE FOR SDDL RELEASE 4
T. M. Zepko 15 Sep. 1981 13 p refs Revised
(Contract NAS7-100)
(NASA-CR-165025; JPL-Pub-77-24-Rev-1-Add-1) Avail: NTIS HC A02/MF A01 CSCL 09B

The changes introduced in the PASCAL implementation of the software design and documentation language are described. These changes include a number of new capabilities, plus some changes to make the language more consistent and easier to use. Incompatibilities with earlier versions are limited to certain of the directive statements. B.W.

N82-13768*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
COMPUTER VISION
Donald Gennery, Robert Cunningham, Eric Saund, John High, and Carl Ruoff 1 Nov. 1981 104 p refs
(Contract NAS7-100)
(NASA-CR-165012; JPL-Pub-81-92) Avail: NTIS HC A06/MF A01 CSCL 09B

The field of computer vision is surveyed and assessed, key research issues are identified, and possibilities for a future vision system are discussed. The problems of descriptions of two and three dimensional worlds are discussed. The representation of such features as texture, edges, curves, and corners are detailed. Recognition methods are described in which cross correlation coefficients are maximized or numerical values for a set of features are measured. Object tracking is discussed in terms of the robust matching algorithms that must be devised. Stereo vision, camera control and calibration, and the hardware and systems architecture are discussed. R.J.F.

N82-13769# Defense Communications Engineering Center, Reston, Va.
PROBLEMS WITH THE MULTITASKING FACILITIES IN THE ADA PROGRAMMING LANGUAGE
Susan Lana Zuckerman 11 May 1981 23 p refs
(AD-A105229; DCEC-TN-16-81) Avail: NTIS HC A02/MF A01 CSCL 09/2

The ADA language was designed for military embedded computer applications, and therefore its multitasking facilities will be heavily utilized in DoD software. However, ADA's multitasking facilities do not provide capabilities equivalent to current multitasking facilities in existing languages. ADA's unconventional multitasking facilities raise serious questions. Problem areas are identified and discussed, and solutions are proposed. Because ADA's multitasking facilities are only a small part of the total language, changes and improvements can be made without impacting the remainder of the language. Author (GRA)

N82-13770# Systems Control, Inc., Palo Alto, Calif. Computer Science Dept.
RESEARCH ON KNOWLEDGE BASED PROGRAMMING AND ALGORITHM DESIGN Final Technical Report, 27 Nov. 1978 - 31 Aug. 1981
Cordell Green Aug. 1981 121 p refs
(Contracts N00014-79-C-0127; N00014-80-C-0045; DARPA Order 3687; DARPA Order 3828)
(AD-A105661; SCI-ICS-L-81-5) Avail: NTIS HC A06/MF A01 CSCL 09/2

The object of our research is the codification of programming knowledge and the creation of computer systems that incorporate this knowledge that assist in the various activities of programming. We have designed and implemented the CHI knowledge-based programming system, including the 'V' wide-spectrum language for expressing both programming knowledge and program specifications. CHI has been used to synthesize several programs including parts of itself. We are extending the uses of the knowledge base to provide intelligent tools for environment to support not only program synthesis but program acquisition, modification, debugging and maintenance. Another aspect of our research is called Algorithm Design. This project emphasizes tools to assist in the more creative aspects of the creation of new algorithms. We have formalized a set of methods, primarily focused upon the incorporation of operations into generators, that seem to be a very powerful set of tools in deriving good and difficult algorithms. We have implemented some of these methods in CHI and include a discussion of the derivations in this report. GRA

N82-13771# Oak Ridge National Lab., Tenn.
ASSESSMENT OF THE COMPUTER CODE COBRA/CFTL
C. B. Baxi and C. J. Burhop Jul. 1981 238 p refs
(Contract W-7405-eng-26)
(DE81-027933; ORNL/Sub-81-92304/1; GA-A-16359) Avail: NTIS HC A11/MF A01

The COBRA/CFTL code was developed for thermal-hydraulic analysis of simulated gas-cooled fast breeder reactor (GCFR) core assemblies to be tested in the core flow test loop (CFTL). The COBRA/CFTL code was obtained by modifying the general atomic code COBRA/GCFR. These modifications are discussed. The two code results for three cases which represent conditions from fully rough turbulent flow to laminar flow are compared. Case 1 represented fully rough turbulent flow in the bundle. Cases 2 and 3 represented laminar and transition flow regimes. The required input for the COBRA/CFTL code, a sample problem input/output, and the code listing are included. DOE

N82-13772# California Univ., Livermore. Lawrence Livermore Lab.
USER'S MANUALS FOR DYNA3D AND DYNAP: NONLINEAR DYNAMIC ANALYSIS OF SOLIDS IN THREE DIMENSIONS
J. O. Hallquist Jul. 1981 96 p refs
(Contract W-7405-eng-48)
(DE81-028360; UCID-19156) Avail: NTIS HC A05/MF A01

A user's manual for DYNA3D, an explicit three-dimensional finite element code for analyzing the large deformation dynamic response of inelastic solids, is given. A contact-impact algorithm permits gaps and sliding along material interfaces. By a specialization of thmis algorithm, such interfaces can be rigidly tied to admit variable zoning without the need of transition regions. Spatial discretization is achieved by the use of 8-node solid elements, and the equations of motion are integrated by the central difference method. Post-processors for DYNA3D include GRAPE for plotting deformed shapes and stress contours and DYNAP for plotting time histories. A user's manual for DYNAP is also provided. DOE

N82-13773# California Univ., Livermore. Lawrence Livermore Lab.
SOLUTION OF SINGLE LINEAR TRIDIAGONAL SYSTEMS AND VECTORIZATION OF THE ICCG ALGORITHM ON THE CRAY 1
David S. Kershaw 25 Jun. 1981 31 p refs
(Contract W-7405-eng-48)
(DE81-025461; UCID-19085) Avail: NTIS HC A03/MF A01

The numerical algorithms used to solve the physics equation in codes which model laser fusion are examined. It is found that a large number of subroutines require the solution of tridiagonal linear systems of equations. The standard algorithm used in the past on CDC 7600's does not vectorize and so cannot take advantage of the large speed increases possible on the Cray-1 through vectorization. There is however, an alternate algorithm for solving tridiagonal systems, called cyclic reduction, which allows for vectorization, and which is optimal for the Cray-1. An alternative ICCG algorithm for the Cray-1 was developed which utilizes a block form of a cyclic reduction algorithm. This algorithm allows full vectorization and runs as much as five times faster than the old algorithm on the Cray-1. It is used in Cray LASNEX to solve the two dimensional diffusion equation in all the physics subroutines. DOE

N82-13774# Los Alamos Scientific Lab., N. Mex.
PLOT2K: A GRAPHICS INTERFACE OF SYSTEM 2000
Larry Creel 1981 7 p Presented at the ASTUTE Conf., New Orleans, Sep. 1981
(Contract W-7405-eng-36)
(DE81-028706; LA-UR-81-2265; CONF-810930-1) Avail: NTIS HC A02/MF A01

PLOT2K, an interactive graphics interface to the System 2000 data base management system is described. It runs on a CDC 6600 computer with an NOS or NOS/BE operating system. The graphics package used is DISSPLA. The PLOT2K will generate bar chart histograms, pie charts, or x-y point plots and will access any System 2000 data base. DOE

N82-13775# Sandia Labs., Albuquerque, N. Mex.
MERLIN: A COMPUTER PROGRAM TO TRANSFER FINITE-ELEMENT MESHES
D. K. Gartling Sep. 1981 45 p refs
(Contract DE-AC04-76DP-00789)
(DE82-000806; SAND-81-0463) Avail: NTIS HC A03/MF A01

The MERLIN program is described which transfers data between two dimensional, finite element meshes of arbitrary geometry. The program is structured to accurately interpolate previously computed solutions onto a given mesh and format the resulting data for immediate use in a variety of existing finite element codes. The theoretical basis and computational algorithms used in the program are described and complete user instructions are presented. Example problems in steady state conductive heat transfer in a cylinder and thermal stresses in the pillars of an underground nuclear waste repository are given. DOE

N82-13776# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Systemes et Communications.
ADAPTIVE EQUALIZATION ALGORITHMS FOR A DISPERSIVE CHANNEL Ph.D. Thesis [ALGORITHMS D'EGALISATION ADAPTATIVE D'UN CANAL DISPERSIF]
Hikmet Sari Oct. 1980 134 p refs In FRENCH
(ENST-E-80012) Avail: NTIS HC A07/MF A01

The equalization of a numerical transmission channel is studied, centering on algorithms which control adaptation of the equalizer to an unknown channel that may be slowly time variable. Two problems, i.e., tracking a nonstationary channel, and identification of a stationary channel, are considered. Two equalizers are compared: a linear nonrecursive one, and a recursive one with a decision loop. Algorithms are described and simulation results show their performance. An auto-orthogonalizing algorithm is treated in greater detail. Two alternative algorithms are then proposed. The first gives rapid convergence and is not sensitive to dispersion of the values of the received signal correlation matrix. It is obtained by replacing the Toeplitz matrix for the gain of the auto-orthogonalizing algorithm by a circulation matrix that is asymptotically equivalent to it. The algorithm is suitable for both equalizers discussed. The second algorithm proposed is noniterative; it is only well-adapted to the linear nonrecursive equalizer. Author (ESA)

N82-13777# Messerschmitt-Boelkow-Blohm G.m.b.H., Hamburg (West Germany). Unternehmensbereich Hamburger Flugzeugbau.
INCREASE IN THE PROFITABILITY OF DESIGN AND PROCESS PLANNING BY INTEGRATED AND GRAPHIC DATA PROCESSING, PHASE 1 Final Report
Rolf Feddersen, Ulrich Grupe (Vereinigte Flugtechnische Werke GmbH, Bremen, West Germany), and Juergen Nagel (Dornier-Werke GmbH, Friedrichshafen, West Germany) Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 275 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-005; ISSN-0170-1339) Avail: NTIS HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 43,90

The basic concepts of computer aided design systems are reviewed and generalized for application throughout the entire production process. Examples from aerospace technology are illustrated. The principles and operation modes of the selected computer-graphics interactive data-processing and programming system are exposed and its utilization assessed in the fields of lofting, structure analysis, tool design, numerical control programming, process planning and order processing. It is found that a favorable basis is thus created for the development of machine independent programs and interactive methods. Author (ESA)

N82-13778# Joint Research Centre of the European Communities, Ispra (Italy).
MESH GENERATING AND PLOTTING FACILITIES OF THE LAMCAL PROGRAM
L. G. Lamain 1980 47 p Submitted for publication
(EUR-7099-EN) Avail: NTIS HC A03/MF A01

The complete LAMCAL program consists of three parts: mesh generation; the elastoplastic finite element part; and the plotting part. The three parts are connected by means of an overlay structure using peripheral units as interfaces, which allows them to be used together, separately, or in combination with other computer programs. The mesh generation and the plotting part of the LAMCAL program are described and the input formats are given. Output formats available for mesh generation are Bersafe, Eurdyne and Semiloof. With varying degrees of effort, all kinds of two-dimensional meshes and some three-dimensional meshes (plate and solid element) may be generated. Special attention is given to meshes for crack problems. The input file for the plotting part can contain any number, and in any order, data for mesh, isofunction, and deformation plots. An existing mesh can also be plotted. Messages about available and required core are given in the program. Author (ESA)

N82-13779# Research Inst. of National Defence, Stockholm (Sweden).
A COMPARISON OF THREE PROGRAMS FOR THE CALCULATION OF SURFACE-RATIO [EN JAEMFOERELSE AV TRE PROGRAM FOER BERAEKNING AV 'YTFOERHAALLANDEN']
Per Svensson Dec. 1980 31 p refs In SWEDISH
(FOA-C-20392-D8) Avail: NTIS HC A03/MF A01

For the calculation of splinter effect on a given cylindrical target struck by a missile, two methods have been used for several years with the VERSAM program. A method for the same geometrical problems and for use in a version of the artillery efficiency model (AVM) is discussed. The three methods were developed to meet different requirements. The accuracy of the three methods is compared. The facit-method, developed for this comparison, is a severely tested extension of the above mentioned AVM-computer program. Author (ESA)

N82-13780# ERIA/ECA Automation, St. Cloud (France).
STUDY ON THE IMPLEMENTATION OF A PROGRAM FOR QUALITY CONTROL OF COMPUTER PROGRAMS, PHASE 1 Final Report [L'ETUDE DE LA MISE EN PLACE D'UN PROGRAMME D'ASSURANCE DE QUALITE DES LOGICIELS - PHASE 1]
Paris ESA Nov. 1980 127 p In FRENCH

(Contract ESTEC-4182/79/NL-PP(SC))
(ESA-CR(P)-1444) Avail: NTIS HC A07/MF A01

A coherent system of quality control for computer programs is defined. Problems arising with the different approaches available for determining the quality of a program are reviewed. Quality requirements specific to ESA are identified. A computer program quality package is presented. Subroutines for static and dynamic analyses are outlined. The ESA programming capabilities are assessed and the characteristics of a specification routine are given. The possibility of ESA's implementing this solution (time and means necessary) is estimated. Author (ESA)

N82-13781 Ohio State Univ., Columbus.
DESIGN OF A REAL TIME, INTERACTIVE, PARALLEL SIMULATION COMPUTER Ph.D. Thesis
Yukoh Kobayashi 1981 169 p
Avail: Univ. Microfilms Order No. 8121814

A parallel computer organization for interactive, real time simulations which deal with models represented in a set of ordinary differential equations is proposed. The concept of a simulation computer, having a highly parallel processing organization involving from tens to thousands of peripheral processing is introduced. The proposed computer organization is supported by an efficient method of process synchronization and data transfer among peripheral processors. While process synchronization and data transfer are traditionally carried out through (or by) processors or by a switching network, the proposed method employs specially organized memory modules which consist of a global and a local region. A simulation of the PHYSBE model, which represents the blood circulation of the human body and involves seven first order differential equations, is demonstrated using the fourth order Runge-Kutta integration method for the proposed computer. For this particular simulation model the porposed computer is estimated to be 15 times faster than the conventional digital computer, and 2.6 times faster than the analog computer. Figures of a comparison of absolute error vs. the number of integration steps per cycle and a comparison of absolute error vs. frequency are shown for various orders of the Runge-Kutta integration method. Dissert. Abstr.

N82-13782 Polytechnic Inst. of New York, Brooklyn.
SOME EXPERIMENTAL DESIGN TECHNIQUES IN IMAGE PROCESSING PROBLEMS Ph.D. Thesis
Edward S. H. Chang 1981 199 p
Avail: Univ. Microfilms Order No. 8118864

The classification, detection and enhancement of images contaminated by Gaussian and/or non-Gaussian noise are presented in the framework of the general linear model, using the techniques of experimental design with or without replications. A set of robust procedures which utilize recursive and non-recursive estimators and classifiers is presented and used to analyze and represent image data in terms of F- and t- statistics. Decision rules for estimation and classification are based on threshold values associated with various confidence levels. An object detection classifier is developed by combining the supervised learning model, hypothesis testing techniques and the robust F-statistic in conjunction with the ANOVA process. In addition, a class of robustized recursive noise detectors based on the Hartley's or Cochran's F-max statistics are developed. Dissert. Abstr.

N82-13783 Syracuse Univ., N. Y.
METHODS OF VERIFICATION OF DIGITAL LOGIC Ph.D. Thesis
Vijayaraghavan Pitchumani 1981 202 p
Avail: Univ. Microfilms Order No. 8123933

Proof techniques are presented for use at both low and high levels of hardware verification. To help in the design of provable logic, a structured register transfer language is defined and an axiomatic definition of its semantics is given. Formal rules for the translation of a description into hardware are discussed. Two techniques, static and dynamic analyses for proof of an implementation are contrasted in terms of their capabilities. At a higher level, techniques are given for the proof of correctness of both serial and parallel control sequences using an assertions approach. These techniques are compared with those used in software. Finally the mechanizability of all the techniques given are discussed. Dissert. Abstr.

N82-13784 Stanford Univ., Calif.
TRELLIS DATA COMPRESSION Ph.D. Thesis
Lawrence Colm Stewart 1981 137 p
Avail: Univ. Microfilms Order No. 8124158

Tree and trellis data compression systems, using a tree or trellis search algorithm to improve the performance of traditional coding systems, are discussed. The possibility of designing tree and trellis codes which are well matched to particular sources using vector quantization was investigated. The main design procedure iterates on a long training sequence to improve the performance of an initial trellis decoder. An additional procedure given a trellis decoder can produce a decoder of longer constraint length which performs at least as well. Combined, these algorithms provide a complete design procedure for trellis encoding data compression systems. For random sources, many existing data compression systems can be readily improved and performance close to the rate-distortion bound can be obtained. In the applications area of speech compression, tree and trellis codes designed with these algorithms permit the construction of low rate speech waveform coders, low rate residual excited linear predictive coders, and a kind of hybrid tree coder. Dissert. Abstr.

62 COMPUTER SYSTEMS

Includes computer networks.

No abstracts in this category.

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

N82-13785 Oklahoma State Univ., Stillwater.
COMPUTER IMPLEMENTATION OF OPTIMAL MULTIVARIABLE CONTROLLER DESIGN IN THE FREQUENCY DOMAIN Ph.D. Thesis
John Edward Perrault, Jr. 1981 129 p
Avail: Univ. Microfilms Order No. 8123850

The numerical computation of optimal controllers using frequency domain synthesis theory are investigated. A synthesis theory is identified and a generalized computation method for obtained necessary transfer function matrices directly from block diagrams is developed. The logical structure of a computer program for optimal controller design is presented. The use of exact arithmetic based on both p-ary and finite field p-adic number systems as well as the use of a symbolic polynomial manipulation program are investigated. The problems associated with the use of finite precision, floating point arithmetic are identified and solutions for the problems are outlined. The many individual algorithms required by the controller design program are identified and analyzed. Dissert. Abstr.

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-13786 Wisconsin Univ. - Madison.
A CONTROL CANONICAL FORM FOR A CLASS OF LINEAR HYPERBOLIC SYSTEMS Ph.D. Thesis
Russell George Teglas 1981 174 p
Avail: Univ. Microfilms Order No. 8120337

Reduction of the eigenvalue placement problem for a class of linear autonomous systems of the form dot x = Ax + bu to the corresponding problem for a scalar neutral functional equation. The reduction relies heavily upon the basic properties of the sequence of eigenfunctions associated with A as well as various properties of non-harmonic Fourier series it is shown. A criterion for the eigenfunctions to form a uniform or Riesz basis is provided and then how a certain class of linear symmetric hyperbolic systems in one space variable may be cast into this abstract framework. Harmonic analysis of the above scalar equation then yields eigenvalue placement results for feedback laws of the form u(t) = (f, x(t)). An application to a problem involving the propagation of electrical signals along a transmission line is included. Dissert. Abstr.

N82-13787 California Univ., Riverside.
THE LEAST FIXED POINT PROPERTY FOR OMEGA CHAIN CONTINUOUS FUNCTIONS Ph.D. Thesis
Joe Don Mashburn 1981 44 p
Avail: Univ. Microfilms Order No. 8122916

The basic definitions are given, including those for omega chain continuity, omega chain completeness, and the least fixed point property for omega chain continuous functions. Some of the relations between completeness and fixed point properties in partially ordered sets are stated. Two examples are given showing that a partially ordered set need not be omega chain complete to have the least fixed point property for omega chain continuous functions. Retracts are discussed where it is seen that they are not sufficiently to characterize those partially ordered sets having the least fixed point property for omega chain continuous functions. The relation between finite width and the least fixed point property for omega chain continuous functions is explored. Finally, the notion of a layered partially ordered set and some of its problems are discussed. It is concluded that a partially ordered set in which every antichain is finite and every chain contains a countable cofinal subchain is omega chain complete if and only if it has the least fixed point property for omega chain continuous functions. Dissert. Abstr.

N82-13788 Syracuse Univ., N. Y.
ZEROS OF SUCCESSIVE DERIVATIVES OF SOME ENTIRE FUNCTIONS OF INFINITE ORDER Ph.D. Thesis
Tsegay Moges 1981 68 p
Avail: Univ. Microfilms Order No. 8123925

Some aspects of a general problem concerning the zeros of successive derivatives of some real, entire functions of infinite order are considered. Functions of the form g(z) = q(z)exp(-e sub z) are studied where the position of the zeros of the real entire function q(z) satisfy some mild restrictions and the growth of the absolute value of q(z) is negligible compared to exp(-e sub z). The work requires an asymptotic evaluation based on the method of steepest descent. A saddle point must be deterined with great accuracy. The effect of the factor q(z) on the number of zeros is investigated. Dissert. Abstr.

N82-13789 Purdue Univ., Lafayette, Ind.
A MIXED VARIATIONAL PRINCIPLE FOR FINITE ELEMENT ANALYSIS Ph.D. Thesis
Michael Lee Day 1981 126 p
Avail: Univ. Microfilms Order No. 8123633

A mixed variational principle is developed and utilized in a finite element formulation. The procedure is mixed in the sense that it is based upon a combinational of the potential and complementary energy principles. The principle evolves from alleviating two drawbacks associated with more traditional approaches. Theses include the problems with interelement continuity and the favoring of displacements over stresses, or vice versa. In order to achieve the desired effect of relaxing the troublesome continuity requirements and to put the displacements and stresses on a more equal footing, it was necessary to modify the potential and complementary principles with Lagrange multipliers. Then both modified principles are simultaneously employed so as not to bias either the compatibility or equilibrium conditions. This gives birth to a finite element formulation which abandons the nodal concept and instead has generalized parameters as it degrees of freedom. Dissert. Abstr.

N82-13790# Rutgers - The State Univ., Piscataway, N. J. Dept. of Mechanical and Aerospace Engineering.
GENERATION OF ORTHOGONAL AND NEARLY ORTHOGONAL BOUNDARY-FITTED COORDINATES WITH DIRECT CONTROL OF GRID SPACING
M. Visbal and Doyle D. Knight Jul. 1981 36 p refs Backup document for AIAA Synoptic, 'Generation of Orthogonal and Nearly Orthogonal Coordinates with Grid Control near Boundaries', scheduled for publication in AIAA Journal in Feb. 1982
(LOG-J12610) Avail: NTIS HC A03/MF A01

A numerical procedure is presented for the generation of boundary-fitted curvilinear coordinates with controllable mesh spacing and orthogonality. The technique is based on a straightforward two-step procedure involving the solution of Poisson's equation. The method is capable of generating orthogonal grids with partial control of the mesh spacing, or nearly-orthogonal grids with strict direct control of mesh spacing. The inhomogeneous terms in the Poisson equations are automatically adjusted during the grid generation. The technique is applicable to two-dimensional simple-connected regions typical of airfoils, cascades, diffusers, inlets, and nozzles. Author

N82-13791# Wisconsin Univ. - Madison. Mathematics Research Center.
A NONLINEAR CONSERVATION LAW WITH MEMORY
J. A. Nohel Aug. 1981 40 p refs
(Contract DAAG29-80-C-0041)
(AD-A103882; MRC-TSR-2251) Avail: NTIS HC A03/MF A01 CSCL 12/1

A history boundary value problem for a nonlinear conservation with fading memory in one space dimension is examined in relation to the motion of a nonlinear, one dimensional viscoelastic body. Using a variant of an energy method applied to the viscoelastic problem it is shown that under physically reasonable assumptions the nonlinear conservation law has a unique, classical solution (global in time), provided the data are sufficiently smooth and small in a suitable norm, moreover, the solution and its first order derivatives decay to zero as t approaches infinity. The proof illustrates the versatility of the energy method combined with frequency domain techniques for Volterra operators. A preliminary analysis is presented concerning the development of singularities in smooth solutions of the conservation law (in finite time) for sufficiently large smooth data; under special assumptions it is shown that such singularities necessarily develop. M.G.

N82-13792# Wisconsin Univ. - Madison. Mathematics Research Center.
THE RELATIONSHIP BETWEEN THE NUMBER OF FACTORS AND SIZE OF AN EXPERIMENT
D. V. Lindley Jul. 1981 28 p ref
(Contract DAAG29-80-C-0041)
(AD-A103877; MRC-TSR-2246) Avail: NTIS HC A03/MF A01 CSCL 12/1

A medical diagnostic problem is used to examine the relationship between the number of factors and size of an experiment. It is shown that in this and similar cases the size of the experiment must increase to achieve a satisfactory analysis - in fact, the increase is exponentially fast. The basic, mathematical tool is the Kullback-Leibler number which measures the discrimination between the possibilities. Calculation of these members uses interactions, forming a basis for all the effects that might occur. M.G.

N82-13793# Texas A&M Univ., College Station. Research Foundation Office.
NEW OPTIMIZATION RESEARCH Final Report, 1 May 1978 - 31 Dec. 1980
Jun. 1981 41 p
(Contract N00014-78-C-0426)
(AD-A104864) Avail: NTIS HC A03/MF A01 CSCL 12/1

The development and application of several optimization techniques are briefly reviewed. Smooth nonparametric regression by quadratic programming, integer programming and optimal capacities and locations for distribution centers, statistical treatment of PERT critical path analysis, linear programming in statistical estimation problems (L sub 1 estimation), and statistical control of nonlinear programming are addressed. M.G.

N82-13794# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.
STRONG CONVERGENCE OF NEAREST NEIGHBOR REGRESSION ESTIMATORS
Philip E. Cheng (Houston Univ.) Jun. 1981 9 p refs
(Contract N00014-79-C-0801)

(AD-A104479; TR-347; ONR-TR-81-7) Avail: NTIS HC A02/MF A01 CSCL 12/1

Nonparametric estimates of the nearest neighbor type are used in the estimation of a regression function given a set of random variables. J.M.S.

N82-13795# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.

ERROR BOUNDS FOR RECONSTRUCTION OF A FUNCTION f FROM A FINITE SEQUENCE (SGN(f: SUB i) + x SUB i))

Alan F. Karr and Robert J. Serfling May 1981 20 p refs

(Contract N00014-79-C-0801)

(AD-A104477; TR-341; ONR-TR-81-4) Avail: NTIS HC A02/MF A01 CSCL 12/1

Consider reconstructing a function f(t), 0 < or equal to t < or equal to 1, from knowledge only of (t) sub i, (s) sub i, 1 < or equal to i < or equal to n), where s sub i = sgn(f(t)sub i) + (x)sub 1), 1 < or equal to i < or equal to n, and the x sub i are additive corruptions. Without the components x sub i, f could not be reconstructed. However, for f continuous and for random uniform noise x, Masry and Cambanis (1980, 1981) show that f can be consistently estimated almost surely and in mean square as n goes to infinity and establish rates of uniform convergence. Through a somewhat different treatment, in which the approximation of f(t)sub i is identified as a numerical integration problem rather than a statistical problem, simple exact bounds are obtained on the error of estimation, the noise x is allowed to be arbitrary (random or deterministic), and the case of f having discontinuities is addressed. The bounds yield substantially improved rates of convergence when the noise values x sub i are from a quasi-random instead of random sequence. M.D.K.

N82-13796# George Washington Univ., Washington, D.C. Inst. for Management Science and Engineering.

SOLVING MULTIACTIVITY MULTIFACILITY CAPACITY-CONSTRAINED 0-1 ASSIGNMENT PROBLEMS

Krishan Lal Chhabra 12 May 1981 121 p refs

(Contract N00014-80-C-0169; NR Proj. 347-059)

(AD-A102583; T-441) Avail: NTIS HC A06/MF A01 CSCL 12/1

A branch-and-bound solution algorithm and a computer program implementing this algorithm are developd to sole multiactivity multifacility capacity-constrained 0-1 assignment problems. Such 0-1 integer programming problems have the objective of minimizing the sum of variable costs due to the assignment of the activities to designs and fixed costs due to the inclusion of the facilities chosen. The constraints ensure that each activity is assigned to a single design and that the capacities of the facilities chosen are not exceeded. Each design involves the use of one or more facilities, and the same design may be used for several activities. The formation of the problem, the mathematical deveopment of the branch-and-bound solution algorithm, a detailed test example, and computational test results using the computer program are included. Areas of application are identified, and consideration for further improvement of the branch-and-bound solution are also included. GRA

N82-13797# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.

PRELIMINARY ANALYSIS OF A BREADTH-FIRST PARSING ALGORITHM: THEORETICAL AND EXPERIMENTAL RESULTS

William A. Martin, Kenneth W. Church, and Ramesh S. Patil Jun. 1981 86 p refs

(Contracts N00014-75-C-0661; PHS-1-P11-LM-03374-02)

(AD-A101852; MIT/LCS/TR-261) Avail: NTIS HC A05/MF A01 CSCL 12/1

Earley's context-free parsing algorithm was adapted to the parsing of difficult sentences. A sentence level parser which finds all parsers of a sentence was implemented in a compiled rather than an interpreted form, permitting the grammar to be written directly as programs rather than as a data structure to be interpreted by a separate parsing program. Speed increases of at least an order of magnitude over interpreted implementation were achieved. Special case processing algorithms were added. GRA

N82-13798# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

A SHARPER ESTIMATE OF THE RENEWAL FUNCTION

Hasse Carlsson 1980 11 p refs

(CTH-Math-1980-18) Avail: NTIS HC A02/MF A01

Remainder term estimates of the renewal function of a strongly non-lattice measure with finite moments of order alpha < or equal to 2 are considered. The estimates are obtained by Fourier methods and improve on previous results. As steps in deriving the estimates, an expression for U(x) equal to o(x exp(-alpha)), as mod x approaches infinity, alpha < or equal to 2, is proved, and an expression for alpha < or equal to 3 is derived. These two lemmas are used to prove and simplify the estimates in the cases of alpha < or equal to 2 and alpha < or equal to 3. Author (ESA)

N82-13799# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.

PROVING TOTAL CORRECTNESS OF NONDETERMINISTIC PROGRAMS IN INFINITARY LOGIC

R. J. R. Back Oct. 1980 32 p refs Submitted for publication

(MC-IW-150/80) Avail: NTIS HC A03/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 4

The formalization in infinitary logic of the weakest precondition approach to prove total correctness of nondeterministic programs was shown. The technique is extended to hierarchically structured programs by adding a primitive statement for operational abstraction, the nondeterministic assignment statement, to the guarded commands of Dijkstra. The infinitary logic is strong enough to express the weakest preconditions for Dijkstra's guarded commands, but too weak for the extended guarded commands. Two possible solutions are considered: (1) going to an essentially stronger infinitary logic, and (2) restricting the power of the nondeterministic assignment statement such that the nondeterministic choice is always made from a finite set of alternatives. Author (ESA)

N82-13800# Royal Inst. of Tech., Stockholm (Sweden). Dept. for Numerical Analysis and Computing Science.

HIGH ORDER APPROXIMATIONS TO EIGENSOLUTIONS OF STURM-LIOUVILLE PROBLEMS BY DEFERRED CORRECTIONS

Bengt Lindberg 1981 14 p refs Sponsored in part by Bielefield Univ.

(TRITA-NA-8104) Avail: NTIS HC A02/MF A01

Sturm-Liouville eigenvalue problems for ordinary differential equations are discretized with second order accurate formulas. Increasingly accurate approximations are computed by solving a sequence of perturbed problems, where each problem can be efficiently solved by a technique similar to inverse iteration. The perturbations are computed by compact deferred correction formulas. Author (ESA)

N82-13801# Royal Inst. of Tech., Stockholm (Sweden). Dept. for Numerical Analysis and Computing Science.

POINTWISE ERROR ESTIMATION FOR FINITE ELEMENT DISCRETIZATIONS, PART 1

Bengt Lindberg 1981 17 p refs

(TRITA-NA-8105-Pt-1) Avail: NTIS HC A02/MF A01

A technique for solving boundary value problems for ordinary differential equations is examined. Ideas are also applicable to partial differential equations. The error estimation algorithm is derived by heuristic arguments based on experience with finite difference discretizations of operator equations. Error estimates are correct to at least two significant digits. Author (ESA)

N82-13802# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

STEENROD OPERATIONS IN SPECTRAL COHOMOLOGY THEORIES Ph.D. Thesis - Illinois Univ.

Thomas Weibull 1981 95 p refs

(CTH-Math-1981-06) Avail: NTIS HC A05/MF A01

Certain properties of Eilenberg-Maclane spectra that allow definition of Steenrod operations are abstracted, and the notion of a Gamma (a)-spectrum is arrived at. This is a ring spectrum E, whose characteristics are given. An expression defining

operations is derived which gives cohomology operations if E is an Omega-spectrum. The process for achieving stability and definability for non Omega-spectra is shown. Internal operations using slant product with sequences of defined elements are given and the case for considering finite coefficients presented. Examples of Gamma (a)-spectra are formulated. The dependence of stable internal slant product operations on the E-cohomological structure of the group is discussed. As a comment on the relationship between the slant product and the Kuenneth formula approach to internal operations, a natural homomorphism from the Ext to the Tor Kuenneth formula in ordinary cohomology is offered.
Author (ESA)

N82-13803# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
ON GENERAL 1 EXP P SUMMABILITY METHODS
Bo Johansson 1981 17 p refs
(CTH-Math-1981-07) Avail: NTIS HC A02/MF A01

The best possible conditions for a rapidly decreasing function to fulfill certain relationships, with a specified discrete tempered distribution where the mass points are well separated, are derived, using Jensen's inequality. Two lemmas necessary for the proof of the theorem are shown, in the first case using the Poisson's summation formula and the Fourier transform of a tempered distribution, and in the second deriving an expression for the existence of a particular function of a sequence of real numbers satisfying predetermined conditions. Author (ESA)

N82-13804 Northwestern Univ., Evanston, Ill.
AN ALGEBRAIC MODEL OF FAULT MASKING LOGIC Ph.D. Thesis
Thomas Frank Schwab 1981 148 p
Avail: Univ. Microfilms Order No. 8125007

The model allows the error-propagating and error-correcting characteristics of FML to be accurately defined by a vectorized form of Boolean algebra in terms of a syndrome-like function. Under the assumption of bitwise logical operations, the model yields the necessary and sufficient conditions for FML to exist in arbitrarily complx logic structures. FML is a hardwired form of fault tolerance using massive hardware redundancy techniques to implicitly correct hardware faults. The massive hardware redundancy requirements of FML are not considered critical because of the emerging expectations of extremely high-levels of integrated circuit technology. Since traditional maintenance and error-recovery procedures arenot necessarily required, FML can potentially simplify the hardware and software recovery design of high availability systems. Dissert. Abstr.

N82-13805 Wisconsin Univ. - Madison.
ON THE DEPENDENCE OF THE GROWTH OF AN ENTIRE FUNCTION OF THE DISTRIBUTION OF THE ZEROS OF ITS DERIVATIVES AND A CONJECTURE OF G. POLYA Ph.D. Thesis
Li-Chien Shen 1981 87 p
Avail: Univ. Microfilms Order No. 8117535

The dependence of the growth of an entire function on the distribution of the zeros of its derivatives and the classification of the entire functions which together with all their derivatives have only real zeros are investigated. A theorem which states that 'if f(z) is a real entire function (i.e., real on the real axis) with only real zeros and the zeros of f(z) form an A-set, then lnlnM(r,f) = O(rlnr) is generalized. It is shown that the condition of reality on f may be dropped. One may also drop the condition of reality on the zeros of f and replace it by the weaker requirement that the zeros of f form an A-set. The problem of classifying the entire functions which together with all their derivatives have only real zeros is explored. The classification is completed in all cases and it is shown that it is sufficient to consider the function and its first two derivatives. Dissert. Abstr.

N82-13806 State Univ. of New York at Binghamton.
THE MISSING BOUNDARY PROBLEM FOR SMOOTH MANIFOLDS OF DIMENSION GREATER THAN OR EQUAL TO SIX Ph.D. Thesis
Gary Francis OBrien 1981 47 p
Avail: Univ. Microfilms Order No. 8124472

Let M be a non-compact differentiable manifold of dimension > 6. Suppose both M and the differential of M are 1-ended spaces. Necessary and sufficient conditions for M to be diffeomorphic to the complement of a compact subset of the boundary of a compact manifold are given. There are four conditions: two geometric conditions and two algebraic obstructions. Examples to show that these obstructions are not always trivial are given. An exmple of a manifold which does not have a completion but where any tubular neighborhood of codimension > 3 has a completion is constructed. We also classify the different ways to complete a given manifold. Dissert. Abstr.

N82-13807 Georgia Inst. of Tech., Atlanta.
SOLUTION OF INITIAL-VALUE PROBLEMS FOR SOME INFINITE EVENTUALLY PERIODIC CHAINS OF HARMONIC OSCILLATORS Ph.D. Thesis
Samuel Ray Glidewell 1981 177 p
Avail: Univ. Microfilms Order No. 8124502

Initial-value problems for some chains of harmonic oscillators when the physical parameters of the chain are eventually periodic and the initial conditions are of slow growth are investigated. The eventually periodic physical parameters and initial conditions of slow growth for fully infinite and half-infinite chains are defined. A procedure is described for solving the equations of motion of the half-infinite, frictionless, eventually periodic chain of harmonic oscillators when an arbitrary initial displacement and velocity are prescribed for one mass only, the remaining masses being initially stationary in their equilibrium positions. A method is described for solving the equtions of motion of the fully infinite, frictionless, eventually periodic chain of harmonic oscillators when arbitrary nonzero initial displacements and velocities are prescribed for any finite number of masses. A finite spring-mass system arranged in a closed loop is described, and the initial-value problem associated with this finite system is formulated. The equations of motion of the half-infinite uniform chain of harmonic oscillators are solved when the initial conditions are of slow growth.
Dissert. Abstr.

N82-13808 Rochester Univ., N. Y.
THE EXISTENCE OF NONZERO MAPS FROM INJECTIVES TO PROJECTIVES Ph.D. Thesis
Jeffrey Warren Neslen 1981 40 p
Avail: Univ. Microfilms Order No. 8123995

Let R be a ring. The existence of nonzero maps from injective to projective R-modules is studied. The conditions on R which will insure the existence of such maps are determined. After establishing several equivalent formulations of the problem, examples are considered. Commutative Artinian and Noetherian rings are investigated. In the Artinian case, it is established that any nonzero R-module, injective or not, admits a nonzero mop into R. The case where R is commutative Noetherian is studied.
Dissert. Abstr.

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-13809 Polytechnic Inst. of New York, Brooklyn.
A CONTRIBUTION TO ROBUST DETECTION AND ESTIMATION Ph.D. Thesis
Chee Tsai 1981 268 p
Avail: Univ. Microfilms Order No. 8118902

Generation of detection and estimation procedures which are robust with respect to such statistical assumption as nominal distribution, independence and identically distributed samples are presented. In the first part two philosophies in the approach to robust detection based on the partition detector and Huber's min-max theory are integrated to yield a class of adaptive robust detectors. In the second part, a robust, nonparametric, recursive and rapidly converging least-integral-square-error density estimators is constructed and then applied to improve the asymptotic efficiencies of stochastic approximation algorithms yielding recursive estimators which behave asymptotically like parametric maximum likelihood estimators. In the next part, equivalence between Huber's m-estimators and stochastic approximation algorithms is given, leading naturally to a robust, recursive, computationally attractive RMSA type estimators based on the m-internal polynomial approximation (MIPA) concept. In the fourth part, the MIPA approach is then applied to Kalman filters. In the last part, the MIPA method is extended naturally to the problem of robust identification. Dissert. Abstr.

N82-13810 Oklahoma State Univ., Stillwater.
A STOCHASTIC EXTENSION OF THE STRUCTURAL PROPERTIES OF COMPARTMENT MODELS VIA A KRONECKER ALGEBRA Ph.D. Thesis
Richard Jay Weidner 1981 112 p
Avail: Univ. Microfilms Order No. 8123474

The deterministic theory of compartment models is extended through the addition of stochastic properties. The concept of identification and Monte Carlo analysis is used to examine structural properties. A Monte Carlo experiment was performed indicating definite sample period bounds for identification. The measure of error was the variance of the compartmental states. It was suggested that structural properties for the mean have influence on the dynamic variance. A Kronecker algebra was proposed and examined at some depth for a simplification transformation for the matrix Lyapunov derivative equation. As a result of the Kronecker transformation, it was illustrated that indeed the proprties, boundedness, monotonicity, etc., of the mean are preserved in the variance. Guidelines were set forth for modifying the basic relaxation identification experiment to take advantage of these new properties for the state variance. Dissert. Abstr.

N82-13811 Northwestern Univ., Evanston, Ill.
SOME SMALL SAMPLE NON-PARAMETRIC SPACE-TIME CLUSTERING TESTS Ph.D. Thesis
Angela Ko Quinn 1981 238 p
Avail: Univ. Microfilms Order No. 8124984

The problem of a special class of space-time clustering tests for detecting possible contagion among cases of disease of rare occurrence and unknown etiology is considered. Nine tests available for the analysis of clustering in small data sets are examined, appropriate ones are suggested, and guidelines for choosing among them are provided. The statistical distribution of Knox's X, cell occupancy score K, and the empiric cluster bar m sub 1 are compared. Simulated data of known distribution is used to test the ability of all the tests to detect different degrees of clustering. A structure for random location of events with a much stronger definition of randomness is defined. Three tests are considered under this structure. Since a precise structure for the alternate hypothesis would be equally desirable, a structure modelled on simple one-step Markov dependence is presented. Dissert. Abstr.

N82-13812 Stanford Univ., Calif.
SEQUENTIAL STOCHASTIC CONSTRUCTION OF RANDOM POLYGONS Ph.D. Thesis
Edward Ian George 1981 140 p
Avail: Univ. Microfilms Order No. 8124071

A sequential stochastic process is developed from which an independent and identically distributed sample of polygons is extracted with a stopping time. The distribution of polygons so obtained is identical to the distribution of polygons in the Poisson field. The stochastic process is developed in full generality and applied to anisotropic cases as well as isotropic case. Useful families of anistropic distributions for this problem are defined. The sequential stochastic process is used to derive general analytical expressions for polygon distributions for the investigation of the unknown distributions of N, S and A. The basis for very fast computer simulation is provided. A Monte Carlo study of the distributions of N, S, and A in various cases is presented. In particular, a sample of 2,500,000 polygons in the isotropic case provides the most precise results to data. Dissert. Abstr.

N82-13813 Tennessee Univ., Knoxville.
PREDICTION OF AERODYNAMIC LOADS ON AIRCRAFTS WITH EXTERNAL STORES AT TRANSONIC SPEEDS Ph.D. Thesis
Chandrasekaran Balasubramanyan 1981 204 p
Avail: Univ. Microfilms Order No. 8123139

The integral equation method was applied to calculate the pressure distribution over an arbitrary, three dimensional lifting wing and a three dimensional wing with an external store, kept beneath the wing. A method to calculate the interference effects imposed by an external store on the wing and vice-versa is given. The wing along transonic solution is analyzed and compared with the experimental results and as well as a wing with an external store. A theory for the flow field nonlinear velocity prediction is developed, programmed, and applied to a wing with an external store configuration and the flow field velocities are compared with the experimental results. The numerical methods for solving the triple and double integrals with limits to infinity are studied and the application of one such method to the flow field prediction problem is briefly indicated. Further extension of this work is indicated with the limitations and advantages. Dissert. Abstr.

N82-13814# Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, Md.
CONFIDENCE INTERVALS FOR THE RELIABILITY OF A FUTURE SYSTEM CONFIGURATION
Grady W. Miller Sep. 1981 15 p refs
(AD-A105031; AMSAA-TR-343) Avail: NTIS HC A02/MF A01 CSCL 12/1

An inferential procedure is presented which provides confidence intervals for a future reliability parameter when reliability growth testing is only partially completed. Hypothesis tests based on this method are uniformly most powerful unbiased. These results are applicable if (1) the system failure rate can be modeled as the intensity function of a Weibull process; and (2) efforts to improve reliability are assumed to continue at a steady rate throughout the intervening period of testing. The usefulness of this methodology is illustrated by evaluating the risk of not reaching some future reliability milestone. If such risk is unacceptably high, program management may have time to identify problem areas and take corrective action before testing has ended. As a consequence, a more reliable system may be developed without incurring overruns in the scheduling or cost of the development program. Author (GRA)

N82-13815# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Statistics.
ASSESSING PROBABILITY ASSESSORS: CALIBRATION AND REFINEMENT
Morris H. Degroot and Stephen E. Fienberg Jul. 1981 29 p refs
(Contract N00014-80-C-0637; Grant NSF SES-79-06386)
(AD-A104174; TR-205) Avail: NTIS HC A03/MF A01 CSCL 12/1

A probabilistic framework for weather forecasters into which to set the problems of assessing probability assessors was developed. The probability distribution of conditional probabilities and the link between the refinement concept and sufficience in the comparison are demonstrated. Scoring rules for sample situations and indications of how they relate to the probablistic concepts of calibration and refinement are reviewed. It is shown that the loss of orientation leads to the inability to recalibrate a forecaster's assessment. Extensions of calibration and refinement structure to forecasting problems are also discussed. E.A.K.

N82-13816# Educational Testing Service, Princeton, N. J.
AN UPPER ASYMPTOTE FOR THE THREE-PARAMETER LOGISTIC ITEM-RESPONSE MODEL
Mark A. Barton and Frederic M. Lord Jul. 1981 112 p refs
(Contract N00014-80-C-0402; NR Proj. 150-453)
(AD-A103013; ETS-RR-81-20) Avail: NTIS HC A06/MF A01 CSCL 12/1

An upper-asymptote parameter was added to the three-parameter logistic item response model. This four-parameter model was compared to the three-parameter model on four data sets. The fourth parameter increased the likelihood in only two of the four sets. Ability estimates for the students were generally unchanged by the introduction of the fourth parameter. R.J.F.

N82-13817# Decision Research Corp., Eugene, Oreg.
CALIBRATION OF PROBABILITIES: THE STATE OF THE ART TO 1980
Sarah Lichtenstein, Fischhoff Baruch, and Lawrence D. Phillips Jun. 1981 59 p refs
(Contracts N00014-80-C-0150; N00014-73-C-0438)
(AD-A101986; PTR-1092-81-6) Avail: NTIS

HC A04/MF A01 CSCL 12/1

This paper presents a review of research literature on an aspect of probability assessment called 'calibration' is presented. Calibration measures the validity of probability assessments and is critical for optimal decision making and for the development of decision aiding techniques. GRA

N82-13818# California Univ., Livermore. Lawrence Livermore Lab.

MONTE CARLO CALCULATIONS OF CHANNELING RADIATION

S. D. Bloom, B. L. Berman, D. C. Hamilton, M. J. Alguard (Measurex Corp.), J. H. Barrett (ORNL), Sheldon Datz (ORNL), R. H. Pantell (Stanford Univ.), and R. L. Swent (Stanford Univ.) 1981 19 p refs Presented at the 9th Intern. Conf. on Atomic Collisions in Solids, Lyon, 6 Jul. 1981

(Contract W-7405-eng-48)

(DE81-027655; UCRL-85778; CONF-810728-4) Avail: NTIS HC A02/MF A01

Classical Monte Carlo calculations are presented for the radiation produced by ultra relativistic positrons incident in a direction parallel to the (110) plane of Si in the energy range 30 to 100 MeV. The characteristic channeling radiation (CR) peak in the energy range 20 to 100 keV is shown, the centroid energies, widths, and total yields of the CR peaks are plotted as a function of energy show the power law dependences of gamma (15), gamma (17), and gamma (25) respectively. Agreement with experimental data is good for the centroid energies and only rough for the widths. DOE

N82-13819 Purdue Univ., Lafayette, Ind.

A BAYESIAN APPROACH TO THE SYMMETRIC MULTIPLE COMPARISONS PROBLEM IN THE TWO-WAY BALANCED DESIGN Ph.D. Thesis

Liwen Alice Sun 1981 171 p

Avail: Univ. Microfilms Order No. 8123713

A class of Bayes rules is constructed for the comparison of all pairs of means resulting from combinations of treatment levels in a balanced two-factor design. Each Bayes rule for the overall multiple comparisons problem is shown to result from the simultaneous applications of the corresponding Bayes rules for all component pairwise comparison problems. A computer program for simultaneously implementing the component Bayes rules is constructed. An important feature of this program is the use of bounds on the posterior Bayes risk function which in many cases enable the action with minimum posterior risk to be chosen without having to explicity calculate these posterior risks, reducing computer time. Nevertheless, the exact Bayes rules are expensive in terms of computer time. For this reason, a large-sample aproxmation to the Bayes rule is proposed which is much easier (and cheaper) to apply, and which performs similarly to the exact Bayes rule on a diversity of examples of data of moderate sample size (error d.f. = 15,30) taken from standard statistical textbooks. Dissert. Abstr.

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-13820# Minnesota Univ., Minneapolis. Dept. of Computer Sciences.

PARALLEL SCHEDULING ALGORITHMS

Eliezer Dekel and Sartaj Sahni Mar. 1981 30 p refs

(Contract N00014-80-C-0650)

(AD-A103796; TR-81-1) Avail: NTIS HC A03/MF A01 CSCL 12/2

Fast parallel algorithms are obtained for several scheduling problems. Some of the problems considered are: scheduling to minimize the number of tardy jobs; job sequencing with deadlines; scheduling to minimize earliness and tardiness penalties; channel assignment; and minimizing the mean finish time. The shared memory model of parallel computers is used. GRA

N82-13821# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Statistics.

TRANSFORMING CONTINGENCY TABLES

Michael M. Meyer Aug. 1981 39 p refs

(Contract N00014-80-C-0636)

(AD-A104182; TR-214) Avail: NTIS HC A03/MF A01 CSCL 12/2

There are many numerical procedures for calculating the maximum likelihood estimates for loglinear models of frequency data. The most popular methods are the Iterative Proportional Fitting Procedure (IPFP) and variants of Newton's method. For problems involving a large number of parameters, Newton's method is often impractical. As the basic IPFP is a well understood, robust, and widely available algorithm it would often be desirable to cajole a given problem into a form where the IPFP can be applied. A general theorem on transforming contingency tables is presented. Several applications of this transformation technique allowed us to take advantage of the IPFP and resulted in simple and useful procedures. A further advantage of this technique is that it is sometimes possible to recognize closed-form estimates in the transformed problem while they would be overlooked in the original setting. Author

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-13822 South Carolina Univ., Columbia.

QUANTUM FRAMES OF REFERENCE Ph.D. Thesis

Tirza Kaufherr 1981 99 p

Avail: Univ. Microfilms Order No. 8123423

The idea that only relative variables have physical meaning is carried over to quantum theory. Finite mass, macroscopic reference frames, relative to which all physical quantities are measured, are considered. During the process of measurement, a finite mass observer receives a kickback, and this reaction of the measuring device is not negligible in quantum theory because of the quantization of the action. Hence, the observer himself has to be included in the system that is being considered. A number of thought experiments involving finite mass observers which have quantum uncertainties in their time or in their position are discussed. The question of the covariance of the theory is analyzed for the case of more than one observer. Finally the electron paramagnetic resonance paradox is examined. Dissert. Abstr.

N82-13823 Northwestern Univ., Evanston, Ill.

ON THE RELATIONSHIP BETWEEN ANALYTICAL REGULARIZATION AND REGULARIZATION BY SURGERY Ph.D. Thesis

Kuang-Fu Tien 1981 57 p

Avail: Univ. Microfilms Order No. 8125024

The relationship between classical regularization and another topological method introduced by Easton called the regularization by surgery is examined. Analytical regularization is defined broadly enough to include all existing classical regularization and strengthen the concept of regularization by surgery. Naturally, we investigate first the relation of solution curves in M sub 2 and the solution curves in M sub 1. Then we obtain two theorems specifying conditions that an analytical regularization will imply regularization by surgery. The first theorem says that if the submanifolds in M sub 2 which are mapped to a single integral curve in M sub 1, form a smooth foliation of M sub 2, or a sufficiently large set in M sub 2 then the singularity in M sub 1 is regularizable by surgery. The second theorem expands the first theorem to allow a more complicated analytic regularization which still ensures regularization by surgery in M sub 1. These theorems are applied to the two body problem and restricted three body problem by using their classical analytical regularization respectively. Dissert. Abstr.

N82-13824 Rochester Univ., N. Y.

CURVATURE SINGULARITIES IN CERTAIN SPACE-TIMES Ph.D. Thesis

William J. DeAngelis 1981 106 p

Avail: Univ. Microfilms Order No. 8123973

Curvature singularities in certain space-times, in particular the notion of a strong curvature singularity, are discussed. Briefly, an incomplete, inextendible timelike geodesic terminates in a strong curvature singularity if the volume elements for all synchronous coordinate systems along the geodesic have limiting values of zero as the singularity is approached. An infinitesimal test body in free fall would be crushed to zero volume as it approached a strong curvature singularity. It is shown that every timelike geodesic, which terminates at the Schwarzschild singularity, terminates in a strong curvature singularity. Further, certain timelike geodesics, which terminates at the Kerr singularity, terminate in a strong curvature singularity. Finally, it is shown that a null geodesic, whose tangent vector field represents a repeated principal null direction, can not terminate in a strong curvature singularity as defined by Tipler. Space-times containing such null geodesics, which in addition terminate at irremovable singularities, include the Schwarzschild, the Kerr, the Reissner-Nordstrom and the Kerr-Newman empty space solutions.

Dissert. Abstr.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-13825# Brookhaven National Lab., Upton, N. Y.

HAVE WE FOUND ASYMPTOPIA: THE ULTIMATE FORM OF PHYSICAL LAWS?

S. J. Lindenbaum 1981 25 p Presented at the 16th Rencontre de Moriond: Nonperturbative QCD; Theory and Expt., Les Arcs, France, 15-17 Mar. 1981 Prepared jointly with City Coll. of the City Univ. of New York

(Contract DE-AC02-76CH-00016; Grant NSF PHY-80-09788)
(DE81-028853; BNL-29769; CONF-810376-4) Avail: NTIS HC A02/MF A01

The search for Asymptopia, a high energy region, is discussed. Asymptotia is where the ultimate form of physical laws are revealed all the way to infinite energy. T.M.

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-13826 Stanford Univ., Calif.

ACOUSTICAL SPECKLE INTERFEROMETRY AND APPLICATIONS IN EXPERIMENTAL MECHANICS Ph.D. Thesis

Mostafa Abbas Hamed 1981 114 p

Avail: Univ. Microfilms Order No. 8123417

When a continuous or pulsed wave of ultrasound is scanned over an object an echo emanating from the object may be detected. If the echo has an irregular variation in amplitude versus position of the sound source, the resulting variation is referred to as acoustical speckle. A theory of acoustical speckle interferometry is presented which parallels the data analysis in pointwise filtering in laser speckle interferometry. Displacement measurements were made utilizing the correlation of reference and displaced ultrasonic signals. Effects of strains and rotations on the minimum of the cross-correlation function are discussed by the illustration of theoretical and experimental examples. Dissert. Abstr.

N82-13827*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DETERMINATION OF TWO-STROKE ENGINE EXHAUST NOISE BY THE METHOD OF CHARACTERISTICS

A. D. Jones (Hills Industries, Clarence Gardens, South Australia) and G. L. Brown (California, Inst. of Technology, Pasadena) Jun. 1981 48 p refs Prepared in cooperation with Adelaide Univ., Australia

(NASA-TM-84061) Avail: NTIS HC A03/MF A01 CSCL 20A

A computational technique was developed for the method of characteristics solution of a one-dimensional flow in a duct as applied to the wave action in an engine exhaust system. By using the method, it was possible to compute the unsteady flow in both straight pipe and tuned expansion chamber exhaust systems as matched to the flow from the cylinder of a small two-stroke engine. The radiated exhaust noise was then determined by assuming monopole radiation from the tailpipe outlet. Very good agreement with experiment on an operation engine was achieved in the calculation of both the third octave radiated noise and the associated pressure cycles at several locations in the different exhaust systems. Of particular interest is the significance of nonlinear behavior which results in wave steepening and shock wave formation. The method computes the precise paths on the x-t plane of a finite number of C(sub +), C(sub -) and P characteristics, thereby obtaining high accuracy in determining the tailpipe outlet velocity and the radiated noise. Author

N82-13828*# Old Dominion Univ., Norfolk, Va. Dept. of Physics.

PROPAGATION OF SOUND THROUGH THE EARTH'S ATMOSPHERE Progress Report, 1 Jan. - 30 Jun. 1981

Roger Meredith, Francis Badavi, and Jacob Becher Aug. 1981 12 p refs

(Grant NAG1-142)
(NASA-CR-165008; PTR-81-12) Avail: NTIS HC A02/MF A01 CSCL 20A

Progress is reported in the development of hardware and software for an experiment to detect and measure sound transmission through air. For individual titles, see N82-13829 through N82-13830.

N82-13829*# Old Dominion Univ., Norfolk, Va.

MEASUREMENT OF SOUND ABSORPTION IN THE AIR

Roger Meredith, Francis Badavi, and Jacob Becher *In* Old Dominion Univ. Propagation of Sound Through the Earth's Atmosphere Aug. 1981 p 1-3 (For primary document see N82-13828 04-71)

Avail: NTIS HC A02/MF A01 CSCL 20A

The large temperature gradient in each section of the resonance tube resulting from the liquid nitrogen coolant necessitated a design modification to the cooling system. A timer and four solenoid valves were installed so that the coolant flow can be reversed periodically. The hardware and software for controlling the analog to digital converter and conversion rate were completed, and the system is operational. A duty cycle control circit was implemented so that on the sixteenth conversion a relay shuts off the vibration exciter used to generate the sound wave. Thus the starting point of each decay curve is exactly known. This information is necessary for evaluating the g digital decay information. The data acquisition and digital decay evaluation programs are described. A.R.H.

N82-13830*# Old Dominion Univ., Norfolk, Va.

DETECTION OF INFRASOUND GENERATED BY CLEAR AIR TURBULENCE (CAT)

Roger Meredith, Francis Badavi, and Jacob Becher *In* Old Dominion Univ. Propagation of Sound Through the Earth's Atmosphere Aug. 1981 p 3-10 refs (For primary document see N82-13828 04-71)

Avail: NTIS HC A02/MF A01 CSCL 20A

A unified data acquisiton system which is an AM carrier system consisting of a converter signal, conditioning electronics, and peripheral equipment was checked and calibrated and installed in a mobile van. A microphone array in the shape of a 244-m equilateral triangle was connected to the data acquisition system using 457-m long cables. Development of techniques for signal processing for interpreting the infrasonic signature (differentiating between CAT and other sources of infrasound) is summarized. Once patches of CAT are located in the atmosphere, corroboration can be achieved through test flights of aircraft into the suspected region. A.R.H.

N82-13831# Naval Postgraduate School, Monterey, Calif.

LABORATORY STUDY OF SOUND PROPAGATION INTO A FAST BOTTOM MEDIUM M.S. Thesis

James Arthur Bradshaw Jun. 1981 61 p refs

(AD-A104596) Avail: NTIS HC A04/MF A01 CSCL 20/1

The feasibility of a laboratory experiment to test an existing theoretical model describing sound propagation into a fast bottom underlying a wedge shaped medium was investigated. Sand under fresh water was found to satisfy the constraints of the theoretical model and to simulate the continental shelf. In a laboratory, accuracy of density, sound speeds, and attenuation was shown to be sufficient to allow quantitative comparison to the prediction of the beam angle. Author

N82-13832# Naval Postgraduate School, Monterey, Calif.
ACOUSTIC BOUNDARY WAVE GENERATION AND SHADOWING AT A SEAMOUNT M.S. Thesis
Edgar Alvin Jordan Jun. 1981 97 p refs
(AD-A104594) Avail: NTIS HC A05/MF A01 CSCL 20/1

The interaction of a sound field and a seamount was studied by physically modeling the ocean surface over 2 dimensional and 3 dimensional models of Dickens Seamount. By using a smooth ocean surface, and one with a surface of scaled Rayleigh roughness to model a 35 knot wind, the relative contributions are determined for off-axis scattering elements, multiple reflection from the ocean surface, and diffraction over the crest of the seamount. Boundary wave generation over a randomly rough plane surface is studied experimentally. The ratio of boundary wave amplitude to volume wave amplitude is found to be proportional to (frequency) to the 3/2 power and (range) to the 1/2 power and the ratio of the empirical scattering parameters to the rms height of the roughness elements is found to be approximately 0.3. The spatial correlation length of the randomly rough surface takes the place of the center-to-center separation of the hemispherical bosses used in Tolstoy's theoretical treatment. Author

N82-13833# Texas Univ. at Arlington. Applied Research Lab.
THEORETICAL ANALYSIS OF THE EFFECTS OF TURBULENCE ON A MOBILE PARAMETRIC RECEIVER
C. Robert Culbertson 1 Apr. 1981 84 p refs
(Contract N00024-77-C-6200)
(AD-A101418; ARL-TR-81-19) Avail: NTIS HC A05/MF A01 CSCL 20/1

Development of analytical expressions that describe some effects of turbulence on the performance of a mobile parametric receiver are presented. Three general topics are covered: (1) summaries of literature pertaining to parametric reception, turbulence, and wave propagation in inhomogeneous media; (2) theoretical analysis; and (3) theoretical estimates of the effects of turbulence on parametric reception. It is concluded that turbulence can produce significant amplitude and phase fluctuations in the acoustic signal detected by the parametric receiver, but the experiments are required to determine the level of fluctuations that might be expected in a practical application. Author

N82-13834# Science Applications, Inc., McLean, Va.
MIXED LAYER DEPTH DISTRIBUTIONS FROM SVSTD DATA Technical Report, 24 Jun. - 22 Sep. 1980
Eugene Molinelli, John Donelson, and Linda Lilly Apr. 1981 114 p refs
(Contract N68463-80-C-0035)
(AD-A105669; SAI-81-260-WA; NOO-TR-271) Avail: NTIS HC A06/MF A01 CSCL 20/1

Mixed layer depths defined in terms of each of four parameters (temperature, sound speed, density and stability) are determined for an area in the northern North Atlantic. The distributions of the mixed layer depth are broken down by season (spring, summer and fall) and by area (Rockall Trough, Iceland Flank, Iceland-Faeroe Front). It is found that seasonal fluctuations in values of mixed layer depth are in excess of 40 meters (fall deeper than summer). Variation in the values of mixed layer depth by area are only about 10 m but are also significant. The Iceland Flank mixed layers are deeper than the Rockall Trough or the Iceland Faeroe Frontal Zone mixed layers. The stability definition is found to be faulty in its present form and an increase in the significant peak criteria from 2 to 3 cycles per hour is suggested. The Iceland-Faeroe Frontal Zone has greater deviation in MLDs which affect the different definitions of MLD in a complex manner. Author (GRA)

N82-13835# Rockwell International Corp., Columbus, Ohio. North American Aircraft Div.
INVESTIGATION OF ACOUSTIC INTERACTIONS IN JET THRUST AUGMENTING EJECTORS Final Report, 1 Jan. 1979 - 30 Sep. 1980
J. R. Campbell, K. D. Korkan (Ohio State Univ., Columbus), and H. Viets (Wright State Univ.) 5 Mar. 1981 244 p refs
(Contract N00019-79-C-0225)
(AD-A106083; NR80H-50) Avail: NTIS HC A11/MF A01 CSCL 20/1

The performance of a constant area rectangular ejector with varying mixing length was investigated to determine the aeroacoustic interaction effects. The rectangular ejector investigation was conducted in two phases. The phase one investigation involved the testing of three different aspect ratio rectangular convergent nozzles at pressures between 15-45 psig to determine the acoustic and jet spreading characteristics. From these data a rectangular ejector incorporating endwall and ejector flap blowing was fabricated and investigated at pressure ratios between 2.0 and 5.0. These investigations were conducted at ejector flap length (L) to ejector throat widths (W), L/W of 11.0, 9.5, 8.0, 6.5, 5.0, 3.5, 2.0, and 0.9 to determine the ejector performance. The data for the rectangular ejector configuration investigated showed an aeroacoustic interaction in the present ratio range of 3.3 - 3.8. However, the resulting performance was not improved to the degree experienced with axisymmetric ejectors. Author (GRA)

N82-13836# Illinois Univ., Urbana. Materials Research Lab.
ULTRASONIC ATTENUATION AND VELOCITY STUDIES IN THE ALPHA-ALPHA' SOLID SOLUTION PHASES OF THE Nb-H SYSTEM
F. M. Mazzolai and H. K. Birnbaum 1981 7 p refs Presented at the Intern. Conf. on Internal Friction and Acoustic Attenuation of Solids, Lausanne, Switzerland, Jun. 1981
(Contract DE-AC02-76ER-01198)
(DE81-026618; DOE/ER-01198/1357; CONF-8106105-1) Avail: NTIS HC A02/MF A01

Data are reported on the elastic constants and ultrasonic attenuation of a single crystal of Nb determined as a function of the hydrogen content (0 < or = H/Nb < or = 0.71) at 528 K and as a function of temperature (380 < or = T < or = 528 K) for H/Nb = 0.31, 0.45, 0.53, and 0.71. A relaxation process is observed which appears to be a Zener-type of effect. DOE

N82-13837# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Berlin (West Germany). Abt. Turbulenzforschung.
THE INFLUENCE OF PRESSURE WAVES ON MEASUREMENTS OF HIGH SPEED TRAIN NOISE
Dietrich Bechert Jul. 1980 94 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(DFVLR-FB-81-06) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 15,60

Pressure waves are studied experimentally and theoretically; their attenuation by high pass filters is calculated. Relative to an observer at rest, strong pressure fluctuations (pressure waves) are generated by high speed trains. Intensities are typically two orders of magnitude higher than those of radiated noise. Although this can cause problems when measuring noise close to the track, pressure waves can usually be filtered out as their major components are infrasonic. The analysis also includes effects due to vehicle shape and air compressibility. Examples are calculated and approximation formulas are given. Author (ESA)

N82-13838 Stanford Univ., Calif.
TRANSMISSION OF SOUND ACROSS A VORTEX LAYER ENCLOSING A CYLINDRICAL COLUMN OF JET Ph.D. Thesis
Raymond Ching Chung Luh 1981 141 p
Avail: Univ. Microfilms Order No. 812410

The transmitted sound field from an impulsive ring source inside an infinitely extending circular jet was investigated for both subsonic and supersonic jet speeds. The interface between the jet and the ambient medium at rest was idealized by a cylindrical vortex layer. Through the application of Fourier transform method, an approximate solution which includes the effects due to curvature was obtained for short waves. From the stability analysis, it is shown that instability is no longer confined to M < 2 square root of 2, as predicted in the case of a plane vortex sheet, but may occur at all Mach numbers. However, the instability waves are wavelength dependent and cease to exist for long waves. A resonance wave present for M > 2 independent of wavelengths is shown to lead a sound field which will modify the specularly transmitted field in the region of its propagation. Dissert. Abstr.

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-13839 Pennsylvania State Univ., University Park.
OUTER-SHELL EXCITATION IN SPUTTERED ATOMS Ph.D. Thesis
Nihad A. Yusuf 1981 148 p
Avail: Univ. Microfilms Order No. 8120475

In order to gain some understanding of the excitation and ionization processes in sputtering, measurements of the absolute photon yield and the velocity distribution of the excited atoms were performed. Experimental results show that the photon yield is lower than the secondary ion yield. They also show that the velocities and threshold energies for excited particles are much higher than those of ground state particles. In addition, the population of upper levels was measured for various atomic transitions and results suggest the nonexistence of a local thermodynamic equilibrium inside a solid undergoing sputtering. Moreover, the high energies of the sputter excited atoms and the wide spread of these energies provide evidence against the existence of a local thermodynamic equilibrium. Based on these and other experimental observations such as the enhancement of both photon and secondary ion yields with oxygen, a unified model for excitation and ionization is proposed. This model is based on the level crossing concept in atomic collisions and it explains qualitatively the similarities and differences between photon and secondary ion emissions. Dissert. Abstr.

N82-13840 Purdue Univ., Lafayette, Ind.
TRANSITION RADIATION AS AN X-RAY SOURCE Ph.D. Thesis
Adam Ning Chu 1981 131 p
Avail: Univ. Microfilms Order No. 8124048

The design of a transition radiation X-ray source is described. Theoretical and physical optimizations to maximize the photon production in a given frequency bandwidth are presented. An optimization analysis accounting for material properties, multiple scattering, photon absorption, and statistical random errors in foil thicknesses is used to design an X-ray emitter. Three major experiments were performed to verify the derived design equations and a comparison is made to existing synchrotron, Bremsstrahlung, and electron bombardment X-ray sources. A comparison between a transition radiation X-ray source with synchrotron, Bremmstrahlung, and electron bombardment X-ray sources shows it to be highly competitive with unique advantages. Transition radiation can be generated by low energy linear accelerators, unlike synchrotron sources which need high energies and extremely high vacuum. Transition radiation is on par with synchrotron sources in brightness, but can also be designed for the very hard X-ray where no synchrotron source exists. Transition radiation is tunable, polarized and highly directional, unlike electron bombardment X-ray sources. Dissert. Abstr.

N82-13841 Nebraska Univ. - Lincoln.
INTERATOMIC POTENTIAL ENERGY HYPERSURFACES FOR MOLECULES Ph.D. Thesis
Robert Lee Vance 1981 158 p
Avail: Univ. Microfilms Order No. 8124525

Recent theoretical advances have placed the description of diatomic potential states (ground and excited) by highly accurate non-orthogonal multiconfiguration valence bond (MCVB) wave functions within reach. Techniques for efficiently handling double-zeta and polarization type basis functions for use in the MCVB wave functions are described. Specifically, an extensive ab initio MCVB calculation for the ground state of hydrogen fluoride is discussed. An efficient method for the modification of atomic orbital basis functions to describe the process of molecule formation is reported. Also, various configuration selection schemes for the MCVB wave function are discussed. Dissert. Abstr.

N82-13842 Wisconsin Univ. - Madison.
THE HADRONIC DECAY RATE OF THE HIGGS BOSON: AN APPLICATION OF THE RUNNING MASS Ph.D. Thesis
Eric Alan Braaten 1981 59 p
Avail: Univ. Microfilms Order No. 8117505

The decay rate of a heavy Higgs boson into a quark-antiquark pair is, in lowest order, proportional to the square of the quark mass. However, there are large quantum chromodynamic corrections to the decay rate in the form of logarithms of the Higgs-quark mass ratio. These logarithms can be absorbed into the quark mass, yielding the running mass evaluated at the scale of the Higgs mass. The size of the residual quantum chromodynamic corrections depends on the prescription for quark mass renormalization. The corrections are small if the running mass is defined so that, at the quark-antiquark threshold, it coincides with the pole in the quark propagator. Dissert. Abstr.

N82-13843 State Univ. of New York, Stony Brook.
ULTRAVIOLET STRUCTURE OF SUPERSYMMETRIC NON-LINEAR SIGMA-MODELS Ph.D. Thesis
Gaume Luis Alvarez 1981 192 p
Avail: Univ. Microfilms Order No. 8118956

The applications of differential geometry to the general supersymmetric nonlinear sigma-meson model on two space-time dimensions are considered. An adequate perturbation theory for these models is constructed. This is obtained using the background field expansion combined with the normal coordinate expansion. The characterization and classification of all possible Fermi-Bose symmetries which appear in two space-time dimensions are discussed in the framework of nonlinear sigma-meson models. It is proved that fermionic symmetries require necessarily the existence of complex structures on the manifold where the theory is defined. The proof is based on the theory of complex manifolds and holonomy groups. As a consequence of the characterization theorem and the background field methods, general criteria are given which determine what kind of counterterms will cancel the ultraviolet divergences of the S-matrix. Dissert. Abstr.

N82-13844 Nebraska Univ. - Lincoln.
SCHWINGER'S VARIATIONAL PRINCIPLE FOR ELECTRON-ION SCATTERING Ph.D. Thesis
Nasser Maleki 1981 239 p
Avail: Univ. Microfilms Order No. 8124517

The principle is formulated for electronion (atom) collision using the coulomb (free particle) Green's function. The theory was applied to a screened coulomb potential as well as e(-) He(+) and e(-)H to obtain analytic distorted waves, phase shifts, and quantum defects for energies near the ionization threshold. A numerical technique of calculating the phase shifts and wave functions is also outlined. Dissert. Abstr.

N82-13845 State Univ. of New York at Albany.
RELATIVISTIC MANY-BODY PERTURBATION THEORY OF PARITY-VIOLATION IN ATOMS Ph.D. Thesis
Bhanu Pratap Das 1981 108 p
Avail: Univ. Microfilms Order No. 8122253

The Weinberg-Salam model is the simplest of all the gauge models that attempt to unity electromagnetic and weak interactions. This model predicts the existence of a parity-violating neutral weak interaction between the particles, electrons, protons and neutrons which make up an atom. Experiments based on optical rotation and circular dichroism were carried out on bismuth, thallium and caesium to detect parity violation in these atoms. The relativistic many-body perturbation theory was employed to study circular dichroism for the 6s sub 1/2 yields 7s sub 1/2 transition in atomic caesium and 6p sub 1/2 yields 7p sub 1/2 transition in atomic thallium. Dissert. Abstr.

N82-13846 Northwestern Univ., Evanston, Ill.
PHYSICAL ADSORPTION OF QUANTUM ATOMIC AND MOLECULAR SYSTEMS Ph.D. Thesis

Sujane Chang Wang 1981 102 p
Avail: Univ. Microfilms Order No. 8125034

Using the variational method proposed by Lowy and Woo, the ground-state energies of the 1/3- and 1/4-coverage superlattices of He sub 4 physisorbed on graphite are calculated. Properly symmetrized single-particle factors in the trial wave function are constructed from expansions in an orthogonal basis set hose elements are the eigenfunctions of a Hamiltonian with a laterally averaged substrate potential. Calculation of the energy of the He sub 4 monolayer in the liquid phase is then carried out in a manner consistent with the superlattice calculation. The 1/3-coverage superlattice is found to be stable, while the 1/4-coverage monolayer chooses to remain in the liquid phase. The physisorption of hydrogen molecules is then investigated in search for quantum liquid crystals. 'Quantum liquid crystals' are quantum liquids which exhibit macroscopic orientational order but no (or partial) spatial order. Ortho-hydrogen molecules are light enough so that even at very low temperatures the zero-point motion of the molcules keeps the system in the liquid state. The molecules are anisotropic and the interaction orientation dependent, so it is not impossible for macroscopic orientational order to arise under appropriate conditions. Dissert. Abstr.

N82-13847 North Carolina State Univ. at Raleigh.

DOUBLE DIFFERENTIAL CONTINUUM NEUTRON SCATTERING CROSS SECTIONS IN IRON AND NICKEL FOR INCIDENT ENERGIES OF 7.5, 10 AND 12 MeV Ph.D Thesis

Albert George Beyerle, Jr. 1981 147 p
Avail: Univ. Microfilms Order No. 8121710

Double differential neutron inelastic scattering cross sections exciting high-lying levels in iron and nickel for incident neutron energies of 7.5, 10, and 12 MeV were measured. Outgoing neutron energy distributions or neutron energies above 0.5 MeV up to about 2 MeV below the incident neutron energy, and scattered neutron angular distributions at up to 5 scattering angles between 45 and 145 deg were measured. These measurement were made using time-of-flight techniques on the neutron scattering facility that has been developed at TUNL. Further attempts to isolate the effects of the scattering cross section are made computationally by a large Monte Carlo type simulation of the experiment. The computed corrections include finite geometry, attenuation, non-monoenergetic source, multiple scattering, and other effects which cannot effectively be removed experimentally. Dissert. Abstr.

N82-13848 Northwestern Univ., Evanston, Ill.

INCLUSIVE CHARGED PARTICLE SPECTRUM FROM THE INTERACTION OF NUCLEI WITH INTERMEDIATE ENERGY PROTON Ph.D. Thesis

Tsewei Chen 1981 251 p
Avail: Univ. Microfilms Order No. 8124865

The nuclear interactions were investigated systematically at the intermediate bombarding energies between 80 Mev and 164 Mev using targets that span the periodic table. Both charged particles and gamma-ray spectra were studied in order to examine the two quite different mechanisms of the interaction, namely, intranuclear cascade and evaporation interactions. It is observed that while fast cascade charged particles are strongly forward peaking the evaporation particles are near isotropic for proton, deutron and alphas. Fast spectrum of the same particle are similar for all the targets studied which indicates the same fast interaction mechanism can apply to all targets. Mass and charge distributions from gamma-ray spectra showed that only one or two of particles are emitted in the cascade stage and most of the incident energy is taken away by the fast nucleons. Finally, two theoretical models, namely cascade and exciton models, were discussed. Comparison between experimental data and model calculation were made. While they both well reproduced the observed data some serious disadvantages exist for both of the models. Dissert. Abstr.

N82-13849 Georgia Inst. of Tech., Atlanta.

ANALYSIS OF COUPLED TRANSLATIONAL AND ROTATIONAL DIFFUSION USING OPERATOR CALCULUS Ph.D. Thesis

Ulrich Robert Steiger 1981 157 p
Avail: Univ. Microfilms Order No. 8124501

The equations for coupled translational and rotational diffusion of asymmetric molecules immersed in a fluid are obtained. The method used begins with the Kramers-Liouville equation and leads to the generalized Smoluchowski equation for diffuion in the presence of potentials. Both external potentials and intermolecular potentials are considered. The contractiction of the description from the Kramers-Liouville equation to the Smoluchowski equation is achieved by using a combination of operator calculus and cumulants. Explicit solutions of these equations are obtained in the two-dimensional case. The formalism also allows the calculation of corrections be be generalzied Smoluchowski equation. Smoluchowski's result is precisely the second cumulant, in the cumulant expansion. Dissert. Abstr.

N82-13850# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.

GAS TARGET NEUTRON GENERATOR STUDIES

Vijay Chatoorgoon Oct. 1981 152 p refs
(UTIAS-251; CN-ISSN-0082-5255) Avail: NTIS HC A08/MF A01

Heat deposition in a subsonic flow can cause the formation of gas density gradients which constitute useful gas targets. The variation of beam voltage, gas density, gas pressure, gas temperature, etc., within a subsonic channel were calculated as a function of the system parameters: beam voltage, beam current, channel diameter, stagnation tank temperature and pressure. The analysis is presented as applicable to any combination of beam particle and target gas. It was found that the subsonic gas target (SGT) is stable against all small perturbations and against certain types of large perturbations. The closely-related transonic gas target (TGT) appears to be unstable to all perturbations. Comparison of hypersonic, transonic, and subsonic gas targets shows that the SGT is the most advantageous type and operates at a lower mass flow and at less severe stagnation tank conditions than the TGT or HGT. The problem of a deuterium spill into the tritium port of a straight hypersonic target was also investigated. A.R.H.

N82-13851*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

ADAPTATION OF THE TH EPSILON MU FORMALISM FOR THE ANALYSIS OF THE EQUIVALENCE PRINCIPLE IN THE PRESENCE OF THE WEAK AND ELECTROWEAK INTERACTION

A. J. Fennelly (Western Kentucky Univ.) Oct. 1981 40 p refs
(NASA-TM-82450) Avail: NTIS HC A03/MF A01 CSCL 20H

The TH epsilon mu formalism, used in analyzing equivalence principle experiments of metric and nonmetric gravity theories, is adapted to the description of the electroweak interaction using the Weinberg-Salam unified SU(2) x U(1) model. The use of the TH epsilon mu formalism is thereby extended to the weak interactions, showing how the gravitational field affects W sub mu (+ or -1) and Z sub mu (0) boson propagation and the rates of interactions mediated by them. The possibility of a similar extension to the strong interactions via SU(5) grand unified theories is briefly discussed. Also, using the effects of the potentials on the baryon and lepton wave functions, the effects of gravity on transitions mediated in high-A atoms which are electromagnetically forbidden. Three possible experiments to test the equivalence principle in the presence of the weak interactions, which are technologically feasible, are then briefly outline: (1) K-capture by the FE nucleus (counting the emitted X-ray); (2) forbidden absorption transitions in high-A atoms' vapor; and (3) counting the relative Beta-decay rates in a suitable alpha-beta decay chain, assuming the strong interactions obey the equivalence principle. Author

N82-13852# Naval Research Lab., Washington, D. C. Plasma Physics Div.

STABILITY CONSIDERATIONS FOR LIGHT-ION BEAM TRANSPORT IN Z DISCHARGE CHANNELS Interim Report

P. F. Ottinger, D. Mosher, and Shyke A. Goldstein 8 Jul. 1981 25 p refs Prepared in cooperation with JAYCOR, Alexandria, Va.
(Contract DE-AI08-79DP-40092)
(AD-A101426; NRL-MR-4548) Avail: NTIS

HC A02/MF A01 CSCL 20/8

Light ion beams, appropriate for use as inertial confinement fusion drivers, are transported in z discharge channels over distance of several meters. Stability considerations for light ion beam transport in such channels are reviewed. The important velocity space instabilities are considered and the resulting conditions for good transport are discussed. The results are presented in a general form so that they may be applied to beams of various species (e.g., H(+), D(+), and C(+4) propagating in channel plasmas of different composition (e.g., hydrogen, argon, air, etc.). Author

N82-13853# Los Alamos Scientific Lab., N. Mex.

MOLECULAR DYNAMICS CALCULATIONS FOR SODIUM USING PSEUDOPOTENTIAL THEORY

R. E. Swanson Jun. 1981 185 p refs
(Contract W-7405-eng-36)
(DE81-029022; LA-8877-T) Avail: NTIS HC A09/MF A01

The equation of state of sodium is studied using the molecular dynamics technique whereby the classical motion of a system of ions is solved with the aid of computers. The interaction potential between pairs of sodium ions consists of Coulomb and Born-Mayer repulsion terms and an effective ion-ion interaction derived from pseudopotential theory. This theory includes the effects of electron gas screening, exchange, and correlation. A model pseudopotential with parameters fit to experimental low-temperature data is used. By using this technique, an atomic description of a simple metal proceeds to the calculation of macroscopic thermodynamic properties. DOE

N82-13854# California Univ., Livermore. Lawrence Livermore Lab.

POSITRON LIFETIME AND DOPPLER BROADENING TECHNIQUES APPLIED TO IRRADIATION DAMAGED SILVER

R. H. Howell 27 Jul. 1981 12 p refs Presented at Am. Inst. of Metallurgical Engr. Meeting, Las Vegas, Nev., Feb. 1980
(Contract W-7405-eng-48)
(DE81-028688; UCRL-83050; CONF-800205-16) Avail: NTIS HC A02/MF A01

Positron lifetime and Doppler broadening measurements was used to study defect production resulting from room temperature irradiation of pure silver by D-T fusion neutrons or energetic protons. Use of the positron annihilation analysis established that the surviving defects from both irradiations have the same dose dependence and that defect concentration can be quantitatively measured and compared to damage models. The relative merit of the lifetime and Doppler broadening measurements in arriving at these conclusions is discussed along with some practical aspect of the measurements. In the proton damaged samples the trapping rate approaches saturation, a circumstance which could be misinterpreted if a less extensive data set containing only Doppler broadening data were available. Some remarks about the analysis of positron data and general conclusion about the defect structure are given. DOE

N82-13855# Oak Ridge National Lab., Tenn.

BACKGROUND FITTING FOR ELECTRON ENERGY-LOSS SPECTRA

J. Bentley, G. L. Lehman, and P. S. Sklad 1981 8 p refs Presented at the 3rd Anal. Electron Microscopy Workshop, Vail, Colo., 13 Jul. 1981
(Contract W-7405-eng-26)
(DE81-027117; CONF-810740-1) Avail: NTIS HC A02/MF A01

Background subtraction methods for microanalysis using electron energy loss spectroscopy are examined. In order to assess true edge profiles and obtain integrated intensities of the inner shell ionization edge of interest, it is first necessary to substract the background. Usually a simple inverse power law is used, but for some spectra this form does not fit well. An alternative form which results in superior fits is described. DOE

N82-13856# Brookhaven National Lab., Upton, N. Y. Dept. of Chemistry.

MECHANISTIC STUDIES OF ELECTRON EXCHANGE KINETICS USING AB INITIO

Marshall D. Newton 1981 25 p refs Presented at the Conf. on Inorganic Reaction Mech., Detroit, 10 Jun. 1981 Submitted for publication
(Contract DE-AC02-76CH-00016)
(DE81-026096; BNL-29896; CONF-8106139-2) Avail: NTIS HC A02/MF A01

The rate constant for the aqueous Fe2(+)-Fe3(+) electron exchange reaction is calculated. The effective contact distance (r sub min) is taken as 5.5 A, the value at which the staggered face-to-face configuration of the orthohedral complexes achieves van der waals contact. The electronic coupling information implicit K sub el(r) is obtained from large scale ab initio molecular orbital calculations carried out for the diabatic states of the reactive ion pair. The calculated rate constant K sub ex, and associated activation parameters are in good agreement with experimental data extrapolated to zero ionic strength and correspond to a mechanism dominated by direct Fe-Fe overlap and characterized by a modest degree of nuclear tunneling and non-adiabatic character. DOE

N82-13857# California Univ., Livermore. Lawrence Livermore Lab.

ROLE OF MOLECULAR DYNAMICS ON DESCRIPTIONS OF SHOCK FRONT PROCESSES

Arnold M. Karo 22 Jul. 1981 17 p refs Presented at the Workshop on the Chem. of Shock Compression, Palo Alto, Calif., 22 Jun. 1981
(Contract W-7405-eng-48)
(DE81-028687; UCRL-86489; CONF-810684-45) Avail: NTIS HC A02/MF A01

A computational approach, based on classical molecular dynamics, is used to form a realistic picture of shock induced processes occurring at the shock front and resulting from the detailed, violent motion associated with shock motion on an atomic scale. Prototype studies of phase transitions are discussed. The interaction of the shock front with defects, surfaces, voids, and inclusions, and across grain boundaries are summarized. The critical question of how mechanical energy imparted to a condensed material by shock loading is converted to the activation energy required to overcome some initial energy barrier in an initiation process, is addressed. DOE

N82-13858# Stanford Linear Accelerator Center, Calif.

TWO-PHOTON PHYSICS AS A PROBE OF HADRON DYNAMICS

Stanley J. Brodsky May 1981 21 p refs Presented at the 4th Intern. Colloq. on Photo-Photon Interactions, Paris, 6-9 Aug. 1981
(Contract DE-AC03-76SF-00515)
(DE81-028757; SLAC-PUB-2747; CONF-810496-2) Avail: NTIS HC A02/MF A01

Two-photon collisions are used to test many features of quantum chromodynamics, especially the interplay between the vector-meson-dominated and point-like hadronic interactions of the photon. A number of QCD applications are discussed, including: jet and single-particle production at large transverse momentum; the photon structure function and its relationship to the gama yields q anti q wave function; and the possible role of gluonium states in the gamma gamma yields rho rho channel. Evidence that even low momentum transfer photon-hadron interactions are sensitive to the point-like gamma yields q anti q coupling is discussed. DOE

N82-13859# Texas A&M Univ., College Station.

STUDY OF THE NEUTRON-PROTON INTERACTION IN THE 300-700 MeV ENERGY REGION Annual Progress Report

L. C. Northcliffe 1981 41 p refs
(Contracts DE-AS05-76ER-04449; E(40-1)-4449)
(DE81-026733; DOE/ER-04449/34) Avail: NTIS HC A03/MF A01

Research investigating nucleon-nucleon interactions in both elastic and inelastic channels at LAMPF energies was performed in cooperation with Los Alamos National Laboratory personnel. A summary is given of the experimental apparatus an method, and results obtained for neutron-proton interactions. DOE

N82-13860# Oak Ridge National Lab., Tenn. Health and Safety Research Div.

ENERGY LOSSES AND MEAN FREE PATHS OF ELECTRONS

IN SILICON DIOXIDE
J. C. Ashley and V. E. Anderson 1981 21 p refs Presented at the IEEE Conf. on Nucl. Sci. and Space Radiation, Seattle, 21 Jul. 1981
(Contract W-7405-eng-26)
(DE81-026353; CONF-810707-6) Avail: NTIS HC A02/MF A01

Theoretical models and calculations are combined with experimental optical data to determine a model energy-loss function for SiO2. Sumrule checks and comparisons with experimental information are made to insure overall consistency of the model. The model energy-loss function is employed to calculate electron inelastic mean free paths and stopping powers for electrons with energies < or = 10 keV in SiO2. DOE

N82-13861# Los Alamos Scientific Lab., N. Mex.
ENHANCED ENERGY DEPOSITION SYMMETRY BY HOT ELECTRON TRANSPORT
D. Wilson, J. Mack, E. Stover, D. VanHulsteyn, G. McCall, and A. Hauer 1981 16 p ref Presented at the Symmetry Aspects of Inertial Fusion Implosions Topical Conf., Washington, D.C., 27 May 1981
(Contract W-7405-eng-36)
(DE81-028774; LA-UR-81-2141; CONF-810576-2) Avail: NTIS HC A02/MF A01

High energy electrons produced by resonance absorption carry the CO2 laser energy absorbed in a laser fusion pellet. The symmetrization that can be achieved by lateral transport of the hot electrons as they deposit their energy is discussed. A K sub alpha experiment shows a surprising symmetrization of energy deposition achieved by adding a thin layer of plastic to a copper sphere. Efforts to numerically model this effect are described. DOE

N82-13862# California Univ., Livermore. Lawrence Livermore Lab.
BEAM PROPAGATION IN THE FREQUENCY-CONVERTED SUBSYSTEMS OF NOVA AND NOVETTE
J. Hunt, W. Simmon, R. Speck, W. Warren, and D. Eimerl 7 Jul. 1981 36 p
(Contract W-7405-eng-48)
(DE81-028253; UCID-19086) Avail: NTIS HC A03/MF A01

It is shown that the nonlinear growth of beam modulation produced by self-focusing is proportional 1/2 exp B where B is the intensity dependent phase retardation (measured in radians) accumulated by the beam. This exponential growth of beam modulation in the baseline frequency conversion/focusing optical train limits the system performance for short pulse (tau less 2 ns), one third micron operation. One micron and one-half micron performance are limited more by the one micron drive available to frequency conversion KDP array than self-focusing. DOE

N82-13863# Oak Ridge National Lab., Tenn.
SPECIFIC GAMMA-RAY DOSE CONSTANTS FOR NUCLIDES IMPORTANT TO DOSIMETRY AND RADIOLOGICAL ASSESSMENT
Laurie M. Unger and D. K. Trubey Sep. 1981 76 p refs
(Contract W-7405-eng-26)
(DE81-031980; ORNL/RSIC-45) Avail: NTIS HC A05/MF A01

Tables of specific gamma-ray dose constants (the unshielded gamma-ray dose equivalent rate at 1 m from a point source) were computed for approximately 500 nuclides important to dosimetry and radiological assessment. The half life, the mean attenuation coefficient, and thickness for a lead shield providing 95 percent dose equivalent attenuation are also listed. DOE

N82-13864# Joint Research Centre of the European Communities, Ispra (Italy).
GAMMA RAY BUILDUP FACTORS IN LEAD-IRON AND IRON-LEAD SHIELDS
H. Penkuhn 1980 22 p refs Submitted for publication
(EUR-7086-EN) Avail: NTIS HC A02/MF A01

Using the gamma transport code PIPE, buildup factors are evaluated in shields consisting of: iron layers of up to 40 cm thickness followed by thick lead layers; and lead layers of up to 10 cm thickness followed by thick iron layers. The source is assumed plane isotropic and four source energies were used, ranging from 0.66 MeV (caesium source) to 6 MeV. The differences between the buildup factors for exposure and equivalent dose rates are outlined. A comparison of the buildup factors in the iron-lead sequence and the lead-iron sequence shows the latter configuration to present fewer problems. Author (ESA)

N82-13865 Northwestern Univ., Evanston, Ill.
ON THE VIBRATIONAL ENERGY TRANSFER PROCESSES OF POLYATOMIC MOLECULES IN THE GAS AND SOLID PHASES Ph.D. Thesis
Vartkess Ara Apkarian 1981 292 p
Avail: Univ. Microfilms Order No. 8124844

Vibrational energy transfer has been studied experimentally, both in the gas and solid phases, with the aim of obtaining a description of the equilibration pathways in multimodes systems and obtaining specific state-to-state rate constants. The experimental results are compared with theoretical models in an attempt to understand the dynamics underlying the exchange of energy among the different degrees of freedom of two interacting systems. The experimental method used in these studies is that of laser induced fluorescence. It is shown that a detailed kinetic treatment is essential for extracting state-to-state rate constants from the experimental observables. Thus the general kinetic problem of vibrational equilibration of a multimode system is considered in some detail. Some mathematical and experimental techniques are intoduced for the reduction of experimental data. Dissert. Abstr.

N82-13866 Georgia Univ., Athens.
THEORY AND CALCULATION OF RAMAN LINE SHAPES AND EXCITATION PROFILES NEAR A ONE PHOTON RESONANCE Ph.D. Thesis
Don Alan Berkowitz 1981 212 p
Avail: Univ. Microfilms Order No. 8123034

The dependence of the crossing angle between two beams of coherent radiation in a coherent anti-stokes Raman Spectroscopy (CARS) experiment on the frequency difference between the beams was determined through consideration of the geometry involved and the dependence of index of refrction on frequency. Closed-form expressions were developed for overlap integrals essential to the calculation of spectral intensities in absorbance, fluorescence, Raman, and CARS spectra. Overlap integrals were calculated for harmonic oscillator wavefunctions, in which the ground and excited state potential functions were not necessarily equal in frequency. Closed-form expressions of overlap integrals were derived for the treatment of Morse potential functions in the ground and excited state. A least squares fitting routine was developed to determine values of moleclar parameters from analysis of spectra and excitation profiles. Dissert. Abstr.

N82-13867 Rochester Univ., N. Y.
MOLECULAR BEAM ELECTRIC RESONANCE STUDIES OF WEAKLY BOUND COMPLEXES Ph.D. Thesis
Robert L. DeLeon 1981 135 p
Avail: Univ. Microfilms Order No. 8123974

Van der Waals molecules composed of an argon atom weakly bound to variety of small molecules are studied. Seeded supersonic nozzle beam expansions were employed in a molecular beam electric resonance spectrometer to study electric dipol transitions both in the presence and absence of an external electric field. Rotational spectra were used to derive rotational constants and structural parameters, including R and theta on all species. R is defined as the distance between the monomer center of mass and the argon and theta is the angle between R and the monomer symmetry axis. Where possible hyperfine parameters, dipole moments, centrifugal distortion constants, force constants, vibrational frequencies, inversion splittings and inversion barriers were obtained. Weakly bound complexes of sulfur dioxide with a large number of molecular species were formed in nozzle expansions and studied mass spectroscopically. The electrostatic deflection of some of these species was observed. Dissert. Abstr.

N82-13868 Iowa State Univ. of Science and Technology, Ames.
A COMPARATIVE STUDY OF CLASSICAL AND QUANTAL APPROACHES TO THERMAL AND DIFFUSIVE TRANSPORT IN A DILUTE ATOM-DIATOM BINARY MIXTURE Ph.D. Thesis

David Russell Evans 1981 334 p
Avail: Univ. Microfilms Order No. 8123123

A parallel derivation of the Boltzmann equation in both classical and quantum mechanics is given. In particular, a quantal form which closely resembles the classical form is obtained. The kinetic theory appropriate to the thermal conductivity, thermal diffusion, and diffusion coefficients is given in both classical and quantum mechanics for an atom and diamagnetic diatom (more generally, a linear molecule) mixture in an applied magnetic field. Explicit expressions for energy dependent, and thermally averaged cross sections are obtained. A study of the effect of chattering collisions on various thermally averaged cross sections is given for a rigid potential. It is found that some cross sections are more strongly effected than others. In particular, those cross sections which are related by energy conservation are most strongly affected. The applicability of a rigid interaction as a control variate in a Monte Carlo study of a realistic interaction is discussed in light of these results. Dissert. Abstr.

N82-13869 Florida Univ., Gainesville.
A CORRELATED TREATMENT OF BOUND-CONTINUUM TRANSITIONS WITHIN THE ELECTRON PROPAGATOR FORMALISM Ph.D. Thesis
Manoj Kumar Mishra 1981 93 p
Avail: Univ. Microfilms Order No. 8124445

A super-operator formulation for decoupling the symmetry blocks of the full 2p-h TDA electron propagator matrix is presented. The accuracy of this decoupling was explored by using the full 2p-h TDA overlap amplitudes to calculate relative ionization intensities for N2 and H2O. The effect of excluding orbitals on the calculated ionization potentials and relative ionization cross-sections is reported. The use of intensities obtained from successively larger subsets for labeling the photo-electron spectrum is suggested. Expressions were formulated for the correlated treatment of photoionization cross-sections using Feynman-Dyson amplitudes of the electron propagator to describe the ionization processes and an orthogonalized plane wave description for the photoelectron. Explicit equations were derived for the theoretical treatment of experimental cross-sections using either spherical grid deflection type spectrometers or those using a particular collection angle. Dissert. Abstr.

N82-13870 Georgia Inst. of Tech., Atlanta.
TRANSPORT PROPERTIES OF GASEOUS IONS Ph.D. Thesis
Michael Gordon Thackston 1981 171 p
Avail: Univ. Microfilms Order No. 8124298

The mobilities and longitudinal diffusion coefficients of positive alkali and negative halogen ions in a variety of gases were measured as functions of the ratio of the electric field strength to the neutral gas number density. Thirty-one ion-gas combinations were studied using a drift tube mass spectrometer of ultra-high vacuum construction. Bursts of ions were repetitively gated into the drift region which contained the neutral gas at a constant, predetermined pressure. After drifting a known distance, the ions were mass selected and then detected. The arrival times of the ions were recorded with the aid of a 256-channel time of flight analyzer, and the resulting arrival time histograms were used to determine the mobilities and longitudinal diffusion coefficients of the ions in the neutral gas. A rigorous kinetic theory of ion mobility was discussed. Dissert. Abstr.

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-13871# Oak Ridge National Lab., Tenn.
HIGH-TEMPERATURE GAS-COOLED REACTOR TECHNOLOGY DEVELOPMENT PROGRAM Annual Progress Report, period ending 31 Dec. 1980
Paul R. Kasten Aug. 1981 332 p refs
(Contract W-7405-eng-26)
(DE81-029096; ORNL-5753) Avail: NTIS HC A15/MF A01

Research activities are described concerning HTGR chemistry; fueled graphite development; prestressed concrete pressure vessel development; structural materials; HTGR graphite studies; HTR core evaluation; reactor physics; shielding; application and project assessments; and HTR Core Flow Test Loop studies. DOE

N82-13872# Ohio State Univ., Columbus. Dept. of Physics.
PATTERN OF NEUTRINO MIXING IN GRAND UNIFIED THEORIES
K. Milton and K. Tanaka 1981 9 p refs
(Contracts DE-AC02-76ER-01545; EY-76-C-02-1545)
(DE81-029034; DOE/ER-01545/309) Avail: NTIS HC A02/MF A01

It was found previously in SO(10) grand unified theories that if the neutrinos have a Dirac mass and a right-handed Majorana mass (approximately 10 to the 15th power GeV) but no left-handed Majorana mass, there is small electron neutrino/sub e/ mixing but muon neutrinos - neutrino sub tau mixing can be substantial. This problem is reexamined on the basis of a formalism that assumes that the up, down, lepton, and neutrino mass matrices arise from a single complex 10 and a single 126 Higgs boson. This formalism determines the Majorana mass matrix in terms of quark mass matrices. Adopting three different sets of quark mass matrices that produce acceptable fermion ass ratios and Cabbibo mixing produces results consistent with the above; however, in the optimum case electron neutrino - muon neutrino mixing can be of the order of the Cabbibo angle. DOE

N82-13873# Oak Ridge National Lab., Tenn. Computer Sciences Div.
HETFIS: HIGH-ENERGY NUCLEON-MESON TRANSPORT CODE WITH FISSION
J. Barish, T. A. Gabriel, F. S. Alsmiller, and R. G. Alsmiller, Jr. Jul. 1981 29 p refs
(Contract W-7405-eng-26)
(DE81-027674; ORNL/TM-7882) Avail: NTIS HC A03/MF A01

A model that includes fission for predicting particle production spectra from medium-energy nucleon and pion collisions with nuclei (Z > or = 91) has been incorporated into the nucleon-meson transport code, HETC. The programming aspects of HETFIS (High-Energy Nucleon-Meson Transport Code with Fission) are presented. A description of the program data and instructions for operating the code are given. HETFIS is written in FORTRAN 4 for the IBM computers and is readily adaptable to other systems. DOE

N82-13874 Rochester Univ., N. Y.
INELASTIC SCATTERING OF HIGH ENERGY MUONS FROM NUCLEAR TARGETS
Martin Thomas Miller 1981 148 p
Avail: Univ. Microfilms Order No. 8123992

The inelastic cross section of high energy muons from nuclear targets were measured. It was performed using a 10.5 GeV muon beam and a system of multiwire proportional chambers. The range of 0.2<Q(2)<2.4(GeV/c)(2) and 1<NU<9 GeV was explored and it was found that in most cases muons scatter incoherently from the individual nucleons in the nucleus. However, for a small fraction of the events the nucleons shadow one another resulting in a cross section sigma sub T is approximately sigma sub NA rho where A is the atomic number of the nuclear target and 0.9<RHO<1.0. This 'shadowing' effect is attributed to the strongly interacting component of the exchanged virtual photon and its magnitude was found to be in excess of the predictions of current theoretical models. B.W.

74 OPTICS

Includes light phenomena.

N82-13875 Rochester Univ., N. Y.
PHASE MEASUREMENTS IN THE REGION OF AN ABERRATED LENS Ph.D. Thesis
Joel Leo Seligson 1981 245 p
Avail: Univ. Microfilms Order No. 8124003

The intensity and phase distributons in the focal region of an aberrated lens were studied both theoretically and experimentally. For computing the intensity and phase distributions, three methods the Nijboer-Zernike method, the asymptotic method and the discrete Fourier transform were compared. The discrete Fourier transform was found to be the most useful method for treating a wide range of aberrated lenses. The intensity and phase distributions were computed for a variety of theoretical lenses. It was observed that in some cases the phase distribution is a much more sensitive indicator of the presence of aberrations than the intensity distribution. It is found that phase measurements provide a very accurate method for locating the zero points of the intensity due to the multivaluedness exhibited by phase around these points. Dissert. Abstr.

N82-13876*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
INFRARED EXPERIMENTS FOR SPACEBORNE PLANETARY ATMOSPHERES RESEARCH. FULL REPORT
Nov. 1981 150 p refs
(Contract NAS7-100)
(NASA-TM-84414) Avail: NTIS HC A07/MF A01 CSCL 20F

The role of infrared sensing in atmospheric science is discussed and existing infrared measurement techniques are reviewed. Proposed techniques for measuring planetary atmospheres are criticized and recommended instrument developments for spaceborne investigations are summarized for the following phenomena: global and local radiative budget; radiative flux profiles; winds; temperature; pressure; transient and marginal atmospheres; planetary rotation and global atmospheric activity; abundances of stable constituents; vertical, lateral, and temporal distribution of abundances; composition of clouds and aerosols; radiative properties of clouds and aerosols; cloud microstructure; cloud macrostructure; and non-LTE phenomena. A.R.H.

N82-13877*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
INFRARED EXPERIMENTS FOR SPACEBORNE PLANETARY ATMOSPHERES RESEARCH. EXECUTIVE SUMMARY
Nov. 1981 13 p
(Contract NAS7-100)
(NASA-TM-84413) Avail: NTIS HC A02/MF A01 CSCL 20F

The role of 0.5 to 300 micron remote sensing in planetary atmospheres exploration was evaluated by examining a broad range of measurement techniques including quantitative intercomparisons of existing and planned instruments by the phenomenological method. Key areas of infrared instrumentation requiring development for the investigations of atmospheres were identified. A.R.H.

N82-13878# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
EVALUATION OF HALO DECONVOLUTION SCHEMES Final Technical Report, Nov. 1978 - Nov. 1980
Richard Barakat Jul. 1981 133 p refs
(Contract F30602-79-C-0018; ARPA Order 3655)
(AD-A105125; RADC-TR-81-196) Avail: NTIS HC A07/MF A01 CSCL 20/6

The final report chronicles various aspects of the research conducted by the principal investigator on the wavefront deconvolution problem. Only work carried out since the interim report RADC-TR-80-154, May 1980, was released is discussed because the material in the interim report is complete in itself. The work discussed here naturally forms four major interrelated, but separate research items, and each topic is the subject of a separate section of the final report. In addition, there is an appendix devoted to a minor item which evolved during the course of the investigation but is not directly related to the major items. Author (GRA)

N82-13879# Purdue Univ., Lafayette, Ind. Center for Information and Numerical Data Analysis and Synthesis.
CRITICALLY EVALUATED DATA ON OPTICAL AND TRANSPORT PROPERTIES OF SOLIDS (REFRACTIVE INDEX AND ABSORPTION COEFFICIENT OF SELECTED OPTICAL MATERIALS) Final Technical Report, 1 May 1976 - 30 Apr. 1981
H. H. Li 4 Jun. 1981 25 p refs
(Contract F44620-76-C-0105; AF Proj. 2308)
(AD-A105059; AFOSR-81-0615TR) Avail: NTIS HC A02/MF A01 CSCL 20/6

Under this contract a study was carried out of the optical properties of selected optical materials through data compilation, critical data evaluation and generation of recommended values based on available data from worldwide literature. The selected optical materials include alkali halides, alkaline earth halides, silicon and germanium, and III-V compounds. A major contribution of this work has been the exhaustive compilation of absorption coefficient and the formulation of an Urbach type equation for the multiphonon region near the infrared absorption edge of alkali halides and alkaline earth fluorides. This equation is used to calculate the intrinsic absorption coefficient as a function of both wavelength and temperature in the temperature region of practical interest with the calculated result in concordance with the best contemporary experimental measurements for the pure samples. Optical constants of silicon and germanium were studied in a similar manner as for the above mentioned materials. Refractive index data for silicon and germanium were exhaustively compiled and analyzed. Recommended values of refractive index for the transparent wavelength region were generated in the range 1.2 to 14 microns and 100-750 K for silicon, and 1.9 to 16 microns and 100-550 K for germanium. GRA

N82-13880# Massachusetts Inst. of Tech., Cambridge. Crystal Physics and Optical Electronics Lab.
INVESTIGATION OF PHOTOACOUSTOREFRACTIVE EFFECT IN LINbO SUB 3 SAW DEVICES Final Report, 6 Feb. 1980 - 5 Feb. 1981
Arthur Linz and Hans P. Jenssen 14 Aug. 1981 5 p refs
(Contract DAAG29-80-C-0074)
(AD-A103705; ARO-17243.1-P) Avail: NTIS HC A02/MF A01 CSCL 20/6

Multiphoton photoelectric emission from lithium niobate is investigated. Thermionic emission occurs at energy density of about 1 J sq. cm at 1060nm and 530nm. GRA

N82-13881# Corning Glass Works, N.Y.
SINGLE MODE OPTICAL WAVEGUIDE DESIGN INVESTIGATION Progress Report
V. A. Bhagavatula, R. A. Westwig, and D. B. Kack 30 Mar. 1981 10 p ref
(AD-A098979; PR-2) Avail: NTIS HC A02/MF A01 CSCL 20/6

Measurements of lateral offset sensitivity were made on several fibers to determine reproducibility, and wavelength dependence. A modified expression for lateral offset loss was studied. Microband sensitivity measurements were made using the linear pin array and compared with the random microband test. Three fibes were determined to be within the fiber design matrix. The criteria for selecting a fiber was expanded to encompass equivalent step parameters whereby refractive index profile shapes other than the ideal step profile are taken into account. Author

N82-13882# Army Armament Research and Development Command, ABerdeen Proving Ground, Md.
DETERMINATION OF OPTICAL CONSTANTS FROM EXTINCTION MEASUREMENTS Technical Report, Apr. - Sep. 1980
M. E. Milham, R. H. Frickel, J. F. Embury, and D. H. Anderson Apr. 1981 33 p refs
(DA Proj. 1L1-62662-A-554)
(AD-A099494; AD-E410396; ARCSL-TR-81031) Avail: NTIS HC A03/MF A01 CSCL 20/6

The determination of the optical constants of aerosols from extinction data is reported. This is an iterative method which uses the Lorenz-Mie formalism in conjunction with the Kramers-Kronig dispersion relations to derive the optical constants of the aerosol material. The theory of the method is developed and is applied to find the optical constants of an o-phosphoric acid aerosol in the 7 to 14 micro infrared. Author

N82-13883# Utah State Univ., Logan. Electro-Dynamics Lab.
DETECTION OF TRACE GASES USING HIGH RESOLUTION

SPECTROSCOPY

A. S. Zachor (Atmospheric Radiation Consultants, Inc.), B. Bartchi, and M. Ahmakjian (Air Force Geophysics Lab., Hanscom AFB) 1981 8 p ref Reprinted from Proceedings of SPIE: The International Soc. for Optical Engr. Atmospheric Transmission, Apr. 1981, Washington, D.C.
(Contract F19628-77-C-0203; AF Proj. 7670)
(AD-A104841; AFGL-TR-81-0273) Avail: NTIS HC A02/MF A01 CSCL 07/4

The capability of a spectrometer system to remotely detect and characterize trace gases in localized cloud; e.g., a stationary source effluent is discussed. The detection method utilizes all of the information contained in the observed spectral radiance contrast between cloud and background. The degree to which this spectrum is correlated with a computed (FASCOD1) reference spectrum is determined. Trace gases are reliably detected even when spectrum features are well below the noise level. The minimum detectable quantities (MDQ's) for various trace games at one atmosphere total pressure are given. The HDQ's determine the combinations of gas column thickness and gas background temperature difference that correspond to 95 percent detection probability and one percent false detection probability for a given system noise equivalent spectral radiance. The capability of the method to remotely infer the gas column thickness and temperature are also discussed. GRA

N82-13884# Science Applications, Inc., San Diego, Calif.

OPTICAL SCANNER SYSTEM FOR INTERNAL INSPECTION OF STEAM-GENERATOR TUBES Final Report

G. D. Hall, E. A. Meckstroth, and V. J. Orphan Jul. 1981 127 p Sponsored by EPRI
(EPRI Proj. S103-2)
(EPRI-NP-1944) Avail: NTIS HC A07/MF A01

Both an improved low resolution scanner and a high resolution scanner and data acquisition system were designed. A low resolution scanner system was assembled, based on the design of the prototype scanner, with improvements in the mechanical and optical design, as well as the addition of a data acquisition and display system for accurate and realistic presentation of the image. Improving on the design of the low resolution system, a high resolution (720 element detector array) scanner was then designed and fabricated. The data acquisition and display system was also upgraded. The resultant system will image a circumferential band on the inside surface of a 0.670 in (17mm) tube to a precision of 480 picture elements. The performance evaluation of the two scanners included resolution tests and observation of simulated and actual defects in steam generator tubes. These test results are compared with similar evaluations of the prototype scanner. DOE

N82-13885# Sandia Labs., Albuquerque, N. Mex.

ELECTROOPTIC SHUTTER DEVICES UTILIZING PLZT CERAMIC WAFERS

Allen L. Thornton 1981 7 p refs Presented a the SPIE Intern. Symp., San Diego, Calif., 24 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025470; SAND-81-0728C; CONF-810810-13) Avail: NTIS HC A02/MF A01

Optical transparency was achieved in lead zirconate-titanate ferrolectric ceramics by substituting moderate amounts of the element lanthanum (8 to 12 percent) for lead. These compositions exhibit the quadratic (Kerr) electrooptic effect. The excellent optical qualities of these materials (designated PLZT) has permitted the practical utilization of their electrooptic properties in a number of devices. Shutter devices developed and those in continuing development are described with respect to operational characteristics and physical configuration. Major efforts have centered on shutter development for the protection of aircrew from eye-damaging weapon effects. Other devices are also described which: provide eye protection for welders, protect vidicon tubes, function as page composers for holographic memories serve as large aperture photographic shutters, provide stereoscopic three dimensional TV displays, and serve as data links in a fiber optic transmission path. DOE

N82-13886# Los Alamos Scientific Lab., N. Mex.

OPTICS OF MASS SEPARATOR 1

Silvio J. Balestrini Jul. 1981 43 p refs
(Contract W-7405-eng-36)
(DE81-028242; LA-8893-MS) Avail: NTIS HC A03/MF A01

The ion optics of an existing mass separator are documented. The electroand magnetic stages are analyzed theoretically, both separately and in combination, by paying particular attention to the ion trajectories, the linear and angular magnifications, and the dispersion. The possibility of converting the magnet into a tunable unit by means of current-carrying elements in the gap is demonstrated. The feasibility of correction coils constructed from printed circuit board is shown. DOE

N82-13887# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

INFRARED VIBRATIONAL PREDISSOCIATION SPECTROSCOPY OF SMALL MOLECULAR CLUSTERS

James M. Lisy, Matthew F. Vernon, Andrzej Tramer, Hoi-Sing Kwok, Douglas J. Krajnovich, Y. R. Shen, and Y. T. Lee Jul. 1981 9 p refs Presented at the Intern. Conf. on Laser Spectroscopy, Alberta, Canada, 29 Jun. 1981
(Contract W-7405-eng-48)
(DE81-028648; LBL-12981; CONF-8106100-4) Avail: NTIS HC A02/MF A01

The structure and interaction of small molecular clusters were studied. Molecular beam electric resonance spectroscopy, Fourier-transform microwave spectroscopy and pressure induced infrared absorption spectra have provided information concerning the ground state structure and the intermolecular potential energy surface for a large number of binary systems. Vibrational predissociation experiments using molecular beam techniques and tunable infrared lasers measured the infrared absorption spectra and dynamical properties of many van der Waals and hydrogen bonded clusters. DOE

N82-13888# Sandia Labs., Albuquerque, N. Mex.

MINIMUM/CONSTANT VOLTAGE PLZT ELECTROOPTIC SHUTTERS

J. O. Harris, Jr., Jack D. Cyrus, and George R. Laguna 1981 7 p refs Presented at the SPIE Intern. Symp., San Diego, Calif., 24 Aug. 1981 Sponsored in part by the Air Force Life Support Systems Program Office, Wright-Patterson AFB, Ohio
(Contract DE-AC04-76DP-00789)
(DE81-028646; SAND-81-0727C; CONF-810810-19) Avail: NTIS HC A02/MF A01

Lead lanthanum zirconate titanate (PLZT) shutters were developed and proposed for several military and industrial applications. To achieve electronic simplification in the control circuitry, it is desirable to lower the voltage operating level to less than 600 volts, and to minimize logistic problems relating to spare lens inventories, it is desirable to produce shutters with a relatively constant operating voltage. Experimental data are presented for a number of electrode gap/PLZT wafer thickness ratios which indicate that this 600 volt maximum can be attained. A procedure is then described whereby manufactured shutters or lens assemblies can be electroded to operate over a narrow voltage range. DOE

N82-13889# California Univ., Livermore. Lawrence Livermore Lab.

TIME DEPENDENT RECORDING OF IMAGES TRANSMITTED OVER OPTICAL FIBERS

R. D. Lear 24 Aug. 1981 14 p refs Presented at the SPIE Intern. Symp., San Diego, Calif., 24 Aug. 1981
(Contract W-7405-eng-48)
(DE81-026599; UCRL-85609; CONF-810810-11) Avail: NTIS HC A02/MF A01

A system is being developed to record temporally and spatially resolved data after transmission through 1 km of optical fiber. Wavelength multiplexing techniques are used to transmit many spatial points over each 62/sub mu/m fiber. Light from the output end of each fiber is demultiplexed back into a spatial line. Four lines of data are focused sequentially across the input face of an RCA streak tube. System sensitivity is increased by coupling a microchannel plate image intensifier to the streak camera output. The image intensifier output is recorded on film. The streak camera gives 200 spatial points at a 25% CTF over a dynamic range of 20 db. The total usable streak length is 120 ns with a resolution of 600 ps. DOE

N82-13890# Los Alamos Scientific Lab., N. Mex.
FIBER OPTIC QUALITY ASSURANCE AT THE NEVADA TEST SITE
J. Manning, S. Baumgart, R. Malone, and D. Thayer 1981 5 p ref Presented at the 25th Tech. Symp. SPIE Tech. Programs Comm., San Diego, Calif., 24-28 Aug. 1981
(Contract W-7405-eng-36)
(DE81-028740; LA-UR-81-2137; CONF-810810-15) Avail: NTIS HC A02/MF A01

A large number of fiber optic cables were used in support of a neutron imaging experiment at the Nevada Test Site. The quality control testing of fiber components used on this experiment is described. The principal reason for quality control testing was to ensure reliable, high transmission fibers, a secondary reason was to gain data on a large sample of fiber cables in the field. The instrumentation developed for carrying out these field measurements is discussed. DOE

N82-13891# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Electronique et Physique.
FAR INFRARED SOURCE CLASSIFICATION SYSTEM Ph.D. Thesis [SYSTEME DE CLASSIFICATION DES SOURCES INFRAROUGE LOINTAIN]
Mohamed Youssry Mahmoud Apr. 1980 333 p refs
(ENST-E-80005) Avail: NTIS HC A15/MF A01

A hardware solution to the problem of classification of isolated IR sources is proposed. The impact of IR technology on the design of a special purpose nonimage forming IR system is discussed. Simulation of the system elements and their effect on IR image acquisition, feature extraction, and classification is analyzed. The algorithms of feature extraction by on-line routines or special purpose hardware are explained. A high density IR mosaic detector is presented which allows for efficient extraction. Although the proposed mosaic geometry is intended for nonimaging applications, its possible extension to IR imaging is pointed out. Author (ESA)

N82-13892# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Electronique et Physique.
EXPERIMENTAL STUDY OF HETERODYNE PHOTODETECTION. PERSPECTIVES FOR APPLICATIONS TO OPTICAL TRANSMISSION Ph.D. Thesis [ETUDE EXPERIMENTALE DE LA PHOTODETECTION HETERODYNE. PERSPECTIVES D'APPLICATIONS AUX TRANSMISSIONS OPTIQUES]
Mondher Attia Dec. 1980 247 p refs In FRENCH; ENGLISH summary
(ENST-E-80013) Avail: NTIS HC A11/MF A01

Heterodyne photodetection in the visible and near infrared spectral ranges was studied. The physical principles underlying the operation of the different components used to establish optical links are recalled. Performance and limitations of incoherent photodetection are then reviewed. A classical electromagnetic representation of heterodyne detection is presented, illustrating advantages and difficulties of application. After a justification of component choices, the experimental setup is described, and results are discussed. The outlook for utilization of heterodyne photodetection in a monomode fiber transmission system is indicated. Author (ESA)

N82-13893 Stanford Univ., Calif.
FIBER OPTIC TIME DOMAIN REFLECTOMETERS: APPROACHES TO PERFORMANCE IMPROVEMENT Ph.D. Thesis
Young Dae Kim 1981 222 p
Avail: Univ. Microfilms Order No. 8124095

The faults and loss profile of an optical fiber cable are conveniently measured by an optical time domain reflectometer (OTDR). The measured results are, however, severely contaminated by various types of noise due to incoherent optical detection, frequently requiring further signal processing. The conventional approach is straightforward signal averaging, which does not take advantage of the unique signal statistics related to low level optical detection. The measurement system was studied from a systems point of view emphasizing performance optimization through signal processing and signal selection. Low level detection requires nonlinear processing, such as threshold detection (photon-counting) or the noise power method. Dissert. Abstr.

N82-13894 Stanford Univ., Calif.
A VACUUM ULTRAVIOLET RADIATION SOURCE USING CERENKOV RADIATION Ph.D. Thesis
John Charles Sheppard 1981 173 p
Avail: Univ. Microfilms Order No. 8124151

An apparatus was designed, fabricated, and installed in a drift section near the end of the Stanford Linear Accelerator Center (SLAC) three kilometer accelerator. When the apparatus is filled with helium, the SLAC primary beam characterized by its high energy, high current, and small emittance, generates a Cerenkov spectrum which is continuous from the infrared through the visible to 584A. Like a synchrotron source, the Cerenkov source generates a well collimated, spectrally that continum extending through the VUV which is free from absorption and emission lines. The flux of synchrotron radiation from SPEAR in the VUV is approximately one hundred billion photons/s per 10% bandwidth per mrad of arc in the orbital plane per mA of beam current, assuming 10% collection efficiency. The observed Cerenkov source flux is about one hundred billion photons/s per 10% bandwidth per mrad divergence per mA of beam current, @ 1000A including mirror and bandwidth limiting iris losses and impurity absorption. Dissert. Abstr.

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-13895 Georgia Univ., Athens.
FUNDAMENTAL STUDIES OF DIRECT CURRENT PLASMAS Ph.D. Thesis
Ronald Ralph Williams 1981 173 p
Avail: Univ. Microfilms Order No. 8123110

Emission profiles of the group IIA elements in both the two and three-electrode direct current plasmas (DCP) are presented. In both cases the optimum emission zone of calcium occurs lower in the plasma than any other element studied. Since calcium most closely approaches argon in atomic mass, a collision mechanism involving some form of argon is implicated in the excitation mechanism. However no present theory accurately accounts for the observed emission profiles of the group IIA elements. Enhancements of analyte emisson caused by the presence of easily ionized elements were studied using emission profiles for calcium and a water-cooled electrical probe. The observed changes in the calcium profile can be qualitatively explained by the change in thermal conductivity of the region below the plasma body induced by the ionization of the concomitant. Dissert. Abstr.

N82-13896 California Univ., Los Angeles.
ION CYCLOTRON RESONANCE HEATING AND ITS EFFECT ON CONFINEMENT IN TOKAMAKS Ph.D. Thesis
Ki Woong Whang 1981 151 p
Avail: Univ. Microflms Order No. 8122885

Ion cyclotron resonance heating (CRH) and its effect on plasma confinement in Tokamaks is considered. The analysis is based on the single particle equations of motion in the 'quasi-adiabatic approximation', i.e., taking advantage that in the absence of collisions, the ion guiding center variables are conserved over most of a particle's trajectory. Nonadiabatic changes in these variables occur only when an ion passes through the localized cyclotron resonance. The effect of RF on electron motion is neglected. The collison less heating is treated both analytically and numerically using a set of finite mapping equations. The stochastic nature of ICRH in the absence of collisions is investigated and the threshold RF electric field amplitude for the transition from the superadiabatic to the stochstic regime is found. The characteristic regimes of two presently operating tokamaks, Macrotor and PTL, are used as a guide in choosing parameter values. The effect of heating on confinement is examined by studying the changes in single particle orbits produced by the RF and the resultant time is compared with the neoclassical confinement time and the charge exchange time. Dissert. Abstr.

N82-13897 Stanford Univ., Calif.
PULSE PROPAGATION IN DISPERSIVE MEDIA WITH APPLICATIONS TO PLASMAS Ph.D. Thesis
Robert Joseph Vidmar 1981 372 p
Avail: Univ. Microfilms Order No. 8124167

The wave properties deduced from wave-packets demonstrate that periodic and transient sources excite amplifying and decaying waves, which have identical frequencies but different signal velocities, phase velocities, and growth rates. The analysis for the amplifying waves in a beam-plasma system exemplifies these source-dependent properties. These results also apply to decaying-wave phenomena such as ray tracing in a absorptive medium and radar pulses in a lossy media. Wave-packets propagating parallel and perpendicular to the Earth's magnetic field in the F-layer of the ionosphere are examples of dispersive wage propagation excited by transient sources. These waveforms suggest a diagnostic method to deduce plasma parameters and the orientation and distance to the transient source from its wave-packet. Dissert. Abstr.

N82-13898 Stanford Univ., Calif.
THE REVERSE-FIELD RIGID ROTOR MODEL, CALCULATION AND SIMULATION Ph.D. Thesis
Michael Leo Blake 1981 129 p
Avail: Univ. Microfilms Order No. 8124037

An example of an equilibrium reverse-field plasma configuration the rigid rotor model is based on counter-rotating Maxwellian velocity distributions of electrons and ions. The drift velocity on the Maxwellian distributions corresponds to rigid rotation and represents the most probable distribution of charged particles in axi-symmetric magnetic fields. Due to the circulating (theta) currents, the confining axial (z) magnetic field changes direction within the plasma. The known analytic solution for the one dimensional (r dependent) case is discussed in terms of the magnetohydrodynamic force equation and numerical solutions of the two dimensional (r and z dependent) case are presented. Numerical solutions showing a density peak beneath the confining coils are presented along with the expected solutions with the density peak between the coils. A two-and-one-half dimensonal particle simulation is used to examine the stability of these reverse-field equilibria in the plane perpendicular to the applied magnetic field. Dissert. Abstr.

N82-13899# Nagoya Univ. (Japan). Inst. of Plasma Physics.
ENERGY AND MOMENTUM DEPOSITION TO PLASMAS DUE TO THE LOWER HYBRID WAVE BY A FINITE SOURCE
Noriyoshi Nakajima, Hirotada Abe, and Ryohei Itatani Oct. 1981 68 p refs
(IPPJ-546) Avail: NTIS HC A04/MF A01

Heating and current generation due to the lower hybrid wave are studied using particle simulation. A propagation cone consisting of Fourier expanded modes is emphasized. The trajectory of the propagation cone is well described up to the lower hybrid resonance layer using both cold plasma approximation and the Wentzel-Kramer-Brillouin method. An ion cross field drift due to the ponderomotive force is observed. The modes in the higher side of the spectrum of the antenna play a key role for creation of the ion high energy tail. This process is called the cascade process judging from the time variation of the damping of each mode. The particle model is significantly improved using the elongated grid and the quadric spatial interpolation. R.J.F.

N82-13900# Nagoya Univ. (Japan).
OXYGEN TRANSPORT AND LINE EMISSIONS IN A TOKAMAK PLASMA
Takako Kato, Masashi Kako, Tsuneo Amano, Yasuyuki Nomura, and Satio Hayakawa Sep. 1981 34 p refs
(IPPJ-544) Avail: NTIS HC A03/MF A01

Two models which describe the behavior of impurity in Tokamaks are investigated: one is the drift model and the other the diffusion model. The drift model is a simplified one in which impurity ions drift only inward, while the diffusion of impurities is taken into account in the diffusion model. The results of the two models are compared. Spectroscopic data on oxygen impurities in JIPP T-2 Tokamaks are employed for comparison with the theoretical results in which metastable populations were considered to calculate the line intensities. Oxygen transport is well interpreted with the neutral influx of energy 10 to 50 eV and anomalous diffusion of magnetic 5000 (n sub max/n sub e(r)) sq cm/sec. Author

N82-13901# Nagoya Univ. (Japan). Inst. of Plasma Physics.
TOROIDAL PLASMA CURRENT SUSTAINMENT BY LOWER HYBRID WAVES IN THE WT-2 TOKAMAK
M. Nakamura, T. Cho, S. Kubo, T. Shimozuma, H. Kawai, Y. Yamazaki, T. Maekawa, Y. Terumichi, S. Tanaka, and Y. Hamada Oct. 1981 16 p refs Prepared in cooperation with Kyoto Univ., Japan
(IPPJ-545) Avail: NTIS HC A02/MF A01

Injecting RF power P sub RF near the lower hybrid frequency into an Ohmic heating plasma near the end of Tokamak discharge in the WT-2, and RF driven current sustained plasma is produced and continued to exist during the RF injection period, where the toroidal current (T sub p approximately 10 kA) is generated by the lower hybrid wave only without the Ohmic power. The efficiency of RF driven current generation is high and attains to I sub/P sub RF approximately 0.9 kA/kW. Author

N82-13902# Nagoya Univ. (Japan). Inst. of Plasma Physics.
SOFT AND HARD MAJOR DISRUPTIONS IN THE PROFILE CONTROL EXPERIMENT OF THE JIPP T-2 TOKAMAK
K. Toi, K. Sakurai, S. Tanahashi, and S. Yasue Sep. 1981 43 p refs
(IPPJ-547) Avail: NTIS HC A03/MF A01

The nonlinear saturation theory of tearing modes is applied to the Tokamak plasmas produced by an appropriate combination of gas puffing and plasma current-rise in JIPP T-2. The calculated relative amplitude of poloidal field fluctuations has good correlation with the experimental data. The radial extent of the island widths of m/n = 2/1 and 3/2 modes which are derived in the calculation suggests that the 'soft' major disruption, where a plasma current suffers only slight change, can be triggered by either the overlapping of 2/1 island with 3/2 one or the contact of 2/1 island with a limiter. Moreover, it is consistent with the experimental data the hard major disruption, which brings about the abrupt and significant reduction of the plasma curent, results from the combined process of two above-mentioned causes of the soft major disruption. Author

N82-13903# Nagoya Univ., Toyokawa (Japan). Inst. of Plasma Physics.
ELECTROMAGNETIC CYCLOTRON HARMONIC WAVES
T. Ohnuma, T. Watanabe, and K. Hamamatsu Sep. 1981 15 p refs
(IPPJ-536) Avail: NTIS HC A02/MF A01

Electromagnetic electron cyclotron harmonic waves just below the electron cyclotron harmonics were investigated numerically and experimentally. Backward waves which were observed to propagate nearly perpendicular to the magnetic field just below the electron cyclotron frequency in a high density magnetoplasma were confirmed to be in accord with the theoretical electromagnetic cyclotron waves. R.J.F.

N82-13904# Nagoya Univ., Toyokawa (Japan). Inst. of Plasma Physics.
PLASMA FOCUS BREEDER
Kazunari Ikuta Sep. 1981 15 p refs
(IPPJ-541) Avail: NTIS HC A02/MF A01

High voltage generation on pinched plasma by a plasma focus device was investigated. Fissile fuels are bred with the help of high current plasma focus device. A mechanism of accelerating proton beam in plasma focus device to high energy changes the inductance in plasma column because of rapid growth of plasma instability. It is concluded that a high current plasma focus device is a good candidate for the generation of energetic, intense proton beams which can be utilized for breeding fissile fuels. E.A.K.

N82-13905# Nagoya Univ., Toyokawa (Japan). Inst. of Plasma Physics.
FEEDBACK PLASMA CONTROL IN HYBRID POLOIDAL COIL SYSTEM
Y. Hamada, Y. Abe, S. Kitagawa, and K. Toi Sep. 1981 25 p refs
(IPPJ-542) Avail: NTIS HC A02/MF A01

Analysis of feedback control characteristics in the hybrid poloidal coil system (hybrid of the ohmic and the equilibrium vertical coils) is performed. It is found that, in the complex hybrid poloidal coil system, the plasma can be sufficiently well controlled using very simple equations for the calculation of feedback voltage. Author

N82-13906# Nagoya Univ., Toyokawa (Japan). Inst. of Plasma Physics.

NUMERICAL STUCY ON THE INTERACTION BETWEEN A MODULATED ELECTRON BEAM AND A PLASMA

Osamu Fukumasa and Ryohei Itatani Sep. 1981 48 p refs
(IPPJ-543) Avail: NTIS HC A03/MF A01

Interaction of a modulated electron beam with a plasma is calculated for unbounded and bounded electron beam-plasma systems, using the method of partial simulation. In the case of the unbounded system, deformation of the beam distribution function is occurred in relation to suppression of one wave by the other wave. While, in the case of the bounded system, occurrence of deformation depends on whether feedback effects of reflected beams are present or not. The findings are qualitatively in agreement with experimental results. Author

N82-13907# Nagoya Univ. (Japan). Inst. of Plasma Physics.

DATA ON THE BACKSCATTERING COEFFICIENTS OF LIGHT IONS FROM SOLIDS

Tatsuo Tabata (Osaka Prefecture), Rinsuke Ito (Osaka Prefecture), Yukikazu Itikawa, Noriaki Itoh, and Kenji Morita Oct. 1981 118 p refs Submitted for publication
(IPPJ-AM-18) Avail: NTIS HC A06/MF A01

Data on the backscattering of H, D and He ions from solids were collected. The following parameters are considered: number backscattering coefficient energy backscattering coefficient, and the mean fractional energy of backscattered particles. Most of the data range in the region of incident energy from 1 to 50 keV. The empirical formulas, obtained from the Monte Carlo results for energies below 1 keV are plotted for energies from 10 eV to 100 keV. The rms deviations of the data from the empirical formulas are between 6 and 30 percent. E.A.K.

N82-13908*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF VACUUM EXHAUST PRESSURE ON THE PERFORMANCE OF MHD DUCTS AT HIGH B-FIELD

J. Marlin Smith, J. L. Morgan, and Shih-Ying Wang 1982 13 p refs Presented at the 20th Aerospace Sci. Meeting, Orlando, Fla., 11-14 Jan. 1982; sponsored by AIAA
(Contract DE-AI01-77ET-10769)
(NASA-TM-82750; DOE/NASA/10769-23; F-1066) Avail: NTIS HC A02/MF A01 CSCL 20I

The effect of area ratio variation on the performance of a supersonic Hall MHD duct is investigated. Results indicate that for a given combustion pressure there exists an area ratio below which the power generating region of the duct is shock free and the power output increases linearly with the square of the magnetic field. For area ratios greater than this, a shock forms in the power generating region which moves upstream with increasing magnetic field strength resulting in a less rapid raise in the power output. The shock can be moved downstream by either increasing the combustion pressure of decreasing the exhaust pressure. The influence of these effects upon duct performance is presented. B.W.

N82-13909# Oak Ridge National Lab., Tenn.

EBT STABILITY THEORY: PROCEEDINGS OF THE WORKSHOP

1981 307 p refs Workshop held in Oak Ridge, Tenn., 13-14 May 1981
(Contract W-7405-eng-26)
(DE81-030635; CONF-810512) Avail: NTIS HC A14/MF A01

The limits of density, beta, and anisotropy are discussed. Topics include: mirror machines, theta pinch, zeta pinch, hot and cold plasmas, hot electrons, toroidal plasmas, and reactor design. Both macro and micro magnetohydrodynamic stability are considered. Emphasis is placed on ring stability and plasma control. For individual titles, see N82-13910 through N82-13922.

N82-13910# Applied Microwave Plasma Concepts, Encinitas, Calif.

RUDIMENTARY THEORIES OF THE STABILITY OF MICROWAVE-HEATED PLASMAS

G. E. Guest *In* ORNL EBT Stability Theory 1981 p 15-32 refs (For primary document see N82-13909 04-75)
Avail: NTIS HC A14/MF A01

The main results from theoretical studies of two obvious sources of plasma instability, anisotropic distributions of particle velocities and locally unfavorable curvature in the magnetic lines of force, are reviewed. Three distinct components of the underlying theoretical models were identified and the degree of realism or completeness achieved in each was assessed: the basic equilibrium model; the set of field equations and polarizations assumed; and the plasma constitutive relations used. T.M.

N82-13911# Oak Ridge National Lab., Tenn.

REVIEW OF RECENT EBT COUPLED RING-CORE STABILITY THEORY

D. A. Spong *In its* EBT Stability Theory 1981 p 33-62 refs (For primary document see N82-13909 04-75)
(Contract W-7405-eng-26)
Avail: NTIS HC A14/MF A01

During the past several years Elmo Bumpy Torus (EBT) stability calculations evolved with respect to treatment of ring-core plasma coupling effects. This evolution began with recognition of the important role of ring compressibility and paramagnetic effects on core beta limits. Models continued to increase in sophistication, including ring-core frequency coupling, velocity space and hot electron distribution function effects, and radically dependent models. Some of these features resulted in wide variations in predicted plasma performance limitations. A number of the models were reviewed and assumptions to which they are particularly sensitive are discussed. T.M.

N82-13912# Oak Ridge National Lab., Tenn.

BRIEF SURVEY OF EXPERIMENTAL INVESTIGATION OF INSTABILITIES IN MICROWAVE-HEATED PLASMAS

N. A. Uckan and G. R. Haste *In its* EBT Stability Theory 1981 p 63-72 refs (For primary document see N82-13909 04-75)
Avail: NTIS HC A14/MF A01

Nearly two decades of experimental investigations exist on instabilities in hot electron plasmas in open (simple and minimum-B mirrors) and closed (bumpy tori, EBT and NBT) geometries. A brief review is given for some of the results from these experiments. Also discussed is the observed behavior of the plasma in C-T and T-M transitions in EBT. T.M.

N82-13913# Oak Ridge National Lab., Tenn.

FLUCTUATION MEASUREMENTS IN EBT

L. Bighel, G. R. Haste, and A. Komori *In its* EBT Stability Theory 1981 p 75-82 (For primary document see N82-13909 04-75)
Avail: NTIS HC A14/MF A01

The stabilty aspects associated with fluctuations in EBT-I were investigated with probes and with light detectors. The EBT-S environment is not suitable to the use of probes, except near the wall. Laser-microwave scattering techniques were investigated for spatially resolved fluctuation measurements in EBT-S. An effort aimed at correlating the fluctuation behavior with the ambipolar potential and the hot ion component in the plasma is reported. T.M.

N82-13914# Tennessee Univ., Knoxville.

HOT-ELECTRON RING STABILITY AT THE UNIVERSITY OF TENNESSEE

Igor Alexeff and Marshall Saylors (Kentucky Univ.) *In* ORNL EBT Stability Theory 1981 p 83-94 (For primary document see N82-13909 04-75)
(Grant NSF ENG-78-03400)
Avail: NTIS HC A14/MF A01

A model that is sufficient to explain the observed stability is presented. The plasma forms a hollow ring in close proximity to the copper all. Moving the ring away from the copper wall causes instability, plasma loss, or simple prevents the ring from forming. The ring was moved from the wall by magnetic compression or by a metal or ceramic limiter. T.M.

N82-13915# Texas Univ., Austin. Inst. for Fusion Studies.
EIGENMODE STABILITY ANALYSIS FOR A BUMPY TORUS
J. W. VanDam, H. L. Berk, M. N. Rowenbluth (ORNL), and D. A. Spong *In* ORNL EBT Stability Theory 1981 p 97-114 refs (For primary document see N82-13909 04-75)
Avail: NTIS HC A14/MF A01

The analysis of eigenmodes in a bumpy torus yielded several stability boundaries that indicate the existence of a parameter regime for generally stable operation consistent with current experiments. A relatively narrow band of parameters where instability persists was obtained and these parameters are discussed. T.M.

N82-13916# Oak Ridge National Lab., Tenn.
NUMERICAL SOLUTIONS OF THE EBT RADIAL EIGENMODE PROBLEM
D. A. Spong, J. W. VanDam, H. L. Berk, and M. M. Rosenbluth *In its* EBT Stability Theory 1981 p 115-140 refs Prepared in cooperation with Texas Univ., Austin (For primary document see N82-13909 04-75)
Avail: NTIS HC A14/MF A01

The radial structure of eigenmodes in EBT is of interest since both modes which are localized within the annulus and moles which extend into the core plasma were predicted to be unstable within appropriate parameter regimes. Radially resolved calculations were done for a z-pinch model which corresponds to a bumpiless, azimuthally symmetric version of EBT. A shooting method was employed which solves two-point boundary value problems on the inside and outside of the ring and which matches derivatives at the center. Comparison of these results with those of a localized dispersion relation are discussed. T.M.

N82-13917# Oak Ridge National Lab., Tenn. Fusion Energy Div.
STABILITY OF HOT ELECTRON PLASMA IN THE ELMO BUMPY TORUS
K. T. Tsang and C. Z. Cheng (Princeton Univ.) *In its* EBT Stability Theory 1981 p 141-160 refs (For primary document see N82-13909 04-75)
Avail: NTIS HC A14/MF A01

The stability of a hot electron plasma in the ELMO Bumpy Torus was investigated using two different models. In the first model, where the hot electron distribution function is assumed to be a delta function in the perpendicular velocity, a stability boundary in addition to those discussed by Nelson and by Van Dam and Lee is found. In the second model, where the hot electron distribution function is assumed to be a Maxwellian in the perpendicular velocity, stability boundaries significantly different from those of the first model are found. Coupling of the Nelson-Van Dam-Lee mode to the compressional Alfven mode is now possible. This leads to a higher permissible core plasma beta value for stable operation. T.M.

N82-13918# Princeton Univ., N. J. Plasma Physics Lab.
ANALYTICAL THEORY OF INTERCHANGE AND COMPRESSIONAL ALFVEN INSTABILITIES IN EBT
C. Z. Cheng and K. T. Tsang (ORNL) *In* ORNL EBT Stability Theory 1981 p 161-178 refs (For primary document see N82-13909 04-75)
Avail: NTIS HC A14/MF A01

The local stability of the EBT plasma is analyzed for the long wavelength perturbations in the frequency regime, omega approximately less than the ion cyclotron frequency sub i. In addition to the low frequency interchange instability, the plasma can be unstable to the compressional Alfven wave. Contrary to the previously obtained quadratic dispersion relation in omega for the interchange mode, the relations for both types of instabilities are cubic in omega. New stability boundaries are found, for the ho electron interchange mode, to relate to the enhanced compressibility of the core plasma in the presnce of hot electrons. The compressional Alfven instability is driven due to the coupling of hot electron magnetic drifts and diamagnetic drift with the compressional Alfven wave. The stability conditions of these two types of instabilities are opposite to each other. T.M.

N82-13919# JAYCOR, San Diego, Calif.
MICROSTABILITY OF THE EBT BOUNDARY
N. T. Gladd, N. A. Krall, S. Hamasaki, and J. L. Sperling *In* ORNL EBT Stability Theory 1981 181-210 refs (For primary document see N82-13909 04-75)
Avail: NTIS HC A14/MF A01

An analysis of the microstability properties using local theory to focus on the effects the relativistic electrons have on low and high frequency drift waves, is presented. The ring electrons are found to have a stabilizing effect, primarily through their contribution to strong magnetic field gradients. A more detailed nonlocal theory was used to analyze the effects of the diamagnetic well on the lower-hybrid-drift instability, a particularly virulent high frequency drift instability. It is found that the presence of the diamagnetic well reduces this instability's rate of growth but that unstable eigenmodes persist for reasonable values of beta sub ring and span a significant portion of the boundary layer. The relative importance of the residual anomalous resistivity when compared to classical resistivity and classical viscosity is discussed. T.M.

N82-13920# California Univ., Livermore. Lawrence Livermore Lab.
ELECTRON-CYCLOTRON RESONANT HEATED ELECTRON DISTRIBUTION FUNCTIONS
Y. Matsuda, W. M. Nevins, and R. H. Cohen *In* ORNL EBT Stability Theory 1981 p 211-226 refs (For primary document see N82-13909 04-75)
(Contract W-7405-eng-48)
Avail: NTIS HC A14/MF A01

Studies with a bounce-averaged Fokker-Planck code indicate that the energetic electron tail formed by electron-cyclotron resonant heating (ECRH) at the second harmonic is not Maxwellian. The results of a bounce-averaged Fokker-Planck code are presented along with some simple analytic models of hot-electron distribution functions. T.M.

N82-13921# General Atomic Co., San Diego, Calif.
KINETIC STABILITY ANALYSES IN A BUMPY CYLINDER
R. R. Dominguez and H. L. Berk (Texas Univ. at Austin) *In* ORNL EBT Stability Theory 1981 p 249-264 refs (For primary document see N82-13909 04-75)
(Contract DE-AT03-76ET-51011)
Avail: NTIS HC A14/MF A01

A fully kinetic formalism for performing nonlocal stability analyses in a bumpy cylinder was developed. The Vlasov-Maxwell integral equations (with one ignorable coordinate) are shown to be self adjoint and hence amenable to analysis using numerical techniques developed for self adjoint systems of equations. The representation obtained for the kernel of the Vlasov-Maxwell equations is a differential operator of arbitrarily high order. This form leads to a manifestly self adjoint system of differential equations for long wavelength modes. T.M.

N82-13922# Oak Ridge National Lab., Tenn.
EFFECT OF BETA LIMITS ON REACTOR PERFORMANCE IN EBT
N. A. Uckan, D. A. Spong, and D. B. Nelson (DOE, Washington, D.C.) *In its* EBT Stability Theory 1981 p 281-295 refs (For primary document see N82-13909 04-75)
Avail: NTIS HC A14/MF A01

Sensitivity studies that can be carried out to determine the boundaries of the operating regime and to demonstrate the effects of various modes, assumptions, and models on reactor performance (Q value) are described. First the modes believed to limit the core beta and ring plasma performance are discussed, and the simplifications and/or assumptions involved in deriving these limits are highlighted. Then, the implicatios of these limits for a reactor are given. T.M.

N82-13923# Wisconsin Univ., Madison.
DRIVING FORCE OF THE BALLOONING INSTABILITY
M. W. Phillips and S. C. Prager Jul. 1981 9 p refs
(Contract DE-AS02-76ET-53051)
(DE81-023099; DOE/ET-53051/25) Avail: NTIS HC A02/MF A01

It is shown that the ballooning mode is (diamagnetic) current driven, not pressure driven. A physical picture and application to experiment is provided. DOE

N82-13924# Princeton Univ., N. J. Plasma Physics Lab.
ENHANCED-CONFINEMENT CLASS OF STELLARATORS
H. E. Mynick, T. K. Chu, and A. H. Boozer Aug. 1981 14 p refs
(Contract DE-AC02-76CH-03073)
(DE81-028727; PPPL-1822) Avail: NTIS HC A02/MF A01

A class of stellarators was found in which the transport is reduced by an order of magnitude from transport in conventional stellarators, by localizing the helical ripple to the inside of the torus. The reduction is observed in numerical experiments and explained theoretically. DOE

N82-13925# Los Alamos Scientific Lab., N. Mex.
FIBER OPTIC ANALOG AND TIMING MONITORING SYSTEM FOR THE ANTARES LASER FUSION PROGRAM
J. L. Longmire and M. E. Thuot 1981 5 p Presented at the SPIE Intern. Symp., San Diego, Calif., 24 Aug. 1981
(Contract W-7405-eng-36)
(DE81-028799; LA-UR-81-2193; CONF-810810-12) Avail: NTIS HC A02/MF A01

The development and use of two optical fiber systems for the Antares 40 KJ CO2 laser is described. In the Antares power amplifier, electron guns produce a discharge-sustaining 8 KA beam of 500 kV electrons. Eight 300 kJ, 3 microns Marx pulsers provide a direct electrical pumping discharge through the laser gas. The electro-optic systems developed allow the measurement of pulsed analog waveforms and trigger timing information within the laser and power systems by a computer based control and data acquisition network. DOE

N82-13926# Mississippi State Univ., Mississippi State. MHD Energy Center.
TESTING AND EVALUATION OF MHD MATERIALS AND SUBSTRUCTURES Final Technical Report, Apr. 1976 - Jun. 1981
Jun. 1981 204 p refs
(Contract DE-AC01-76ET-10785)
(DE81-024331; DOE/ET-10785/T1) Avail: NTIS HC A10/MF A01

Stand that can simulate the environment in any of the various substructures of a coal fired baseline MHD power plant. After construction was completed, shakedown tests were performed, and the Test Stand was used in a series of tests to simulate the gas stream composition and temperature conditions in the baseline plant's radiant boiler. The tests were conducted in order to study the effect of stoichiometry and staged combustion on the generation of nitrogen oxide. A computer based monitoring and control system was developed that provides safe Test Stand operation, controls the critical parameters, and accurately measures, displays, and logs the necessary physical data. Several computer programs were developed to determine the thermal performance of the Test Stand, and several models were developed to predict the thermal performance of the Test Stand with bare walls and with slag coated walls, and to determine the gas stream properties as a function of temperature and pressure. DOE

N82-13927# Fom-Instituut voor Plasmafysica, Rijnhuizen (Netherlands).
ON HIGH BETA EQUILIBRIA OF PLASMAS IN THE QUASI-UNIFORM CURRENT MODEL: INFLUENCE OF SHAPING THE PLASMA CROSS SECTION AND OF THE SECOND ORDER IN THE INVERSE ASPECT RATIO
W. Schuurman and C. Bobeldijk Apr. 1981 32 p refs Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (ZWO)
(Rept-81-131) Avail: NTIS HC A03/MF A01

Analytical calculations of toroidal plasma equilibria in the high beta ordering were performed in the quasi-uniform current model, varying the shape of the poloidal plasma crosssection. The effect of the second order in an expansion in the inverse aspect ratio was determined for a plasma with elliptic crosssection. Analytical representation of curves with a shape deviating from an ellipse (e.g., racetrack, triangle, rectangle) enabled the treatment of high beta equilibria of plasmas having these curves as poloidal crosssection. A smooth current profile or a flat plasma crosssection allow higher values of beta p than a skin current or a vertically pointed crosssection. Also, D-shaping improves the equilibrium beta p especially at higher values of the ellipticity. The method of crosssection shaping allows, in principle, the extension to higher mode harmonic contributions. Author (ESA)

N82-13928# National Bureau of Standards, Boulder, Colo. Fracture and Deformation Div.
MATERIALS STUDIES FOR MAGNETIC FUSION ENERGY APPLICATIONS AT LOW TEMPERATURES -4
R. P. Reed, ed. and N. J. Simon, ed. Apr. 1981 659 p refs Sponsored in part by DOE
(PB81-222507; NBSIR-81-1645) Avail: NTIS HC A99/MF A01 CSCL 18A

The low temperature mechanical and physical properties of stainless steel base metal and welds, particularly the nitrogen strengthened stainless steels are evaluated. Aluminum alloys have received some consideration. Nonmetallics, primarily industrial laminates are investigated for low temperature applications and their properties measured at cryogenic temperatures. GRA

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N82-13929 Stanford Univ., Calif.
CURRENT TRANSIENT SPECTROSCOPY OF DEEP LEVELS IN SILICON Ph.D. Thesis
Judith Aviva Borsuk 1981 120 p
Avail: Univ. Microfilms Order No. 8124039

A high sensitivity deep level transient spectrometer was built, which detects diode current transients induced by pulsing the reverse bias, and correlates them with an internally generated exponential waveform. The technique is designated current transient spectroscopy (CTS). Theoretical calculations of system performance under various circumstances are presented, along with example spectra of defects in silicon p(+)n diodes. A spectrum of unintentional defects is shown to closely match computer calculations of the expected peak shape. A theoretical analysis of noise and signal to noise ratio was performed, yielding results consistent with the measured output noise and sensitivity. Spectra of diodes heat treated in quartz and SiC furnace tubes are presented which demonstrate the utility of CTS in detecting processing induced contamination in concentrations as low as 10 to the 9th power. Dissert. Abstr.

N82-13930 Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
CHARGE TRAPPING IN INTERFACE DOPED MNOS STRUCTURES Ph.D. Thesis
William Gardner Sutton 1981 195 p
Avail: Univ. Microfilms Order No. 8123464

Parameters of evaporated tungsten interface dopant induced traps, naturally occurring oxide-nitride interface traps and nitride bulk traps in conventional and interface doped MNOS structures were examined using charge centroid and thermally stimulated current techniques. Charge centroid measurements showed charge trapping in interface doped MNOS structures occurred at the oxide-nitride interface for injected charge levels below a trap saturation level. The saturation level depended more on the oxide thickness than on the dopant density decreasing as oxide thickness increased. Above the saturation level considerable charge trapping in the nitride occurred, causing the charge centroid to approach the mid point of the nitride. conventional MNOS structures exhibited charge centroid values equal to the nitride mid point. Dissert. Abstr.

N82-13931 Wisconsin Univ. - Madison.
COEXISTENCE OF NON-REGISTERED MONOLAYER AND BILAYER SOLID FILMS Ph.D. Thesis
Mein Sieng Wei 1981 84 p
Avail: Univ. Microfilms Order No. 8117547

Statistical thermodynamic theories are formulated for monolayer and bilayer solid films of inert gases in physical adsorption. At low temperatures, the quasiharmonic approximation is used to evaluate the Helmholtz free energies of the adsorbed phases. At higher temperatures, the free energies are evaluated using the single occupancy cell theory including part of the correlation energy. With realistic models for adatom interactions and substrate holding potentials, the theories are applied to three physical systems: Xe/Ag(111), Ar/Gr and Kr/Ag(111). Phase diagrams and thermodynamic functions along the phase boundaries are calculated. The calculated difference between the latent heats of adsorption of the monolayer and the bilayer is in good agreement with experimental data for Xe/Ag(111) and Ar/Gr, but it is significantly smaller than the experimental difference for Kr/Ag(111). Dissert. Abstr.

N82-13932 Stanford Univ., Calif.
SUPERCONDUCTIVITY OF THE A15 COMPOUND NIOBIUM ALUMINUM Ph.D. Thesis
Jueinai Raynien Kwo 1981 214 p
Avail: Univ. Microfilms Order No. 8124099

The microscopic superconducting properties of the metastable high transition temperature A15 compound niobium aluminum were investigated in this work to further understand the origins of the high transition temperature in the A15 superconductors as a whole class. Material synthesis on A15 thin films was carried out using electron-beam coevaporation to determine the A15 phase equilibrium and to establish the conditions of preparing homogeneous materials. Superconducting tunneling into high-quality, Nb-Al junctions was used to diagnose the material properties of the A15 Niobium Aluminum and shows that it is strongly electron-phonon coupled only when the composition approaches the A15 phase boundary. Tunneling spectroscopy analysis gives striking evidence of mode-sofening mechanism responsible for the stronger coupling and the higher transition temperature. Dissert. Abstr.

N82-13933 Purdue Univ., Lafayette, Ind.
THE STRUCTURAL AND VIBRATIONAL PROPERTIES OF AMORPHOUS AND CRYSTALLINE GROUP V ELEMENTS Ph.D. Thesis
Benjamin Victor Shanabrook 1981 134 p
Avail: Univ. Microfilms Order No. 8112834

First and second order Raman scattering measurements of orthorhombic (o-)P and o-As were performed. A scaling relation between the k = 0 phonon frequencies of o-As and o-P as well as a Born model calculation indicate that the near-neighbor force constants are larger in o-P. The excellent agreement between the second order Raman spectrum and a theoretical calculation of o-As suggests the dominance of overtone scattering. Furthermore, the second order Raman spectra suggest that greater phonon dispersion exists in o-As relative to o-P. A larger contribution of covalent bonding exists in o-P. Similarities between the Raman spectra of o-P and a-P were observed. In contrast to earlier suggestions, the structural studies of a-P samples indicate that highly variable intermediate range structural correlations may exist in an amorphous network. These correlations appear related to displacement induced polarizability correlations probed by Raman scattering. Dissert. Abstr.

N82-13934 Purdue Univ., Lafayette, Ind.
RAMAN PROBE OF EQUILIBRIUM AND LASER MODULATED POPULATIONS OF ELECTRONS AND PHONONS IN GaAs Ph.D. Thesis
Dennis Alan Abramsohn 1981 260 p
Avail: Univ. Microfilms Order No. 8123607

The Raman spectrum was used as a probe of the free electron solid state plasma and of the phonons in GaAs. In an effort to elevidate single particle scattering (essentially Compton scattering from a Maxwellian distribution of electrons), manifested as a Gaussian wing around the laser line (the Rayleigh wing). A high intensity pulsed YAG laser photoexcited carriers from deep traps. The same laser pulse also probed the new carrier distribution. A computer controlled Raman scattering system was developed which made gated, high intensity measurements during Q-switched laser excitation and obtained excellent low intensity spectra. From the high intensity measurements, light scattering from excess carriers photoexcited from deep traps in GaAs was observed and the possibility of studying non-equilibrium populations of electrons by pulsed laser techniques was demonstrated. The analysis of the Rayleigh wing lineshape at low intensity led to several new and interesting results which are discussed. Dissert. Abstr.

N82-13935 Ohio State Univ., Cleveland.
AN INVESTIGATION OF SOME MAGNETIC PROPERTIES OF CALCIUM SUBSTITUTED YTTRIUM IRON GARNET FILMS Ph.D. Thesis
Liang-Choo Hsia 1981 193 p
Avail: Univ. Microfilms Order No. 8121804

The properties of Calcium substituted Yttrium Iron Garnet were investigated using ferromagnetic resonance techniques. The samples used were grown by liquid phase epitaxy on [111] oriented Gd3Ga5O12 substrates. The exchange stiffness constant was studied as a function of temperature for both the virgin and reduced states, and the results are consistent with the double exchange mechanism. The exchange stiffness constant has also been studied as a function of oxygen vacancy concentration and the results indicate a definite correlation between the two. It was found that the reduction process induces an easy plane uniaxial anisotropy energy and the measured values are in reasonable agreement with those calculated from the crystal field theory. It is believed that oxygen vacancy ordering is responsible for the induced uniaxial anisotropy energy. Magnetostatic modes were observed on reduced films with a thickness 16 microns. Dissert. Abstr.

N82-13936 Northwestern Univ., Evanston, Ill.
LOCAL DENSITY STUDIES OF ELECTRONIC STRUCTURE AND BONDING IN TRANSITION METAL COMPOUNDS Ph.D. Thesis
Cyrus Jehangir Umrigar 1981 181 p
Avail: Univ. Microfilms Order No. 8125027

Self consistent calculations with local exchange correlation potentials were performed on the transition metal compounds NbO2 and TiS2. NbO2 was treated by the molecular cluster method, in which the wavefunctions of a finite cluster of atoms extracted from the solid are explicity calculated and effects of the rest of the solid are taken into account by embedding the cluster in a crystal field. NbO6 and Nb3O6 clusters were treated and the electronic energy levels were compared with experimental data and with non self-consistent band structure results. TiS2 crystallizes in a layered structure that consists of S-Ti-S sandwiches, that are internally strongly bonded, but have weak intersandwich interaction. The band structure and density of states (DOS) of a single sandwich, double sandwich and the bulk were calculated by the linearized augmented plane wave method and compared with each other. Dissert. Abstr.

N82-13937 Northwestern Univ., Evanston, Ill.
NONLINEAR OPTICAL EFFECTS IN LIQUID CRYSTALS Ph.D. Thesis
Santosh Kumar Saha 1981 111 p
Avail: Univ. Microfilms Order No. 8124999

Direct current field induced optical second harmonic generation in nematic and cholesteric liquid crystals is investigated. In addition, flexoelectric induced second harmonic generation in nematic MBBA is studied. The experiments involve the detection of optical radiation at second harmonic frequency when aligned thin film liquid crystals samples are irradiated with laser beam at the fundamental frequency. The laser used is a Q switched Nd YAG laser. Sample alignment is achieved either with rubbing technique or by coating glass spacers with 100 A thick of SiO2. Experiments on nematic liquid crystals show that the temperature dependence of nematic order parameters is obtained from the measurement of dc induced second harmonic generation. Flexoelectric effect gives rise to second harmonic generation in nematic liquid crystal and the birefringence of nematic crystal is used to achieve phase matching. Dissert. Abstr.

N82-13938 Northwestern Univ., Evanston, Ill.
PHASE SEPARATION OF A TWO COMPONENT ELECTRON-HOLE LIQUID IN (111) STRESSED Ge Ph.D. Thesis
Jagmohan Bajaj 1981 123 p
Avail: Univ. Microfilms Order No. 8124849

The possibility of phase separation of an electron-hole drop (EHD) containing both hot and cold electrons in < 111 > stressed

Ge was investigated. It is predicted theoretically that in Ge under appropriate < 111 > uniform stress and at low temperatures, hot and cold electrons are uniformly distributed inside EHD only if the ratio x of the total number of hot electrons to that of cold electrons is larger than a certain critical ratio x sub c. However, for x less than x sub c the system should phase separate into two coexisting phases with quite different x ratio. Time resolved luminescence spectroscopy was used to probe this phase separation. Dissert. Abstr.

N82-13939 Missouri Univ. -Rolla.
BORON IMPLANTED STRONTIUM TITANATE Ph.D. Thesis
Connie Jeanne McDonald Cooper 1981 120 p
Avail: Univ. Microfilms Order No. 8123581

Single crystals of strontium titanate implanted with boron were found to have highly conductive surface layers. The effects of varying dose from 10 to the 16th power to 10 to the 17th power ions/sq cm, implantation voltage from 50 to 175 keV and annealing conditions on the room temperature surface resistance and Hall mobility are presented. Variation of the implantation voltage did not have a major effect on the sheet resistances obtained by boron implantation of strontium titanate, while dose and annealing conditions have major effects. Doses of 5 x 10 to the 16th power ions/sq cm required annealing on the order of one hour at 500 K for maximum reduction of the room temperature resistance in the implanted layer. Samples implanted with a dose of 1 x 10 to the 17th power ions/sq cm required slightly higher temperatures (approximately 575 K) to obtain a minimum resistance at room temperature. Long term (several weeks) room temperature annealing was found to occur in high dose samples. After one to two months at room temperature followed by an anneal to 575 K, the surface resistances were found to be lower than those produced by the annealing of a freshly implanted sample to 575 K.

Dissert. Abstr.

N82-13940 Temple Univ., Philadelphia, Pa.
FLUORESCENT GUEST-HOST EFFECT IN SCATTERING LIQUID CRYSTALS AND NEW PHYSICAL PHENOMENA IN THIN LIQUID CRYSTAL FILMS Ph.D. Thesis
Aharon Hochbaum 1980 190 p
Avail: Univ. Microfilms Order No. 8124545

Fluorescence emission of guest molecules in cholestric liquid crystal hosts was modulated by an electric-field-induced cholesteric-nematic transition. The contrast ratio between the emissions from the two states is affected primarily by the scattering properties of the phase and the order parameter of the guest. Data are presented on the dependence of the contrast ratio the cell parameters and the structure of both guest and host. A simple model is presented accounting for the observed behavior. The feasibility of growing thin liquid crystal films, via thermal evaporation, was demonstrated. In sub-micron films a departure from bulk behavior was observed; the orientation of smectic layers was found to depend on temperature and thickness; nematic films show a two-domain pattern which we interpreted as two opposite spontaneous twists; phase transition temperatures showed large, thickness dependent depressions; deep supercooling effects in thin films reveal new phases (most likely smectic) that are absent from the bulk phase diagram. Dissert. Abstr.

N82-13941. Stanford Univ., Calif.
LONG-RANGE INTERACTIONS IN LATTICE FIELD THEORY Ph.D. Thesis
Jeffrey Mark Rabin 1981 139 p
Avail: Univ. Microfilms Order No. 8124137

Lattice quantum field theories containing fermions can be formulated in a chirally invariant way provided long-range interactions are introduced. In weak coupling perturbation theory such a lattice theory is renormalized when the corresponding continuum theory is recovered in the perturbative continuum limit. In the strong-coupling limit of these theories, an effective Hamiltonian describing a Heisenberg antiferromagnet with long-range interactions is studied. A critical rate of falloff of the interactions, approximately as inverse distance squared, which separates a nearest-neighbor-antiferromagnetic phase from a phase displaying identifiable long-range effects is found. A duality-type symmetry which is present in some block-spin calculations is pointed out. Dissert. Abstr.

N82-13942 Stanford Univ., Calif.
UPPER CRITICAL FIELDS AND SPAN STATES IN A-15 SUPERCONDUCTORS, PART 1. VORTICES IN TWO-DIMENSIONAL SUPERCONDUCTORS, PART 2 Ph.D. Thesis
Terry Philip Orlando 1981 195 p
Avail: Univ. Microfilms Order No. 8124125

The upper critical fields of niobium-tin and vanadium-silicon were measured and analyzed within the Ginzburg-Landau-Abrikosov-Gor'kov theory of type 2 superconductivity. The importance of many-body effects on the spin· states of the superconductor is stressed, especially the renormalization of the Pauli paramagnetic limiting process. For niobium-tin failure to include renormalizations from the electronphonon interaction leads to too high spin-orbit scattering rates. For a similar A15 compounds vanadium-gallium failure to include renormalizations from the electron-electron interaction (spin-fluctuations and the related Szoner factor) leads to a measured upper critical field a zero temperature which is lower than theoretically allowed. The phase transition of Kosterlitz and Thouless, in which bound pairs of positive and negative vortices dissociate at a characteristic temperature, is shown to be possible for thin superconducting films. The resistance in the superconductor caused by this dissociation is compared to that caused by thermally activated vortices and by current-induced phase slips. Dissert. Abstr.

N82-13943 Stanford Univ., Calif.
CW LASER ANNEALING AND CW LASER ASSISTED DIFFUSION IN GALLIUM ARSENIDE Ph.D. Thesis
Yves Isaac Nissim 1981 167 p
Avail: Univ. Microfilms Order No. 8124120

It is demonstrated that lasers or electron beams are very attractive tools to process semiconductors. They provide a rapid localized heating of the surface of the semiconductor to precisely control its temperature. As a result it is possible to completely anneal ion implanted silicon and to induce various reactions. Gallium arsenide is a promising potential candidate for laser processing since conventional thermal treatments are not yet fully satisfactory. The annealing of ion implanted gallium arsenide using laser techniques was investigated and some mechanisms that enhance the recovery of the lattice and the activation of the dopants were identified. Then as a substitute to ion implantation, CW laser irradiation was used to diffuse dopants in gallium arsenide from surface sources to create thin n+ layers. These diffused layers were optimized to form nonalloyed ohmic contacts that were successfully utilized in the fabrication of different GaAs metal semiconductor field effect transistor structures.

Dissert. Abstr.

N82-13944 Stanford Univ., Calif.
ELECTRON BEAM EVAPORATION OF SUPERCONDUCTING, A15 NIOBIUM-SILICON Ph.D. Thesis
Robert David Feldman 1981 180 p
Avail: Univ. Microfilms Order No. 8124063

Niobium-silicon compounds with the A15 crystal structure have been of interest for the possibility that they would have superior superconducting properties. The maximum superconducting transition temperature is expected to occur for a well-ordered A15 phase containing 25 atomic percent silicon. The A15 phase does not appear in the niobium-silicon equilibrium phase diagrams, so the structure must be synthesized by nonequilibrium means. Electron beam evaporation has been used to synthesize A15 niobium-silicon films. The addition of oxygen during evaporation stabilizes the A15 structure, and permits the formation of a homogeneous, well-ordered, single-phase film for compositions up to approximately 18.5 atomic percent silicon. The maximum transition temperature is 8.3 K. In order to understand the role played by oxygen, metastable phase diagrams were prepared, and the initial growth to films was studied as a function of substrate temperature and oxygen pressure.

Dissert. Abstr.

N82-13945 Wisconsin Univ. - Madison.
COMPOSITION DEPENDENCE OF NEODYMIUM OPTICAL HOMOGENEOUS LINEWIDTHS IN GLASSES Ph.D. Thesis

John Michael Pellegrino 1981 133 p
Avail: Univ. Microfilms Order No. 8117528

Various host media were surveyed in order to ascertain the dependence of the optical homogeneous linewidth upon host velocity of sound and system temperature. Measurements are made for Nd(+3) in oxide and fluoride based glasses for host composition ranging from simple binary to multicomponent glasses. Line broadening processes active in crystalline systems to lay the groundwork for the glass investigations are reviewed. A LiF:F2+ color center laser provided excitation for the observation of fluorescence. Homogeneous linewidths at 300 K exhibit a broad range of values, varying by approximately a factor of four. The ratio of homogeneous to inhomogeneous linewidth also varies over a broad range, from 0.16 for a sodium barium borate glass to 1.86 for a rubidium phosphate glass. The homogeneous linewidth is inversely dependent to the 2.6 power of the velocity of sound from host to host. Results strongly suggest that the Raman process is responsible for a major portion of the glass linewidth in the high temperature regime.
Dissert. Abstr.

N82-13946# Aerospace Corp., El Segundo, Calif. Electronics Research Lab.

STATISTICAL ANALYSIS OF ACCELERATED TEMPERATURE AGING OF SEMICONDUCTOR DEVICES Interim Report

Walter A. Johnson and Michael F. Milles 15 May 1981 51 p refs
(Contract F04701-80-C-0081)
(AD-A099439; TR-0081(6930-02)-1; SD-TR-81-37) Avail: NTIS HC A04/MF A01 CSCL 20/12

A number of semiconductor devices taken from a distribution were operated at several elevated temperatures to induce failure in all devices within a reasonable time. Assuming general characteristics of the device failure probability density function (pdf) and its temperature dependence, the expected cumulative failure function (cff) for devices in normal operation were estimated based on statistical inference, taking the average probability of a random device (from the same distribution but operated at a normal temperature) failing as a function of time. A review of the mathematical formalism employed in semiconductor reliability discussions is included. Three failure pdf's at particular usefulness to this analysis--exponential, normal, and lognormal - are discussed. The cff, at times orders of magnitude loss then, at times comparable to the desired system useful, life (*10 to the 4th power to 10 to the 5th power hr) is considered. A review of accelerated temperature aging is presented, and the assumption concerning the general characteristics of the failure pdf, which are fundamental to this analysis, are emphasized. Author

N82-13947# Spire Corp., Bedford, Mass.

HgCdTe FABRICATION USING DIRECTED ENERGY TECHNIQUES Final Report

Anton C. Greenwald and John Miles Aug. 1981 97 p refs
Prepared in cooperation with New England Research Center, Inc.
(Contract MDA903-79-C-0434; DARPA Order 3800)
(AD-A105626; FR-81-10071) Avail: NTIS HC A05/MF A01 CSCL 20/7

The goal of this research is to produce large-area, thin-film, single crystal mercury cadmium telluride material for infrared detectors. The successful approach is to (1) evaporate cadmium telluride in an enclosed furnace on insulating crystalline substrates (hot wall epitaxy), (2) melt a thin surficial layer by pulsed electron beam irradiation to improve morphology, and (3) convert to mercury cadmium telluride by evaporation and diffusion at constant temperature. The final result is a single crystal film of Hg (sub 1-x) Cd sub x Te, 30 microns thick and 0.5 inch square, with a compositional variation of x less than + or - 0.0007. Films of up to 20 microns thick, 1 inch o.d., single crystal (but twinned) CdTe were produced by the first process. These faceted films were smoothed without change of surface stoichiometry or structure by the second process. Evaporation of HgTe at less 0.5 atm Hg overpressure onto the CdTe film produced the final result on mica or quartz substrates. Electron mobility at 77 K was as high as 1.5 x 10 to the 5th power sq cm/V-s in the final samples. GRA

N82-13948# California Univ., Livermore. Lawrence Livermore Lab.

SHOCK ANOMALY AND S-D TRANSITION IN HIGH-PRESSURE LANTHANUM

A. K. McMahan, H. L. Skriver (Research Establishment, Roskilde, Denmark), and B. Johansson (Aarhus Univ.) 23 Jul. 1981 7 p refs Presented at the Intern. Symp. on the Phys. of Solids Under High Pressure, Bad Honnef, West Germany, 10-14 Aug 1981
(Contract W-7405-eng-48)
(DE81-027659; UCRL-86484; CONF-810828-2) Avail: NTIS HC A02/MF A01

Linear muffin-tin orbital calculations of the band structure and pressure volume isotherms for fcc La, both at zero and finite temperatures are presented. The calculated bulk modulus shows a rapid stiffening in the range from 40 to 50 percent compression, due to termination of the 6s to 5d electronic transition. When combined with a simple Slater model analysis, these results yield a temperature dependent peak in the lattice Gruneisen parameter. Experimental confirmation of this peak is found in an anomalous stiffening seen in the shock compression data for La, and it may also have some bearing on the observed saturation of the superconducting transition temperature in La around 200 kbar. DOE

N82-13949# Illinois Univ., Urbana. Dept. of Physics.

DEFECT STUDIES OF MOLECULAR AND RARE-GAS CRYSTALS DOWN TO 50mK AND UP TO 150 MPa

R. O. Simmons 1981 14 p refs Presented at Am. Crystallographic Assoc. Meeting, College Station, Tex., Mar. 1980
(Contract DE-AC02-76ER-01198)
(DE81-026617; DOE/ER-01198/135) Avail: NTIS HC A02/MF A01

Phase transitions arising from changes in molecular rotational ordering in solid CH4 and CD4 and lattice parameters during sublimation and melting of solid Ar, Kr, and Xe have thus been studied. The symmetries of the different phases below 1 K of the system solid ortho- and para-H were determined and He3-He4 mixtures below 0.4 was investigated using coherent scattering techniques. DOE

N82-13950# New Mexico Univ., Albuquerque.

OBSERVATION OF HIGH FIELD DHVA EFFECT AND INDUCED MAGNETISM IN SINGLE CRYSTAL TiBe SUB 2

A. P. J. vanDeursen, J. M. VanRuitenbeek, W. A. Verhoef, A. R. deVroomen, J. L. Smith, R. A. Groot, D. D. Koelling, and F. M. Muller 1981 3 p refs Presented at the 26th Intern. Conf. on Low Temp. Phys. LT-16, Los Angeles, 19-25 Aug. 1981 Submitted for publication
(Contract W-7405-eng-36)
(DE81-025292; LA-UR-81-1664; CONF-810809-12) Avail: NTIS HC A02/MF A01

Recently much interest has been given to itinerant magnetism in cubic Laves phase or C15 materials. Primarily this stems from the discussion of the relationship of p state pairing and ferromagnetism in ZrZn2 by Enz and Matthias, and the possibility of triplet superconductivity. The most recent work in this field has focused on the isoelectronic, isostructural material TiBe sub 2 and the possibility that this material is metamagnetic. That TiBe sub 2 is close to some form of magnetic instability can be inferred indirectly from the peaked nature of its density of states near the fermi level, but also from the observation of ferromagnetism in TiBe/sub 2-x/Cu/sub x/, when x is greater than about 0.15. In this paper a single crystal of pure TiBe sub 2 is considered in fields larger than 15 Tesla (T) and at a temperature of 1.3 K. DOE

N82-13951# Hanford Engineering Development Lab., Richland, Wash.

HELIUM DIFFUSION IN IRRADIATED BORON CARBIDE

G. W. Hollenberg Mar. 1981 18 p refs Presented at the 83rd Symp. on Nucleation and Crystallization in Glasses, Washington, D.C., 3-6 May 1981; sponsored by the American Ceramic Society
(Contract DE-AC14-76FF-02170)
(DE81-027848; HEDL-SA-2236-FP; CONF-810528-10) Avail: NTIS HC A02/MF A01

Instrumented irradiation experiments in EBR 2 providing continuous helium release data on boron carbide at a variety of operating temperatures are described. Although some microstructural and compositional variations were examined in these experiments most of the boron carbide was prototypic of that used in the Fast Flux Test Facility. The density of the boron carbide pellets was approximately 92% of theoretical. The boron carbide pellets were approximately 1.0 cm in diameter and possessed average grain sizes that varied from 8 to 30 microns. Pellet centerline temperatures were continually measured during the irradiation experiments. DOE

N82-13952# Oak Ridge National Lab., Tenn.
ROLE OF ELECTRON SWARM STUDIES IN THE DEVELOPMENT OF GASEOUS DIELECTRICS
L. G. Christophorou 1981 17 p refs Presented at the 2nd Intern. Swarm Seminar, Oak Ridge, Tenn., 22 Jul. 1981
(Contract W-7405-eng-26)
(DE81-026349; CONF-810720-2) Avail: NTIS HC A02/MF A01

Recent knowledge provided by swarm studies allowing control of the number densities and energies of free electrons in electrically stressed gases is highlighted. This knowledge aided the discovery of new gas dielectrics and the tailoring of gas dielectric mixtures. The role of electron attachment in the choice of unitary gas dielectrics or electronegative components in dielectric gas mixtures, and the role of electron scattering at low energies in the choice of buffer gases for mixtures is outlined. DOE

N82-13953# Oak Ridge National Lab., Tenn.
EFFECTS OF PRESSURE ON THE MIXED VALENT PROPERTIES OF Ce AND ITS INTERMETALLIC COMPOUNDS
S. H. Liu Jul. 1981 9 p refs Presented at Conf. on High Pressure Phys., Bad Honnef, West Germany, Aug. 1981
(Contract W-7405-eng-26)
(DE81-028572; CONF-810828-5) Avail: NTIS HC A02/MF A01

A systematic high pressure study of intermetallic compounds of Ce is proposed to elucidate the phenomenon of valence fluctuations. For these materials, the single parameter which is most sensitive to the pressure is the position of the Ce 4f level relative to the conduction bands. Therefore, it should be possible to monitor the valence with pressure and follow the evolvement of the system from a local moment state to a nonmagnetic state. The latter may be a spin compensated Kondo lattice state of a lattice of virtual bound states. The experimental evidence of exotic states is reviewed, and experiments to investigate their physical properties are suggested. DOE

N82-13954# Los Alamos Scientific Lab., N. Mex.
SPECTROMETRIC PROPERTIES OF CRYSTALS FOR LOW-ENERGY X-RAY DIAGNOSTICS
D. M. Barrus, R. L. Blake, H. Felthauser, E. E. Fenimore, and A. J. Burek (NBS, Washington, D.C.) 1981 10 p refs Presented at the Topical Conf. on Low-Energy X-Ray Diagnostics, Livermore, Calif., 8 Jun. 1981
(Contract W-7405-eng-36)
(DE81-028763; LA-UR-81-2283; CONF-810651-4) Avail: NTIS HC A02/MF A01

A summary is presented of several accurately measured parameters for the crystals KAP, RbAP, TIAP, NH4AP, NaAP, ADP, and EDDT including: the interplaner spacing of atoms; the angle correction for normal and anomalous dispersion that is required for application of the Bragg formula; the thermal expansion coefficient near room temperature for commonly used planes; and the integrated coefficient of reflection. DOE

N82-13955# California Univ., Livermore. Lawrence Livermore Lab.
ELECTRON BAND THEORY AND HIGH PRESSURE EQUATION OF STATE
A. K. McMahan 21 Jul. 1981 8 p refs Presented at the 8th AIRAPT Conf. and 19th EHPRG Conf., Uppsala, 17-22 Aug. 1981
(Contract W-7405-eng-48)
(DE81-027436; UCRL-86485; CONF-810827-4) Avail: NTIS HC A02/MF A01

Calculations of the high pressure equation of state of selected materials are reviewed, in order to illustrate general trends which occur in the evolution of electronic structure with compression, and the consequence of these trends for material properties. Elemental solids are reviewed. The manner in which unhybridized energy bands evolve with compression is considered. DOE

N82-13956# Sandia Labs., Albuquerque, N. Mex.
FUNDAMENTAL STUDIES OF GRAIN-BOUNDARY PASSIVATION IN POLYCRYSTALLINE SILICON WITH APPLICATION TO IMPROVED PHOTOVOLTAIC DEVICES
C. H. Seager and D. S. Ginley Aug. 1981 80 p refs
(Contract DE-AC04-76DP-00789)
(DE82-000825; SAND-81-1950) Avail: NTIS HC A05/MF A01

Barrier heights and recombination velocities for silicon grain boundaries were calculated and are shown to be in good agreement with transpot measurements on uniformly illuminated silicon bicrystals. Improved calculations of the Hall effect in polycrystalline solids are also presented along with assessments of the ability of effective circuit models to account for the anomalously low carrier concentrations measured in small grain polycrystalline silicon. Preliminary optimization of some new methods for hydrogen passivation was completed. Almost complete removal of EBIC grain boundary losses can now be achieved in times as short as twenty minutes. Progress was made in the identification and characterization of infrared vibrational modes associated with grain boundary-bonded hydrogen. The effects of fluorine and oxygen treatments on silicon grain boundaries were determined. These agents appear to increase grain boundary potential barrier heights in n-type silicon in marked contrast to the effect of hydrogen. DOE

N82-13957# Siemens A.G., Munich (West Germany). Werk fuer Roehren und Sondergebiete.
MULTIFUNCTIONS - LIQUID CRYSTAL DISPLAYS Final Report
Martin Bechteler Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 68 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-181; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,90

Large area liquid crystal displays up to 400 cm square were developed capable of displaying a large quantity of analog and digital information, such as required for car dashboards, communication systems, and data processing, while fulfilling the attendant requirements on view tilt angle and operating temperature range. Items incorporated were: low resistance conductive layers deposited by means of a sputtermachine, preshaped glasses and broken glassfibers, assuring perfect parallellism between glass plates, rubbed plastic layers for excellent electrooptical properties, and fluorescent plates for display illumination in bright sunlight as well as in dim light conditions. Prototypes are described for clock and automotive applications. Author (ESA)

N82-13958# Virginia Polytechnic Inst. and State Univ., Blacksburg.
COMPUTER PROGRAMS FOR LINE SHAPE ANALYSIS OF X-RAY DIFFRACTION PEAKS
T. M. Smith and C. R. Houska Dec. 1980 100 p refs Prepared in cooperation with Tektronix, Inc., Beaverton, Oreg.
(Grant NSF DMR-75-17201)
(PB81-227787; VPI-E-81-19) Avail: NTIS HC A05/MF A01 CSCL 20B

Modifications of the Warren-Averbach line shape analysis and necessary computer programs written in Fortran 4, which perform the analysis, are preentered. Very accurate instrumental broadening parameters are determined by one program. Another program fits the theoretical intensity expression to the experimental data to yield particle size and two strain parameters. Also included are programs which combine the two strain components found in thin films to yield the total mean square microstrain. Sample inputs and outputs for the analysis of a one micrometer thick Mo film sputter deposited onto a (111)-oriented Si single crystal substrate are given. Descriptions of the programs as well as detailed procedures for their use are included. GRA

N82-13959 Northwestern Univ., Evanston, Ill.

DEFECT STRUCTURE AND PROPERTIES OF INTERMETALLIC COMPOUND BETA-LIAl Ph.D. Thesis

Kohji Kishio 1981 162 p

Avail: Univ. Microfilms Order No. 8124926

The defect structure of the NaTl-type intermetallic compound beta-LiAl and its doped alloys was studied through X-ray lattice parameter, bulk density as well as NMR spin-lattice relaxation rate measurements. The lattice parameter of slowly cooled LiAl alloys was found to vary almost linearly within the composition range of the beta-phase. A defect model which consists of the coexistence of two types of point defects was proposed and their concentrations were determined as a function of composition. The observations suggested a model in which the concentration of vacancies on the Li sublattice decreased while that of the Li antistructure atoms on the Al sublattice increased with Li composition. The average number valance electrons per lattice site was calculated and it was found it would not exceed 2.0 even at Li poor side of the composite due to the formation of a defect lattice. This behavior has been interpreted in the light band structure, and a correlation of the defect structure with the electronic structure in NaTl-type compounds was hypothesized. Dissert. Abstr.

N82-13960 Rochester Univ., N. Y.

PUSH-PULL FATIGUE OF LIF AND MgO SINGLE CRYSTALS Ph.D. Thesis

Bhaskar Sinha Majumdar 1980 250 p

Avail: Univ. Microfilms Order No. 8123990

The mechanical and microstructural response of LiF and MgO, subjected to push-pull cyclic deformation was studied as a function of strain amplitude, strain rate and temperature. Comparisons are made with the fatigue behavior of f.c.c., b.c.c. and h.c.p. metals. At room temperature the fatigue hardening of LiF is rapid and almost linear per cycle. The flow stress rises to as much as ten times the original yield stress. Based on a concept of cumulative strain, excellent agreement was obtained between the hardening rates in fatigue and in monotonic deformation. The fatigue analysis, which separates long and short range stresses, explains why LiF in fatigue can withstand larger applied stresses before fracture when compared to unidirectional tensile deformation. Dissert. Abstr.

N82-13961 Florida Univ., Gainesville.

ELECTRIC FIELD-ENHANCED DIFFUSION AND ELECTRON STIMULATED DESORPTION OF ALKALI ELEMENTS FROM GLASS SURFACES DURING ELECTRON BOMBARDMENT AND AUGER ELECTRON ANALYSIS Ph.D. Thesis

Fumio Ohuchi 1981 153 p

Avail: Univ. Microfilms Order No. 8124448

Among a number of modern surface sensitive analytical techniques, Auger electron spectroscopy (AES) is extensively applied for glass surface research because of its superior characteristics. AES is generally considered as a nondestructive technique; however, a number of reports have shown that the incident electron beam can alter the surface composition of the solid being analyzed. Compositional changes in glass is particularly severe in glasses containing alkali ions and it is manifested by the time dependent alkali Auger signal loss during electron bombardment. The fundamental mechanisms of alkali Auger signal loss from glass surfaces during electron bombardment are described. It is shown that this is the result of electric field enhanced diffusion and electron stimulated description. Dissert. Abstr.

N82-13962 Pennsylvania Univ., Philadelphia.

THE STRUCTURE AND PROPERTIES OF GRAIN BOUNDARIES Ph.D. Thesis

Adrian Peter Sutton 1981 405 p

Avail: Univ. Microfilms Order No. 8117861

Long period symmetrical and asymmetrical tilt boundaries in aluminum and copper were studied. Two classes of grain boundaries were found favoured which consist of a contiguous sequence of primary dislocations whose long range elastic fields cancel and nonfavoured which exist in the misorientation ranges between favoured boundaries and are composed of units of the neighboring favoured boundaries. A crystallographic analysis of tilt boundaries reveals the relationship between them through faceting or dislocation formation. This analysis is readily applied to atomistic calculations of long period asymmetrical tilt boundaries. Three previous atomistic studies of tilt boundary structure are reinterpreted and several fundamental difference between intrinsic and extrinsic grain boundary dislocations are described. A preliminary atomistic study of grain boundaries containing impurities was made using silver and bismuth atoms which were introduced subsitutionally into favoured and nonfavoured boundaries in copper. A strong tendency for segregation of bismuth to both boundaries is found while only a small tendency (sometimes none) is found for silver. Dissert. Abstr.

N82-13963 Florida Univ., Gainesville.

TRANSPORT NOISE ARISING FROM DIFFUSION AND BULK OR SURFACE GENERATION RECOMBINATION IN SEMICONDUCTORS Ph.D. Thesis

Harshad Mehta 1981 141 p

Avail: Univ. Microfilms Order No. 8124442

The type of noise spectra in solids or solid state devices, which can arise from noise due to a combination of causes, such as diffusion of carriers, generation and recombination (g-r) processes of carriers in the bulk and at the surface was studied using techniques to be described apply equally well to the problem of heat diffusion, with heat transfer or reflection at the boundaries of the system, we have, however, mainly the carrier noise problem in mind. The physical noise sources, the diffusion source, g-r source and surface source, Clarke and Voss' P source are discussed as well as transport noise in symmetrical embedded bodies, in nonsymmetrical embedded bodies, in symmetrical nonembedded bodies and in nonsymmetrical nonembedded bodies. Results indicate that volume g-r and diffusion processes give rather smooth spectra, but, without a l/f range. The high frequency asymptote is always w-3/2 (embedded case) or omega to the minus 2 power (nonembedded case). Dissert. Abstr.

N82-13964 Stanford Univ., Calif.

THE PHYSICAL AND ELECTRICAL PROPERTIES OF POLYCRYSTALLINE-SILICON Ph.D. Thesis

Mohammad Mahmoud Mandurah 1981 161 p

Avail: Univ. Microfilms Order No. 8124106

The detailed characterization of the physical and electrical properties of polycrystalline-silicon is essential to ensure the proper design and reliable performance of the devices in which this material is used. Modeling of electrical conduction is critical for predicting the effects of the processing cycles on their electrical properties. The physical and electrical properties of low-pressure chemically-vapor-deposited silicon films are characterized and are then related to each other to develop a new model for electrical conduction. The structure of the LPCVD films strongly depends on deposition conditions. Below the critical deposition temperature of 580 C, the deposited films are amorphous, highly unstable, and recrystallize easily after high-temperature annealing. Enhanced grain growth is detected as a result of heavy doping and/or annealing at elevated temperatures. The electrical properties of these films strongly depend on dopant concentration and species and processing. Carrier reflection at the grain boundaries (neglected in models) is demonstrated to be an important mechanism that, combined with carrier trapping and dopant segregation, controls electrical conduction in polycrystalline-silicon. Dissert. Abstr.

N82-13965 Nebraska Univ. - Lincoln.

THE GROWTH AND CARRIER TRANSPORT PROPERTIES OF SPUTTER DEPOSITED GaAs THIN FILMS DOPED WITH SILICON AND MAGNESIUM Ph.D. Thesis

Dan Michael Mosher 1981 153 p

Avail: Univ. Microfilms Order No. 8124519

Thin films of GaAs were deposited with a triode sputtering system onto single crystal GaAs semiinslating substrates. Most of the films were doped by the cosputtering of Si for n type or Mg for p type films. The electrical resistivity and Hall Effect were measured by the van der Pauw technique to obtain the carrier concentration and mobility as a function of temperature. Analysis of these data determined that the dopant energy levels had created a band which merged with the production band. The characteristics of this merged band structure controlled the free carrier concentration. It was determined that the dopant density was controlled by the duty cycle of the bias voltage on the dopant target. The resistivity of the *n* type films at room temperature ranged from 0.036 Ohm cm to 20.8k Ohm cm. The most important mobility limitations were found to be ionized impurity scattering from the high doping densities and grain boundary scattering from the film disorder. The average grain size was determined from grain boundary scattering analysis to be about 50 to 100 A. Dissert. Abstr.

N82-13966 Northwestern Univ., Evanston, Ill.
A STOCHASTIC LANGEVIN DYNAMICS STUDY OF CORRELATED IONIC MOTION IN ONE-DIMENSONAL FRAMEWORK SOLID ELECTROLYTES Ph.D. Thesis
Solomon Howard Jacobson 1981 227 p
Avail: Univ. Microfilms Order No. 8124913

The microscopic motion of charge carriers in one-dimensional framework ionic conductors is described by stochastic Langevin dynamics. The interactions of the charge carriers with the framework lattice are approximated by a sum of periodic and random forces, representing the static and dynamic effects of the framework lattice. Ionion interactions are represented by realistic Coulomb and short range forces. Mechanisms for fast ion transport, based on the calculated transport properties in systems where the various constituent factors (forces in the Langevin equation) have been systematically varied, are presented. Independent particle models are examined first. The stochastic Langevin dynamics technique is shown to contain the correct low frequency and high frequency behavior. Comparison of stochastic Langevin dynamics with the Smoluchowski equation is presented. Results at several different values of the damping constant define the criteria for which the Smoluchowski approximation is valid. Dissert. Abstr.

N82-13967 Stanford Univ., Calif.
EXPERIMENTAL AND THEORECTICAL STUDIES OF EXCITED STATE TRANSPORT Ph.D. Thesis
Craig Robert Gochanour 1981 177 p
Avail: Univ. Microfilms Order No. 8124074

The spatial transport of electronic excited state energy was examined. The first problem considered is the transport of singlet excited state energy among a set of randomly distributed solute molecules in a host solvent. The effects of the random distribution of spatial positions were studied in a theoretical analysis of the Green function. From the master equation a diagrammatic expansion of the Green function was derived. The second topic considered is the basic nature of the excited states of a pure molecule crystal. The nature of the excited state is an important factor needed to understand transport as a delocalized excited state will lead to coherent, wavelike transport while a localized excited state leads to incoherent, hopping transport. An experimental study of the temperature dependence of the absorption lineshape of the s sub o yields t sub 1 transition in 1,2,4,5-tetrachlorobenzene is presented. Dissert. Abstr.

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

N82-13968 Purdue Univ., Lafayette, Ind.
COMPTON SCATTERING IN A UNIFORM, CONSTANT MAGNETIC FIELD Ph.D. Thesis
Evelyn Smith Kinzel 1981 143 p
Avail: Univ. Microfilms Order No. 8123666

A general expression for the Compton cross section for a uniform, constant magnetic field was derived based on the Dirac equation and second order perturbation theory, the electrons were represented by single particle wave functions and the photons by plane waves. The solution was programmed for numerical solution by computer; the results were displayed graphically. The solution possesses the usual energy conservation for the system of the electron plus the photon; in addition, the component along the magnetic field of the linear momentum of the system is conserved in the magnetic Compton effect. There is no general conservation of momentum. The numberical portion reveals a resonance in the total cross section when the frequency of the incoming photon is near the electron's Larmor frequency. At the Peak, one photon polarization mode exhibits a severe dip for outgoing photons moving perpendicular to the magnetic field. Dissert. Abstr.

N82-13969 California Univ., Los Angeles.
SPECTRAL FUNCTIONS IN QUANTUM CHROMODYNAMICS AND APPLICATIONS Ph.D. Thesis
Minh Dinh Tran 1981 180 p
Avail: Univ. Microfilms Order No. 8122870

The longitudinal and transverse spectral functions for arbitrary conserved and non-conserved vector and axial vector currents of massive quarks are calculated to first order in alpha sub s and exact analytical expressions are given. As an intermediate step the form factors to the same order in alpha sub s are determined. A remarkably simple result is derived for the combination of the spectral functions corresponding to the Weinberg's first sum rule. It behaves asymptotically like alpha sub s/sq s thus ensuring the convergence of the sum rule. The Weinberg's second sum rule is shown to fail to hold, a new sum rule is then proposed to replace the original one. The current algebra calculation of the pion electromagnetic mass difference is reexamined in the light of quantum chromodynamics. The current couplings of five low lying mesons, decay properties of intermediate vector bosons and gluonic corrections to hadronic decay modes are calculated. Implications of the results for decay widths, branching ratios are examined. Dissert. Abstr.

N82-13970 California Univ., Los Angeles.
PROBLEMS IN QUANTUM MECHANICS AND GRAVITATION Ph.D. Thesis
Gregg Darryl Wilensky 1981 117 p
Avail: Univ. Microfilms Order No. 8122087

The rate of spontaneous particle production in the presence of a collapsed star, described by the static Schwarzschild solution to the gravitational field equations was explicity calculated. The calculation of the vacuum persistence probability is based on a semiclassical approximation to the Green's function of a spin O, massless particle in this gravitational field. The singularity in the differential equations at $r = 2GM$ is avoided by giving M, the mass of the star, an infinitesimal imaginary part (motivated by quantum corrections to the gravitational field) whose sign is uniquely determined by the requirement that the vacuum persistence probability should not exceed unity. In contrast to a previous result, particle production is found to occur for this static situation. The value for this rate can not be determined using the semiclassical methods, however, as it is sensitive to the behavior of the Green's function near the classical turning point. Dissert. Abstr.

N82-13971# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
MANUAL FOR THE PROGRAM CASLE: CYCLE ANALYSIS AND SECOND-LIFE EVALUATION
Warren W. Madsen, Janet L. Bogue, C. Dennis McMurtrey, and Scott L. Richlen Apr. 1981 262 p refs
(Contract DE-AC07-76ID-01570)
(DE81-027487; EGG-CS-5351) Avail: NTIS HC A12/MF A01

The user's manual and the computer program CASLE, which models and analyzes Rankine and Brayton cycle systems with regenerator, superheat, and supercritical cycle options is presented. The code has a state point option that will describe any cycle for which the values of pressure and temperature at each state point are known. The code generates the required thermodynamic properties internally using only a few input constants for fluids that are either internal or external to the code. The program version presented is written in Dartmouth BASIC Language and intended for use with the Tektronix 4052 computer. DOE

N82-13972# California Univ., Berkeley. Lawrence Berkeley Lab.
NUCLEAR SLAB COLLISION IN A RELATIVISTIC QUANTUM FIELD THEORY

K. H. Mueller Jun. 1981 10 p refs Presented at the 5th High Energy Heavy Ion Study, Berkeley, Calif. 18-22 May 1981
(Contract W-7405-eng-48)
(DE81-028132; LBL-12893; CONF-8105104-3) Avail: NTIS HC A02/MF A01

Starting from Walecka's Lagrangian, the nucleons are represented by single particle spinors, which are determined by a Dirac equation containing a repulsive mean neutral vector field V/sub mu/ and an attractive mean isosclar field sigma. Both fields satisfy Klein-Gordon equations. Their source terms are again determined by the spinors. This relativistic mean field model was applied to the dynamics of two colliding slabs. They are translational invariant in two transverse dimensions and consist of spin and isospin symmetric nuclear matter. By specification of appropriate initial conditions for the collision of two equal slabs, the system of coupled Klein-Gordon-Dirac equations was solved for lab bombarding energies per nucleon up to 400 MeV. At low energies the results are identical with TDHF results. The damping of the collisions, the phenomenon of high nuclear density, and the effect of retardation during the reaction are studied.
DOE

N82-13973 Rochester Univ., N. Y.
NEW EXACT AND ASYMPTOTIC SOLUTIONS OF THE STATIONARY VACUUM EINSTEIN EQUATIONS Ph.D. Thesis
Prasun Kumar Kundu 1980 124 p
Avail: Univ. Microfilms Order No. 8123984

A projection tensor calculus is described for treating spacetimes with two commuting Killing vectors and its use is illustrated by two examples--an alternative proof of a sufficient condition for such a spacetime to be orthogonally transitive (Papapetrou's Theorem) and an application to the Rainich-Misner-Wheeler (RMW) geometrization of the electromagnetic field. A special null tetrad is introduced which is naturally adapted to the group orbits and the components of the Weyl tensor was examined in this basis. This framework is applied to investigate the admissible Petrov types in the special case when the group orbits admit orthogonal two-surfaces. The new formalism is employed to obtain a class of noncanonical stationary axisymmetric vacuum metrics whose Killing orbits do not admit orthogonal two-surfaces. A metric is found which is Petrov type 2 with expansion-, twist-, and the shear-free geodesic rays and which includes the van Stockum solution as a limiting case. A multipole expansion scheme is also introduced for a wide class of stationary, asymptotically flat, vacuum solutions of Einstein's equations using the conformal techniques of Geroch and Hansen. Dissert. Abstr.

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

No abstracts in this category.

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N82-13974# Naval Postgraduate School, Monterey, Calif.
COMPILATION OF ABSTRACTS OF DISSERTATIONS THESES, AND RESEARCH PAPERS SUBMITTED BY CANDIDATES FOR DEGREES, 1 OCTOBER 1979 - 30 SEPTEMBER 1980
Mar. 1981 514 p
(AD-A104124; NPS-012-81-002PR) Avail: NTIS HC A22/MF A01 CSCL 05/2

Abstracts are presented of works submitted in fulfillment of degree requirements in the area of aeronautical, electrical, and mechanical engineering as well as in applied mathematics, applied sciences, and computer sciences. Author

N82-13975# Naval Postgraduate School, Monterey, Calif.
A SUMMARY OF THE NAVAL POSTGRADUATE SCHOOL RESEARCH PROGRAM Summary Report, 1 Oct. 1979 - 30 Sep. 1980
Apr. 1981 528 p
(AD-A104112; NPS-012-81-003PR) Avail: NTIS HC A23/MF A01 CSCL 05/2

Two hundred thirty research projects are summarized in the following areas: computer science; mathematics; administrative sciences; defense resources management; operations research; national security affairs; physics and chemistry; electrical engineering; meteorology; aeronautics; oceanography; and mechanical engineering. Author

N82-13976# Young (Arthur) and Co., Washington, D. C.
MANAGING INFORMATION TECHNOLOGY CHANGE IN THE DECADE OF THE 80'S Final Report
Jack R. Borsting, Jack Brooks, and Charles P. Lecht Jan. 1981 65 p Proceedings of the DOD Long Range ADP Planning Conf., Washington, D.C., 28-29 Jan. 1981
(Contract MDA903-79-C-0690)
(AD-A099441; Rept-0690-005A) Avail: NTIS HC A04/MF A01 CSCL 05/2

Abstracts of 21 presentations on automatic data processing management changes and impact expected during this decade are presented. Five conference panels were conducted and addressed the following themes: information resource management; trend projections and ADP policies for the 80's; program management; management/technical considerations; and office automation. Author

N82-13977# Oak Ridge National Lab., Tenn. Chemical Technology Div.
SEPARATIONS SCIENCE DATA BASE: AN ABSTRACTOR'S MANUAL
J. W. Roddy, W. J. McDowell, and D. C. Michelson Jul. 1981 25 p refs
(Contract W-7405-eng-26)
(DE81-029101; ORNL/TM-7805) Avail: NTIS HC A02/MF A01

The Separations Science Data Base, designed specifically for the retrieval of information needed in chemical separations problems is described. The procedure for entering records into the data base is given. The initial entries are concerned primarily with liquid-liquid extraction and liquid-solid ion exchange methods for metal ions and salts; however, the data base is constructed so that almost any separations process can be accommodated.
DOE

N82-13978# General Atomic Co., San Diego, Calif.
DATA MANAGEMENT IN A FUSION ENERGY RESEARCH EXPERIMENT
A. Glad, D. Drobnis, and B. McHarg Jul. 1981 33 p refs
(Contract DE-AT03-76ET-51011)
(DE81-027932; GA-A-16272) Avail: NTIS HC A03/MF A01

Present-day fusion research requires extensive support for the large amount of scientific data generated, bringing about three distinct problems computer systems must solve: (1) the processing of large amounts of data in very small time frames; (2) the archiving, analyzing and managing of the entire data output for the project's lifetime; (3) the standardization of data for the exchange of information between laboratories. The computer system supporting General Atomic's Doublet III Tokamak, a project funded by the United States Department of Energy is the first to encounter and address these problems through a system-wide data base structure. DOE

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N82-13979# RAND Corp., Santa Monica, Calif.
A NEW APPROACH TO MODELING THE COST OF OWNERSHIP FOR AIRCRAFT SYSTEMS Interim Report
K. E. Marks, H. G. Massey, B. D. Bradley, and J. Lu Aug. 1981 151 p refs
(Contract F49620-77-C-0023)
(AD-A104434; RAND/R-2601-AF) Avail: NTIS
HC A08/MF A01 CSCL 05/1

Support investment costs and recurring operations and support costs are through determined using a model for estimating aircraft cost of ownership (MACO), which also provides a framework for future research. An outgrowth of an earlier evaluation of the strengths and weaknesses of the most widely used aircraft life cycle cost models, MACO combines algorithms for major, maintenance related costs with formulas drawn from existing models for other cost elements. A full set of ownership cost elements is related to component level reliability and maintainability characteristics and to aircraft design, operations, logistics, and deployment parameters. Resource quantities are computed in units that can be related directly to Air Force programming categories, including base maintenance manning (by work center), depot manning, and recoverable spares inventory levels. Output and input parameters accommodate annual changes in system parameters and operating conditions such as component reliability and aircraft inventory size and activity rates. Author

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

No abstracts in this category.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N82-13980# RAND Corp., Santa Monica, Calif. Dept. of Social Science.
THE EVALUATION OF TECHNOLOGY R&D: A CONTINUING DILEMMA
Peter deLeon Aug. 1981 31 p refs Prepared for UCLA
(RAND/P-6655) Avail: NTIS HC A03/MF A01

The development of new and advanced technologies, especially those with significant potential social effects are discussed. A technology evaluation agenda for the next decade with special emphasis on four issues is proposed: (1) appropriate technology R&D standards and criteria; (2) the institutional context; (3) comparisons to alternative options; and (4) the social effects. E.A.K.

N82-13981*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONTROLLED SPEED ACCESSORY DRIVE DEMONSTRATION PROGRAM
Frank W. Hoehn 15 Oct. 1981 105 p refs
(Contracts NAS7-100; DE-AI01-80CS-50194)
(NASA-CR-165010; JPL-Pub-81-83) Avail: NTIS
HC A06/MF A01 CSCL 13F

A Controlled Speed Accessory Drive System was examined in an effort to improve the fuel economy of passenger cars. Concept feasibility and the performance of a typical system during actual road driving conditions were demonstrated. The CSAD system is described as a mechanical device which limits engine accessory speeds, thereby reducing parasitic horsepower losses and improving overall vehicle fuel economy. Fuel consumption data were compiled for fleets of GSA vehicles. Various motor pool locations were selected, each representing different climatic conditions. On the basis of a total accumulated fleet usage of nearly three million miles, an overall fuel economy improvement of 6 percent to 7 percent was demonstrated. Coincident chassis dynamometer tests were accomplished on selected vehicles to establish the effect of different accessory drive systems on exhaust emissions, and to evaluate the magnitude of the mileage benefits which could be derived. J.M.S.

N82-13982# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Materials Lab.
AIR FORCE TECHNICAL OBJECTIVE DOCUMENT FY 1982
Richard L. Verga Jan. 1981 29 p
(AD-A099741; AFWAL-TR-81-4041) Avail: NTIS
HC A03/MF A01 CSCL 11/4

The materials technology planning objectives (TPOs) for meeting future Air Force operational needs are described. The six TPOs encompass the full spectrum of materials capabilities required for future aircraft, missile, space, and electronic systems: thermal protection materials; aerospace structural materials; aerospace propulsion materials, fluid, lubricant, and elastomeric materials; protective coatings and materials; and electromagnetic windows and electronics. General objectives, specific goals, technical approaches, and a laboratory focal point are presented. Author

N82-13983# Galaxy, Inc., Washington, D.C.
UPDATE ON SPECIFIED EUROPEAN R AND D EFFORTS. PART 1: APPENDICES
Oct. 1980 117 p Partly in ENGLISH; partly in GERMAN
(Contract DE-AC03-79SF-10538)
(DE81-026404; DOE/SF-10538/T10) Avail: NTIS
HC A06/MF A01

Progress and update on specified European R and D are reported. The following topics are discussed: blueburner test with different swirl spray nozzles, aerodynamics of a flat nonswirl blue flame, and large industrial blue flame burners, manufacturer's design and performance literature for the 2500 to 3500 KW KG5 gas turbine, the Kongsberg 1500 to 2000 kVA generating set, the 500 to 700 kVA generating set, the KG 831 gas turbine generating set, the KG 2 gas turbine, and selection criteria for gas turbines for emergency power supplies; and high temperature corrosion and carburization and silicon coatings as high temperature corrosion protection for gas turbine blades. DOE

N82-13984# Smith (Wilbur) and Associates, New York.
MEASURES OF EFFECTIVENESS OF TRANSPORTATION SYSTEMS MANAGEMENT Final Report
Apr. 1981 43 p refs Prepared jointly with Tri-State Regional Planning Commission
(PB81-233884; UTMA-IT-09-00890-81-1) Avail: NTIS
HC A03/MF A01 CSCL 13B

The basic concepts of transportation systems management (TSM) by providing simple classification schemes, geographic conditions of applicability, relative measures of effectiveness, and techniques for quantification were developed. Two key elements are emphasized: coordination of transportation activities, and maximization of efficiency and productivity. Some of the findings reported are: (1) traffic engineering improvements; (2) demand management measures achieve reductions in vehicle miles of travel; and (3) bus lanes and priority entry treatments. GRA

N82-13985# Aerospace Corp., El Segundo, Calif. Environment and Energy Conservation Div.
EVALUATION OF TECHNIQUES FOR REDUCING IN-USE AUTOMOTIVE FUEL CONSUMPTION Final Report, Jun. 1976 - Mar. 1978
L. Forrest, W. B. Lee, and W. M. Smalley Apr. 1981 330 p refs Prepared in cooperation with Transportation Systems Center
(Contract F04701-77-C-0078)
(PB81-233298; DOT-TSC-NHTSA-81-13; DOT-HS-805833)
Avail: NTIS HC A15/MF A01 CSCL 13F

Techniques for reducing fuel consumption in the light duty road vehicle fleet are assessed. Modification of vehicles, modification of traffic flow, and modification of driver behavior are considered. Factors included in the evaluation are fuel economy effects, safety impacts, availability for fleet implementation, and unit price. In addition, the implementation of each technique is assessed with regard to number of vehicles impacted, fuel savings effected, national cost, potential problems, and required lead time. Cost effective techniques are ranked in terms of their assessed potential for reducing fleet fuel consumption. GRA

N82-13986# Transportation Systems Center, Cambridge, Mass.
HIGHWAY FUEL ECONOMY STUDY Final Report, Sep. 1979 - Mar. 1981
Robert L. Mason and Russell W. Zub Jun. 1981 155 p refs
(PB81-233850; DOT-TSC-NHTSA-81-18; DOT-HS-805873)
Avail: NTIS HC A08/MF A01 CSCL 13F

The fuel consumption changes attributable to speed reduction and compliance with the 55 MPH speed limit are described. The effects of vehicle size and type, and driver-controllable functions on vehicle fuel economy at highway speeds are discussed. Most of the analytical work is related to passenger cars and light trucks, however, medium and heavy trucks, primarily commercial in application, have been included in the highway fuel economy analyses. GRA

N82-13987# Transportation Systems Center, Cambridge, Mass.
WEIGHT REDUCTION POTENTIAL OF AUTOMOBILES AND LIGHT TRUCKS: 1980 SUMMARY SOURCE DOCUMENT Final Report
Hsi-Sheng Hsia Jun. 1981 327 p refs
(PB81-235756; DOT-TSC-NHTSA-81-17; DOT-HS-805892)
Avail: NTIS HC A15/MF A01 CSCL 13F

The potential of weight reduction for passenger cars and light trucks (including pickup trucks, vans, and utility vehicles of GVWR up to 8500 pounds) in the post-1985 period is assessed. Vehicle characteristics and weight reduction methodologies, as well as methodologies for determining secondary weight reduction, are presented. Results of four weight reduction scenarios for material substitution, emphasizing high strength steels, fiberglass reinforced plastics, aluminum, and hybrid reinforced plastics, are presented for baseline vehicles. GRA

N82-13988# National Bureau of Standards, Washington, D.C. National Engineering Lab.
PEDESTRIAN MOVEMENT CHARACTERISTICS ON BUILDING RAMPS Final Report
George Turner and Belinda Collins Jun. 1981 60 p refs
(PB81-229163; NBSIR-81-2310) Avail: NTIS HC A04/MF A01 CSCL 13M

Knowledge of design for effective pedestrian circulation is one of the main requirements in building planning. While an understanding of pedestrian movement characteristics on the various component parts that make up a building circulation system is the key to effective planning, one component type, the ramp, has rarely been the subject of building circulation research. The research described is the result of an investigation of pedestrian movement characteristics on four specific building ramps during two different professional athletic contests. Variables of pedestrian movement such as speed, flow, and density were studied as well as the relationships between them. In addition, counts of pedestrians by sex were made. Results were compared for the specific ramps and with previously reported data obtained for ramps, stairs, and level surfaces. GRA

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-13989* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MODERN OBSERVATIONAL TECHNIQUES FOR COMETS
J. C. Brandt, ed. (NASA, Goddard Space Flight Center), J. M. Greenberg, ed. (Leiden Univ.), B. Donn, ed. (NASA, Goddard Space Flight Center), and J. Rahe, ed. (Erlangen-Nuernberg Univ.) 1 Oct. 1981 327 p refs Workshop held at Greenbelt, Md., 22-24 Oct. 1980 Original document contains color illustrations
(Contract NAS7-100)
(NASA-CR-165006; JPL-Pub-81-61) HC SOD $16.00 CSCL 03A

Techniques are discussed in the following areas: astrometry, photometry, infrared observations, radio observations, spectroscopy, imaging of coma and tail, image processing of observation. The determination of the chemical composition and physical structure of comets is highlighted. For individual titles, see N82-13990 through N82-14026.

N82-13990* Toledo Univ., Ohio. Dept. of Physics and Astronomy.
OBSERVING CHEMICAL ABUNDANCES IN COMETS
A. H. Delsemme *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 5-13 refs (For primary document see N82-13989 04-89)
(Grants NsG-7301; NSF AST-79-14789)
HC SOD $16.00 CSCL 03A

The atomic resonance lines of the major elements were observed in the atmospheres of a few comets, by using vacuum ultraviolet spectrographs on board rockets or orbiting observatories. Dust-to-gas ratios were also deduced for two comets through a Finson-Probstein's analysis of their dust-tail isophotes. The geometric albedo of the dust for the phase angle alpha of the observations is not accurately known but, the dust-to-gas ratio is not overly sensitive to the actual value of this albedo. Infrared observations of the dust head of some comets show that the bulk of cometary dust must be silicates, although a minor component (5-10 percent) of carbon compounds is rather likely, because of poor dielectric properties of the grains. This interpretation is confirmed by the fact that interplanetary dust probably of cometary origin, that was collected in the stratosphere by NASA-U2 Spacecraft, is chondritic in nature. Metal abundances in the head of a sungrazing comet support the chondritic hypothesis. T.M.

N82-13991* Los Alamos Scientific Lab., N. Mex.
OBSERVATIONAL DATA NEEDS USEFUL FOR MODELING THE COMA
W. F. Huebner and P. T. Giguere *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 14-18 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

A computer model of comet comae is described; results from assumed composition of frozen gases are summarized and compared to coma observations. Restrictions on relative abundance of some frozen constituents are illustrated. Modeling, when tightly coupled to observational data, can be important for comprehensive analysis of observations, for predicting undetected molecular species and for improved understanding of coma and nucleus. To accomplish this, total gas production rates and relative elemental abundances of H:C:N:O:S are needed as a function of heliocentric distance of the comet. Also needed are relative column densitites and column density profiles with well defined diaphragm range and pointing position on the coma. Production rates are less desirable since they are model dependent. Total number (or upper limits) of molecules in the coma and analysis of unidentified spectral lines are needed also. T.M.

N82-13992* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

OBSERVATIONAL DATA NEEDS FOR PLASMA PHENOMENA

Malcolm B. Niedner, Jr. *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 21-32 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

Bright comets display a rich variety of interesting plasma phenomena which occur over an enormous range of spatial scales, and which require different observational techniques to be studied effectively. Wide-angle photography of high time resolution is probably the best method of studying the phenomenon of largest known scale: the plasma tail disconnection event (OE), which has been attributed to magnetic reconnection at interplanetary sector boundary crossings. These structures usually accelerate as they recede from the head region and observed velocities are typically in the range 50 < V < km/s. They are often visible for several days following the time of disconnection, and are sometimes seen out past 0.2 AU from the cometary head. The following areas pertaining to plasma phenomena in the ionoshere are addressed: the existence, size, and heliocentric distance variations of the contact surface, and the observational signatures of magnetic reconnection at sector boundary crossings. T.M.

N82-13993* Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).

ANTICIPATED RESULTS FROM DUST EXPERIMENTS ON COMETARY MISSIONS

J. Kissel, H. Fechtig, and E. Grun *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 33-38 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

The major scientific objectives of a mission are: to determine the chemical nature and physical structure of comet nuclei, and to characterize the changes that occur as a function of time orbital position; to characterize the chemical and physical nature of the atmospheres and ionospheres of comets as well as the processes that occur in them, and to characterize the development of the atmospheres and ionospheres as functions of time and orbital position; and to determine the nature of comet tails and processes by which they are formed, and to characterize the interaction of comets with the solar wind. Since dust is a major constituent of a comet, the achievement of these goals requires the intensive study of the paticulate emission from a comet. T.M.

N82-13994* Academy of Sciences (USSR), Dushanbe. Inst. of Astrophysics.

NEW PROBLEMS OF COMETARY OBSERVATIONS FROM SPACE

O. V. Dobrovolsky and S. I. Ibadov *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 39-41 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

The possibility of treating the comets as natural probes of the solar system presents one of the attractive sides of cometary astronomy. In connection with the plans to study comets from space, new aspects for comets as interplanetary probes are of interst. Possible meteor formation in cometary heads and the implication for space research are considered. T.M.

N82-13995* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

COMETARY EPHEMERIDES - NEEDS AND CONCERNS

Donald K. Yeomans *In its* Mod. Observational Tech. for Comets 1 Oct. 1981 p 46-49 refs (For primary document see N82-13989 04-89)
(Contract NAS7-100)
HC SOD $16.00 CSCL 03A

With the use of narrow field-of-view instrumentation on faint comets, the accuracy requirements upon computed ephemerides are increasing. It is not uncommon for instruments with a one arc minute field-of-view to be tracking a faint comet that is not visible without a substantial integration time. As with all ephemerides of solar syste objects, the computed motion and reduction of these observations, the computed motion of a comet is further depenent upon effects related to the comet's activity. Thus, the ephemeris of an active comet is corrupted by both observational errors and errors due to the comet's activity. T.M.

N82-13996* Maryland Univ., College Park.

INTRODUCTORY REMARKS: PHOTOMETRY SECTION

Michael F. AHearn *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 53-56 (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

The principal goals of photometry and polarimetry are summarized. These goals include studies of the emission features of gaseous species of comets, the wavelength depenence of albedo, the phase function of scatter distribution, and time variation of rotation. Recent advances in photometric techniques were reviewed and include: use of proper filters, extension to the shortest and longest wavelengths, higher spectral resolving power, and polarization techniques. T.M.

N82-13997* Lowell Observatory, Flagstaff, Ariz. Planetary Research Center.

GROUND-BASED PHOTOMETRY OF COMETS IN THE SPECTRAL INTERVAL 3000 TO 3500 ANGSTROM

R. L. Willis (Hawaii Univ.) and M. F. AHearn (Maryland Univ.) *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 57-62 refs (For primary document see N82-13989 04-89)
(Grants NGR-03-003-001; NsG-7322)
HC SOD $16.00 CSCL 03A

Abundances and production rates of CN, C3, and C2 for fifteen comets were determined and the variation of these parameters with helicentric distance for two comets were monitored. While these measurements provide much information about the similarities and differences among comets, only a small fraction of the total material in any of the comets observed was sampled. T.M.

N82-13998* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SPECTROPHOTOMETRY OF FAINT COMETS: THE ASTEROID APPROACH

Johan Degewij *In its* Mod. Observational Tech. for Comets 1 Oct. 1981 p 63-69 refs (For primary document see N82-13989 04-89)
HD SOD $16.00 CSCL 03A

Observing programs at optical (0.35-0.8 micron) and near-infrared (1.1-2.4 micron) wavelengths, directed at the acquisition of reflection spectra of faint and distant comets, are described. The ultimate goal is to obtain spectrophotometric measurements of comets for which a significant part of the light is expected to be reflected by the solid surface of the nucleus. T.M.

N82-13999* Ruhr Univ., Bochum (West Germany). Bereich Extraterrestrische Physik.

RESULTS TO BE EXPECTED FROM LIGHT SCATTERING DUST ANALYZER DURING A RENDEZVOUS MISSION

R. H. Zerull, R. H. Giese, and B. Kneissel IN JPL Mod. Observational Tech. from Comets 1 Oct. 1981 p 72-76 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

The light scattering principle for particle detection is customary for the measurement of aerosols. Light scattering techniques can be applied to mixtures of particles (nephelometers) and to single particles as well. Measuring particle mixtures simplify detection because of the higher intensity level, however, information concerning the individual particle is lost. To provide well defined conditions over the whole rendezvous period, i.e., constant illumination beam and unchangeable scattering angle, the use of an artificial light source (instead of the sun) and a scattering volume located within the S/C is desirable. Considering this and the relatively low particle densities to be expected, the measurement of particle mixtures must be excluded. T.M.

N82-14000* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INFRARED OBSERVATIONS OF COMETS
Robert W. Hobbs *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 79-82 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

Infrared observation are important for deducing a great deal about properties of the cometary dust surrounding the cometary nucleus. All observations in the infrared are limited to long period comets. Three features of the spectrum which seem to be present in nearly all of the comets observed are discussed. First, there is a peak in the spectrum in the near infrared and visible wavelength, which can be attributed to scattered sunlight. This feature, as expected, gets fainter as a comet recedes from the sun. The second dominant feature in the spectrum is a broad peak in the infrared which is attributed to the thermal emission of the dust in the coma. This part of the spectrum also gets dimmer as the comet gets further from the sun but, at the same time the peak of the spectrum shifts to longer wavelengths, indicating that the dust from which this radiation arises is cooling as the comets receds. The other feature in the spectrum which is noted is the emission feature at about 10 microns attributed to emission from metallic ilicates. T.M.

N82-14001* Arizona Univ., Tucson. Dept. of Planetary Sciences.
INFRARED OBSERVATIONS OF FAINT COMETS
Humberto Campins, Jonathan Gradie, Marcia Lebofsky, and George Rieke *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 83-89 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

Infrared observations of the periodic comets Encke, Stephan-Oterma and Chernykh indicate that the dusty component in this class of comets is not radically different from the dusty component found in nonperiodic comets. The differences in the infrared behavior among these three comets suggest that a range of behaviors rather than a single behavior typifies the cometary activity. The range in albedo (0.02 to 0.10) of the dust calculated for the periodic comets is similar to the range in albedos seen among the asteroids. T.M.

N82-14002* Illinois Univ., Urbana-Champaign. Dept. of Astronomy.
RADIO OBSERVATIONS OF COMETS
L. E. Snyder *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 93-95 refs (For primary document see N82-13989 04-89)
(Grant NSF AST-79-07830)
HC SOD $16.00 CSCL 03A

Three general techniques of radio science used to attempt to observe comets are discussed: spectral line, continum and radar observations. Of these, only radio spectral line observations achieved a degree of success but, more often than not, the results was negative. Cometary excitation and reasons why radio searches can fail were examined. T.M.

N82-14003* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MILLIMETER WAVE RADIOMETRY AS A MEANS OF DETERMINING COMETARY SURFACE AND SUBSURFACE TEMPERATURE
Robert W. Hobbs, John C. Brandt, and Stephan P. Maran *In* JPL Mod. Observations Tech. for Comets 1 Oct. 1981 p 96-103 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

Thermal emission spectra for a variety of cometary nucleus models were evaluated by a radiative transfer technique adapted from modeling of terrestrial ice and snow fields. It appears that millimeter wave sensing from an interplanetary spacecraft is the most effective available means for distinguishing between alternate models of the nucleus and for evaluating the thermal state of the layer which is below the instantaneous surface where modem theories of the nucleus indicate that sublimation of the cometary volatiles actually occurs. T.M.

N82-14004* Toledo Univ., Ohio.
THE SPECTROSCOPY OF COMETS: INTRODUCTORY REMARKS
A. H. Delsemme *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 107-109 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

Emphasis in cometary spectroscopy is on production rates, because they open the door to more fundamental clues about the origin and the history of the solar system, through the understanding of comet chemistry. In order to establish production rates quantitatively, suggestion are provided, in particular: to study the lifetimes of all hypothetical parents, against all processes of decay, namely photodissociations, photoionizations and ion-molecule reactions; and to study the velocity of all molecular fragments resulting from all the decay processes, through the balance sheet of the energy distribution before and after each decay process. T.M.

N82-14005* Arizona Univ., Tucson. Lunar and Planetary Lab.
A SYSTEMATIC PROGRAM OF COMETARY SPECTROSCOPY
Stephen M. Larson and Bertram Donn *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 110-114 refs (For primary document see N82-13989 04-89)
(Grant NGL-03-002-002)
HC SOD $16.00 CSCL 03A

Some early results of a systematic program of observing the spectroscopic behavior of comets as a function of heliocentric distance are presented. An ultraviolet sensitive microchannel plate intensifier spectrograph was used to record the 3000-5000A spectrum of comets brighter than magnitude 17 with a spectral resolution of 8 or 16A, followed by direct image for better interpretation of the spatial distribution of spectral features. Although the goals of the program require much more time and data, some interesting results from Comets Schwassmann-Wachmann, 1, Bradfield and Bowell were obtained. T.M.

N82-14006* European Southern Observatory, La Silla (Chile).
OBSERVING FACILITIES AT THE EUROPEAN SOUTHERN OBSERVATORY (ESO) IN CHILE FOR COMETARY OBSERVATIONS
Gerhard F. O. Schnur, Lubos Kohoutek (Hamburger Sternwarte), and Jurgen Rahe (Remeis Sternwarte, Bamberg) *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 115-128 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

The (ESO) is located on the mountain La Silla (geographical coordinates: 4h42m55s10 west, -29 deg 15' 25'.8 south, 2400 m elevation. The size of the telescopes ranges from a 40 cm Astrograph to the 3.6 m Richey-Chretien telescope. Future telescopes are discussed: a 2.2 m RC-Telescope which will be identical with the German 2.2 m telescope on Calor Alto in SE-Spain, and a 3.5 m telescope, the New Technology Telescope. In addition to these telescopes, a great number of auxiliary instrumentation are operational. Because ESO has to serve all requests of the visiting astronomers these instruments are designed for very different applications. The telescopes and auxiliary instruments that are especially suited for cometary observations are discussed. The dicussion is divided into three parts: photography, photometry-polarimetry and spectroscopy. T.M.

N82-14007* Arizona State Univ., Tempe. Dept. of Physics.
GROUND-BASED COMETARY SPECTROSCOPY
Susan Wyckoff *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 129-137 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

The observational problems presented by bright comets near perihelion are discussed. High and low resolution spectra (3100-800A) of the bright comets Kohoutek, Kobayashi-Berger-Milon, West and d'Arrest are presented. Digital reduction of calibrated photographic spectra to relative intensity versus wavelength, can provide useful information. The reduction of comet spectra to absolute intensities involves, however, large uncertainties and should be interpreted cautiously. Data on recent comets lead to the following results: tentative identification of a new ion in the tail of comets, namely, NH(+); spectroscopic resolution of the fragmented nucleus of comet West; and an accurate monochromatic intensity profile of the Co+ emission (4020A) in comet West. T.M.

N82-14008* Maryland Univ., College Park.

CORRELATED GROUND-BASED AND THE OBSERVATIONS

Michael F. AHearn *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 138-140 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

The value of coordination among different observers particularly, those working in different wavelength regions is highlighted. This coordination is more important among observers of comets than among observers of almost any other class of astronomical object. The basic reason for this is that comets are highly time-variable, often erratically so, and observations of a particular comet usually cannot be repeated. As a result, some uncoordinated observations cannot be interpreted at all while others are susceptible to misinterpretation. Several specific examples of coordinated observations are discussed. T.M.

N82-14009* Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.

ULTRAVIOLET SPECTROSCOPY OF COMETS USING SOUNDING ROCKETS, IUE AND SPACELAB

P. D. Feldman *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 141-147 refs (For primary document see N82-13989 04-89)
(Grants NGR-21-001-001; NsG-5393)
HC SOD $16.00 CSCL 03A

Ultraviolet spectroscopy is a very powerful tool for the study of cometary atmospheres since the four elemental cosmic species, H, C, N and O, as well as several simple molecules made from these species, have their strong resonance transitions in the ultraviolet region of the spectrum. However, due to the opacity of the atmosphere to ultraviolet, these observations must be made from space. Results are presented for observations of several comets along with plans for further cometary spectroscopy. T.M.

N82-14010* Texas Univ. at Austin.

OBSERVATIONS OF FAINT COMETS AT MCDONALD OBSERVATORY: 1978-1980

E. S. Barker, A. L. Cochran, and P. M. Rybski *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 150-155 refs (For primary document see N82-13989 04-89)
(Contracts JPL-699911; JPL-708823; Grant NGR-44-012-052)
HC SOD $16.00 CSCL 03A

Modern observational techniques, developed for spectroscopy and photometry of faint galaxies and quasars, successfully applied to faint comets on the 2.7 m telescope. The periodic comets Van Biesbrock, Ashbrook-Jackson, Schwassmann-Wachmann 1, Tempel 2, Encke, Forbes, Brooks 2, Stephan-Oterma and the new comets Bradfield (19791), Bowell (1980b), Chernis-Petrauskas (1980k) were observed. The comets ranged in magnitude from 10th to 20th magnitude. For comets fainter than 19th magnitude, reflectance spectra at 100A resolution and area phptometry were obtained. On comets of 17th or 18th magnitude, spectrometric scans (6A resolution) of the nucleus or inner coma region. On those comets which are brighter than 16th magnitude spatial spectrophotometric (6A resolution) studies of the inner and extended comae were done. An extensive spatial study of the comae of P/Encke and P/Stephen-Oterma, correlated with heliocentric distance is taking place. The observing process used is described and examples of the results obtained to date are discussed. A.R.H.

N82-14011* Washington Univ., St. Louis, Mo. Dept. of Earth and Planetary Sciences.

SPECTRAL IMAGERY: RECENT RESULTS WITH THE SPIFI AND THEIR IMPLICATIONS FOR COMETARY ATMOSPHERIC STUDIES

Wm. Hayden Smith *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 156-160 refs Original document contains color illustrations (For primary document see N82-13989 04-89)
(Grant NsG-7334)
HC SOD $16.00 CSCL 03A

Spectral polarimetric imaging of comets is considered using state-of-the-art methods and a servo-controlled polarimetric imaging Fabry-Perot interferometer is described. Related observational data are shown and sensitivity levels are given which indicate the range of objects which may be studied. Some proposed observational goals are indicated. A.R.H.

N82-14012* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A POSSIBLE TECHNIQUE FOR COMETARY STUDIES WITH HIGH ANGULAR AND SPECTRAL RESOLUTION

T. R. Gull *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 161-166 (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

The echelle spectrographs, designed for and used at the Cassegrain stations of the KPNO and CTIO 4-meter telescopes, are capable of cometary spectroscopy with seeing-limited angular resolution along the slit and with spectral resolving power (lambda/delta lambda) ranging from 10 to the 4th power to 10 to the 5th power. Various gratings, cameras and detectors can be used in combination for specific studies in the 3000A to 10,000A range. A.R.H.

N82-14013* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE JOCR PROGRAM

John C. Brandt *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 171-184 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

Observational data on large-scale plasma structures in comets is of value in (1) analyzing the interaction between the solar wind and comets, (2) using comets as solar wind probes, and (3) using comets as an astrophysical plasma laboratory with the CO+ plasma serving as tracers of the magnetic field. To obtain this data, the Joint Observatory for Cometary Research was built on South Baldy in the Magdalena Mountains west of Socorro, New Mexico, at an altitude of 10,615 feet. The telescope is a 14' f/2 Schmidt camera which records an 80 deg x 10 deg field onto 4 x 5 inch plates. The camera is designed for fixed focus operation, i.e., within design limits, the focus is not a function of temperature. A vacuum platen system allows the use of film for color photography. Sample observations of comets Kohoutek, West, Kobayashi-Berger-Milon and Bradfield are interpreted. A.R.H.

N82-14014* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

NARROW PASSBAND IMAGERY OF COMETS

T. R. Gull *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 185-190 refs (For primary document see N82-13989 04-89)
HC SOD $16.00 CSCL 03A

During an emission-line survey of the Milky Way, Comet West was accidently imaged through four different narrow passbands with a wide-field, image-intensified camera. Three passbands recorded very similar head plus tail structure. The fourth passband shows an additional large, diffuse component around the head. It was serendipitous that such was recorded as the filters, being selected for studies of emission nebulae, are not particularly suited for studies of comets. However the imagery, plus subsequent studies, suggests that much can be learned about the structure of comets using narrow passband imagery simultaneously with long slit spectroscopy. Author

N82-14015* Smithsonian Astrophysical Observatory, Cambridge, Mass.

ON OBSERVING COMETS FOR NUCLEAR ROTATION

Fred L. Whipple *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 191-207 refs (For primary document see N82-13989 04-89)
(Grant NsG-7082)
HC SOD $16.00 CSCL 03A

The prevalent non-gravitational motions among comets demonstrate that the sublimination does not reach a maximum at the instant of maximum insolation on the nucleus. The occurrence of halos or 'parabolic' envelopes in the comae of some comets and of jets, rays, fans, streamers and similar phenomena very near the nucleus in the brightest comets demonstrates that the sublimation process is not uniform over the nuclei. In other words, the nuclei of many comets contain relatively small active regions which provide much or most of the sublimation when these areas are turned toward the Sun. The period of rotation can be determind by measurement of the diameters of the halos or of the latus recta of the 'parabolic' envelopes, if the expansion velocities are averaged from observations as a function of solar distance. Experience from analyses of some 80 well observed comets shows that the nuclei are 'spotted' for more than a third of all comets, regardless of the 'age' as measured by the original inverse semimajor axis including correction for planetary perturbations. A.R.H.

N82-14016* Lowell Observatory, Flagstaff, Ariz.

PHOTOGRAPHIC OBSERVATIONS OF COMETS AT LOWELL OBSERVATORY

Henry L. Giclas *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 202-212 (For primary document see N82-13989 04-89)

HC SOD $16.00 CSCL 03A

Observations of Halley's comet at Lowell Observatory cover a period from November 10, 1909 to May 17, 1911: 334 direct photographs were taken, 118 objective prism spectra, and 32 slit spectrograms of the nucleus, many of them including 5 arc minutes of the surrounding coma. Just one morning's observations are illustrated as an example of utilizing every possible resource available at the Observatory at the time. Observational improvements developed since then are described and some suggestions for the coming return of Halley's comet are made. A.R.H.

N82-14017* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

EXISTING COMETARY DATA AND FUTURE NEEDS

Jurgen Rahe *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 213-215 refs (For primary document see N82-13989 04-89)

Avail: NTIS HC SOD $16.00 CSCL 03A

To assist scientists studying comets and their interaction with the interplanetary medium, compilations of existing cometary observations and data plans for additional publication are reported. The works cited include updates and/or supplements to: (1) the Catalogue of Cometary Orbits, (2) Physical Characteristics of Comets, (3) the Atlas of Representative Cometary Spectra, (4) the Atlas Cometas-Viento Solar, (5) the Isophotometrischer Atlas der Kometen, and (6) the Atlas of Cometary Forms. An Atlas of Cometary Spectra and an Atlas of Comet Halley 1910 (II) photographs and spectra are in preparation. A.R.H.

N82-14018* Wien Univ. (Austria). Inst. for Astronomy.

OUTBURST AND NUCLEAR BREAKUP OF COMET HALLEY - 1910

H. John Wood (Indiana Univ., Bloomington) and R. Albrecht *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 216-219 refs Sponsored in part by the AAS (For primary document see N82-13989 04-89)

HC SOD $16.00 CSCL 03A

Computer processing of five plates of Comet Halley taken during the 1910 apparition shows that on May 24 strong asymmetric (with respect to the tail axis) fountain-like parabolic plumes had developed on the sunward side of the nucleus. Visual observations showed that after an initial fading while passing in front of the sun, the brightness increased to about magnitude 1. On the plates taken May 31, the nucleus is clearly divided into at least three parts of nearly equal brightness. However, the last plate on June 3 shows a symmetrical coma with a small stellar-like nucleus. Author

N82-14019* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE INTERACTIVE ASTRONOMICAL DATA ANALYSIS FACILITY - IMAGE ENHANCEMENT TECHNIQUES TO COMET HALLEY

D. A. Klinglesmith, III *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 223-231 Original document contains color illustrations (For primary document see N82-13989 04-89)

HC SOD $16.00 CSCL 03A

PDP 11/40 computer is at the heart of a general purpose interactive data analysis facility designed to permit easy access to data in both visual imagery and graphic representations. The major components consist of: the 11/40 CPU and 256 K bytes of 16-bit memory; two TU10 tape drives; 20 million bytes of disk storage; three user terminals; and the COMTAL image processing display system. The application of image enhancement techniques to two sequences of photographs of Comet Halley taken in Egypt in 1910 provides evidence for eruptions from the comet's nucleus. A.R.H.

N82-14020* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ASTRONOMICAL DATA BASES AND RETRIEVAL SYSTEMS

Jaylee M. Mead, Theresa A. Nagy (Systems and Applied Sciences Corp., Riverdale, Md.), and Wayne H. Warren, Jr. *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 232-236 refs (For primary document see N82-13989 04-89)

HC SOD $16.00 CSCL 03A

The status of the development of machine-readable stellar and extragalactic data bases is summarized, including several examples of astronomical applications using these data sets. The creation of a computerized bibliographical data base for cometary research is described. Author

N82-14021* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

NEAR PERIHELION OBSERVATIONS OF COMET HALLEY FROM SHUTTLE ORBITER

Jay T. Bergstralh *In its* Mod. Observational Tech. for Comets 1 Oct. 1981 p 241-248 refs (For primary document see N82-13989 04-89)

HC SOD $16.00 CSCL 03A

Intercept missions and the space telescope will return unique data on Comet Halley, but will leave important gaps in the observational coverage of the comet's activity, especially around the time of perihelion passage. A small package of instruments, which could be scheduled to fly on several shuttle missions, would be an effective means of extending observational coverage of Comet Halley to include the critical part of the apparition near perihelion passage. This approach would certainly be 'second best' to a dedicated orbital comet observatory. However, it would be feasible in the sense that payload space appears to be available for at least two flights during the apparition, and instruments exist, or could be modified, or are being developed, which could be integrated into a package of the required size, and which would return useful physical data on the comet. A.R.H.

N82-14022* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

LABORATORY RESEARCH

B. Donn *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 251-256 refs (For primary document see N82-13989 04-89)

HC SOD $16.00 CSCL 03A

To properly interpret the rapidly growing body of data from comet observations, many types of laboratory measurements are needed. These include: (1) molecular spectroscopy in the visible, ultraviolet, infrared and microwave region of the spectra; (2) laser fluorescent spectroscopy of photofragments; (3) laboratory cross-section or reaction rate measurements using flow tube techniques, fluorescent spectroscopy detection for neutrals and ion-molecule reaction techniques; (4) experiments to simulate solar-wind interactions with comets; (5) studies of the properties and behavior of ice mixtures; (6) experiments on the sublimation rate of ice, and the phase transition from amorphous to crystalline ice; (7) investigations of the irradiation of ice; and (8) the electron impact dissociation and excitation of molecules of cometary interest. A nearly completed experiment on the proton irradiation of ice is described. A.R.H.

N82-14023* Howard Univ., Washington, D. C.

LABORATORY MEASUREMENTS OF THE COMETARY PHOTOCHEMICAL PHENOMENA

William M. Jackson *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 257-274 refs (For primary document see N82-13989 04-89)

(Contract N00014-80-C-0306; Grant NsG-C-5071)

HC SOD $16.00 CSCL 03A

Laboratory experiments are described that provide fundamental information about photochemical processes in comets. The yield of cometary radicals such as CN, OH, etc. can be determined as a function of photolyzing wavelength. Quantum state distributions of the internal energy of the cometary radicals can also be measured as a function of wavelength permitting one to define the recoil velocity of the fragments. This type of information supplies the data needed for more elaborate models to interpret the data being obtained on comets. Author

N82-14024* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

PLANS FOR COMET HALLEY

Jurgen Rahe *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 277-283 refs (For primary document see N82-13989 04-89)

HC SOD $16.00 CSCL 03A

The configuration, trajectories, and payloads of a spinning Earthorbiting satellite designed by ESA for a post-perihelion flythrough (Giotto mission) of Comet Halley are described. Experiments approved for use on two identical three-axis stabilized Venera spacecraft destined to encounter the comet after releasing probes to Venus are listed as well as the instruments to be carried on Japan's Planet-A flyby mission. The main features launch windows are given for each spacecraft. A.R.H.

N82-14025* European Space Agency, Noordwikj (Netherlands).

THE ESA MISSION TO COMET HALLEY

R. Reinhard *In* JPL Mod. Observational Tech. for Comets 1 Oct. 1981 p 284-312 refs (For primary document see N82-13989 04-89)

HC SOD $16.00 CSCL 03A

The Europeon Space Agency's approximately Giotto mission plans for a launch in July 1985 with a Halley encounter in mid-March 1986 4 weeks after the comet's perihelion passage. Giotto carries 10 scientific experiments, a camera, neutral, ion and dust mass spectrometers, a dust impact detector system, various plasma analyzers, a magnetometer and an optical probe. The instruments are described, the principles on which they are based are described, and the experiment key performance data are summarized. The launch constraints the helicentric transfer trajectory, and the encounter scenario are analyzed. The Giotto spacecraft major design criteria, spacecraft subsystem and the ground system are described. The problem of hypervelocity dust particle impacts in the innermost part of the coma, the problem of spacecraft survival, and the adverse effects of impact-generated plasma around the spacecraft are considered. A.R.H.

N82-14026* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE INTERNATIONAL HALLEY WATCH: A PROGRAM OF COORDINATION, COOPERATION AND ADVOCACY

L. Friedman and R. L. Newburn *In its* Mod. Observational Tech. of Comets 1 Oct. 1981 p 313-314 (For primary document see N82-13989 04-89)

(Contract NAS7-100)

HC SOD $16.00 CSCL 03A

To prevent a repetition of the lack of reporting and dissemination of the data obtained during the 1910 observations of Comet Halley, a mechanism is proposed for coordinating the work of scientists and amateurs, including government, industrials, and academic personnel during the 1985-86 apparition of Comet Halley. Specialists from each discipline, in consultation with other experts in the field, would recommend specific objectives, standards, data format, and priorities for observations in that discipline. Following time for individual publication, scientists would be invited to contribute results to a multivolume compilation containing as complete as possible a record of the apparition. It is suggested that the discipline specialists be selected jointly by the IHW leader an by an international steering group with members from COSPAR, the IAU, etc., perhaps in response to some form of international announcement of opportunity. A.R.H.

N82-14027*# California Univ., Los Angeles. Dept. of Astronomy.

EVOLUTION OF CLOSE BINARY SYSTEMS: OBSERVATIONAL ASPECTS

Mirek J. Plavec Nov. 1981 22 p refs Presented at the IAU Colloq. No. 69, Binary and Multiple Stars as Tracers of Stellar Evolution, Bamberg, West Germany, Sep. 1981 Sponsored by NASA and NSF

(NASA-CR-165039; Rept-134) Avail: NTIS HC A02/MF A01 CSCL 03A

Detached close binary systems define the main sequence band satisfactorily, but very little is known about the masses of giants and supergiants. High dispersion international ultraviolet explorer satellite observations promise an improvement, since blue companions are now frequently found to late type supergiants. Mu Sagittarii and in particular Xi Aurigae are discussed in more detail. The barium star abundance anomaly appears to be due to mass transfer in interacting systems. The symbiotic stars are another type of binary systems containing late type giants; several possible models for the hotter star and for the type of interaction are discussed. The W Serpentis stars appear to be Algols in the rapid phase of mass transfer, but a possible link relating them to the symbiotics is also indicated. Evidence of hot circumstellar plasmas has now been found in several ordinary Algols; there may exist a smooth transition between very quiescent Algols and the W Serpentis stars. Beta Lyrae is discussed in the light of new spectrophotometric results. Author

N82-14028# European Southern Observatory, Munich (West Germany).

[ASTRONOMICAL ACTIVITIES REPORT] Annual Report, 1980

L. Woltjer 1980 62 p refs

(ISSN-0531-4496) Avail: NTIS HC A04/MF A01

Research, using the Schmidt telescope and the sky survey and atlas laboratories, is outlined together with joint research with the Chilean institute. Telescopes, instrumentation, and image processing facilities are reviewed, including studies on the design of a computer controlled mirror support system for a very large (3.5m) telescope, and the testing and installation of the Coude Echelle Spectrometer. Tables show the programs and institutes using the 3.6m, 1.52m, and 1m telescopes, and the Danish 1.54m and Dutch 92cm telescopes. Author (ESA)

N82-14029 Stanford Univ., Calif.

X-RAY AND ULTRAVIOLET OBSERVATIONS OF STELLAR ATMOSPHERES Ph.D. Thesis

Marie-Christine Sophie Zolcinski 1981 137 p

Avail: Univ. Microfilms Order No. 8124181

Implications of atmospheric models for the observation of stellar atmospheres are discussed. Seven of the most luminous X-ray stars were observed with the IUE observatory. Flux determinations for emission lines originating from chromospheric and transition region like temperatures for four stars and upper limits for the three other stars were obtained. Combined with the Einstein observations, this allowed calculation of a differential emission measure for each star, and to constraint atmospheric parameters such as the pressure at the top of the chromosphere, the isothermal temperature of the corona and the fraction of stellar surface covered by emitting loops. Dissert. Abstr.

N82-14030 Florida Univ., Gainesville.

OPTICAL BRIGHTNESS VARIATIONS IN A SAMPLE OF NINETEEN RADIO-QUIET QUASI-STELLAR OBJECTS Ph.D. Thesis

Patricia Louise Edwards 1981 174 p

Avail: Univ. Microfilms Order No. 8124423

Monitoring of the optical brightnesses was done to study the characteristics of the variability of the RQQSOs for comparison with the much larger sample of quasi-stellar radio sources (QSRSs). A variability index (V.I.) was computed to facilitate numerical comparisons and to check for correlation between the extent of variability and other properties of the quasistellar objects (QSOs). Of the nineteen RQQSOs studied, eight did not show evidence of variability at the confidence level of at least 95 percent. Eight objects (PHL 3632, PHL 1186, PHL 1226, BSO 1, B 154, B 234, B 312, and BSO 11) were variable at a confidence level greater than 95 percent. An additional three objects showed variability at a confidence level greater than 99.9 percent. These strongly varying objects were PHL 1194, B 46, and B 114. The proportion of RQQSOs which show variability is similar to that of the QSRs. Dissert. Abstr.

N82-14031 Ohio State Univ., Columbus.
THE TRANSFER OF POLARIZED RADIATION IN SPECTRAL LINES FROM ROTATIONALLY DISTORTED STARS Ph.D. Thesis
Sean Jeffrey McKenna 1981 182 p
Avail: Univ. Microfilms Order No. 8121830

The development of an accurate NLTE theory for the transport of polarized radiation in spectral lines with the inclusion of partial frequency redistribution of photons in the scattering process was investigated. The nature of the scattering process and the forms of the redistribution functions for model two level atoms are discussed. A NLTE theory for the transport of polarized radiation in spectral lines is derived, and is tested for lines formed in isothermal atmospheres. The theoretical line profiles and polarization structures for lines are computed for solar atmospheric conditions. There is a clear separation of the polarization maxima as the inclination of the system is varied. Using data from other spectral lines, it may be possible to determine the inclination of the rotational axis of the rapidly rotating stars, and ultimately the geometry of the emitting region. Dissert. Abstr.

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-14032# Los Alamos Scientific Lab., N. Mex.
RADIATION-HYDRODYNAMICS OF HII REGIONS AND MOLECULAR CLOUDS
M. T. Sandford, II, Rodney W. Whitaker, and Richard I. Klein 1981 7 p refs Presented at the IAU Colloq., Penticton, Canada, 24-26 Jun. 1981
(Contract W-7405-eng-36)
(DE81-028696; LA-UR-81-2320; CONF-8106140-1) Avail: NTIS HC A02/MF A01

Two-dimensional calculations of ionization-shock fronts surrounding neutral cloud clumps reveal that a radiation-driven implosion of the clump can occur. The implosion of a cloud clump results in the formation of density enhancements that may eventually form low mass stars. The smaller globules produced may become Herbig-Haro objects, or maser sources. DOE

N82-14033 Ohio State Univ., Columbus.
AN INVESTIGATION OF WARM CARBON STARS Ph.D. Thesis
Sandra Bruce Yorka 1981 191 p
Avail: Univ. Microfilms Order No. 8121876

Warm carbon stars were investigated with narrow band photometric systems designed to measure band strengths of NH, CN, CH, and C2, an index of the C12/C13 ratio, and the color temperature. It is shown from molecular indices for R, CH, CH like, and barium stars as compared to G and K giants that the barium stars have slightly higher C/O ratios than normal field giants and, though they are N-enriched with respect to the sun, they generally are not as N enriched as the field giants. A comparison of the photometry with model atmospheres shows the energy distribution of the R stars in the near IR, but are underblanketed in the UV. It is found that the R stars have nitrogen abundances somewhat lower than those of the giants. Dissert. Abstr.

N82-14034 California Univ., Los Angeles.
RADIATIVELY COOLED STELLAR WINDS Ph.D. Thesis
Pornchai Pacharintanakul 1981 173 p
Avail: Univ. Microfilms Order No. 8122831

An approach to solving time dependent hydrodynamics in spherical gemoetry was developed and used to solve the evolutionary models for mass loss rates above the limit. It is found that the flow stops, due to excessive cooling, within the flow time scale. After that the one dimensional spherical symmetry model might be invalid because of the thermal instability and the development of shocks and/or turbulence and a three dimensional model is needed. Results of both steady state and evolutionary calculations of hydrodynamics in spherical geometry are discussed. Dissert. Abstr.

N82-14035 Yale Univ., New Haven, Conn.
INTERMEDIATE BAND SURFACE PHOTOMETRY OF ELLIPTICAL GALAXIES Ph.D. Thesis
Robert James Boyle 1981 239 p
Avail: Univ. Microfilms Order No. 8124348

Detailed surface photometry of two normal elliptical galaxies, NGO 3379 and NGC 4406 was developed. The present structure of elliptical galaxies contains clues to the physical processes which played an important role in their early evolution. The photometric system provides six indicies measuring a variety of absorption and continuum features. The color profiles of these galaxies reveal two distinct classes of color and band strength gradients. A number of population syntheses were carried out using the color profiles derived for NGC 3379. The existence of an inflection point in the luminosity profile of the archetypal elliptical NGC 3379, is confirmed. The excess luminosity or bulge in the luminosity profile which gives rise to this inflection point can be adequately represented by a very broad gaussian. Dissert. Abstr.

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-14036 Washington Univ., St. Louis, Mo.
POTASSIUM-ARGON AND IODINE-XENON GAS RETENTION AGES OF ENSTATITE CHONDRITE METEORITES Ph.D. Thesis
Burton Mack Kennedy 1981 311 p
Avail: Univ. Microfilms Order No. 8122742

Chondritic meteorites are generally considered to represent the most chemically primitive solar system material presently available for analysis. Due to their primitive nature, they preserve a record of the early solar system history and provide a substantial contribution to the knowledge of the events which characterized the early history of the solar system. The enstatite chondrites are a very unusual and rare group of meteorites characterized by a high degree of reduction. Radiometric ages of meteoritic material accordingly provide important data for the evaluation of early solar system history by establishing a time scale over which various discrete and/or episodic events have occurred. The potassium-argon an iodine zenon radiometric dating techniques were applied to a suite of enstatite chondrite meteorites. Dissert. Abstr.

N82-14037*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PLANETARY RADIO ASTRONOMY OBSERVATIONS FROM VOYAGER-2 NEAR SATURN
J. W. Warwick, D. R. Evans, J. H. Romig, J. K. Alexander, M. D. Desch, M. L. Kaiser, M. Aubier, Y. Leblanc, A. Lecacheux, and B. M. Pedersen Nov. 1981 22 p refs Submitted for publication Prepared in cooperation with Radiophysics, Inc., Boulder, Colo. and Observatoire de Paris, Meudon, France
(Contract NAS7-100)
(NASA-TM-83856) Avail: NTIS HC A02/MF A01 CSCL 03B

Voyager-2 planetary radio astronomy measurements obtained near Saturn are discussed. They indicate that Saturnian kilometric radiation is emitted by a strong, dayside source at auroral latitudes in the Northern Hemisphere and by a weaker (by more than an order of magnitude) source at complementary latitudes in the

Southern Hemisphere. These emissions are variable both due to Saturn's rotation and, on longer time scales, probably due to influences of the solar wind and the satellite Dione. The Saturn electrostatic discharge bursts first discovered by Voyager-1 and attributed to emissions from the B-ring were again observed with the same broadband spectral properties and a 10(h)11(m) + or - 5(m) episodic recurrence period but with an occurrence frequency of only of about 30 percent of that detected with Voyager-1. During the crossing of the ring plane at a distance of 2.88 R sub S, an intense noise event is interpreted to be consequence of the impact/vaporization/ionization of charged micron-size G-ring particles distributed over a total vertical thickness of about 1500 km. B.W.

N82-14038*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATURNIAN KILOMETRIC RADIATION: SOURCE LOCATIONS
M. L. Kaiser and M. D. Desch Nov. 1981 20 p refs Submitted for publication
(NASA-TM-83846) Avail: NTIS HC A02/MF A01 CSCL 03B

The surce locations of both polariation components of the Saturn kilometer wavelength radiation were deduced using Voyager 1 and Voyager 2 planetary radio astronomy data and assumptions about radiation beam geometry. Radio source footprints were compared with the surface locations of Saturns ultraviolet aurorae, its polar cap boundary, and its polar cusp. R.J.F.

N82-14039*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
ASTROMETRIC OBSERVATIONS OF COMETS AND ASTEROIDS AND SUBSEQUENT ORBITAL INVESTIGATIONS Semiannual Progress Report, 1 May - 31 Oct. 1981
Richard E. McCrosky and Brian G. Marsden Nov. 1981 14 p refs
(Grant NGR-09-015-212)
(NASA-CR-165004; SAPR-16) Avail: NTIS HC A02/MF A01 CSCL 03B

Comets and minor planets were observed with a 155 cm reflector. Their orbital positions are presented in tabular form. S.L.

N82-14040*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CATALOG OF LUNAR MARE BASALTS GREATER THAN 40 GRAMS. PART 1: MAJOR AND TRACE CHEMISTRY, WITH MEGASCOPIC DESCRIPTIONS AND ROCK AND THIN SECTION PHOTOGRAPHS
Gary E. Lofgren and Ellen M. Lofgren (Lunar and Planetary Inst.) Aug. 1981 420 p refs
(NASA-TM-84065; LPI-Contrib-438) Avail: NTIS HC A18/MF A01 CSCL 03B

Megascopic descriptions of 133 basaltic rocks returned from the Moon are presented along with photographs of each rock and its thin section, if available. The major and trace element chemistry of each is included wherever possible. A.R.H.

N82-14041*# National Aeronautics and Space Administration, Washington, D. C.
REPORTS OF PLANETARY GEOLOGY PROGRAM, 1981
Henry E. Holt, comp. Dec. 1981 580 p refs
(NASA-TM-84211) Avail: NTIS HC A25/MF A01 CSCL 03B

Abstracts of 205 reports from Principal investigators of NASA's Planetary Geology Program succinctly summarize work conducted and reflect the significant accomplishments. The entries are arranged under the following topics: (1) Saturnian satellites; (2) asteroids, comets and Galilean satellites; (3) cratering processes and landform development; (4) volcanic processes and landforms; (5) Aerolian processes and landforms; (6) fluvial, preglacial, and other processes of landform development; (7) Mars polar deposits, volatiles, and climate; (8) structure, tectonics, and stratigraphy; (9) remote sensing and regolith chemistry; (10) cartography and geologic mapping; and (11) special programs. A.R.H.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-14042# Nagoya Univ., Toyokawa (Japan).
A TRIGGERING OF SOLAR FLARE BY MAGNETOSONIC WAVES IN A NEUTRAL SHEET PLASMA
Jun-Ichi Sakai and Haruichi Washimi Sep. 1981 31 p refs
(IPPJ-540) Avail: NTIS HC A03/MF A01

A theoretical model of the triggering of a solar flare by magnetosonic waves in a neutral sheet plasma is discussed. It is shown that the ponderomotive force due to the magnetosonic waves strongly excites the plasma convection flow in the magnetic neutral sheet which in turn enhances the tearing instability. The system of basic equations for the tearing mode including the time-averaged nonlinear effects due to the magnetosonic waves is derived and the boundary value problem is solved. The results show that the growth time of the instability is shortened to about 100 sec for reasonable magnetosonic wave intensity. Author

N82-14043*# Hawaii Univ., Honolulu. Inst. for Astronomy.
SUBMILLIMETER OBSERVATIONS OF SOLAR LIMB-BRIGHTENING IN THE TOTAL SOLAR ECLIPSE OF 31 JULY 1981 Final Technical Report, 1 Oct. 1980 - 30 Sep. 1981
Eric E. Becklin, John T. Jefferies, Charles Lindsey, Frank Orrall, Ian Gatley, and Michael Werner 30 Sep. 1981 3 p
(NASA-CR-165023; Grant NAG2-59)
Avail: NTIS HC A02/MF A01 CSCL 03B

Eight flights of the Kuiper Airborne Observatory (KAO) were devoted to solar observation. The successful observation of a total solar eclipse was accomplished. The observations were made simultaneously at 30, 50, 100, and 200 microns. The successful adaptation of the KAO for solar observations thus provided the most detailed data to date in this spectral band. The results from a preliminary analysis of the KAO data are summarized: (1) the 200 micron limb is extended about 3 arc sec above the 30 micron limb, indicating the prescence of cool dense material up to the altitudes of spicules; (2) strong radial darkening of the quiet sun intensity profile appeared at 200 microns, probably an indication that hot material in the low chromosphere is recessed into vertical magnetic flux tubes embedded in a cooler nonmagnetic substrate, which obscures the heated material approaching the limb; (3) active regions were observed to undergo a strong increase in contrast above the quiet sun background at wave lengths of 100 microns and longer; and (4) the moon was mapped for use as a photometric standard for determining the absolute intensity of the sun in all four wavelength bands. N.W.

N82-14044# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Data and Information Service.
SOLAR-GEOPHYSICAL DATA. PROMPT REPORT, PART 1
Helen E. Coffey Mar. 1981 184 p
(PB81-221178; NOAA-81050602-Pt-1; SGD-439-Pt-1) Avail: NTIS HC A09/MF A01 CSCL 03B

In addition to an index for 1980-1981, this prompt report provides data for February 1981 on: alert periods, daily solar indices, solar flares, solar radio emission, inferred interplanetary magnetic field polarities, mean solar magnetic field, coronal holes and the Boulder geomagnetic substorm log. It also provides data for January 1981 on: daily solar activity centers, sudden ionospheric disturbances, spacecraft observations, solar radio emission, cosmic rays, geomagnetic indices and radio propagation indices. Late data includes solar radio emission for January 1981, cosmic rays Huancayo November, December 1980, geomagnetic indices for December 1980, and errata for December 1980 regions of solar activity. GRA

N82-14045# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Data and Information Service.
SOLAR-GEOPHYSICAL DATA. COMPREHENSIVE REPORTS, PART 2
Helen E. Coffey, ed. Mar. 1981 131 p
(PB81-221186; NOAA-81050603-Pt-2; SGD-439-Pt-2) Avail: NTIS HC A07/MF A01 CSCL 03B

In addition to an index for 1980-1981, this issue of comprehensive reports provides data for September 1980 on: solar radio emission, solar X-ray radiation, and mass ejections from the sun. The daily flare index and the regional flare index appear 13 and 14 months from the date of observation. This report includes solar flares for September 1979 and for October 1979. Miscellaneous data includes: active regions July 5-August 29, 1980, synoptic solar maps July 5 - August 29, 1980, and the regional flare index for August 1979. GRA

N82-14046# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Data and Information Service.
SOLAR-GEOPHYSICAL DATA. EXPLANATION OF DATA REPORTS
Feb. 1981 94 p
(PB81-221194; NOAA-81050601-Suppl; SGD-438-Suppl.)
Avail: NTIS HC A05/MF A01 CSCL 03B

A complete index for data since July 1957 is presented. Data in the monthly publication, Solar-Geophysical Data are described and explained in an effort to keep research workers informed on a timely schedule of the major events of solar activity and the associated interplanetary, ionospheric, radio propagation and other geophysical effects. GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

No abstracts in this category.

99 GENERAL

N82-14047*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
REPORT ON RESEARCH AND TECHNOLOGY-FY 1981
Annual Report
Nov. 1981 39 p
(NASA-TM-81367) Avail: NTIS HC A03/MF A01 CSCL 05A

More than 65 technical reports, papers, and articles published by personnel and contractors at the Dryden Flight Research Center are listed. Activities performed for the Offices of Aeronautics and Space Technology, Space and Terrestrial Applications, Space Transportation Systems, and Space Tracking and Data Systems are summarized. Preliminary stability and control derivatives were determined for the shuttle orbiter at hypersonic speeds from the data obtained at reentry. The shuttle tile tests, spin research vehicle nose shapes flight investigations, envelope expansion flights for the Ames tilt rotor research aircraft, and the AD-1 oblique wing programs were completed as well as the KC-135 winglet program. A.R.H.

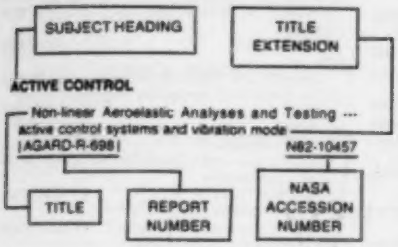
N82-14048# California Univ., Livermore Lawrence Livermore Lab.
LLNL 1981: TECHNICAL HORIZONS
Jul. 1981 49 p
(Contract W-7405-eng-48)
(DE81-028265; UCRL-52000-81-7) Avail: NTIS HC A03/MF A01

Research programs are described in broad terms. A $481 million operating budget is projected for fiscal year 1982, up nearly 13% from last year. In projects for the Department of Energy and the Department of Defense, the Laboratory applies its technical facilities and capabilities to nuclear weapons design and development and other areas of defense research that include inertial confinement fusion, nonnuclear ordnances, and particle-beam technology. LLNL is also applying its unique experience and capabilities to a variety of projects that will help the nation meet its energy needs in an environmentally acceptable manner. DOE

SUBJECT INDEX

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 20 NUMBER 4

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7050).

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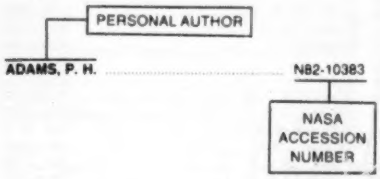

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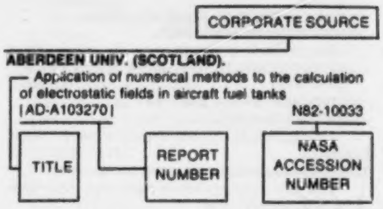
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Digital Equation Corporation PDP-11 COBOL, version 4.1 [PB81-232423] N82-13746

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HAWAII UNIV. AT MANOA, HONOLULU.
Five-year Hawaii water research agenda, 1982-1987
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The internal structure of the magnetopause
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INSTITUT DE MECANIQUE DES FLUIDES DE LILLE (FRANCE).
Transonic flows in an air inlet with large incidence and the effect of a blowing trap N82-13071

INSTITUTE FOR DEFENSE ANALYSES, ARLINGTON, VA.
Helicopter reliability and maintainability trends during development and production
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SEPAC software configuration control plan and procedures, revision 1
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Five-year water resources research plan, 1982-1987
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JOINT RESEARCH CENTRE OF THE EUROPEAN COMMUNITIES, ISPRA (ITALY).

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KYOTO UNIV. (JAPAN).

Toroidal plasma current sustainment by lower hybrid waves in the WT-2 Tokamak
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Endurance test and evaluation of alkaline water electrolysis cells
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LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.

Data report for the northeast residential experiment station, June 1981
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LINKABIT CORP., SAN DIEGO, CALIF.

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MASSACHUSETTS INST. OF TECH., CAMBRIDGE.

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MATHTECH, INC., PRINCETON, N. J.

Environmental impacts of energy transportation
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MAX-PLANCK-INSTITUT FUER AERONOMIE, KATLENBURG-LINDAU (WEST GERMANY).

Two-satellite study of proton drift on quiet days
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MAX-PLANCK-INSTITUT FUER KERNPHYSIK, HEIDELBERG (WEST GERMANY).

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MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).

Investigation of the vortex field generated by an airfoil model in a wind tunnel, using ultrasonic pulses
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Statistical energy analysis computer program, user's guide
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MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.

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MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., HAMBURG (WEST GERMANY).

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MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).

Concept and feasibility study (phase A) for the X-ray satellite ROBISAT. Executive summary
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MESSERSCHMIDT-BOELKOW G.M.B.H., MUNICH (WEST GERMANY).

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METEOROLOGY RESEARCH, INC., SANTA ROSA, CALIF.

Aircraft data summaries for the SURE intensives, volume 6
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MICHIGAN STATE UNIV., EAST LANSING.

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MINNESOTA UNIV., MINNEAPOLIS.

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MOTOREN- UND TURBINEN-UNION MUENCHEN G.M.B.H. (WEST GERMANY).

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MRC APPLIED PSYCHOLOGY UNIT, CAMBRIDGE (ENGLAND).

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Toroidal plasma current sustainment by lower hybrid waves in the WT-2 Tokamak
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.

Aeronautical engineering: A continuing bibliography with indexes, supplement 140
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Mission operation report: INTELSAT V-C(F-3)
[NASA-TM-84072] N82-13162

Reports of Planetary Geology Program, 1981
[NASA-TM-84211] N82-14041

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.

Top-mounted inlet system feasibility for transonic-subsonic fighter aircraft applications
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Crossflow effects on steady and fluctuating pressures on an ogive-cylinder cone-frustum model in supersonic separated flow
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Analysis of a longitudinal pilot-induced oscillation experienced on the approach and landing test of the space shuttle
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.

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Catalog of lunar mare basalts greater than 40 grams. Part 1: Major and trace chemistry, with megascopic descriptions and rock and thin section photographs
[NASA-TM-84065] N82-14040

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. JOHN F. KENNEDY SPACE CENTER, COCOA BEACH, FLA.

Launch mission summary: Intelsat 5 (F3) Atlas/Centaur-55
[NASA-TM-84068] N82-13161

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.

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Wind-tunnel investigation of the tail-spoiler concept for stall-prevention on general aviation airplanes
[NASA-TM-83208] N82-13047

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Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13110

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Determination of two-stroke engine exhaust noise by the method of characteristics
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Computational methods for internal flows with emphasis on turbomachinery
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NATIONAL AEROSPACE LAB., TOKYO (JAPAN).

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Materials studies for magnetic fusion energy applications at low temperatures -4
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Review of fire test methods and incident data for portable electric cables in underground coal mines
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Pedestrian movement characteristics on building ramps
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NATIONAL GAS TURBINE ESTABLISHMENT, PYESTOCK (ENGLAND).

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Report of survey for McDonald Observatory, Harvard Radio Astronomy Station, and vicinity
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Environmental effects of pollutants from coal combustion. 1: The Four Corners Power Plant, Farmington, N.M.
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Environmental effects of pollutants from coal combustion. 2: The Colstrip, Montana Power Plant
[PB81-234114] N82-13573

Environmental assessment of the Alaskan Continental Shelf: Annual reports of principal investigators for the year ending March 1980. Volume 5: Hazards
[PB81-225732] N82-13607

Geophysical monitoring for climatic change, number 8: Summary Report, 1979
[PB81-233355] N82-13631

Hawaii Mesoscale Energy and Climate project (HAMEC). 3: Atmospheric aerosol and cloud microphysics measurements
[PB81-231482] N82-13633

Solar-geophysical data. Prompt report, part 1
[PB81-221178] N82-14044

Solar-geophysical data. Comprehensive reports, part 2
[PB81-221186] N82-14045

Solar-geophysical data. Explanation of data reports
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.

Deep Ocean Mining Environmental Study. Environmental effects of commercial-scale mining
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SILVER SPRING, MD.

Atmospheric dispersion forecasts at selected locations in the United States
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NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).

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NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.
Effects of the Satellite Power System on low Earth orbit and geosynchronous satellites
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NATIONAL WEATHER SERVICE, HONOLULU, HAWAII.
Some mean characteristics of Central North Pacific tropical cyclones
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NATIONAL WEATHER SERVICE, SALT LAKE CITY, UTAH.
Annual data and verification tabulation, eastern North Pacific tropical storms and hurricanes 1980
[PB81-230336] N82-13636

NATIONAL WEATHER SERVICE, SILVER SPRING, MD.
National Weather Service public forecast verification
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High latitude measurements of the Total Electron Content (TEC) using the Faraday technique and comparisons with TEC estimates from NAVSTAR-GPS data
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OBSERVATOIRE DE PARIS-MEUDON (FRANCE).

Planetary radio astronomy observations from Voyager-2 near Saturn
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OCCIDENTAL RESEARCH CORP., IRVINE, CALIF.

Controlled-flash pyrolysis
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OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).

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PARIS XII UNIV., EVRY (FRANCE).

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PUBLIC SERVICE CO. OF INDIANA, PLAINFIELD.

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RADIOPHYSICS, INC., BOULDER, COLO.

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Environment simulator for radar signals on the digital level
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RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM (SWEDEN).

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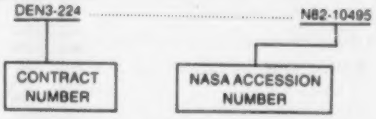

Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

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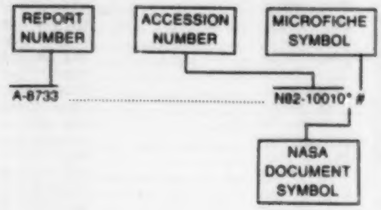

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>
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73 NUCLEAR AND HIGH-ENERGY PHYSICS 700

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

74 OPTICS 701

Includes light phenomena.

75 PLASMA PHYSICS 703

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS 705

Includes superconductivity.

For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS 707

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) 708

Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT 708

Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **709**

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **711**

Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **N.A.**

Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **712**

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.

For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **713**

89 ASTRONOMY **714**

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **714**

Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **715**

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **N.A.**

Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **N.A.**

Includes cosmic radiation; and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL **716**

Note: N.A. means that no abstracts were assigned to this category for this issue.

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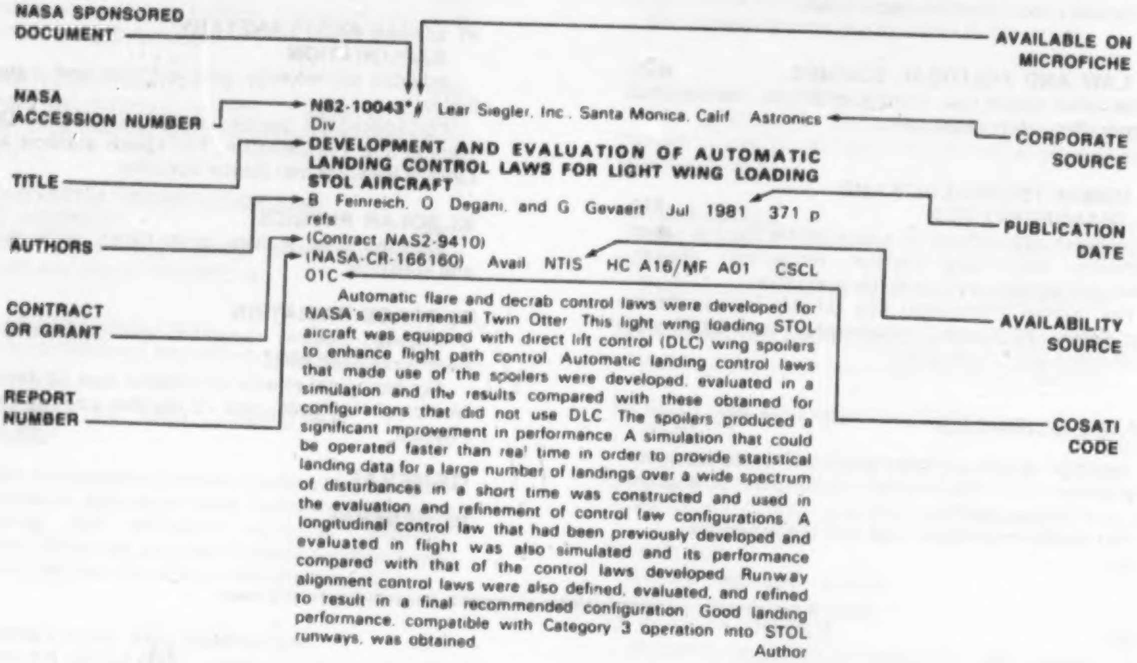
TYPICAL CITATION AND ABSTRACT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N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.

DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT

B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs

(Contract NAS2-9410)

(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained.

Author

VOLUME 20 NUMBER 5 MARCH 8, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-14049*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
OPTIMIZATION AND PERFORMANCE CALCULATION OF DUAL-ROTATION PROPELLERS
Robert E. Davidson Dec. 1981 48 p refs
(NASA-TP-1948; L-14678) Avail: NTIS HC A03/MF A01 CSCL 01A

An analysis is given which enables the design of dual-rotation propellers. It relies on the use of a new tip loss factor deduced from T. Theodorsen's measurements coupled with the general methodology of C. N. H. Lock. In addition, it includes the effect of drag in optimizing. Some values for the tip loss factor are calculated for one advance ratio. Author

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-14050# Institut fuer Theoretische Stroemungsmechanik, Goettingen (West Germany).
COMPUTATION OF SUBSONIC FLOW AROUND AIRFOIL SYSTEMS WITH MULTIPLE SEPARATION
Klaus Jacob 1981 63 p refs In GERMAN
(DFVLR-FB-81-24) Avail: NTIS HC A04/MF A01

A numerical method for computing the subsonic flow around multielement airfoil systems was developed, allowing for flow separation at one or more elements. Besides multiple rear separation, short bubbles on the upper surface and cove bubbles are taken into account. Compressibility effects for pure subsonic flow are approximately accounted for. S.L.

N82-14051*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYTIC INVESTIGATION OF EFFECT OF END-WALL CONTOURING ON STATOR PERFORMANCE
Robert J. Boyle, Harold E. Rholik, and Louis J. Goldman Nov. 1981 12 p refs
(NASA-TP-1943; E-719) Avail: NTIS HC A02/MF A01 CSCL 01A

Calculations show improved stator performance when the tip end wall was contoured so that the inlet area was greater than the exit area. Comparisons are made with previously published experimental data. The results of a parametric analysis of the effect contour geometry on the efficiency of a highly loaded axial stator are given. The maximum stator efficiency gain is about 0.8 percentage point, and this represents a 22 percent reduction in stator losses. The degree to which endwall contouring reduces the forces driving secondary flows was also examined. The driving forces for both cross channel and radial secondary flow were reduced. T.M.

N82-14052*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF AXISYMMETRIC SUPERSONIC CRUISE NOZZLE GEOMETRY AT MACH NUMBERS FROM 0.60 TO 1.30
George T. Carson, Jr. and Edwin E. Lee, Jr. Dec. 1981 89 p refs
(NASA-TP-1953; L-14661) Avail: NTIS HC A04/MF A01 CSCL 01A

Quantitative pressure and force data for five axisymmetric boattail nozzle configurations were examined. These configurations simulate the variable-geometry feature of a single nozzle design operating over a range of engine operating conditions. Five nozzles were tested in the Langley 16-Foot Transonic Tunnel at Mach numbers from 0.60 to 1.30. The experimental data were also compared with theoretical predictions. B.W.

N82-14053*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STABILITY AND CONTROL CHARACTERISTICS OF A MONOPLANAR MISSILE CONFIGURATION WITH TRI-FORM-TAIL-FIN ARRANGEMENTS AT MACH NUMBERS FROM 1.70 TO 2.86
Milton Lamb Dec. 1981 119 p refs
(NASA-TM-83223; L-14724) Avail: NTIS HC A06/MF A01 CSCL 01A

A wind-tunnel missile model with either a lower vertical tail fin with a pair of horizontal fins having 0 deg, 22.5 deg, or 30 deg dihedral or an upper vertical tail fin with horizontal fins having 0 deg, -22.5 deg, or -30 deg dihedral was investigated. The results indicated that those configurations with horizontal fins at or below the horizontal plane had nearly linear pitching-moment characteristics, while those with the horizontal fins above the horizontal plane experienced pitch-up which increased with increasing horizontal-fin-dihedral angle. At zero angle of attack, the configurations were directionally stable at most test Mach numbers. Generally, those configurations with the upper vertical fin had positive effective dihedral at zero angle of attack, while those with he lower vertical fin had negative effective dihedral. For roll control, three deflected tail fins produced more total roll control than two horizontal fins. For yaw control, three tail fins deflected equally or differentially produced more total yaw control than the single vertical fin. B.W.

N82-14054*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRESSURE DISTRIBUTIONS AND SHOCK SHAPES FOR 12.84 DEG/7 DEG ON-AXIS AND BENT-NOSE BICONICS IN AIR AT MACH 6
Charles G. Miller, III and Peter A. Gnoff Dec. 1981 127 p refs
(NASA-TM-83222; L-14896) Avail: NTIS HC A07/MF A01 CSCL 01A

Pressure distributions and shock shapes on a spherically

blunted, 12.84 deg /7 deg on axis biconic and a spherically blunted, 12.84 deg/7 deg bent nose biconic at Mach 6 in air were measured. The angle of attack, referenced to the axis of aft cone, was varied from 0 deg to 25 deg in nominal 5 deg increments. Two values of free stream Reynolds number based on model length were tested. Predictions from simple, theories and from a supersonic, three dimensional, external invsicid code (STEIN) are compared with measured values. Predicted STEIN shock shapes and windward pressures are in agreement with measured values for both biconics over the present range of angle of attack.
E.A.K.

N82-14055*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

COMPARISON OF EXPERIMENTAL AND THEORETICAL TURBULENCE REDUCTION CHARACTERISTICS FOR SCREENS, HONEYCOMB, AND HONEYCOMB-SCREEN COMBINATIONS

James Scheiman Dec. 1981 55 p refs
(NASA-TP-1958; L-14628) Avail: NTIS HC A04/MF A01 CSCL 01A

Turbulence reduction research using screens, honeycomb, and combinations thereof was conducted in a half-scale model of a portion of the Langley 8-foot transonic pressure tunnel. It was found that screens alone reduce axial turbulence more than lateral turbulence; whereas, honeycomb alone reduces lateral turbulence more than axial turbulence. Because of this difference, the physical mechanism for decreasing turbulence for screens and honeycomb must be completely different. It is concluded that honeycomb with a downstream screen is an excellent combination for reducing turbulences.
E.A.K.

N82-14056*# National Aeronautics and Space Administration, Washington, D. C.

SYSTEM FOR ACQUISITION AND ANALYSIS OF DYNAMIC TESTS ON AIR INTAKES

P. Perrier, B. Delahaye (SNECMA, Moissy-Cramayel, France), and G. Laruelle (ONERA, Paris) Dec. 1981 54 p refs Transl. into ENGLISH of "Systeme d'Acquisition et d'Analyse pour Essais Dynamiques d'Entees d'Air", Rept. ONERA-TP-1981-37 ONERA, France, 1981 15 p Presented at the AGARD Symp. on Aerodyn. of Power Plant Installation, Toulose, 11-14 May 1981 Original language document was announced as A81-39240 Transl. by Scientific Translation Service, Santa Barabara, Calif. Original doc. prep. by Avions Marcel Dassault-Brequet Aviation
(Contract NASw-3542)
(NASA-TM-76646) Avail: NTIS HC A04/MF A01 CSCL 01A

The problem of compatibility between the airflow developed through the aircraft's air intake ducting and its suitability to the jet engine are studied. A review of the various functions of the air intake is presented. A proposed solution to measure the various parameters is described. The specifications and details of the system permit measurements with a satisfactory reliability on the test bench, as well as in the wind tunnel or in flight.
R.J.F.

N82-14057*# National Aeronautics and Space Administration, Washington, D. C.

EXPERIMENTAL INVESTIGATION OF A TRANSONIC POTENTIAL FLOW AROUND A SYMMETRIC AIRFOIL

W. J. Hiller and G. E. A. Meier Dec. 1981 26 p refs Transl. into ENGLISH from Rept. 10/1971 Max-Planck Inst. fuer Stroemungsforschung, Goettingen, W. Germany, Nov. 1971 22 p Original language document was announced as N72-19996 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76676; Rept-10/1971) Avail: NTIS HC A03/MF A01 CSCL 01A

Experimental flow investigations on smooth airfoils were done using numerical solutions for transonic airfoil streaming with shockless supersonic range. The experimental flow reproduced essential sections of the theoretically computed frictionless solution. Agreement is better in the expansion part of the of the flow than in the compression part. The flow was nearly stationary in the entire velocity range investigated.
Author

N82-14058*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

A FLIGHT INVESTIGATION OF BLADE-SECTION AERODYNAMICS FOR A HELICOPTER MAIN ROTOR HAVING 10-64C AIRFOIL SECTIONS

Charles E. K. Morris, Jr. Nov. 1981 181 p refs
(NASA-TM-83226) Avail: NTIS HC A09/MF A01 CSCL 01A

Pressure data at 90 percent blade radius were obtained for a helicopter main rotor with 10-64C blade sections during flight. Concurrent measurements were made of vehicle flight state, performance and some rotor loads. The test envelope included hover, level flight from about 65 to 162 knots, climb and descent, and collective fixed maneuvers. Good agreement is shown between some sets of airfoil pressure distributions obtained in flight and those from two-dimensional wind-tunnel tests or theoretical calculations.
A.R.H.

N82-14059*# Low Energy Transport Systems, Capistrano Beach, Calif.

LOW REYNOLDS NUMBER AIRFOIL SURVEY, VOLUME 1 Final Report

B. H. Carmichael Nov. 1981 106 p refs
(NASA Order L-40598)
(NASA-CR-165803-Vol-1) Avail: NTIS HC A06/MF A01 CSCL 10A

The differences in flow behavior two dimensional airfoils in the critical chordlength Reynolds number compared with lower and higher Reynolds number are discussed. The large laminar separation bubble is discussed in view of its important influence on critical Reynolds number airfoil behavior. The shortcomings of application of theoretical boundary layer computations which are successful at higher Reynolds numbers to the critical regime are discussed. The large variation in experimental aerodynamic characteristic measurement due to small changes in ambient turbulence, vibration, and sound level is illustrated. The difficulties in obtaining accurate detailed measurements in free flight and dramatic performance improvements at critical Reynolds number, achieved with various types of boundary layer tripping devices are discussed.
E.A.K.

N82-14060# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ACTA MECHANICA SINICA (SELECTED ARTICLES)

20 Oct. 1981 37 p refs Transl. into ENGLISH from Acta Mech. Sinica (Communist China), no. 3, 1980 p 217-231, 302-310
(AD-A107322; FTD-ID(RS)T-0709-81) Avail: NTIS HC A03/MF A01 CSCL 01/1

Simplified Navier-Stokes equations, their mathematical properties, and equations of flight mechanics used in analyzing the effects of wind and atmospheric turbulence on flight performance are presented. Lifting surface theory for wings in low frequency small amplitude yawing and side slipping oscillating motions at low speeds is also presented. For individual titles, see N82-14061 through N82-14063.

N82-14061# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

LIFTING SURFACE THEORY FOR WINGS IN LOW FREQUENCY SMALL AMPLITUDE YAWING AND SIDE SLIPPING OSCILLATING MOTIONS AT LOW SPEEDS

Huang Mingke *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0709-81) 20 Oct. 1981 p 1-15 refs Transl. into ENGLISH from Acta Mech. Sinica (Communist China), no. 3, 1980 p 217-231, 302-310 (For primary document see N82-14060 06-02)
Avail: NTIS HC A03/MF A01 CSCL 01/1

The mathematical problem of flow at low speeds past a yawing oscillating wing set up by using a coordinate system fixed in the wing is discussed. The snake-like tail vortices behind the wing are investigated in detail. In the case of low frequency oscillations, numerical solution is obtained by the non-steady vortex-lattice method which can be used to calculate the rolling moment aerodynamic derivatives of the wing due to yaw and side slip. Some of the computed results are compared with the experimental results.
Author

N82-14062# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SIMPLIFIED NAVIER-STOKES EQUATIONS AND THEIR MATHEMATICAL PROPERTIES

Wang Ruquan, Liu Xue Zong, Jiao Luquong, and Gao Zhi *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 20 Oct. 1981 p 16-27 refs Transl. into ENGLISH from Acta Mech. Sinica (Communist China), no. 3, 1980 p 217-231, 302-310 (For primary document see N82-14060 05-02)
HC A03/MF A01 CSCL 01/1

Two-dimensional simplified Navier-Stokes equations are analyzed qualitatively. It is concluded that the above equations are ill-posed when the tangential flow velocity component u < c(c) is the local sound velocity. Hence, instability arises in numerical solutions. The proper specification of initial and boundary value conditions of supersonic viscous flow around a sphere-cone body is also discussed. Author

N82-14063# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

EQUATIONS OF FLIGHT MECHANICS CONSIDERING ATMOSPHERIC TURBULENCE

Jiang Yu-xian *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 20 Oct. 1981 p 28-34 refs Transl. into ENGLISH from Acta Mech. Sinica (Communist China), no. 3, 1980 p 217-231, 302-310 (For primary document see N82-14060 05-02)
Avail: NTIS HC A03/MF A01 CSCL 01/1

The effect of wind on the flight performance, starting from the difference between the relative motion and the absolute motion, is discussed. The general form of the flight mechanics equations with wind are derived. The vector forms of the weight, air speed, ground speed, wind speed, aerodynamic force, thrust, aerodynamic moment, angular velocity relative to the air, angular velocity relative to the ground of the flying vehicle and the angular velocity of the air are simplified for fflight mechanics equations. The body coordinate system is Oxyz and the inertial coordinate system is O sub g x sub g y sub g z sub g. It is concluded that the relative motion and the absolute motion of the equations of flight mechanics with wind should be distinguished. M.D.K.

N82-14064# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. High Speed Aero Performance Branch.

EVALUATION OF USSAERO AND HABP COMPUTER CODES FOR AERODYNAMIC PREDICTIONS FOR SLENDER BODIES Final Report, Oct. 1979 - Jul. 1980

Jack I. Flaherty Sep. 1981 105 p refs
(AF Proj. 2404)
(AD-A106065; AFWAL-TR-81-3035) Avail: NTIS
HC A06/MF A01 CSCL 20/4

This study has been conducted to evaluate the merits and limitations of a subsonic and a supersonic analysis method used frequently in Government and Industry for predicting aerodynamic characteristics. Specifically the Unified Subsonic-Supersonic Aerodynamic Computer Program (USSAERO) was evaluated at Mach 0.4 for the subsonic case. The Supersonic-Hypersonic Arbitrary Body Program (HABP) was evaluated for the supersonic case beginning at a low Mach number of 1.50 and systematically increasing to Mach 4.63. Model geometries have been restricted to simple axisymmetric ogive forebody cylindrical afterbody combinations to aid in the relative comparison of the method capabilities. For the supersonic comparisons a data base was selected that featured a wide variety of nose bluntness and fineness ratios to determine their impact on the analysis capabilities. Specific limitations of the methods are identified from comparisons with detailed body pressure coefficient data. Author (GRA)

N82-14065# Ballistic Research Labs., Aberdeen Proving Ground, Md.

NUMERICAL SIMULATION OF STEADY SUPERSONIC FLOW OVER AN OGIVE CYLINDER BOATTAIL BODY Final Report

Lewis B. Schiff and Walter B. Sturek Sep. 1981 50 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A106060; ARBRL-TR-02363) Avail: NTIS
HC A03/MF A01 CSCL 20/4

A recently reported Parabolized Navier-Stokes code has been employed to compute the supersonic flow field surrounding an ogive-cylinder-boattail body at incidence. The computations were performed for flow conditions where an extensive series of experimental surface pressure and turbulent boundary-layer profile measurements had been obtained. Comparison between the computational results and experimental measurements for angles of attack up to 6 deg. show excellent agreement. At angles greater than 6 deg. discrepancies are observed which are tentatively attributed to three-dimensional turbulence modeling errors. Author (GRA)

N82-14066# Ballistic Research Labs., Aberdeen Proving Ground, Md.

COMPUTATIONAL PARAMETRIC STUDY OF THE AERODYNAMICS OF SPINNING SLENDER BODIES AT SUPERSONIC SPEEDS Final Report

Walter B. Sturek, Donald C. Mylin, and Clarence C. Bush Aug. 1981 40 p refs
(DA Proj. 1L1-62618-AH-80)
(AD-A106074; ARBRL-TR-02358) Avail: NTIS
HC A03/MF A01 CSCL 20/4

Three dimensional finite-difference flow field computation techniques have been employed to generate a parametric aerodynamic study at supersonic speeds. Computations for viscous turbulent and inviscid flow have been performed for cone-cylinder, secant-ogive-cylinder, and tangent-ogive-cylinder bodies for a Mach number range of 1.75 < or = M < or = 5. The aerodynamic coefficients computed are pitching moment, normal force, center of pressure, Magnus moment, Magnus force, Magnus center of pressure, form drag, viscous drag, roll damping and pitch damping. All aerodynamic coefficients are computed in a conceptually exact manner. The only empirical input is that required for turbulence modeling. Computed results are compared to experimental data from free flight aerodynamic ranges and wind tunnels in order to validate the computational techniques. parametric comparisons illustrate the effects of body configuration and Mach number for the ten aerodynamic coefficients. The results for Magnus and pitch damping are of particular interest. Author (GRA)

N82-14067# General Dynamics Corp., Fort Worth, Tex.

AN EMPIRICAL METHOD FOR ESTIMATING THE EFFECT OF GROUND PROXIMITY ON THE JET-INDUCED LIFT OF V/STOL AIRCRAFT EMPLOYING RECTANGULAR JETS

J. A. Sansone and W. H. Foley Aug. 1981 154 p refs
(Contract N62269-80-C-0238)
(AD-A105668; NADC-79298-60) Avail: NTIS
HC A08/MF A01 CSCL 20/4

An empirical method has been developed to predict the propulsive-induced forces on a V/STOL aircraft hovering in proximity of the ground. This method is applicable to configurations employing two, three, or four rectangular exhausts. Planform contour, nozzle pressure ratio, and lift improvement devices are considered. Accuracies on the order of one percent of propulsive thrust are demonstrated. Author (GRA)

N82-14068# Sandia Labs., Albuquerque, N. Mex. Advanced Energy Projects Div.

MODULAR ASYMMETRIC PARACHUTE FOR WIND-TUNNEL TESTING

P. C. Klimas, H. E. Widdows, and R. H. Croll 1981 16 p refs Presented at the 7th AIAA Aerodyn. Decelerator and Balloon Technol. Conf., San Diego, Calif., 21 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE81-028416; SAND-78-1744C; CONF-811002-2) Avail: NTIS HC A02/MF A01

The construction of a series of asymmetrical wind tunnel model parachutes designed to a modular concept is described. The static force, inflation force, and dynamic force and motion time history wind tunnel testing of up to 123 different configurations is discussed. DOE

N82-14069# European Space Agency, Paris (France).

HYPERSONIC SLIP-FLOW AROUND SLENDER ELLIPTICAL CONES AT A SLIGHT ANGLE OF ATTACK Ph.D. Thesis - Rheinisch-Westfaelischen Technischen Hochsule, West Germany

Panajotis Evangelou Sep. 1981 122 p refs Transl. into ENGLISH of "Hypersonische Gleitstroemung um schwach angestellte schlanke elliptische Kegel", DFVLR-FB-79-21 DFVLR, Goettingen, West Germany, May 1979 Original report in GERMAN previously announced as N80-25301
(ESA-TT-644; DFVLR-FB-7921) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 19.20

A method is developed for calculating the hypersonic slip flow around elliptical cones at low angles of incidence. Using orders of magnitude a system of partial nonlinear differential equations of second order and parabolic character is derived from the Navier-Stokes equations and the energy equation; this system describes the flow in the shock formation region. The system of differential equations is integrated using an explicit finite difference procedure. The results obtained are compared with test results and the results of other theoretical flow field investigations. The influence of the axis ratio of the elliptical cone section and of the angle of incidence on the development of the flow field in the shock formation region is investigated. For small angles of incidence, to an elliptical cone, the cross flow appears only slowly, or not at all, whereas at moderate incidences, because of the large expansion, a marked cross flow occurs around the ridge line. This expansion and cross flow become more marked with increasing ellipticity of the conical section and with increasing incidence. Author (ESA)

N82-14070# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Abteilung Instationaere Aerodynamik.
TIME LINEARIZED CALCULATION OF TWO DIMENSIONAL UNSTEADY TRANSONIC POTENTIAL FLOW AT SMALL DISTURBANCES
Ralph Voss Oct. 1980 88 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-728)
(DFVLR-FB-81-01) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 20

An integral equation method for calculating unsteady transonic flow fields around oscillating airfoils at small disturbances was investigated. The procedure is based on separating the velocity potential into steady and unsteady parts and linearizing the resulting unsteady differential equation under the assumption of harmonic oscillations of small amplitudes. Use of Green's theorem results in two coupled integral equations for a doublet distribution at the profile and a source distribution in the whole flow field. Neglecting far field influences, the equations are discretized in a finite area and solved by iteration. The influences of discretization and limitation of the field are shown by results for a NACA 64A 006 profile. Author (ESA)

N82-14968*# Saint Louis Community Coll. at Meramec, Mo.
WHY USE CASE STUDIES RATHER THAN SIMULATION-GAMING TECHNIQUES OR LIBRARY RESEARCH?
Susan W. McDonald *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 99-103 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N82-14071# Arinc Research Corp., Annapolis, Md.
THE USE OF FLIGHT MANAGEMENT COMPUTERS IN AIR CARRIER OPERATIONS IN THE 1980S Interim Report
I. Gershkoff Washington FAA Aug. 1981 113 p refs
(Contract DTFA01-80-C-10030)
(AD-A105621; Rept-1378-11-1-2482; FAA-EM-81-10) Avail: NTIS HC A06/MF A01 CSCL 09/2

The use of on-board flight management computers (FMCs) in air carrier operations has the potential for significant fuel savings. This report assesses the general capabilities of the FMCs currently available. From this information, economic benefits and rates at which aircraft would be equipped were developed. Minimum-cost flight profiles were analyzed for various common conditions to determine the problems associated with incorporating the capabilities of FMCs into a heavy traffic Air Traffic Control environment. GRA

N82-14072# Hamilton Standard, Windsor Locks, Conn.
ADVANCED CRASH SURVIVABLE FLIGHT DATA RECORDER AND ACCIDENT INFORMATION RETRIEVAL SYSTEM (AIRS) Final Report, Oct. 1978 - Dec. 1980
Henry R. Ask, Donald L. White, and Kent E. Berwick Fort Eustis, Va. Army Research and Technology Labs. Aug. 1981 166 p refs
(Contract DAAK51-78-C-0025; DA Proj. 1L1-62209-AH-76)
(AD-A105510; ESP-8109; USAAVRADCOM-TR-81-D-20) Avail: NTIS HC A08/MF A01 CSCL 01/3

The Accident Information Retrieval System, (AIRS) development program consisted of four phases. Design concepts were formulated based on selection and definition of aircraft parameters to be monitored by the AIRS, selection of memory technology, circuit definitions for aircraft interfacing, and studies and tests related to the development of an armored module to protect the memory device. Brassboard electronics were fabricated and tested and software which proved the feasibility of data collection and storage in a solid-state memory device utilizing unique data compression techniques to reproduce critical aircraft flight information was developed and tested. Flight-worthiness assurance tests were performed on the AIRS brassbroad. The hardware was installed in a Sikorsky UH-60A BLACK HAWK helicopter. The system was reviewed for final configuration, risk areas, final size (207 cu. in. or less), weight (less then 9.3 lbs.), and life cost (greater than 10,000 hours MTBF). GRA

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N82-14073# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.
ANALYSIS OF TWO AIR TRAFFIC SAMPLES IN THE TERMINAL AREA OF FRANKFURT/MAIN, AUGUST 4TH 1978
Uwe Voelckers, Manfred Schubert, and Albrecht Seyfried 1981 127 p refs In GERMAN
(DFVLR-Mitt-81-12) Avail: NTIS HC A07/MF A01

Two 'arrival peaks' are analyzed. Computer programs used to combine data recorded from several sources are discussed. Traffic analysis includes quantitative evaluation of traffic density, studies of air traffic distributions relating to space and time, investigation of air traffic control procedures, determination of the approach control planning strategies, and a basic investigation of traffic vectoring in the terminal area. The similarities and differences of the two traffic samples are discussed. N.W.

N82-14074*# Texas A&M Univ., College Station. Dept. of Electrical Engineering.
DESIGN STUDIES FOR A TECHNOLOGY ASSESSMENT RECEIVER FOR GLOBAL POSITIONING SYSTEM
John H. Painter 15 Dec. 1981 120 p refs
(Grant NsG-1639)
(NASA-CR-165046) Avail: NTIS HC A06/MF A01 CSCL 17G

The operational conditions of a radio receiver - microprocessor for the global positioning system are studied. Navigation fundamentals and orbit characterization are reviewed. The global positioning system is descrbied with emphasis upon signal structure and satellite positioning. Ranging and receiver processing techniques are discussed. R.J.F.

N82-14075*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DESIGN AND IMPLEMENTATION OF A TELECOMMUNICATION INTERFACE FOR THE TAATM/TCV REAL-TIME EXPERIMENT

Joseph D. Nolan Dec. 1981 26 p refs
(NASA-TM-83231; L-15021) Avail: NTIS HC A03/MF A01 CSCL 17G

The traffic situation display experiment of the terminal configured vehicle (TCV) research program requires a bidirectional data communications tie line between an computer complex. The tie line is used in a real time environment on the CYBER 175 computer by the terminal area air traffic model (TAATM) simulation program. Aircraft position data are processed by TAATM with the resultant output sent to the facility for the generation of air traffic situation displays which are transmitted to a research aircraft. E.A.K.

N82-14076# Federal Aviation Administration, Atlantic City, N.J.

IN-SERVICE TESTING OF THE PRECISION APPROACH PATH INDICATOR (PAPI) AT NEWARK INTERNATIONAL AIRPORT, NEW JERSEY Interim Report, Dec. 8, 1980 - Apr. 8, 1981

Bret B. Castle Dec. 1981 11 p
(DOT-081-502-510)
(DOT/FAA/RD-81/95; DOT/FAA/CT-81/79) Avail: NTIS HC A02/MF A01

The Precision Approach Path Indicator (PAPI) tests involving four months of inservice testing at Newark International Airport, New Jersey are presented. Basically, the PAPI was compared against the standard red/white Visual Approach Slope Indicator (VASI) system at a large airport and on a runway with an Instrument Landing System (ILS). The PAPI system was installed in a manner to take care of aircraft of all sizes; that is, different wheel to eye distances. Information was obtained from pilots of large commercial aircraft. Results show that under these conditions about 60 percent of the pilots prefer the PAPI over the VASI system. S.L.

N82-14077*# Ohio Univ., Athens. Avionics Engineering Center.

COMMUTATED AUTOMATIC GAIN CONTROL SYSTEM

Stephen R. Yost [1981] 25 p refs
(Grant NGR-36-009-017)
(NASA-CR-164798; TM-81) Avail: NTIS HC A02/MF A01 CSCL 17G

A commutated automatic gain control system (AGC) was designed and constructed for the prototype Loran C receiver. The AGC is designed to improve the signal-to-signal ratio of the received Loran signals. The AGC design does not require any analog to digital conversion and it utilizes commonly available components. The AGC consists of: (1) a circuit which samples the peak of the envelope of the Loran signal to obtain an AGC voltage for each of three Loran stations, (2) a dc gain circuit to control the overall gain of the AGC system, and (3) an AGC amplification of the input RF signal. The performance of the AGC system was observed in bench and flight tests; it has improved the overall accuracy of the receiver. Improvements in the accuracy of the time difference calculations to within approx. + or - 1.5 microseconds of the observed time differnces for a given position are reported. N.W.

N82-14078*# Ohio Univ., Athens. Avionics Engineering Center.

A PROTOTYPE INTERFACE UNIT FOR MICROPROCESSOR BASED LORAN-C RECEIVER

Stanley M. Novacki, III Nov. 1981 11 p refs
(Grant NGR-36-009-017)
(NASA-CR-164887; TM-82-NASA) Avail: NTIS HC A02/MF A01 CSCL 17G

An inexpensive data/command entry and CRT display system capable of alphanumeric and graphics moe operation and designed to operate in place of a seperate ASCII terminal, is documented. The software to interface this unit to the 6502-based Loran C receiver is also described. The system simplifies receiver operations to a level typical of current avionics systems. N.W.

N82-14079# Mitre Corp., McLean, Va.

REQUIREMENTS FOR INSTRUMENT APPROACHES TO TRIPLE PARALLEL RUNWAYS

T. N. Shimi, W. J. Swedish, and L. C. Newman Jul. 1981 148 p refs
(Contract DTFA01-81-C-10001)
(AD-A105622; MTR-81W145; FAA-EM-81-12) Avail: NTIS HC A07/MF A01 CSCL 01/2

Current ATC procedures do not consider instrument approaches to more than two parallel runways. This document discusses the engineering results of an analysis that examined the technical feasibility of conducting triple parallel instrument approaches as a means of increasing the aircraft flow at congested airports. The technical criteria that were subjected to analysis include the physical characteristics of the airfield, airspace and aircraft mix, surveillance (the radar and display systems), and control (procedures for normal and abnormal operations. The expected performance in safety and capacity was estimated for alternative landing concepts. An analysis was conducted of blunders and evasion strategies. It was found that, for a given configuration, a single blunder recovery strategy could be specified that would produce acceptable separations between aircraft. Missed approaches on triple parallels and pilot acceptance of triple approaches are also discussed. Lastly, recommended requirements and control procedures for triple parallel instrument approaches are presented. Author (GRA)

N82-14080# Mitre Corp., McLean, Va.

REQUIREMENTS FOR INDEPENDENT AND DEPENDENT PARALLEL INSTRUMENT APPROACHES AT REDUCED RUNWAY SPACING

A. L. Haines and W. J. Swedish Washington FAA May 1981 182 p refs
(Contract DTFA01-81-C-10001)
(AD-A105673; MTR-81W15; FAA-EM-81-8) Avail: NTIS HC A09/MF A01 CSCL 01/2

Independent parallel instrument approaches are conducted today only if the runway centerlines are 4300 ft apart or more. The rationale behind this criterion is reviewed, and the requirements for reducing the criterion to 3000 ft are evaluated. Although some benefit is derived from improvements in navigational accuracy, the performance of the surveillance system has the greatest impact on the required runway spacing. Dependent alternating instrument approaches to parallel runways are also evaluated. Currently such approaches require a runway spacing of 3000 ft or more. The effects of reducing this runway spacing are discussed, especially with regard to blunder recovery. Reducing the runway spacing required for these approaches could increase the arrival capacity and reduce delays at certain airports and would provide increased flexibility for planning new runways. Author (GRA)

N82-14081# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

FEASIBILITY STUDY FOR AN ADVANCED LIGHTED AID TO NAVIGATION Final Report

Stephen Jaskulek, Eric J. Hoffman, and Walter E. Allen Sep. 1981 121 p refs
(Contract N00024-81-C-5301)
(AD-A105944; USCG-D-48-81) Avail: NTIS HC A06/MF A01 CSCL 17/7

This report discusses a Coast Guard advanced aid to navigation network. Various light sources, positioning systems, and radio links are investigated for suitability to solar powered marine aids. A modular microprocessor-based aid, capable of self diagnostic monitoring and differential Loran-C positioning, is described. A communication system between the aids and shore stations, using conventional or meteor burst VHF or a GOES satellite link, is examined, showing the first and last options to be most viable. Inter-aid flash synchronization schemes, and data transmission formats, polling methods, and system performance analysis are discussed. Having established the technical feasibility of the advanced aid concept, cost and reliability estimates are performed on the proposed systems. Finally, recommendations on areas requiring further study are presented. Author (GRA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-14082# Kaman Aerospace Corp., Bloomfield, Conn.
ADVANCED TECHNOLOGY LIGHTWEIGHT GONDOLA SYSTEM EXPERIMENTAL FABRICATION PROGRAM Final Report, Aug. 1979 - Mar. 1981
John D. Porterfield Jul. 1981 133 p refs
(Contract DAAK51-79-C-0036; DA Proj. 1L1-62209-AH-76)
(AD-A104157; R-1630; USAAVRADCOM-TR-81-D-24) Avail: NTIS HC A07/MF A01 CSCL 01/3

Design concept verification hardware for the helicopter external gondola systems (HEGS) 10 and 20 modules, critical element and component fabrication and testing and full-scale HEGS 20 gondola assemblies were accomplished. The HEGS 20 module characteristics demonstrated during design, fabrication, and testing included (1) structural efficiency (2) impact resistance potential, (3) producibility, (4) repairability without post heat treatment, (5) maintenance, (6) functional and structural capabilities, (7) load and unload capabilities, (8) cargo tie-down capabilities, (9) compatibility with automated lifting devices and ground transport equipment, (10) suitability for loading and unloading on uneven terrain, and (11) low weight potential
Author

N82-14083# Army Armament Research and Development Command, Watervliet, N. Y. Geotechnical Lab.
C-5A OPERATIONAL UTILITY EVALUATION SOIL TESTS AND ANALYSIS Final Report, Jun. - Aug. 1980
Robert W. Grau Aug. 1981 74 p refs
(Contract MIPR-F7813001430001)
(AD-A105555; WES-TR-GL-81-7) Avail: NTIS HC A04/MF A01 CSCL 08/13

The purpose of this report is to present the data collected concerning the ground flotation characteristics of the C-5A aircraft during the C-5A operational utility evaluation test program. This report gives a description of the three test sites selected for this program, a summary of all soil and surface distress measurements taken at each site during aircraft operations, and an analysis of the data. Results of this evaluation test program indicate that 3-in. ruts have little or no effect on the performance of the C-5A aircraft on unsurfaced areas. Author (GRA)

N82-14084# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
A METHOD FOR MEASURING TAKEOFF AND LANDING PERFORMANCE OF AIRCRAFT, USING AN INERTIAL SENSING SYSTEM
A. Pool, J. L. Simons, G. J. H. Wensink, and A. J. L. Willekens 26 Sep. 1980 10 p refs Presented at AGARD Flight Mech. Panel Symp. on Subsystem Testing and Flight Test Instrumentation, Geilo, Norway, 27-30 Oct. 1980
(NLR-MP-80036-U) Avail: NTIS HC A02/MF A01

An inertial sensing system, STALINS, used to provide trajectory data for takeoff and landing measurement instrument design, is presented. The system specifications based on certification requirements for civil transport aircraft are defined for continuous and rejected takeoff, minimum unstick speed, minimum control speed on the ground, and landing. Calculations are performed using a computer program supplemented by a manual check, giving horizontal distance and height measurements. Data are made available within 24 hours. The method is accurate and is suitable for tests at several airfields, since instrumentation is either onboard already, or easily transported by the aircraft.
Author (ESA)

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N82-14085*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A GENERAL AVIATION SIMULATOR EVALUATION OF A RATE-ENHANCED INSTRUMENT LANDING SYSTEM DISPLAY
David A. Hinton Dec. 1981 44 p
(NASA-TP-1960; L-13911) Avail: NTIS HC A03/MF A01 CSCL 01D

A piloted-simulation study was conducted to evaluate the effect on instrument landing system tracking performance of integrating localizer-error rate with raw localizer and glide-slope error. The display was named the pseudocommand tracking indicator (PCTI) because it provides an indication of the change of heading required to track the localizer center line. Eight instrument-rated pilots each flew five instrument approaches with the PCTI and five instrument approaches with a conventional course deviation indicator. The results show good overall pilot acceptance of the display, a significant improvement in localizer tracking error, and no significant changes in glide-slope tracking error or pilot workload.
B.W.

N82-14086 Royal Aircraft Establishment, Farnborough (England).
A TRUE AIR SPEED SENSOR FOR MINIATURE UNMANNED AIRCRAFT
J. A. C. Beattie Jun. 1981 11 p refs
(RAE-TM-SPACE-287; BR80019) Copyright. Avail: Issuing Activity

A prototype sensor with digital output is described. Vortex shedding principles are exploited by using a bluff body with end-plates to produce a stable set of vortices alternately from the edges of the body. Vortex production frequency is directly proportional to the speed of the fluid past the body. A pair of printed thick film thermistors detect the vortices. Tests show excellent linearity of response, although sensor geometry, and signal processing electronics can be improved. Author (ESA)

N82-14087# General Electric Co., Cincinnati, Ohio. Aircraft Equipment Div.
ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM, OPERATIONAL FUCTIONS REPORT Interim Report, Jun. 1979 - Oct. 1980
Oct. 1980 201 p refs
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85)
(AD-A105516; ACS-12-217; AVRADCOM-TR-79-0270-2; IR-2) Avail: NTIS HC A10/MF A01 CSCL 01/3

Basic system operating requirements for an Electronic Master Monitor and Advisory Display System (EMMADS), developed for use on U.S. Army helicopters to reduce crew workload by assuming responsibility for tasks associated with subsystem status monitoring, are described. A baseline for defining the requirements of the feasibility demonstration hardware is provided EMMADS functions described include examples related to the CH-47C helicopter, the aircraft selected as the basis for the EMMADS feasibility model.
Author

N82-14088# Naval Air Development Center, Warminster, Pa.
INVESTIGATION OF FUNCTIONAL COMMONALITY OF AVIONICS SYSTEMS IN NAVAL AIRCRAFT Final Report, Jan. - Sep. 1981
John M. Cunningham 30 Sep. 1981 136 p refs
(W05720000)
(AD-A105503; NADC-81235-20) Avail: NTIS HC A07/MF A01 CSCL 09/3

This report presents the results of a study to determine general requirements for the development of core avionics equipment for common usage by Naval aircraft. The study addresses the core avionics architecture and the relationship between existing core avionics equipment and advanced subsystems under development. The report provides specific recommendations regarding: procurement policies; the application of standards to electronic interfaces; and the development of the basic architectural components. GRA

N82-14069# Southwest Research Inst., San Antonio, Tex.
HELICOPTER MODEL STUDIES FOR ON-BOARD ELECTROSTATIC SENSORS Final Report, 25 Sep. 1979 - 24 Jan. 1981
O. Tranbarger, B. M. Duff, and T. R. Owen Fort Eustis, Va. Army Research and Technology Labs. Sep. 1981 286 p refs (Contract DAAK51-79-C-0060; DA Proj. 1L1-62209-AH-76) (AD-A105511; SWRI-14-5863; USAAVRADCOM-TR-81-D-26) Avail: NTIS HC A13/MF A01 CSCL 13/12

Hovering helicopters accumulate excessive charge as a result of triboelectrification, surrounding space charge, and external electric fields that result in high electrostatic potentials on the aircraft. Electrostatic energy stored on the helicopter can cause electrical discharges to occur from the cargo hook when contact is made with the ground or ground personnel. Laboratory model studies were conducted under electrostatic conditions simulating hovering aircraft to show that on-board instrumentation capable of measuring electric field intensity and charge density can provide the basis for indirectly inferring the correct potential relative to ground of a spherical model test body. Potential of the model was inferred for three cases involving electrostatic instrumentation located (1) on the ground below the model, (2) installed at the south pole of the model, and (3) mounted at the end of the simulated cargo hook. Analysis of laboratory test data resulted in empirical derivations of unique electric field curves for each of the three cases studied. The first two cases were also studied analytically by solving Poisson's equation for a sphere between two parallel plates, and the mathematical expressions substantiated the laboratory results. Methodology for developing a full-scale helicopter electrostatic discharger system to eliminate hazardous potentials on helicopter aircraft is described.
Author (GRA)

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-14090*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
GAS TURBINE CERAMIC-COATED-VANE CONCEPT WITH CONVECTION-COOLED POROUS METAL CORE
Albert F. Kascak (AVRADCOM Research and Technology Labs., Cleveland), Curt H. Liebert, Robert F. Handschuh, and Lawrence P. Ludwig Dec. 1981 14 p refs Sponsored in part by U.S. Army Aviation Research and Development Command, St. Louis (NASA-TP-1942; AVRADCOM-TR-81-C-7; E-732) Avail: NTIS HC A02/MF A01 CSCL 21E

Analysis and flow experiments on a ceramic-coated-porous-metal vane concept indicated the feasibility, from a heat transfer standpoint, of operating in a high-temperature (2500 F) gas turbine cascade facility. The heat transfer and pressure drop calculations provided a basis for selecting the ceramic layer thickness (to 0.08 in.), which was found to be the dominant factor in the overall heat transfer coefficient. Also an approximate analysis of the heat transfer in the vane trailing edge revealed that with trailing-edge ejection the ceramic thickness could be reduced to (0.01 in.) in this portion of the vane. B.W.

N82-14091*# National Aeronautics and Space Administration, Washington, D. C.
WIND TUNNEL TESTS OF ENGINE-EQUIPPED MODELS: COMPARISON OF TWO JET WASH SIMULATION METHODS
J. P. Becle and R. Perin Dec. 1981 43 p ref Transl. into ENGLISH of 'Essais en Soufflerie de Maquetter Motorisees. Comparison de Deux Methodes de Simulation des Jets des Reacteurs'' rept. T.P. 1981-42, France, 1981 p 1-18 Presented at the AGARD/FDP Symp. Aerodynamics of Power Plant Installation, Toulouse, 11-14 May 1981 Original language document was announced as A81-39245 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by ONERA, Toulouse
(Contract NASw-3542)
(NASA-TM-76764; TP-1981-42) Avail: NTIS HC A03/MF A01 CSCL 21E

The optimization of performance factors in state of the art civil aircraft was studied by using powered models in wind tunnels. In cooperation with ONERA, two methods of cold simulation of jet engine washes were developed. The first, called 'blown jet', benefitted from the previously perfected test set-ups made for studies of the CONCORDE. The second, which utilized small air-turbines, were recently put into operation for the AIRBUS family of aircraft. The facilities, the measurement equipment and the methods of exploiting the results are described. The relative value of each of the methods of motorization is analyzed: complexity of equipment, duration, precision of measurements and comparison of results are also discussed. A.R.H.

N82-14092*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
CORE COMPRESSOR EXIT STAGE STUDY. VOLUME 4: DATA AND PERFORMANCE REPORT FOR THE BEST STAGE CONFIGURATION Final Report
D. C. Wisler Apr. 1981 204 p refs
(Contract NAS3-20070)
(NASA-CR-165357; R80AEG314-Vol-4) Avail: NTIS HC A10/MF A01 CSCL 21E

The core compressor exit stage study program develops rear stage blading designs that have lower losses in their endwall boundary layer regions. The test data and performance results for the best stage configuration consisting of Rotor-B running with Stator-B are described. The technical approach in this efficiency improvement program utilizes a low speed research compressor. Tests were conducted in two ways: (1) to use four identical stages of blading to obtain test data in a true multistage environment and (2) to use a single stage of blading to compare with the multistage test results. The effects of increased rotor tip clearances and circumferential groove casing treatment are evaluated. E.A.K.

N82-14093*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
CORE COMPRESSOR EXIT STAGE STUDY. VOLUME 5: DESIGN AND PERFORMANCE REPORT FOR THE ROTOR C/STATOR B CONFIGURATION
D. C. Wisler May 1981 101 p refs
(Contract NAS3-20070)
(NASA-CR-165358; R81AEG287-Vol-5) Avail: NTIS HC A06/MF A01 CSCL 21E

Rear stage blading designs that have lower losses in their endwall boundary layer regions were developed. The design of rotor-C and the performance results for rotor-C running with stator B are described. A low speed research compressor is utilized as the principal investigative tool. Four identical stages of blading are used to obtained data in a true multistage environment. E.A.K.

N82-14094*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE USE OF OPTIMIZATION TECHNIQUES TO DESIGN CONTROLLED DIFFUSION COMPRESSOR BLADING
Nelson L. Sanger 1982 18 p refs Proposed for presentation at the 27th Ann. Intern. Gas Turbine Conf., London, Apr. 18-22, 1982; sponsored by ASME
(NASA-TM-82763; E-1084) Avail: NTIS HC A02/MF A01 CSCL 21E

A method for automating compressor blade design using numerical optimization, and applied to the design of a controlled diffusion stator blade row is presented. A general purpose optimization procedure is employed, based on conjugate directions for locally unconstrained problems and on feasible directions for locally constrained problems. Coupled to the optimizer is an analysis package consisting of three analysis programs which calculate blade geometry, inviscid flow, and blade surface boundary layers. The optimizing concepts and selection of design objective and constraints are described. The procedure for automating the design of a two dimensional blade section is discussed, and design results are presented. E.A.K.

N82-14095*# AiResearch Mfg. Co., Phoenix, Ariz.
POLLUTION REDUCTION TECHNOLOGY PROGRAM SMALL JET AIRCRAFT ENGINES, PHASE 3 Final Report
T. W. Bruce, F. G. Davis, T. E. Kuhn, and H. C. Mongia Dec. 1981 180 p refs
(Contract NAS3-20819)
(NASA-CR-165386; AiResearch-21-3615) Avail: NTIS HC A09/MF A01 CSCL 21E

A series of Model TFE731-2 engine tests were conducted with the Concept 2 variable geometry airblast fuel injector combustion system installed. The engine was tested to: (1) establish the emission levels over the selected points which comprise the Environmental Protection Agency Landing-Takeoff Cycle; (2) determine engine performance with the combustion system; and (3) evaulate the engine acceleration/deceleration characteristics. The hydrocarbon (HC), carbon monoxide (CO), and smoke goals were met. Oxides of nitrogen (NOx) were above the goal for the same configuration that met the other pollutant goals. The engine and combustor performance, as well as acceleration/deceleration characteristics, were acceptable. The Concept 3 staged combustor system was refined from earlier phase development and subjected to further rig refinement testing. The concept met all of the emissions goals. E.A.K.

N82-14096*# AiResearch Mfg. Co., Phoenix, Ariz.
ERBS FUEL ADDENDUM: POLLUTION REDUCTION TECHNOLOGY PROGRAM SMALL JET AIRCRAFT ENGINES, PHASE 3 Final Report
T. W. Bruce, F. G. Davis, T. E. Kuhn, and H. C. Mongia [1982] 47 p refs
(Contract NAS3-20819)
(NASA-CR-165387; AiResearch-21-3619) Avail: NTIS HC A03/MF A01 CSCL 21E

A Model TFE731-2 engine with a low emission, variable geometry combustion system was tested to compare the effects of operating the engine on Commercial Jet-A aviation turbine fuel and experimental referee broad specification (ERBS) fuels. Low power emission levels were essentially identical while the high power NOx emission indexes were approximately 15% lower with the EBRS fuel. The exhaust smoke number was approximately 50% higher with ERBS at the takeoff thrust setting; however, both values were still below the EPA limit of 40 for the Model TFE731 engine. Primary zone liner wall temperature ran an average of 25 K higher with ERBS fuel than with Jet-A. The possible adoption of broadened proprties fuels for gas turbine applications is suggested. E.A.K.

N82-14097# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
OPTIMIZATION OF COMPRESSOR VANE AND BLEED SETTINGS Final Report, May 1979 - May 1981
J. E. Garberoglio, J. O. Song, and W. L. Boudreaux Wright-Patterson AFB, Ohio AFWAL Jun. 1981 83 p refs
(Contract F33615-79-C-2018; AF Proj. 2307)
(AD-A106059; PWA-FR-14487; AFWAL-TR-81-2046) Avail: NTIS HC A05/MF A01 CSCL 21/5

THis report evaluates optimization methods for their effectiveness in relating multistage axial compressor test data to the decision to very a selected vane or bleed to reach a predetermined performance goal. Compressor simulations were used in a comparative evaluation and each method was judged on the basis of the number of tests required to achieve an optimum performance goal. The influence of measurement errors and finite vane travel were also prime considerations. Based on this evaluation, the COPES/CONMIN approximate optimization technique was chosen most suitable. Author (GRA)

N82-14098# Naval Postgraduate School, Monterey, Calif.
FOREIGN OBJECT DAMAGE IN NAVAL AIRCRAFT ENGINES M.S. Thesis
Jack B. Mills Jun. 1981 138 p refs
(AD-A105787) Avail: NTIS HC A07/MF A01 CSCL 01/3

An investigation of historical data was conducted in an attempt to assign a specific cause to each foreign object damage incident reported during an eighteen month period. Interviews were conducted with engineers and fleet maintenance personnel in support of the above research. The impact of current FOD reporting procedures, the foreign objects, the ingestion process and the operating environment are discussed. Conclusions and recommendations are included. Author (GRA)

N82-14099# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
CORROSION INHIBITING ENGINE OILS Final Interim Report, 4 Sep. 1979 - 1 Dec. 1980
G. C. Brown, R. J. Meehan, and P. A. Warner Wright-Patterson AFB, Ohio AFWAL Aug. 1981 73 p refs
(Contract F33615-79-C-5089)
(AD-A106127; PWA-FR-13908; AFWAL-TR-81-4028) Avail: NTIS HC A04/MF A01 CSCL 11/8

The Fluids, Lubricants, and Elastomers Branch of the Materials Laboratory, AFWAL, established the requirements for a MIL-L-7808H operational oil with corrosion inhibition characteristics at least equal to those of MIL-C-8188C. The new oil formulation is to provide corrosion inhibition under long-term storage conditions of the ALCM F107 turbine engine. During the initial fifteen-month effort, several approaches were evaluated as candidate methods for determining the effectiveness of corrosion inhibiting oil additives. A screening procedure was developed after preliminary modifications were made to the Corrosion Rate Evaluation Procedure (CREP). Using the CREP together with compatibility and miscibility screening of oil/inhibitor blends, a total of 67 candidate corrosion inhibitors (CCI) were evaluated. These included CCI obtained from Bray Oil Company, El Monte, California, as part of a subcontract to synthesize candidate corrosion inhibitors. Additional tests were completed on a preliminary physical and chemical property evaluation of the oil/inhibitor blends in regard to MIL-L-7808H and MIL-C-8188C specifications. GRA

N82-14100# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Werkstoffkunde.
LONG-TERM STABILITY OF FINELY CAST ALLOYS FOR GAS TURBINE BLADES UNDER HOT GAS CORROSION CONDITIONS [ZEITSTANDFESTIGKEIT VON FEINGUSSLEGIERUNGEN FUER GAS TURBINENSCHAUFELN]
K. H. Kloos, J. Granacher, and H. Denus 1980 25 p refs In GERMAN Presented at European Symp. on the Interaction between Corrosion and Mech. Stress at High Temp., Petten, Netherlands, 13-14 May 1980 Sponsored by Bundesministerium fuer Forschung und Technologie
(DECHEMA-Proj-4.2/1; DECHEMA-Proj-4.2/1F) Avail: NTIS HC A02/MF A01

Two hot gas corrosion conditions were tested: mild for aircraft and industrial turbines, and hard (by adding seasalt or S, Na, Va and Cl) for aircraft and industrial gas turbine composite materials. The longest loading times obtained before rupture are about 2000 hr at 700C and about 5000 hr at 800C. The probes were microscopically investigated after the tests. No reduction of the long-term stability due to hot gas corrosion is found as compared to the case of air at rest. Author (ESA)

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-14101*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MLS VERTICAL GUIDANCE AND NAVIGATION FOR A STOL AIRPLANE LANDING ON AN ELEVATED STOLPORT
David N. Warner, Jr. Nov. 1981 27 p refs
(NASA-TM-81338) Avail: NTIS HC A03/MF A01 CSCL 01C

In contrast to CTOL landing operations, STOL airplanes landing on short STOLport runways typically begin the flare maneuver before reaching the runway surface. Vertical guidance procedures were developed to allow an autoland flight control system for a STOL airplane to use Microwave Landing System (MLS) signals as altitude and sink rate references for flare initiation, with a transition to radar altimeter after the airplane is over the runway. The implementation has minimum impact on the control system and landing performance. Data are presented which show validation of the concepts in a simulator. Author

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-14102 Royal Aircraft Establishment, Farnborough (England).
THE DESIGN OF A JET CATCHER
K. G. Winter and L. F. East Feb. 1981 11 p refs
(RAE-TM-AERO-1891; BR78582) Copyright. Avail: Issuing Activity

A device for catching and dissipating the kinetic energy of a jet used in a boundary layer tunnel to eliminate unwanted air currents is described. A dished front face and a large outlet catch the jet, avoiding spillage, and pass it through a screen set normal to the flow in order to reduce kinetic energy. The screen is inclined so as to take advantage of refraction. An additional muslin screen reduces noise. Final outlet velocity is 1/8 of the jet velocity, although there is slight spillage. Author (ESA)

N82-14103 Royal Aircraft Establishment, Farnborough (England).
AN AFTERBODY DRAG BALANCE
A. G. Kurn Mar. 1981 12 p ref
(RAE-TM-AERO-1897; BR78346) Copyright. Avail: Issuing Activity

A strain gage drag balance was made to fit into the jet blowing rig in a transonic wind tunnel. Differences in the drag of various axisymmetric boattailed afterbodies surrounding an engine exhaust nozzle were determined. Three sets of four flexures are spaced equally along the x axis, with strain gages on the middle set. The gages on the center flexures form bridges, compensated for thermal induced drift. Calibration shows that signals are linear with drag force. Output signals can be monitored from two separate strain gage circuits. The device can withstand components of force and moment that might be applied during model assembly. Drag values up to 20N can be measured. Author (ESA)

N82-14104# Grumman Aerospace Corp., Bethpage, N.Y.
STUDY OF FIBER OPTICS TO ENHANCE AN ENVIRONMENTAL LIGHTING LABORATORY Final Report, Nov. 1979 - Mar. 1981
J. Connelly Wright-Patterson AFB, Ohio AFWAL Aug. 1981 154 p Prepared in cooperation with Galileo Electro-Optics Corp., Strubridge, Mass.
(Contract F33615-79-C-3629; AF Proj. 2403)
(AD-A106117; AFWAL-TR-81-3098) Avail: NTIS HC A08/MF A01 CSCL 13/1

This report documents the results of an investigation to determine how fiber optic materials can be utilized to substantially increase the simulation capabilities of an Environmental Lighting Laboratory. This Laboratory must provide the capability to dynamically simulate the ambient environmental illumination conditions encountered in day, night and high threat/high risk aircraft missions. Three cockpit lighting simulator concepts were studied. Two of these concepts utilized a spherical lighting enclosure with a visual scene being projected at the inner surface via a remote projection input surface; fiber optics carry the image from input surface to output surface. In one concept, the pilot views a back-projected image on a translucent spherical screen via a spherical output surface with imbedded fiber optics. In the other concept, the pilot views the spherical fiber optic output surface directly. Both concepts were considered possible to implement; each concept having appropriate cost vs. performance tradeoffs. No useful solution was found using the third concept, a fiber optic input to mirrored ellipsoidal enclosure. It was found that the spherical enclosure concept with an internal translucent projection screen offers the best combination of illumination level and resolution; however, the cost of implementing this concept is substantial. GRA

N82-14105# Test Group (6585th), Holloman AFB, N. Mexico.
RAIL ROUGHNESS STUDY OF THE HOLLOMAN HIGH SPEED ROCKET SLED TEST TRACK Final Report, May 1978 - Jun. 1981
Larry C. Mixon, Charles B. Evans, and Windell L. Gilliam 1 Sep. 1981 97 p refs
(AF Proj. 9993)
(AD-A105778; AD-TR-81-62) Avail: NTIS HC A05/MF A01 CSCL 14/2

Data from a first order survey of the Holloman High Speed Rocket Sled Test Track was statistically analyzed to characterize the roughness of the rails. The rail roughness is a forcing function manifested as vibration in high speed sled tests conducted on the Track. Statistical methods in the space and frequency domain were developed and discussed and further data requirements were justified. Author (GRA)

N82-14394# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
RESEARCH ON AN INDUCTION DRIVEN CRYOGENIC WIND TUNNEL
Alain Blanchard, Jean-Bernard Dor, Andre Mignosi, and Jean-Francois Breil *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 63-77 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-14106*# Texas Southern Univ., Houston.
INTRODUCTION TO ORBITAL FLIGHT PLANNING (1)
H. E. Blackwell, ed., Eugene L. Davis, and Della D. Dell 31 Aug. 1981 140 p refs
(Grant NAG9-6)
(NASA-CR-165052) Avail: NTIS HC A07/MF A01 CSCL 22A

This workbook is designed for students interested in space flight planning, who after training, may serve as flight planning aides. Routine flight planning activities requiring engineering-type calculations and analysis are covered. Practice exercises and brief instructions are given for the programming and use of the hand calculator as well as the calculation of position and velocity in the orbital plane. Calculation of relative orbital position is also covered with emphasis upon celestial coordinates and time measurement. R.J.F.

N82-14107# European Space Agency, Paris (France).
SCIENTIFIC AND EXPERIMENTAL ASPECTS OF THE GIOTTO MISSION
B. Battrick, comp. and J. Mort, comp. Jun. 1981 154 p refs Proceedings of Intern. Meeting, Noordwijkerhout, Netherlands, 27-29 Apr. 1981
(ESA-SP-169; ISSN-0379-6566) Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

A flyby mission to Halley's comet is discussed, and various experiments and sensors are described. Investigations center on solar wind/comet interaction, cometary dust, composition of the cometary atmosphere, and the comet nucleus. For individual titles, see N82-14108 through N82-14122.

N82-14108# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.

GIOTTO: A MISSION TO HALLEY'S COMET

R. Reinhard *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p ix-xix refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others;

The ESA Giotto mission, a fast flyby of Halley's Comet in March 1986, is described. In situ measurements in the cometary atmosphere are planned to unravel the complex physical and chemical processes that occur in it, to provide the elemental and isotopic composition of the volatile components and dust, to investigate the solar wind/comet interaction, and to image the nucleus which is too small to be seen from Earth. Giotto is a spin stabilized spacecraft based on a GEOS design. Its main features include a dual sheet bumper shield to protect it from dust particle impacts in the innermost part of the coma and a high gain, despun antenna dish allowing high data rate transmission at 40 kbit/sec over a distance of 1 AU. The encounter in the comet environment only lasts 4 hours due to the high flyby velocity of 68 km/sec. Giotto is targeted on the comet nucleus or slightly sunward of it, the miss distance being on the order of 500 km. Together with the Soviet Venera and the Japanese Planet A missions to Halley, the Giotto in situ measurements are the first on any comet. Author (ESA)

N82-14109# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Astrophysik.

PLASMA FLOW AND MAGNETIC FIELDS IN COMETS

c91

H. U. Schmidt and R. Wegmann *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 3-7 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

Plasma flow and field amplification, resulting from the interaction of the solar wind with a comet, are studied by model calculations for the rates G = 7 X 10 to the 28 power to 2 X 10 to the 30 power of total cometary gas production. The influence of the magnetic field is investigated, using an axisymmetric model. A three-dimensional magnetohydrodynamic calculation shows how the magnetic field induces an asymmetry. A sudden change of direction in the interplanetary field produces streamer-like structures. Author (ESA)

N82-14110# Technische Universitaet, Brunswick (West Germany). Inst. fuer Geophysik und Meteorologie.

THE GIOTTO MAGNETOMETER EXPERIMENT

F. M. Neubauer *In* ESA Sci. and Exptl. Effects of the Giotto Mission Jun. 1981 p 9-15 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

The Giotto magnetometer experiment for triaxial measurement of the magnetic vector field during and before the Halley encounter in March 1986 is described. in situ observations of the magnetic fields associated with the comet/solar wind interaction, including a variety of macroscopic and microscopic plasma phenomena, and a careful search for nucleus related magnetic field signatures are planned. The instrumentation, designed for minimum mass, consists of a triaxial ring-core fluxgate magnetometer sensor system mounted on the antenna mast, the magnetometer analog electronics, and a minimum digital processor inside the spacecraft proper. The experiment has a total mass of 1.5 kg and power consumption of 1.2 W. The measuring ranges per component are given. The 12 bit analog to digital conversion together with some overhead provide 40 bits per vector and a total bitrate of 1200 bit/sec. Author (ESA)

N82-14111# University Coll., London (England). Mullard Space Science Lab.

A COMETARY PLASMA EXPERIMENT FOR THE MISSION TO HALLEY'S COMET

A. Johnstone, D. Bryant (Space Research Council, Chilton, Engl.), T. Edwards (Space Research Council, Chilton, Engl.), B. Hultquist (Kiruna Geophysical Inst., Sweden), V. Formisano (ESTEC, Noordwijk, Netherlands), L. Biermann (Max-Planck Inst. fuer Physik und Astrophysik), R. Luest (Max-Planck Inst. fuer Physik und Astrophysik), H. Schmidt (Max-Planck Inst. fuer Physik und Astrophysik), W. Feldman (Los Alamos Scientific Labs), P. Cerulli-Irelli (Ist. Plasma Spaziale) et al *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 17-27 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

The cometary plasma experiment measures the three dimensional velocity distribution of positive ions in the energy range 10 eV to 70 keV, separating the masses into six major groups. The instrument package includes a fast ion sensor to measure the energy distribution from 10 eV to 20 keV in all directions except the cone around the velocity vector once every rotation of the spacecraft without mass discrimination. An implanted ion sensor is also provided to measure the energy distribution from 100 eV to 70 keV over a 140 deg range of polar angle, with mass discrimination. Author (ESA)

N82-14112# Toulouse Univ. (France).

THE COPERNIC EXPERIMENT TO MEASURE THREE DIMENSIONAL ELECTRON DISTRIBUTION AND THE COMPOSITION OF THERMAL POSITIVE IONS INCLUDING WATER CLUSTERS NEAR HALLEY'S COMET

H. Reme, F. Cotin, C. Duston, J. A. Sauvard, A. Korth (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), A. K. Richter (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), K. A. Anderson (California Univ., Berkeley), C. W. Carlson (California Univ., Berkeley), R. P. Lin (California Univ., Berkeley), A. Wekhof (California Univ., Berkeley) et al *In* ESA Sci. and Exptl. Effects of the Giotto Mission Jun. 1981 p 29-37 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

An experiment was designed to measure three-dimensional electron energy distribution from < 10 eV to 30 keV as well as the composition and distribution of thermal positive ions, with mass discrimination, including clathrate hydrates in the range 10 to < 230 amu is described. The data obtained can help in determining: (1) the nature of comet tails and the comet/solar wind interaction; (2) the chemical and physical nature of the comet atmosphere and ionosphere and (3) the chemical and physical structure of the comet nucleus. Symmetric quadrispherical electrostatic analyzer provides three-dimensional electron measurements with high sensitivity and high energy, angular, and time resolution. A light electrostatic mass analyzer detects thermal positive ions with high sensitivity, low background and good mass resolution close to the comet. The two instruments have open, flythrough apertures. Author (ESA)

N82-14113# Saint Patrick's Coll., Maynooth (Ireland).

AN ENERGETIC PARTICLE DETECTOR FOR GIOTTO AND ITS SCIENTIFIC OBJECTIVES

S. McKenna-Lawlor, A. Thompson (Dublin Inst. for Advanced Studies), D. OSullivan (Dublin Inst. for Advanced Studies), E. Kirsch (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), D. B. Melrose (Sydney Univ.), and K.-P. Wenzel (ESTEC, Noordwijk, Netherlands) *In* ESA Sci. and Exptl. Aspects for the Giotto Mission Jun. 1981 p 39-44 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

Active and passive background shielding is provided for an energetic particle detector designed to observe energetic particles in the cometary atmosphere as well as monitor the presence of energetic solar particle fluxes. During the encounter phase, spectrum and angulr information concerning particle fluxes are provided with a time resolution of 1 sec. During the cruise phase, 1 hr average particle flux measurements are made in all channels. Sectoring of the measurement of one proton channel (0.1 to 2.1 MeV) is also planned. One hour average solar particle flux measurements together with angular information in the 0.1 to 2.1 MeV proton channel acquired during cruise, when combined with simultaneous observations made by other spacecraft located at different heliographic longitudes, provide information concerning solar particle propagation in the corona and in interplanetary space. Author (ESA)

N82-14114# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).

SIZE DISTRIBUTION, STRUCTURE, AND CHEMICAL COMPOSITION OF COMETARY DUST PARTICLES c91

Hugo Fechtig *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 47-52 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

Observations of cometary dust are reviewed, both for Earthbound measurements and for space measurements. The structure of cometary dust is of low density, such as the loosely conglomerated fluffy particles collected in the atmosphere by Brownlee. Reported IR measurements show silicates to be the main constituent of cometary dust. From simulation experiments and theoretical considerations, more primitive material than previously assumed in the form of carbonaceous C 1 chondrites should be expected. The submicron sized grains may be at least partly of presolar or interstellar origin. The strongest criteria are isotopic deviations from the solar system values, for example for C12/C13 and/or Li7/Li6. Author (ESA)

N82-14115# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).

THE PARTICULATE IMPACT ANALYZER, AN INSTRUMENT TO ANALYZE SMALL PARTICLES RELEASED BY HALLEY'S COMET c19

J. Kissel *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 53-60 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

The particulate impact analyzer, which is to provide time of flight mass spectra of individual dust particles released by Halley's Comet and the average composition and mass distribution of cometary matter, is described. The instrument is a redesign of the dust experiment flown on Helios 1 and 2, using commercial instrument developments (mass resolution m/Delta m = 200). It has a sensitivity as to measured particles from 3 x 10 to the minus 16 power to 5 x 10 to the minus 10 power g (0.1 to 10 microns diameter) with impact rates up to 100/sec. Depending on cometary activity, data on some 1000 to 50,000 cometary particles should be obtained. Author (ESA)

N82-14116# Kent Univ., Canterbury (England). Space Sciences Lab.

A DUST IMPACT DETECTION SYSTEM FOR THE GIOTTO HALLEY MISSION c19

J. A. M. McDonnell, E. Gruen (Max-Planck Inst. fuer Kernphysik), G. C. Evans, J. G. Firth (Science Research Council, Chilton, Engl.), W. C. Carey, H. Kuczera (Technische Univ., Munich), W. M. Alexander (Baylor Univ., Waco, Tex.), D. H. Clark (Sciene Research Council, Chilton, Engl.), R. J. L. Grard (ESTEC, Noordwijk, Netherlands), M. S. Hanner (JPL, Pasadena, Calif.) et al *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 61-75 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

A detection system which registers impacts from all significant masses of particles incident on the probe during the post perihelion encounter with Halley's Comet in 1986 is described. Instrumentation comprises three separate subsystems: an impact plasma and momentum sensor (IPM), a meteoroid shield momentum sensor (MSM), and a meteoroid shield penetration sensor which is an additional channel of the MSM system. The IPM sensor is a very high sensitivity impact plasma detector which measures the simultaneous positive and negative signals caused by a charge separation of the plasma in a lateral electric field. The MSM system deploys three 200 kHz resonant piezoelectric crystals on the periphery of the meteoroid shield, yielding a sensor area of 1.94 sq m. From the amplitude of the signals from the sensors both the impact position and impact momentum can be deduced. The system is controlled and data processed by a microprocessor yielding flexible formatting for information on the 100, 000 separate events to be transmitted during the brief encounter period. Author (ESA)

N82-14117# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).

DYNAMICS AND CHEMISTRY OF COMETARY COMAS: A PRE-GIOTTO VIEW c91

W.-H. Ip *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 79-91 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

Present understanding and basic questions of cometary coma chemistry and dynamics are reviewed. Comet-solar wind interaction, the particle-and-field environment of a cometary coma, and the chemical composition for both neutral particles and ions in different regions of a coma are discussed, stressing how the Giotto mission can contribute to elucidating these phenomena. Cometary models are postulated and expected results from Giotto measurements on Halley's Comet are mentioned. Author (ESA)

N82-14118# Bern Univ. (Switzerland). Physikaliches Inst.

THE GIOTTO ION MASS SPECTROMETER c19

H. Balsiger, J. Geiss, D. T. Young, H. Rosenbauer (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), R. Schwenn (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), W.-H. Ip (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), E. Ungstrup (Danish Space Research Inst.), M. Neugbauer (JPL, Pasadena, Calif.), R. Goldstein (JPL, Pasadena, Calif.), B. E. Goldstein (JPL, Pasadena, Calif.) et al *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 93-98 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

An ion mass spectrometer for the Giotto mission is proposed. A wide range of ion species and velocity distributions are expected to be found in the interaction between solar wind and cometary plasmas. The resultant demands on instrument dynamic range preclude use of a single sensor for measurements of ion composition. The Giotto ion mass spectrometer consists of two sensors: one optimized for the outer and the other for the inner coma, with each obtaining complementary information in the region for which it is less than optimal. Both sensors have mass resolution m/Delta m = 20 and use two-dimensional detector arrays to improve time resolution. Considerable onboard data compression is used to reduce the four-dimensional measurements (mass, energy, elevation and azimuth) to the available data rate. Author (ESA)

N82-14119*# Smithsonian Astrophysical Observatory, Cambridge, Mass.

NOTES ON THE P/HALLEY NUCLEUS c91

Fred L. Whipple *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 101-103 refs (For primary document see N82-14107 05-12)

(Grant NsG-7082)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

Indirect evidence and theory concerning the nucleus of P/Halley are summarized. Reasonable estimates place its diameter in the range 2.5 to 4.0 km, but the true value may well lie outside these bounds. The observed activity in its inner coma indicates that the nucleus is spotty and contains small activity areas as do other similar comets. Whether these active areas will show as dark or light regions on the nucleus is not known. Jets of dust will probably obscure parts of the nucleus when imaged by a nearby spacecraft. Author (ESA)

N82-14120# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).

A HALLEY MULTICOLOR CAMERA c35

H. U. Keller, C. Arpigny (Liege Univ.), C. Barbieri (Padua Univ.), P. Benvenuti (Padua Univ.), L. Biermann (Max-Planck Inst. fuer Physik und Astrophysik, Munich), R. M. Bonnet (CNRS, Verrieres-le-Buisson, France), S. Cazes (CNRS, Verrieres-le-Buisson, France), G. Colombo (Padua Univ.), C. B. Cosmovici (DFVLR, Oberpfaffenhofen, West Germany), W. A. Delamere (Ball Aerospace Systems Div., Boulder, Colorado) et al *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 105-117 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

A multicolor camera is proposed which would provide high quality images of the nucleus (in four colors) and of the coma (in several filter bands) of Halley's Comet. With this experiment, the nuclear size, shape and albedo are measured while the active sublimation process of the nucleus is observed. Determination of the chemical composition (albedo variation and wavelength dependence) of the nucleus is assisted, and insight into the energy balance on the surface is gained. Observations of the inner coma provide details of the interaction of the sublimating gas with the surface and dust. A major part of the encounter is devoted to coma (gas and dust) observations in ten different wavelength (color) bands. The microcomputer of the Halley multicolor camera can also determine the trajectory parameters of the spacecraft relative to the nucleus in real time.

Author (ESA)

N82-14121# Centre National de la Recherche Scientifique, Verrieres-le-Buisson (France). Service d'Aeronomie.

THE HALLEY OPTICAL PROBE EXPERIMENT c19

A.-C. Levasseur-Regourd, J. L. Weinberg (Lab. d'Astronomie, Marseille), F. Giovane (Lab. d'Astronomie, Marseille), D. W. Schuermann (Lab. d'Astronomie, Marseille), P. Lamy (Space Astronomy Lab., Gainesville, Florida), M. Festou (Space Astronomy Lab., Gainesville, Florida), J. L. Bertaux, R. Dumont, A. Lleberia, and R. H. Giese *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 121-126 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

The concept of the optical probe is presented; it is based on photopolarimetric measurements made parallel to the direction of motion through gas and dust coma. The measurements optically characterize the interior of the coma and provide in situ information on optical properties of the grains. They also determine spatial variations of the number densities, changes in the grains size distribution and ratio of gaseous emission/dust scattering as a function of probe position. The spectral photopolarimeter to be used is described. Since all channels are analyzed by a multi-anode microchannel photomultiplier and since polarization is determined through the spacecraft rotation, the instrument is extremely simple, light, and reliable. Author (ESA)

N82-14122# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).

THE GIOTTO NEUTRAL MASS SPECTROMETER c19

D. Krankowsky, P. Laemmerzahl, P. Eberhardt (Bern Univ.), U. Herrmann (Bern Univ.), J. J. Berthelier (CNRS, Paris), M. Sylvain (CNRS, Paris), J. H. Hoffman (Texas Univ., Dallas), R. R. Hodges (Texas Univ., Dallas), U. vonZahn (Bonn Univ.), H. U. Keller (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany) et al *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 127-130 refs (For primary document see N82-14107 05-12)

Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

The chemical nature of gases and ionized species in the coma are identified and their chemical and isotopic abundances and energy distributions measured using an instrument having two sensors. The E-analyzer is a parallel plate electrostatic analyzer, and the M-analyzer consists of a parallel plate electrostatic analyzer coupled with a magnetic analyzer in a double-focusing geometry. The M-analyzer provides mass identification even for particles that have kinetic energies up to 20 eV in the comet frame. The E-analyzer determines the energy distribution of the constituents up to 2110 eV in the probe frame which for thermal species (200 K) also gives mass information, thus expanding the instrument mass range. As both the M and E-analyzer have focal plane detectors, the full mass-energy range is measured simultaneously without scanning, providing high sensitivity and a spatial resolution of about 100 km.

Author (ESA)

N82-14123# European Space Agency, Paris (France).

SPACECRAFT FLIGHT DYNAMICS

T. D. Guyenne, ed. and G. Levy, ed. Aug. 1981 503 p refs Partly in ENGLISH and FRENCH Proceedings of Intern. Symp., Darmstadt, West Germany, 18-22 May 1981

(ESA-SP-160; ISSN-039-6566) Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Analytical and computational methods used in ground-based control of satellites, software utilization, and the evaluation of satellite missions and their associated software are discussed. For individual titles, see N82-14124 through N82-14172.

N82-14124# Royal Aircraft Establishment, Farnborough (England).

RESEARCH RESULTS FROM ANALYSIS OF SATELLITE ORBITS c13

D. G. King-Hele *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 3-11 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The analysis of changes in satellite orbits caused by aerodynamic and gravitational forces as a tool to investigate the upper atmosphere and Earth gravitational field is assessed. While the technique is limited, being incapable of measuring rapid changes density or distinguishing between species of gases, it remains the best way of tracing long term variations in air density, particularly semiannual variations and changes during a solar cycle. Other uses include the provision of scale height for atmospheric models, information on rotation rate of the upper atmosphere, evaluation of zonal harmonics for gravitation studies, and lumped harmonic values for gravity field models.

Author (ESA)

N82-14125# European Space Operations Center, Darmstadt (West Germany).

A SIRIO 2 LASER RANGING EXPERIMENT c19

J. M. Dow and W. Flury *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 13-23 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The use of tracking data from the SIRIO 2 Laser Synchronization from Stationary Orbit experiment for high precision determination of a geostationary orbit is proposed. Data of decimeter or subdecimeter accuracy collected for the basic mission can be used to investigate polar motion to determine gravity coefficients for ionospheric calibration for precise orbit determination comparison with radio tracking and to calibrate the VHF ranging network used for ESA geostationary missions. Additional ranging operations to supplement routine VHF checks are needed.

Author (ESA)

N82-14126# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

ACCURATE ORBIT DETERMINATIONS FROM LASER RANGE OBSERVATIONS BY LAGEOS, STARLETTE AND GEOS 3 c13

K. F. Wakker and B. A. C. Ambrosius *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 25-35 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The effect on orbit calculation of the spatial, temporal and geographical distribution of laser data and of different perturbation models was investigated. Selected data arcs of geodetic satellites were analyzed. The data were used to determine simultaneously for the orbit the coordinates of two laser stations and the effect of atmospheric drag and gravity field models on orbit determination. The positional accuracy of the LAGFOS, Starlette, and GEOS 3 satellites is evaluated. Truncating the GEM 9 gravitational field model up to order and degree 13, yields position differences of < 15 cm for LAGEOS while GEM 10B gives position differences < 1m along track. For GEOS 3 and Starlette, position differences of of 4.5 m radial and 17 m along track are shown between the two models. Atmospheric drag modeling for GEOS 3 shows an along track position error of 30 m for an arc in which a geomagnetic storm occurred.

Author (ESA)

N82-14127# European Space Operations Center, Darmstadt (West Germany).

LUNAR GRAVITATIONAL FIELD DETERMINATION c91
W. Flury *In* ESA Spacecraft Flight Dyn. Aug 1981 p 37-45 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and No (+20% others)

Lunar gravitational field determination is reviewed and the Polar Orbiting Lunar Observatory gravity experiment is discussed. The mission baseline comprises two spacecraft; the Orbiter in a low altitude near circular polar orbit and the Relay in a high altitude trajectory. The two spacecraft allow Doppler tracking on the lunar farside (via Relay) and improve coverage in the polar regions. Covariance analysis shows that processing of Relay Doppler data permits an order of magnitude improvement in the precision of the polar moment of inertia parameter. Daily tracking sessions of 2 hours over 27 days are required. Doppler data accurate from 1 to 2 mm/sec is essential. Author (ESA)

N82-14128# Pisa Univ. (Italy). Gruppo di Meccanica Spaziale.
MODELING OF ORBITAL PERTURBATIONS DUE TO RADIATION PRESSURE FOR HIGH EARTH SATELLITES c13
L. Anselmo, P. Farinella, A. Milani, and A. M. Nobili *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 47-52 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

By general perturbations techniques, the orbital effects of radiation pressure in the semimajor axis and in longitude are computed and divided into long and short periodic ones. Long periodic effects are excluded for constant attitude spacecraft. Even for satellites with an Earth pointing antenna, for low inclination and eccentricity and for good antenna pointing, long periodic perturbations in the semimajor axis are small. However, there are longitude perturbations of secular character. The perturbations on the orbit of the SIRIO 2 satellite are computed as an example. An accurate orbit determination is possible for high, e.g., geosynchronous, satellites if orbit and attitude are carefully chosen. Author (ESA)

N82-14129# European Space Operations Center, Darmstadt (West Germany).
SPACECRAFT FLIGHT DYNAMICS AT ESOC c18
R. E. Muench *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 55-60 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The characteristics and applications of mathematical tools used by the European Space Operations Center (ESOC) for mission planning and support are outlined, including estimation methods, optimization methods; modeling (dynamics, control devices, and space environment sensors), and computer systems. Computer software used in mission planning and spacecraft evaluation is described. Support tasks are characterized as development, planning, evaluation, and consultancy. Author (ESA)

N82-14130# Aerospace Corp., El Segundo, Calif.
NAVSTAR GLOBAL POSITIONING SYSTEM (GPS): FUTURE ENHANCED CAPABILITIES c17
Mohan Ananda *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 61-71 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Aspects of GPS research are reviewed. Navigation using radio interferometric techniques, analyses leading to more accurate orbit prediction of GPS satellites, and high precision application of GPS beyond the current 16 m spherical error probability capability are discussed. Improved ground systems are advocated in order to fully exploit the radio interferometric technique. User system signal processing and data processing capabilities for high precision applications, are needed. Author (ESA)

N82-14131# Centre National d'Etudes Spatiales, Toulouse (France).
OPERATIONAL LOADS INDUCED BY ORBITAL CONTROL OF A GEOSTATIONARY SATELLITE [LES CHARGES OPERATIONNELLES INDUITES PAR LE CONTROLE EN ORBITE D'UN SATELLITE GEOSTATIONNAIRE] c15
G. Cales *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 73-80 refs In FRENCH (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The ground control structures needed for a geostationary satellite are discussed. Standardization of equipment and software used in centers; use of job specific techniques, e.g., computers (since they are easy to use and involve less time and installation costs than more powerful, multipurpose techniques); and geographical centralization which facilitates information exchange, reduces equipment expenses, and creates a readily available multidisiplinary research team are discussed. Author (ESA)

N82-14132# Amsat-Deutschland e.V., Marburg (West Germany).
THE ATTITUDE CONTROL SYSTEM OF AMSAT P 3 SATELLITES c15
Karl Meinzer *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 81-84 ref (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A system which uses an onboard 16 k byte computer to control attitude using magnetic torque and sensor data is described. Sun data is collected by crossed slit sensors. A Sun crossing time reference (signal/satellite revolution) controls a phase locked loop dividing the spin rotation into time increments. Earth sensors are pencil beam, visible light sensors 3 deg above and below the satellite equatorial plane. The computer uses Earth based, orbit based, and spacecraft spin based coordinates. Accuracy depends on sensor performance. Even with 2 deg error it is sufficient for amateur radio communication. Author (ESA)

N82-14133# European Space Operations Center, Darmstadt (West Germany).
IRREGULARITIES IN THE MOTION OF SPIN STABILIZED EARTH SATELLITES c15
L. Fraiture, N. Wiengam, and B. Chambaz (Applications Mathematiques et Logiciel, SARL) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 87-104 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Changes in spin rate of rigid spacecraft caused by slowly moving internal parts which are periodic with the orbital period and secular spin up are analyzed using data from the radiometer of METEOSAT 1, ESRO 4, and GEOS 2. A hierarchy of relative spin variations, i.e., near Earth orbital missions with eclipse thruster leakage, thermal yearly geostationary missions, and diurnal albedo geostationary missions are shown. For missions where exact spin rate and its control are important, in-flight calibration is recommended as these are difficult to predict, especially the leaking thruster effect. Author (ESA)

N82-14134*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HIGH PRECISION ATTITUDE DETERMINATION FOR MAGSAT c15
G. Abshire, R. McCutcheon, G. Summers, F. VanLandingham, and G. Meyers *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 105-116 refs Prepared in cooperation with Computer Science Corp., Silver Spring, Md. (For primary document see N82-14123 05-12)
(Contract NAS-5-24300)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 22A

A two phase approach to attitude determination software development is introduced. The prelaunch planning and software activities connected with the development and testing of the baseline system for processing nominal attitude data for MAGSAT are described and postlaunch analysis and modifications are outlined. Attitude data processing began 5 months after launch so that postlaunch anomalies could be accounted for. Another advantage of the two phase approach is that costs are reduced because the system is not burdened with software dealing with all possible contingencies. A definitive, continuous, time history of the three axis attitude of the spacecraft was generated to a precision of 20 arc sec (one standard deviation), in each axis. Sensor alignment determinations were done continuously because of the deletrious effects of changing alignments on attitude precision.

Author (ESA)

N82-14135# National Aerospace Lab., Amsterdam (Netherlands).
ESTIMATES OF SPACECRAFT ATTITUDE AND SENSOR PARAMETERS USING ADAPTIVE FILTERING: METEOSAT 1 TRANSFER ORBIT APPLICATION c18
G. Moek and C. R. Traas (Technische Hogeschool, Twente, Netherlands) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 117-131 refs (For primary document see N82-14123 05-12)
(Contract ESTEC-3319/77)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

An adaptive filtering technique which resolves filter divergence problems caused by modeling errors was developed and applied to Meteosat 1. Adaptation is applied with an intensity governed directly by the intensity of the divergence detected. Delays of IR Earth sensors spacecraft attitude were estimated. Combinations of Sun aspect angle, Earth chord, and midscan rotation angle measurements were used. Results for spacecraft attitude and Earth sensor delays are accurate to within 3 to 4 standard deviations and suggest that modeling errors are due to simple modeling of spacecraft dynamics and sensors which does not allow accurate evaluation of updated measurements.

Author (ESA)

N82-14136*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Navigation Systems Section.
DEEP SPACE NAVIGATION SYSTEMS AND OPERATIONS c17
James F. Jordan *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 135-150 refs (For primary document see N82-14123 05-12)
(Contract NAS-7-100)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 22A

The history of the deep space navigation system developed by NASA is outlined. Its application to Mariner, Viking and Pioneer missions is reviewed. Voyager navigation results for Jupiter and Saturn are commented on and velocity correction in relation to fuel expenditure and computer time are discussed. The navigation requirements of the Galileo and Venus orbiting imaging radar (VOIR) missions are assessed. The measurement and data processing systems are described.

Author (ESA)

N82-14137# National Space Development Agency, Ibaraki (Japan). Tsukuba Space Center.
GEOSTATIONARY SATELLITES LAUNCHED BY NASDA. PART 1: NASDA TRACKING AND CONTROL SYSTEM c15
T. Takenouchi and M. Suzuki *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 151-155 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Software used by the National Space Development Agency (NASDA) of Japan is described. The telemetry and command processing (on-line) and housekeeping data processing; orbit determination, including tracking data preprocessing and orbital event prediction, attitude determination, including telemetry data preprocessing and sensor event prediction; maneuver planning and command generation, including apogee kick motor firing, station acquisition and keeping, and command evaluation and the mission analysis subsystems are discussed. The system operates on-line during the launch phase and off-line during the stationary phase. The system has proven reliable for all NASDA missions.

Author (ESA)

N82-14138# National Space Development Agency, Ibaraki (Japan). Tsukuba Space Center.
GEOSTATIONARY SATELLITES LAUNCHED BY NASDA. PART 2: MISSION ANALYSIS FOR MANEUVER c15
A. Tanaka, M. Utashima, K. Inamiya (Mitsubishi Electric Corp.), T. Ogino (Mitsubishi Electric Corp.), and T. Shimizu (Fujitsu Ltd.) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 157-166 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Analyses, operational criteria and emergency operations related to the attitude and maneuvering orbit control for Japanese geostationary satellites from injection into transfer orbit to the final station are provided. The maneuver mission analysis defines base lines for preparation of maneuver task flow, judging criteria, and emergency counter plan. Sequential task flows and judging criteria are necessary for actual maneuver planning, preparations of commanding, monitoring and evaluation in order to prevent confusion and wrong operations on actual missions. These are prepared considering not only the nominal case but also off nominal missions including emergency. The topical maneuver data of actual operation on geostationary satellites are shown.

Author (ESA)

N82-14139# British Aerospace Dynamics Group, Stevenage (England). Space and Communications Div.
L-SAT STATIONKEEPING c17
J. J. Pocha and A. F. Edwards *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 169-182 (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The stationkeeping strategy for L-SAT is derived. The orbit perturbations that must be counteracted arise not only from natural sources such as triaxiality, solar radiation pressure, and lunisolar gravitation, but also from the spacecraft attitude control system operating in its normal and stationkeeping modes. The strategy is designed to allow for worst case conditions on a statistical basis and includes the effects of tracking and maneuver implementation errors. It provides for stationkeeping within the specified deadband with an optimum use of propellant.

Author (ESA)

N82-14140# European Space Operations Center, Darmstadt (West Germany).
THE USEFULNESS OF AUXILIARY TRANSFER ORBIT MANEUVERS FOR A NEAR NOMINAL GEOSTATIONARY MISSION c13
F. Hechler, M. Rosengren, and M. Soop *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 183-187 (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The usefulness of apogee and perigee raising maneuvers during transfer orbit operations in correcting errors due to launcher performance is illustrated. Maneuvers suggested are at perigee to raise the apogee and improve fuel usage, at apogee to raise the perigee in order to both improve fuel usage and decrease air drag, and between perigee and apogee to raise the perigee and reduce air drag. Depending on the amount of fuel available, these maneuvers can save a mission if hydrazine burns after apogee boost firing were used. Extra orbit burns can alleviate the risk of air drag damage to an anomalously low transfer orbit perigree.

Author (ESA)

N82-14141# European Space Operations Center, Darmstadt (West Germany).
MIDCOURSE NAVIGATION FOR THE EUROPEAN COMET HALLEY MISSION c17
Martin Hechler and Freidrich Hechler *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 189-195 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Midcourse correction modes for the Giotto mission are analyzed and an onboard algorithm for propellant estimation is developed. Omnidirectional mode (turning the spacecraft spin axis in any direction for a low gain) cardoid, S band antenna combined mode (using a despun high gain antenna together with thermal and power conditions), and contingency modes used in case of thruster failure are used with axial continuous burn or radial pulsed burn. The use of these modes and propellant budgeting methods is investigated using the discretization method. Optimization is important for Giotto in case malfunctions in the initial stages prevent its close approach to the target.

Author (ESA)

N82-14142# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Wesseling (West Germany).

STATION ACQUISITION AND STATIONKEEPING WITH LOW THRUST SYSTEMS c13
M. Eckstein and F. Hechler (ESOC, Darmstadt, West Germany) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 197-208 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Optimum control problems with low thrust station acquisition and stationkeeping during geostationary missions are linearized and solved by discretization of the thrust times and the thrust directions. This technique has considerable advantages in comparison to the classical methods, especially in the presence of constraints, on maneuver times and directions. A procedure applying the discretization method to a sequence of fuel-optimal minimum problems can be used to solve certain time minimum problems even in cases where classical methods fail. The rope stretching method is used to derive algorithms for the long-term strategy of correcting eccentricity perturbations. Examples of short-term and long-term optimal control problems associated with low thrust systems demonstrate the capacity of the methods. Author (ESA)

N82-14143# Columbia Univ., New York.
AN INVESTIGATION OF THE ANOMALOUS ATTITUDE MOTION OF THE ISEE B SPACECRAFT c13
Richard W. Longman and J. Andre Massart (ESOC, Darmstadt, West Germany) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 211-224 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

An unexpected spin rate fluctuation of ISEE B is discussed. A temporary improvement achieved by attitude maneuvers only lasted 10 days. Since spin rate data do not show persistent decay, environmental sources of perturbation were studied. As apogee altitude excludes atmospheric drag and orbital eccentricity minimizes gravitational and magnetic field effects, solar influence was investigated. The equations of motion relevant to solar radiation pressure are derived. Although the numerical results are not conclusive, they suggest that solar radiation pressure alone is not sufficient to explain the spin ripple phenomenon. Analytical isolation of any steady oscillation or limit cycles is difficult because of the nonlinear nature of the excitation and the small amount of damping in the system. Author (ESA)

N82-14144# European Space Agency, Toulouse (France). Earth Observation Programme Office.
A EUROPEAN FLIGHT DYNAMICS EXPERIMENT c15
P. Boland *In its* Spacecraft Flight Dyn. Aug. 1981 p 225-232 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The interaction between spin velocity and torque produced by a thruster on the main body of Geos 1 parallel to the spin axis was investigated, using a model consisting of a rigid body and two hinged bars. This predicted that a maneuver involving a long, continuous burst of the thruster would result in a rapid reduction in spin velocity which would destabilize the spacecraft. Theoretical investigations confirm this and the maneuver was modified. An inflight test bears out the predictions, emphasizing the need for complete models of satellite dynamic behavior. Author (ESA)

N82-14145# Instituto de Pesquises Espaciais, Sao Paulo (Brazil). Inst. de Pesquisas Espacias.
OPTIMAL LINEAR ESTIMATION AND SUBOPTIMAL NUMERICAL SOLUTIONS OF DYNAMICAL SYSTEMS CONTROL PROBLEMS c63
Atair Rios Neto and Luiz A. Waack Bambace *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 233-237 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A procedure which generates open loop suboptimal numerical solutions is proposed. The approximation of the control by a function dependent upon a finite number of parameters and the use of a linear perturbation scheme associated with a direct search criterion, reduce the problem to one of parameter optimization in each iteration. A stochastic approach to establish the search criterion and to treat the errors due to the first order approximation makes it possible to arrive at the search increment using optimal linear estimation. The procedure is applied to trajectory control and attitude maneuvers during transfer orbits. Author (ESA)

N82-14146# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
LINEAR PROGRAMMING AND SUBOPTIMAL SOLUTIONS OF DYNAMICAL SYSTEMS CONTROL PROBLEMS c63
Decio Castilho Ceballos and Atair Rios Neto *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 239-243 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Linear programming is used to obtain a direct search procedure for parameter optimization in the numerical solution of dynamical systems control problems, including those where state inequality constraints are present. The procedure applies to optimal control problems where the Rayleigh-Ritz method is used to obtain a suboptimal approximation, imposing a particular mathematical form on the control function, and making it dependent on a finite number of parameters. Due to its characteristic of reducing the problem in each iteration to one of optimization of a direct search increment vector of parameters, inherent plant parameters are easily treated. This characteristic implies having perturbations in the final states which explicity depend on the control parameters demonstrating that state inequality constraints can be included without the need of using penalty function methods. Author (ESA)

N82-14147# Universite Catholique de Louvain (Belgium).
PARTITIONING METHODS FOR IDENTIFICATION AND CONTROL OF FLEXIBLE SPACECRAFT c18
G. Campion and P. Y. Willems *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 245-251 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Results obtained in the estimation of the state vector and in the parameter identification of a linear model of Geos are presented. The sequential decision technique based on a binary quantization procedure is used. This method is tested with simulated data as well as with in-flight data provided by telemetry. Numerical results show good parameter identification, although when many have to be identified simultaneously, decision criteria must not be too severe. In-flight data from accelerometers are close to predicted values, but magnetometer data are available only for spin motion, so parameter identification is limited to preliminary steps. Author (ESA)

N82-14148*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FUTURE IN GROUND BASE ATTITUDE SUPPORT ACTIVITIES c14
R. D. Werking and L. J. Happel (Old Dominion Systems Inc.) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 255-262 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 22D

The history of attitude support activities is traced. Support for a conventional mission and for the Solar Maximum Mission (SMM) are compared. The trend is towards more onboard data processing, with the ground computer playing a supportive, rather than governing role. This eliminates the need for large amounts of data transfer, enabling rapid delivery of ancillary data products. In SMM, attitude is included in the telemetry stream. The need for ground support is unlikely to diminish in the near future, since onboard computations still have to be checked. Author (ESA)

N82-14149# European Space Research and Technology Center, Noordwijk (Netherlands).
ON SPIN MANEUVERS WITH A SYMMETRIC SATELLITE c15
F. Janssens *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 263-268 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Formulas for calculating nonideal spin maneuvers with a symmetric satellite, e.g. Meteosat, are presented. These maneuvers generate a nutational motion and an attitude change. Self excited rigid body formulation was employed. The nutation is described by Fresnel integrals and formulas giving the maximum nutation and its rate of decrease are extracted. A closed form result for a small attitude change caused by a pure spin up thruster in the presence of initial nutation and by a general thruster on a Kovaleski top is quoted. Author (ESA)

N82-14150# National Aerospace Lab., Emmeloord (Netherlands).

THE OBSERVATION PLANNING FACILITY FOR THE INFRARED ASTRONOMICAL SATELLITE (IFAS)

c14

E. Oord, P. J. dePagter, R. C. vanHoltz, and J. R. Mcdougall (Rutherford and Appleton Labs., Chilton, England) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 269-280 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The software that generates and schedules observations to enable IRAS to perform an all sky infrared survey and to observe other sources is described. The onboard computer consists of 2 processors, 64 K words of solid state memory and 2 455 Mbit taperecorders to allow the satellite to store an observations sequence, execute these in a time tagged manner, and store the resulting data. The planning facility correlates observation with other tasks, and provides human readable versions of observation programs. Although routine tasks are done automatically, manual intervention is possible. Author (ESA)

N82-14151# European Space Operations Center, Darmstadt (West Germany).

SOFTWARE FOR THE RESCUE OF NONNOMINAL MISSIONS

c61

Guy Janin *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 281-283 ref (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Software system for mission planning of emergency situations occuring during partial mission failures are discussed. General mission analysis software which can be quickly adapted to an unexpected situation is required. A skeleton program, corresponding to the most general task and consisting of a succession of calls to subroutines, is designed. A collection of functional modules are stored in a library for use along with dummies to fill in the program. Standard algorithms are used, decided by the function rather than give the mathematical aspect preeminence. This approach is useful for orbit computation since it allows quick verification of orbital stability, eclipse times, visibility from ground stations, and other mission constraints for the proposed orbit, if an emergency arises during a mission. Author (ESA)

N82-14152*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

PRESENT STATUS AND FUTURE TRENDS IN NEAR-EARTH SATELLITE ORBIT DETERMINATION

c13

A. J. Fuchs *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 287-292 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 22A

The major components of an orbit determination system and the evolution of the elements making up each component are reviewed. Typical accuracies presently achievable in the orbit determination process, the factors limiting the accuracies, and improvements in the dynamic models used in the process are summarized. Models are developed for orbit determination programs which include: (1) time varying area for solar radiation pressure; (2) a time varying model for albedo radiation pressure; (3) Earth tides which account for the distortions in the Earth's body due to Sun and Moon attraction; and (4) ocean tides which affect satellite altimeter data. Author (ESA)

N82-14153# European Space Operations Center, Darmstadt (West Germany).

A SIMPLE APPROACH TO SOLVE THE METEOSAT IMAGE DEFORMATION PROBLEM BASED ON HORIZON EXTRACTION FROM IMAGE DATA AND ORBIT INFORMATION

c74

T. Wolff *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 293-298 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A method which determines in a restitution mode Meteosat image deformations of an image taken under nominal conditions is proposed. An iterative procedure for refined determination of the attitude derived from northern and southern polar horizon scan limits extracted from infrared image data is employed to be known with sufficient accuracy. The model can be applied, accurately using a pocket calculator, at any point of the Earth and no numerical problems are involved. The model is much faster than its predecessors, with only the inclusion of automatic landmark registration needing a lot of computer time. Author (ESA)

N82-14154# Analytical and Computational Mathematics, Zurich (Switzerland).

AN ANALYTICAL SINGULARITY-FREE ORBIT PREDICTOR FOR NEAR-EARTH SATELLITES

c13

G. Scheifele *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 299-306 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A completely analytical, first order satellite theory intended for low Earth orbits is presented. Perturbations are unified under the nonsingular Poincare Similar element formulation. The theory includes: short period, long period and secular effects of J2 and all higher zonal harmonics; secular and quadratic effects of atmospheric drag; and the average mean motion considering all harmonics of the geopotential. Recursive equations are used instead of explicit formulas. In the drag theory, the density model accounts for not only changes in altitude, but also the important effects of the Sun and its location. The theory is implemented in an operational computer program. Author (ESA)

N82-14155# Chinese Academy of Sciences, Peking. Space Science and Technology Center.

ASPECTS IN MEASURING AND CORRECTING OF SATELLITE ORBIT

c13

Liu Zhong-yu and Gao Huai-bao *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 307-309 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris F 160 Member States, AU, CN and NO (+20% others)

Orbit calculation based on the initial ephemeris of the orbit along with the Doppler frequency data obtained from four ground stations, and a method for correcting the initial elliptical orbit using low thrust and short operation duration are discussed. Using the orbital differential correction method, more accurate orbit parameters are obtained. The orbit transfer and the control equations are derived. Numerical examples are presented. Attitude errors which occur during maneuvers are best corrected by manipulating yaw angle. Author (ESA)

N82-14156# Telespazio, S.p.A., Rome (Italy).

SIRIO 2 LASSO MISSION: GEOSYNCHRONOUS SATELLITE LASER STATION RANGING DATA ORBIT DETERMINATION SIMULATIONS

c13

G. Vulpetti *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 313-323 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A predicted/updated estimation procedure, equivalent to Kalman filtering driven by white noise for the LASSO mission is presented. Analyzing the root-mean-squares of the cartesian components of the estimated error in position and velocity as a function of time and the number of observations, an almost steady state can be reached. In such environments, by processing periodical sets of some hundreds of 2 to 3 m noisy range values, precision one order of magnitude better than a VHF based estimation is achieved. It is suggested that precision can be further improved by adding astronomical angle data like azimuth and elevation. Author (ESA)

N82-14157# Indian Space Research Organization, Bangalore.

ORBIT AND ATTITUDE DETERMINATION FOR BHASKARA

c13

R. S. Bhat, P. Rajendra Prasad, N. Ramani, P. Padmanabhan, and K. Harendranath *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 325-332 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

An analytical orbit determination program is evaluated. During the early phase of the mission, satellite position was determined to an accuracy of 500 m, using interferometry data. An empirical method which uses times of closest approach data from a one way Doppler system reduces along track error to within 10 km is examined. Orbit decay is higher than predicted. The extended Kalman filter is used for attitude calculation data analysis, achieving 0.5 deg accuracy. It is concluded that a program which employs direct search, using simplexes, is more stable than an ordinary least square when data are limited. Author (ESA)

N82-14158# Mathematischer Beratungs- und Programmierungsdienst G.m.b.H. Dortmund (West Germany).

QUALITY CONTROL FOR MISSION-CRITICAL FLIGHT DYNAMIC OPERATIONS c38

H. Mueller and R. E. Muench (ESOC, Darmstadt, West Germany) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 333-340 ref (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20 % others)

Quality control requirements predominant for mission critical operations are illustrated by using Meteosat transfer orbits. Quality in flight dynamics is defined as numerical accuracy and stability, environment modeling accuracy, spacecraft subsystem compatibility, ability to cover non-nominal mission performances, and ability to cope with the environmental conditions. Mission critical operations emphasis is on: (1) software system consistency; (2) availability of tools and awareness of staff for the solving of unforeseen problems; and (3) compatibility between the mission timeline and flight dynamics operations. Author (ESA)

N82-14159# TRW Systems Group, Redondo Beach, Calif.

GLOBAL GEOMETRY TECHNIQUES FOR MISSION ANALYSIS

James R. Wertz *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 343-351 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A33/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The application of inertially fixed and spacecraft fixed global geometry plots to mission planning is discussed in relation to: (1) attitude determination and accuracy; (2) Sun, Moon and Earth interference; (3) eclipses; (4) tracking and data relay satellite system; and (5) launch windows. Spacecraft centered observations are used to obtain an understanding of spacecraft geometry which ensures that solutions to mission problems are based on engineering judgement rather than partial parametric studies, although these remain essential in the later stages. Global geometry techniques are faster and cheaper than parametric analysis. Author (ESA)

N82-14160# European Space Research and Technology Center, Noordwijk (Netherlands).

THE DYNAMIC ATTITUDE RECONSTRUCTION METHOD c17

A. G. Bird, L. Fraiture (ESOC, Darmstadt, West Germany), J. C. VanderHa (ESOC, Darmstadt, West Germany), and P. Kohler (Ecole Polytechnique Federale de Lausanne, Switzerland) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 353-360 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Operational software improvements to a method which uses information contained in the temporal evolution of the Earth colatitude and the Sun Earth azimuth angles, are described. The colatitudes and their derivatives are estimated by Kalman filter, using an observation model derived from a Kepler orbit. Three different attitude estimates follow directly from the Kalman estimates. A single attitude estimate is obtained by a weighted least squares combination of the Kalman filter outputs and the Sun measurements. In near colinearity of Sun and Earth vectors, the attitude estimate remains stable, whereas conventional methods diverge. Author (ESA)

N82-14161# National Aerospace Lab., Amsterdam (Netherlands).

THE USE OF ESA STARMAPPER MEASUREMENTS FOR SPACECRAFT ESTIMATION: ESTIMATOR DESIGN RATIONALE AND RESULTS c13

P. T. L. M. vanWoerkom, F. J. Sonnenschein, and G. Moek *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 361-372 refs (For primary document see N82-14123 05-12)
(Contracts ESTEC-2383/75/AK; ESTEC-3625/78/AK; ESOC-4133/79/D-IM)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Attitude estimation algorithms for processing starmapper data are outlined. The error in the averaged estimate is one arcminute. An operator which adjusts estimator tolerances and/or trigger levels is included. Measurements are taken over one nutation period, or less, on line estimation results are sufficient. The recursive processor uses the output from the batch processor as input. It uses a reduced sky model, monitors operation of the estimation process on line, introduces statistical adaptation when necessary, and produces more detailed information on the attitude motion of the spacecraft, misalignments of the starmapper, spacecraft mass redistribution, and external torques. Author (ESA)

N82-14162# Indian Space Research Organization, Bangalore.

VALIDATION AND OPERATIONS EXPERIENCE RELATED TO ORBIT AND ATTITUDE SOFTWARE OF BHASKARA c13

K. S. Prabhu, S. K. Sinha, N. Ramani, C. Sreehari Rao (SHAR Centre, Sriharikota, India), and P. Soma (SHAR Centre, Sriharikota, India) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 375-383 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Software which meets a position accuracy requirement of + or - 4 km and attitude accuracy of + or - 3 deg for control purposes and better than 1 deg for post facto data processing was developed. An extended Kalman filter algorithm is used in near real time for attitude refinement. A geometrical method is used for initial estimation. A modified version which uses sensor and orbit data is used postfacto. Mission performance confirms predictions, even for unforeseen circumstances. The standard deviation in position determination is 500 m. Author (ESA)

N82-14163# European Space Operations Center, Darmstadt (West Germany).

SPACECRAFT TRACKING CAMPAIGNS AND THE ASSESSMENT OF ORBIT DETERMINATION ACCURACY c17

S. Pallaschke *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 385-395 (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Transfer orbit determination, based on VHF tracking and geosynchronous orbit determination with single station tracking are discussed. Analysis of VHF tracking of OTS 2 and VHF plus S band tracking of Meteosat shows that the ionospheric model performs well. A comparison test of S-band and VHF shows a difference of 200 m in semimajor axis, and an 8 km position difference. Single station tracking data for OTS shows good stability. More accurate calibration (detection of systematic offsets), by using radio stars, is needed to eliminate long-term variations. Author (ESA)

N82-14164# National Space Development Agency, Ibaraki (Japan). Tsukuba Space Center.

OPTIMIZATION OF APOGEE KICK MOTOR (AKM) FIRING ATTITUDE c20

M. Hirota, A. Tanaka, C. Abe (Fujitsu Ltd.), and T. Shimizu (Fujitsu Ltd.) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 399-406 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Error propagation from the AMF parameters to the drift orbital elements is discussed. Geometrical solutions of the AMF attitude which give the typical drift orbits are presented. Optimum

AMF attitude is obtained by taking into account residuals of the AMF parameters: (1) increment velocity vector of AMF; (2) operational constraints for the stationing maneuvers; (3) effect of the attitude reorientation maneuver; and (4) post burn. Considering the effect of reorientation and post burn maneuvers, an iterative process calculates points on the error ellipsoid which give the maximum stationing fuels, and if the difference between these values is less than the tolerance the optimum point is reached.
Author (ESA)

N82-14165# National Space Development Agency, Ibaraki (Japan). Tsukuba Space Center.

EAST-WEST STATIONKEEPING MANEUVER
c18

M. Utashima, A. Tanaka, T. Tohchi (Fujitsu Ltd.), and T. Ogino (Mitsubishi Electric Corp.) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 407-415 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Perturbations of a gestationary orbit and effects of an impulsive velocity increment were analyzed. Stationkeeping maneuvers based on a sun synchronized method (SSM) are evaluated for a communications satellite (CS). The SSM uses tangenital velocity impulses at the same time each day to correct drift. Maneuvers are performed every 21 days with a velocity increment of 0.1 m/sec, consuming 0.002 kg of hydrazine. The maneuvers lean towards the left due to the error in the semimajor axis resulting from orbit determination. These account for 50 m of the error.
Author (ESA)

N82-14166# National Space Development Agency, Ibaraki (Japan). Tsukuba Space Center.

INCLINATION CONTROL USING A PULSE MODE AXIAL THRUSTER
c15

M. Suzuki and K. Yoneyama *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 417-420 (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The use of a pulse mode axial thruster for inclination control of spin stabilized satellites is discussed. Computer simulations show that if attitude is controlled along the normal attitude plane an hour before crossing over the descending node, efficiency is reduced by 3% compared with control at the descending node, and by 10% at other times, so a control within one hour of descending node was used for in-flight tests. Attitude maneuvers were carried out in two stages to prevent Sun or Earth sensors losing their objectives during a long operation. Normal attitude was regained after further maneuvers. This method is longer than continuous mode thrusting but fuel consumption is similar.
Author (ESA)

N82-14167# Centre National d'Etudes Spatiales, Toulouse (France).

SKYLAB DECAY FOLLOW-UP
c14

J. P. Carrou *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 421-430 ref (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Skylab orbit decay and tracking procedures used for reentry predictions are described. Data from military and civilian radars were processed and used to compute a decay window which minimized risk to inhabited regions. Orbit control was achieved by modifying drag force to influence attitude. Semimajor axis drift was calculated and used to update predictions. The areas overflown during the final orbits were pinpointed 5 days previously. By reentry day it was possible to state that there was no danger of Skylab landing on France.
Author (ESA)

N82-14168*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

OPERATIONAL COMPENSATION FOR EFFECT OF CLOSE TITAN FLYBY ON REMAINDER OF VOYAGER 1 SATURN NEAR ENCOUNTER

Richard P. Laeser *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 431-440 (For primary document see N82-14123 05-12) (Contract NAS7-100)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The satellite instrument pointing update process (SPUP) developed for the Voyager 1 Saturn encounter is assessed. At certain times, navigation errors translated into target pointing errors, impede camera operation. Two sigma pointing accuracy of 1.5 to 2.0 mrads per axis was required.The SPUP combines correction slews implemented by immediate action commands with preevent modifications. The process worked perfectly, producing good quality images of target areas.
Author (ESA)

N82-14169# Science Research Council, Chilton (England). Rutherford and Appleton Labs.

ACS PERFORMANCE VERTIFICATION FOR IRAS: SOFTWARE ENGINEERING AT THE OPERATIONS CONTROL CENTRE
c61

L. P. Baldwin *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 443-450 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The software engineering approach to support in orbit checkout, performance verification, and maintenance of the IRAS ACS are described. For in orbit checkout, a simple set of software is used to extract attitude related data from the observations required for the on-off calibration of the ACS units. During routine operations, however, a more complex set of software is used to perform an automatic analysis of attitude related data, extracted in general from the normal observing program, for regular monitoring of the various ACS performance characteristics. Testing shows adequate performance of individual units and the system as a whole.
Author (ESA)

N82-14170# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Space Div.

IN ORBIT CHECKOUT OF THE IRAS GYROSCOPES
c18

J. F. M. vanCasteren *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 451-459 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The IRAS gyroscope package and factors which affect mission operations are described. The gyro sensor contains four gyros, one of which is redundant. A thermal control circuit and an optical cube to enable correct axes alignment at integration are included. For each satellite axis, one gyro controls and reconstructs attitude, making the gyro package a prime sensor for the mission. For control, the transfer function is assumed constant for 2 weeks. For reconstruction, a Kalman filter reestimates the transfer function parameters each second. The control and reconstruction accuracy of the primary observation modes, the survey scan, the low speed raster scan, and pointing are increased by calibrating the gyro transfer function at the applicable angular velocities about the input axis. Author (ESA)

N82-14171# Officine Galileo S.p.A., Florence (Italy).

INFRARED RADIANCE MODEL VARIATION BY SENSOR FLIGHT MEASUREMENTS
c43

R. BaldasslniFontana, D. Sciacovelli (ESTEC, Noordwijk, Netherlands), and L. Fraiture (ESOC, Darmstadt, West Germany) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 461-478 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The NASA and BAC-ESR 4 IR radiance models of Earth, applied to attitude sensor calibration, are compared. The sensors are IR pencil beams on spinning satellites. Flight measurements of Geos 2 and OTS transfer orbits were compared to simulations from a model which describes the optics, detector and electronics of the beam, based on directly measured parameters and laboratory test data. The models performed equally well. It is shown that anomalies in preflight calibration can be detected. A small mismatch of the optical axis inclination of a Geos 2 IR telescope was observed.
Author (ESA)

N82-14172# Engins Matra, Velizy (France).

THRUSTOR PERFORMANCE MODELING AND PARAMETERS ESTIMATION
c20

P. E. Bourg *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 479-484 refs (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The impact of temperature, pressure, and aging on thrustor behavior in pulsed and continuous burn modes was analyzed. Flight analysis of spin and three axis stabilized cases indicates maneuvers for which telemetered data allows identification algorithms to be applied: for three axis stabilized, nutation motion in normal operational mode and fixed momentum wheel unloading and for spin stabilized cases, spin axis reorientation and north south stationkeeping. Computer programs were checked on telemetry data and it is shown that it is not necessary to vary all control parameters to explain particular aspects of control loop behavior. Author (ESA)

N82-14173# European Space Agency, Paris (France).
OTS: 3RD YEAR IN ORBIT
Aug. 1981 222 p refs Presented at Intern. Conf. on Results of Tests and Expt. with the European OTS Satellite, London, 8-10 Apr. 1981
(ISBN-0-8529-6244-4; ISSN-0537-9989) Avail: NTIS HC A10/MF A01

The history and applications of OTS are discussed. Tests performed to aid in design of the European Communications Satellite, calibration, and performance tests, data transmission for both analog and digital television, use of ground station, and multiple access telephony systems are covered. For individual titles, see N82-14174 through N82-14198.

N82-14174# European Space Agency, Paris (France).
PERFORMANCE OF THE ORBITAL TEST SATELLITE (OTS) DURING ITS THIRD YEAR OF OPERATION IN ORBIT c15
In its OTS: 3rd Year in Orbit Aug. 1981 71 p (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Operation of the ESA geostationary telecommunication satellite, OTS, is assessed. The orbital test program is introduced. Spacecraft subsystems are described, including situation reports. Subsystems covered are: repeater, antenna, attitude and orbit control, power, and thermal control. Author (ESA)

N82-14175# Interim Eutelsat, Paris (France).
OVERVIEW OF THE OTS EXPERIMENTAL PROGRAM
P. Barthmann *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 7-11 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

The history of OTS and the establishment of the orbital test program (OTP) are outlined. The OTP consists of data transmission tests, i.e., telephony, propagation experiments, and television broadcasting. Various other tests, not falling within the original mission parameters, are also carried out, e.g., research into digital television. Author (ESA)

N82-14176# British Aerospace Dynamics Group, Stevenage (England). Space and Communications Div.
GENERAL DESCRIPTION OF THE ORBITAL TEST SATELLITE (OTS) c15
D. E. McLaurin and D. N. Gregory *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 12-17 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

The OTS is a three axis stabilized vehicle designed for a minimum 5 year life in geosynchronous orbit with the individual satellite equipment designed for 7 year life operation. The modular approach adopted in the satellite design and in most equipment is identical to that used for the subsequent European Communications Satellite. The OTS consists of a service module providing all the basic service functions and a communication module carrying the payload. The configuration comprises two solar array paddles, each consisting of two hinged panels which are attached to the bearing and power transfer assemblies mounted on the north and south sides of the satellite being aligned along the satellite pitch axis. During launch and transfer orbit, the arrays are folded against the satellite sides so that half of their surface is exposed to provide power during this phase of the mission whereas in normal operation the arrays are deployed and steered to track the Sun. Author (ESA)

N82-14177# Telespazio, S.p.A., Rome (Italy).
ATTENUATION STATISTICS OBTAINED WITH OTS c32
P. Ferrazzoli, G. Brussaard (ESTEC, Noordwijk, Netherlands), L. Piccolomini, and A. Laloux (Univ. Catholique de Louvain, Belgium) *In* ESA OTS: 3rd Year in Orbits Aug. 1981 p 18-21 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Attenuation results in the form of single strong events and cumulative values are presented. In the 14 GHz uplink experiment 10 Earth stations transmitted two circularly polarized beacons each. One beacon, polarized in the same sense at the satellite receiving antenna, is used to measure attenuation. The other one transmits in the orthogonal polarization at a frequency 5 KHz higher than the corresponding beacon and is used to measure cross polarization. Single events considered include relationships between downlink beacon attenuation and radiometric attenuation, and attenuation between pairs of beacons. Large variations in results indicate that data from a longer timespan must be collected if useful conclusions are to be drawn. Author (ESA)

N82-14178# British Telecommunications Research, Ltd., Taplow (England).
DEPOLARIZATION MEASUREMENTS AT 11 AND 14 GHz WITH OTS c32
J. Thirlwell and N. J. McEwan *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 22-32 refs Prepared in cooperation with Bradford Univ., England (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

The OTS provides a linearly polarized beacon transmitted at 11.6 GHz and a circularly polarized one at 11.8 GHz. Crosspolar discrimination (XPD) is used as the measure of depolarization. A single event is used to illustrate effects. Methods of presenting joint XPD/attenuation statistics are shown. Linear polarization is superior to circular. Frequency scaling of XPD is assumed to follow theoretical predictions, but more data are needed. Wet snow on the ground station antenna produces XPD effects more severe than those of propagation effects. For scaling ice depolarization and XPD cumulation statistics, a modified scaling curve is suggested. Author (ESA)

N82-14179# Swedish Telecommunications Administration, Farsta.
CORRELATING OTS BEACON MEASUREMENTS WITH RADIOMETER AND RAINFALL DATA c32
Lennart Hansson *In* ESA OTS: 3rd year in Orbit Aug. 1981 p 33-36 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

The equivalent media temperature (EMT) used in radiometer attenuation evaluations is treated. Measured attenuation and rain rate statistical distributions are used to check an equivalent distance model. For EMT, rain attenuation was measured for two beacon frequencies, using beacon signals, and calculated from radiometer values of antenna noise temperature increase using a fixed EMT value of 270 K. Reliable data are obtained. The 5 year average statistical distribution of attenuation can be estimated to within 5% from the 5 year average rain rate distribution for any 5 year period using the same equivalent distance curve (obtained from floating 5 year average distributions over a 7 year period). The error is within 0.5 db, even at the 10 db level. Author (ESA)

N82-14180# Interim Eutelsat, Paris (France).
IMPACT OF OTS PROPAGATION RESULTS ON THE ECS SYSTEM c32
J. Dutronc and J. C. Raison *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 37-40 ref (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Fade and cross polarization results obtained from OTS are considered along with other propagation parameters (scintillation, atmospheric noise) in relation to the design of ECS. Results support the proposed design, but improvements are possible in polarization and frequency scaling of parameters, model for ice only crosspolar discrimination (XPD) statistics, and attenuation/XPD joint statistics. Further analysis is required, since results show large variations between ground stations. For a detailed

assessement of any given ECS link, a country by country scaling of statistics is needed.
Author (ESA)

N82-14181# European Space Agency, Noordwikj (Netherlands).
PLATFORM PERFORMANCE FACTORS AFFECTING LINK BUDGETS OF GEOSYNCHRONOUS COMMUNICATION SATELLITES
c15
L. vanHoltz and S. Fagg *In its* OTS: 3rd Year in Orbit Aug. 1981 p 41-47 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Problems of maintaining the communication antennas pointed accurately and controlling the orbit parameters so that movement relative to the Earth is minimized, are treated. The OTS is used to illustrate how natural forces tend to depoint the satellite and also disturb the otherwise perfect geostationary orbit. Experiments on OTS to reduce the latitude and longitude station-keeping deadband to + or - 0.035 deg are discussed. Attitude variations of as little as 0.05 deg can be observed in signal strength measured at the Earth stations. Monitoring these variations can be used when large maneuvers are to be conducted for purposes like changing coverage, or antenna pattern mapping.
Author (ESA)

N82-14182# European Space Agency, Noordwikj (Netherlands).
RESULTS OF TESTS ON THE SATELLITE SPOTBEAM ANTENNA
c32
N. Neale, P. Daly, and L. vanHoltz *In its* OTS: 3rd Year in Orbit Aug. 1981 p 48-52 ref (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Antenna performance was measured for OTS, using ground station recording of received signal levels while the satellite was allowed to swing to precise locations in a rectangular grid surrounding nominal beam center. Day/night beamswing caused by thermal stress was measured at night at 50 C, and by day at -140 C. Reliable antenna contours were produced within 24 hours of test completion. Beam movement of the spotbeam agrees with prelaunch predictions. Day/night gain variations can be directly related to received power flux density. Accuracy in determining beam center position is 0.1 deg absolute, with 0.04 deg repeatability.
Author (ESA)

N82-14183# Fernmeldetechnisches Zentralamt, Darmstadt (West Germany).
RESULTS AND CONCLUSIONS FROM THE RF CLASSICAL TRANSMISSION TESTS FROM THE POINT OF VIEW OF THE TELECOMMUNICATION AUTHORITIES c32
H. Kleinschmidt, J. LeLigne (Centre National d'Etudes des Telecommunications), E. Saggese (Telespazio Spa), Y. Tharaud (Centre National d'Etudes des Telecommunications), and P. Tutton (British Telecom International) *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 53-55 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Practicability and accuracy of verification tests of radio electrical characteristics of the complete link and the possibility of dividing ground station parameters from satellite parameters are discussed in relation to monitoring OTS. Test stations working in the 11/14 GHz bands, fully representative of future traffic stations for Eutelsat, performed tests on satellite parameters, including phase shift, cross polarization, gain, and amplitude/frequency characteristics. While key satellite parameters are measured with reasonable accuracy and repeatability, ground station parameters, e.g., antenna gain, must be more precisely calibrated.
Author (ESA)

N82-14184# Filtronic Components Ltd., Leeds (England). ESA Communications Satellite Dept.
RESULTS AND CONCLUSIONS OF RF PERFORMANCE TESTS MADE BY ESA
c32
C. D. Hughes and R. A. Gough *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 56-64 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Results of tests on OTS antennas (gain and gain stability of repeaters, payload, flux density, and amplitude/frequency response of repeaters) are discussed. Data were collected on an intensive basis during the first months postlaunch, followed by measurements at 6 month intervals. Results indicate that measurements possible with OTS, e.g., on antennas or flux, are not practical on commercial satellites because of damage risks and different ground support systems. On-line measurements are recommended to make satellites operational as quickly as possible. The test shows that OTS equipment is suitable for inclusion in the European Communications Satellite (ECS), although one antenna appears to have suffered mechanical damage and an amplifier failed after a few months.
Author (ESA)

N82-14185# British Telecom International (England).
RESULTS AND CONCLUSIONS OF THE 60 MBIT/SEC DIGITAL TRANSMISSION TESTS c32
D. Prouse *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 65-68 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Results from breadboard models are compared with tests carried out by ground stations for OTS digital transmission. In-band impairment, interchannel interference, and noise interference were examined for their effect on bit error rate (BER). Results show good agreement between predictions and real data. Differences between given ground stations are attributed to individual demodulators responding in different ways to an impairment. Judged by the 60 Mbit/sec standard, the 40 MHz transponders of OTS perform well, although failure of the traveling wave tube amplifier in the transponder for the orthogonal polarization signal meant that investigations were limited to the uplink.
Author (ESA)

N82-14186# Telespazio, S.p.A., Rome (Italy).
RESULTS AND CONCLUSIONS OF THE 120 AND 180 MBIT/SEC DIGITAL TRANSMISSION TESTS c32
A. Vernucci *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 69-73 Sponsored by Interim Eutelsat (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Single channel and cochannel interference tests were performed on the OTS transponders at 120 and 180 Mbits/sec in order to test their suitability for inclusion in the European Communications Satellite (ECS). Ground stations were used to check breadboard model predictions of systems performance. Although at 120, band-edge effects were not considered, and at 180, transponder amplitude was absent, results predict degradation at high data rates for ECS. Additional degradation is expected due to multipath and adjacent channel interference. More data is required, especially since a demodulator, which comes within specifications in the back to back mode, may have problems in the real environment. Other aspects, e.g. absolute encoding, burst to burst power variation, and the 40% cosine roll of filters, also require further investigation. Author (ESA)

N82-14187# European Space Agency, Paris (France). OTS-TDMA Experimenters Group.
TDMA/DSI SYSTEM TESTS AND TELEPHONY CHANNEL TESTS VIA THE ORBITAL TEST SATELLITE (OTS) c32
A. Bernard, T. Hentrich, H. Jack, A. Patacchini, D. Prouse, and N. Deacon *In its* OTS: 3rd Year in Orbit Aug. 1981 p 74-78 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Tests conducted at 120 Mbits/sec at 11/14 GHz are reported. Reference bursts were simulated by ground stations. Pseudorandom interference was added to the uplink and noise to the downlink, providing degraded link conditions. The OTS 120 MHz transponders which handle linear orthogonal polarized signal were used. System performance is good, with the synchronization accuracy of + or - 2 symbols attained even during highly degraded link conditions. Telephony channel results are incomplete due to equipment anomalies. Author (ESA)

N82-14188# British Telecom International (England).
RESULTS AND CONCLUSIONS FROM TELEPHONE SIGNALING TESTS THROUGH TDMA/DSI SYSTEM c32
M. L. Kerridge *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 79-82 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

An analog line signalling system for use via the European Communications Satellite was tested on OTS. Clipping of interregister signalling and the effect of freeze out, i.e., when demand for channels exceeds supply, were subjected to normal (gain = 2, activity/circuit 30%) and overload (gain = 2.4, activity 0%) conditions. Installed capacity was 120 terrestrial channels (TC) and 60 satellite channels. The use of a speech activity simulator allowed up to 240 TC's to be simulated. Performance is good, with no clipping under normal conditions. During overload, call failures due to loss of the pulsed register signal are low. Clipping is reduced by using satellite overload channels, and is affected by the level of signalling activity on circuits routed via the DSI terminal. Author (ESA)

N82-14189# Telespazio, S.p.A., Rome (Italy).
ANALOGUE TELEVISION TESTS c32
V. Speziale, Y. Tharaud (Centre National d'Etudes des Telecommunications), and D. C. Savage (British Broadcasting Corp.) *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 83-88 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Tests involving a single television program/transponder and two television program/transponder were carried out on OTS in order to check the performance of the European Communication Satellite (ECS) against the criteria of users. Exact simulation of ECS was not possible, but results for single program, color video signals, a high quality sound signal, teletext and 625 line test signals indicate that performance should be adequate. Adjacent channel interference tests show that, under normal conditions, user requirements should be met 99% of the time. Cochannel interference should be minimal if the transponders with orthogonal polarization are offset by 35 MHz. Two programs/transponder performance is inadequate. Author (ESA)

N82-14190# Independent Broadcasting Authority, Winchester (England).
EXPERIMENTAL DIGITAL TELEVISION TRANSMISSIONS THROUGH THE OTS c32
D. K. W. Hopkins (British Broadcasting Corp.), D. W. Osborne, N. D. Wells, and E. J. Wilson (British Broadcasting Corp.) *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 89-92 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Digital television using satellites was studied. A 60 Mbit/sec signal, including 2.048 Mbit/sec for sound and other data, was used. The bit error rate (BER) of the satellite link was measured for a range of Eb/No values (Eb = Energy/bit, No = noise power unit bandwith) at ground stations for various operating conditions, e.g., saturated or with interference. Results show that cycle skips occur, but can be eliminated by filters. Digital systems show significantly reduced interference potential to other systems sharing the same frequency band, compared to analog television. In a power limited satellite system, impairment due to BER limits performance, but subjective impairments are very small. Author (ESA)

N82-14191# Independent Broadcasting Authority, Winchester (England).
DIRECT BROADCASTING EXPERIMENTS WITH OTS: RESULTS OF PICTURE TRANSMISSION TESTS c32
D. C. Griffiths (Radiotelevisione Italiana) and R. Orta *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 93-99 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

The viability of satellite picture broadcasting, using frequency modulation in the 27 MHz band was investigated. Subjective and objective quality assessments are reported. Test transmissions of 625 lines, with 13.5 MHz/V peak to peak carrier deviation and 600 KHz peak to peak energy dispersal were examined for signal to noise ratio, picture distortion, frequency deviation, the effect of threshold extension demodulators, and crosspolar cancellation. Picture quality is good where the carrier to noise ratio exceeds 14 db, but intermodulation causes degradation if closely spaced subcarriers are used above the vision signal. The propagation effect of attenuation degrades the video signal to noise ratio a small percentage of the time. Author (ESA)

N82-14192# Institut fuer Rundfunktechnik, Munich (West Germany).
DIRECT BROADCASTING EXPERIMENTS WITH OTS: RESULTS OF SOUND TRANSMISSION TESTS c32
C. Dosch and J. Georgy (Telediffusion de France) *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 100-104 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Tests carried out with the broadcasting of a multiplex of independent analog subcarriers (instead of television signals) and with a digital modulated subcarrier in order to provide high quality sound channels, are reported. Objective and subjective simulations of operating conditions indicate that sound associated with pictures can be transmitted with quality equal to that of terrestrial links. Analog frequency modulated sound carriers are best when transmitting only one sound channel, digital for more than two, and either for exactly two. Author (ESA)

N82-14193# Radiotelevisione Italiana, Milan (Italy).
TELETEXT AND DATA BROADCASTING EXPERIMENTS WITH OTS c32
R. Orta and D. Pommier (Centre Commun d'Etudes de Television et de Telecommunications) *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 104-107 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Decoding margin and bit error rate (BER) were used to assess the suitability of satellites for teletext and data broadcasting. Ground stations examined parameters, including influence of the sound subcarrier, statistical independence of errors and the use of threshold extension demodulators. If 0.001 is the maximum acceptable BER, a well aligned demodulator maintains service with a minimum carrier/noise ratio between 8.5 and 9 db, i.e., an operating margin (decoding margin) from 0 to 10% (0.5 to 1 db expressed in equivalent degradation of carrier/noise ratio). For domestic users, a larger operating margin, 30% or 2 db, is desired. Other parameters studied, receiver mistuning, frequency deviation, etc., do not significantly influence service quality. Author (ESA)

N82-14194# Telespazio, S.p.A., Rome (Italy).
THE MEASUREMENT OF EARTH STATION PERFORMANCES AND ITS IMPACT ON FUTURE DESIGN c14
S. Tirro, M. Fornari, and M. Giovanni *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 108-113 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Methods used to measure antenna gain are discussed. Values obtained for the path loss method, using a boresight at 11 and 14 GHz, for a radio star at 11.45 GHz, and for the photogrammetric method are compared. Antenna polarization purity measurement and problems encountered on matching and equalization are treated. Radio stars are the most convenient method and are less expensive than boresights. Photogrammetry can indicate corrective actions needed to achieve required performance. Polarization purity can only be proved by a very good boresight. This can be a major problem for systems with frequency reuse by polarization discrimination. The use of a satellite to replace the boresight needs further investigation. Matching and equalization problems must be overcome for commercial stations. Author (ESA)

N82-14195# Centre National d'Etudes des Telecommunications, Saclay (France).
EARTH STATION MEASUREMENT TECHNIQUES AND LESSONS IN EARTH STATION DESIGN c14
J. LeLigne *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 114-117 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Classical RF tests, analog television tests, digital transmission tests, and time division multiple access (TDMA) tests are discussed in relation to the OTS test program. Radio frequency equipment in the 11 and 14 GHz bands are evaluated. Receiver equipment operated nonstop for three years. Transmission equipment was switched off, or on standby, when not operating. Experiments of 8 to 12 hrs tested reliability, and of 4 to 8 days tested stability of equipment characteristics. Receiver equipment shows no failures. The stability of low noise receivers is + or - 0.2 db/day. The stability of transmission power is + or -

0.3 db/day. A 2 kw traveling wave tube was replaced after 9000 hrs.
Author (ESA)

N82-14196# European Space Agency, Paris (France).
AN OVERVIEW OF THE DESIGN AND CONSTRUCTION OF SMALL EARTH STATIONS USED WITH OTS c14
C. D. Hughes, G. Bommes, W. Dobson, L. Sundin (Ericson (L. M.), G. Pellegrineschi (Satellite Telecommunicatons Sta.), J. Salomon, and G. Wood *In its* OTS: 3rd Year in Orbit Aug. 1981 p 118-127 Prepared in cooperation with Dornier-Werke GmbH, Marconi Communications System, Ltd. and Telespace and Ferranti Ltd. (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Ground stations with an antenna diameter < 5 m used for propagation, data transmission, and communication and television demonstrations during the OTS test program are listed. Location, equipment, and typical examples of each type are described. Most stations use 3 m antennas, but further rationalization and standardization is urged in order to avoid duplication of effort, to increase cost effectiveness and to make the system more competitive economically. Author (ESA)

N82-14197# European Space Agency, Noordwikj (Netherlands).
STELLA AND SPINE DATA TRANSMISSION EXPERIMENTS: PRELIMINARY RESULTS AND CONCLUSIONS c32
P. Bartholome, M. G. N. Hine (European Organization for Nuclear Research), and J. O. Scalan (Univ. College, Dublin) *In its* OTS: 3rd Year in Orbit Aug. 1981 p 128-131 ref (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

High speed data tensmission by satellite, investigated during the STELLA and SPINE OTS experiments, is treated. Differences between the systems concern data processing rather than modems, antennas, etc. In STELLA, retransmission requires backspacing while SPINE uses disk buffers. In SPINE the link driving minicomputer cannot handle transmit and receive simultaneously, so burst cycle time depends on satellite link delay, whereas STELLA is duplexed, with an external timer. Problems with STELLA arise from bit patterns containing long strings of zeros. These interfere with synchronization of a burst modem for regular and frequent zero-one transitions. Also, high error rates when signal and noise levels are normal remain unexplained. For SPINE, buffer sizing is a problem, but otherwise it performs well.
Author (ESA)

N82-14198# British Telecom International (England).
THE USE OF OTS IN THE COST 211 PROJECT c84
J. R. Taylor *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 132-133 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

Progress in the COST 211 project, redundancy reduction techniques for visual telephone signals (related to videoconferencing), is reported. Codecs built in four different countries show good compatability. Satellite transmission links via OTS are good, and under normal conditions the effect of transmission errors on picture quality is almost nonexistent. Problem solving is helped by a real time interactive video link. Author (ESA)

N82-14199# Ruhr Univ., Bochum (West Germany). Bereich Extraterrestrische Physik.
PREPARATORY TASKS ON THE DEFINITION AND OPTIMIZATION OF THE OUT OF ECLIPTIC ZODIACAL LIGHT EXPERIMENT Final Report, Feb. 1980
Richard H. Giese, Gerhard H. Schwehm, and Dieter Hablick Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 43 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-009; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9.50

The experiment consists of a scanning photopolarimeter, developed on the basis of the Helios Zodiacal Light Experiment. The scientific objectives are to study the spatial distribution of the interplanetary dust cloud, to investigate the diffuse brightness of the background star light when the sonde is above the zodiacal light cloud, and to search for a possible contribution of interstellar dust particles to the zodiacal light cloud. The instrument allows simultaneous measurements in two separate wavelength bands (UV and visual channel). Measurements are performed near 200, 220, 240, 280, 350 (UV) and at 360, 440, 540, 640, and 800 nm, including the state of polarization (Stokes parameters I, Q, U). First estimates of expected brightness values at selected viewing directions are presented for typical phases of the mission.
Author (ESA)

N82-14200# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Abteilung ERTK.
CRITICAL ANALYSIS OF GRADIENT AND ISOTHERMAL FURNACE CONCEPTS FOR USE IN SPACELAB WITH SPECIAL REGARD FOR HEAT PIPE TECHNOLOGY AND CONNECTED BASIC REQUIREMENTS Final Report
Harald Lenski Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 189 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-019; ISSN-0170-1339) Avail: NTIS HC-A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 35.80

The detailed design of the oven is presented. The maximum heater temperature is 2000 K for a heating power of 400 W. Gradients up to 150 K per cm are expected in a cylindrical copper sample of 10 mm diameter. Quenching of the samples during solidification by means of water evaporitive cooling is included. The utilization of a heat pipe furnace was discarded, since the Spacelab safety measures imposed by the usage of alkali metals in high temperature heat pipes were shown to offset its potential advantages with respect to conventional oven designs.
Author (ESA)

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N82-14124# Royal Aircraft Establishment, Farnborough (England).
RESEARCH RESULTS FROM ANALYSIS OF SATELLITE ORBITS
D. G. King-Hele *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 3-11 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14126# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
ACCURATE ORBIT DETERMINATIONS FROM LASER RANGE OBSERVATIONS BY LAGEOS, STARLETTE AND GEOS 3
K. F. Wakker and B. A. C. Ambrosius *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 25-35 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14128# Pisa Univ. (Italy). Gruppo di Meccanica Spaziale.
MODELING OF ORBITAL PERTURBATIONS DUE TO RADIATION PRESSURE FOR HIGH EARTH SATELLITES
L. Anselmo, P. Farinella, A. Milani, and A. M. Nobili *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 47-52 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14140# European Space Operations Center, Darmstadt (West Germany).
THE USEFULNESS OF AUXILIARY TRANSFER ORBIT MANEUVERS FOR A NEAR NOMINAL GEOSTATIONARY MISSION
F. Hechler, M. Rosengren, and M. Soop *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 183-187 (For primary document see N82-14123 05-12)

Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14142# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Wesseling (West Germany).
STATION ACQUISITION AND STATIONKEEPING WITH LOW THRUST SYSTEMS
M. Eckstein and F. Hechler (ESOC, Darmstadt, West Germany) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 197-208 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14143# Columbia Univ., New York.
AN INVESTIGATION OF THE ANOMALOUS ATTITUDE MOTION OF THE ISEE B SPACECRAFT
Richard W. Longman and J. Andre Massart (ESOC, Darmstadt, West Germany) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 211-224 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14152*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRESENT STATUS AND FUTURE TRENDS IN NEAR-EARTH SATELLITE ORBIT DETERMINATION
A. J. Fuchs *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 287-292 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 22A

N82-14154# Analytical and Computational Mathematics, Zurich (Switzerland).
AN ANALYTICAL SINGULARITY-FREE ORBIT PREDICTOR FOR NEAR-EARTH SATELLITES
G. Scheifele *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 299-305 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14155# Chinese Academy of Sciences, Peking. Space Science and Technology Center.
ASPECTS IN MEASURING AND CORRECTING OF SATELLITE ORBIT
Liu Zhong-yu and Gao Huai-bao *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 307-309 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris F 160 Member States, AU, CN and NO (+20% others)

N82-14156# Telespazio, S.p.A., Rome (Italy).
SIRIO 2 LASSO MISSION: GEOSYNCHRONOUS SATELLITE LASER STATION RANGING DATA ORBIT DETERMINATION SIMULATIONS
G. Vulpetti *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 313-323 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14157# Indian Space Research Organization, Bangalore.
ORBIT AND ATTITUDE DETERMINATION FOR BHASKARA
R. S. Bhat, P. Rajendra Prasad, N. Ramani, P. Padmanabhan, and K. Harendranath *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 325-332 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14161# National Aerospace Lab., Amsterdam (Netherlands).
THE USE OF ESA STARMAPPER MEASUREMENTS FOR SPACECRAFT ESTIMATION: ESTIMATOR DESIGN RATIONALE AND RESULTS
P. T. L. M. vanWoerkom, F. J. Sonnenschein, and G. Moek *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 361-372 refs (For primary document see N82-14123 05-12)
(Contracts ESTEC-2383/75/AK; ESTEC-3625/78/AK; ESOC-4133/79/D-IM)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14162# Indian Space Research Organization, Bangalore.
VALIDATION AND OPERATIONS EXPERIENCE RELATED TO ORBIT AND ATTITUDE SOFTWARE OF BHASKARA
K. S. Prabhu, S. K. Sinha, N. Ramani, C. Sreehari Rao (SHAR Centre, Sriharikota, India), and P. Soma (SHAR Centre, Sriharikota, India) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 375-383 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N82-14201# Army Missile Command, Redstone Arsenal, Ala.
TERRAIN MASKING ANALYSIS FOR WHITE SANDS MISSILE RANGE EAST CENTER 50 AND WEST CENTER 50
Samuel O. Dunlap Jul. 1981 54 p refs
(AD-A105806; AD-E950156; DRSMI/RE-81-25-TR) Avail: NTIS HC A04/MF A01 CSCL 17/9

An analysis was made of terrain making for selected ground radar test locations at White Sands Missile Range. Digitized terrain altitude data are reformatted to allow calculation of straight line masking along radial profiles from the radar site. These data are then displayed in the form of maps of the illuminated terrain and altitude profiles. GRA

N82-14148*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FUTURE IN GROUND BASE ATTITUDE SUPPORT ACTIVITIES
R. D. Werking and L. J. Happel (Old Dominion Systems Inc.) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 255-262 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 22D

N82-14150# National Aerospace Lab., Emmeloord (Netherlands).
THE OBSERVATION PLANNING FACILITY FOR THE INFRARED ASTRONOMICAL SATELLITE (IFAS)
E. Oord, P. J. dePagter, R. C. vanHoltz, and J. R. Mcdougall (Rutherford and Appleton Labs., Chilton, England) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 269-280 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14167# Centre National d'Etudes Spatiales, Toulouse (France).
SKYLAB DECAY FOLLOW-UP
J. P. Carrou *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 421-430 ref (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14184# Telespazio, S.p.A., Rome (Italy).
THE MEASUREMENT OF EARTH STATION PERFORMANCES AND ITS IMPACT ON FUTURE DESIGN
S. Tirro, M. Fornari, and M. Giovanni *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 106-113 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14186# Centre National d'Etudes des Telecommunications, Saclay (France).
EARTH STATION MEASUREMENT TECHNIQUES AND

LESSONS IN EARTH STATION DESIGN
J. LeLigne *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 114-117 (For primary document see N82-14173 05-12) Avail: NTIS HC A10/MF A01

N82-14196# European Space Agency, Paris (France).
AN OVERVIEW OF THE DESIGN AND CONSTRUCTION OF SMALL EARTH STATIONS USED WITH OTS
C. D. Hughes, G. Bommas, W. Dobson, L. Sundin (Ericson (L. M.), G. Pellegrineschi (Satellite Telecommunicatons Sta.), J. Salomon, and G. Wood *In its* OTS: 3rd Year in Orbit Aug. 1981 p 118-127 Prepared in cooperation with Dornier-Werke GmbH, Marconi Communications System, Ltd. and Telespace and Ferranti Ltd. (For primary document see N82-14173 05-12) Avail: NTIS HC A10/MF A01

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-14202*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPARATIVE ANALYSES OF SPACE-TO-SPACE CENTRAL POWER STATIONS
Paul F. Holloway and L. Bernard Garrett Dec. 1981 49 p refs
(NASA-TP-1955; L-14766) Avail: NTIS HC A03/MF A01 CSCL 22B

The technological and economical impact of a large central power station in Earth orbit on the performance and cost of future spacecraft and their orbital transfer systems are examined. It is shown that beaming power to remote users cannot be cost effective if the central power station uses the same power generation system that is readily available for provision of onboard power and microwave transmission and reception of power through space for use in space is not cost competitive with onboard power or propulsion systems. Laser and receivers are required to make central power stations feasible. Remote power transmission for propulsion of orbital transfer vehicles promises major cost benefits. Direct nuclear pumped or solar pumped laser power station concepts are attractive with laser thermal and laser electric propulsion systems. These power stations are also competitive, on a mass and cost basis, with a photovoltaic power station. E.A.K.

N82-14203*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SYSTEM ANALYSIS APPROACH TO DERIVING DESIGN CRITERIA (LOADS) FOR SPACE SHUTTLE AND ITS PAYLOADS. VOLUME 1: GENERAL STATEMENT OF APPROACH
Robert S. Ryan, Tulon Bullock, Wayne B. Holland, Dennis A. Kross, and Larry A. Kiefling Dec. 1981 47 p
(NASA-TP-1949; M-358) Avail: NTIS HC A03/MF A01 CSCL 22B

Space shuttle, the most complex transportation system designed to date, illustrates the requirement for an analysis approach that considers all major disciplines simultaneously. Its unique cross coupling and high sensitivity to aerodynamic uncertainties and high performance requirements dictated a less conservative approach than those taken in programs. Analyses performed for the space shuttle and certain payloads, Space Telescope and Spacelab, are used a examples. These illustrate the requirements for system analysis approaches and criteria, including dynamic modeling requirements, test requirements control requirements and the resulting design verification approaches. A survey of the problem, potential approaches available as solutions, implications for future systems, and projected technology development areas are addressed. S.L.

N82-14204*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT: VOYAGER MISSION SUCCESS ASSESSMENT
[1981] 6 p
(NASA-TM-84062; S-802-77-01/02) Avail: NTIS HC A02/MF A01 CSCL 22B

A favorable assessment of the Voyager Mission is based upon: (1) scientific investigations performed at seven of the major bodies of the solar system; (2) comparative studies of the Jupiter and Saturn systems, including their satellites, rings, and fields and particles environments; (3) measurements of the characteristics of the interplanetary medium from Earth to Saturn; and (4) fulfillment of the Mission Success Criteria. Fifteen mission achievements are listed. Publication of results is mentioned. The status of voyager spacecrafts 1 and 2 is reviewed. A list of ten awards is included. N.W.

N82-14205*# National Aeronautics and Space Administration, Washington, D. C.
POMS, POLAR METEOROLOGICAL SATELLITE: A CONTRIBUTION FOR GLOBAL RADIATION BUDGET MEASUREMENT
Juergen Puls Nov. 1981 29 p refs Transl. into ENGLISH from Z. fuer Flugwillenschaften und Weltraumforschung (West Germany), v. 5, no. 2, p 94-103 Original language document was announced as A81-35787 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by DFVLR, Oberpfaffenhofen, West Germany
(Contract NASw-3542)
(NASA-TM-76642) Avail: NTIS HC A03/MF A01 CSCL 22B

A proposal for a climate research mission specialized to Earth radiation budget measurements is given. This mission requires daily global coverage established by a system of three orbiting satellites. One of them is represented by the European Space Agency satellite SEOCS that is on a drifting orbit with respect to the Sun with 57 degrees inclination. The two others are polar orbiting satellites (POMS). The mission concept is treated with reference to the payload side requirements, the choice of orbit, orbital analysis, and satellite requirements. R.J.F.

N82-14206# Naval Postgraduate School, Monterey, Calif.
COMPUTER PROGRAM APPLICATIONS TO TACTICAL MISSILE CONCEPTUAL DESIGN M.S. Thesis
Martin David Sullivan Jun. 1981 200 p refs
(AD-A105788) Avail: NTIS HC A09/MF A01 CSCL 16/4

This thesis is comprised of four independent computer programs and their related operating instructions. Each of these programs focuses on a particular facet of tactical missile design. The topics covered include guidance and trajectory calculations, rocket motor propulsion sizing, warhead design, and aerodynamic coefficient determination. The programs are developed from accepted mathematical procedures and are tailored to optimize operator interaction for educational purposes. GRA

N82-14207# Ballistic Research Labs., Aberdeen Proving Ground, Md.
TRAJECTORY PREDICTIONS FOR A 75 MM SOLID FUEL RAMJET TUBULAR PROJECTILE
Carl W. Nelson Sep. 1981 25 p refs
(DA Proj. 1L1-61101-A-91A)
(AD-A105551; ARBRL-MR-03136) Avail: NTIS HC A02/MF A01 CSCL 19/4

The AFAPL ramjet design analysis code was modified to predict a point mass trajectory for a 75 mm solid fuel ramjet tubular projectile. Projectile velocity was found sensitive to the combustion efficiency relation assumed. Author (GRA)

N82-14208# National Oceanic and Atmospheric Administration, Washington, D. C.
ATMOSPHERIC SOUNDING USER'S GUIDE
Adolf Werbowetzki Apr. 1981 92 p refs
(PB81-230476; NOAA-TR-NESS-83; NOAA-81062602) Avail: NTIS HC A05/MF A01 CSCL 22B

The TIROS operational vertical sounder (TOVS) on TIROS-N series satellites replaced the vertical temperature profile radiometer (VIPR) flown on earlier polar orbiting spacecraft. Since the successful launch of TIROS-N and the change-over to TOVS, many papers and articles were presented concerning the various aspects of the TOVS hardware/software system. The significant features of the TOVS operational system are presented. T.M.

N82-14131# Centre National d'Etudes Spatiales, Toulouse (France).
OPERATIONAL LOADS INDUCED BY ORBITAL CONTROL OF A GEOSTATIONARY SATELLITE [LES CHARGES OPERATIONNELLES INDUITES PAR LE CONTROLE EN ORBITE D'UN SATELLITE GEOSTATIONNAIRE]
G. Cales *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 73-80 refs In FRENCH (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14132# Amsat-Deutschland e.V., Marburg (West Germany).
THE ATTITUDE CONTROL SYSTEM OF AMSAT P 3 SATELLITES
Karl Meinzer *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 81-84 ref (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14133# European Space Operations Center, Darmstadt (West Germany).
IRREGULARITIES IN THE MOTION OF SPIN STABILIZED EARTH SATELLITES
L. Fraiture, N. Wiengarn, and B. Chambaz (Applications Mathematiques et Logiciel, SARL) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 87-104 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14134*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HIGH PRECISION ATTITUDE DETERMINATION FOR MAGSAT
G. Abshire, R. McCutcheon, G. Summers, F. VanLandingham, and G. Meyers *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 105-116 refs Prepared in cooperation with Computer Science Corp., Silver Spring, Md. (For primary document see N82-14123 05-12)
(Contract NAS-5-24300)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 22A

N82-14137# National Space Development Agency, Ibaraki (Japan). Tsukuba Space Center.
GEOSTATIONARY SATELLTES LAUNCHED BY NASA. PART 1: NASDA TRACKING AND CONTROL SYSTEM
T. Takenouchi and M. Suzuki *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 151-155 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14138# National Space Development Agency, Ibaraki (Japan). Tsukuba Space Center.
GEOSTATIONARY SATELLITES LAUNCHED BY NASDA. PART 2: MISSION ANALYSIS FOR MANEUVER
A. Tanaka, M. Utashima, K. Inamiya (Mitsubishi Electric Corp.), T. Ogino (Mitsubishi Electric Corp.), and T. Shimizu (Fujitsu Ltd.) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 157-166 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14144# European Space Agency, Toulouse (France). Earth Observation Programme Office.
A EUROPEAN FLIGHT DYNAMICS EXPERIMENT
P. Boland *In its* Spacecraft Flight Dyn. Aug. 1981 p 225-232 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14149# European Space Research and Technology Center, Noordwijk (Netherlands).
ON SPIN MANEUVERS WITH A SYMMETRIC SATELLITE
F. Janssens *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 263-268 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14166# National Space Development Agency, Ibaraki (Japan). Tsukuba Space Center.
INCLINATION CONTROL USING A PULSE MODE AXIAL THRUSTER
M. Suzuki and K. Yoneyama *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 417-420 (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14174# European Space Agency, Paris (France).
PERFORMANCE OF THE ORBITAL TEST SATELLITE (OTS) DURING ITS THIRD YEAR OF OPERATION IN ORBIT
In its OTS: 3rd Year in Orbit Aug. 1981 71 p (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14176# British Aerospace Dynamics Group, Stevenage (England). Space and Communications Div.
GENERAL DESCRIPTION OF THE ORBITAL TEST SATELLITE (OTS)
D. E. McLaurin and D. N. Gregory *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 12-17 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14181# European Space Agency, Noordwikj (Netherlands).
PLATFORM PERFORMANCE FACTORS AFFECTING LINK BUDGETS OF GEOSYNCHRONOUS COMMUNICATION SATELLITES
L. vanHoltz and S. Fagg *In its* OTS: 3rd Year in Orbit Aug. 1981 p 41-47 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N82-14209*# Martin Marietta Aerospace, Denver, Colo.
SPACE TUG SYSTEMS STUDY (STORABLE). VOLUME 1: OVERVIEW PRESENTATION Final Report
Jan. 1974 111 p 3 Vol.
(Contract NAS8-29675)
(NASA-CR-161919; MCR-73-314-Vol-1) Avail: NTIS HC A06/MF A01 CSCL 22B

Program plans are established for a storable propellant space tug used to perform high energy orbit transfers from the space transportation system (STS) orbiter. The mission model for the STS in the 1980's is analyzed. Performance and mission requirements are determined. Various flight operations modes are evaluated and selected. Subsystems are selected and synthesized into various tug configurations. Program options for these configurations are defined, analyzed, and selected. Selected program options are further defined and optimized, including program requirements, tug vehicle definition, mission accomplishment, ground and flight operations, programmatics and costs. Author

N82-14210*# Martin Marietta Aerospace, Denver, Colo.
SPACE TUG SYSTEMS STUDY. VOLUME 2: COMPENDIUM Final Report
Jan. 1974 318 p refs 3 Vol.
(Contract NAS8-29675)
(NASA-CR-161920; MCR-73-314-Vol-2) Avail: NTIS HC A14/MF A01 CSCL 22B

Possible storable propellant configurations and program plans are evaluated for the space tug. Alternatives examined include:

use of existing expendable stages modified for use with shuttle, followed by a space tug at a later date; use of a modified growth version of existing expendable stages for greater performance and potential reuse, followed by a space tug at a later date; use of a low development cost, reusable, interim space tug available at shuttle initial operational capability (IOC) that could be evolved to greater system capabilities at a later date; and use a direct developed tug with maximum potential to be available at some specified time after space shuttle IOC. The capability options were narrowed down to three final options for detailed program definition. S.L.

N82-14211*# Martin Marietta Aerospace, Denver, Colo.
SPACE TUG SYSTEMS STUDY (STORABLE). VOLUME 3: EXECUTIVE SUMMARY Final Report
Jan. 1974 37 p refs 3 Vol.
(Contract NAS8-29675)
(NASA-CR-161918; MCR-73-314-Vol-3) Avail: NTIS HC A03/MF A01 CSCL 22B

Space tug program options that consider key issues and mission requirements are assessed, component and subsystem candidates are evaluated, and tug configurations synthesized. Three tug program options are defined and evaluated. S.L.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N82-14130# Aerospace Corp., El Segundo, Calif.
NAVSTAR GLOBAL POSITIONING SYSTEM (GPS): FUTURE ENHANCED CAPABILITIES
Mohan Ananda *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 61-71 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14136*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Navigation Systems Section.
DEEP SPACE NAVIGATION SYSTEMS AND OPERATIONS
James F. Jordan *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 135-150 refs (For primary document see N82-14123 05-12)
(Contract NAS-7-100)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 22A

N82-14139# British Aerospace Dynamics Group, Stevenage (England). Space and Communications Div.
L-SAT STATIONKEEPING
J. J. Pocha and A. F. Edwards *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 169-182 (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14141# European Space Operations Center, Darmstadt (West Germany).
MIDCOURSE NAVIGATION FOR THE EUROPEAN COMET HALLEY MISSION
Martin Hechler and Freidrich Hechler *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 189-195 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14160# European Space Research and Technology Center, Noordwijk (Netherlands).
THE DYNAMIC ATTITUDE RECONSTRUCTION METHOD
A. G. Bird, L. Fraiture (ESOC, Darmstadt, West Germany), J. C. VanderHa (ESOC, Darmstadt, West Germany), and P. Kohler (Ecole Polytechnique Federale de Lausanne, Switzerland) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 353-360 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14163# European Space Operations Center, Darmstadt (West Germany).
SPACECRAFT TRACKING CAMPAIGNS AND THE ASSESSMENT OF ORBIT DETERMINATION ACCURACY
S. Palleschke *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 385-395 (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-14212*# Texas Univ., Dallas. Center for Space Sciences.
MOLECULAR WAKE SHIELD GAS ANALYZER Final Report
John H. Hoffman 6 Aug. 1980 28 p refs Revised
(Contract NAS8-32689)
(NASA-CR-161926) Avail: NTIS HC A03/MF A01 CSCL 22B

Techniques for measuring and characterizing the ultrahigh vacuum in the wake of an orbiting spacecraft are studied. A high sensitivity mass spectrometer that contains a double mass analyzer consisting of an open source miniature magnetic sector field neutral gas analyzer and an identical ion analyzer is proposed. These are configured to detect and identify gas and ion species of hydrogen, helium, nitrogen, oxygen, nitric oxide, and carbon dioxide and any other gas or ion species in the 1 to 46 amu mass range. This range covers the normal atmospheric constituents. The sensitivity of the instrument is sufficient to measure ambient gases and ion with a particle density of the order of one per cc. A chemical pump, or getter, is mounted near the entrance aperture of the neutral gas analyzer which integrates the absorption of ambient gases for a selectable period of time for subsequent release and analysis. The sensitivity is realizable for all but rare gases using this technique. S.L.

N82-14213*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SPACECRAFT CHARGING TECHNOLOGY, 1980
Washington Oct. 1981 1005 p refs Conf. held in Colorado Springs, 12-14 Nov. 1980; sponsored by AFGL and NASA Lewis Research Center
(NASA-CP-2182; AFGL-TR-81-0270) Avail: NTIS HC A99/MF A01 CSCL 22B

The third Spacecraft Charging Technology Conference proceedings contain 66 papers on the geosynchronous plasma environment, spacecraft modeling, charged particle environment interactions with spacecraft, spacecraft materials characterization, and satellite design and testing. The proceedings is a compilation of the state of the art of spacecraft charging and environmental interaction phenomena. For individual titles, see N82-14214 through N82-14275.

N82-14214*# JAYCOR, Alexandria, Va.
DIELECTRIC DISCHARGE CHARACTERISTICS IN A TWO-ELECTRON SIMULATION ENVIRONMENT
M. Treadaway, R. Leadon, C. Mallon, T. Flanagan, R. Denson, and F. Wenaas *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 4-16 refs Sponsored by AFWL (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

The results of a series of experiments in which flux levels representative of the space electron environment were used are presented and compared to the results of high flux tests. The simulation approach was to partition the space electron spectrum into two parts, those electrons which do not penetrate a material and therefore contribute to charging and those which completely penetrate the material. The nonpenetrating electrons were simulated using 25 keV electrons and the penetrating electrons by 350 keV electrons. The materials included in this investigation were Kapton, optical solar reflectors (OSRs), and a ground test satellite surface potential monitor which contained Kapton, astroquart, OSRs and teflon. S.L.

N82-14215*# Beers Associates, Inc., Reston, Va.

ELECTRON-BEAM-CHARGED DIELECTRICS: INTERNAL CHARGE DISTRIBUTION

Brian L. Beers and V. W. Pine *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 17-32 refs Sponsored by AFSD (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

Theoretical calculations of an electron transport model of the charging of dielectrics due to electron bombardment are compared to measurements of internal charge distributions. The emphasis is on the distribution of Teflon. The position of the charge centroid as a function of time is not monotonic. It first moves deeper into the material and then moves back near to the surface. In most time regimes of interest, the charge distribution is not unimodal, but instead has two peaks. The location of the centroid near saturation is a function of the incident current density. While the qualitative comparison of theory and experiment are reasonable, quantitative comparison shows discrepancies of as much as a factor of two. S.L.

N82-14216*# Rome Air Development Center, Hanscom AFB, Mass.

BULK CHARGING AND BREAKDOWN IN ELECTRON-IRRADIATED POLYMERS

A. R. Frederickson *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 33-51 refs (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

High energy electron irradiations were performed in an experimental and theoretical study of ten common polymers. Breakdowns were monitored by measuring currents between the electrodes on each side of the planar samples. Sample currents as a function of time during irradiation are compared with theory. Breakdowns are correlated with space charge electric field strength and polarity. Major findings include evidence that all polymers tested broke down, breakdowns remove negligible bulk charge and no breakdowns are seen below 20 million V/m. S.L.

N82-14217*# Mission Research Corp., San Diego, Calif.

CHARGING AND DISCHARGING TEFLON

B. C. Passenheim and V. A. J. vanLint *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 52-64 refs (For primary document see N82-14213 05-18)

(Contracts DNA001-78-C-0269; F29601-78-C-0012)

Avail: NTIS HC A99/MF A01 CSCL 22B

The charging and discharging characteristics of several common satellite materials exposed to 0-30KV electrons are measured. Teflon is discussed because the charging characteristics are radically altered immediately after a spontaneous discharge. The exterior geometry of the test structure is shown. In all cases dielectric samples were 82 cm in diameter mounted on the front of a 120 cm diameter cylinder supported on an 85 cm, 0.95 cm thick plexiglass disc. Dielectric materials investigated were: back surface aluminized Kapton, back surface silvered Teflon, silicon alkyd white thermal control paint, and 50 cm by 50 cm array of 0.030 cm thick MgF2 coated fused silica solar cell cover slips. S.L.

N82-14218*# Parker (Lee W.), Inc., Concord, Mass.

EXPERIMENTAL VALIDATION OF A NUMERICAL MODEL PREDICTING THE CHARGING CHARACTERISTICS OF TEFLON AND KAPTON UNDER ELECTRON BEAM IRRADIATION

R. C. Hazelton (Inland Research and Development Center), E. J. Yadlowsky (Inland Research and Development Center), R. J. Churchill (Inland Research and Development Center), Lee W. Parker, and B. Sellers (Panametrics, Inc.) *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 65-73 refs Sponsored by INTELSAT (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

The effect differential charging of spacecraft thermal control surfaces is assessed by studying the dynamics of the charging process. A program to experimentally validate a computer model of the charging process was established. Time resolved measurements of the surface potential were obtained for samples of Kapton and Teflon irradiated with a monoenergetic electron beam. Results indicate that the computer model and experimental measurements agree well and that for Teflon, secondary emission is the governing factor. Experimental data indicate that bulk conductivities play a significant role in the charging of Kapton. S.L.

N82-14219*# Lockheed Missiles and Space Co., Palo Alto, Calif.

ROLE OF ENERGETIC PARTICLES IN CHARGING/DISCHARGING OF SPACECRAFT DIELECTRICS

J. B. Reagan, R. W. Nightingale, E. E. Gaines, R. E. Meyerott, and W. L. Imhof *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 74-85 refs (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

The role that energetic particles in the substorm plasma have on the charging and discharging of typical dielectric layers used on spacecraft was investigated using spectra and pitch angle distributions measured in situ on the SCATHA spacecraft prior to and during a few kilovolt differential charging event in eclipse conditions. The particle spectra was input to deposition codes that determine the dose rate as a function of depth in Kapton and Teflon layers used in an experiment on SCATHA. The calculated ambient dose rates of a few rads/sec throughout the bulk of the samples are sufficiently high that radiation damage levels are reached on the time scale of 1 year. Surface dose is a factor of 100 higher. Bulk conductivity profiles were obtained from the dose rates using empirical relationships. The radiation induced bulk conductivities calculated at the peak charging time are found to be smaller than the intrinsic dark conductivity range of solar conditioned Kapton but higher than the corresponding value for Teflon. S.L.

N82-14220*# TRW Defense and Space Systems Group, Redondo Beach, Calif.

ELECTRON PENETRATION OF SPACECRAFT THERMAL INSULATION

Walter L. Powers, Barbara F. Adams, and George T. Inouye *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 86-95 refs (For primary document see N82-14213 05-18)

(Contract JPL-955500)

Avail: NTIS HC A99/MF A01 CSCL 22B

The external thermal blanket with 13 mils of polyethylene which has the known range and stopping power as a function of electron energy is investiated. The most recent omnidirectional peak Jovian electron flux at 5 Jupiter radii is applied, the electron current penetrating the thermal blanket is calculated and allowed to impinge on a typical 20 mil polyethylene insulator surrounding a wire. The radiation dose rate to the insulator is then calculated and the electrical conductivity found. The results demonstrate that the increased electronic mobility is sufficient to keep the maximum induced electric field two orders of magnitude below the critical breakdown strength. S.L.

N82-14221*# United Kingdom Atomic Energy Authority, Harwell (England).

ELECTROSTATIC DISCHARGING BEHAVIOUR OF KAPTON IRRADIATED WITH ELECTRONS

Derek Verdin *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 96-114 refs Sponsored by RAE (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

The electrostatic charging and discharging of Kapton when irradiated with monoenergetic electrons of 5 to 30 keV energy were studied. The leakage currents and rates of discharging always increased with the incident electron energy and flux, whereas the surface voltage showed a more complex behavior depending on the thickness of the material: for the thinner films it exhibited a maximum and then fell at higher energies. The surface voltage, the rate of discharging, and the peak current and total charge flow during a discharge were enhanced as the temperature was decreased from 70 C to -180 C, and were accompanied by a decreasing leakage current. Visible light or the presence of an aluminum coating on the irradiated surface caused reductions in the surface voltage and changes in the discharging characteristics. The results are discussed in terms of the leakage currents and the secondary emission of electrons. Photomicrographs taken after irradiation, and photographs of samples during irradiation, show good correlations between the positions of light flashes and of pinholes produced by the discharge arcs. S.L.

N82-14222*# Toronto Univ. (Ontario).

DIELECTRIC SURFACE DISCHARGES: EFFECTS OF COMBINED LOW-ENERGY AND HIGH-ENERGY INCIDENT ELECTRONS

K. G. Balmain and W. Hirt *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 115-128 refs Sponsored by AFWL (For primary document see N82-14213 05-18)
(Grant NsG-7647)
Avail: NTIS HC A99/MF A01 CSCL 22B

Dielectric surface discharges affected by the addition of high energy electrons at 5 pA/sq cm to a primary 20 keV, 10 nA/sq cm electron beam with the high energy broad spectrum particles coming from the beta decay of Strontium 90 are studied. Kapton exhibits significantly increased discharge strength, increased waiting time between discharges, and a decreased number of discharges per specimen before discharge cessation. Mylar exhibits similar but less pronounced effects, while Teflon is relatively unaffected. With Kapton and Mylar, the high energy electrons act in some way to delay the instant of discharge ignition so that more charge can be accumulated and hence released during discharge. S.L.

N82-14223*# SRI International Corp., Menlo Park, Calif.

PRELIMINARY COMPARISON OF MATERIAL CHARGING PROPERTIES USING SINGLE-ENERGY AND MULTIENERGY ELECTRON BEAMS

R. C. Adamo and J. E. Nanevicz *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 129-132 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

Results of tests designed to compare the charging properties of spacecraft material under a monoenergetic beam and under a continuously distributed beam are summarized. In the test setup the electron source was mounted in the top of a cylindrical vacuum chamber. A sheet of 5-mil-thick Kapton was placed on an insulated metal substrate at the bottom of the vacuum chamber. The dc current arriving on the substrate was measured and a field meter measured the potential of the test sample. A retarding potential analyzer measured the energy spectrum of the incident electron beam. With the monoenergetic beam, the sample charged to 12 kV and electrical discharges occurred. With the multi-energy spectra the samples charged to only 6 kV and 4 kV, and no discharger were observed. In these experiments, no effort was made to duplicate the spectra occurring in space. The tests were intended to simply to compare spacecraft material charging properties using monoenergetic and continuous multi-energy beams. M.D.K.

N82-14224*# TRW Defense and Space Systems Group, Redondo Beach, Calif.

BRUSHFIRE ARC DISCHARGE MODEL

G. T. Lnouye *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 133-162 refs (For primary document see N82-14213 05-18)
(Contract NAS3-21961)
Avail: NTIS HC A99/MF A01 CSCL 22B

A one dimensional arc discharge model incorporating a brushfire-type propagation of a discharge wavefront was investigated. A set of equations, developed and their which include electrical, thermal and plasma parameters, were solutions shown to be consistent with a propagating brushfire wavefront. Voltage, current, plasma density, temperature, and resistivity profiles were obtained. Mechanical forces, magnetic and electrostatic were considered in evaluating the flashover to blowout current ratio, G', for arc discharges with the brushfire parameters developed in the model. This ratio is an important factor in determining the electromagnetic interference (EMI) impact of arc discharges on spacecraft electrical subsystems. The conclusion of the analysis is that electrostatic forces are much more important than magnetic forces. The magnitude of the G' factor obtained, 58.5 percent, is within the range of those obtained by experimental means. Improvements in the analytical model as well in the experimental approach are recommended. M.D.K.

N82-14225*# Aerospace Corp., El Segundo, Calif.

EFFECTS OF SECONDARY ELECTRON EMISSION ON CHARGING

Martin S. Leung, Michael B. Tueling, and Edwin R. Schnauss *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 163-178 refs (For primary document see N82-14213 05-18)
(Contract F04701-80-C-0081)
Avail: NTIS HC A99/MF A01 CSCL 22B

Laboratory charging studies using two electron sources with different energies show that the charging behaviors of typical spacecraft thermal control dielectric surface are extremely sensitive to the shape of their secondary emission curves. The results also suggest that the electron spectrum in a natural charging environment can be separated into three distinct regions (noninteracting, discharging, and charging) depending on the kinetic energy of the incident electron relative to the charged surface, and on the secondary emission characteristics of the material. To a first order approximation, the relative number of electrons in these different regions determines the potential of the charged surface. Detailed measurements of the secondary electron emission characteristics of Kapton, the effects of bulk conductivity and secondary emission on surface charging of these materials is reported. M.D.K.

N82-14226*# Case Western Reserve Univ., Cleveland, Ohio.

SECONDARY ELECTRON EMISSION YIELDS

I. Krainsky, W. Lundin, W. L. Gordon, and R. W. Hoffman *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 179-197 refs (For primary document see N82-14213 05-18)
(Grant NsG-3197)
Avail: NTIS HC A99/MF A01 CSCL 22B

The secondary electron emission (SEE) characteristics for a variety of spacecraft materials were determined under UHV conditions using a commercial double pass CMA which permits sequential Auger electron electron spectroscopic analysis of the surface. The transparent conductive coating indium tin oxide (ITO) was examined on Kapton and borosilicate glass and indium oxide on FED Teflon. The total SEE coefficient ranges from 2.5 to 2.6 on as-received surfaces and from 1.5 to 1.6 on Ar(+) sputtered surfaces with < 5 nm removed. A cylindrical sample carousel provides normal incidence of the primary beam as well as a multiple Faraday cup measurement of the approximately nA beam currents. Total and true secondary yields are obtained from target current measurements with biasing of the carousel. A primary beam pulsed mode to reduce electron beam dosage and minimize charging of insulating coatings was applied to Mg/F2 coated solar cell covers. Electron beam effects on ITO were found quite important at the current densities necessary to do Auger studies. M.D.K.

N82-14227*# Pennsylvania State Univ., University Park.

OBLIQUE-INCIDENCE SECONDARY EMISSION FROM CHARGED DIELECTRONICS

James W. Robinson and Paul A. Budd *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 198-210 refs (For primary document see N82-14213 05-18)
(Grant NsG-3166)
Avail: NTIS HC A99/MF A01 CSCL 22B

Experimental measurements and computer simulation of secondary electron emission coefficients for FEP-Teflon, for normal and oblique incidence in the presence of a normal electric field are reported. Knowledge of the electrostatic environment surrounding the specimen calculation of particle trajectories are considered. A simulation using a conformal mapping, a Green's integral, and a trajectory generator provides the necessary mathematical support for the measurements which have been made with normal fields of 1.5 and 2.7 kV/mm. When incidence is normal and energy exceeds the critical energy, the coefficient is given by V.58 and for oblique incidence this expression may be divided by the cosine of the angle. The parameter V sub 0 is a function of normal field. Measurements for values of V sub f are presented. M.D.K.

N82-14228*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

TANK TESTING OF A 2500-cm2 SOLAR PANEL

Renate S. Bever and John Staskus (NASA. Lewis Research Center) *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 211-227 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

A 50 cm by 50 cm solar array panel test patch was investigated for spacecraft charging and arcing effects. Bombardment with monochromatic electron was carried out. Some objectives of the test were: (1) to estimate at what voltage of electron bombardment arcing would be probable; (2) to find whether the arc's energy would be tolerable or damagingly large; (3) to try and separate thermal and photoeffects; and, (4) to see whether materials used were such as to minimize arcing. Some conclusions were: In sunlight the tracking data relay satellite's solar panel which has ceria glass on the front and conductive paint on the backside is probably a good design for reducing charge-up. In a geomagnetic substorm simulated in testing there will be arcing at the interconnects during eclipse and transitions into and out of eclipse in testing especially in view of the very cold temperatures that will be reached by this lightweight array. Ceria-doped glass is preferred to fused silica glass for reducing charge build up. The Kapton bare patch should still be conductively painted. The differential voltages on the panel determine when arcing first begins, and the electron beam voltages vary depending upon whether the metallic structure is directly grounded or semifloating. M.D.K.

N82-14229*# Lockheed Missiles and Space Co., Sunnyvale, Calif.

CHARGING AND DISCHARGING CHARACTERISTICS OF A RIGID SOLAR ARRAY

George F. Brady, Jr., David A. Vance, and Stanely A. Greenberg *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 228-236 (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

Two rigid solar array panels were subjected to a simulated geosynchronous orbit substorm environment. During the charging sequence, distributions of accumulated surface charge were measured under eclipse and sunlight conditions. Discharge events were characterized with respect to voltage pulse signatures and amplitudes on the solar array bus leads. Post-exposure analysis of the solar array panels indicated that the electrical characteristics were not degraded in spite of the substantial discharge actvity. However, significant cratering and discoloration of the Tedlar dielectric were observed. Author

N82-14230*# European Space Research and Technology Center, Noordwijk (Netherlands).

MATERIALS CHARACTERIZATION STUDY OF CONDUCTIVE FLEXIBLE SECOND SURFACE MIRRORS

F. Levadou, S. J. Bosma, and A. Paillous (DERTS) *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 237-260 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

The status of prequalification and qualification work on conductive flexible second surface mirrors is described. The basic material is FEP Teflon witn either aluminium or silver vacuum deposited reflectors. The top layer has been made conductive by deposition of layer of a indium oxide. The results of a prequalification program comprised of decontamination, humidity, thermal cycling, thermal shock and vibration tests are presented. Thermo-optical and electrical properties. The results of a prequalification program comprised of decontamination, humidity, thermal cycling, thermal shock and vibration tests are presented. Thermo-optical and electrical properties, the electrostatic behavior of the materials under simulated substorm environment and electrical conductivity at low temperatures are characterized. The effects of simulated ultra violet and particles irradiation on electrical and thermo-optical properties of the materials are also presented. M.D.K.

N82-14231*# British Aerospace Public Ltd. Co., Bristol (England). Space and Communications Div.

DESIGN OF AN ARC-FREE THERMAL BLANKET

Christakis N. Fellas *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 261-266 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

The success of a multilayer thermal blanket in eliminating arcing is discussed. Arcing is eliminated by limiting the surface potential to well below the threshold level for discharge. This is achieved by enhancing the leakage current which results in conduction of the excess charge to the spacecraft structure. The thermal blanket consists of several layers of thermal control (space approved) materials, bonded together, with Kapton on the outside, arranged in such a way that when the outer surface is charged by electron irradiation, a strong electric field is set up on the Kapton layer resulting in a greatly improved conductivity. The basic properties of matter utilized in designing this blanket method of charge removal, and optimum thermo-optical properties are summarized. M.D.K.

N82-14232*# General Electric Co., Fairfield, Conn.

CHARGING CONTROL TECHNIQUES

R. E. Schmidt *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 267-286 refs (For primary document see N82-14213 05-19)
(Contract F33615-78-C-5119)
Avail: NTIS HC A99/MF A01 CSCL 22B

Transparent conductive thin films of indium oxide and indium-tin oxide were evaluated for their properties to control charge buildup on satellite materials. Both oxide coatings were evaluated for their uniformity, stability, reproducibility and characteristics on various substrate materials such as FEP Teflon, Kapton, and glass. The process development toward optimization and characterization of these thin semiconductor oxide coatings and the evaluation on large sizes performed for qualification for use on thermal control satellite materials is described. The materials have been characterized in multiple energy electron plasma environment and at low temperatures. All radiation measurements of the coatings under simulated substorm conditions have exhibited the characteristics of stable charge control. Measurement of surface potential during and after irradiation by electrons up to 30 KeV and ionizing gamma radiation show an effective stable grounding surface. M.D.K.

N82-14233*# Centre d'Etudes et de Recherches, Toulouse (France).

CHARGING CHARACTERISTICS OF SILICA FABRICS

Leon Levy and Alain Pallous *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1981 p 287-308 refs (For primary document see N82-14213 05-18)
(Grants AF-AFOSR-3704-78; AF-AFOSR-0183-80)
Avail: NTIS HC A99/MF A01 CSCL 22B

The charge dissipation mechanism of silica fabrics and silica fabric/Aluminum composites was studied by means of various sample configurations tested under monoenergetic electron beams at energies between 5 and 20 keV. Grounding of the aluminum rear face of the composite is necessary in order to ensure a good electrostatic performance. The surface potentials are dependent on the flux rate in the range 10 pA -cm(2-) to 3 nA cm(-2); they are the highest at the lowest flux rate. Strong discharges have been evidenced at 20 keV but do not occur under 15 keV electrons. A substantial decrease in the surface potential of the sample is observed every time that an irradiation by low energy electrons (2 to 4 keV) is performed simultaneously with the irradiation by medium-energy electrons (10 to 20 keV). Silica fabrics and composites are very sensitive of contamination or contamination-plus-irradiation effects. M.D.K.

N82-14234*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ELECTROSTATIC CHARGING CHARACTERISTICS OF THERMAL CONTROL PAINTS AS FUNCTION OF TEMPERATURE

Paul A. Robinson, Jr. (Hughes Research Labs.) and A. C. Whittlesey *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 209-319 refs (For primary document see N82-14213 05-18)

(Contract NAS7-100)

Avail: NTIS HC A99/MF A01 CSCL 22B

The charging characteristics of paints for various uses on spacecraft under electron bombardment were studied. It was found that there is not a strong temperature dependence of the charging characteristics between -155 C and +30 C; and there is a noticeable hystereis effect as the electron beam energy is varied. Furthermore, all of the paints tested exhibit large secondary yields at low (approx. 1 keV) bombarding electron energies; and surfaces can charge either positively or negatively depending on the conditions and the paint. It was concluded that paints are not simple, will require more detailed study, and will probably act differently in multiple energy electron tests. N.W.

N82-14235*# Hughes Research Labs., Malibu, Calif.

EVALUATION OF CHARGE CONTROL TECHNIQUES ON SPACECRAFT THERMAL SURFACES (ELECTROSTATIC DISCHARGE STUDY)

Paul A. Robinson, Jr., E. M. Brown, S. M. Conan, C. R. Dulgeroff, W. R. Elkman, G. J. Holm, L. C. Lawton, G. J. Pack, and D. L. Shannon *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 320-341 (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

The charging and discharging characteristics of various dielectric materials commonly used on spacecraft were tested. The experimental apparatus and the calculations used to analyze the data generated during the testing are described. The test technique, results, and analysis used are presented. Indium tin oxide coated Teflon, Kapton, and quartz do not charge significantly. CTL 15 white paint shows no large charge build up. Pinholes in Teflon and Kapton increase the leakage through the sample and reduce the energy released in an arc. Conductive grids in Teflon and Kapton reduce the arc energy by two orders of magnitude over untreated samples. Extreme low temperatures (-195 C) do not significantly increase the arc energy of the gridded sample. N.W.

N82-14236*# Communications Satellite Corp., Washington, D.C.

CONDUCTION THROUGH PUNCTURES IN METAL-BACKED DIELECTRICS

A. Meulenberg and Paul A. Robinson, Jr. (JPL, California Inst. of Technology, Pasadena) *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 342-352 refs (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

A theoretical mechanism to explain the main features of experiments with punctured spacecraft-thermal-blanket materials is presented. The model is based on consideration of the electric fields developed about punctures; the focusing of primary electrons toward the punctures; the generation, migration, and cascade of secondary electrons along the surface; and the radiation induced conductivity characteristics of thin dielectric films. Qualitative predictions of the model agree with experiment results N.W.

N82-14237*# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

ACCELERATED ALPHA-S DETERIORATION IN A GEOSTATIONARY ORBIT

Otto K. Husmann *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 353-364 refs Sponsored by Bundesministerium fuer Forschung und Technologie (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

Between the Teflon substrate and the interference filter a 2 micron varnish layer was sandwiched in. The bending radius of the SSM, measured on a cone, decreased from about 13 mm to 6 mm prior to interference filter fracture, due to increased tensile strength of its substrate. These samples, and for comparison samples of the same make but without varnish and a conductive layer were included in the test. Additionally 2 Teflon FEP samples without the protective interference filter, one of them with a conductive layer, were tested. The sample substrate was 125 micron Teflon FEP, with vapor deposited silver reflector and a thin Inconel film for corrosion protection. N.W.

N82-14238*# Air Force Space Div., Los Angeles, Calif.

OPERATIONAL STATUS OF THE SPACE TEST PROGRAM P78-2 SPACECRAFT AND PAYLOADS

Richard N. Osgood *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 365-369 (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

Operations of the P78-2 spacecraft and its 12 payloads, which attempt to measure the buildup and breakdown of charge on various spacecraft components and to characterize the natural environment at synchronous altitudes, are summarized. Launch procedures, orbit alignment, and eclipse seasons are reviewed. The spacecraft configuration and subsystems are described. Catastrophic payload failures are reported: the SC6 (AFGL Thermal Plasma Analyzer) failed due to an excessive power draw in the electron step generator. The SC7 (NASA/MSFC Light Ion Mass Spectrometer) internal power supply failed. Lesser payload failures, including SC2 probe biasing, SC4-1 pulsed mode, and SC4-2 neutralizer are discussed. N.W.

N82-14239*# Aerospace Corp., El Segundo, Calif.

ELECTRON ANGULAR DISTRIBUTIONS DURING CHARGING EVENTS

J. F. Fennell, D. R. Croley, Jr., P. F. Mizera, and J. D. Richardson *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 370-385 refs (For primary document see N82-14213 05-18)

(Contract F04701-80-C-0081)

Avail: NTIS HC A99/MF A1 CSCL 22B

The angular distribution of electrons and ions at times of spacecraft charging were examined for several charging events. Generally it was found that electrons measured perpendicular to the Earth's magnetic field are more intense and more energetic than those measured parallel to the magnetic field during charging events. During the substorm charging injection, the electron spectra harden at all angles to the magnetic field as the evolution of the charging spectra is monitored by the P78-2 satellites. An example of the onset of charging and the changes in the electron distributions is examined. The evolution of the electrons from a 'soft' plasma sheet distribution to a 'hard' charging distribution is compared with the charging of Kapton on the satellite and the spacecraft frame potential. The ions are used to determine the spacecraft potential. Evidence of periodic surface potential variations related to particle anisotropies are presented and discussed. N.W.

N82-14240*# Panametrics, Inc., Waltham, Mass.

OPERATION OF SC5 RAPID SCAN PARTICLE SPECTROMETER ON SCATHA SATELLITE

Frederick A. Hanser, Bach Sellers, David A. Hardy, H. A. Cohen, J. Feynman, and M. S. Gussenhoven *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 386-411 refs Prepared in cooperation with AFGL and Boston Coll. (For primary document see N82-14213 05-18)

(Contracts F19628-79-C-0099; F19628-79-C-0031)

Avail: NTIS HC A99/MF A01 CSCL 22B

The SC5 rapid scan particle spectrometer, operating on the SCATHA satellite, is discussed. SC5 in-orbit operation and reduction of electrostatic analyzer (ESA) spectra are addressed. ESA data summaries from ion and electron gun operations are explained. Data from gun operations show how the satellite potential responds and provide information on the various time constants involved. N.W.

N82-14241*# Lockheed Missiles and Space Co., Palo Alto, Calif.

REVIEW OF HOT PLASMA COMPOSITION NEAR GEOSYNCHRONOUS ALTITUDE

Richard G. Johnson *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 412-432 refs Prepared in cooperation with Bern Univ. (For primary document see

N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

The information available on the hot plasma composition at and near the geostationary satellite orbit has increased dramatically during the past four years. At energies below 32 keV, ions of terrestrial origin, O(+) and He(+) are frequently observed to be significant contributors to the hot plasma density and energy density, and during geomagnetically disturbed periods, O(+) ions are typically the dominant hot plasma ions. Evidence for a solar cycle dependence to the O(+) hot plasma densities at the geostationary orbit has been found. Our understanding of the details of the physical processes involved in the entry, acceleration, transport, and loss of the plasma ions, and thus our ability to model them, is still quite limited. N.W.

N82-14242*# Lockheed Missiles and Space Co., Palo Alto, Calif.
SCATHA OBSERVATIONS OF SPACE PLASMA COMPOSITION DURING A SPACECRAFT CHARGING EVENT
R. G. Johnson, R. Strangeway, S. Kaye, R. Sharp, and E. Shelley *In* NASA. Lewis Research Center Spacecraft Charging Technol. 1980 Oct. 1980 p 433-438 refs (For primary document see N82-14213 05-18)
(Contract N00014-76-C-0444)
Avail: NTIS HC A99/MF A01 CSCL 22B

During an Earth eclipse of the SCATHA spacecraft, the spacecraft charged to potentials greater than 1KV for about 30 minutes with extended excursions greater than 4KV. The composition of the hot plasma was obtained in the 0.1 to 32 keV energy range with an ion mass spectrometer aboard the spacecraft. Prior to the onset of the charging event, H(+) was the principal plasma ion, and during the event O(+) was the principal ion. The composition was energy dependent and varied significantly on a time scale of 4 minutes. An assumption that the ion flux was all H(+) led to computed number densities that were in error by more than a factor of two for several time intervals during the event. S.L.

N82-14243*# Aerospace Corp., El Segundo, Calif.
P78-2 ENGINEERING OVERVIEW
A. L. Vampola *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 439-460 refs (For primary document see N82-14213 05-18)
(Contract F04701-80-C-0080)
Avail: NTIS HC A99/MF A01 CSCL 22B

Data from the P78-2 spacecraft are being used in verifying and validating analytical tools being developed for the design of spacecraft, such as NASCAP, for updating Military Standard 1541, for investigation of materials contamination, and for a study of the physics of charging. The analysis of this data has already resulted in changes in laboratory testing procedures, in a better understanding of some properties of materials exposed to the space environment, and in some insight into the EMI caused by discharges on spacecraft in a plasma environment. Some examples of early results from the engineering experiments are presented. Author

N82-14244*# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
SATELLITE SURFACE POTENTIAL SURVEY
Paul F. Mizera and G. M. Boyd *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 461-469 refs (For primary document see N82-14213 05-18)
(Contract F04701-79-C-0080)
Avail: NTIS HC A99/MF A01 CSCL 22B

Results of Kapton differential voltage charging of the satellite surface potential monitor Kapton samples are presented for the first 100 days of P78-2 operations. Daily charging occurrences are plotted in magnetic local time and L-shell (altitude and magnetic latitude) space as a function of magnetic activity. Most of the low level charging occurs well into the dawn local time sector whereas the highest voltage levels occur in the premidnight local time sector. The probabilities of differential charging are extremely dependent on the local time sector, the altitude (or L-shell) and of course, the magnetic activity. A.R.H.

N82-14245*# SRI International Corp., Menlo Park, Calif.
PRELIMINARY ANALYSIS OF DATA FROM SRI INTERNATIONAL TRANSIENT PULSE MONITOR ON BOARD P78-2 SCATHA SATELLITE
S. A. Damron, R. C. Adamo, and J. E. Nanevicz *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 470-477 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

The satellite charging at high altitudes (SCATHA) program addresses the occurrence of electrostatic discharges causing undesirable effects like deleterious transients in electronic circuits on satellites. The high altitude plasma environment and the effects of the interaction of this environment with the orbiting satellite are studied. The SRI transient pulse monitor (TPM) detects the transient electromagnetic signals induced in selected circuits. As a transient detector the TPM records transient signals, indicates the number of transients observed, and gives peak amplitude of the largest transient during each second's interval. Most of the early data from the TPM contain pulses associated with internal electrical activity and electrostatic charging on the surface of the P78-2 is evidenced. It is found that periods of external discharging do not necessarily coincide with periods in which high potentials are measured on the satellite's surface. E.A.K.

N82-14246*# Aerospace Corp., El Segundo, Calif.
ASPECT DEPENDENCE AND FREQUENCY SPECTRUM OF ELECTRICAL DISCHARGES ON THE P78-2 (SCATHA) SATELLITE
Harry C. Koons *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 478-492 refs (For primary document see N82-14213 05-18)
(Contract F04701-80-C-0081)
Avail: NTIS HC A99/MF A01 CSCL 22B

The satellite charging at high altitudes (SCATHA) P78-2 satellite payload includes a charging electrical effects analyzer (CEEA) which measures the characteristics of electrical discharges in both the frequency and time domain. Pulses are detected in response to commands during electron and ion beam operations and during natural discharge events. The pulse analyzer measures the shape of pulses on four sensors and is the primary CEEA diagnostic for the natural discharges. Only five discharges were found in the data at a time when the pulse analyzer was in mode with sufficient time resolution to resolve the frequency components in the waveform. E.A.K.

N82-14247*# Aerospace Corp., El Segundo, Calif.
FLIGHT EVIDENCE OF SPACECRAFT SURFACE CONTAMINATION RATE ENHANCEMENT BY SPACECRAFT CHARGING OBTAINED WITH A QUARTZ CRYSTAL MICROBALANCE
D. M. Clark and David F. Hall *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 493-508 refs (For primary document see N82-14213 05-18)
(Contract F04701-80-C-0081)
Avail: NTIS HC A99/MF A01 CSCL 22B

The significance of the fraction of the mass outgassed by a negatively charged space vehicle which is ionized within the vehicle plasma sheath and electrostatically reattracted to the space vehicle was determined. The ML-12 retarding potential analyzer/temperature controlled quartz crystal microbalances (RPA/TQCMs) distinguishes between charged and neutral molecules and investigates contamination mass transport mechanism. Two long term, quick look flight data sets indicate that on the average a significant fraction of mass arriving at one RPA/TQCM is ionized. It is assumed that vehicle frame charging during these periods was approximately uniformly distributed in degree and frequency. It is shown that electrostatic reattraction of ionized molecules is an important contamination mechanism at and near geosynchronous altitudes. E.A.K.

N82-14248*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
P78-2 SATELLITE AND PAYLOAD RESPONSES TO ELECTRON BEAM OPERATIONS ON MARCH 30, 1979
H. A. Cohen (AFGL), R. C. Adamo (SRI International), T. Aggson, A. Chesley (AFGL), D. M. Clark (Aerospace Corp.), S. A. Damron (SRI International), D. E. Delorey (Boston Coll.), J. F. Fennell (Aerospace Corp.), M. S. Gussenhoven (Boston Coll.), F. A. Hanser (Panametrics, Inc.) et al *In* NASA. Lewis Research Center

Spacecraft Charging Technol., 1980 Oct. 1980 p 509-559 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

The operating modes of the SC4-1 payload, the resultant charging of the spacecraft frame and sample materials on the spacecraft exterior and recorded transient pulses are reported. Arcing was detected by pulse monitors in several electron beam modes of operation. The ejection of a beam of 6 mA of 3 keV electrons caused three distinct payload failures and created a transient problem in the telemetry system. The exact time, nature, and cause of these failures was determined and component failure and why they failed was identified. Analytical and modeling techniques are used to examine possible spacecraft and payload responses to the electron beam ejection which might have contributed to the arcing and payload failures. E.A.K.

N82-14249*# Systems Science and Software, La Jolla, Calif.
REPRESENTATION AND MATERIAL CHARGING RESPONSE OF GEOPLASMA ENVIRONMENTS
P. R. Stannard, G. W. Schnuelle, I. Katz, and M. J. Mandell *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 560-579 refs (For primary document see N82-14213 05-18)
(Contract NAS3-21762)
Avail: NTIS HC A99/MF A01 CSCL 22B

The sensitivity of the charging response to the representation of the measured environments and material properties are discussed. Single and double Maxwellian representations are compared with direct numerical integration of the observed spectra. The effect of anisotropic incident flux distribution is modeled. In addition, the effect of the high energy radiation upon bulk conductivity and hence differential charging is examined. E.A.K.

N82-14250*# Systems Science and Software, La Jolla, Calif.
SIMULATION OF CHARGING RESPONSE OF SCATHA (P78-2) SATELLITE
G. W. Schnuelle, P. R. Stannard, I. Katz, and M. J. Mandell *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 580-591 refs (For primary document see N82-14213 05-18)
(Contract NAS3-21762)
Avail: NTIS HC A99/MF A01 CSCL 22B

A model of the satellite charging at high altitudes (SCATHA P78-2) satellite was used to simulate the charging response of SCATHA at geosynchronous orbit. The model includes a description of the geometry, currents to exposed surface materials, and electrical connections on the spacecraft. The charging response of the vehicle to that predicted by the NASCAP model for the Day 87, 1979 eclipse charging event, in which the spacecraft charged to several kilovolts negative during a magnetospheric substorm are compared. Double Maxwellian representations of the plasma environment reproduce the charging response observed experimentally. E.A.K.

N82-14251*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SCATHA SSPM CHARGING RESPONSE: NASCAP PREDICTIONS COMPARED WITH DATA
Carolyn K. Purvis and John Staskus *In its* Spacecraft Charging Technol., 1980 Oct. 1980 p 592-607 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

Models for the satellite surface potential monitor (SSPM) units constructed in the NASCAP code and the results of comparing predictions to surface voltage and baseplate current data are reported. Several peculiarities in the test data are noted. Preliminary results from space simulations of a SCATHA model with environments representative of the day 87, 1979, eclipse injection event are presented, and their implications for predicting space response are discussed. E.A.K.

N82-14252*# Boston Coll., Chestnut Hill, Mass.
THREE-DIMENSIONAL ANALYSIS OF CHARGING EVENTS ON DAYS 87 AND 114, 1979, FROM SCATHA
N. A. Saflekos, M. F. Tautz (Radex Corp.), A. G. Rubin (AFGL), D. A. Hardy (AFGL), P. F. Mizera (Aerospace Corp.), and J. Feynman *In* NASA. Lewis Research Center Spacecraft Charging Tecnol., 1980 Oct. 1980 p 608-631 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

Angular distributions of ions and electrons from the Spacecraft Charging at High Altitudes (SCATHA) were investigated for the floating potential and the differential charging of the spacecraft as deduced from Liouville's theorem. The following was found: (1) short time charging events on the spacecraft are associated with short time increases of the intensity of 10 keV to 1 MeV electrons; (2) short time changes of the spacecraft differential potential are associated with simultaneous short time changes of the spacecraft floating potential; (3) solar UV intensities in penumbra anticorrelate with the spacecraft floating potentials; (4) NASCAP predicts correct forms of sunshade asymmetric surface potentials; (5) certain enhancements of the intensity of energetic ions diminishes the absolute value of the spacecraft surface potential; (6) spacecraft discharging events in times shorter than 20 sec did not change in the spectrum of the energetic plasma; (7) partial discharging of the spacecraft occurred upon entry into a magnetically depleted region; and (8) steady state potentials and transient potentials of duration less than 30 seconds are simulated by the NASCAP code. E.A.K.

N82-14253*# Air Force Geophysics Lab., Hanscom AFB, Mass.
COMPUTER SIMULATION OF SPACECRAFT CHARGING ON SCATHA
A. G. Rubin, H. A. Cohen, D. A. Hardy, M. F. Tautz (Radex Corp.), and N. A. Saflekos (Boston Coll.) *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 632-641 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

Computer simulation to determine spacecraft charging on P78-2 (SCATHA) during a substorm and for modeling the effects of electron beam emission on the P78-2 ground potential for a variety of beam voltages and currents was used. Measured and computed spacecraft potentials are obtained to within several hundred eV. Computation of the electron beam emission effects on the spacecraft ground potential are shown. It is concluded that the spacecraft ground potential can be controlled by emitting an electron beam. E.A.K.

N82-14254*# Boston Coll., Chestnut Hill, Mass.
ANALYSIS OF AMBIENT AND BEAM PARTICLE CHARACTERISTICS DURING THE EJECTION OF AN ELECTRON BEAM FROM A SATELLITE IN NEAR-GEOSYNCHRONOUS ORBIT ON MARCH 30, 1979
M. S. Gussenhoven, H. A. Cohen, D. A. Hardy, W. J. Burke, and A. Chesley *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 642-664 refs Prepared in cooperation with AFGL (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

An electron beam system was operated over a wide range of beam currents and energies for periods both in sunlight and in eclipse. Complex pitch angle modulations of the electron spectra are separately decomposed for each beam operation. When electrons are emitted perpendicular to the magnetic field with an energy of 3 keV and a current of 0.10 mA they return as a coherent beam only to the parallel detector. Throughout the beam operations the pitch angle distributions show electrons with energy less than beam energy streaming along the field line. Analytic expressions for the satellite electric field are constructed and particle trajectories are determined. E.A.K.

N82-14255*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPARISON OF NASCAP MODELLING RESULTS WITH LUMPED CIRCUIT ANALYSIS
David B. Stang and Carolyn K. Purvis *In its* Spacecraft Charging Technol., 1980 Oct. 1980 p 665-683 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

Engineering design tools that can be used to predict the development of absolute and differential potentials by realistic spacecraft under geomagnetic substorm conditions are described. Two types of analyses are in use: (1) the NASCAP code, which computes quasistatic charging of geometrically complex objects with multiple surface materials in three dimensions; (2) lumped element equivalent circuit models that are used for analyses of particular spacecraft. The equivalent circuit models require very little computation time, however, they cannot account for effects, such as the formation of potential barriers, that are inherently multidimensional. Steady state potentials of structure and insulation are compared with those resulting from the equivalent circuit model. E.A.K.

N82-14256*# TRW Defense and Space Systems Group, Redondo Beach, Calif.

NASCAP CHARGING CALCULATIONS FOR A SYNCHRONOUS ORBIT SATELLITE

N. L. Sanders and G. T. Inouye *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 684-706 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

The use of the NASA Charging Analyzer Program (NASCAP) for the computation of spacecraft charge up in the energetic plasma environment of geosynchronous orbits is described. Spacecraft modelling, materials parameters, and NASCAP charging analyses are described. The synchronous orbit plasma environment used in the stress analysis employs a two Maxwellian energy distribution to determine the fluxes. Several NASCAP runs performed to determine the location and magnitude of environmentally induced voltage stresses are analyzed. J.D.H.

N82-14257# York Univ., Toronto (Ontario). Dept. of Physics.

RESULTS FROM A TWO DIMENSIONAL SPACECRAFT CHARGING SIMULATION AND COMPARISON WITH A SURFACE PHOTOCURRENT MODEL

J. G. Laframboise, S. M. L. Prokopenko, M. Kamitsuma, and R. Govard *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 709-716 refs (For primary document see N82-14213 05-18)
(Grant AF-AFOSR-2962-76)
Avail: NTIS HC A99/MF A01 CSCL 22B

A two dimensional spacecraft charging simulation program called CYLVIA, which treats infinite cylindrical geometries with angle dependence, is considered. Two features of this program, its orbit integration and current collection methods, are discussed. A calculation is presented of floating potentials of a spacecraft cross section which is represented by two conductive sectors, and a comparison is made between the photoemission current distribution obtained therein and another given by an approximate analytic surface photocurrent expression by Laframboise and Whipple. Author

N82-14258*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ANALYTICAL MODELING OF SATELLITES IN GEOSYNCHRONOUS ENVIRONMENT

N. John Stevens *In its* Space Charging Technol., 1980 Oct. 1980 p 717-729 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

Experiences with surface charging of geosynchronous satellites are reviewed and mechanisms leading to discharges on satellite surfaces are considered. It was found that the large differential voltages between the surface and the substrate required to produce massive laboratory discharges do not occur on satellites in space. Analytical modeling predictions supported by dielectric charging data from P78-2, SCATHA (Spacecraft Charging at High Altitudes) flight results are discussed. Ungrounded insulator areas, buried charge layers (due to mid-energy range particles), and positive differential voltages (where structure voltages are less negative than surrounding dielectric surface voltages) are considered as possible mechanisms producing satellite charge up. J.D.H.

N82-14259*# Systems Science and Software, San Diego, Calif.

CALCULATION OF SURFACE CURRENT RESPONSE TO SURFACE FLASHOVER OF A LARGE SAMPLE UNDER GROUNDED AND FLOATING CONDITIONS

M. J. Mandell, I. Katz, and G. W. Schnuelle *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 730-744 refs (For primary document see N82-14213 05-18)
(Contracts DNA001-79-C-0079; DNA001-79-C-0027)
Avail: NTIS HC A99/MF A01 CSCL 22B

Results for the electromagnetic response to the discharge of an 80 cm diameter dielectric sample mounted on a 120 cm diameter cylinder are presented. It is assumed that the dielectric is charged with a known potential profile dropping sharply near the edge, and the substrate initially grounded. During the early part of the discharge (approximately 10 ns) there is little difference between the grounded and floating cases. Beyond about 10 ns the grounded experiment is in approximate steady state, continuous to blow off charge until the dielectric is substantially discharged. The floating case, however, shows modestly decreasing emission and response. Eventually, a quasi-steady state is reached in which charge is transported from dielectric to substrate rather than blown off. J.D.H.

N82-14260*# JAYCOR, Alexandria, Va.

MODEL OF COUPLING DISCHARGES INTO SPACECRAFT STRUCTURES

A. J. Woods, M. J. Treadway, R. Grismore, R. E. Leadon, T. M. Flanagan, and E. P. Wenaas *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 745-754 refs Sponsored by AFWL (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

The calculated results of a semiempirical model for electron-caused electromagnetic pulse (ECEMP) are compared to the experimental data for three spacecraft geometries. The appropriateness of certain model assumptions which have been employed in the absence of a microscopic theory for dielectric breakdown and associated electron blowoff is discussed. Results are limited to the exterior response of spacecraft structures, although neither the model nor the experiments were limited to the outside problem. Rationales for model assumptions are provided. J.D.H.

N82-14261*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DISAPPEARANCE AND REAPPEARANCE OF PARTICLES OF ENERGIES < 50 keV AS SEEN BY P78-2 (SCATHA) NEAR GEOSYNCHRONOUS ORBIT

J. Feynman (Boston Coll.), N. A. Saflekos (Boston Coll.), H. G. Garrett, D. A. Hardy (AFGL), and E. G. Mullen *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 755-767 refs (For primary document see N82-14213 05-18)
(Contract F19628-79-C-0031)
Avail: NTIS HC A99/MF A01 CSCL 22B

The nightside particle environment as observed by the AFGL Rapid Scan Particle Detector on SCATHA showing large, sudden simultaneous changes in the fluxes of electrons and protons with energies above 50 keV (dropouts) is considered. An interesting feature of SCATHA dropouts is the quasiperiodic behavior of the particle flux amplitudes which often vary with a period of the order of 15 minutes both during the dropout and after the return. A flux return during eclipse caused a major spacecraft charging event of several kilovolts. The SCATHA observations are compared with those reported for other geosynchronous satellites. In agreement with ATS-5, a marked dependence in the frequency of occurrence due to an effect of the orbit is found. ATS-5 experienced few dropouts during quiet geomagnetic conditions. However, for an L shell greater than seven, SCATHA particle dropouts occur routinely during quiet conditions. Thus, for SCATHA's orbit, both the orbital position and geomagnetic conditions must be taken into account in evaluating the potential hazard of flux returns. J.D.H.

N82-14262*# Aerospace Corp., El Segundo, Calif.

MILITARY STANDARDS AND SCATHA PROGRAM UPDATE OF MIL-STD-1541

D. T. Frankos *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 768-788 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

The elctromagnetic compatability requirements for space systems, 15 October 1973, to be met by industry contractors for spacecraft launch vehicles and other special space systems, are considered. Deficiencies in the existing standard with respect to spacecraft charge and discharge phenomena, the technical ramifications for generating a new standard, and the upgrading of MIL-STD-1541 with requirements supplied as a result of the SCATHA program are discussed. J.D.H.

N82-14263*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

USE OF CHARGING CONTROL GUIDELINES FOR GEOSYNCHRONOUS SATELLITE DESIGN STUDIES

N. John Stevens *In its* Spacecraft Charging Technol., 1980 Oct. 1980 p 789-801 refs (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

Several of the principle guidelines from the Spacecraft Charging Design Guidelines Handbook are presented with illustrative examples. Use of the geomagnetic substorm specification to qualify satellite designs, the evaluation of satellite designs by using analytical modelling techniques, the use of selected materials and coatings to minimize charging, the tying of all conducting elements to a common ground, and the use of electrical filtering to protect circuits from discharge induced upsets are discussed. Discharge criteria and SCATHA data are excluded.
J.D.H.

N82-14264*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

P78-2 SCATHA ENVIRONMENTAL DATA ATLAS

E. Gary Mullen (AFGL), David A. Hardy (AFGL), Henry B. Garrett, and Elden C. Whipple (California Univ., San Diego) *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 802-813 refs (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

The 100 eV to approximately 1 MeV plasma environment encountered by the P78-2 Spacecraft Charging at High Altitudes (SCATHA) satellite during its initial operation period was studied. Forty-four days of 10 minute averages of the four moments of the electron and ion distribution functions calculated from the SC5 and SC9 energetic particle measurements were analyzed to determine occurrence frequency, local time variation, geomagnetic activity variation, and L shell variation. The single and double Maxwellian parameters derived from the four moments were similarly analyzed. The interrelationships between the moments and derived parameters were computed and the results compared with the ATS-5 and ATS-6 atlas. Results of this analysis establish a baseline range for the SCATHA plasma environment.
Author

N82-14265*# European Space Agency, Paris (France).

METEOSAT SPACECRAFT CHARGING INVESTIGATION

Dierk G. Hoge *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 814-834 refs (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

A number of phenomena observed on the first orbiting Meteosat satellite attributed to spacecraft charging effects are considered. Design analysis, correlation of anomalies with space environmental data, on ground tests with an engineering model spacecraft, tests on the validity of improvements, and installation of suitable monitors for the second improved flight satellite are discussed.
J.D.H.

N82-14266*# European Space Agency, Paris (France).

ELECTRON IRRADIATION TESTS ON EUROPEAN METEOROLOGICAL SATELLITE

J. Reddy *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 835-855 refs (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

The observation of in orbit anomalies on Meteosat resulted in a test being performed to establish the charging and discharging characteristics of a flight configured engineering model when irradiated with electrons. Surface potentials were measured together with discharge rates and amplitudes. Results indicate that a large number of discharges are possible on the satellite whether or not the external surfaces are grounded. Initial measurements show that there are very high potential gradients around the satellite which obviously contribute largely to the discharging behavior. The time constant for charging is very small, indicating also that equilibrium conditions are achieved very quickly as the local ambient changes in orbit.
A.R.H.

N82-14267*# Defense Nuclear Agency, Washington, D.C.

SPACECRAFT CHARGING TECHNOLOGY IN THE SATELLITE X-RAY TEST FACILITY

Troy J. Sponaugle *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 856-865 refs (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

A satellite X-ray test facility (SXTF) is planned for studying system generated electromagnetic pulse effects on full scale, operational spacecraft. The environment created by a distant, high altitude nuclear burst can be simulated using pulsed X-ray sources. The facility is to be installed in a thermal vacuum chamber with dimensions greater then 10 m diameter and 20 m height and equipped with solar simulators and equipment for simulating the charging environment of space. The spacecraft charging system consists of several low energy electron and hydrogen ion sources (5-25 keV), one or two medium energy electron accelerators (150-300 keV), an array of vacuum ultraviolet lamps, and geomagnetic field suppression coils. Military, scientific, and commercial spacecraft can be tested before launching into the radiation environment of space. construction of SXTF is scheduled to begin in 1982 and the facility should be available for general use in 1984. Potential users are encouraged to express their needs for specific testing environments in SXTF.
A.R.H.

N82-14268*# Spire Corp., Bedford, Mass.

SIMULATION OF SPACECRAFT CHARGING ENVIRONMENTS BY MONOENERGETIC BEAMS

Ward Halverson *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 866-886 refs Sponsored by AFGL (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

To simulate the distributed spectra of plasmas in space, the differential current density spectrum of the plasma was divided into a number of energy bands and the beam energy and current were calculated for each band to provide a piecewise reproduction of the distributed spectrum. Beam energies and current densities were chosen to match the velocity moments of the plasma distribution function. The velocity moments are averages related to physical quantities such as particle density, flux, pressure, and energy flux, and have been used extensively to characterize the measured properties of plasmas in space. Combinations of one, two, and three beams were found to match two to six velocity moments of Maxwellian distributions. A computational model was used to compare the charging of a spacecraft by plasmas with distributed spectra and by monoenergetic beams.
A.R.H.

N82-14269*# California Univ., San Diego. Center for Astrophysics and Space Science.

IMPORTANCE OF DIFFERENTIAL CHARGING FOR CONTROLLING BOTH NATURAL AND INDUCED VEHICLE POTENTIALS ON ATS-5 AND ATS-6

E. C. Whipple and R. C. Olsen *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 888-893 refs (For primary document see N82-14213 05-18)

Avail: NTIS HC A99/MF A01 CSCL 22B

Three techniques of discharging satellites used on the P78-2 satellite were the ejection of a beam of electrons from an electron gun; the emission of electrons from a heated, biased filament; and the ejection of a plasma containing energetic positive xenon ions and low energy electrons. When the P78-2 satellite ground to plasma potential difference reached several hundred volts, each of the three techniques was able to completely discharge the satellite. The comparative effctiveness of the techniques were clearly shown. Two days later, the satellite charged to -8 keV upon entering eclipse. The electron gun, emitting 1 mA of electrons with 150 eV energy, reduced the difference in potential between satellite ground and the ambient plasma to -1 kV, but could not completely discharge the satellite. The plasma source completely discharged the satellite.
A.R.H.

N82-14270*# SRI International Corp., Menlo Park, Calif.

ELECTROMAGNETIC FIELDS PRODUCED BY SIMULATED SPACECRAFT DISCHARGES

J. E. Nanevicz, R. C. Adamo (Beers Associates, Inc.), B. L. Beers, and T. N. Delmer (Beers Associates, Inc.) *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980

p 894-911 refs Sponsored by Air Force (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

The initial phase of a broader, more complete program for the characterization of electrical breakdowns on spacecraft insulating materials is described which consisted of the development of a discharge simulator and characterization facility and the performance of a limited number of discharge measurements to verify the operation of the laboratory setup and to provide preliminary discharge transient field data. A preliminary model of the electromagnetic characteristics of the discharge was developed. It is based upon the 'blow off' current model of discharges, with the underlying assumption of a propagating discharge. The laboratory test facility and discharge characterization instrumentation are discussed and the general results of the 'quick look' tests are described on quartz solar reflectors aluminized Kapton and silver coated Teflon are described. A.R.H.

N82-14271*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

AGREEMENT FOR NASA/OAST - USAF/AFSC SPACE INTERDEPENDENCY ON SPACECRAFT ENVIRONMENT INTERACTION

C. P. Pike (AFGL) and N. John Stevens *In its* Spacecraft Charging Technol., 1980 Oct. 1980 p 912-930 refs (For primary document see N82-14213 05-18)
Avail: NTIS HC A99/MF A01 CSCL 22B

A joint AF/NASA comprehensive program on spacecraft environment interactions consists of combined contractual and in house efforts aimed at understanding spacecraft environment ineraction phenomena and relating ground test results to space conditions. Activities include: (1) a concerted effort to identify project related environmental interactions; (2) a materials investigation to measure the basic properties of materials and develop or modify materials as needed; and (3) a ground simulation investigation to evaluate basic plasma interaction phenomena and provide inputs to the analytical modeling investigation. Systems performance is evaluated by both ground tests and analysis. There is an environmental impact investigation to determine the effect of future large spacecraft on the charged particle environment. Space flight investigations are planned to verify the results. The products of this program are test standards and design guidelines which summarize the technology, specify test criteria, and provide techniques to minimize or eliminate system interactions with the charged particle environment. A.R.H.

N82-14272*# Kansas Univ., Lawrence.

NUMERICAL SIMULATION OF PLASMA INSULATOR INTERACTIONS IN SPACE. PART 1: THE SELF CONSISTENT CALCULATION

J. H. Nonnast, R. C. Chaky, T. P. Armstrong, J. Enoch, and G. G. Wiseman *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 932-945 refs (For primary document see N82-14213 05-18)
(Grant NsG-3290)
Avail: NTIS HC A99/MF A01 CSCL 22B

A computer program is being developed to simulate the interaction of a plasma with a conducting disk partially covered by an insulator. Initial runs consider only charge sticking to the dielectric. Results indicate that the current density drawn by the hole in the dielectric increases approximately linearly with voltage for conductor voltages between 5 volts and 250 volts. Author

N82-14273*# Kansas Univ., Lawrence.

NUMERICAL SIMULATION OF PLASMA INSULATOR INTERACTIONS IN SPACE. PART 2: DIELECTRIC EFFECTS

R. C. Chaky, J. H. Nonnast, T. P. Armstrong, J. Enoch, and G. Wiseman *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 946-956 (For primary document see N82-14213 05-18)
(Grant NsG-3290)
Avail: NTIS HC A99/MF A01 CSCL 22B

Any process which may be modeled statistically for a simple plasma particle may be modeled by the particle in cell technique. The success of the calculation is then dependent on having a large enough number of particles that the statistical treatment is meaningful. Thus it is possible to include the effects of secondary emission, backscattering, charge sticking and possibly dielectric breakdown, photoemission, and spallation. The first plasma dielectric interaction included in the computer code for simulating plasma insulator interactions is secondary electron emission. A calculated current density vs. voltage curve is presented and compared to an experimental curve. A.R.H.

N82-14274*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

THREE DIMENSIONAL SPACE CHARGE MODEL FOR LARGE HIGH VOLTAGE SATELLITES

David Cooks (Rice Univ.), Lee W. Parker (Parker (Lee W.), Inc.), and James E. McCoy *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 957-978 refs (For primary document see N82-14213 05-18)
(Contract NAS9-16206)
Avail: NTIS HC A99/MF A01 CSCL 22B

High power solar arrays for satellite power systems with dimensions of kilometers, and with tens of kilovolts distributed over their surface face many plasma interaction problems that must be properly anticipated. In most cases, the effects cannot be adequately modeled without detailed knowledge of the plasma sheath structure and space charge effects. Two computer programs were developed to provide fully self consistent plasma sheath models in three dimensions as a result of efforts to model the experimental plasma sheath studies at NASA/JSC. Preliminary results indicate that for the conditions considered, the Child-Langmuir diode theory can provide a useful estimate of the plasma sheath thickness. The limitations of this conclusion are discussed. Some of the models presented exhibit the strong ion focusing observed in the JSC experiments. A.R.H.

N82-14275*# Systems Science and Software, San Diego, Calif.

CHARGING OF A LARGE OBJECT IN LOW POLAR EARTH ORBIT

D. E. Parks and I. Katz *In* NASA. Lewis Research Center Spacecraft Charging Technol., 1980 Oct. 1980 p 979-989 refs Sponsored in part by AFGL (For primary document see N82-14213 05-18)
(Contract NAS3-21762)
Avail: NTIS HC A99/MF A01 CSCL 22B

The charging of a large sphere subject to the environment encountered by the shuttle orbiter as it passes through the auroral regions in its low polar Earth orbit was investigated. The environment consists of a low temperature dense plasma and a relatively intense (200 mu A/sq m) field aligned flux of energetic electrons (approximately 5 to 10 keV). The potential on a sphere in eclipse is presented as a function of the ratio kappa of the charging rate produced by precipitating electrons to the discharging rate produced by ram ions. It was found that a 5 meter conducting sphere charges to potentials of order 1 kilovolt for kappa approximately 2, even though a 0.5 meter sphere charges to less than 100 volts. It is concluded that the natural charging environment can induce large potentials (approximately 1 kilovolt) on the shuttle orbiter. A.R.H.

N82-14276*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

INTERACTIVE DESIGN AND ANALYSIS OF FUTURE LARGE SPACECRAFT CONCEPTS

L. Bernard Garrett Dec. 1981 32 p refs Presented at the 16th AIAA Thermophys. Conf., Palo Alto, Calif., 23-25 Jun. 1981
(NASA-TP-1937; L-14739) Avail: NTIS HC A03/MF A01 CSCL 22B

An interactive computer aided design program used to perform systems level design and analysis of large spacecraft concepts is presented. Emphasis is on rapid design, analysis of integrated spacecraft, and automatic spacecraft modeling for lattice structures. Capabilities and performance of multidiscipline applications modules, the executive and data management software, and grahics display features are reviewed. A single user at an interactive terminal create, design, analyze, and conduct parametric studies of Earth orbiting spacecraft with relative ease. Data generated in the design, analysis, and performance evaluation of an Earth-orbiting large diameter antenna satellite are used to illustrate current capabilities. Computer run time statistics for

the individual modules quantify the speed at which modeling, analysis, and design evaluation of integrated spacecraft concepts is accomplished in a user interactive computing environment.
E.A.K.

N82-14277*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THERMAL AND AEROTHERMAL PERFORMANCE OF A TITANIUM MULTIWALL THERMAL PROTECTION SYSTEM
Don E. Avery, John L. Shideler, and Robert N. Stuckey (Johnson Space Center) Dec. 1981 59 p refs
(NASA-TP-1961; L-14719) Avail: NTIS HC A04/MF A01 CSCL 22B

A metallic thermal protection system (TPS) concept the multiwall designed for temperature and pressure at Shuttle body point 3140 where the maximum surface temperature is approximately 811 K was tested to evaluate thermal performance and structural integrity. A two tile model of titanium multiwall and a model consisting of a low temperature reusable surface insulation (LRSI) tiles were exposed to 25 simulated thermal and pressure Shuttle entry missions. The two systems performed the same, and neither system deteriorated during the tests. It is indicated that redesign of the multiwall tiles reduces tile thickness and/or weight. A hine tile model of titanium multiwal was tested for radiant heating and aerothermodynamics. Minor design changes that improve structural integrity without having a significant impact on the thermal protection ability of the titanium multiwall TPS are identified. The capability of a titanium multiwall thermal protection system to protect an aluminum surface during a Shuttle type entry trajectory at locations on the vehicle where the maximum surface temperature is below 811 K is demonstrated.
E.A.K.

N82-14129# European Space Operations Center, Darmstadt (West Germany).
SPACECRAFT FLIGHT DYNAMICS AT ESOC
R. E. Muench *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 55-60 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14135# National Aerospace Lab., Amsterdam (Netherlands).
ESTIMATES OF SPACECRAFT ATTITUDE AND SENSOR PARAMETERS USING ADAPTIVE FILTERING: METEOSAT 1 TRANSFER ORBIT APPLICATION
G. Moek and C. R. Traas (Technische Hogeschool, Twente, Netherlands) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 117-131 refs (For primary document see N82-14123 05-12)
(Contract ESTEC-3319/77)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14147# Universite Catholique de Louvain (Belgium).
PARTITIONING METHODS FOR IDENTIFICATION AND CONTROL OF FLEXIBLE SPACECRAFT
G. Campion and P. Y. Willems *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 245-251 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14165# National Space Development Agency, Ibaraki (Japan). Tsukuba Space Center.
EAST-WEST STATIONKEEPING MANEUVER
M. Utashima, A. Tanaka, T. Tohchi (Fujitsu Ltd.), and T. Ogino (Mitsubishi Electric Corp.) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 407-415 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14170# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Space Div.
IN ORBIT CHECKOUT OF THE IRAS GYROSCOPES
J. F. M. vanCasteren *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 451-459 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

N82-14278*# National Aeronautics and Space Administration, Washington, D. C.
ATTITUDE MEASUREMENT: PRINCIPLES AND SENSORS
P. Duchon and M. P. Vermande Nov. 1981 47 p Transl. into ENGLISH of "La Mesure d'Attitude, les Principes - les Sensors" France, 1980 p 315-348 Presented at Spacecraft Orbital Motion; Course in Space Technol., Toulouse, 2-13 Jun. 1980 Original language document was announced as A81-33388 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by CNES, France
(Contract NASw-3541)
(NASA-TM-76647) Avail: NTIS HC A03/MF A01 CSCL 22B

Tools used in the measurement of satellite attitude are described. Attention is given to the elements that characterize an attitude sensor, the references employed (stars, moon, Sun, Earth, magnetic fields, etc.), and the detectors (optical, magnetic, and inertial). Several examples of attitude sensors are described, including sun sensors, star sensors, earth sensors, triaxial magnetometers, and gyrometers. Finally, sensor combinations that make it possible to determine a complete attitude are considered; the SPOT attitude measurement system and a combined CCD star sensor-gyrometer system are discussed.
Author

N82-14279# Centre de Recherches en Physique de l'Environnement Terrestre et Planetaire, Orleans (France).
RICAR: PORTABLE TEST EQUIPMENT FOR THE INTEGRATION OF THE ISOPROBRE EXPERIMENT ON BOARD THE ARCAD 3 SATELLITE [RICAR: REFERENCE POUR INTERFACE COUPLEUR ARCAD. APPAREIL DE TEST PORTABLE POUR L'INTEGRATION DE L'EXPERIENCE ISOPROBE A BORD DU SATELLITE ARCAD 3]
J. P. Dume, M. Leveque, and P. Fort 10 Jun. 1981 147 p In FRENCH
(CRPE-1078) Avail: NTIS HC A07/MF A01

Test equipment that substitutes for an onboard computer which operates a satellite sounding experiment was developed. Computer system functions are described and circuit diagrams are given. The test system performs two operations: it verifies experiment modules, localizing defects and it sends repetitive command sequences, detecting malfunctions which might be due to the satellite/experiment interface. Checkout procedures for satellite support and maintenance personnel are recommended.
Author (ESA)

N82-14115# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).
THE PARTICULATE IMPACT ANALYZER, AN INSTRUMENT TO ANALYZE SMALL PARTICLES RELEASED BY HALLEY'S COMET
J. Kissel *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 53-60 refs (For primary document see N82-14107 05-12)
Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

N82-14116# Kent Univ., Canterbury (England). Space Sciences Lab.
A DUST IMPACT DETECTION SYSTEM FOR THE GIOTTO HALLEY MISSION
J. A. M. McDonnell, E. Gruen (Max-Planck Inst. fuer Kernphysik), G. C. Evans, J. G. Firth (Science Research Council, Chilton, Engl.), W. C. Carey, H. Kuczera (Technische Univ., Munich), W. M. Alexander (Baylor Univ., Waco, Tex.), D. H. Clark (Sciene Research Council, Chilton, Engl.), R. J. L. Grard (ESTEC, Noordwijk,

Netherlands), M. S. Hanner (JPL, Pasadena, Calif.) et al *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 61-75 refs (For primary document see N82-14107 05-12)
Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

N82-14118# Bern Univ. (Switzerland). Physikalisches Inst.
THE GIOTTO ION MASS SPECTROMETER
H. Balsiger, J. Geiss, D. T. Young, H. Rosenbauer (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), R. Schwenn (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), W.-H. Ip (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), E. Ungstrup (Danish Space Research Inst.), M. Neugbauer (JPL, Pasadena, Calif.), R. Goldstein (JPL, Pasadena, Calif.), B. E. Goldstein (JPL, Pasadena, Calif.) et al *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 93-98 refs (For primary document see N82-14107 05-12)
Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

N82-14121# Centre National de la Recherche Scientifique, Verrieres-le-Buisson (France). Service d'Aeronomie.
THE HALLEY OPTICAL PROBE EXPERIMENT
A.-C. Levasseur-Regourd, J. L. Weinberg (Lab. d'Astronomie, Marseille), F. Giovane (Lab. d'Astronomie, Marseille), D. W. Schuermann (Lab. d'Astronomie, Marseille), P. Lamy (Space Astronomy Lab., Gainesville, Florida), M. Festou (Space Astronomy Lab., Gainesville, Florida), J. L. Bertaux, R. Dumont, A. Llebaria and R. H. Giese *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 121-126 refs (For primary document see N82-14107 05-12)
Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

N82-14122# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).
THE GIOTTO NEUTRAL MASS SPECTROMETER
D. Krankowsky, P. Laemmerzahl, P. Eberhardt (Bern Univ.), U. Herrmann (Bern Univ.), J. J. Berthelier (CNRS, Paris), M. Sylvain (CNRS, Paris), J. H. Hoffman (Texas Univ., Dallas), R. R. Hodges (Texas Univ., Dallas), U. vonZahn (Bonn Univ.), H. U. Keller (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany) et al *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 127-130 refs (For primary document see N82-14107 05-12)
Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

N82-14125# European Space Operations Center, Darmstadt (West Germany).
A SIRIO 2 LASER RANGING EXPERIMENT
J. M. Dow and W. Flury *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 13-23 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-14280*# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
PARAMETRIC ANALYSIS OF DIFFUSER REQUIREMENTS FOR HIGH EXPANSION RATIO SPACE ENGINE Final Report
C. J. Wojciechowski and P. G. Anderson Nov. 1981 65 p refs
(Contract NAS8-33981)
(NASA-CR-161924; LMSC-HREC-TR-D784489) Avail: NTIS HC A04/MF A01 CSCL 21H

A supersonic diffuser ejector design computer program was developed. Using empirically modified one dimensional flow methods the diffuser ejector geometry is specified by the code. The design code results for calculations up to the end of the diffuser second throat were verified. Diffuser requirements for sea level testing of high expansion ratio space engines were defined. The feasibility of an ejector system using two commonly available turbojet engines feeding two variable area ratio ejectors was demonstrated. N.W.

N82-14281*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
SOLAR CELL MODULES FOR PLASMA INTERACTION EVALUATION Final Report
15 Oct. 1981 47 p refs
(Contract NAS8-34026)
(NASA-CR-161922; LMSC-D794945) Avail: NTIS HC A03/MF A01 CSCL 21C

A plasma interaction analysis in support of the solar electric propulsion subsystem examined the effects of a large high voltage solar array interacting with an ion thruster produced plasma. Two solar array test modules consisting of 36 large area wraparound contact solar cells welded to a flexible Kapton integrated circuit substrate were abricated. The modules contained certain features of the effects of insulation, din-holes, and bonding of the cell to the substrate and a ground plane. The possibility of a significant power loss occurring due to the collection of charged particles on the solar array interconnects was the focus of the research. R.J.F.

N82-14282# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
A STUDY OF TEST TECHNIQUES FOR EVALUATING ABLATIVE PLASMA ENGINES IN VACUUM TEST CELLS Interim Report, 14 Apr. 1979 - 31 Dec. 1980
R. Dawbarn, S. Steely, R. L. McGuire, and L. L. Price AEDC Oct. 1981 80 p refs Sponsored by Air Force
(AD-A105875; AEDC-TR-81-8) Avail: NTIS HC A05/MF A01 CSCL 14/2

The Teflon pulsed thruster is being considered as an attitude control and station-keeping device for spacecraft and satellites. In determining the compatibility of the pulsed plasma thruster with spacecraft systems, it is necessary to assess the potentially harmful effects the exhaust products may have on various spacecraft surfaces. Previous efforts to acquire data in space environmental chambers have had limited success due to the interferences caused by exhaust products scattering from the test facility walls and pumping panels. The overall objective of this effort is to define the operating characteristics of prototype pulsed plasma engine and a test facility configuration suitable for contamination-type tests. The immediate objectives of this report are: (1) to use a micropound and a millipound pulsed plasma engine to obtain information on the species in the plasma and how they react when they encounter the test chamber walls, and (2) to examine the effectiveness of possible diagnostic techniques; these include witness plates, electron multipliers, mass spectrometers, Faraday cups, attenuated total reflectance (ATR) plates, calorimeters, and UV spectroscopy. Author (GRA)

N82-14164# National Space Development Agency, Ibaraki (Japan). Tsukuba Space Center.
OPTIMIZATION OF APOGEE KICK MOTOR (AKM) FIRING ATTITUDE
M. Hirota, A. Tanaka, C. Abe (Fujitsu Ltd.), and T. Shimizu (Fujitsu Ltd.) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 399-406 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14172# Engins Matra, Velizy (France).
THRUSTOR PERFORMANCE MODELING AND PARAMETERS ESTIMATION
P. E. Bourg *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 479-484 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-14283*# National Aeronautics and Space Administration, Washington, D. C.
AEROSIL FOR THE IMPROVEMENT OF THE FLOW BEHAVIOR OF POWDERED SUBSTANCES
Dec. 1981 28 p refs Transl. into ENGLISH from Schriftenreihe Pigmente, Degussa, (Frankfurt), no. 31, 10 Aug. 1971 p 1-17 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76643) Avail: NTIS HC A03/MF A01 CSCL 11G

The tendency of powdered substances to agglomerate and stick together is studied. The highly dispersed silicic acid Aerosil (tradename) is studied as an agent to improve the free flowing characteristics of powdered materials. It was concluded that the use of Aerosil 200, Aerosil R 972, aluminum oxide C and sylicic acid D 17 as flow agents caused broad improvements in the flow properties of powders. Additionally, the sifting, dispersion, and spray behavior, as well as the grinding and air separation characteristics of powders were improved. R.J.F.

24 COMPOSITE MATERIALS

Includes laminates.

N82-14284# Indian Inst. of Tech., Bombay. Dept. of Aeronautical Engineering.
HAND-OPERATED HONEYCOMB CORE EXPANSION SET-UP
N. K. Naik, Nitin Rameshchandra, and G. R. Shevare Sep. 1981 16 p
(AE-TN-810901) Avail: NTIS HC A02/MF A01

Honeycomb sandwiches as a design concept and adhesive bonding as a joining process have been combined by unique designs and processes to produce extremely efficient structural configurations. An attempt to design and fabricate a simple hand operated laboratory based honeycomb core expansion set-up is described. Locally available adhesives and aluminum foils are used for preparing the slabs for expansion. A.R.H.

N82-14285*# National Aeronautics and Space Administration, Washington, D. C.
BENDING FATIGUE TESTS ON SIC-AL TAPES UNDER ALTERNATING STRESS AT ROOM TEMPERATURE
Johann-Albrecht Herzog Nov. 1981 21 p refs Transl. into ENGLISH Z. fuer Metallk. (West Germany), v. 72, Mar. 1981 p 191-197 Original language document was announced as A81-27934 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76631) Avail: NTIS HC A02/MF A01 CSCL 20K

The development of a testing method for fatigue tests on SiC-Al tapes containing a small amount of SiC filaments under alternating stress is reported. The fatigue strength curves resulting for this composite are discussed. They permit an estimate of its behavior under continuous stress and in combination with various other matrices, especially metal matrices. J.D.H.

N82-14286*# Boeing Aerospace Co., Seattle, Wash.
DESIGN, FABRICATION AND TEST OF GRAPHITE/POLYIMIDE COMPOSITE JOINTS AND ATTACHMENTS FOR ADVANCED AEROSPACE VEHICLES Quarterly Technical Progress Report, 1 Dec. 1980 - 31 Mar. 1981
J. B. Cushman Hampton, Va. NASA. Langley Research Center. Apr. 1981 47 p refs
(Contract NAS1-15644)
(NASA-CR-159114; QTPR-7) Avail: NTIS HC A03/MF A01 CSCL 11D

Standard and advanced bonded joint concepts were evaluated to develop a data base for the design and analysis of advanced composite joints for use at elevated temperatures (561K (550 F)). Design concepts for specific joint applications and the fundamental parameters controlling the static strength characteristics of such joints were identified. Test results are presented for rail shear and sandwich beam compression tests and tension tests of moisture conditioned specimens and bonded on 'T' sections. Coefficients of thermal expansion data are presented for A7F (LARC 13 Amide-imide modified) adhesion. Static discriminator test results for type 1 and type 2 bonded and bolted preliminary attachment concepts are presented and discussed. A.R.H.

N82-14287*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DURABILITY/LIFE OF FIBER COMPOSITES IN HYGROTHERMOMECHANICAL ENVIRONMENTS
C. C. Chamis and J. H. Sinclair 1981 28 p refs Presented at the Sixth Conf. on Composite Mater.: Testing and Design sponsored by the Am. Soc. for Testing and Mater., Phoenix, Ariz., 12-13 May 1981
(NASA-TM-82749; E-1065) Avail: NTIS HC A03/MF A01 CSCL 11D

Statistical analysis and multiple regression were used to determine and quantify the significant hygrothermomechanical variables which infuence the tensile durability/life (cycle loading, fatigue) of boron-fiber/epoxy-matrix (B/E) and high-modulus-fiber/epoxy-matrix (HMS/E) composites. The use of the multiple regression analysis reduced the variables from fifteen, assumed initially, to six or less with a probability of greater than 0.999. The reduced variables were used to derive predictive models for compression an intralaminar shear durability/life of B/E and HMS/E composites assuming isoparametric fatigue behavior. The predictive models were subsequently generalized to predict the durability/life of graphite-fiber-r generalized model is of simple form, predicts conservative values compared with measured data and should be adequate for use in preliminary designs. B.W.

N82-14288*# Wyoming Univ., Laramie. Composite Materials Research Group.
ANALYSIS OF CRACK PROPAGATION AS AN ENERGY ABSORPTION MECHANISM IN METAL MATRIX COMPOSITES Interim Report, Sep. 1979 - Dec. 1980
Donald F. Adams and Daniel P. Murphy Feb. 1981 159 p refs
(Grant NsG-3217)
(NASA-CR-165051; UWME-DR-101-102-1) Avail: NTIS HC A08/MF A01 CSCL 11D

The crack initiation and crack propagation capability was extended to the previously developed generalized plane strain, finite element micromechanics analysis. Also, an axisymmetric analysis was developed, which contains all of the general features of the plane analysis, including elastoplastic material behavior, temperature-dependent material properties, and crack propagation. These analyses were used to generate various example problems demonstrating the inelastic response of, and crack initiation and propagation in, a boron/aluminum composite. B.W.

N82-14289# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Werkstoff-Forschung.
COLLOQUIUM ON COMPOSITE MATERIALS [VERBUND-WERSTOFFE: WERKSTOFF KOLLOQUIUM]
1980 27 p refs In GERMAN Presented at Cologne, 3 Dec. 1980
Avail: NTIS HC A03/MF A01

Directionally solidified entectic composites are discussed as well as superalloys and the effects of a large temperature gradient on their structure; thermal fatigue; vapor deposition tests with Ni Co Gr Al Y alloys; solidification; oxidation behavior; protective layers are also considered. The fracture mechanics and microanalysis of fiber, and reinforced composites and the influence of a protective oxidation layer on the high temperature resistance of reaction bonded silicon nitride are also examined. For individual titles, see N82-14290 through N82-14295.

N82-14290# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).

FRACTURE MECHANICS IN FIBER REINFORCED COMPOSITE MATERIALS, TAKING AS EXAMPLES B/Al AND CFRP [BRUCHMECHANIK AN FASERVERBUNDWERKSTOFFEN AM BEISPIEL VON B/Al UND CFK]
P. W. M. Peters *In its* Colloq. on Composite Mater. 1980 2 p refs In GERMAN (For primary document see N82-14289 05-24)
Avail: NTIS HC A03/MF A01

The validity of linear elastic fracture mechanics and other fracture criteria was investigated with laminates of boron fiber reinforced aluminum (B/Al) and of carbon fiber reinforced epoxide (CFRP). Cracks are assessed by fracture strength Kc or Kmax (critical or maximum value of the stress intensity factor). The Whitney and Nuismer point stress criterium and average stress criterium often show that Kmax of fiber composite materials increases with increasing crack length; however, for B/Al and CFRP the curve showing fracture strength as a function of crack length is only applicable in a small domain. For B/Al, the reason is clearly the extension of the plastic zone (or the damage zone in the case of CFRP) which can not be described with a stress intensity factor.
Author (ESA)

N82-14291# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
EFFECTS OF A LARGE TEMPERATURE GRADIENT ON THE STRUCTURE OF DIRECTIONALLY SOLIDIFIED EUTECTIC COMPOSITES AND SUPERALLOYS [EINFLUSS EINES HOHEN TEMPERATURGRADIENTEN AUF DAS GEFUEGE GERICHTET ERSTARRTER EUTEKTIKA UND SUPERLEGIERUNGEN]
G. Staniek *In its* Colloq. on Composite Mater. 1980 3 p refs In GERMAN (For primary document see N82-14289 05-24)
Avail: NTIS HC A03/MF A01

An apparatus for high temperature tests of the structural stability of directionally solidified eutectic composites and superalloys was developed. It was used for cooled blades in high temperature gas turbines in which fast temperature changes and important temperature gradients occur. With this apparatus, a temperature gradient of a few hundred K/mm is obtained with a maximum of 1600 K. Structural instabilities due to mechanical stresses (cracks and plastic deformation) occur especially in superalloys, although some are decidedly stable. Instabilities due to thermal loads (coarsening, transformations, decomposition of phases, oxidation) are frequently observed, but test temperatures and gradients are considerably higher than in normal operation, so the employment of these alloys is not directly limited.
Author (ESA)

N82-14292# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
VAPOR DEPOSITION TESTS WITH NiCoCrAlY ALLOYS: FIRST RESULTS FOR THE MECHANICAL HIGH TEMPERATURE CHARACTERISTICS OF THE COATED SUPERALLOY IN 738 LC [AUFDAMPFVERSUCHE MIT NiCoCrAlY-LEGIERUNG ERSTE ERGEBNISSE MECHANISCHER HOCHTEMPERATUR-EIGENSCHAFTEN VON BESCHICHTETEM IN 738 LC]
S. Scheidt *In its* Colloq. on Composite Mater. 1980 2 p In GERMAN (For primary document see N82-14289 05-24)
Avail: NTIS HC A03/MF A01

The mechanical properties of directionally solidified IN738LC (j+j' superalloy), vapor coated with NiCoGrAlY (j+B alloy), were tested, in order to enhance the lifetime of turbine blades. The oxidation behavior of uncoated and coated samples is compared. Creep, fatigue, and accelerated life test results are presented and interpreted. The influence of sample preparation (cleaning, heating); treatment after the coating procedure on the coating structure and the arrest of coating and substrate (IN100 and others) are discussed.
Author (ESA)

N82-14293# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
LABORATORY EXPERIENCE WITH DIRECTIONAL SOLIDIFICATION OF EUTECTIC HIGH TEMPERATURE ALLOYS [ERFAHRUNGEN BEI DER GERICHTETEN ERSTARRUNG VON EUTEKTISCHEN HT-LEGIERUNGEN IM LABOR]
K. Fritscher, G. Staniek, and H. Mangers *In its* Colloq. on Composite Mater. 1980 2 p refs In GERMAN (For primary document see N82-14289 05-24)
Avail: NTIS HC A03/MF A01

The structure of five directionally solidified eutectic alloys was studied. Two structures (j/j'a and j/j' TaC) were found to be very regular, the others were found to deviate from the ideal structure (Co, Cr-Cr7 Cr3). The velocities at which the practically faultless eutectic structures are grown using the Bridgman technique, are given together with the average thermodynamic and constitutional values. Small differences in the entropy of fusion of the phases concerned and a possibly small difference in their chemical composition favor fast solidification. The susceptibility to defects during production and the necessary technological outlay strongly depend on the alloying system.
Author (ESA)

N82-14294# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
MICROANALYSIS OF COMPOSITE MATERIALS [MIKROANALYSE AN VERBUNDWERKSTOFFEN]
H. J. Dudek, G. Ziegler, R. Borath, and R. Leucht *In its* Colloq. on Composite Mater. 1980 2 p In GERMAN (For primary document see N82-14289 05-24)
Avail: NTIS HC A03/MF A01

Analysis methods that determine the chemical structure of the reaction zone, intervening in the adhesion between the components of fiber reinforced composite materials, are discussed for silicon carbide fiber reinforced titanium alloys. Both X-ray microanalysis, and Auger electron spectroscopy (AES) are suited for this analysis. On compact samples, AES allows a spatial resolution of up to 0.05 micron and, in combination with ion etching, it enables the demonstration of monatomic layers. The reaction zone in SiC Ti composites has a diameter of a few microns. The reaction between SiC and Ti predominantly leads to solving the fiber material. In the AES depth profile, concentrations of Si and C which can lead to the formation of hard phases are observed.
Author (ESA)

N82-14295# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
OXIDATION BEHAVIOR OF DIRECTIONALLY SOLIDIFIED EUTECTIC COMPOSITES AS PROTOTYPES FOR THE DEVELOPMENT OF PROTECTIVE LAYERS [OXIDATIONSVERHALTEN VON GERICHTET ERSTARRTEN EUTEKTIKA UND DEREN MODELLCHARAKTER FUER DIE SCHUTZSCHICHTENTWICKLUNG]
K. Fritscher, S. Scheidt, and H. Gedanitz *In its* Colloq. on Composite Mater. 1980 2 p In GERMAN (For primary document see N82-14289 05-24)
Avail: NTIS HC A03/MF A01

The structure of a NiCoGrAlY layer is compared with the structure of fibrous and lamellar directionally solidified eutectic composites. In all cases there exist two-phase structures with phase alignment. A comparatively strong similarity is observed between the structure of fibrous directionally solidified eutectic composites and the structure of vapor deposited NiCoCrAlY layers. The oxidation of fibrous eutectic composites is anisotropic: the phase alignment directly influences the oxidation velocity, whereby enhanced diffusion along the tubular phase boundary is assumed. Lamellar eutectic composites do not show this anisotropy since many phase boundaries are in contact with the oxidizing surface as well as in the direction of and perpendicular to the growth direction. Both types of eutectic composites basically show acceleration of oxidation when the distance between the phases decreases, enhancing the specific phase boundary surface. The results are discussed with regard to outlining protective layer systems.
Author (ESA)

N82-14296# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Laser Hardened Materials Branch.
SYNTHESIS, CHARACTERIZATION AND OPTICAL PROPERTIES OF BARIUM TITANATE FILMS SPUTTERED UNDER VARIOUS CONDITIONS Final Report, 1 Apr. - 5 Dec. 1980
John C. Olson, Donald F. Stevison, and Izhar Bransky Jun. 1981 75 p refs
(AF Proj. 2422)
(AD-A105655; AFWAL-TR-81-4049) Avail: NTIS HC A04/MF A01 CSCL 13/8

Data is presented on BaTiO3 films which were RF sputtered on Pt, quartz and sapphire substrates at various temperatures and gas mixtures. Measurements of density, dielectric constant, electrical conductivity, X-ray diffraction, energy band gap from optical absorption and wavelength, and temperature dependence of refractive index are presented. Measurements were also made on a BaTiO3 single crystal and a hot-pressed ceramic pellet for direct comparison of bulk properties to those of the films. The results of this work demonstrate that a transition of the properties occurs between the amorphous and crystalline states depending on the surface temperature during sputtering. The transition is sluggish up to 700 C above which crystalline properties of the films appear rapidly. Author (GRA)

N82-14297# California Univ., Berkeley. Dept. of Mechanical Engineering.

A THEORY OF LAMINATED COMPOSITE PLATES AND RODS

A. E. Green May 1981 66 p refs
(Contract N00014-75-C-0148; NR Proj. 064-436)
(AD-A105591; UCB/AM-81-3) Avail: NTIS HC A04/MF A01 CSCL 11/4

This paper is concerned with small deformations of a class of laminated layered composite plates and a class of laminated layered composite rods utilizing a direct formulation of thermomechanical theories of shells and rods. The paper is arranged in two parts, namely Part A (for laminated composite plates) and Part B (for laminated composite rods), and can be read independently of each other. In each part, after providing the main ingredients of a direct formulation, fairly general linear theories are developed which include both dynamical and thermal effects. Some applications to sandwich plates and layered rods are discussed in detail. Author (GRA)

N82-14298# Army Missile Command, Redstone Arsenal, Ala.

WHOLE-FIELD EXPERIMENTAL STRESS ANALYSIS USING LASER SPECKLE INTERFEROMETRY

Terry L. Vandiver 14 Feb. 1981 138 p refs
(AD-A105805; AD-E950170; DRSMI/RL-81-10-TR) Avail: NTIS HC A07/MF A01 CSCL 11/4

The objective of this study was to develop a whole-field experimental stress analysis method for composite structures. A data-gathering system, using the optical technique of laser speckle interferometry, was used to capture deformation of bodies under load on a film record. The speckle interferograms were analyzed by a computer-aided scanning system. A mathematical and geometrical interpretation of interferometric data is presented. The interferograms were analyzed at strategic image points on the test specimens to obtain displacement data which was used to calculate strains, shearing strains, and correlated with shearing stresses. Anisotropic elastic constants such as Young's modulus, shear modulus, and Poisson's ratio were calculated. A full-field aperture analysis was used as a tool to qualitatively observe the free edge effects of shear specimens. The techniques presented in this report are significant because full-field or discrete information can be obtained from any point rather than averaging data from a small region. Author (GRA)

N82-14299# California Univ., Livermore. Lawrence Livermore Lab.

COMPOSITE FLYWHEEL DURABILITY AND LIFE EXPECTANCY: TEST PROGRAM

S. V. Kulkarni, K. L. Reifsnider, and D. M. Boyd 14 Jul. 1981 13 p refs Presented at the DOE Passive and Hybrid Solar Energy Program Update, Washington, D.C., 24-26 Aug. 1981
(Contract W-7405-eng-48)
(DE81-028849; UCRL-86450; CONF-810832-5) Avail: NTIS HC A02/MF A01

A test program was designed to: determine the durability and life expectancy of flywheel rotors; identify critical performance and durability characteristics that control the long-term service and safety of rotors and rotor containments; and develop test procedures that can be used to economically evaluate the performance of flywheels under cyclic loading in the laboratory and to relate that information to long-term service behavior. Approximately half the project is complete, including the following tasks: a material property data base was assembled for each major material to be used in the flywheels; material property data was characterized and modeled; the initial version of a generic test program was designed; and some NDE characterization of all prototype composite flywheels rotors was conducted. DOE

N82-14300# Oak Ridge National Lab., Tenn.

FRACTURE TOUGHNESS OF Al2O3-ZrO2 COMPOSITES

P. F. Becher and V. J. Tennery 1981 17 p refs Presented at the Intern. Symp. on the Fracture Mech. of Ceramics University Park, Pa., 15 Jul. 1981
(Contract W-7405-eng-26)
(DE81-028575; CONF-810746-1) Avail: NTIS HC A02/MF A01

The fracture toughness K sub IC, of Al2O3-ZrO2 two-phase ceramic composites was determined for different ZrO2/Al2O3 ratios and selected Y2O3 stabilizer concentrations in the ZrO2. The double cantilever beam specimen geometry was used. In composites containing 20 vol % ZrO2, K sub IC increases with decrease in Y2O3 content from 3 to 1 mol %. On the other hand, composites containing 30 vol % ZrO2, decreasing Y2O3 additions from 3 to 2 mol % leads to a maximum in K sub IC value of about 6.2 MPa m (1/2) which occurred in a composition containing 2 mol % Y2O3. In this same composite, this maximum shifts to a value of about 8 MPa m (1/2) at about 2 to 3 mol % Y2O3 at -195 C. These observations are consistent with a transformation toughening model. The increase in K sub IC with ZrO2 content results from the resultant increase in the number of ZrO2 particles which transform to the monoclinic phase during crack propagation. Microstructural analyses are discussed in reference to microcracking. DOE

N82-14301# California Univ., Livermore. Lawrence Livermore Lab.

MECHANICAL AND THERMOPHYSICAL PROPERTIES OF HOT-PRESSED SYNROC B

C. L. Hoenig, H. W. Newkirk, R. A. Otto, R. L. Bradley, R. E. Brown, A. R. Ulrich, and R. C. Lum 6 May 1981 20 p refs
(Contract W-7405-eng-48)
(DE81-029299; UCRL-53143) Avail: NTIS HC A02/MF A01

The optimal SYNROC compositions for use with commercial waste are reviewed. Large amounts of powder (about 2.5 kg) were prepared by conventional ceramic operations to test the SYNROC concept on a processing scale. Samples 15.2 cm in diameter, were hot pressed in graphite, and representative samples were cut for microstructural evaluations. Measured mechanical and thermophysical properties did not vary significantly as a function of sample location and were typical of titanate ceramic materials. DOE

N82-14302# Technische Univ., Berlin (West Germany). Inst. fuer Nichtmetallische Werkstoffe.

PREPARATION OF SINTER ACTIVE SILICON CARBIDE POWDERS Final Report, Apr. 1980

Wolfgang Boecker, Hans Hausner, and Heide Landfermann Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 111 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-038; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,10

Sinter active alpha SiC powders were prepared by processing of Acheson grade silicon carbide and beta SiC powders through the thermal decomposition of methylsilane. The sintering behavior of the powders when adding boron, aluminum or various compounds of these elements was investigated. The influence of various processing steps on the density and the microstructure of the silicon carbide is discussed. Sinter densities > or = 95% are achieved with both type of powders by sintering at temperatures of 2000 C. Author (ESA)

N82-14303# Kunstoffen en Rubber Instituut TNO, Delft (Netherlands).

EXAMINATION OF A DAMAGED GUN SHIELD OF OTA MELARA

G. Hamm 11 Jun. 1980 5 p
(Contract A80/KM/064)
(KRI-204/80; TDCK-75033) Avail: NTIS HC A02/MF A01

A glass fiber reinforced polyester gun shield that was damaged during service was studied. Visual inspection suggested that a large deformation of the dome, caused by large waves, produced high stresses in the laminate, causing local ruptures and collapse. Bending tests, shear tests, and glass content tests show no defect in the material, but stiffening ribs should be strengthened to increase load bearing capacity of the shield when faced with large waves. Author (ESA)

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-14304 Virginia Polytechnic Inst. and State Univ., Blacksburg.
POTENTIOMETRIC STRIPPING AS A DETECTOR FOR FLOW INJECTION ANALYSIS OF METAL IONS Ph.D. Thesis
Tseng-En Hu 1981 232 p
Avail: Univ. Microfilms Order No. 8121500

An automated flow injection analysis, of trace metals for and the use of potentiometric stripping as a detector is demonstrated. The detector provides sensitivity comparable to that of linear scan anodic stripping voltammetry, does not require deaeration and therefore the speed of the analysis is considerably faster than anodic stripping voltammetry. The limited dispersion concept in flow injection analysis was used to achieve peak separation for samples containing both Pb(II) and Sn(IV); Pb(II) and T1(I); and Cu(II) and Bi(II). The otherwise overlapped peaks were separated by performing the stripping in an electrolyte which is optimized for the peak separation. This technique decomposes the overlapped peaks chemically and the results are more reproducible than the conventional matrix exchange method. Dissert. Abstr.

N82-14305 Defence Research Information Centre, Orpington (England).
APPLICATION OF RESONANCE RAMAN SPECTROMETRY IN HIGH PERFORMANCE LIQUID CHROMATOGRAPHY
Shinji Saito, Norio Teramae, and Nobuyuki Tanaka Aug. 1981 13 p refs Transl. into ENGLISH OF 'Nippon Kagaku Kaishi, (Japan) v. 9, 1980 p 1363-1366 Presented at 41st Spring Ann. Conf. of the Japan Chem. Assoc.
(DRIC-T-6367; BR80388) Copyright. Avail: Issuing Activity

A detection system for the sensitive and selective analysis of the eluted components of a high performance liquid chromatograph is described. The system connects a laser Raman spectrophotometer to a high performance LC. Results from investigations of dimethylaminoazobenzene compounds show that the LC Raman effect is highly sensitive and has a high degree of selectivity. It is possible to evaluate independently compounds which can not be seperated by other methods. Author (ESA)

N82-14306# Technische Hogeschool, Eindhoven (Netherlands).
INTEGRATED SCHOTTKY LOGIC Ph.D. Thesis
Jan Lohstroh Nov. 1981 232 p refs
Avail: NTIS HC A11/MF A01

Integrated Schottky logic (ISL) is a bipolar logic concept that uses existing processes. It combines device structures, which are already known separately, with a very attractive type of logic gate which is used for high speed (VLSL), very large scale integration. Aspects of ISL, its performance in different processes, switching speed (calculated and measured), first order modeling, its behavior is a function of temperature, the noise margins as a function of temperature, and its applications are discussed. Bipolar circuits are compared with MOS circuits in general, and bipolar circuit technology combinations which satisfy VLSI requirements are discussed. A general noise margin test method is proposed, which is applicable to every type of logic circuit. S.L.

N82-14307*# National Aeronautics and Space Administration, Washington, D. C.
DEPOSITION OF THIN INSULATION LAYERS FROM THE GAS PHASE
Reinhard Behn, Horst Hagedorn, Johann Kammermaier, Manfred Kobale, Horst Packonik, Dietrich Ristow, and Gerhard Seebacher Jul. 1981 86 p refs Transl. into ENGLISH from West German Rept. BMFT-FB-T-76-66 Unternehmensber. Bauelemente Hauptber. Grundlagnentwicklung, and Bundesmin. fuer Forsch. und Technol. Munich, May 1976 p 1-88 Original language document was announced as N77-29418 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-76607) Avail: NTIS HC A05/MF A01 CSCL 07D

The continuous deposition of thin organic dielectric films on metallized carrier foils by glow discharge in monomeric gases is described. Depending on the applied monomers, the films had a dissipation factor of .001 to .003 (1 kHz), a relative permittivity of 2.3 to 2.5 and a resistivity of about 10 to the 17th power omega cm. Additionally, they proved to have a high mechanical homogeneity. Self-healing rolled capacitors with a very high capacitance per volume and of consistently high quality were fabricated from the metallized carrier foils covered with the dielectric film. J.D.H.

N82-14308*# Honeywell Electro-Optics Center, Lexington, Mass.
DEFECT CHEMISTRY AND CHARACTERIZATION OF (Hg, Cd)Te Interim Report, 1 Jan. - 30 Jun. 1981
H. R. Vydyanath 30 Jun. 1981 51 p refs
(Contract NAS8-33245)
(NASA-CR-161928) Avail: NTIS HC A04/MF A01 CSCL 07D

Single crystal samples of phosphorus doped Hg sub 0.8 Cd sub 0.2 Te were anneald at temperatures varying from 450 C to 600 C in various Hg atmospheres. The samples were quenched to room temperature from the annealing temperatures. Hall effect and mobility measurements were performed at 77 K on all these samples. The results indicate the crystals to be p type for a total phosphorus concentration of 10 to the 19th power/cu cm in all the samples. The hole concentration at 77 K increases with increasing Hg pressures at 450 C and 500 C contrary to the observation in undoped crystals. Also, at low Hg pressures the concentration of holes in the phosphorus doped crystals is lower than in the undoped crystals. The hole concentration in all the samples is lower than the intrinsic carrier concentration at the annealing temperatures. The hole mobility in the doped crystals is similar to that in the undoped crystals. A defect model according to which phosphorus behaves as a single acceptor interstitially, occupying Te lattice sites while it acts as a single donor occupying Hg lattice sites was established. Equilibrum constants established for the incorporation of all the phosphorus species explain the experimental results N.W.

N82-14309*# National Aeronautics and Space Administration, Washington, D. C.
DETERMINATION OF A KINETIC REGION IN CATALYTIC OXIDATION OF CARBON MONOXIDE
M. Yu. Sultanov and Kh. A. Sadykhova Nov. 1981 7 p refs Transl. into ENGLISH from Azerb. Khim. Zh. (USSR), no. 2, 1980 p 3-6 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76651) Avail: NTIS HC A02/MF A01 CSCL 07D

The catalytic activity of cupric oxide activated with ceric oxide in a braod interval of volumetric velocities was investigated. It was determined that for practical catalysts used in the diffuse region, dilution of the active substance by an inert diluent increases the effectiveness of the catalysts. J.D.H.

N82-14310*# National Aeronautics and Space Administration, Washington, D. C.
REACTIVITY OF PYRYLIUM SALTS TOWARD BASIC REACTANTS
Richard Neidlein and Peter Witerzens Aug. 1981 16 p Transl. into ENGLISH from Archiv der Pharmacie (Weinheim), no. 309, 1976 p 649-660 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76675) Avail: NTIS HC A02/MF A01 CSCL 07D

The reactivity of some N-acyl and N-sulfonyl-hydrazines 2-4, 10a-10g, 12, 13, 16a, 16b and of hydrazones 18, benzyl-hydrazone 21 towards pyrylium salts 1 was examined. By reaction of 2,4,6-trimethyl-pyrylium salt 1 with substituted hydrazines some pyridinium salts were obtained. Relationships between basicity and reactivity were discussed. B.W.

N82-14311# United Technologies Research Center, East Hartford, Conn.
INVESTIGATION OF THE CARS SPECTRUM OF WATER VAPOR Final Report, Jul. 1980 - May 1981
J. A. Shirley and R. J. Hall Wright-Patterson AFB, Ohio AFWAL Aug. 1981 65 p refs
(Contract F33615-80-C-2061; AF Proj. 2301)
(AD-A105235; UTRC/R81-955278-10; AFWAL-TR-81-2075) Avail: NTIS HC A04/MF A01 CSCL 07/4

The coherent anti-Stokes Raman spectrum of water vapor was measured and compared with CARS code calculations to facilitate diagnostics of this important combustion product. Measurements were made with mixtures of H_2O and a diluent gas heated to 450-800 K in a test cell at atmospheric pressure. The experimental spectra were computer fit to calculations to deduce H_2O Raman linewidths. The self broadening coefficient was found to be 0.5 per cm/atm at 773K and to depend inversely on the temperature. N_2 and CO_2 broadening coefficients are comparable, essentially independent of temperature at 0.17 per cm/atm over this range. Measurements were also made in the post-reaction region of stoichiometric CH_4-air flames at 1670 and 2070 K. The linewidth was inferred to be 0.24-0.25 per cm/atm in both flames. Author (GRA)

N82-14312# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Fuels Branch.
DETERMINATION OF SELECTED DISTILLATE BLENDING SOLVENTS IN SIMPLE AND COMPLEX AIRCRAFT FUEL MATRICES VIA GLASS CAPILLARY GAS CHROMATOGRAPHY Final Report, Jan. - Dec. 1979
Paul C. Hayes, Jr. Jun. 1981 44 p refs
(AF Proj. 3048)
(AD-A105588; AFWAL-TR-80-2082) Avail: NTIS HC A03/MF A01 CSCL 07/4

A study was initiated to accurately determine the volume percent of various hydrocarbon distillate solvents present in blends with aircraft jet fuels JP-4 and JP-8. These modified fuels were an integral part of a combustion program to elucidate the effect altered fuel properties had on selected combustion parameters. A method of analysis was desired to check the accuracy of both in-house and contractual blending work. The effort was further expanded to even determine the amount of JP-4 present in the event of gross cross-contamination. Author (GRA)

N82-14313# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Fuels Branch.
DETERMINATION OF PYRIDINE IN MODIFIED JP-4 VIA HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC) Final Report, Jun. - Jul. 1975
Paul C. Hayes, Jr. Apr. 1981 24 p refs
(AF Proj. 3048)
(AD-A105589; AFWAL-TR-80-2081) Avail: NTIS HC A02/MF A01 CSCL 07/4

A study was initiated to accurately determine the weight percent of pyridine present in pyridine-modified JP-4 used for contractual combustion studies. High Performance Liquid Chromatography (HPLC) was the method of choice. A chromatographic process was developed and systematic quantitative analyses performed to substantiate the accuracy and precision of the new test method. A computing integrator interfaced with the HPLC system performed all data collection and calculations automatically, with the results printed on a teletype. Least square curve fitting accentuated the reliability for determining pyridine in the 0.5 to 5.0 weight percent concentration range. Author (GRA)

N82-14314# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Electronic Research Group.
CATHODOLUMINESCENCE CHARACTERIZATION OF ION IMPLANTED GaAs Final Report, Apr. 1977 - Jul. 1978
Milton L. Cone Apr. 1981 121 p refs
(AF Proj. 2306)
(AD-A105656; AFWAL-TR-80-1184) Avail: NTIS HC A06/MF A01 CSCL 07/4

Depth-resolved cathodoluminescence was used to study ion implanted GaAs. This was done in a two step process. First a model for the luminescence from ion implanted GaAs was developed. This model includes a detailed Monte Carlo simulation of electrons penetrating into GaAs. The result of this calculation is a prediction of luminescent intensity as a function of electron beam energy. This calculation differs from preceding ones in that the ion implanted profile is specifically included in the analysis. Second, the model was validated by a suitable experiment that confirms the theoretical predictions. The luminescence measurements were made on Mg ions implanted into epitaxial GaAs. Mg was chosen since it has not been previously studied in epitaxial GaAs. The results of this research include the identification of many of the lines in the Mg implanted GaAs spectrum from 1.32 ev to 1.52 ev, a study of the effect of changing the current of the electron beam on the spectra and a comparison of the theoretical and experimental luminescence curves. These results show that changing the current density at the sample surface dramatically changes the spectra and that good agreement exists between the theoretical and experimental luminescence curves. Author (GRA)

N82-14315# George Washington Univ., Washington, D.C. Dept. of Chemistry.
INTERPRETATION OF THE NITROGEN KVV AUGER LINESHAPE FROM ALKALI METAL NITRATES
F. L. Hutson, D. E. Ramaker, B. I. Dunlap, J. D. Ganjei, and J. S. Murday Oct. 1981 21 p Submitted for publication
(Contract N00014-80-K-0852)
(AD-A105877; TR-6) Avail: NTIS HC A02/MF A01 CSCL 07/4

Experimental N KVV Auger lineshapes from sodium nitrate, produced by both X-ray (XEA) and electron (EEA) excitation, are compared to theoretically derived lineshapes based on populations derived from a GTO-LCAO-X alpha model. The one-electron orbital energies and valence line widths are determined from X-ray emission and photoelectron data; the Auger matrix elements are determined from experimental gas phase atomic Auger data. The theoretical Auger energies include hole-hole repulsion and relaxation. Theoretical lineshapes using the local and the Mulliken x alpha populations are generated, and a set of empirical populations are also determined. This work emphasizes the importance of shake-off arising from creation of the initial core hole and its effect on the Auger lineshape. A theoretical shake/Auger satellites lineshape is generated and found to contribute up to 35% of the total intensity. The XEA and EEA lineshapes (after correction for the sample and spectrometer transmission response) each show five features, but some differences are noted. These are attributed primarily to beam damage and charging effects on the EEA lineshape. The theoretical lineshapes reproduces the five principal features of the experimental spectra; specific features in the lineshape are shown to reflect the relative size of the Auger matrix elements, the symmetry of the NO_3 ion, and satellite contributions. Arguments for the validity of a one-electron orbital model to describe the Auger lineshape are presented. Author (GRA)

N82-14316# Naval Postgraduate School, Monterey, Calif.
COMBUSTION BEHAVIOR OF SOLID FUEL RAMJETS. VOLUME 1: CORRELATION OF REACTING AND NON-REACTING FLOW CHARACTERISTICS Final Report
Brian A. Binn, Winston E. Scott, and David W. Wetzer Jul. 1981 68 p refs
(AD-A106061; NPS67-81-010-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 21/2

An experimental investigation was conducted to determine the relationship between the cold flow characteristics of velocity, pressure distribution, and turbulence intensity and the reacting flow performance and combustion characteristics of a solid fuel ramjet. The effects of configuration and air flow changes on the above characteristics were examined. Average regression rates and combustion efficiencies were not significantly affected by changes in configuration. These variations in test conditions significantly affected the centerline turbulence intensity but not the near-wall turbulence intensity in cold flow. Near-wall turbulence profiles in cold flow were found to correlate with the fuel regression profiles in reacting flows. The use of bypass resulted in decreases in regression rate and efficiencies for all cases. Author (GRA)

N82-14317# Delaware Univ., Newark. Center for Catalytic Science and Technology.

DEVELOPMENT OF SUPERIOR DENITROGENATION AND ISOMERIZATION CATALYSTS FOR PROCESSING CRUDE OIL DERIVED FROM SHALE, PART 1 Final Interim Report

James R. Katzer, Alvin B. Stiles, and Harold Kwart 15 Aug. 1981 23 p refs
(Contract N00019-80-K-0507)
(AD-A105667) Avail: NTIS HC A02/MF A01 CSCL 08/7

For purposes of immediate application to shale oil, the most important conclusions derived from this preliminary work are the following: (1) As with quinoline, total nitrogen removal in multiring condensed heterocycled amines involves hydrogenation of the aromatic rings followed by (an often slower) process of C-N bond scission. (2) With multiring substrates of this nature the ring hydrogenation occurs more rapidly than the C-N bond scission reactions leading to the accumulation of considerable concentrations of hydrogenated nitrogen-containing species in the reaction mixture. (3) The overall rates of N-removal do not vary significantly because the rates of C-N bond scission in these hydrogenated species are quite similar. (4) The rates of these reactions would appear to be somewhat affected by steric hindrance to adsorption caused by the puckered cyclohexane rings and the similarity of rates must be due to the similarity of the steric effects. GRA

N82-14318# Texas A&M Univ., College Station. Dept. of Chemistry.

HIGH PERFORMANCE LIQUID CHROMATOGRAPHY/VIDEO FLUOROMETRY. PART 3: APPLICATIONS Interim Technical Report

Dennis C. Shelly, Michael P. Fogarty, and Isiah M. Warner 30 Sep. 1981 41 p refs Sponsored in part by the Upjohn Co. Submitted for publication
(Contracts N00014-80-C-0703; DE-AS05-80EV-10404; NR Proj. 051-747)
(AD-A105945; TR-3) Avail: NTIS HC A03/MF A01 CSCL 07/4

A video fluorometer is used as a detector for HPLC to characterize highly complex samples. Data selection and evaluation techniques are discussed so as to speed the spectral identification process. Several well-known polynuclear aromatic hydrocarbons are found in the samples. Author (GRA)

N82-14319# Illinois Univ. at Urbana. Dept. of Aeronautical and Astronautical Engineering.

A STUDY OF THE MECHANISM OF LEAN LIMIT FLAMMABILITY Final Report, 21 May 1978 - 21 Aug. 1981

Roger A. Strehlow 31 Aug. 1981 10 p
(Contract DAAG29-80-C-0118; Grant DAAG29-78-G-0098)
(AD-A105952; ARO-15662.1-E) Avail: NTIS HC A02/MF A01 CSCL 21/2

In this study the mechanism of extinction of a lean limit flame in a premixed methane-air or propane-air system was studied in a vertical rectangular flammability tube with variable inside dimensions. Both upward and downward extinction were observed for methane while only upward extinction was studied for propane. In addition to the observations of extinction, a theoretical analysis of the flow ahead of the upward propagating flame was made which showed that at extinction the upward propagating flame is severely stretched in the Karlovitz sense. The upward propagating flame in the 50 x 50 mm tube had a stable hemispherical shape with a trailing skirt towards the walls. Extinction in this case occurred from the central holding region of the flame where the stretch was calculated to be the maximum. In larger than 50 x 50 mm tubes the flame is hydrodynamically unstable and extinction occurs on one of the instability cycles. The downward propagating flame in methane is almost flat in the tube but it propagates in an unstable manner. It was observed, both with image intensifier photographs and with a schlieren optics, that this flame extinguished by first losing heat to the walls. Thus the downward propagating flame is extinguished by heat loss mechanism coupled with a differential buoyancy driving mechanism which is sufficiently complex that it cannot be modeled using one dimensional heat loss theories. GRA

N82-14320# Oak Ridge National Lab., Tenn. Chemical Technology Div.

DESTRUCTION OF OXALATE BY REACTION WITH HYDROGEN PEROXIDE

J. C. Mailen, O. K. Tallent, and P. C. Arwood Sep. 1981 30 p refs
(Contract W-7405-eng-26)
(DE81-030624; ORNL/TM-7474) Avail: NTIS HC A03/MF A01

The destruction of oxalate by oxidation to carbon dioxide using hydrogen peroxide was studied as an alternative method for the disposal of oxalate in connection with the possible use of an aqueous hydrazine oxalate solution as a scrubbing agent for solvent cleanup in processes for the recovery of uranium, plutonium, and thorium by solvent extraction. The rate of oxidation of oxalate by hydrogen peroxide in acid solution at the flux temperature was adequate for process application; reaction half-times at 1000 C were less than on hour when the hydrogen peroxide concentration was greater than 0.5 M. The reaction was first order with respect to both the oxalate and hydrogen peroxide concentrations and had an activation energy of 58.7 kJ/g-mol. In the near-neutral hydrazine oxalate solutions, the reaction of either component with hydrogen peroxide was to slow for process application. DOE

N82-14321# State Univ. of New York, Albany.

FUNDAMENTAL STUDIES IN ISOTOPE CHEMISTRY Progress Report, 1 Oct. 1980 - 1 Aug. 1981

Jacob Bigeleisen (State Univ. of New York at Stony Brook) 1981 25 p refs
(Contract DE-AC02-79ER-10346)
(DE82-000651; DOE/ER-10346/T1) Avail: NTIS HC A02/MF A01

The current program, as in the past, utilizes theoretical advances made specifically with respect to isotope chemistry in the study of the structure of matter. Experimental investigation using isotope effects provides a unique tool for the determination of the mean square force on an atom in a molecular and how it is affected by intermolecular forces. We have completed the systematic study of the isotope chemistry of hydrogen. Studies have been made of the isotopic reduced partition function ratio, (s/s')f, of thirtynine diatomic and nineteen polyatomic hydrides. It encompasses compounds of hydrogen with every element in each row and each column of the periodic table. This progress report also includes a description of our final design for sampling of cryogenic liquid. Such a sampler is necessary if we are to realize the full potential of the isotopic fraction method to study the mean square forces and torques in polyatomic liquids. DOE

N82-14322# Los Alamos Scientific Lab., N. Mex.

CHEMICAL ELEMENT CONCENTRATIONS IN LIQUIDS AND SOLIDS ASSOCIATED WITH POWER PLANTS USING FGD SYSTEMS

Lawrence Edward Wangen and Marianne Mills Jones Aug. 1981 27 p refs
(Contract W-7405-eng-36)
(DE81-030422; LA-8929-MS) Avail: NTIS HC A03/MF A01

Solid and liquid process steam samples from eight power plants using wet flue gas desulfurizaton (FGD) scrubbers were analyzed for the trace elements As, B, Br, Cl, Cd, Co, Cr, F, Ga, I, Mo, Ni, Pb, S, Sb, Se, Th, U, V, W, and Zn as well as several major and minor elements. Four plants burned high-sulfur coals and three burned low-sulfur coals. One plant used a low-sulfur lignite coal. Four FGD systems used limestone, two used lime, and two used alkaline flyash as scrubbing reagent. Elemental concentration data were used to identify chemical elements of concern regarding their potential for causing environmental harm as a result of the disposal of residues associated with FGD systems. Calcium, Mg, Mn, Ni, Se, and SO4(2-) were identified as most generally problematic. The elements B, Cd, F, and Mo were judged as potentially problematic in certain situations. Generally FGD liquors from power plants that burned low-sulfur western coals had highest concentrations of most trace elements. DOE

N82-14323# Sandia Labs., Albuquerque, N. Mex.
CATALYTIC EFFECT OF IRON IN HYDROGASIFICATION OF COAL
T. D. Padrick, D. D. Dees, and T. M. Massis 1981 9 p refs
Presented at the 11th North Am. Thermal Analysis Soc. Conf., New Orleans, 19 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023928; SAND-81-0715C; CONF-811014-2) Avail: NTIS HC A02/MF A01

Results indicate that finely divided hematite enhances the production of methane, by a factor of fifteen, during char gasification at one atmosphere of hydrogen. Gasification rates were measured by heating the samples in a thermal gravimetric analysis system to a fixed temperature and then monitoring the rate of weight loss versus time. Product gas analysis indicates that during char gasification with hematite present, greater than 85 mole % of the gas is methane. The catalytic form of the hematite was identified as reduced iron. The effect of the reduced iron as a catalyst is strongly dependent on particle size. The catalytic activity is also dependent on precursor species with the following order observed: Fe2O3, Fe3O4, FeS2, Fe. DOE

N82-14324# Rockwell International Corp., Golden, Colo.
DIRECT ANALYSIS OF PLUTONIUM METAL FOR GALLIUM, IRON AND NICKEL BY ENERGY DISPERSIVE X-RAY SPECTROMETRY
H. L. Bramlet and J. H. Doyle 1981 10 p ref Presented at the X-ray Analysis Conf., Denver, 3 Aug. 1981
(Contract DE-AC04-76DP-03533)
(DE81-028046; RFP-3214; CONF-810854-1) Avail: NTIS HC A02/MF A01

An X-ray secondary target method for routine determination of gallium, iron, and nickel in plutonium metal is described that has significant advantages over wet chemical analysis. Coupons requiring minimal preparation for analysis are produced as a breakaway tab on the plutonium ingot. All three elements are determined on the same coupon. Gallium is determined using an arsenic secondary target followed by iron and nickel using a zinc target. The analysis times are 5 minutes for gallium and 15 minutes for the combined iron and nickel. The method of analysis was evaluated in the range of from 0.5 to 1.5% gallium. Iron was investigated over the range of 67 to 3000 ppM and nickel from 64 to 110 ppM. DOE

N82-14325# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
OXYGEN REDUCTION WITH CARBON SUPPORTED METALLIC CLUSTER CATALYSTS IN ALKALINE ELECTROLYTE
P. N. Ross, Jr. Mar. 1981 16 p refs Presented at Symp. on Electrocatalyis, Minneapolis, 10-15 May, 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-027400; LBL-11891; CONF-8105105-6) Avail: NTIS HC A02/MF A01

The atomic structure of clusters of Pt group metals dispersed on carbon blacks was examined using transmission electron microscopy and extended X-ray absorption fine structure spectroscopy. Both the catalyzation procedure and the microstructure of the carbon influence the resulting structure of the metal cluster. Colloidal catalyzation of Pt onto a turbostratic carbon black support yields a metals cluster with an amorphous structure, i.e., no atomic order. The amorphous structure is metastable, undergoing an ordering transition at temperature above ca. 800 C. The amorphous form of Pt interacts with both oxygen and water more strongly tha the crystalline form This stronger interaction produces characteristically different kinetic behavior of the catalysts for oxygen reduction. These differences take the form of a compensation effects, with lower activation energy and lower pre-exponential factor for the amorphous clusters. The properties of highly dispersed Pt clusters relative to the bulk form appears to be a general feature of the Group VIII metals. DOE

N82-14326# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATION OF LUMINESCENCE IN THE CHARGE EXCHANGE PROCESS OF Ar++ WITH N2 OF N(+) WITH CO [UNTERSUCHUNG DER LUMINESZENZ BEIM LADUNGSAUSTAUSCH VON Ar++ MIT N2 UND N+ MIT CO]
Dieter Neuschaefer Mar. 1980 80 p refs In GERMAN
(MPIS-3/1980; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15

Luminescence spectra of two ion-molecular reactions were analyzed using computerized simulation. Vibration and rotation states of the luminescent reaction products were studied in terms of impact dynamics. The charge exchange of Ar++ ions with molecular nitrogen and the reaction of N+ ions with CO (in an energy domain from 3 to 1000 eV) were investigated in their electronically excited states. The rotational spectra depend on the vibration level and show increased rotation excitation at lower energy. Author (ESA)

N82-14327# Prins Maurits Lab. TNO, Rijswijk (Netherlands). Inst. voor Chemische en Technologische Research.
A MICROWAVE INDUCED HELIUM PLASMA EMISSION DETECTOR FOR GAS CHROMATOGRAPHY
A. Verweij Dec. 1979 26 p refs
(Contract A74/K/029)
(PML-1979-75; TDCK-73058) Avail: NTIS HC A03/MF A01

The suitability of the detector for analysis of carbon, fluorine, chlorine, phosphorus and sulfur compounds is investigated. The influence of variations in the microwave power, the helium gas flow, the discharge gas pressure and the observation zone of the plasma on the operation of the detector were studied. From an experiment carried out with two model compounds, the detection limit and linear dynamic range of the detector are determined. Author (ESA)

N82-14328 Oklahoma State Univ., Stillwater.
STUDIES IN UNSEGMENTED CONTINUOUS-FLOW ANALYSIS. PART 1: REPETITIVE DETERMINATIONS OF Cu(2) CATALYST. PART 2: REPETITIVE DETERMINATIONS OF BROMINE AND CHLORINE IN GASEOUS SAMPLES AT A GAS-SOLID INTERFACE Ph.D. Thesis
Savakkattupalayam Muniappan Ramasamy 1981 155 p
Avail: Univ. Microfilms Order No. 8123853

A catalytic method for trace analysis in a continuous, unsegmented, closed flow system which is selective, and sensitive has a high sample throughput and minimizes waste handling is described and evaluated. The sample and the thiosulfate reactant were injected into the circulating ferric thiocyanate solution and the decrease in absorbance was monitored. Controlled potential electrolysis was employed for the removal of the catalyst after its assay. A method of repetitive determinations of bromine in gaseous samples, based on monitoring the transient signal resulting from two consective reactions taking place at gas-solid interface is described and evaluated. The sample was intercalated into a continous flow of carrier (air) gas which impinged on a layer of a dried reagent mixture of alpha--naphthaflavon, NF, and As(III), on the surface of a filter paper. The course of the reactions was followed by monitoring the formation and disappearance of the red-colored Br/NF with direct transmission photometry. Repetitive determinations of chlorine were made possible by incorporating Br(-) ions into the filter paper.
Dissert. Abstr.

N82-14329 Seton Hall Univ., South Orange, N. J.
THE ELECTRONIC STRUCTURE OF PORPHYRINS AND METALLOPORPHYRINS Ph.D. Thesis
Virginia Ellen Bass 1981 169 p
Avail: Univ. Microfilms Order No. 8122396

Current molecular orbital descriptions of the macrocycles are reviewed and analyzed in terms of their ability to account for the intensities and polarizations of the absorbance and emission vectors. A modified Huckel MO calculation was performed on the tetraphenyl and octaethylporphyrins and their derivatives. The resulting ground state energy level diagrams were used to estimate the energies of the excited state configurations. Dissert. Abstr.

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-14330 Stanford Univ., Calif.
MULTIAXIAL FATIGUE OF METALS Ph.D. Thesis
Yogendra Somnath Garud 1981 178 p
Avail: Univ. Microfilms Order No. 8124070

* Fatigue of metals under loadings which induce non-zero principal stresses along more than one direction in a part is considered. A literature survey focusing on a critique and comparison of existing criteria for evaluation of multiaxial fatigue is presented. A method for assessing multiaxial fatigue is proposed. In this approach fatigue life (to crack initiation) is related to the plastic work (density) per cycle of loading. The relation can be determined from results of fatigue tests on smooth specimens subjected to uniaxial loading. Fatigue life predictions using this approach are found to agree, within a factor of three on life, with tests under in-phase as well as out-of-phase combined axial and torsional loading for 1% Cr-Mo-V steel and 7075-T6 aluminum. A set of constitutive relations is developed to predict stress-strain response under general loading. Dissert. Abstr.

N82-14331 Defence Research Information Centre, Orpington (England).
QUANTITATIVE DETERMINATION OF FLUORINE IN STEEL-MAKING SLAGS BY THE ION SELECTIVE ELECTRODE
Teruaki Ishii and Mutsumi Ihida Aug. 1981 13 p refs Transl. into ENGLISH of 'Bunseki Kagaku' (Japan), v. 22, 1973 p 665-669
(DRIC-T-6448; BR80028) Copyright. Avail: Issuing Activity

A circuit with a high input impedance was devised which gives good results. Using this apparatus, the effects of pH and of interfering ions were determined. The values obtained in the quantitative determination of fluorine by this method are in good agreement with those obtained by the zirconium alizarine absorption photometric method. Author (ESA)

N82-14332*# National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF THE POWDER CHARACTERISTICS OF SISUB3NSUB4 ON THE MICROSTRUCTURE OF SINTERED BODIES
G. Woetting and H. Hausner Nov. 1981 15 p refs Transl. into ENGLISH from Keramische Z. (West Germany), v. 32, no. 10, 1980 p 579-581 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Technische Univ., Berlin
(Contract NASw-3198)
(NASA-TM-76619) Avail: NTIS HC A02/MF A01 CSCL 11F

Silicon nitride powders sintered with the addition of 2 wt% MgO to 95% theoretical density after attrition milling and subsequent purification were evaluated. Preparation of the powders is described. The powder characteristics (specific surfaces, iron concentration, and oxygen content), and density, weight loss, and phase state of the sinter bodies as a function of powder preparation are presented. J.D.H.

N82-14333*# Avco Lycoming Div., Stratford, Conn. Materials Lab.
DEVELOPMENT OF IMPROVED HIGH TEMPERATURE COATINGS FOR IN-792 + Hf Final Report
D. D. Profant and S. K. Naik Jun. 1981 95 p refs
(Contract NAS3-22371; DA Proj. 1L1-62209-AH-76)
(NASA-CR-165395) Avail: NTIS HC A05/MF A01 CSCL 11F

The development for t-55 I712 engine of high temperature for integral turbine nozzles with improved thermal fatigue resistance without sacrificing oxidation/corrosion protection is discussed. The program evaluated to coating systems which comprised one baseline plasma spray coating (12% Al-NiCoCrALY), three aluminide coatings including the baseline aluminide (701), two CoNiCrAly (6% Al) + aluminide systems and four NiCoCrY + aluminide coating were evaluated. The two-step coating processes were investigated since it offered the advantage of tailoring the composition as well as properly coating surfaces of an integral or segmented nozzle. Cyclic burner rig thermal fatigue and oxidation/corrosion tests were used to evaluate the candidate coating systems. The plasma sprayed 12% Al-NiCoCrAlY was rated the best coating in thermal fatigue resistance and outperformed all coatings by a factor between 1.4 to 2.5 in cycles to crack initiation. However, this coatings is not applicable to integral or segmented nozzles due to the line of sight limitation of the plasma spray process. The 6% Al-CoNiCrAlY + Mod. 701 aluminide (32 w/o Al) was rated the best coating in oxidation/corrosion resistance and was rated the second best in thermal fatigue resistance. J.D.H.

N82-14334# Southwest Research Inst., San Antonio, Tex.
CRACK TIP PLASTICITY ASSOCIATED WITH CORROSION ASSISTED FATIGUE Interim Report, Jun. 1980 - Jun. 1981
D. L. Davidson and J. Lankford 18 Sep. 1981 50 p refs
(Contract N00014-75-C-1038; NR Proj. 036-109)
(AD-A105529) Avail: NTIS HC A03/MF A01 CSCL 11/6

Preliminary data is presented on the effect of a water vapor environment on the deformation within the plastic zone of fatigue cracks in 7075-T6. Results in the water vapor environment is compared to those in a vacuum environment. High spatial resolution observations have been made using a special cyclic stage for the SEM and strains have been determined using the stereoimaging technique. Crack tip opening is shown to be a power function of the distance behind the crack tip, in agreement with a theoretical derivation of this correlation. The crack tip strain correlates with the crack opening at 1 micrometer behind the crack tip. Crack tip strains are shown to vary considerably for a fixed cyclic stress intensity. By ignoring some data, a preliminary analysis is made which indicates that the water vapor environment lowers crack tip strains. Strain distribution within the plastic zone is shown to fit a logarithmic function, as opposed to a power function, although there is still some uncertainty in this result. Work on 7075-T6 and the powder metallurgy alloy MA-87 is continuing, with definitive results expected next year. Author (GRA)

N82-14335# Naval Postgraduate School, Monterey, Calif.
MECHANISMS OF ELEVATED TEMPERATURE FATIGUE DAMAGE IN 2 1/4 Cr - 1 Mo STEEL M.S. Thesis
Pierre G. Vining Jun. 1981 138 p refs
(AD-A105786) Avail: NTIS HC A07/MF A01 CSCL 11/6

The microstructural changes and fatigue crack growth rates induced by elevated temperature push-pull fatigue and creep fatigue tests in 2 1/4 Cr - 1 Mo steel have been examined using optical and electron microscopy techniques. The only microstructural change noted was the development of dislocation substructures in the proeutectoid ferrite. Creep fatigue tests with a single maximum strain hold period per cycle created a cellular substructure whose size was solely dependent on the carbide interparticle spacing. Temperature and strain range effects were noted on the dislocation densities in the maxtrix which were generally consistent with work reported in the literature. As there were no resolvable changes in the carbides in the ferrite, it was concluded that there must be some change in the microstructure on a finer scale, such as the early stages of MO-C-Mo cluster formation, which might explain the cyclic hardening/cyclic softening response of the alloy. The fatigue crack growth rate of the alloy was strongly dominated by the hold periods imposed during the loading cycle. A single 0.1 hr. hold period doubled the fatigue crack growth rate obtained for a continuously cycled test and two hold periods per loading cycle gave a four fold increase over the continuously cycled crack growth rate. GRA

N82-14336# Brown Univ., Providence, R. I.
PLASTIC DEFORMATION AND FRACTURE OF STEEL UNDER DYNAMIC LOADING Final Report, 20 Jul. 1980 - 19 Jul. 1981
J. Duffy Sep. 1981 4 p
(Contract DAAG29-80-K-0045)
(AD-A105997; ARO-17221.2-E) Avail: NTIS HC A02/MF A01 CSCL 11/6

The author summarizes his research effort during the grant period. Included is the development of an infrared radiation temperature detection system for monitoring the temperature rise in thin-walled steel specimens loaded dynamically in a torsional Kolsky bar. Also included is a description of an investigation aimed at transforming AISI 1020 HRS under controlled conditions of prior austenite grain size, ferrite and pearlite grain sizes to reduce the size and number of carbide plates along the grain boundaries. The transformed material is to be used in a subsequent investigation into the influence of microstructure on the fracture toughness of 1020 HRS.

Author (GRA)

N82-14337# Mound Lab., Miamisburg, Ohio.

MICROSTRUCTURAL ANALYSIS OF KOVAR/MOLYBDENUM AND COPPER/MOLYBDENUM INTERDIFFUSION

Michael D. Kelly, Kenneth L. Breakall, Jr., and Dale L. Roesch 1981 13 p Presented at the 14th Ann. Technol. Meeting of Intern. Metallographic Soc., San Francisco, 21 Jul. 1981
(Contract DE-AC04-76DP-00053)
(DE81-025919; MLM-2848(OP); CONF-810731-1) Avail: NTIS HC A02/MF A01

Studies were conducted to measure interdiffusion of Kovar/molybdenum and copper/molybdenum at different temperatures for various periods of times. Optimum operating parameters to achieve good bonding while maintaining practical processing time were determined. Metallographic techniques were developed to prepare specimens for microprobe analysis, and to etch specimens for photomicrography. The metallographic techniques used, along with the resulting microprobe analyses, are discussed.

DOE

N82-14338# Battelle Columbus Labs., Ohio.

INFLUENCE OF CYCLIC LOAD AND ENVIRONMENTAL EFFECTS ON STRESS CORROSION CRACKING OF SENSITIZED STEEL Final Report

E. L. White and W. E. Berry Aug. 1981 62 p refs Sponsored in part by EPRI
(EPRI Proj. 311-3)
(DE81-904216; EPRI-NP-1991) Avail: NTIS HC A04/MF A01

An experimental stress corrosion cracking (SCC) study was conducted in order to mitigate SCC in stainless steel piping was boiling water reactor. Temperature effects, dissolved oxygen, and cyclic loading were studied on furnace sensitized Type 304 stainless steel. Slow strain rate tests at 4 million s(+) strain rate produce intergranular stress corrosion cracking (IGSCC) at temperatures above 2040 C, suggesting a threshold temperature for IGSCC of about 1300 C at the 0.2 ppm oxygen level. Saturated solutions of AgCl produce IGSCC in slow strain rate tests in both aerated (8 ppm O2) and deaerated < 0.006 ppM O2) tests at temperature as low as 850 C. A potential hazard in using Ag/AgCl reference electrodes is suggested. Trapezoidal cyclic loading (5 min load/unload, 10 or 75 min at load produces IGSCC. Tests in 8 ppM oxygen water with the 75 min hold cycle, minimum load of 0.1 yield strength and maximum load greater than YS, indicate a threshold temperature for IGSCC of 1900 C.

DOE

N82-14339# Hanford Engineering Development Lab., Richland, Wash.

ALLOY DEVELOPMENT FOR CLADDING AND DUCT APPLICATIONS

J. L. Straalsund and G. D. Johnson 2 Feb. 1981 43 p Presented at the Am. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7-12 Jun. 1981
(Contracts DE-AC14-76FF-02170; EY-76-C-14-2170)
(DE81-027843; HEDL-SA-2344; CONF-810606-89) Avail: NTIS HC A03/MF A01

Three general classes of materials under development for cladding and ducts are listed. Solid solution strengthened, or austenitic, alloys are Type 316 stainless steel and D9. Precipitation hardened (also austenitic) alloys consist of D21, D66 and D68. These alloys are similar to such commercial alloys as M-813, Inconel 706, Inconel 718 and Nimonic PE-16. The third general class of alloys is composed of ferritic alloys, with current emphasis being placed on HT-9, a tempered martensitic alloy, and D67, a delta-ferritic steel. The current reference, or first generation alloy, is 20% cold worked Type 316 stainless steel. Second generation alloys for near-term applications include D9 and HT-9. Third generation materials consist of the precipitation strengthened steels and ferritic alloys, and are being considered for implementation at a later time than the first and second generation alloys. The status of development of these alloys is summarized.

DOE

N82-14340# Battelle Memorial Inst., Richland, Wash.

EVALUATION OF STRESS-CORROSION CRACKING OF SENSITIZED 304SS IN LOW-TEMPERATURE BORATED WATER

R. H. Jones, A. B. Johnson, Jr., and S. M. Bruemmer May 1981 15 p refs Presented at the Intern. Conf. on Environ. Degradation of Engr. Mater., Blacksburg, Va., 21 Sep. 1981
(Contract DE-AC06-76RL-01830)
(DE81-028090; PNL-SA-9387; CONF-810913-7) Avail: NTIS HC A02/MF A01

Intergranular stress corrosion cracking was observed in constant extension rate tests, CERT and constant load tests of 304SS tested at 32 C in borated water plus 15 ppm Cl(-). Evidence of IGSCC was obtained in CERT tests of welded pipe samples only when the original inner diameter surface was intact and with 15 ppm Cl(-) added to the borated water while IGSCC occurred in a furnace sensitized pipe sample after 500 h at a constant stress of 340 MPa in borated water containing 15 ppm Cl(-). These results indicate that surface features associated with weld preparation grinding contributed to the susceptability of sensitized 304SS to IGSCC in low temperature borated water; however, the constant load test indicates that such surface defects are not necessary for IGSCC in low tempeature borated water.

DOE

N82-14341# Oak Ridge National Lab., Tenn.

MICROSTRUCTURE OF TRIPLE-BEAM ION IRRADIATED Fe AND Fe-Cr ALLOYS

L. L. Horton, J. Bentley, and W. A. Jesser 1981 5 p refs Presented at the Fusion Reactor Materials Meeting, Seattle, 9 Aug. 1981 Prepared in cooperation with Virginia Univ., Charlottesville
(Contract W-7405-eng-26)
(DE81-028347; CONF-810831-32) Avail: NTIS HC A02/MF A01

The development of defect structures in Fe-10% Cr, triple-beam ion irradiated to 10 dpa at temperatures from 725 to 950 K was studied. Limited cavity formation was observed. Peak swelling of 0.02% occurred at irradiation temperatures of 850 K. Similar irradiations at this temperature led to 0.022% swelling in iron. While no cavities were observed in Fe-5% Cr, calculations have shown that cavities formed at 875 K and above are more bubble-like than those at lower temperatures. Dislocation structures varied from interstitial dislocation loops with b = a < 100 > at low temperature to a coarse dislocation network at 850 K. Large dislocation loops had a convoluted shape which suggested that loop growth had occured preferentially in < 110 < directions. The results are discussed and related to current swelling suppression mechanisms for ferritic steels.

DOE

N82-14342# Oak Ridge National Lab., Tenn. Metals and Ceramic Div.

INFLUENCE OF NEUTRON IRRADIATION AT 55 DEG C ON THE PROPERTIES OF AUSTENITIC STAINLESS STEELS

F. W. Wiffen and P. J. Maziasz 1981 6 p refs Presented at the Fusion Reactor Materials Meeting, Seattle, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028065; CONF-810831-31) Avail: NTIS HC A02/MF A01

Types 316 and 316 + 0.23 wt % Ti stainless steels and 16-8-2 weldment were irradiated in HFIR at 55 C to fluences up to 1.35 times 10 to the 26th power neutrons sq m of (< 0.1 MeV), which produced up to 10.5 dpa and 520 at ppm He. Examination showed no swelling, no cavities, no precipates, but a high concentration of dislocations. Tensile tests showed large increases in the 35 C strength properties, with the weldments the weakest of the materials. The ductility of all materials was reduced by the irradiation, the uniform elongation to only 0.4% in the cold worked material. Tests at temperatures above the irradiation temperature showed an approach to unirradiated properties as the temperature was increased from 200 to 600 C.

Helium embrittlement at 700 C severely reduced elongation. DOE

N82-14343# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
EFFECTS OF PULSED DUAL-ION IRRADIATION OF MICROSTRUCTURAL DEVELOPMENT
N. H. Packan 1981 5 p refs Presented at the Fusion Reactor Materials Meeting, Seattle, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028631; CONF-810831-30) Avail: NTIS HC A02/MF A01

The effect of pulsed irradiation on the development of microstructure during Ni ion bombardment was investigated in a simple austenitic alloy similar to type 316 stainless steel. Bombardment conditions were 10 dpa, 940 K, pulsing with equal on/off times of either 0.5 or 60 s, and the addition of 20 app He/dpa to some specimens either by room temperature peimplantation or by dual-beam coimplantation. Particular care was taken to minimize thermal pulses from beam heating (to < 2 C). The results show that pulsing has a subtle influence, and the effects on specific cavity parameters are complex. Pulsing produced a small increase in swelling in the helium-free case, but a slight decrease for helium-implanted specimens, and it seems to have counteracted the usual stimulative effects of helium on cavity nucleation. DOE

N82-14344# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
MECHANICAL RELAXATION RESPONSE OF 2 1/4 Cr-1 Mo STEEL
R. W. Swindeman 1981 30 p refs Presented at the 28th Sagamore Army Materials Conf., Lake Placid, N.Y., 13 Jul. 1981
(Contract W-7405-eng-26)
(DE81-027301; CONF-810741-1) Avail: NTIS HC A03/MF A01

The mechanical relaxation of 2 1/4 Cr-1 Mo steel was examined in the temperature range 450 to 566 C for times to 100 h. Data from four heats were included. The relaxation strength was found to vary with heat treatment by a factor of three from the weakest to the strongest. The extent of recovery and tempering that occurred during relaxation was displayed by means of isochronous stress vs strain curves constructed from multiple loading tests. Relaxation response after cyclic strain was examined to response after monotonic strain providing that the starting stress was at the tip of the hysteresis loop. The salient features of the relaxation response were consistent with expectations based on a material deformation model that included parameters to accommodate kinematic and istropis hardening. DOE

N82-14345# Cambridge Univ. (England). Dept. of Metallurgy and Materials Science.
ELECTROCHEMICAL ASPECTS OF STRESS-CORROSION CRACKING IN ALPHA-BRASS
G. T. Burstein and R. C. Newman 1981 11 p refs Presented at Electrochem. Soc. Conf., Denver, 11 Oct. 1981
(Contract DE-AC02-76CH-00016)
(DE81-022078; BNL-29589; CONF-811013-1) Avail: NTIS HC A02/MF A01

A number of aspects of the stress corrosion cracking of brass from the point of view of the localized electrochemical processes occurring at the tip of a propagating crack are investigated. The principal system examined is the intergranular stress (SCC) of 70-30 brass in near-neutral ammoniacal solutions, for which a detailed mechanism is developed. In addition, the effects of nitrite ions in promoting SCC of both brass and copper are considered. DOE

N82-14346# Oak Ridge National Lab., Tenn.
IDEAL TRANSPORT IN TRANSITION METALS: THE RIGID-MUFFIN-TIN APPROXIMATION AND BEYOND
W. H. Butler 1981 11 p refs Presented at the Intern. Conf. of Electron Transport in Metals, Ottawa, 13 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028073; CONF-810853-1) Avail: NTIS HC A02/Mf A01

A recent calculation of the electrical and thermal resistivities of Nb and Pd due to electron-phonon scattering is reviewed. This calculation used the rigid-muffin-tin approximation and its results indicate that electron-phonon matrix elements calculated in this approximation are too weak at low momentum transfer. A formalism is developed for calculating the corrections to the rigid-muffin-tin approximation. DOE

N82-14347# Battelle Pacific Northwest Labs., Richland, Wash.
H2S ADSORPTION OF PLASTICITY STRAINED IRON
M. T. Thomas, D. R. Baer, and R. H. Jones May 1981 8 p refs Presented at the NATO Advan. Study Inst. on Atomistics of France, Corsice, France, 22 May 1981
(Contract DE-AC06-76RL-01830)
(DE81-027996; PNL-SA-9546; CONF-810584-2) Avail: NTIS HC A02/MF A01

Data showing an increased adsorption rate for H2S on plastically strained iron is presented. There has been considerable speculation in the literature concerning the effect of strain on tha enhanced corrosion and surface reactivity, but there has been on direct experimental evidence that strain does increase surface reactivity. The possible effects of strain enhanced adsorption on crack initiation and growth, catalytic corrosion, and wear properties of materials were considered. DOE

N82-14348# Sandia Labs., Albuquerque, N. Mex.
VISCOPLASTIC RESPONSE OF BERYLLIUM UNDER SHOCK COMPRESSION
J. R. Asay, L. C. Chhabildas, and J. L. Wise 1981 4 p refs Presented at the 8th AIRAPT Conf. and the 19th EHPRG Conf., Uppsala, 17 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-028248; SAND-81-0379C; CONF-810827-8) Avail: NTIS HC A02/MF A01

Plane shock wave techniques were used to determine the effective viscosity of beryllium over a range of strain rates. Viscosity coefficients were derived from risetime measurements on steady shock waves produced by initial compression of specimens from the ambient state, and also from measured risetime of reloading waves produced by recompression from the initial shocked state. Recompression experiments indicate an increase in viscosity over that obtained for initial compression. DOE

N82-14349# California Univ., Livermore. Lawrence Livermore Lab.
POLARIZATION STUDY OF HOT CORROSION PHENOMENA IN Ni-Cr ALLOYS
John J. Truhan and Thomas R. Jeys 17 Aug. 1981 23 p refs Presented at the Conf. on Chem. of Mater. at High Temp., Harwell, England, 7-10 Sep. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-029609; UCRL-85554; CONF-810943-3) Avail: NTIS HC A02/MF A01

Electrochemical polarization was used to study the hot corrosion of nickel chromium binary alloys in molten sodium sulfate at 900 C. The advantages of using this technique to study hot corrosion compared to thermogravimetric analysis include accelerated oxidation by anodic polarization, rapid determination of corrosion rates, and quantitative measures of the stability of protective scales. By systematically studying the effect of alloy composition, the primary mode of corrosion change from nickel oxidation and sulfidation to chromium oxidation was observed. A coherent protective chromium oxide scale forms on alloys containing at least 15 to 20 wt % chromium, and only a marginal increase of protection is realized using additional chromium. DOE

N82-14350# Brookhaven National Lab., Upton, N. Y. Dept. of Nuclear Energy.
DISSOLUTION KINETICS DURING LOCALIZED CORROSION
H. S. Isaacs and R. C. Newman 1981 12 p refs Presented at Electrochem. Soc. Conf., Denver, 11 Oct. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025092; BNL-29580; CONF-811013-2) Avail: NTIS HC A02/MF A01

The dissolution kinetics of iron and cobalt were measured under one dimensional diffusional boundary conditions. Experimental results obtained in aggressive neutral electrolytes show features resulting from transient supersaturation, salt film precipitation and diffusion controlled dissolution. A mathematical model incorporating these features was applied to metal dissolution in neutral chloride solutions. The effects of sulfur-containing ions on localized dissolution of iron are described with reference to the stress-corrosion cracking of sensitized stainless steels. DOE

N82-14351# Fraunhofer Inst. fuer Werkstoffmechanik, Freiburg (West Germany).
CORROSION AND HIGH TEMPERATURE RESISTANT COATINGS FOR MOLYBDENUM, MADE OUT OF IRON AND NICKEL ALLOYS AND APPLIED BY EXPLOSIVE WELDING [KORROSIONS- UND HOCHTEMPERATURBESTAENDIGE SCHICTEN FUER MOLYBDAEN AUS Fe- UND Ni- BASISLEGIERUNGEN AUFGEBRACHT MITTELS EXPLOSIVPLATTIERUNG]
R. Pruemmer and R. Henne Apr. 1980 18 p refs In GERMAN
(T-15/80) Avail: NTIS HC A02/MF A01

The impact parameters of the explosive welding of molybdenum with Inconel 601 were determined. The combination Mo and Inconel 601 was considered as nonweldable. It can be applied in solar radiation concentrating devices, allowing a higher operating temperature and higher energy conversion efficiency. The usual velocities of the explosive welding process (collision velocities of 2200 m/sec) lead at best to samples affected by cracks, due to the insufficient workability of molybdenum. At higher velocities cracks no longer occur, molybdenum being a strain rate sensitive material. Layer composite materials can be manufactured in flat as well as in tube form. Author (ESA)

N82-14352# Battelle Inst., Frankfurt am Main (West Germany).
THEORETICAL INVESTIGATIONS ON THE SEPARATION OF IMMISCIBLE ALLOYS Final Report
Dieter Langbein Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 66 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-004; BF-R-64-152-1; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,90

The physical effects which contribute to the separation of immiscible alloys are discussed and mathematically modeled. Particular attention is given to (1) the mode of cooling, (2) the formation and growth of clusters, (3) free convection, (4) sedimentation, (5) capillary forces, (6) differences in surface tension, (7) differences in interface tension, (8) interface or Marangoni convection, (9) the directed growth of droplets, (10) Ostwald ripening, (11) the overlapping on the impoverished regions around droplets, and (12) the migration of droplets ahead of a solidification front. As it takes at least 20 sec for a metallic melt of 1 cm in diameter to cool down completely, all experiments planned or already conducted under zero-gravity have to be rated at this time interval. Effects (5) to (8) and (11) are fast processes in this sense, all being based on interface phenomena. The tendency of regions of equal concentration or temperature to contract into spheres is demonstrated using the transparent model system methanol/cyclohexane. Author (ESA)

N82-14353# Centre Technique des Industries Mecaniques, Senlis (France).
IONIC TREATMENT OF TOOLS AND GEARS Final Report [TRAITEMENT IONIQUE DES OUTILLAGES ET ENGRENAGES]
A. Dubus, J. P. Peyre, M. Gantois (Ecole Nationale Superieure de la Metallurgie et l'Industrie des Mines), H. Michel (Ecole Nationale Superieure de la Metallurgie et l'Industrie des Mines), C. Leroy (Ecole Nationale Superieure de la Metallurgie et l'Industrie des Mines), and J. M. Rongvaux (Ecole Nationale Superieure de la Metallurgie et l'Industrie des Mines) 30 Sep. 1980 265 p refs In FRENCH
(CETIM-12-G-129) Avail: NTIS HC A12/MF A01

Ionic nitriding was studied. The diffusion layers were quantitatively and microstructurally analyzed. The fundamental mechanisms which govern the in situ transformation of sulfur carbides into nitrides and lead to the precipitation of cementite lattices are defined. Optimization of the treatment parameters allows for the realization of single-phase layers on Z 155 CDV 12 steel. This phase transformation conditions the mechanical resistance of the nitrided layers. Wear test results indicate that for tool steels, the choice of nitriding treatment must be specific to the intended application. Author (ESA)

N82-14354# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
FATIGUE CORROSION RESISTANCE OF ALUMINUM ALLOYS [TENUE EN FATIGUE CORROSION DE QUELQUES ALLIAGES D'ALUMINIUM]
E. Budillon and D. Aliaga 9 Jun. 1981 17 p In FRENCH Presented at 52nd AGARD Conf., Cesme, Turkey, 5-10 Apr. 1981
(SNIAS-812-551-104; C-42087) Avail: NTIS HC A02/MF A01

Fatigue corrosion of light alloys used in aeronautical construction is evaluated. Alloys 2024, 2618, 2214, 6061, 7075, and 7050 are discussed. Dry argon, humid air, and salt water environments were used. Alloys 2618A and 7175 were subjected to additional analysis of crack behavior: with a surface coating; with chromium anode oxidation; and with a coating similar to those used by the aircraft industry. Salt water is the most harmful environment, followed by humid air. The 2000 series alloys are more affected than the 7000 series by these environments. In salt water; however, 2618A shows 25% greater resistance than 7175 to cracks. In normal, and humid air, chromium anode oxidation can adversely affect resistance. Shot blasting beforehand prevents this. In salt water, painting and anode treatment are effective in reducing environmental effects. Author (ESA)

N82-14355# Chemical Recovery Systems, Hanover, Maine.
NICKEL RECOVERY FROM ELECTROPLATING RINSEWATERS BY ELECTRODIALYSIS Final Report
John L. Eisenmann Jul. 1981 55 p refs Prepared jointly with Risdon Mfg. Co., Waterbury, Conn.
(Grant EPA-R-803742)
(PB81-227209; EPA-600/2-81-130) Avail: NTIS HC A04/MF A01 CSCL 11F

A program to demonstrate the feasibility of metal salt recovery and pollution control on a Watts-type nickel plating line by electrolysis was conducted. Each of two reclaim rinse tanks, arranged in series following plate tanks, was treated by recirculating the rinse solutions through separate electrodialysis stacks. The nickel salts recovered from the rinse solutions were concentrated 20 fold by the electrodialysis treatment, and could be returned directly to the plate tanks for reuse. A cost estimate based on the data obtained during the demonstration indicates that 95% of the nickel lost from untreated rinses could be recovered and that ancillary benefits in sludge disposal, use of treatment chemicals, etc. could be realized. Pay back periods of less than 18 months are anticipated for commercial units. GRA

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-14356 Polytechnic Inst. of New York, Brooklyn.
NEW EPOXY RESINS: SYNTHESIS AND STABILITY Ph.D. Thesis
Chii-Shu Chen 1981 203 p
Avail: Univ. Microfilms Order No. 8118866

A polymer which has high aromaticity and/or cyclic ring structures in the chain backbone usually gives high heat resistance and flame resistance. Five glycidyl ether type epoxy resins are prepared from bisphenol A(DGEBA), 9-9-bis(4-hydroxyphenyl) fluorene (DGEBF), 3,6-dihydroxyspiro [fluorene-9,9'-xanthane] (DGEFX), 10,10-bis(4-hydroxyphenyl) anthrone (DGEA) and 9,9,10,10-tetrakis(4-hydroxyphenyl) anthracene (TGETA) in order to study structure thermal stability-flame resistance property relationships. Various curing agents were evaluated. The char yield at 700 C under a nitrogen atmosphere and the glass transition temperature (Tg) for the cured and uncured resins decrease according to the sequence TGETA > DGEFX > DGEA > DGEBF > DGEBA. The Tg's for these cured epoxy resins are DGEBA > DGEBF > DGEFX > DGEA. A Tg for the TGETA is not obtainable but would be expected to be the highest. DGEBF, DGEFX, DGEA and TGETA added to the DGEBA system show increases in the char yield, Tg and oxygen index with increasing concentration. Dissert. Abstr.

N82-14357*# Toronto Univ. (Ontario). Dept. of Chemistry.
MODELLING OF POLYMER PHOTODEGRADATION FOR SOLAR CELL MODULES Quarterly Technical Progress Report, 1 Jan. - 31 Mar. 1981
A. C. Somersall and J. E. Guillet Apr. 1981 17 p ref
(Contract JPL-955591)
(NASA-CR-165041; JPL-9950-615) Avail: NTIS HC A02/MF A01 CSCL 07C

A computer model including an integration routine was developed and demonstrated to simulate, in principle, the chemical changes which may occur in the photooxidation of hydrocarbons, using as input data a set of elementary reactions, corresponding rate constants and appropriate starting conditions. Application of this model to the photooxidation of pottant and plastic materials used in the LSA module designs provides a reliable predictive capability regarding the useful lifetime of these materials. An earlier mechanism consisting of 46 reactions was simplified considerably by reducing the number of formal termination steps since it became apparent that the major termination process goes via the peroxy radicals. In addition, new reactions of oxygen with acryl radicals (from Norrish type I) to form peracids, which then decompose to form carbon dioxide are included. M.D.K.

N82-14358*# Toronto Univ. (Ontario). Dept. of Chemistry.
MODELLING OF POLYMER PHOTODEGRADATION FOR SOLAR CELL MODULES Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
A. C. Somersall and J. E. Guillet Jul. 1981 16 p
(Contract JPL-955591)
(NASA-CR-165040; JPL-955591-81/3; JPL-9950-616) Avail: NTIS HC A02/MF A01 CSCL 07C

A computer program developed to model and calculate by numerical integration the varying concentrations of chemical species formed during photooxidation of a polymeric material over time, using as input data a choice set of elementary reactions, corresponding rate constants and a convenient set of starting conditions is evaluated. Attempts were made to validate the proposed mechanism by experimentally monitoring the photooxidation products of small liquid alkane which are useful starting models for ethylene segments of polymers like EVA. The model system proved in appropriate for the intended purposes. Another validation model is recommended. M.D.K.

N82-14359*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ULTRASONIC VELOCITY FOR ESTIMATING DENSITY OF STRUCTURAL CERAMICS
S. J. Klima, G. K. Watson, T. P. Herbell, and T. J. Moore 1981 12 p refs Presented at the Automotive Technol. Develop. Contractor Coord. Meeting, Dearborn, Mich., 26-29 Oct. 1981
(Contract DE-AI01-77CS-51040)
(NASA-TM-82765; DOE/NASA/51040-35; E-1026-5) Avail: NTIS HC A02/MF A01 CSCL 11B

The feasibility of using ultrasonic velocity as a measure of bulk density of sintered alpha silicon carbide was investigated. The material studied was either in the as-sintered condition or hot isostatically pressed in the temperature range from 1850 to 2050 C. Densities varied from approximately 2.8 to 3.2 g cu cm. Results show that the bulk, nominal density of structural grade silicon carbide articles can be estimated from ultrasonic velocity measurements to within 1 percent using 20 MHz longitudinal waves and a commercially available ultrasonic time intervalometer. The ultrasonic velocity measurement technique shows promise for screening out material with unacceptably low density levels. Author

N82-14360# Boeing Vertol Co., Philadelphia, Pa.
LOW-COST FORMING INFLUENCE ON REINFORCED THERMOPLASTIC MECHANICAL PROPERTIES Final Report, Jan. - Dec. 1980
Donald J. Hoffstedt, Lawrence C. Ritter, and Donald J. Toto Aug. 1981 112 p refs
(Contract DAAG46-79-C-0092; DA Proj. 1L1-62105-AH-84)
(AD-A106004; AMMRC-TR-81-36) Avail: NTIS HC A06/MF A01 CSCL 11C

A study of the influence of low cost forming method on the mechanical properties of reinforced thermoplastics is described. A relationship between processing parameters (time/pressure/temp-variables) and selected material properties (modulus, flex strength, inter-laminar shear strength) is established. The effects (measured by the change in material flexural properties) of simulated solvent attack on painted and unpainted laminates are determined. A review of the available literature on reinforced thermoplastic materials, material properties, and fabrication methods is provided. Four, 16 in x 20 in, five ply Kevlar 49 style 285 fabric, polysulfone, laminated panels for AMMRC testing were manufactured. A decrease in flexural strength readings coming at the 450 F thermoforming temperature is indicated. Modulus values are highest in the 500 F to 550 F thermoforming temperature range. Interlaminar shear strength values also tend to decrease as thermoforming temperature increases. Regarding solvent attack, generally higher flexural strength with polyphenylsulfone than with polysulfone sandwich beams is indicated. Conversely higher 'EI' values occurred in the polysulfone than in the polyphenylsulfone sandwich beams. GRA

N82-14361# Space Sciences, Inc., Monrovia, Calif.
MASS SPECTROMETRIC STUDIES OF THE THERMAL DECOMPOSITION OF SOME AZIDO POLYMETRIC BINDERS Annual Summary Report, 1 Aug. 1980 - 31 Jul. 1981
Milton Farber and R. D. Vastava Sep. 1981 26 p refs
(Contract N00014-80-C-0711)
(AD-A106090) Avail: NTIS HC A03/MF A01 CSCL 07/4

Thermal decomposition studies were conducted on BAMO, GAP and AZOX. Decomposition was initiated at approximately 120 C, with activation energies for the three materials approximately 170 kJ/mol. The primary mechanism for the decomposition is the release of molecular N2. Secondary decomposition occurring at temperatures above 150 C included the fracturing of the three-carbon backbone of both the polymers and the monomer. Higher decomposition temperature species included HCN, HCO, and smaller amu fragments. Author (GRA)

N82-14362# Atlanta Univ., Ga. Dept. of Chemistry.
LIQUID CRYSTAL BLOCK COPOLYESTERS. 2: PREPARATION AND PROPERTIES OF BLOCK COPOLYESTERS CONTAINING CYCLOHEXANE AND BENZENE RINGS Technical Report, 1 Jan. 1980 - 31 May 1981
Malcolm B. Polk, Kofi B. Bota, Edmond C. Akubuiro, and Metha Phingbodhipakkiya 28 Sep. 1981 23 p refs
(Contract N00014-80-C-0557)
(AD-A105556; TR-1) Avail: NTIS HC A02/MF A01 CSCL 11/9

Poly oxy-trans- 1,2 -cyclohexyleneoxycarbonyl-trans- 1,2 -cyclohexylenecarbonyl-b-oxy (2-methyl- 1,3 -phenylene) oxyterephthaloyl V; Poly (oxy-trans- 1,4 -cyclohexyleneoxycarbonyl-trans- 1,4 -cyclohexylenecarbonyl-b-oxy- 1,4 -phenyleneoxyterephthaloyl) VI; Poly (oxy-cis- 1,4 -cyclohexyleneoxycarbonyl-trans- 1,4 -cyclohexylenecarbonyl-b-oxy- 1,4 -phenyleneoxyterephthaloyl)-VII; and Poly (oxy-trans- 1,4 -cyclohexyleneoxycarbonyl-trans- 1, 4 -cyclohexylenecarbonyl-b-oxy (2-methyl- 1,4 -phenylene) oxyterephthaloyl) VIII have been synthesized and characterized by infrared spectroscopy, nuclear magnetic resonance spectroscopy, differential scanning calorimetry, and viscometry. Block copolymers VI, VII, and VIII form mesomorphic solutions which depolarize plane-polarized light. Author (GRA)

N82-14363# Army Materials and Mechanics Research Center, Watertown, Mass.
ACCELERATION OF THE EPOXY RESIN-DICYANDIAMIDE CURE CYCLE BY TRISUBSTITUTED UREAS *Final Report*
Bernard R. LaLiberte, Robert E. Sacher, and Joseph Bornstein Jun. 1981 15 p refs
(DA Proj. 1L1-62105-AH-84)
(AD-A105870; AMMRC-TR-81-30) Avail: NTIS HC A02/MF A01 CSCL 11/9

The addition of accelerators such as Monuron, N-(4-chlorophenyl)-N',N'-dimethylurea, or Diuron, N-(3,4-dichlorophenyl)-N',N'-dimethylurea, to epoxy resin-dicyandiamide mixtures significantly decreases the hardening temperature of

these systems. These trisubstituted urea accelerators are believed to serve mainly as a latent source of dimethylamine. This amine is believed to play a very important role in the cure cycle. One pathway to dimethylamine is a low-temperature cyclocondensation reaction between the trisubstituted urea and the epoxy functionality to form a 2-oxazoli-done; this reaction partially hardens the resin. The significance of this source of dimethylamine in the overall mechanism of epoxy hardening was illustrated by differential scanning calorimetry. Several epoxy formulations were examined at various heating rates. Arrhenius plots of the data indicated that the slope of a two-component mixture consisting of resin and Monuron was approximately the same as that of a three-component system composed of resin, dicyandiamide, and Monuron. In contrast, the slope of a two-component resin-dicyandiamide system was found to be considerably larger. Thus the reaction of Monuron with the resin is an important factor that must be considered in any explanation of the acceleration of the hardening process of dicyandiamide-containing resins.
Author (GRA)

N82-14364# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.

FAILURE PREDICTION IN GLASS Final Report, 1 Jul. 1978 - 30 Jun. 1981

Robert H. Doremus Jul. 1981 9 p refs
(Contract DAAG29-80-C-0140; Grant DAAG29-78-G-0141)
(AD-A105857; ARO-14639.8-MS) Avail: NTIS HC A02/MF A01 CSCL 09/1

The static fatigue of Pyrex borosilicate glass was measured over a wide range of stress and failure time, and the log failure time was found to be inversely proportional to the applied stress. The appearance of fracture origins was consistent with crack tip sharpening during fatigue, as predicted by the Hillig-Charles theory as modified for different failure time-stress functional relations. An explanation for the sensitivity of fatigue of soda-lime glass to surface treatment was proposed. Author (GRA)

N82-14365# National Bureau of Standards, Washington, D.C. Center for Materials Science.

PYROELECTRICITY AND CHARGE TRANSPORT IN A COPOLYMER OF VINYLIDENE FLUORIDE AND TETRAFLUROETHYLENE

M. G. Broadhurst, G. T. Davis, A. S. DeReggi, S. C. Roth, and R. E. Collins (Sydney Univ.) 30 Sep. 1981 32 p refs Submitted for publication
(Contract N00014-79-F-0012)
(AD-A105790; TR-15) Avail: NTIS HC A03/MF A01 CSCL 11/9

A copolymer of vinylidene fluoride and tetrafluoroethylene shows pyroelectric and piezoelectric effects after poling. Thermal pulsing measurements indicate that the polarization in this material is highly non-uniform. The piezo/pyroelectric response of this non-uniformly poled copolymer consists of two parts: a rapid response that is the result of changes in internal polarization, and a delayed response due to reversible motion of real charge through the bulk of the material. .This model explains previously reported observations of the independence of pyroelectric response over a wide range of poling conditions. Author (GRA)

N82-14366# Syracuse Univ., N. Y. Dept. of Electrical and Computer Engineering.

POLYMERIC MICROELECTRONICS Annual Technical Report, May 1980 - May 1981

Stephen T. Kowel, Edward Balizer, T. T. Su, I. H. Loh, Dennis Cleverly, George C. Martin, and Philipp G. Kornreich 1 Jun. 1981 235 p refs
(Contract DAAK70-80-C-0053; DA Proj. 1L1-62709-DH-95)
(AD-A105707; TR-81-6) Avail: NTIS HC A11/MF A01 CSCL 11/9

Our basic goal has been to evaluate the suitability of polymer systems for use in adaptive optics. Structures such as the electrostatically controlled mirrors and lenses described in this report require the mating of materials relatively new to electronics applications with microfabrication technology. Microprocessor technology will be essential in electronically calibrating structures with little inherent optical quality. The resultant devices should be small, inexpensive, and should require low power and voltages since no mechanical motion is employed. In the case of deformable mirrors, analysis indicates that elastomer microstructures should be capable of larger deformations than conventional adaptive optical components. Microfabrication creates structures with large area-to-volume ratios. Thus electrostatic forces can overcome inertial forces. We have verified that such materials can be spread in thin sheets and formed into islands smaller than 20 micrometers on a side. The techniques developed depend on using elastomers which can serve as resist. Exposed to ultraviolet light through a mask, they are chemically altered and the unwanted portions can then be washed away. We have also demonstrated that conductive and reflective metal electrodes can be deposited using low temperature conditions. The thin films created should not stiffen the polymer appreciably. Indium is the best material for use in these structures. GRA

N82-14367# Mason and Hanger-Silas Mason Co., Inc., Amarillo, Tex.

EVALUATION OF CLEANING PROCEDURES AND BONDING MATERIALS FOR TPX PLASTIC

G. L. Flowers and J. L. Montague Sep. 1981 9 p
(Contract DE-AC04-76DP-00487)
(DE82-000048; MHSMP-81-40) Avail: NTIS HC A02/MF A01

TPX plastic parts currently undergo a chromium trioxide acid etch and polyolefin primer application prior to being bonded to LX-17 explosive parts with Exlostik 473. This study evaluates Explostik 473 (epoxy), APC 2.5 (Silicone) and Hexcel Uralite 3121 S (urethane) adhesive several surface treatment. These surface treatments include acid etch; acid etch and polyolefine primer; polyolefin primer; oxygen plasma clean; oxygen plasma clean and polyolefin primer. Results indicate that oxygen plasma cleaning is the best surface treatment. Plasma treatment times as short as 2.5 min do an adequate job. Plasma-treated parts remain clean and bondable for at least 16 days after treatment.
GRA

N82-14368# Purdue Univ., Lafayette, Ind.

MECHANISMS OF ELEVATED-TEMPERATURE IN SINGLE PHASE CERAMICS Progress Report, 1 Feb. 1981 - 31 Jan. 1982

A. A. Solomon Sep. 1981 87 p refs
(Contract DE-AC02-80ER-10591)
(DE82-000691; DOE/ER-10591/2) Avail: NTIS HC A05/MF A01

The quadrupole mass spectrometer system was completed, calibrated, tested, and used to analyze swelling and rupture transients in nickel and UO2. An automatic data acquisition system was also designed and built to feed all temperature, pressure, displacement and released gas signals directly to the PDP-11 computer for data reduction and tabulation. Swelling and gas release studies were completed on Ni and initiated on UO2. A method was developed to fabricate tensile creep specimens of CoO and UO2 using slip-casting and isostatic compaction. The assembly and testing of the thoriated tungsten constant-true-stress creep machine was also completed for testing appropriately shaped specimens. Sintering studies carried out on UO2 in the thoriated tungsten pressure vessel at high ambient pressure indicated that sinterng was impeded in the tungsten vessel. Finally, a system was designed and built to test ceramics under relatively high oxygen pressre. Tensile creep specimens of CoO were produced by oxidation. Tensile creep deformation was performed on two CoO specimens. The results indicate superplastic strains in a porous ceramic under tensile loading. DOE

N82-14369# Prins Maurits Lab. TNO, Rijswijk (Netherlands). Inst. for Chemical and Technological Research.

POROUS POLYMERS AS NEW SORPTIVE MATERIALS

J. Medema and J. J. G. M. vanBokhoven Oct. 1980 18 p refs
(PML-1980-77; TDCK-75001) Avail: NTIS HC A02/MF A01

Porous polymers are compared with active carbon for the adsorption of harmful compounds from the atmosphere. Factors determining the character of porous polymers are discussed, and results regarding adsorption capacity is described. Literature data and adsorption tests were used. The main factors which characterize the polymer are solvent type and degree of crosslinking. Active groups do not influence the physical adsorption capapcity very much. Water vapor adsorption on porous polymers is extremly low. The rate of adsorption on a good porous polymer is considerably lower than the rate of adsorption into active carbon. Author (ESA)

N82-14370# Environmental Protection Polymers, Inc., Hawthorne, Calif.
SECURING CONTAINERIZED HAZARDOUS WASTES WITH WELDED POLYETHYLENE ENCAPSULATES Final Report
H. R. Lubowitz, R. W. Telles, S. L. Unger, and R.-R. Phillips Jul. 1981 90 p refs
(Contracts EPA-68-03-2483; EPA-68-03-2993)
(PB81-231292; EPA-600/2-81-139) Avail: NTIS HC A05/MF A01 CSCL 11I

Full scale encapsulation of 208 liter (55 gal) drums was studied as a means of managing corroding containers of hazardous wastes in the field and rendering them suitable for transport and safe deposit within a final disposal site such as a landfill Polyethylene (PE) receivers with 6.35 mm (1/2 in) thick walls and wider mouths were employed for fabricating encapsulates. After insertion of drums, the receivers were weld sealed with 6.35 mm (1/2 in) sheet PE. A light weight prototype apparatus was designed and transportable contructed to fabricate the PE encapsulate by welding. Precision alignment of pieces and high regularity of surfaces to be joined were found to be unnecessary. Furthermore, only minimal mechanical pressures were needed to form the welded joints. Results indicated plastics welding to be an effective method for encapsulating corroding drums of hazardous wastes. DOE

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-14371*# United Technologies Research Center, East Hartford, Conn.
EXTERNAL FUEL VAPORIZATION STUDY Final Report
E. J. Szetela and J. A. TeVelde Nov. 1981 92 p refs
(NASA-CR-165513; UTRC-81-915326-15) HC A05/MF A01 CSCL 21D

The feasibility of external fuel vaporization in advanced aircraft gas turbine engines is addressed. Experiments were run to determine key fuel properties including boiling points, dew points, critical temperature, critical pressure, heat transfer coefficients, deposit formation rates, and deposit removal in a flowing system. Of particular concern were the heat transfer rate in the heat exchanger and the performance of the orifice used in the throttling process. Three fuels were utilized in the experiments including Jet-A, Experimental referee broad specification fuel, and a premium No. 2 diesel fuel. Engine conditions representing the NASA Energy Efficient Engine at sea level takeoff, cruise, and idle were simulated in the vaporization system and it was found that single phase flow was maintained in the heat exchanger and downstream of the throttle. Deposits encountered in the heat exchanger represented a thermal resistance as high as .0013 sq M K/watt and a deposit formation rate as high as 800 micro-gC/sq cm hr. These values are equivalent to a buildup of 0.055 cm of thickness in 36 hours resulting in a more severe fouling condition than originally anticipated. It was found that the deposit can be removed by cleaning with air at a temperature of 720 K for 10 minutes. R.J.F.

N82-14372# Farallones Inst. Rural Center, Occidental, Calif.
THE PC/ECUADOR BIOGAS PROGRAM: CONSIDERATIONS FOR FUTURE DEVELOPMENT
Paul R. Warpeha 28 Jun. 1980 25 p Sponsored in part by ACTION/Peace Corps.
(PB81-234783) Avail: NTIS HC A02/MF A01 CSCL 21D

The production of methane fuel and fertilizer through the process of controlled anaerobic decomposition on a decentralized community level technology for rural development is considered. The research, development, and demonstration of biogas technology conducted by the Peace Corps in Ecuador for the past six years is presented. GRA

N82-14373# Ballistic Research Labs., Aberdeen Proving Ground, Md.
EROSIVITY OF LOVA PROPELLANTS
J. R. Ward, T. L. Brosseau, R. P. Kaste, I. C. Stobie, and B. Bensinger Sep. 1981 30 p refs
(DA Proj. 1L1-62618-AH-80)
(AD-A106081; ARBRL-TR-02368) Avail: NTIS HC A03/MF A01 CSCL 19/1

The erosivity of a series of LOVA propellants was evaluated with the BRL 37-mm blowout gun and with heat input measured in a 105-mm M68 tank cannon. The results in the 37-mm blowout gun suggested that three of the eight propellants were as erosive as M30. Subsequent review of the closed bomb data used to calculate charge weights indicated that it is likely the extraordinary erosivity of these three propellants was caused by overestimating the propellant needed to match peak pressure of M30. Author (GRA)

N82-14374# Department of Energy, Laramie, Wyo. Energy Technology Center.
SIXTH UNDERGROUND COAL-CONVERSION SYMPOSIUM
1980 619 p refs Symp. held in Shangri-la, Okla., 13-17 Jul. 1980 Prepared in cooperation with Williams Bros. Engineering Co., Tulsa, Okla.
(DE81-027669; CONF-800716) Avail: NTIS HC A99/MF A01

Department of Energy underground coal gasification (UCG) field programs at different sites are reviewed. Private sector industrial activity in UCG is reported. Mathematical modeling for UCG processes is discussed. Laboratory studies concerning UCG are presented. Environmental studies concerning specific UCG sites are examined. The economics of UCG are addressed. Instruments and controls are considered. General topics relevant to UCG are included. DOE

N82-14375# Lincoln Land Community Coll., Springfield, Ill.
ALCOHOL FUELS GRANT PROGRAM AT LINCOLN LAND COMMUNITY COLLEGE, SPRINGFIELD, ILLINOIS Final Report
1981 14 p
(Contract DE-FG02-80IR-1855)
(DE82-000744; DOE/IR-10855/T1) Avail: NTIS HC A02/MF A01

Progress in the development of alcohol fuels is reported. A tristar still was produced during demonstrations and workshops. Two cars were converted to run on the fuel produced from the still. Preliminary trials of a converted tractor using ethanol and water are reported. Information on the curriculum developed as part of this program is presented. DOE

N82-14376# Dvorak Farms, Inc., Whitelaw, Wisc.
TECHNICAL AND ECONOMIC FEASIBILITY STUDY FOR A 1,500,000 GALLON PER YEAR ANHYDROUS ETHANOL MANUFACTURING PLANT
Mar. 1981 170 p refs Prepared jointly with Foth & Van Dyke and Assoc., Inc.
(Contract DE-FG01-80RA-50391)
(DE82-000286; DOE/RA-50391/T1) Avail: NTIS HC A08/MF A01

The objective of this study was to determine whether the most appropriate available technology; present and foreseeable resource, market, finance, and economic conditions in the northeastern Wisconsin area may be combined under the proposed management structure to produce ethanol from biomass with favorable economic and energy related results. The method by which this study was completed was to conduct and document a professional review of each of the above mentioned conditions and factors. Each factor was analyzed at a level of detail sufficient enough to allow a decision to be made relative to eventual plant construction. The original intent of the study was to assess the construction and operation of a plant producing between 1,000,000 and 3,000,000 gallons of ethanol per year. Based on an initial assessment of feedstock availability and market and capital requirements, the plant size to be used in this feasibility study was set at 1.5 million gallons per year. One of the first steps in the study was to complete an assessment of the amount of waste biomass feedstock available in the study area. Based on this assessment it was determined that approximately 45,000 tons of waste biomass would be available to the plant at the cost of transportation. Subsequent laboratory analyses indicated, though, that the expected ethanol yield from this waste resource would be approximately five gallons per ton or 225,000 gallons per year, which is about 15% of the total annual capacity of the proposed plant. Therefore it was necessary to direct the feasibility study toward a basic plant using corn as a primary feedstock, and waste biomass as a secondary feedstock. GRA

N82-14377# Andco Environmental Processes, Inc., Buffalo, N.Y.
FEASIBILITY STUDY FOR AN ALCOHOL-FUELS PLANT FOR BUFFALO, NEW YORK
Nov. 1980 369 p refs
(Contract DE-FG01-80RA-50357)
(DE82-000032; DOE/RA-50357/T1) Avail: NTIS HC A16/MF A01

A feasibility study was conducted of a 15,000,000 gal per year anhydrous ethanol plant to be located in the Buffalo area. All major aspects of the construction and operation of the plant were investigated. It is concluded that: (1) the volatile energy situation presents too much of a risk for bankers and investors unless the Department of Energy guarantees that they will purchase any alcohol not sold on the open market at a guaranteed price formula; (2) the complete plant design was prepared and it appears that there is very little technological risk in the process; (3) a suitable plant site is available with all necessary utilities and the plant equipment has been laid out for this site; (4) the plant easily complies with environmental, health, safety and socioeconomic requirements; (5) raw materials consisting of corn and coal are readily available in adequate quantity and at reasonable prices in the Buffalo area; (6) the distillers dried grains and the carbon dioxide can both be sold in their entirety at reasonable prices; and (7) capital cost and operating cost are such that the alcohol plant makes an attractive investment with reasonable payout and profit potential. DOE

N82-14378# Oak Ridge National Lab., Tenn.
NEUTRON PRODUCTION BY PROTONS (190 TO 268 MeV) IN A WATER-COOLED TANTALUM TARGET
R. G. Alsmiller, Jr., J. Barish, J. M. Barnes, and R. T. Santoro Sep. 1981 17 p refs
(Contract W-7405-eng-26)
(DE81-030628; ORNL/TM-7949) Avail: NTIS HC A02/MF A01

The number of neutrons produced in a water cooled tantalum target, the neutron production spectra, and energy deposition are calculated as a function depth. Protons in the energy range 190 to 268 MeV are incident on the target. DOE

N82-14379# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
COAL-OIL MIXTURES: AN ALTERNATIVE FUEL FOR THE COMMERCIAL MARKETS AND LARGE RESIDENTIAL MARKETS
Thomas A. Butcher and Robert J. Isler 1981 29 p refs Presented at the Intern. Conf. on Residential Solid Fuels, Portland, Oreg., 1 Jun. 1981
(Contract DE-AC02-76CH-00016)
(DE81-028335; BNL-29773; CONF-810674-2) Avail: NTIS HC A03/MF A01

Results are presented of a program aimed at promoting wide-spread use of coal-oil mixtures in large residential and commercial sector size oil-fired heating equipment. Fuel properties are discussed including viscosity, heating values, and effect of coal particle size. On-site mixing of COM is not considered practical for users in this size range and a number of central preparation plant projects are in progress. Options for on-site storage including the addition of paddle agitators, recirculation agitation systems, auxiliary tanks, and stable slurries are discussed. Fuel pump, controls, and atomizer modifications will be required as well. Special problems of sootblowers, cyclones, baghouses, and scrubbers are considered. DOE

N82-14380# Kerr-McGee Corp., Oklahoma City.
PROCESS DEVELOPMENT FOR IMPROVED SRC OPTIONS. KERR-MCGEE CRITICAL SOLVENT DEASHING AND FRACTIONATION STUDIES Final Report
R. A. Baldwin, R. E. Davis, L. D. Gillham, R. C. Janka, R. E. Leonard, and D. E. Rhodes Jul. 1981 108 p refs Sponsored by EPRI
(EPRI Proj. 1134-2)
(DE81-903785; EPRI-AP-1932) Avail: NTIS HC A06/MF A01

The solvent refined coal 1/2 process, a coal liquefaction process which includes Kerr-McGee critical solvent deashing (CSD), was demonstrated in a blocked-out fashion in continuous bench-scale units. It was demonstrated that conventional SRC-I as well as short-residence-time vacuum bottoms could be successfully deashed and fractionated and that the fractionated portion of the soluble coal product, light SRC, could be added to the liquefaction solvent to improve its quality. An amount of light SRC equivalent to that which was initially added to the liquefaction solvent was recovered in the CSD process in most cases to maintain light SRC recycle. It was found that soluble coal product recovery was inversely proportional to the first-stage CSD temperature and that the fractionation step was sensitive to deashing solvent to feed ratio. The SRC-1/2 process was not, however, fully integrated and therefore these results are not necessarily indicative of steady-state conditions. DOE

N82-14381# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
POTENTIAL SUPPLY OF SYNTHETIC FUELS FROM ALASKAN HYDROELECTRIC POWER AND COAL
Meyer Steinberg and James R. Powell 1981 15 p refs Presented at the IGRC 1981 Conf., Chicago, 28 Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025743; BNL-29764; CONF-810933-1) Avail: NTIS HC A02/MF A01

It is proposed to develop and utilize the large potential hydroelectric power resources in Alaska to produce hydrogen by the electrolytic decomposition of water and to combine the hydrogen with the large Alaskan coal reserves to produce synthetic liquid and gaseous fuels. It is estimated that in this manner, as much as 1.8 million bbls/day of gasoline or 6.2 billion SCF/day of substitute natural gas can be produced. The existing and projected Alaskan pipelines would provide the means of transporting the fuels to energy consuming load centers in the U.S. This development would move the US a considerable way towards energy independence as well as employing the material resources in Alaska in an efficient manner. DOE

N82-14382# Brookhaven National Lab., Upton, N. Y.
DEVELOPMENT OF A METAL HYDRIDE PROCESS FOR HYDROGEN RECOVERY FROM SUPPLEMENTED NATURAL GAS
F. Reidinger and F. B. Hill 1981 6 p refs Presented at the 2nd World Congr. of Chem. Engr., Montreal, Canada, 4 Oct. 1981
(Contract DE-AC02-76CH-00016)
(DE81-022685; BNL-29461; CONF-811007-4) Avail: NTIS HC A02/MF A01

A metal hydride hydrogen recovery process which has commercially attanable pretreatment requirements, a thermal reactivation procedure with temperatures not exceeding 500 C with reactivation rquired at intervals of 100 absorption desorption cycles, and an alloy lifetime of the order of 70,000 cycles is described. Mercaptan-alloy interactions are considered. The interaction of CO with the alloy in the presence of hydrogen appears quite complicated. The present work indicates that CO 2 concentrations up to 500 ppM may have negligible effect on the rate of hydrogen absorption after an initial exposure to CO2 and hydrogen. If a slower hydrogen sorption rate can be tolerated then higher CO2 levels may be acceptable. DOE

N82-14383# Battelle Pacific Northwest Labs., Richland, Wash.
BIOMASS ENERGY UTILIZATION IN THE PACIFIC NORTHWEST: IMPACTS ASSOCIATED WITH RESIDENTIAL USE OF SOLID FUELS
P. Petty, W. Hopp, and A. Chockie May 1981 23 p refs Presented at the 1981 Intern. Conf. on Residential Solid Fuels,

Portland, Oreg., 1 Jun. 1981
(Contract DE-AC06-76RL-01830)
(DE81-029137; PNL-SA-9618; CONF-810674-3) Avail: NTIS HC A02/MF A01

The Pacific Northwest Region, including Washington, Oregon, and Idaho, is the geographic area for which an impact assessment of the residential use of solid fuels is performed. An estimate of the potential energy contained in the fuelwood burned annually and an estimate of the mean conversion efficiency of the regional capital stock of woodburning appliances leads to a reasoned assessment of the contribution of wood energy to the residenital energy use in the region. The use of solid fuels was associated with an increase in the incidence of residential fires nationally. An estimate is made of the economic costs attributable to this source of fire incidence. An additional area of concern relates to the harvesting practices of hundreds of individuals, cutting fuelwood for their own use. Statistics describing injuries and death per Btu in the commercial logging industry are used as a basis for an estimate of injuries and deaths resulting from the increased collection of forest residues and fuelwood by private woodcutters. DOE

N82-14384# New Hampshire Univ., Durham. Dept. of Chemical Engineering.
FUELS AND CHEMICALS MADE FROM SOLAR ENERGY
V. K. Mathur, F. K. Manasse, and S. Lakshmanan 1981 10 p refs Presented at the 2nd World Congr. of Chem. Engr., Montreal, Canada, 4-9 Oct. 1981
(Contract DE-AC02-79ET-21067)
(DE81-025018; CONF-811007-6) Avail: NTIS HC A02/MF A01

The application of high temperature solar energy for the production of fuels and chemicals from various feed stocks is reviewed. The promises and problems of this technology are highlighted. The two-stage Sun gas process is described. The role of chemical engineers and the future of Sun fuels and chemicals are discussed. DOE

N82-14385# Punjab Agriculture Univ., Ludhiana (India). Coll. of Agricultural Engineering.
ENERGY BALANCE AND UTILIZATION OF AGRICULTURAL WASTE ON A FARM Final Report
B. S. Pathak, A. P. Bhatnagar, Dalijit Singh, and K. S. Salariya 1980 90 p refs Sponsored in part by Tata Energy Research Inst.
(PB81-229262) Avail: NTIS HC A05/MF A01 CSCL 21D

The possibility of using crop residues and other agricultural works as a renewable energy source is investigated. Some conclusions drawn are: energy requirements of tractor operated farms are only marginally higher than bullock operated farms; the use of commercial fuels for cooking in rural areas is very limited; most crop residues except paddy straw is used for fodder or fuel; farmers use dung as fuels although they know its use as a fertilizer; all energy required by farms could be self-generated; and paddy straw should be burned to produce electricity. GRA

N82-14386# Punjab Agriculture Univ., Ludhiana (India). Coll. of Agricultural Engineering.
STUDIES ON SUGARCANE AS AN ENERGY CROP FOR PUNJAB Final Report
B. S. Pathak, A. P. Bhatnagar, Dalijit Singh, and K. S. Salariya 1980 25 p refs Sponsored in part by Tata Energy Research Inst.
(PB81-232308) Avail: NTIS HC A02/MF A01 CSCL 21D

The energy costs and returns in the production of sugar cane and its conversion to alcohol, based on data collected from a sugar mill and a brewery, are presented. Author (GRA)

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-14387 DSM/nv Nederlandse Staatsmijnen, Geleen. Centraal Lab.
DESIGN OF A CONTROL SYSTEM FOR THE OPTIMUM HEATING OF BATCH REACTORS [ENTWURF EINES REGELSYSTEMS ZUM ANFAHREN VON BATCH-REAKTOREN]
H. Slangen 28 Nov. 1978 40 p In GERMAN
(MS-1296) Avail: Issuing Activity

A nonlinear and unstable reaction system can be represented as a model of third order, and of fifth order if the reaction conversion degree and the time constant of the temperature measurement are included as variables of state. Standard systems are not optimum, but saving of time with optimum control systems is negligible. However, they allow lower conversion during the heating phase, enabling a better product quality. The most important source of error in practice is the changing time contant of the temperature measurement. The optimum system is bang-bang control, with two control points the location of which is calculated with the help of algebraic exponential system equations, if all variables of state and parameters are known. Author (ESA)

N82-14388# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BI-MONTHLY BULLETIN NO. 1981-2, MARCH - APRIL 1981
Claude Sevestre, ed. Sep. 1981 77 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981
(ESA-TT-713) Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

Research in aerodynamics is reported, including: thermal fatigue tests; cryogenic wind tunnels; plate buckling; subsonic flow; thin film transducers for temperature and heat flux measurements; and laser pumping by electron beam discharge. For individual titles, see N82-14389 through N82-14394.

N82-14389# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
KrF LASER PUMPING BY ELECTRON BEAM DISCHARGE c36
Jean Bonnet, Gerard Fournier, and Daniel Pigache *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 3-7 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

The pumping of excimer lasers used in nuclear fusion and isotope separation is considered. Homogeneous ionization with an electron beam permitted discharge pumping of a KrF laser with a discharge-energy/beam-energy ratio > 5. This high value is obtained to the detriment of an energy density and an efficiency which are about half the best values obtained under other conditions. This result does not modify a recent conclusion indicating that an electron beam controlled discharge has no significant advantage over a pure electron beam as regards pumping high energy KrF lasers at high repetition rate. Author (ESA)

N82-14390# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
THIN FILM TRANSDUCERS FOR TEMPERATURE AND HEAT FLUX MEASUREMENTS c35
Jean-Claude Godefroy *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 9-19 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

Surface thermometers and fluxmeters in the form of thin films that can be installed without requiring any machining, and which are thin enough not to perturb the flow, are studied as a means for assessing heat exchange particularly in turbomachinery. Thermocouple transducers made of thin layers deposited on a flexible substrate (Kapton) are considered for measurements of low temperatures, in fluctuating mode, and in liquids. At present, technology limits their use to temperatures below 200 C, so for temperatures found on turbine blades, further development is needed. Spatial analysis of heat exchanges is possible, since the same substrate can receive several transducers. They can be used in cryogenic wind tunnels, or for investigating the local nature of a boundary layer. Author (ESA)

N82-14391# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

DESCRIPTION AND NUMERICAL SIMULATION OF THERMAL FATIGUE TESTS ON SMOOTH SPECIMENS c39

Georges Cailletaud, Jean-Pierre Culie, and Henri Kaczmarek *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 21-33 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

A three bar type thermal fatigue system is described which uses classical tensile-compressive test specimens, but no servohydraulic device and allows stress and strain measurements in the critical zone throughout the lifetime. A nickel based turbine blade alloy was tested at high temperature in order to evaluate, under nonisothermal conditions, behavior and rupture modeling established from simple tests. The analysis is shown together with the elements required for simulation by numerical calculations. Good general agreement between the tests and the calculation results confirms the reliability of the experimental system and the validity of the theoretical models. Author (ESA)

N82-14392# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

HOMOGENIZATION METHOD FOR REINFORCED PLATE BUCKLING PREDICTION c39

Pierre Suquet *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 35-43 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

The buckling of reinforced plates, or of bars, with periodic heterogeneties is considered. A theory for a typical plate is developed which defines membrane and flexural deformation. The problem decomposes into a linear problem and a nonlinear one where the only unknown is the flexural displacement. For the postbuckling nonlinear analysis, the bifurcation branch of a homogeneous plate is shown to be a good approximation of the bifurcation branch of a reinforced plate, for a simple critical value. The homogenization method gives satisfactory results when limited to global phenomena, e.g., first buckling modes. Author (ESA)

N82-14393# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

SUBSONIC FLOW IN A CORNER c34

Daniel Arnal and Jean Cousteix *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 45-62 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

Laminar and turbulent flow, as found e.g., at the wing-fuselage junction, were studied numerically. In laminar flow a vortical system close to the edge disturbs calculations. Modifications to the field of the secondary velocity improve this. Further improvement can be achieved by varying vortex parameters. In the turbulent mode, the anisotropy of the turbulence should be considered in the calculation of the second order vortices, (although here it was ignored, and qualitatively correct results are still obtained). The basic equations are the streamwise momentum equation, the streamwise component of the vorticity equation, and two Poisson-type equations for secondary velocities. Author (ESA)

N82-14394# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

RESEARCH ON AN INDUCTION DRIVEN CRYOGENIC WIND TUNNEL c09

Alain Blanchard, Jean-Bernard Dor, Andre Mignosi, and Jean-Francois Breil *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 63-77 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

The cryogenitization of an induction driven transonic wind tunnel is discussed. Internal insulation and the design of a liquid nitrogen injection system are considered. A unit of 32 injectors is arranged at the periphery of the first diffuser in two rows. Each injector is controlled by a solenoid valve. Several elements can be brought together at the control point to form a 10 bit digital regulation unit. The nitrogen pulses are kept symmetrical by varying the response time of the solenoid valves. This induction system works well, since the increase in nozzle performance compensates increase of flow in the test section due to the drop in temperature. It should be suitable with nitrogen gas. Composite and homogeneous insulating materials were repeatedly plunged into liquid nitrogen. All reveal defects when exposed to stress induced by differences in the expansion between their internal and external faces. Internal surfaces must be reinforced with polyurethane. Author (ESA)

N82-14395# Textron, Inc., Springfield, Vt.

ULTRA-HIGH SURFACE SPEED FOR METAL REMOVAL, ARTILLERY SHELL

Richard F. Pugh, Michael R. Walsh, and Raymond F. Pohl (Army Armament Research and Development Command, Dover, N. J.) Dover, N.J. Army Armament Research and Development Command Jul. 1981 310 p
(Contract DAAK10-80-C-0029)
(AD-A103970; ARLCD-CR-81019) Avail: NTIS HC A14/MF A01 CSCL 13/9

Four types of steel (AISI 1340, 4140, 4340, and HF-1) which are commonly used in large caliber projectile manufacture were machined with five types of tools at different hardness ranges representing the as-forged and the heat-treated condition. Results show that machining speeds can be increased significantly over current practice using the present available tooling. Author

N82-14396# Honeywell, Inc., New Hope, Minn. Ceramics Center.

MANUFACTURING METHODS AND TECHNOLOGY FOR PRODUCTION HOT FORGING OF ALKALI HALIDE LENSES Semiannual Progress Reports, 7 Apr. 1980 - 7 Apr. 1981

William B. Harrison and James D. Weigner 30 Jun. 1981 47 p
(Contract DAAK70-79-C-0138)
(AD-A104643; Rept-47822; SAR-2; SAR-3) Avail: NTIS HC A03/MF A01 CSCL 13/8

The hot-forged-to-shape process was adapted and optimized for the 2 by 3 series/parallel operation. Several of the optimization steps led to major cost reductions and process simplifications, as well as an increase in the potential production volume. Optical testing equipment is under investigation as a means of evaluating the finished lenses in a production environment. The automation of the process is almost complete and will allow for much finer control of the forging process. Author

N82-14397# California Inst. of Tech., Pasadena. Graduate Aeronautical Labs.

DETERMINATION OF AIRLOADS ON CERTAIN AIRPORT TOWERS DUE TO ADDITION OF RADOMES Final Report, Jan. 1979 - Dec. 1980

Charles D. Babcock and William H. Bettes Aug. 1981 135 p
(Contract DOT-TSC-1633)
(AD-A105854; GALCIT-1020; FAA-RD-81-74; TSC-FAA-81-14) Avail: NTIS HC A07/MF A01 CSCL 17/9

This report presents the results of wind tunnel tests conducted on three different radome configurations mounted atop three different airport tower designs. The wind tunnel tests were conducted on 1/12th scale models. Field tests were conducted on one full-scale radome and tower configuration and the data compared with the wind tunnel data. The data are useful for comparing the airloads transmitted into an airport-tower roof by the various radomes and for evaluating the effects tower geometry can have on these airloads. Author (GRA)

N82-14398# Ministry of Housing, Ottawa (Ontario). Project Planning Branch.
RESIDENTIAL SITE DESIGN AND ENERGY CONSERVATION. PART 1: GENERAL REPORT
Jan. 1981 158 p
(DE81-904010; NP-1904010-Pt-1; ISBN-0-7743-6072-0)
Avail: NTIS HC A08/MF A01

The energy costs that can be saved by a subdivision design format related to energy conservation that is reasonably acceptable in marketing and aesthetic terms were determined. Six subdivision layouts were designed to densities ranging from 6.5 to 13.6 units per gross acre (1058 to 2232 units) or 16.25 to 34 units per gross hectare. Hourly radiation temperature, and wind characteristics for a year constitute the local climate data base. Six house types (from detached to apartment units) and seventeen basic house designs (mostly picked at random) were used. The method for calculating the set heat load and an analysis of the results are presented. The study shows that by way of the selection of the more energy efficient traditional house designs, orientation of buildings to maximize solar transmission, and landscaping to reduce the effect of wind, there is a possible residential space heating energy saving of up to 20% for a low density housing development. T.M.

N82-14399# Naval Sea Command Detachment, Norfolk, Va.
TEST AND EVALUATION OF THE BELL-HALTER 110-FOOT SURFACE EFFECT SHIP DEMONSTRATION CRAFT Final Report, Feb. - Mar. 1980
Peter K. Spangler Feb. 1981 211 p refs Sponsored by DOT and Urban Mass Transportation Administration
(Contract MIPR-Z-70099-0-019283-A)
(AD-A099000; USCG-D-13-81) Avail: NTIS HC A10/MF A01 CSCL 13/10

Comparative seaworthiness and towing tests were performed with an 82-foot USCG WPB. Other major test categories yielded speed, range, fuel consumption, directional stability, turning, acceleration, and noise characteristics. Limited maintainability and reliability information was compiled and manning and human factors considerations were studied. The SES craft was operated in sea state 2 at speeds of 29 knots with significant vertical acceleration peaks in the passenger compartment of 0.6 g and in sea state 4 at 26 knots with peaks of 0.5 g. Maximum vertical acceleration peaks under these conditions were 0.9 and 1.5 g's, respectively. The SES craft towed the 82-foot USCG WPB at speeds to 11 knots. The maximum measured calm water speed of the SES was 33 knots at a displacement of 121 long tons and a fuel consumption of 6.9 gallons per nautical mile yielding a top speed maximum range of 672 nautical miles. Turning performance and directional control were maintained during simulated combinations of propulsion and lift engine impairment. Author

N82-14400# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
CYCLE DESIGN FOR A CRYOGENIC REFRIGERATION SYSTEM FOR FED WITH FORCED-FLOW SUPERFLUID HELIUM THROUGH INTERNALLY COOLED CONDUCTORS
Joel H. Schultz 1981 19 p refs
(Contract DE-AC02-78ET-51013)
(DE82-000446; DOE/ET-51013/23; PFC/RR-81-29) Avail: NTIS HC A02/MF A01

The system was designed for the specifications of the magnet system of the fusion engineering device (FED). The unusual specification of an internally cooled cabled niobium titanium superconductor at a maximum field of 10 tesla, coupled with high ac losses and high neutron and gamma heating in the toroidal field coils led to the selection of a cooling system with superfluid helium at the inlet to the toroidal field coils. While highly unusual as a coil-cooling concept, the implications for the refrigeration system were not unfavorable and showed several features of interest. Among the favorable comparisons with conventional supercritical flow systems was reduced entropy generation in the coil due to pressure drops. DOE

N82-14401# Oak Ridge National Lab., Tenn.
TEST OF A CRYOGENIC HELIUM PUMP
J. W. Lue, J. R. Miller, P. L. Walstrom, and W. Herz (Kernforschungszentrum, Karlsruhe, West Germany) 1981 7 p refs Presented at the 1981 Cryogenic Eng. Conf., San Diego, Calif., 10 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028629; CONF-810835-6) Avail: NTIS HC A02/MF A01

The design of a cryogenic helium pump for circulating liquid helium in a magnet and the design of a test loop for measuring the pump performance in terms of mass flow vs pump head at various pump speeds are described. A commercial cryogenic helium pump was tested successfully. Despite flaws in the demountable connections, the piston pump itself has performed satisfactorily. A helium pump of this type is suitable for the use of flowing supercritical helium through internally cooled superconductor magnets. It has pumped supercritical helium up to 7.5 atm with a pump head up to 2.8 atm. The maximum mass flow rate obtained was about 16 g/s. Performance of the pump was degraded at lower pumping speeds. DOE

N82-14402# Zeiss (Carl), Oberkochen (West Germany).
DEVELOPMENT OF NEW PRODUCTION TECHNOLOGIES FOR OPTICAL COMPONENTS WITH SPHERICAL SURFACES Final Report
Hans-Joachim Juranek Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 68 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-032; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,30

Spherical surfaces for precision optical components were produced by a two-step method instead of the three-step method. The two-step method is known in ophthalmic optics, but did not succeed in precision optics because of the lack of fast high precision grinding machines. Such a machine was built, using special spindles and numerical control. A computer controlled high precision centering and edging machine was built in order to enhance productivity and accuracy and to enable optical shops to produce even complicated lens shapes in an economical way. Author (ESA)

N82-14403# Fritz-Haber-Institut, Max-Planck-Gesellschaft, Berlin-Dahlem (West Germany).
HELIUM 2 COOLING SYSTEMS FOR LONG TERM MISSIONS IN SPACE: PHASE SEPARATION AND HYBRID COOLING SYSTEMS [HELIUM-2-KUEHLSYSTEME MIT LANGEN STANDZEITEN FUER WELTRAUMANWENDUNGEN: PHASENTRENNUNG, HYBRID-KUEHLSYSTEME]
G. Klipping, I. Klipping, and Schmidtchen 10 Sep. 1980 50 p refs In GERMAN Report will also be announced as translation (ESA-TT-721)
Avail: NTIS HC A03/MF A01

The suitability of helium 2 (superfluid helium) phase separation and hybrid cooling systems for astronomical and aeronomical observations in space, e.g., infrared radiation, was studied. The different aspects of phase separation under conditions of weightlessness are treated and the active phase separator for a liquid helium cooled infrared observatory for Spacelab, German Infrared Laboratory (GIRL) is described. For long-term (more than one year) applications, a hybrid cooling system is required in which refrigerants boiling at higher temperatures are employed. The suitability of hydrogen and neon were investigated as well as that of a secondary solid refrigerant. Analysis indicates that such a hybrid cooling system, using solid neon, can be realized and has substantial advantages compared with a one-stage He 2 cooling system. Author (ESA)

N82-14404# Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium).
[SCIENTIFIC AND TECHNICAL RESEARCH ACTIVITIES REPORT IN INDUSTRIAL FABRICATION] Annual Report, 1980 [RAPPORT ANNUEL DU COMITE PERMANENT AU CONSEIL GENERAL]
10 Jun. 1981 39 p refs In FRENCH
Avail: NTIS HC A03/MF A01

Activities in heavy construction and industrial research were reviewed. Foundry works, metal industry, and construction are discussed. Fabrication of mechanical and electrical devices as well as industrial automation and data processing are described. The use of plastics is also dealt with. Author (ESA)

N82-14405# Technische Hogeschool, Delft (Netherlands). Lab. for Refrigerating Engineering and Air Conditioning.
SIMULATION OF TRANSIENT BEHAVIOR OF A COMPRESSION-EVAPORATION REFRIGERATION SYSTEM
H. Yasuda, C. H. M. Machielsen, S. Touber, S. W. Brok, and M. deBruijn Mar. 1981 97 p refs
(WTHD-133) Avail: NTIS HC A05/MF A01

A mathematical model was developed, which by timewise integration of the governing equations pertaining to each of the components, permits computer simulation of steady state as well as transient behavior of single stage vapor compression systems, as used in refrigeration, air conditioning, and heat pumps. Qualitative (stable behavior, or not) and quantitative conclusions (amplitudes, frequencies) are obtained. Comparison with experimental results for dynamic behavior validates the model. The computer programs are appended. Author (ESA)

N82-14406# Sinclair (Benito A.) and Associates, Inc., Los Angeles, Calif.
INCREMENTAL ANALYSIS OF STRUCTURAL CONSTRUCTION COSTS Final Report
Apr. 1981 58 p refs
(Contract DTFH61-80-C-00148)
(PB81-234932; FHWA/PL-81/008) Avail: NTIS HC A04/MF A01 CSCL 13B

The analysis was performed by assuming an existing bridge as a prototype and designing eight hypothetical bridges for decreasing design loads. The design load implements and design standards for the hypothetical bridges were developed to reflect the current traffic and construction patterns. Based on a standardized unit cost for materials developed from the unit costs of the prototypes, cost was then allocated to each hypothetical bridge design and bridge loading. The result was that 65 to 88% of bridge costs were incurred by the lightest design loading. However, when the same loading was analyzed at a narrower width it only occurred 53 to 74% of total bridge costs. The effects of increased strength and width requirements of progressively heavier vehicles are included. T.M.

N82-14407# Approved Engineering Test Labs., Fullerton, Calif.
STAGED COLLISION AND DAMAGE DATA. VOLUME 1: REPORT FOR ACCIDENT RECONSTRUCTION OF THIRTY (30) TEST VEHICLES Final Report, Jan. - Dec. 1980
D. H. Hand Jan. 1981 270 p 2 Vol.
(Contract DOT-HS-6-01477)
(PB81-234072; DOT-HS-805929-Vol-1) Avail: NTIS HC A12/MF A01 CSCL 13L

The test vehicles were impacted tested for compliance with FMVSS 212/219/301-75. As a parallel nonconflicting effort, the test vehicles were instrumented with accelerometers to measure vehicle accelerator resultants. T.M.

N82-14408# Approved Engineering Test Labs., Fullerton, Calif.
STAGED COLLISION AND DAMAGE DATA. VOLUME 2: REPORT FOR ACCIDENT RECONSTRUCTION OF THIRTY (30) TEST VEHICLES Final Report, Jan. - Dec. 1980
Jan. 1981 277 p 2 Vol.
(Contract DOT-HS-6-01477)
(PB81-234080; DOT-HS-805930-Vol-2) Avail: NTIS HC A13/MF A01 CSCL 13L

Test vehicles were instrumented with accelerometers to measure vehicle accelerator resultants. The vehicles were also identified for residual crush and collision deformation classification (CDC) measurements. GRA

N82-14409# Approved Engineering Test Labs., Fullerton, Calif.
OCCUPANT RESPONSE AND VEHICLE ACCELERATION IN A 30 MPH FRONTAL IMPACT TEST, 1981 FORD F150 CUSTOM EXPLORER STYLESIDE, PICKUP, NHTSA 810602 Final Report, Mar. - Apr. 1981
D. H. Hand 10 Jun. 1981 107 p
(Contract DOT-HS-9-02273)
(PB81-231045; DOT-HS-805927; Rept-971-3882-37) Avail: NTIS HC A06/MF A01 CSCL 13L

Various impact modes and vehicle types are investigated through staged collisions. The information collected includes occupant injury measurements as well as seat belt loads, and vehicle acceleration. GRA

N82-14410# Austin Research Engineers, Inc., Tex.
RELATING PAVEMENT DISTRESS TO SERVICEABILITY AND PERFORMANCE Final Report
W. R. Hudson, F. N. Finn, R. D. Pedigo, and F. L. Roberts Feb. 1981 275 p refs
(Contract DOT-FH-11-9393)
(PB81-227852; FHWA/RD-80-098) Avail: NTIS HC A12/MF A01 CSCL 13B

Regression analyses, Markov processes, Bayesian analysis, and utility theory were examined as analytical tools useful in relating distress to performance. Several specific performance models of limited applicability are reported, along with some generally applicable techniques and recommended methods. It is shown that useful relationships can be obtained from existing data and are, in fact, being used in several states and other highway agencies. In each case, however, it is shown that significant improvements in the distress performance relationships are needed which can only be obtained through the conscientious observation of distress and performance of pavements under a variety of environmental and load conditions for a reasonable period of time, e.g., (approximately ten years). T.M.

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-14411# SRI International Corp., Arlington, Va.
FISH RAGU (FISH, RADIO-RECEIVING AND GENERALLY USEFUL)
R. L. Garwin Aug. 1981 19 p refs
(Contract MDA903-78-C-0086)
(AD-A105505; SRI-JSN-81-64) Avail: NTIS HC A02/MF A01 CSCL 17/2

The concept of using a 50kg self-propelled body as a receiver for VLF signals is presented. This fish would operate a few meters below the surface and communicate to submarine via high frequency acoustics. Zinc oxide batteries provide sufficient power for all of the fish operations including a 24 hour endurance at a 4 knot speed. The fish could also be used as a sonar receiver, a sensor of submarine radiated noise, and as a VHF or UHF receiver. Author

N82-14412*# National Aeronautics and Space Administration, Washington, D. C.
POSSIBILITY OF A NEW APPROACH TO PROCESSING SPACE PULSE RADIO SIGNALS
A. A. Bocharov Oct. 1981 20 p refs Transl. into ENGLISH of "O Vozmozhnosti Novogo Podkhoda k Obrabotke Kosmicheskikh Impulsnykh Radiosignalov" Rept. PR-605, 1980 p 1-8 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Inst. of Space Research, Academy of Sciences (USSR), Moscow
(Contract NASw-3541)
(NASA-TM-76748; PR-605) Avail: NTIS HC A02/MF A01 CSCL 17B

A approach to the processing of space pulse radio signals, which makes it possible to achieve a high level of time resolution is proposed. The approach is based on the utilization of the Fourier transform of a radio pulse envelope in the interstellar medium effect. The conditions of applicability of the proposed method and the requirements for recording equipment are substantiated. Also indicated is the possibility of obtaining superresolution with the utilization of the given method of signal processing. Author

N82-14413# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNA (SELECTED ARTICLES)
26 Oct. 1981 54 p refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 p 50-59, 89-105
(AD-A107428; FTD-ID(RS)T-1107-81) Avail: NTIS HC A04/MF A01 CSCL 17/2

Two articles discussing antennas are presented. Synthesis of a plane impedance antenna of finite length, and emission of an elementary slot vibrator located in the center of an ideally conducting disk are discussed. For individual titles, see N82-14414 through N82-14415.

N82-14414# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SYNTHESIS OF A PLANE IMPEDANCE ANTENNA OF FINITE LENGTH
V. V. Chebyshev *In its* Antenna (Selected Articles) (FTD-ID(RS)T-1107-81) 26 Oct. 1981 p 1-20 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 p 50-59, 89-105 (For primary document see N82-14413 05-32)
Avail: NTIS HC A04/MF A01 CSCL 17/2

A method is examined for synthesis of an antenna in the form of an impedance band in a unbounded conducting screen, excited by a filament of magnetic current. An expression is obtained which joins the radiation pattern of a very random type. This pattern is described using odd Mathieu's functions, with a distribution of the surface reactance in the limits of the band. N.W.

N82-14415# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
EMISSION OF AN ELEMENTARY SLOT VIBRATOR LOCATED IN THE CENTER OF AN IDEALLY CONDUCTING DISK
Yu. V. Pimanov and L. G. Braude *In its* Antenna (Selected Articles) (FTD-ID(RS)T-1107-81) 26 Oct. 1981 p 21-50 refs Transl. into ENGLISH from Antenny (USSR), no. 1969 p 50-59, 89-105 (For primary document see N82-14413 05-32)
Avail: NTIS HC A04/MF A01 CSCL 17/2

The emission of an elementary slot vibrator, located in the center of an infinitely thin ideally conducting round disk, was examined. A solution was obtained on the basis of the Fourier method in the form of series with respect to spheroidal functions. Asymptotic expressions for the field arising in the far zone during excitation of an ideally conducting disk were obtained by an elementary slot vibrator (magnetic dipole) located in the center of the disk on the basis of the solution of an integral equation. During solution it was assumed that the radius of the disk is much greater than the wavelength. N.W.

N82-14416# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNA (SELECTED ARTICLES)
15 Oct. 1981 97 p refs Transl. into ENGLISH from Antenny (USSR), no. 13, 1971 p 3-48, 56-70
(FTD-ID(RS)T-0943-81) Avail: NTIS HC A05/MF A01

Five articles on antenna design, synthesis and calculation are presented. Coverage includes: (1) phased annular arrays of interacting radiators, (2) critical wave number and wave resistance of a coaxial line, (3) difference direction patterns of spherical antennas, (4) input resistance of a vibrator with dielectric cover, and (5) H plane stepped joint of rectangular waveguides. For individual titles, see N82-14417 through N82-14421.

N82-14417# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE DESIGN OF PHASED ANNULAR ANTENNA ARRAYS OF INTERACTING RADIATORS, EXCITED BY A BUTLER CIRCUIT
N. P. Polishchuk and D. M. Sazonov *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0943-81) 15 Oct. 1981 p 1-19 refs Transl. into ENGLISH from Antenny (USSR), no. 13, 1971 p 3-48, 56-70 (For primary document see N82-14416 05-32)
Avail: NTIS HC A05/MF A01

An annular antenna array of arbitrary interacting radiators, excited by means of a passive reactive Butler pattern-forming circuit, is discussed. The procedure is given for calculating the phase distribution at the inputs of the pattern-forming circuit, assuring the best root mean square approximation to the direction pattern with maximum efficiency in the given direction. The amplitude distribution is assumed to be uniform. Several numerical examples are given and discussed. N.W.

N82-14418# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE DESIGN OF THE CRITICAL WAVE NUMBER AND WAVE RESISTANCE OF A COAXIAL LINE WITH INTERIOR CONDUCTOR OF CROSS-SHAPED SECTION
G. P. Koshelev, Yu. B. Korchemkin, and S. I. Shanayev *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0943-81) 15 Oct. 1981 p 20-35 refs Transl. into ENGLISH from Antenny (USSR), no. 13, 1971 p 3-48, 56-70 (For primary document see N82-14416 05-32)
Avail: NTIS HC A05/MF A01

The results of a theoretical investigation of a new waveguide with complicated profile of its cross section are reported. Formulas are derived to calculate the critical wave number and wave resistance for various dimensions of the cross section. The results of a numberical calculation for a broad range of cross sectional parameters are given in the form of graphs, convenient for practical use. N.W.

N82-14419# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE SYNTHESIS OF DIFFERENCE DIRECTION PATTERNS OF SPHERICAL ANTENNAS
D. I. Voskresenskiy and A. Yu. Grinev *In* is Antenna (Selected Articles) (FTD-ID(RS)T-0943-81) 15 Oct. 1981 p 36-56 refs Transl. into ENGLISH from Antenny (USSR), no. 13, 1971 p 3-48, 56-70 (For primary document see N82-14416 05-32)
Avail: NTIS HC A05/MF A01

The problem of minimization of the lateral space radiation of difference direction patterns of spherical nonsuperdirectional antennas in the form of an idealized continuous system of diffraction-type radiators, arranged on ideally conducting spherical surface is considered. N.W.

N82-14420# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreignt Technology Div.
THE CALCULATION OF THE INPUT RESISTANCE OF A VIBRATOR WITH DIELECTRIC COVER BY THE METHOD OF INDUCED EMF
Yu. N. Sokolov *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0943-81) 15 Oct. 1981 p 57-67 refs Transl. into ENGLISH from Antenny (USSR), no. 13, 1971 p 3-48, 56-70 (For primary document see N82-14416 05-32)
Avail: NTIS HC A05/MF A01

The radiation of a vibrator with dielectric cover, placed in a semiconducting medium is discussed. The field in the dielectric is analyzed. The complete value of the input resistance under the assumption of a sinusoidal current distribution is found.N.W.

N82-14421# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON THE CALCULATION OF THE H-PLANE STEPPED JOINT OF RECTANGULAR WAVEGUIDES
S. V. Butakova *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0943-81) 15 Oct. 1981 p 68-93 refs Transl. into ENGLISH from Antenny (USSR), no. 13, 1971 p 3-48, 56-70 (For primary document see N82-14416 05-32)
Avail: NTIS HC A05/MF A01

A block diagram of a computer program is considered and numerical results of a calculation by the program for the scattering matrix of a step in a rectangular waveguide are pesented. The balance of active powers of the waveguide structures is shown to be carried out independently of the number of higher types of waves for which an allowance is made in the waveguides between heterogeneities. N.W.

N82-14422# Computer Sciences Corp., Falls Church, Va.
AFCC TECHNICAL REPORT. USE OF SHORT RANGE MODEMS (SRM) Final Report
L. Rousseau, J. Su, and T. H. Weaver, Jr. Scott AFB, Ill. Electronics Engineering Group (1842nd) 1 Sep. 1981 418 p refs
(Contract F23613-77-D-0011)

(AD-A105597; CSC-79-9) Avail: NTIS HC A18/MF A01 CSCL 17/2

Methods for modelling metallic wire transmission paths and means of assessing the estimated performance of modulation/demodulation short range modem designs over these paths are presented.

Author

N82-14423# ITT Avionics, Nutley, N.J.
MODULAR MULTI-FUNCTION MULTI-BAND AIRBORNE RADIO SYSTEM (MFBARS). VOLUME 1: EXECUTIVE SUMMARY Final Technical Report, Mar. 1978 - Jun. 1980
R. A. Reilly, C. W. Ward, A. Lee, R. Schineller, A. Clemens, W. Robertson, and J. Rome (Lowell Univ.) Wright-Patterson AFB, Ohio AFWAL Oct. 1981 65 p 2 Vol.
(Contract F33615-78-C-1518; AF Proj. 2003)
(AD-A106057; AFWAL-TR-81-1077-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 17/2

This report describes the results of the first two phases of the MFBARS radio architecture study. This study was aimed at establishing a cost effective and volume-conserving method of integrating tactical CNI avionics equipments. The goal was innovative integration of these systems, by a method which would allow the incorporation of new capabilities and which would take advantage of technological advances, both in-hand and projected within the near-term future (1985). Such integration is needed to reduce spiraling life cycle costs and to alleviate severe hardware space limitation problems in tactical aircraft. During Phase I, a set of viable MFBARS candidate architectures was developed, together with a cost evaluation of these with respect to a government-provided baseline of existing equipment, to allow meaningful comparisons. The three MFBARS architectures proposed during Phase I were keyed to a reasonable expectation of techniques and devices projected to be available when MFBARS advanced development would be initiated in the mide '80's. The three architectures provided a graduated increase in payoff potential with associated increases in technical risk. The Government then selected the most advanced of the three Phase I candidate system architectures for more detailed study.

Author (GRA)

N82-14424# ITT Avionics, Nutley, N.J.
MODULAR MULTI-FUNCTION MULTI-BAND AIRBORNE RADIO SYSTEM (MFBARS). VOLUME 2: DETAILED REPORT Final Technical Report, Mar. 1978 - Jun. 1980
R. A. Reilly, C. W. Ward, A. Lee, R. Schineller, A. Clemens, W. Robertson, and J. Rome (Lowell Univ.) Wright-Patterson AFB, Ohio AFWAL Jun. 1981 231 p 2 Vol.
(Contract F33615-78-C-1518; AF Proj. 2003)
(AD-A106052; AFWAL-TR-81-1077-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 17/2

A top down, system oriented study of the selected system approach was conducted. System configuration details and performance parameters were refined. In addition, to minimize system development risk and to provide guidance on the best direction among which MFBARS should proceed, recommended plans were defined for development of the system and supporting technology. Emphasis is placed on the final recommended development plans.

T.M.

N82-14425# Colorado Univ. at Boulder. Electromagnetics Lab.
RADIATION LOSS FROM A CURVED DIELECTRIC CHANNEL WAVEGUIDE IN A DENSE SUBSTRATE
Edward F. Kuester, Robert L. Holland, and David C. Chang Jun. 1981 86 p refs
(Grant DAAG29-78-G-0173)
(AD-A105928; ARO-15632.5-EL; SR-64) Avail: NTIS HC A05/MF A01 CSCL 09/3

This report gives the results of an investigation to analytically determine the effect of a plane dielectric interface upon the radiation loss of a curved channel dielectric waveguide embedded in a dense substrate and bent in a plane parallel to that of the material interface. The radiation loss from bent dielectric waveguides is of interest for a variety of potential applications in integrated optics. Knowledge of the factors influencing the radiation from bend dielectric waveguides will allow the design of integrated optical component characteristics which, in one application, may result in decreased radiation to conserve signal energy or which, in another application, may achieve enhanced radiation effects in order to optimize the coupling between various optical waveguides. An obvious example for which the conservation of signal energy is of prime concern is the dielectric fiber transmission line used in simple point-to-point data transfer applications.

Author (GRA)

N82-14426# General Electric Co., Syracuse, N.Y. Military Electronic Systems Operation.
MANUFACTURING TECHNOLOGY STUDY ON RADIO FREQUENCY POWER MODULES PACKAGING TECHNIQUES Final Report, Sep. 1979 - Jun. 1981
1981 220 p refs
(Contract N00039-79-C-0378)
(AD-A105692) Avail: NTIS HC A10/MF A01 CSCL 17/9

Program requirements cover manufacturing methods and technology encompassing a determination of materials, processes, and related techniques to improve producibility thereby enhancing manufacturing methods to achieve a significant reduction in production cost of R.F. Power Amplifier Modules. The requirement includes the fabrication and test of proof of process of 25-100 watt R.F. Microwave Hybrid Modules. The foregoing amplifiers featured the enhanced materials, processes, and techniques evolved under this program which achieved reduction of total cost of product. The achieved design is directly applicable to the production design of the AN/TPS-59 Solid State Radar system with direct benefit to a wide family of other Solid State Radars and other systems which may use similar R.F. Power Modules. Because several hundred of these R.F. power modules are used per system, the cost savings resulting from this program are significantly multiplied and provide a very favorable payback on MM&T investment. At the outset of the program, the materials, manufacturing and test/tune methods being used for fabricating power modules at that time were reviewed with respect to their yielded final cost.

GRA

N82-14427# Orincon Corp., La Jolla, Calif.
ADAPTIVE ENHANCEMENT OF FINITE BANDWIDTH SIGNALS IN WHITE GAUSSIAN NOISE Final Report, Jan. 1979 - Jun. 1981
C. M. Anderson, E. H. Satorius, and J. R. Zeidler 15 Aug. 1981 40 p refs Prepared jointly with Naval Ocean Systems Center and sponsored by Naval Electronic Systems Command and Naval Sea Systems Command, Washington, D.C.
(Contract N66001-79-C-0204; XF11101100)
(AD-A105873; NOSC-TR-711) Avail: NTIS HC A03/MF A01 CSCL 09/4

The steady-state behavior of the adaptive line enhancer (ALE) is analyzed for stationary inputs consisting of finite signals embedded in a white Gaussian noise (WGN) background. Analytic expressions for the weights and output of the LMS adaptive filter are derived as functions of input signal bandwidth and SNR, as well as ALE length and bulk delay. The steady-state gain in broadband SNR from input to output is derived as a function of these same four variables. For fixed ALE parameters and input SNR, it is shown that this gain increases as the input signal becomes narrower and approaches the sinusoidal unit. It is emphasized that because the correlation time of finite bandwidth signals is limited, excessively large values of the ALE bulk delay parameter result in diminished gain. Furthermore, there is an optimal filter length, whose value depends upon signal bandwidth and SNR, for which the broadband gain is maximized. These results demonstrate the importance of including the effects of algorithm noise in analyzing the performance of real-time adaptive processors.

Author (GRA)

N82-14428# Ohio State Univ., Columbus. Electroscience Lab.
A USER'S MANUAL FOR: ELECTROMAGNETIC SURFACE PATCH CODE (ESP)
E. H. Newman Jul. 1981 75 p refs
(Contract DAAG29-81-K-0020)
(AD-A105954; ESL-713402-1; ARO-17446.1-EL) Avail: NTIS HC A04/MF A01 CSCL 20/14

This report is a code manual for the Electromagnetic Surface Patch Code (ESP). The code can find the radiation and scattering from geometries consisting of rectangular plates, thin wires, wire/plate junctions and plate/plate junctions.

Author (GRA)

N82-14429# Institute for Telecommunication Sciences, Boulder, Colo.

SHF-EHF PROPAGATION THROUGH VEGETATION ON COLORADO EAST SLOPE Final Report, 1 Jan. - 31 Oct. 1980

Edmond J. Violette, Richard H. Espeland, Albert R. Mitz, Frank A. Goodknight, and F. Schwering Fort Monmouth, N. J. Army Communications Electronics Command Jun. 1981 107 p refs
(DA Proj. 1L1-61102-AH-48)
(AD-A105672; CECOM-81-CS020-F) Avail: NTIS HC A06/MF A01 CSCL 20/14

An SHF/EHF measurement program was conducted to determine the effects on propagation through vegetation common to the Colorado East Slope. Presented in this report are the frequency dependence of vegetation losses, polarization, depolarization, and backscatter on observed signal amplitude for three deciduous tree paths, two conifer tree paths, and one grass path at 9.6, 28.8, and 57.6 GHZ. Some of the variables for these measurements were foliage depth, antenna position, antenna pointing, and antenna beamwidth. Time series data showing scintillation due to wind is displayed and discussed. A single rain event and a single snow event were recorded. Summer foliage measurements were compared to a wintertime defoliated state with identical terminal locations used for each condition. Author (GRA)

N82-14430# Norden Systems, Inc., Norwalk, Conn.

HIGH CONTRAST CRT MODULE Interim Technical Report, 1 Apr. - 30 Sep. 1980

Michael H. Kalmanash Aug. 1981 43 p refs
(Contract DAAK20-79-C-0290; DA Proj. 1L2-63742-DF-32)
(AD-A106079; Rept-1310-R-0025; DELET-TR-79-0290-2)
Avail: NTIS HC A03/MF A01 CSCL 17/2

The objective of this program is the development of a miniature high contrast color CRT module compatible with the AN/APR-39 system, except for an increase in overall length compared to the monochrome AN/APR-39 display indicator. The second interim period of this program has resulted in completion of the electrical and mechanical design of the Advanced Development Module (ADM) and initial ADM fabrication. Author (GRA)

N82-14431# Illinois Univ. at Urbana. Electromagnetics Lab.

INVESTIGATION OF TRANSFORM TECHNIQUES FOR SOLVING ELECTROMAGNETIC RADIATION AND SCATTERING PROBLEMS Final Report, 1 Mar. 1979 - 31 Dec. 1980

S. W. Lee, R. Mittra, and W. L. Ko Apr. 1981 127 p refs
(Contract N00014-75-C-0293)
(AD-A105664; UIEM-81-3; UILU-ENG-81-2544) Avail: NTIS HC A07/MF A01 CSCL 20/14

In this report we summarize the research performed under the ONR Grant N00014-75-C-0293 during the calendar years 1979 and 1980. We described a number of electromagnetic scattering problems which we have solved using the spectral domain methods. Among these are the frequency selective surfaces, leaky-wave antennas on dielectric waveguides and arbitrarily shaped conducting or dielectric scatterers. Author (GRA)

N82-14432# California Univ., Berkeley. Lawrence Berkeley Lab. Lighting Systems Research.

ELECTROMAGNETIC INTERFERENCE (EMI) MEASUREMENTS OF FLUORESCENT LAMPS OPERATED WITH SOLID-STATE BALLASTS

A. Arthur, R. Verderber, F. Rubinstein, and O. Morse May 1981 9 p refs Presented at IEEE/Indus. Appl. Soc. Ann. Meeting, Philadelphia, 5-9 Oct. 1981
(Contract W-7405-eng-48)
(DE81-025218; LBL-12462; CONF-811017-1) Avail: NTIS HC A02/MF A01

Solid state ballasts were placed in fluorescent lamps in various areas of a hospital to determine if these high frequency systems would adversely any hospital operations. The general areas tested included a lobby and an office space. Potentially sensitive areas containing hospital diagnostic and monitoring equipment, including a computerized axial tomography (CAT) scanning room, an electroencephatograph (EEG) examination room, and a coronary ward were also tested. The measurement techniques are described and the results discussed with respect to the existing RFI environment and with respect to EMI radiated and conducted limits specified by the Federal Communications Commission and the Federal Drug Administration. DOE

N82-14433# Standard Elektrik Lorenz A.G., Stuttgart (West Germany). Entwicklung Uebertragungsysteme.

STUDY ON DIGITAL TELEVISION TRANSMISSION VIA A TELEVISION BROADCASTING SATELLITE (TV-SAT) Final Report, Mar. 1980

Roland Burkhardt, Hans-Christian Dinglinger, Rudo Faelker, Alfred Kemper, Helmut Mitschke, Wolfram Schildauer, Josef Wasser, and Wilmut Zschunke (Uebertragungstechnik und Elektroakustik) Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 124 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-18; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 26

Digital transmission and signal encoding methods with redundancy reduction were investigated for a television downlink from a satellite to the home receiver as an alternative method to analog FM transmission, the main criteria being bandwidth, carrier to noise ratio, picture quality and equipment costs at the receiving end. Digital PCM encoded and four phase shift key modulated transmission with a bandwidth of 22.4 MHz, giving very good picture quality, is proposed as advantageous for signal reception with small antennas. An alternative two channel transmission with 27 MHz bandwidth, using a higher order modulation method, is discussed. However, this proposal calls for a higher receiving antenna performance and is thus suitable for community antenna systems only. Author (ESA)

N82-14434# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Systemes et Communications.

[ACTIVITIES OF THE DEPARTMENT OF SYSTEMS AND COMMUNICATIONS] Annual Report, 1980-1981 [PRESENTATION ET COMPTE RENDU D'ACTIVITES]

Mar. 1981 122 p refs In FRENCH
(ENST-D-81003) Avail: NTIS HC A06/MF A01

Systems theory, signal processing, and communication theory were studied. Signal analysis, synthesis, transmission and coding was investigated. The contribution of rapid development in integrated circuits to the mathematical analysis of communication problems is emphasized. Author (ESA)

N82-14435# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 4: Microwaves.

RESULTS OF THE PROPAGATION MEASUREMENTS AT 94 GHz OVER A 935 M LINK ON THE YPENBURG AIRFIELD

C. D. deHaan Oct. 1979 52 p refs
(PHL-1979-43; TDCK-73422) Avail: NTIS HC A04/MF A01

Extremely high frequency propagation data and meteorological measurements, including rain rate along the propagation path, windspeed and wind direction in the horizontal plane, the atmospheric temperature, pressure and humidity and raindrop size distribution are given for a vertically polarized Cassegrain antenna link. Actually measured raindrop size distribution and spherical raindrops, were used to measure the attenuation caused by rain using Mie's scattering theory for water spheres. It is noted that in fog, the attenuation is small for millimeter waves and high for infrared waves. Data are collected from point visibility meters, ombrometers and rapid response rain gages. Author (ESA)

N82-14436# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 4: Microwaves.

FURTHER RESULTS OF THE PROPAGATION MEASUREMENTS AT 94 GHz OVER A 935 m LINK ON THE YPENBURG AIRFIELD

J. H. Buijs Dec. 1980 22 p refs
(PHL-1980-46; TDCK-75028) Avail: NTIS HC A02/MF A01

The effects of rain, snow, and wet snow on vertically and horizontally polarized Cassegrain antenna link 94 GHz waves are reported. Data were collected from point visibility meters, ombrometers, and rapid response rain gages. It is noted that

water effect is the same in both cases. Rain effect is described by the calculated rain attenuation based on measured drop size distributions and spherical raindrops. Snow gives a slightly higher attenuation than rain at the same equivalent rain rate for vertical polarization.
Author (ESA)

N82-14437# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 4: Microwaves.

A TRANSMITTING SOLID STATE LINEAR PHASED ARRAY ANTENNA FOR C BAND

P. Doelman and W. P. M. N. Keizer Feb. 1980 60 p refs
(Contract A78/K/040)
(PHL-1980-10; TDCK-73844) Avail: NTIS HC A04/MF A01

An IMPATT diode transmiter phased array module, delivering 60 mW power at 5.75 GHz, was built. The oscillators in the transmitting modules consist of IMPATT diode sources and serve as injection locked elements in the antenna system. Details of the design and performance of the transmitter and its component parts, all constructed in microstrip, are given. Results for an antenna provided with eight transmitting modules, injection locked to a reference source, show that the measured radiation characteristics are in excellent agreement with those calculated. Loss in antenna gain due to mutual coupling is less than 2.6 db compared to broadside, for scan angles between 30 and 150 deg in the H plane.
Author (ESA)

N82-14438# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Hochfrequenztechnik.

ON THE ACCURACY OF RADIO LOCATION IN MEDIA WITH INDIRECT WAVE PROPAGATION

Emil Seppl Dec. 1980 33 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-729)
(DFVLR-FB-81-02) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 8,10

The elimination of the errors of position determination systems, by appropriate evaluation of the measurements is based on radio frequency range measurements and operating in urban areas. Based on the statistical properties of the errors, the lower limit for the final position error is found which cannot be improved by any evaluation method. This limit is calculated for a system with four reference points at the corners of a square.
Author (ESA)

N82-14439# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Optoelektronik.

RESULTS OF A SLANT RANGE VISIBILITY FIELD EXPERIMENT WITH THE MODIFIED DFVLR-MINILIDAR

Christian Werner Jan. 1981 21 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-731)
(DFVLR-Mitt-81-01) Avail: NTIS HC A02/MF A01; DFVLR, Cologne DM 5,60

The modified minilidar was used for a slant visual range experiment. The measured lidar visibility values were compared with: (1) in situ measurements from different heights above ground, using an instrumented tower; and (2) a slant installed transmissometer. The possibilities of the lidar two point method for practical application are shown.
Author (ESA)

N82-14440 Georgia Inst. of Tech., Atlanta.

THE ECCENTRICALLY INSULATED CIRCULAR-LOOP ANTENNA AND THE HORIZONTAL CIRCULAR-LOOP ANTENNA NEAR A PLANAR INTERFACE Ph.D. Thesis

Lam Nhat An 1981 205 p
Avail: Univ. Microfilms Order No. 8124280

The analysis for the circular loop antenna in a concentric insulating sphere was extended to the case where the loop is eccentrically located in the sphere. Both the transmitting and receiving antennas were treated using the Debye potentials and the Fourier series expansion method. Parametric studies were used to determine the effect of the electrical size of the loop and sphere, the eccentricity and the electrical properties of the media on the directivity of the antenna. The solution to the problem of an eccentrically insulated antenna was extended to obtain the solution to the problem of a loop antenna near a material interface. Specifically, the radius of the insulating sphere is allowed to increase to infinity while the loop is kept at a constant distance from the surface of the sphere.
Dissert. Abstr.

N82-14441 California Univ., Los Angeles.

ANTI-JAM ANALYSIS OF FREQUENCY HOPPING M-ARY FREQUENCY SHIFT KEYING COMMUNICATION SYSTEMS IN HIGH FREQUENCY RAYLEIGH FADING CHANNELS Ph.D. Thesis

Dan Avidor 1981 157 p
Avail: Univ. Microfilms Order No. 8122799

The performance of such systems over High Frequency (HF) sky wave channels, when subjected to intentional jamming, were studied. The channels considered are characterized by Rayleigh fading and additive Gaussian noise. To combat jamming the communication system hops over the total spread spectrum bandwidth, which is many times larger than the instantaneous bandwidth occupied by the MFSK signal. Located within the HF band and using sky wave as the dominant propagation mode, the spread spectrum bandwidth is typically nonuniform, time dependent, and congested by many other users of the electromagnetic spectrum in such an environment. Frequency Hopping (FH) MFSK systems seem to be more practical than direct sequence spectrum spreading techniques. A FH/MFSK system can be easily programmed to use a noncontiguous band, thereby avoiding strong interfering signals (which are usually narrow band signals) of friendly signals that should not be interfered with.
Dissert. Abstr.

N82-14177# Telespazio, S.p.A., Rome (Italy).

ATTENUATION STATISTICS OBTAINED WITH OTS

P. Ferrazzoli, G. Brussaard (ESTEC, Noordwijk, Netherlands), L. Piccolomini, and A. Laloux (Univ. Catholique de Louvain, Belgium) *In* ESA OTS: 3rd Year in Orbits Aug. 1981 p 18-21 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14178# British Telecommunications Research, Ltd., Taplow (England).

DEPOLARIZATION MEASUREMENTS AT 11 AND 14 GHz WITH OTS

J. Thirlwell and N. J. McEwan *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 22-32 refs Prepared in cooperation with Bradford Univ., England (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14179# Swedish Telecommunications Administration, Farsta.

CORRELATING OTS BEACON MEASUREMENTS WITH RADIOMETER AND RAINFALL DATA

Lennart Hansson *in* ESA OTS: 3rd year in Orbit Aug. 1981 p 33-36 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14180# Interim Eutelsat, Paris (France).

IMPACT OF OTS PROPAGATION RESULTS ON THE ECS SYSTEM

J. Dutronc and J. C. Raison *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 37-40 ref (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14182# European Space Agency, Noordwikj (Netherlands).

RESULTS OF TESTS ON THE SATELLITE SPOTBEAM ANTENNA

N. Neale, P. Daly, and L. vanHoltz *In its* OTS: 3rd Year in Orbit Aug. 1981 p 48-52 ref (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14183# Fernmeldetechnisches Zentralamt, Darmstadt (West Germany).

RESULTS AND CONCLUSIONS FROM THE RF CLASSICAL TRANSMISSION TESTS FROM THE POINT OF VIEW OF THE TELECOMMUNICATION AUTHORITIES

H. Kleinschmidt, J. LeLigne (Centre National d'Etudes des Telecommunications), E. Saggese (Telespazio Spa), Y. Tharaud

(Centre National d'Etudes des Telecommunications), and P. Tutton (British Telecom International) *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 53-55 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14184# Filtronic Components Ltd., Leeds (England). ESA Communications Satellite Dept.
RESULTS AND CONCLUSIONS OF RF PERFORMANCE TESTS MADE BY ESA
C. D. Hughes and R. A. Gough *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 56-64 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14185# British Telecom International (England).
RESULTS AND CONCLUSIONS OF THE 60 MBIT/SEC DIGITAL TRANSMISSION TESTS
D. Prouse *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 65-68 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14186# Telespazio, S.p.A., Rome (Italy).
RESULTS AND CONCLUSIONS OF THE 120 AND 180 MBIT/SEC DIGITAL TRANSMISSION TESTS
A. Vernucci *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 69-73 Sponsored by Interim Eutelsat (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14187# European Space Agency, Paris (France). OTS-TDMA Experimenters Group.
TDMA/DSI SYSTEM TESTS AND TELEPHONY CHANNEL TESTS VIA THE ORBITAL TEST SATELLITE (OTS)
A. Bernard, T. Hentrich, H. Jack, A. Patacchini, D. Prouse, and N. Deacon *In its* OTS: 3rd Year in Orbit Aug. 1981 p 74-78 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14188# British Telecom International (England).
RESULTS AND CONCLUSIONS FROM TELEPHONE SIGNALING TESTS THROUGH TDMA/DSI SYSTEM
M. L. Kerridge *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 79-82 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14189# Telespazio, S.p.A., Rome (Italy).
ANALOGUE TELEVISION TESTS
V. Speziale, Y. Tharaud (Centre National d'Etudes des Telecommunications), and D. C. Savage (British Broadcasting Corp.) *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 83-88 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14190# Independent Broadcasting Authority, Winchester (England).
EXPERIMENTAL DIGITAL TELEVISION TRANSMISSIONS THROUGH THE OTS
D. K. W. Hopkins (British Broadcasting Corp.), D. W. Osborne, N. D. Wells, and E. J. Wilson (British Broadcasting Corp.) *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 89-92 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14191# Independent Broadcasting Authority, Winchester (England).
DIRECT BROADCASTING EXPERIMENTS WITH OTS: RESULTS OF PICTURE TRANSMISSION TESTS
D. C. Griffiths (Radiotelevisione Italiana) and R. Orta *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 93-99 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14192# Institut fuer Rundfunktechnik, Munich (West Germany).
DIRECT BROADCASTING EXPERIMENTS WITH OTS: RESULTS OF SOUND TRANSMISSION TESTS
C. Dosch and J. Georgy (Telediffusion de France) *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 100-104 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14193# Radiotelevisione Italiana, Milan (Italy).
TELETEXT AND DATA BROADCASTING EXPERIMENTS WITH OTS
R. Orta and D. Pommier (Centre Commun d'Etudes de Television et de Telecommunications) *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 104-107 refs (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

N82-14197# European Space Agency, Noordwikj (Netherlands).
STELLA AND SPINE DATA TRANSMISSION EXPERIMENTS: PRELIMINARY RESULTS AND CONCLUSIONS
P. Bartholome, M. G. N. Hine (European Organization for Nuclear Research), and J. O. Scalan (Univ. College, Dublin) *In its* OTS: 3rd Year in Orbit Aug. 1981 p 128-131 ref (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N82-14442 Stanford Univ., Calif.
BROADBAND MONOLITHIC SEZAWA WAVE STORAGE CORRELATORS AND CONVOLVERS Ph.D. Thesis
John Edward Bowers 1981 217 p
Avail: Univ. Microfilms Order No. 8124041

A number of different techniques to obtain wide bandwidth, monolithic SAW devices are compared using a more exact theory than was to obtain the bandwidth insertion loss relationship for interdigital transducers. The optimum approach considered here for obtaining acoustoelectric devices using planar processing is the use of the second order Rayleigh mode, commonly called the Sezawa mode, in ZnO/Si devices. Sezawa wave convolvers with -50 dBm efficiency were constructed and demonstrated in compression experiments. The mechanism causing saturation of the convolution efficiency at high power levels was examined and found to be due to charging up of the diodes in diode convolvers, and surface state charging in Sezawa wave convolvers without diodes. Dissert. Abstr.

N82-14443# Helsinki Univ. of Technology, Otaniemi (Finland). Dept. of Chemistry.
PREPARATION, THERMAL PROPERTIES, SOLID SOLUTION FORMATION AND SOME LUMINESCENCE PROPERTIES OF RARE EARTH OXYSULFIDES Ph.D. Thesis
Markku Leskela 1980 39 p refs
(ISBN-951-751-949-4; RP-64) Avail: NTIS HC A03/MF A01

The preparation of rate earth oxysulfides, including their solid solutions, was studied, with particular attention to a method involving reduction of corresponding sulfites in carbon monoxide atmosphere. The thermal stability of the different phase and their oxidation products is noted. A method based on the luminescence lifetime of Eu(3+)luminescence for the determined of the activator concentration in europium activated yttrium oxysulfide is introduced. The effect of host cation solid solution on the intensity and life-time of europium luminescence is discussed. The effects of the host lattice, impurities, activator concentration, and particle size on the luminescene spectra and reviewed for europium activated yttrium oxysulfide, Eu(3+)iY2O2s. S.L.

N82-14444*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
RELIABILITY STUDY OF OPTO-COUPLED SEMICONDUC-

TOR DEVICES AND LIGHT EMITTING DIODES (LED) Final Technical Report, Oct. 1974 - Oct. 1977
R. C. Maurer, V. A. Weissflug, and E. V. Sisul Oct. 1977 256 p refs
(Contract NAS8-30777)
(NASA-CR-161923) Avail: NTIS HC A12/MF A01 CSCL 09C

Opto-coupler and light emitting diode (LED) failure mechanisms and associated activation energies were determind from the results of environmental and accelerated lift tests of over 2,400 devices. The evaluation program included LED phototransistor opto-couplers from three sources, LED photoamplifier opto-couplers from a single source, and discrete infrared emitting LEDs from two sources. Environmental tests to evaluate device mechanical integrity included power cycling (10,000 cycles), temperature cycling (500 cycles) and a sequence of monitored shock, monitored vibration and constant acceleration. Multiple temperature operating life tests were conducted at ambient temperatures between 25 C and 200 C. Opto-couplers were operated in both the 'on' and 'off' states during life testing. Author

N82-14445# Technische Hogeschool, Delft (Netherlands).
INTEGRATED CIRCUITS FOR ACCURATE LINEAR ANALOGUE ELECTRIC SIGNAL PROCESSING Ph.D. Thesis
J. H. Huijsing 1981 229 p refs
Avail: NTIS HC A11/MF A01

The main lines in the design of integrated circuits for accurate analog linear electric signal processing in a frequency range including DC are investigated. A categorization of universal active electronic devices is presented on the basis of the connections of one of the terminals of the input and output ports to the common ground potential. The means for quantifying the attributes of four types of universal active electronic devices are included. The design of integrated operational voltage amplifiers (OVA) is discussed. Several important applications in the field of general instrumentation are numerically evaluated, and the design of operatinal floating amplifiers is presented. S.L.

N82-14446# Helsinki Univ. of Technology, Espoo (Finland).
OPTIMAL VOLTAGE LEVEL CONTROL AND ITS APPLICATION TO LONG RANGE EXTENSION PLANNING IN HIGH VOLTAGE TRANSMISSION NETWORK Ph.D. Thesis
Yrjo Laiho 6 Mar. 1981 136 p refs Sponsored by the Foundation of Technology
(ISBN-951-45-5116-2) Avail: NTIS HC A07/MF A01

The work deals with the basic computer algorithms and their application long range network planning. The full a.c. load flow is calculated for every network state. Estimation for losses in each network state is obtained by performing a voltage level optimization routine. It finds the generator voltages, tap changer position and shunt compensation connections such that the losses are minimized simple method based on direct search was selected due to the significant mount of shut compensation equipment in the Finnish network that make the variables discontinuous. Losses are linearized and expressed as a function voltage magnitude only. Sensitivity matrix is used to calculated these voltage changes. The inherently great need of computer storage to store this matrix and the long time to prepare it were overcome by assuming that small reactive power changes do not disturb the active power balance. This small approximation causes an error that is smaller than 1% but gives the benefit that the sensitivity matrix can be factorized and stored in a similar way to the Jacobia matrix used in load flow calculation. The optimization method has been proved to be feasible and fast in relatively large networks. It is in daily practical use at a utility. Numerical examples demonstrate the effect of corona losses on the optimal voltage level. Author

N82-14447*# Virginia Polytechnic Inst. and State Univ., Blacksburg.
MODELING AND ANALYSIS OF POWER PROCESSING SYSTEMS (MAPPS). VOLUME 1: TECHNICAL REPORT Final Technical Report, Oct. 1977 - Aug. 1980
F. C. Lee, S. Rahman, R. A. Carter, C. H. Wu, Yuang Yu (TRW Defense and Space Systems Group, Redondo Beach, Calif.), and R. Chang (TRW Defense and Space Systems Group, Redondo Beach, Calif.) Dec. 1980 335 p refs
(Contract NAS3-21051)
(NASA-CR-165538; TRW-32660-6001-RU-01) Avail: NTIS HC A15/MF A01 CSCL 09C

Computer aided design and analysis techniques were applied to power processing equipment. Topics covered include: (1) discrete time domain analysis of switching regulators for performance analysis; (2) design optimization of power converters using augmented Lagrangian penalty function technique; (3) investigation of current-injected multiloop controlled switching regulators; and (4) application of optimization for Navy VSTOL energy power system. The generation of the mathematical models and the development and application of computer aided design techniques to solve the different mathematical models are discussed. Recommendations are made for future work that would enhance the application of the computer aided design techniques for power processing systems. A.R.H.

N82-14448# Frequency and Time Systems, Inc., Beverly, Mass.
EVALUATION OF THE PERFORMANCE CHARACTERISTICS OF BVA RESONATORS UNDER STATIC AND DYNAMIC CONDITIONS Final Technical Report, 9 Jan. 1980 - 8 Jan. 1981
Donald A. Emmons Griffiss AFB, N.Y. RADC Aug. 1981 45 p refs
(Contract F19628-80-C-0037; AF Proj. LD06)
(AD-A105064; RADC-TR-81-70) Avail: NTIS HC A03/MF A01 CSCL 09/1

This report presents results on evaluation and development of precision oscillators utilizing a novel quartz frequency control element, the BVA resonator. Performance characteristics of the BVA were evaluated utilizing an ensemble of oscillators all having SC-cut BVA resonators. Important results include the demonstration of low g-sensitivity, reduced sensitivity to thermal stress, and very good frequency stability. The systematic dependence of aging rate on crystal drive level was investigated. A high precision BVA oscillator was delivered to the procuring agency. Throughout the program, technical coordination efforts have involved AFSC, DRET (France) and OSA (SW). Author (GRA)

N82-14449# TRW Defense and Space Systems Group, Redondo Beach, Calif.
MONOLITHIC MICROWAVE PREAMPLIFIER Final Report, 1 Jul. 1979 - 31 Dec. 1980
A. Benavides, R. Kaelberer, T. S. Lin, D. Romeo, and K. Weller Jul. 1981 182 p
(Contract N00014-77-C-0645; NR Proj. 251-028)
(AD-A104857; TRW-S/N-32153.000) Avail: NTIS HC A09/MF A01 CSCL 09/5

A GaAs monolithic microwave preamplifier has been fabricated and characterized. The design was implemented by a cascade connection of eight stages in a single ended configuration. The input, output and interstage matching sections utilized microelectronic siral rectangular inductors and MOM capacitors. The best unit yielded an average gain of 25 dB from 3 to 8 GHz. GRA

N82-14450# Varian Associates, Palo Alto, Calif.
DISPENSER CATHODE PHYSICS Final Technical Report, 1 Aug. 1979 - 1 Nov. 1980
Michael C. Green Griffiss AFB, N.Y. RADC Jul. 1981 87 p refs
(Contract F30602-79-C-0220; AF Proj. 4506)
(AD-A105126; RADC-TR-81-211) Avail: NTIS HC A05/MF A01 CSCL 09/1

The structure and composition of the emissive layers of activated and stabilize B-type and M-type cathode surfaces at operating temperature were investigated using X-ray photoelectron spectroscopy and high spatial resolution Auger Spectroscopy. The results indicate that the activating layer consists of a monolayer or submonolayer film of barium and oxygen of stoichiometry close to Ba1O1. The emissive layer was found to be vertically ordered, with barium concentrated in the first monolayer above oxygen. The primary difference observed between the B-type and M-type surfaces was increased coverage of the underlying metal by the barium/oxygen layer in the M-type case. The spectra of the emissive layer, although quite different from those of 'bulk' barium oxide, were consistent with a barium-oxygen bonding interaction. A theoretical model of the bonding of barium and oxygen to each other and to the underlying metal matrix surface was proposed, consistent with the above experimental data and with the published results of other workers in the field. A calculation of the lattice stabilization energy in bulk ionic BaO indicated that the bonding in the emissive layer must be predominantly covalent. In Appendix A, a new user-oriented method of plotting cathode emission test data in the form of Miram-plots of normalized current density against temperature is described. Examples are given of the manner in which such plots clearly delineate changes in cathode performance capability with time and specific cathode failure modes. The cathode physics of a novel failure mode of a high current density cathode involving saturation of pore center emission is described. GRA

N82-14451# Army Materiel Development and Readiness Command, Adelphi, Md. Countermeasures/Counter-countermeasures Office.
SIGNAL PROCESSING THEORY OF BRAGG CELLS
Don J. Torrieri May 1981 22 p refs
(DA Proj. 1S2-63749-D-462)
(AD-A100451; CM/CCM-81-1) Avail: NTIS HC A02/MF A01 CSCL 09/5

The acousto-optical interaction theory is used to develop a basic theory that explains the signal processing capabilities of Bragg cell devices. Examples of devices for frequency estimation, correlation, and Fourier transformation are presented. Author

N82-14452# Brigham Young Univ., Provo, Utah. Dept. of Chemical Engineering.
LITHIUM-ALUMINUM ALLOY ELECTRODES IN LITHIUM CHLORATE
David H. Shen and Douglas N. Bennion 20 Jan. 1981 21 p refs Submitted for publication Prepared in cooperation with California Univ., Los Angeles
(Contract N00014-80-C-0345; NR Proj. 359-551)
(AD-A105902; TR-2) Avail: NTIS HC A02/MF A01 CSCL 08/1

To prevent lithium dendrite growth during cycling of Li electrodes in molten LiClO3 at 140 C, a Li-Al electrode in cells of the type Li/LiClO3/LiAl has been investigated. Two discharge plateaus, one about 0.42V and the other about 0.20V versus a lithium wire, were obtained. No lithium dendrites were observed. Continued cycling caused the lithium-aluminum electrode to break down to particles or grains. The corrosion of isolated Al grains during operation of a Li-Al electrode was confirmed using atomic absorption spectrophotometer (AA) analysis on a white precipitate formed where the alloy electrode had been. Author (GRA)

N82-14453# Michigan Univ., Ann Arbor. Electron Physics Lab.
DESIGN, PERFORMANCE AND DEVICE/CIRCUIT LIMITATIONS OF N-WAY SYMMETRICAL IMPATT DIODE POWER COMBINING ARRAYS Interim Technical Report, Jul. 1979 - Feb. 1981
D. F. Peterson and G. I. Haddad Wright-Patterson AFB, Ohio AFWAL Aug. 1981 90 p
(Contract F33615-77-C-1132; AF Proj. 2002)
(AD-A105663; TR-149; AFWAL-TR-81-1107) Avail: NTIS HC A05/MF A01 CSCL 09/5

Circuit design and stability criteria are developed for a new class of IMPATT diode power combiners. These combiners make use of radial-symmetric circuits and provide an optimal integration of device and circuit properties to perform the power adding function. Both lossless N-way combiners and resistively stabilized N-way combiners are considered. Examples of this combining technique are given at frequencies of 10 GHz and 90 GHz which make use of realistic IMPATT diode parameters. The 30-W, ten-diode lossless X-band combiner indicates a 1-dB locking bandwidth of 300 MHz and 10 dB gain, while the millimeter-wave combiner provides a 1-dB bandwidth of 9 GHz at 87 GHz and 10 dB locking gain. A 100-W, resistively stabilized 10 GHz, ten-diode combiner shows a 150 MHz locking bandwidth, also at 10 dB locking gain. Author (GRA)

N82-14454# Naval Research Lab., Washington, D. C. Combustion and Fuels Branch.
GENERATION OF ELECTROSTATIC CHARGE IN FUEL HANDLING SYSTEMS: A LITERATURE SURVEY Final Report, 1973 - 1980
J. T. Leonard 24 Sep. 1981 55 p refs
(AD-A106056; NRL-8484) Avail: NTIS HC A04/MF A01 CSCL 05/2

A review is presented on the status of research on the generation and dissipation of electrostatic charge by hydrocarbon liquids and fuels, with emphasis on the period 1973-1980. Both metallic and nonmetallic fuel handling systems are covered, including the special problems encountered in aircraft fuel tanks filled with polyurethane foam. The review stresses recent advances and presents opportunities for future research in some neglected, but nonetheless fundamentals areas affecting the charge generation process. Author (GRA)

N82-14455# Naval Research Lab., Washington, D. C.
PROCEEDINGS OF THE MOLECULAR ELECTRONIC DEVICES WORKSHOP Final Report
Forrest L. Carter, ed. 22 Oct. 1981 399 p refs Proceedings of Conf. held at Washington, D.C., 23-24 Mar. 1981
(Contract N00014-81-WR-10052)
(AD-A105816; NRL-MR-4662) Avail: NTIS HC A17/MF A01 CSCL 09/1

Switching at the molecular level is discussed in several papers. The Bell Laboratories' workers developed the concept of 'smart molecules' where eight bit data processing could be carried out via optical methods. F. L. Carter's discussion of both conformational switching and electron tunnelling at the molecular level envisions either soliton propagation in conjugated linear polymers or metal-like conduction in (SN)x as modes of communication with the switching elements. An experimental example of fast switching in thin films of CuTCNQ is provided. The section on materials and microfabrication includes D. Sandman's (GTE) generalized approach to organic pi-donor-acceptor systems and K. Ulmer's (Genex) speculation on the engineered biological assembly of molecular ultracircuits. The first step toward the biological assembly of an electronic device is discussed in two related papers in which Ag metal was selectively deposited on a polylysine substrate. Two serious problem areas that might be anticipated are considered by D. K. Ferry (quantum effects in arrays of devices) and C. S. Guenzer ('soft' errors). That nature has, of course, numerous practical examples of 'molecular' switching which is evident from, among others, the two stimulating papers of L. L. Shipman (ANL) on the photosynthesis process and from a paper of S. R. Hameroff and R. Watts (U. of Arizona) on microtubules. They developed a micro-computer model of the ubiquitous microtubules that strongly suggests that considerable information processing occurs in the alpha, beta tubulin helical structure. GRA

N82-14456# Texas Instruments, Inc., Dallas. Central Research Lab.
DEVELOPMENT OF FABRICATION TECHNOLOGY FOR THE PERMEABLE BASE TRANSISTOR Annual Report, 1 Feb. 1980 - 31 Mar. 1981
W. R. Frensley and G. H. Westphal 1 Sep. 1981 33 p
(Contract N00014-80-C-0246)
(AD-A105532) Avail: NTIS HC A03/MF A01 CSCL 09/1

Efforts during the first year of this contract have concentrated on the development of the key processes required for fabrication of the permeable base transistor: sub-micrometer lithography and epitaxial overgrowth. Electron beam lithography was used, with a dry-process resist and ion milling, to produce 0.25 micrometer lines. The arsenic trichloride epitaxial process was used to embed metal structures in a single crystal of gallium arsenide. High-resolution electron microscopy revealed that the epitaxial overgrowth was imperfect, leaving voids in the single crystal which are often too small to be resolved using conventional electron microscopy. GRA

N82-14457# Western Research Corp., San Diego, Calif.
THE TRANSVERSE RF ACCELERATOR Final Technical Report, 15 Aug. 1980 - 15 Feb. 1981
Nino R. Pereira 11 Sep. 1981 93 p refs
(Contract N00014-80-C-0902; DARPA Order 3747)
(AD-A105896; WRC-R-308) Avail: NTIS HC A05/MF A01 CSCL 20/7

High electric fields are obviously advantageous in powerful electron accelerators: for a given energy gain per particle, the device length is inversely proportional to the maximum field; and the maximum current is roughly proportional to the field. The transverse RF accelerator provides a high field strength by using an accelerator cavity analogous to an optical resonator: the focusing of electromagnetic energy produces large fields along the cavity axis for manageable fields at the wall. In addition, it is possible to have the fields largely transverse, permitting very high accelerating gradients. This report discusses two basic topics: the field structure as related to the acceleration mechanism, and limitation on the electric field strength. GRA

N82-14458# Brookhaven National Lab., Upton, N.Y. Accelerator Dept.
MEANING OF THE NEGATIVE IMPEDANCE
G. Conciauro (Inst. di Elettronica dell'Universita' di Pavia) and M. Puglisi Jun. 1981 7 p
(Contract DE-AC02-76CH-00016)
(DE81-030830; BNL-51420) Avail: NTIS HC A02/MF A01

It is shown that the negative real part of an input impedance does not mean instability of the related circuit. A negative real part of the input impedance means only that the concerned circuit is active. DOE

N82-14459# Bendix Corp., Kansas City, Mo.
CHARACTERIZATION AND COMPARISON OF THERMISTOR THICK FILMS
R. W. Gehman Sep. 1981 56 p refs
(Contract DE-AC04-76DP-00613)
(DE82-000831; BDX-613--2683) Avail: NTIS HC A04/MF A01

Four film inks were evaluated for HMC production use. The physical, chemical and electrical properties of the wet inks and fired films were measured. Variations in the physical and chemical properties of the inks were used to explain variations in thermistor electrical resistance and temperature coefficient of resistance. DOE

N82-14460# Oak Ridge National Lab., Tenn.
PERFORMANCE OF AN INTERNALLY COOLED SUPERCONDUCTING SOLENOID
J. W. Lue and J. R. Miller 1981 8 p refs Presented at the 1981 Cryogenic Eng. Conf., San Diego, Calif., 10 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028058; CONF-810835-13) Avail: NTIS HC A02/MF A01

A superconducting magnet constructed of an internally cooled solenoid was produced and tested. Particular emphasis was placed on measurement of the stability margins of the magnet. Test results showed that: (1) this magnet reached short sample critical current limit with no training; (2) no degradation due to strand motion in fields was apparent; (3) it can be charged and discharged to high current densities and high fields at a fast rate; (4) it has reasonable stability margin up to 90% of the critical current; (5) stability measurements verify the scaling relationship for a limiting current below which there is single valued high stability margin; (6) it is not really necessary to have bulk helium flow to ensure high stability; and (7) very high pulse field changes can be accomodated as long as the energy deposition is within its stability margin. DOE

N82-14461# California Univ., Berkeley. Lawrence Berkeley Lab.
CRYOGENIC TESTS OF GLASS-EPOXY BASED ELECTRICAL INSULATION
J. D. Taylor, P. S. Martin (Fermi National Accelerator Lab., Batavia, Ill.), M. Pripstein, and M. A. Green Aug. 1981 10 p refs Presented at the 1981 Cryogenic Eng. Conf., San Diego, Calif., 10 Aug. 1981
(Contract W-7405-eng-48)
(DE81-028144; LBL-12782; CONF-810835-11) Avail: NTIS HC A02/MF A01

A thin superconducting solenoid for the Time Projection Chamber (TPC) experiment was constructed and tested. A failure of the ground plane insulation damaged the coil to the point that it required rebuilding. An extensive study of this failure indicated that an iron chip embedded in the bore tube had penetrated the insulation. Before rebuilding the coil, an investigation of the insulation system was done with the goal of determining the most reliable techniques and materials for withstanding high voltages in the coil package. The experience with the TPC coil and its prototypes indicate that glass cloth vacuum-impregnated with epoxy is an excellent material for cryogenic applications from the mechanical standpoint. The investigation concentrated on different types of glass cloth and on composites containing glass cloth. DOE

N82-14462# Battelle Pacific Northwest Labs., Richland, Wash.
EDDY-CURRENT PHASOGRAPHY
H. D. Collins, T. J. Davis, L. J. Busse, and R. P. Gribble 1981 19 p refs Presented at the 13th Symp. on Nondestructive Evaluation, San Antonio, 21 Apr. 1981
(Contract DE-AC06-76RL-01830)
(DE81-024242; PNL-SA-9499; CONF-810470-2) Avail: NTIS HC A02/MF A01

Phasography shows excellent potential for high resolution imaging of flaws using eddy current data. The process is an eddy current equivalent to acoustic holography. Phase multiplication of the detected coherent signal is used to simulate a test wavelength one to two orders of magnitude smaller than the actual wavelength, permitting the use of image reconstruction techniques. Since this process is performed on the detected data, the eddy current penetration depth remains unchanged. It is also possible to apply this phase multiplication technique to low frequency acoustic holography, resulting in a test which combines excellent penetration of difficult materials with high resolution images. Preliminary experimental results graphically illustrate this unique imaging technique. Eddy current phasograms and their reconstructed images of small internal simulated defects in 1 mm thick stainless steel plates are presented. DOE

N82-14463# Siemens A.G., Munich (West Germany). Werk fuer Integrierte Schaltungen.
INTEGRATED CIRCUITS FOR INDUSTRIAL CONTROLLER APPLICATIONS Final Report
Theo Freitag, Gerhard Gehring, Gerhard Weil, and Wolfgang Werner Bonn Bundesministerium fuer Forschung und Technologie Nov. 1980 44 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-116; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsrhue, West Germany DM 9,30

A family of drivers, sensors, and a bitprocessor were developed in order to obtain simple, cheap and flexible industrial control systems. Work on the bit processor was stopped at the layout stage. The process for LSTTL (Large Scale Transistor-Transistor Logic) integrated circuits was completely developed. Chip and assembly development of an integrated optical sensor is described. Author (ESA)

N82-14464# Zeiss (Carl), Oberkochen (West Germany).
ELECTRONIC IMAGE ANALYSIS Final Report
Josef Gahm, Rudolf Grosskopf, Hubert Jaeger, and Franz Trautwein Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 50 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-126; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsrhue, West Germany DM 10,50

An electronic system for image analysis was developed on the basis of low and medium cost integrated circuits. The printed circuit boards were designed, using the principles of modern digital electronics and data processing. The system consists of modules for automatic, semiautomatic and visual image analysis. They can be used for microscopical and macroscopical observations. Photographs can be evaluated, too. The automatic version is controlled by software modules adapted to various applications. The result is a system for image analysis suitable for many different measurement problems. The features contained in large image areas can be measured. For automatic routine analysis controlled by processing calculators the necessary software and hardware modules are available. Author (ESA)

N82-14465# AEG-Telefunken, Heilbronn (West Germany). Geschaeftsbereich Halbleiter.
MOS FIELD EFFECT TRANSISTORS FOR UHF APPLICA-

TIONS Final Report
Wilfried Quast and Winfried-Johann Rabe Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 111 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-030; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,30

Three different techniques for the fabrication of UHF MOSFET's were developed and their suitability as a production process was examined. The source and drain regions were realized by phosphorus ion implantation followed by selective oxidation, by diffusion from P and As doped oxides (PDO), and by a double lateral diffusion process. In order to characterize the fabricated MOSFET tetrodes, S parameters at high frequencies (800 MHZ) were measured. The best results were obtained with elements which were manufactured using the PDO technique. A one-dimensional small signal MOS model was derived which is able to describe the static characteristics of short channel MOS transistors. Author (ESA)

N82-14466# AEG-Telefunken, Ulm (West Germany). Geschaeftsbereich Roehren und Baugruppen.
DEVELOPMENT OF A DUAL MODE SATELLITE TRAVELING WAVE TUBE 11GHz, 12W/6W Final Report, Jul. 1978
Lieter Deml Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 94 p refs Partly in GERMAN and ENGLISH Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-001; ISSN-0170-1339) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,80

A high power 11GHz dual mode traveling wave tube (TWT) was developed for use in communication satellites. The tube is based on the technology of previous space-qualified tubes (TL12006, TL12022, and TL12025). The tube operates at 12 or 6W, seperated by 3dB, without a dramatic efficiency loss in the low power mode. Gain, efficiency and nonlinear distortion criteria are all met, by channel tuning the tube within the operating band (from 10.9 to 11.8 GHz). The channel bandwidth is 100MHz. Author (ESA)

N82-14467# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
LOW POWER HYBRID CIRCUITS FOR SATELLITE-BORNE TIME OF FLIGHT SPECTROMETERS Final Report, Oct. 1980
Berend Wilken and Werner Weiss Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 32 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-013; MPAE-T-74-80-25; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,70

A charge sensitive amplifier and an input discriminator for a time amplitude converter were developed for time of flight spectrometers, and tested as thin film hybrids. Time of flight spectrometers are very important tools for analyzing the ion composition of planetary and interplanetary magnetized plasma populations. The particle mass is obtained from simultaneous measurements of the particle energy and velocity. Application of this technique in satellite instruments requires low mass and low power circuits. The amplifier weighs 1.9 g and has a power consumption of 6.8 mW. The hybrid weighs 2.9 g with 100 mW power. The time walk is smaller than 200 psec over a dynamic range of more than 30. Author (ESA)

N82-14468# Oxford Univ. (England). Dept. of Engineering Science.
OPTIMUM DESIGN OF WIDE-BANDWIDTH, LOW-NOISE PHOTODIODE AMPLIFIERS. VOLUME 1: BANDWIDTH
D. K. Hamilton 1981 14 p refs
(OUEL-1363/81-Vol-1) Avail: NTIS HC A02/MF A01

A circuit with video applications was tested. A reversed biased junction is a parallel combination of resistance and capacitance, which varies with the applied reverse voltage. The complete equivalent circuit model includes these components in parallel with a current generator. For optimum response at high frequency critical damping is necessary. The circuit allows the use of an amplifier with a wider open loop bandwidth than one compensated for unity gain, with a corresponding increase in system bandwidth. Author (ESA)

N82-14469# Centre National d'Etudes Spatiales, Toulouse (France). Centre Spatial.
EVALUATION OF FRENCH HYBRID MICROELECTRONICS [EVALUATION DE LA MICROELECTRONIQUE HYBRIDE FRANCAISE]
Marc Billot Oct. 1980 15 p In FRENCH; ENGLISH summary
(CNES-NT-97) Avail: NTIS HC A02/MF A01

Thin and/or thick film technology of French manufacturers of hybrid circuits is assessed. Hybrid devices were subjected to mechanical and environmental life tests, and failure analysis was performed. Results show that both thick and thin deposition layers have good stability characteristics. The only significant difference is that thin films age better than thick films over the long-term at high temperature. Reproducibility of results for active components in the form of chips is poor when tested before they are incorporated into hybrid circuits. The principal cause of failure is identified as faulty interconnections for thick film active components. Author (ESA)

N82-14470# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
MODELING THE INFLUENCE OF STATIC ACCELERATION ON SURFACE WAVE (QUARTZ) OSCILLATORS Ph.D. Thesis - Paris Univ.
Patrick Levesque 1981 96 p refs In FRENCH; ENGLISH summary Report will also be announced as translation (ESA-TT-726)
(ONERA-NT-1981-3; ISSN-0078-3781) Avail: NTIS HC A05/MF A01

The application of a static acceleration on a quartz oscillator, working in elastic surface wave mode, was modeled. Modification of the wave propagation speed through the substrate and its frequency are studied. The frequency shift depends on the nature of the substrate through which the wave is propagated, but also on its dimensions and its mode of attachment. The relationship between the stresses arising in the substrate during the acceleration and the sensitivity to this acceleration of surface wave devices are shown. Author (ESA)

N82-14471# Engins Matra, Velizy (France). Lab. Connection Reseaux.
STUDY OF AN AUTOADAPTIVE EQUALIZER: COMPUTERIZED SIMULATION BASED ON KALMAN FILTER OR GRADIENT METHODS [ETUDE D'UN EGALISEUR AUTOADAPTATIF, PAR SIMULATION SUR ORDINATEUR, EN UTILISANT LES METHODES DE FILTRAGE DE KALMAN OU DE GRADIENT]
Bruno Arbuud 1981 62 p refs In FRENCH
(TEL/ARB/81) Avail: NTIS HC A04/MF A01

The principle of an autoadaptive equalizer is envisaged, specifically to deal with parasitic noise on data transmission lines. Data transmission is described and the necessity of an equalizer is shown. The appropriate mathematical tools are layed out and computerized simulation, along with results obtained, are explained. Programs that make use of Kalman numerical filtering are presented. Author (ESA)

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

N82-14472# Technische Univ., Berlin (West Germany).
EXPERIMENTAL INVESTIGATION OF THE INFLUENCE OF THE CASING GEOMETRY UPON THE FLOW CONDITIONS AND THE NOISE OF A CENTRIFUGAL FAN Ph.D. Thesis
Teofani Gikadi 1981 136 p refs In GERMAN Prepared in

cooperation with DFVLR, Berlin
(DFVLR-FB-81-20) Avail: NTIS HC A07/MF A01

Beginning with a casingless impeller with six backward curved blades, the influence of a small logarithmic volute casing with a cutoff clearance of delta/R = 0.014 (R = impeller radius) upon the flow through the rotating impeller ducts is studied. There was a blockage of the flow in each impeller duct when passing the cutoff, due to the small cutoff clearance. An optimization of the casing geometry regarding low noise and high fan efficiency leads to a logarithmic spiral with a large cutoff clearance of detla/R = 0.3. The noise is reduced by 22 dB (A) without loss in fan efficiency. S.L.

N82-14473*# Cambridge Hydrodynamics, Inc., Mass.
NUMERICAL STUDIES OF LAMINAR AND TURBULENT DRAG REDUCTION Final Report
R. Balasubramanian and S. A. Orszag Washington NASA Dec. 1981 33 p refs
(Contract NAS1-16237)
(NASA-CR-3498; CHI-57) Avail: NTIS HC A03/MF A01 CSCL 20D

Two-dimensional incompressible flow over wavy surfaces is studied numerically by spectral methods. Turbulence effects are modeled. Results for symmetric and asymmetric wave forms are presented. Effect of propagating surface waves on drag reduction is studied. Comparisons between computer simulations and experimental results are made. Author

N82-14474*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPARISON OF THIN-FILM RESISTANCE HEAT-TRANSFER GAGES WITH THIN-SKIN TRANSIENT CALORIMETER GAGES IN CONVENTIONAL HYPERSONIC WIND TUNNELS
Charles G. Miller, III Dec. 1981 93 p refs
(NASA-TM-83197; L-14627) Avail: NTIS HC A05/MF A01 CSCL 20D

Thin film gages deposited at the stagnation region of small (8.1-mm-diameter) hemispheres and gages mounted flush with the surface of a sharp-leading-edge flat plate were tested in the Langley continuous-flow hypersonic tunnel and in the Langley hypersonic CF4 tunnel. Two substrate materials were tested, quartz and a machinable glass-ceramic. Small hemispheres were also tested utilizing the thin-skin transient calorimeter technique usually employed in conventional tunnels. One transient calorimeter model was a thin shell of stainless steel, and the other was a thin-skin insert of stainless steel mounted into a hemisphere fabricated from a machinable-glass-ceramic. Measured heat-transfer rates from the various hemispheres were compared with one another and with predicted rates. The results demonstrate the feasibility and advantages of using-film resistance heat-transfer gages in conventional hypersonic wind tunnels over a wide range of conditions. A.R.H.

N82-14475*# National Aeronautics and Space Administration, Washington, D. C.
DETERMINATION OF THE TRANSITION POINT IN A BOUNDARY LAYER BY THE MEASUREMENT OF PRESSURE FLUCTUATION
Vaclav Strach Dec. 1981 14 p refs Transl. into ENGLISH from Zpravodaj VZLU (Poland), no. 5, 1980 p 201-205 Original language document was announced as A81-31040 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76639) Avail: NTIS HC A02/MF A01 CSCL 20D

A method is developed for determining the laminar-to-turbulent transition point in a boundary layer. The method involves the measurement of pressure on the surface of the body and the computation of pressure fluctuations. This method of determining the transition point is suitable when visualization methods cannot be used. Author

N82-14476*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
NUMERICAL STABILITY OF AN EXPLICIT FINITE DIFFERENCE SCHEME FOR THE SOLUTION OF TRANSIENT CONDUCTION IN COMPOSITE MEDIA
Warren Campbell Nov. 1981 29 p refs
(NASA-TM-82453) Avail: NTIS HC A03/MF A01 CSCL 20D

A theoretical evaluation of the stability of an explicit finite difference solution of the transient temperature field in a composite medium is presented. The grid points of the field are assumed uniformly spaced, and media interfaces are either vertical or horizontal and pass through grid points. In addition, perfect contact between different media (infinite interfacial conductance) is assumed. A finite difference form of the conduction equation is not valid at media interfaces; therefore, heat balance forms are derived. These equations were subjected to stability analysis, and a computer graphics code was developed that permitted determination of a maximum time step for a given grid spacing. Author

N82-14477# Physical Research, Inc., Palos Verdes Estates, Calif.
HIGH REYNOLDS NUMBER CYLINDER FLOW WORKSHOP Final Report
W. C. L. Shih 17 Aug. 1981 98 p refs Workshop held at Moffett Field, Calif., 27-28 Nov. 1979 Sponsored by Science Applications, Inc.
(Contract N00014-79-C-0893)
(AD-A105088; PRI-LA-81-R003) Avail: NTIS HC A05/MF A01 CSCL 20/4

The purpose of this workshop was to review the state of knowledge of high Reynolds number (incompressible) rigid cylinder flows, to identify problem areas, and recommend research for understanding these flow conditions. The recommendations are being incorporated into the design of a comprehensive experiment that is scheduled for Spring of 1982 in the NASA Ames Research Center 12-foot pressurized wind tunnel. GRA

N82-14478# Rutgers - The State Univ., New Brunswick, N. J. Dept. of Mechanical and Aerospace Engineering.
A FLOW-VISUALIZATION STUDY OF TURBULENT SPOTS ON SOLID AND COMPLIANT SURFACES Final Report, 1 Jan. - 30 Sep. 1981
J. W. Hoyt Oct. 1981 10 p refs
(Contract N00014-81-K-0290; ONR Proj. 062-689)
(AD-A106073) Avail: NTIS HC A02/MF A01 CSCL 20/4

A water table study of the formation of turbulent (spots) in laminar flow shows no difference in the production, appearance or other characteristics of spots flowing over either rigid or compliant surfaces. An indication of damping was obtained with compliant surfaces at very low Reynolds numbers. Author

N82-14479# Army Armament Research and Development Command, Dover, N. J.
SHOCK FRONT RISE TIME IN WATER Program Status Report
Paul Harris and Henri-Noel Presles (Univ. of Poitiers, France) Oct. 1981 30 p refs
(DA Proj. 1L1-61101-A-91A)
(AD-A105704; AD-E400719; ARLCD-TR-81032) Avail: NTIS HC A03/MF A01 CSCL 20/11

A review is made of the present status of the experimental-theoretical program for the evaluation of the shock front thickness in water, and the results of recently performed hyperbolic tangent shock front structure calculations are presented. The hyperbolic tangent results, when compared with experimental data, predict a shock front thickness upper limit of 6.2 X 10 to the minus 6th power cm at 5.8 kbar. Experiments and theory planned for the near future are outlined. These experiments will involve shock front optical reflectivity and shock polarization voltage measurements. Some preliminary theory corresponding to these planned experiments is presented. In particular, a net electric dipole alignment calculation is presented which predicts approximately 5 mv across a 50-ohm load at 15 kbars. The anomalously large Soviet shock viscosity results are considered (without resolution of the question), and the possibility of significant hydrogen bond breaking at shock pressures above 5.8 kbars is discussed. GRA

N82-14480# Naval Research Lab., Washington, D. C.
A CLASS OF MONOTONIC SHOCK-CAPTURING DIFFERENCE SCHEMES
A. I. Zhmakin (Academy of Sciences (USSR), Leningrad) and A. A. Fursenko (Academy of Sciences (USSR), Leningrad) 30 Jul.

1981 48 p refs Sponsored in part by Defense Nuclear Agency
(AD-A105601; NRL-MR-4567) Avail: NTIS
HC A03/MF A01 CSCL 20/4

Two principal approaches used in the numerical study of unsteady inviscid compressible flow problems -- shock-fitting and shock-capturing -- are discussed briefly. This paper presents a new example of the latter approach. The proposed method is monotonic and provides second-order accuracy in regions where the concept of order is meaningful. The method is simple and fast running. The monotonicity of a standard finite difference scheme (the well-known MacCormack scheme was chosen in the paper) is achieved by means of a local conservative smoothing operation. It eliminated nonphysical ripples, which usually appear near discontinuities when nonmonotonic schemes are used. The method is similar to one developed by Boris and Book and gives essentially the same results, but is much simpler and faster. The proposed method is compared to some other finite difference schemes. Two one dimensional tests are used: a linear convection equation and a shock tube problem. Finally, the example of nonsteady three-dimensional scattering of a shock wave by a step obstacle of finite width is discussed. GRA

N82-14481# Naval Postgraduate School, Monterey, Calif.
COMPARISON OF VISCOUS AND PRESSURE ENERGY EXCHANGE IN FLUID FLOW INDUCTION M.S. Thesis
Harry Joseph Rucker, Jr. Jun. 1981 72 p refs
(AD-A105808) Avail: NTIS HC A04/MF A01 CSCL 20/4

The pumping power and efficiency of a jet pump can be substantially increased by introducing a rotating primary flow. The rotating primary causes an energy transfer from the primary fluid to the secondary fluid through a pressure force. Non-rotating jet pumps transfer energy through viscous friction. The reversible nature of the work accomplished through a pressure exchange is inherently more efficient than the nonreversible work accomplished through viscous interaction. This study focuses on the interaction zone of the inducer and specifically on an experimental comparison of viscous and pressure energy exchange. GRA

N82-14482# Naval Surface Weapons Center, White Oak, Md. Strategic Systems Dept.
HEAT-TRANSFER AND PRESSURE TESTS ON AN OBLATE ELLIPTIC NOSETIP IN THE NSWC/WO HYPERSONIC TUNNEL AT MACH NUMBER 5 (STR-1346)
M. D. Jobe Jun. 1981 60 p refs
(AD-A106058; NSWC/MP-81-259) Avail: NTIS
HC A04/MF A01 CSCL 20/13

An extensive data base on a 2:1 elliptical nosetip shape to be utilized for verification of the AVCO MTSCT three dimensional transition code was generated in the NSWC Hypersonic Tunnel at Mach Number 5. Four nosetip models in which the surface roughness was varied from a smooth wall to a roughness value of 10 mils were tested. The first three nosetips were instrumented with 112 backfaced chromel-alumel thermocouples. The fourth model (i.e., 10-mil roughness) instrumentation consisted of 87 thermocouples and 31 Statham pressure transducers. The test matrix consisted of sixty runs where the variables included angle-of-attack, tunnel Reynolds number, and wall enthalpy ratio. Author (GRA)

N82-14483# TRW, Inc., Redondo Beach, Calif.
COMPRESSIBLE FLUIDS INVESTIGATION Final Report
C. Gustavson and Robert Dombroski Oct. 1981 54 p refs
(Contract DAAK10-80-C-0257)
(AD-A105703; AD-E400704; ARLCD-CR-81034) Avail: NTIS
HC A04/MF A01 CSCL 20/4

This report describes an investigation of compressible fluids for use in artillery recoil mechanisms. An examination of chemical theory revealed the ideal properties which a compressible fluid should possess. More than 20 sample fluids were evaluated in a series of hydrostatic and miscibility tests. Results indicate that perfluorinated compounds exhibit better qualities for artillery applications than the silicone oil currently in use. GRA

N82-14484# Los Alamos Scientific Lab., N. Mex.
COOL-DOWN FLOW-RATE LIMITS IMPOSED BY THERMAL STRESSES IN LNG PIPELINES
J. K. Novak, F. J. Edeskuty, and J. R. Bartlit 1981 8 p refs
Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981
(Contract W-7405-eng-36)
(DE81-028731; LA-UR-81-2365; CONF-810835-4) Avail: NTIS HC A02/MF A01

Warm cryogenic pipelines are usually cooled to operating temperature by a small, steady flow of the liquid cryogen. If this flow rate is too high or too low, undesirable stresses will be produced. Low flow-rate limits based on avoidance of stratified two-phase flow were calculated for pipelines cooled with liquid hydrogen or nitrogen. High flow-rate limits for stainless steel and aluminum pipelines cooled by liquid hydrogen or nitrogen were determined by calculating thermal stress in thick components vs flow rate and then selecting some reasonable stress limits. The present work extends these calculations to pipelines made of AISI 304 stainless steel, 6061 aluminum, or ASTM A420 9% nickel steel cooled by liquid methane or a typical natural gas. Results indicate that aluminum and 9% nickel steel components can tolerate very high cool-down flow rates, based on not exceeding the material yield strength. DOE

N82-14485# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
EFFECTS OF SUSPENDED PARTICLES ON THE RATE OF MASS TRANSFER TO A ROTATING DISK ELECTRODE M.S. Thesis
David Jeffries Roha Jun. 1981 310 p refs
(Contract W-7405-eng-26)
(DE81-028002; LBL-12737) Avail: NTIS HC A14/MF A01

Limiting currents for the reduction of ferric cyanide at a rotating disk were determined in the presence of 0 to 40 percent by volume of spherical glass beads. Experiments were conducted with six different particle diameters, and with rotation speeds in the range of 387 to 270 rpm, using both a 0.56 cm and a 1.41 cm radius disk electrode. Two mass transfer models, both of which assume that the beads are in contact with the disk electrode and moving parallel to its surface, are offered. In the surface renewal model it is assumed that complete mixing takes place with the passage of each bead and the boundary layer is replaced with fresh bulk solution. While with the particle film model it is assumed the bead and a clinging film of fluid rotate together. The film promotes mass transfer by alternately absorbing and desorbing the diffusion species. The particle film model best explains the observed behavior of the limiting current density. DOE

N82-14486# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Mechanical Engineering.
GENERALIZED ALGEBRAIC RELATION FOR PREDICTING DEVELOPING CURVED CHANNEL FLOW WITH A k-EPSILON MODEL OF TURBULENCE
Joseph A. C. Humphrey and Farzad Pourahmadi Jun. 1981 16 p refs Presented at 3rd Symp. on Turbulent Shear Flow, Davis, Calif., 9-11 Sep. 1981
(Contract W-7405-eng-48)
(DE81-028131; LBL-12009-Rev) Avail: NTIS
HC A02/MF A01

Using algebraic approximations for the Reynolds stress equations a general expression was derived which accounts simultaneously for the effects of streamline curvature and pressure strain in the flow, including wall induced influences on the velocity fluctuations. The expression derived can be shown to encompass similar but more specific formulations proposed by Bradshaw, Rodi, and Leschziner and Rodi. The present formulation was used in conjunction with a k-e model of turbulence to predict developing, two dimensional, curved channel flows where both curvature and pressure strain effects can be large. Minor modifications to include the influence of curvature on the length scale of the flow near the walls produce a significant improvement in the calculations. While, in general, predictions, are in good agreement with experimental measurements of mildly and strongly curved flows, the model tends to overpredict the kinetic energy of turbulence in the inner radius (convex) wall region. DOE

N82-14487# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
THE TEMPERATURE STRUCTURE OF A TURBULENT

VORTEX RING [DIE WAERMESTRUKTUR EINES TURBULENTEN RINGWIRBELS]
Peter E. M. Schneider Mar. 1980 35 p refs In GERMAN
(MPIS-4/1980; ISSN-0436-1199) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,05

Temperature profiles in turbulent vortex rings were experimentally investigated. A test arrangement was used that produces vortices which are visualized by coloring and Schlieren-photography. Temperature profiles were obtained by a hot-film anemometer. Turbulent vortex rings are structures with individual temperature profiles whose temperature is everywhore higher than that of the surrounding medium in test. Temperature measurements show that secondary vortices consist of core material, material from the transition region between vortex core and envelope, and material from the envelope.
Author (ESA)

N82-14488# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
TRANSFORMATION AND REFLECTION OF VORTEX RINGS IMPINGING ON A PLATE INCLINED WITH RESPECT TO THEIR TRANSLATION DIRECTION [UMBILDUNG UND REFLEXION EINES RINGWIRBELS AN EINER PLATTE, DIE SCHRAEG ZU SEINER TRANSLATIONSRICHTUNG ORIENTIERT IST]
Peter E. M. Schneider Jul. 1980 101 p refs In GERMAN
(MPIS-12/1980; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22,05

Reflection processes in turbulent boundary layers were investigated by examining the reflection angle of a vortex ring. The tests were conducted in a vortex generating setup. The vortices were colored and photographed. The primary vortex transforms into an oscillating vortex ring, while secondary vortices develop in its envelope. Reverse flow vortex rings, helix and double-helix vortices develop in its core. The reflection angle at which this new vortex leaves the plate is independent of the distance between the plate and the test stand inlet nozzle where the vortex ring is formed, the flow stability condition (laminar, ondulated, turbulent) of the vortex ring when it arrives at the plate, and the vortex ring translation velocity. Author (ESA)

N82-14489# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
EXPERIMENTAL INVESTIGATION OF INSTABILITY PHASES OF A LAMINAR VORTEX RING, IN LIGHT OF COMPARABLE INSTABILITY EVENTS IN TURBULENT SHEAR LAYER, BOUNDARY LAYER, AND CHANNEL FLOWS [EXPERIMENTELLE UNTERSUCHUNG DER INSTABILITAETSPHASEN EINES LAMINAREN RINGWIRBELS MIT HINBLICK AUF VERGLEICHBARE INSTABILITAETSEREIGNISSE IN TURBULENTEN SCHERSCHICHT-, GRENZSCHICHT- UND KANALSTROEMUNGEN]
Peter E. M. Schneider Oct. 1980 99 p refs In GERMAN
(MPIS-17/1980; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 27,30

The laminar flow in a vortex is primarily determined by the toroidal laminar vortex core, the ondulatory flow by the ondulated laminar core, and the turbulent flow by the turbulent oscillating core. Inside these three global vortex flows, locally or globally unstable secondary vortices, and helix and double-helix flows are formed. A turbulence model was established in which turbulent flows consist of a complex organized vortex hierarchy and develop from an invarying degree, rhythmic sequence of unstable, laminar vortices as a result of an evolutional process. Author (ESA)

N82-14490# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
EXPERIMENTAL INVESTIGATION OF THE FLOW IN A ROTATING CIRCULAR CHANNEL Thesis [EXPERIMENTELLE UNTERSUCHUNG UEBER EINE STROEMUNG IN EINEM ROTIERENDEN RINGKANAL]
Johannes Kuehl Nov. 1980 101 p refs In GERMAN
(MPIS-21/1980; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20,85

Mixing devices were studied using flow in a rotating cylindrical annulus with rectangular cross section, in which the medium has a free surface directed towards the rotation axis. The flow is considered as quasi-stationary. The flow is controlled by the equilibrium between pressure gradient and Coriolis force. There exists a frictionless central flow with mainly azimuthal velocity, two Ekman boundary layers perpendicular to the axis, and a boundary outer layer which becomes unstable at higher speeds. In the experiment, the flow was visualized in a stroboscopically illuminated rotating plexiglass channel by coloring. The approximate calculations were checked by means of velocity measurements. The expected Taylor-Gortler vortex was observed.
Author (ESA)

N82-14393# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
SUBSONIC FLOW IN A CORNER
Daniel Arnal and Jean Cousteix *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 45-62 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-14491 Royal Aircraft Establishment, Farnborough (England).
APPLICATIONS OF THE MICROSCAN 9 MICROANALYSER
P. D. Pitcher Jan. 1981 19 p
(RAE-TM-MAT-358; BR77779) Copyright. Avail: Issuing Activity

A computer controlled electron probe microanalyzer used to obtain data on the chemical composition of areas down to 1 micron, is assessed. The X-rays generated by an electron beam incident on a specimen are analyzed by detection and counting, using energy dispersive and wavelength dispersive techniques. Qualitative, or quantitative analyses can be done of segregation, diffusion of particular elements, inclusion identification, contamination, etc. Results are obtained as uncorrected concentrations, Bragg angle, backgrounds and standard deviations. Author (ESA)

N82-14492*# Lockheed Missiles and Space Co., Palo Alto, Calif. Applied Materials and Technology Lab.
A PRELIMINARY DESIGN OF THE CRYOGENIC SYSTEM FOR THE COOLED LIMB SCANNING INTERFEROMETER RADIOMETER (CLIR), PHASE 3 Final Report
L. G. Naes, R. T. Parmley, and T. C. Nast [1981] 82 p refs
(Contract NAS5-26042)
(NASA-CR-166722; LMSC-D767447; TP-5848)
HC A05/MF A01 CSCL 14B

The performance of the cryogenic cooling system for the limb scanning interferometer radiometer (CLIR) instrument which was proposed to be flown on the Atmospheric-Magnetospheric Physics Satellite is discussed. The use of both normal boiling point liquid helium or hydrogen is considered. In determining the performance of the two cooler configurations, a nominal aperture heat of 4.33 watts was used, which is half the value used in previous studies. The reduced aperture heat load reflects that benefits achieved by using an improved baffle configuration. The ground support equipment necessary to support the CLIR cooler in either the liquid helium or solid hydrogen mode was determined. A parts list was generated for both the ground support equipment and the cooler system. R.J.F.

N82-14493# Technische Hogeschool, Delft (Netherlands).
SILICON DEW-POINT SENSOR FOR ACCURATE HUMIDITY MEASUREMENT SYSTEMS Ph.D. Thesis
Paulus Petrus Leonardus Restien Delf Univ. Press 10 Jun. 1981 157 p refs In ENGLISH; DUTCH abstract
Avail: NTIS HC A08/MF A01

The design and properties of an electronic humidity measuring system for the determination of the water-vapor content in air or other gases are described. The system is based on an integrated silicon dew-point sensor. After a discussion of the increasing scope of hygrometry in a variety of application fields in science, engineering and production, a review is given of humidity measuring methods. The most promising measuring method appears to be the determination of the dew-point temperature. It is shown that the integrated circuit technology can be applied successfully for the realization of accurate dew-point sensors. Three types of integrated dew-point sensors made with a standard IC-process or compatible technology are described. Based on an error analysis, a continuously operating dew-point hygrometer system was designed. This system consist of, beside the designed integrated sensor, a special control system for thermoelectrically controlled cooling, and data processing unit for selected presentation of the most important humidity quantities. R.J.F.

N82-14494*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AN EXPERIMENTAL INVESTIGATION INTO THE FEASIBILITY OF A THERMOELECTRIC HEAT FLUX GAGE
Jan C. Jones (Tri State Univ.) and G. James VanFossen, Jr. Dec. 1981 17 p refs
(NASA-TM-82755; E-1071) Avail: NTIS HC A02/MF A01 CSCL 14B

An experiment was conducted to determine the feasibility of using a commerically available thermoelectric device as a heat flux gage. In certain research applications, the thermoelectric heat flux gage can provide a relatively simple means to model a warm fluid--cold wall. The experiment showed that heat flux through the gage could be correlated within two percent to the applied thermoelectric current through the device and the hot and cold side temperature with a simple algebraic equation. Author

N82-14495# Defence Research Establishment Valcartier (Quebec).
A STARK CELL FOR FREQUENCY CONTROL OF A WAVEGUIDE CO2 LASER
P. Lavigne, A. Deslauriers, and J. Lemay Feb. 1981 30 p refs
(AD-A104734; DREV-R-4188/81) Avail: NTIS HC A03/MF A01 CSCL 20/5

In this report, we describe the mode of operation and the design of a Stark cell suitable for the frequency control of a local oscillator at 10 micrometers, and we analyze its characteristics. Using this cell, a waveguide CW CO2 laser was tuned over + or - 100 MHz around the line center of the P(20) CO2 line, at 10.6 micrometers, and a long-term frequency stability better than + or - 1.5 MHz was achieved. Author (GRA)

N82-14496# Stanford Linear Accelerator Center, Calif.
TWO-DIMENSIONAL BEAM-PROFILE MONITOR USING THE RETICON MC510A ARRAY CAMERA
B. Gottschalk Aug. 1981 70 p refs
(Contract DE-AC03-76SF-00515; Grant NSF PHY-79-20821)
(DE81-030853; SLAC-TN-81-7) Avail: NTIS HC A04/MF A01

A quantitative two dimensional beam profile may be obtained from a scintillator viewed by a Reticon camera which uses a 32 x 32 array of photodiodes as its sensing element. CAMAC oriented data acquisition electronics, which allow one either to transmit the profile to a computer or to use the monotor in a stand alone mode, are described. DOE

N82-14497# Oak Ridge National Lab., Tenn. Industrial Safety and Applied Health Physics Div.
PERFORMANCE OF A LARGE HYPERPURE GERMANIUM DETECTOR ARRAY FOR IN-VIVO DETECTION OF LOW-ENERGY PHOTON AND X-RAY EMITTERS: ANALYTICAL PROCEDURE AND CURRENT CAPABILITIES
C. D. Berger and B. H. Lane Oct. 1981 23 p refs
(Contract W-7405-eng-26)
(DE82-000443; ORNL/TM-7925) Avail: NTIS HC A02/MF A01

The ORNL whole body counter is one of the few in the country that is capable of assessment of body burdens of low-energy photon and X-ray emitters. This requires detectors and electronics specific for the task. Isotope identification and quantification capabilities are crucial at the facilities which deal with quantities of many radionuclides. Isotope identification and quantification capabilities for detection of the actinides using the HPGe array are greatly improved over the phoswich system, making the HPGe detector an integral part of lung counting operations at ORNL. The current analysis techniques are discussed, examples of MSMA and MDTA for various isotopes are given, and the derivation of a universal calibration curve for preliminary estimation of body burden is discussed using data acquired by the HPGe array. DOE

N82-14498# Exxon Nuclear Idaho Co., Inc., Idaho Falls.
AUTOMATED TRANSPORTABLE MASS SPECTROMETER
M. W. Echo Sep. 1981 45 p refs
(Contract DE-AC07-79ID-01675)
(DE82-000903; ENICO-1096) Avail: NTIS HC A03/MF A01

The need was identified for a mass spectrometer (MS) which can be conveniently transported among several facilities for rapid verification of the isotopic composition of special nuclear material. This requirement for a light weight, transportable MS for U and Pu mass analysis was met by deleting the gas chromograph (GC) portions of a Hewlett-Packard Model 5992 Quadrupole GCMS and substituting a vacuum lock sample entry system. A programmable power supply and vacuum gauge were added and circuitry modifications were made to enable use of the supplied software. DOE

N82-14499# Oak Ridge Gaseous Diffusion Plant, Tenn.
PROCEDURES FOR THE CALCULATION OF THE SEPARATIVE PERFORMANCE OF A COUNTERCURRENT GAS CENTRIFUGE
Edward VonHalle Jul. 1981 71 p refs Presented at the 4th Workshop on Gases in Strong Rotation, Oxford, 24-27 Aug. 1981
(Contract W-7405-eng-26)
(DE81-025448; K/OA-5013; CONF-810845-1) Avail: NTIS HC A04/MF A01

The approximations used in the development of the standard Onsager-Cohen gradient equation produce results which depart from the more detailed solutions presented in one direction in the enriching section and in the other direction in the stripping section and the errors therefore tend to cancel for the machine as a whole. It follows that for a centrifuge in which most of the bowl is used as an enriching section or as a stripping section this cancellation would not occur and some appreciable error would result from the use of the standard Onsager-Cohen gradient equation. A modified Onsager-Cohen gradient equation is therefore recommended in preference to the standard Onsager-Cohen gradient equation. It is shown in the results of calculations that indeed very little effect is observed by neglecting the term in the gradient equation containing the second derivative of the concentration. DOE

N82-14500# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTER MODELING OF PIEZORESISTIVE GAUGES
G. L. Nutt and J. O. Hallquist 7 Aug. 1981 12 p refs Presented at the 1st Symp. on Gauges and Piezoresistive Mater., Archachon, Frances, 29 Sep. - 1 Oct. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-027964; UCRL-85763; CONF-810931-2) Avail: NTIS HC A02/MF A01

A computer model of piezoresistive gauge subject to shock loading is developed. The time-dependent two-dimensional response of the gauge is calculated. The stress and strain components of the gauge are determined assuming elastic-plastic material properties. The model is compared with experiment for four cases. An ytterbium foil gauge in a PPMA medium subjected to a 0.5 Gp plane shock wave, where the gauge is presented to the shock with its flat surface both parallel and perpendicular to the front. A similar comparison is made for a manganin foil subjected to a 2.7 Gp shock. The signals are compared also with a calibration equation derived with the gauge and medium properties accounted for but with the assumption that the gauge is in stress equilibrium with the shock medium. DOE

N82-14501# Rottenkolber Holo-System G.m.b.H., Obing (West Germany).

MANUFACTURE AND TESTING OF A PROTOTYPE HOLOGRAPHIC SERIES TIRE TESTER Final Report

Hans Rottenkolber Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 27 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-192; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5,70

The testing unit is for nondestructive tire testing, especially for retreads. The working conditions in the production area and the effects on the unit or its components were determined. The elaborated equipment draft meets production requirements. However, the cost is too high for broad application.
Author (ESA)

N82-14502# Schenck (Carl) A.G., Darmstadt (West Germany).

AUTOMATIC BALANCING SYSTEM WITH LASER UNIT Final Report

Alfred Giers Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 28 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-008; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5,90

A balancing plant for miniature rotor gyroscopes was developed, using a pulsed laser for material removal in order to perform the necessary measurements and balancing processes in one single operation. The plant, consisting of five units, is depicted and illustrated by graphs and photographs. The tests were intended to check the machine, to get experimental data, and to investigate the possibilities of this technology. As compared to conventional procedures, this automatic balancing process with laser compensation is rationalized, is faster, is cheaper, and provides a higher balancing quality. The test results confirm the system reliability as well as the process advantages.
Author (ESA)

N82-14503# Spindler und Hoyer G.m.b.H. und Co., Goettingen (West Germany).

DEVELOPMENT OF A LINEAR MEASURING SYSTEM Final Report

Detlef Mallwitz and Rainer Lessing Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 97 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-031; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20,20

Tests show that photographic coatings marked with corresponding graduations are usable for linear measuring systems. Processing of holographically produced gratings on adequate photo plates, the structures of which are appropriate for a linear measuring system is described. Gratings of this kind can be copied in a simple way under certain conditions. Two operational models are discussed which can be used in the range of the optical length measuring technique with digital indication of measured values. Author (ESA)

N82-14504# Zeiss (Carl), Oberkochen (West Germany).

PMP 80 AUTOMATIC PHOTOMETER Final Report, Sep. 1979

Goetz-Reinhard Lampe Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 32 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-051; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,70

Personnel and apparatus cost reduction as well as guaranteeing and improving the quality of the results are emphasized. This photometer permits interlaced measurement of the enzyme kinetics of several samples over a fairly long period of time and at a high sample rate. It also allows determination of substrate concentrations by end point measurements. In enzyme activity determinations, an aliquot volume of serum is added to the appropriate substrate and transferred to a transport chain with plastic cells. The samples are accurately thermostatically controlled in a contact thermostat. After the addition of the inducing reagent the samples are mixed. The sample chain is then fed to a microprocessor-controlled photometer which, after carrying out regression calculations, documents the activities plus errors on an integrated printer. Author (ESA)

N82-14505# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Bereich Raumfahrt.

ANALYSIS AND CALCULATION OF SPECIAL SYSTEM ASPECTS FOR THE CONICAL SCAN RADIOMETER (PHASE A) Final Report

Helmut Klostermann, Klaus Thoermer, and Wolfgang Ruehe Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 86 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-003; ISSN-0170-1339) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,10

Alternative concepts for a flexible radiometer system for Sun calibration were analyzed, imposing as few constraints as possible to the spacecraft system. The principal possibilities for the variation of the instantaneous field of view (FOV) were investigated in order to provide better data correlation for the wide FOV system. The influence of polarization on the system energy transfer function was calculated. Results make it possible to specify a system with higher performance concerning system calibration and geometrical data correlation. The theoretical limits of radiometric resolution due to polarization errors are given.
Author (ESA)

N82-14120# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).

A HALLEY MULTICOLOR CAMERA

H. U. Keller, C. Arpigny (Liege Univ.), C. Barbieri (Padua Univ.), P. Benvenuti (Padua Univ.), L. Biermann (Max-Planck Inst. fuer Physik und Astrophysik, Munich), R. M. Bonnet (CNRS, Verrieres-le-Buisson, France), S. Cazes (CNRS, Verrieres-le-Buisson, France), G. Colombo (Padua Univ.), C. B. Cosmovici (DFVLR, Oberpfaffenhofen, West Germany), W. A. Delamere (Ball Aerospace Systems Div., Boulder, Colorado) et al *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 105-117 refs (For primary document see N82-14107 05-12)
Avail: NTIS HC A06/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

N82-14390# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

THIN FILM TRANSDUCERS FOR TEMPERATURE AND HEAT FLUX MEASUREMENTS

Jean-Claude Godefroy *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 9-19 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-14506# California Univ., Santa Barbara. Quantum Inst.

THE UCSB FREE ELECTRON LASER EXPERIMENTAL PROGRAM

Luis R. Elias 1980 11 p refs
(AD-A106084; QIFEL-005/80) Avail: NTIS

HC A02/MF A01 CSCL 20/5

The main goal in this paper is threefold: (1) to present a summary of the UCSB experimental FEL program to date, (2) to discuss future FIL device development objectives, and (3) to talk briefly about the future of applied research at UCSB. Electrostatic accelerators appear to offer great promise for generating the electron beams needed by free electron lasers. Their conventional technology is well understood and there are good reasons to believe that this technology can be used with free electron lasers. The UCSB level experimental program is based on the use of electrostatic accelerators in conjunction with the ideas developed by Elias and Madey. GRA

N82-14507# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.

TEMPERATURE DEPENDENCE OF O2 (1 DELTA) + O2 (1 DELTA) AND I (2P SUB 1/2) + O2 (1 DELTA) ENERGY POOLING

Raymond F. Heidner, III, Carrol E. Gardner, G. I. Segal, T. M. El-Sayed, and J. V. V. Kasper (California Univ., Los Angeles) 1 Sep. 1981 38 p refs
(Contract F04701-80-C-0081)
(AD-A105817; TR-0081(6940-01)-2; SD-TR-81-65) Avail: NTIS HC A03/MF A01 CSCL 20/5

The electronic-energy pooling reactions forming O2(1 sigma) are of critical importance to the overall mechanism of the O2(1 delta) - I atom transfer laers. In this study, we report temperature-dependent rate coefficient data for O2(1 delta reactions). GRA

N82-14508# Naval Postgraduate School, Monterey, Calif.

A PROBABLE BREAKDOWN MECHANISM IN THE ELECTRON BEAM SUSTAINED CO2 LASER M.S. Thesis

Rodney Deayne Timm Jun. 1981 33 p refs
(AD-A105809) Avail: NTIS HC A03/MF A01 CSCL 20/5

A stable high-pressure electric discharge is produced using an electron-beam to ionize the gas in the CO2 -N2 -He laser. The important electron loss process in this type of discharge are recombination and attachment. The prominent instability in the nonself-sustaining discharge is the streamer which leads to arcing and complete breakdown of the gas. A qualitative analysis of streamer formation based on the ionization and resultant electron production of secondary electrons setup an avalanche starting the chain which produces a highly conductive channel and results in the complete breakdown of the gas is presented. The onset of streamer formation at the anode is aided by local release and ionization of neutral atoms. The resulting increase of the plasma pressure leads to an increase of the potential and the onset of unipolar arcing. Author (GRA)

N82-14509# Defence Research Establishment Valcartier (Quebec). Research and Development Branch.

ANGLE OF ARRIVAL AND IRRADIANCE STATISTICS OF LASER BEAMS IN TURBULENCE

L. Bissonnette and R. Cote Jul. 1981 45 p refs In ENGLISH; FRENCH summary
(AD-A105639; DREV-R-4213/81) Avail: NTIS HC A03/MF A01 CSCL 20/5

Measurement of the local angle of arrival in a laser beam traveling in turbulence is achieved by frequency demodulating the heterodyne signal derived from the interference of a probe and a reference beam. The resulting data are then used to demonstrate that the statistical correlation between the angle of arrival and the irradiance is weak and that the random angle of arrival is normally distributed. These results constitute a direct confirmation of two fundamental assumptions of the theoretical model of propagation in turbulence previously developed at the Defence Research Establishment Valcartier (DREV). Author (GRA)

N82-14510# Defense Intelligence Agency, Washington, D.C. Directorate for Scientific and Technical Intelligence.

BIBLIOGRAPHY OF SOVIET LASER DEVELOPMENTS, NO. 47, MAY - JUNE 1980

9 Apr. 1981 124 p
(AD-A105585; DIA-DST-2700Z-002-81) Avail: NTIS HC A06/MF A01 CSCL 20/5

This is the Soviet Laser Bibliography for May-June 1980, and is No. 47 in a continuing series on Soviet laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; crystal growing; theoretical aspects of advanced lasers; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; laser spectroscopy; beam-target interaction; and plasma generation and diagnostics. Author (GRA)

N82-14511# Defense Intelligence Agency, Washington, D.C. Directorate for Scientific and Technical Intelligence.

BIBLIOGRAPHY OF SOVIET LASER DEVELOPMENTS, NO. 48, JULY - AUGUST 1980

Jul. 1981 138 p
(AD-A105578; DIA-DST-2700Z-003-81) Avail: NTIS HC A07/MF A01 CSCL 20/5

This is the Soviet Laser Bibliography for July-August 1980, and is No. 48 in a continuing series on Soviet laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; theoretical aspects of advanced lasers; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; laser spectroscopy; beam-target interaction; and plasma generation and diagnostics. Author (GRA)

N82-14512# National Bureau of Standards, Washington, D.C. Electrical Measurements and Standards Div.

LASER COOLING AND TRAPPING OF NEUTRAL ATOMS Summary Report, 1 Oct. 1980 - 30 Sep. 1981

William D. Phillips Sep. 1981 5 p refs
(Contract N00014-81-F-0011; RR0110303; NR Proj. 407-007)
(AD-A105750) Avail: NTIS HC A02/MF A01 CSCL 20/5

This report demonstrated the deceleration of an atomic sodium beam by means of photon pressure. Near resonant light from a counter-propagating (cooling) laser beam is absorbed by the atoms, causing them to slow down. The deceleration is observed by means of Doppler velocity analysis using a second (probe) laser. We modulate the cooling laser on and off while using time resolved observation of the fluorescence induced by the second laser; this allows observation of the effects of the cooling laser when the cooling laser light is not present. We have used circularly polarized light and a strong magnetic field in the direction of the cooling laser to avoid optical pumping of the atoms, a process which limits the amount of momentum which can be transferred to the atoms. GRA

N82-14513# Illinois Univ. at Urbana.

HOT ELECTRON EFFECTS OF IMPORTANCE FOR MICRON AND SUBMICRON DEVICES Final Report

K. Hess and G. E. Stillman Sep. 1981 77 p refs
(Contract N00014-79-C-0768)
(AD-A105616) Avail: NTIS HC A05/MF A01 CSCL 20/5

During the period of this contract fifteen papers have been published. The manuscripts concern lateral transport in superlattices, transport at extremely high electric fields and impact ionization and quantum well heterojunction lasers. Author (GRA)

N82-14514# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Chemistry.

LASER-INDUCED-FLUORESCENCE STUDIES OF FRAGMENT IONS: CH( ) AND CD( ) Ph.D. Thesis

Anthony OKeefe Aug. 1981 114 p refs
(Contract W-7405-eng-48)
(DE82-001010; LBL-13258) Avail: NTIS HC A06/MF A01

The dynamics of ion molecular interactions within a mass selective rf quadrupole ion trap were studied for several ion molecule systems. Laser induced fluorescence is used as a probe of the internal energy distributions of molecular ions under collision free conditions and under controlled collision conditions. The ions were produced from methane through electron impact ionization/dissociation. The energy distributions reflect the dynamical partitioning of dissociation exothermicity, excepting short lived electronic states. DOE

N82-14515# California Univ., Livermore. Lawrence Livermore Lab.

NONADIABATIC CORRECTIONS AND DETRAPPING FOR VARIABLE PARAMETER FREE ELECTRON LASERS

J. C. Garrison and J. Wong 10 Aug. 1981 18 p refs Presented at the 1981 Workshop on Free Electron Lasers, Sun Valley, Idaho, 22 Jun. 1981
(Contract W-7405-eng-48)
(DE81-028425; UCRL-86568; CONF-8106145-1) Avail: NTIS HC A02/MF A01

In analytical treatments of free electron laser (FEL) problems an adiabatic, approximation is used in which the electron orbits are calculated as though the wiggler and signal fields were constant. The slow spatial variations of the field amplitudes are then reinstated at the end of the calculation. A check to see if secular effects are present in the corrections to the adiabatic approximation for FEL problems is described. The nonstatic action angle transformation produces a new Hamiltonian in which the nonadiabatic effects are explicitly given by the term g kappa. Perturbation expansions in g are valid in the interior of the trapping region with the exception of an exponentially small neighborhood of the separatrix. By using Lie transform perturbation theory it was found that secular effects are absent to O(g), and the O(g2) secular effects are not important in the FEL application. DOE

N82-14516# Los Alamos Scientific Lab., N. Mex.

LASER-INDUCED FLUORESCENCE TECHNIQUE TO MONITOR H2S (PR 16023) Quarterly Technical Progress Report, 1 May 1981 - 31 Jul. 1981

30 Jul. 1981 6 p
(Contract W-7405-eng-48)
(DE81-028784; DOE/TIC-1028784) Avail: NTIS HC A02/MF A01

A means to detect H2S at the 0.1-ppM level via laser induced fluorescence (LIF) was developed. The upper electronic states of H2S are repulsive, which necessitates the use of a two laser pump probe technique. The fluorescence signal is related back to the H2S concentration prior to dissociation and affords a real time diagnostic for the species of interest. DOE

N82-14517# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Angewandte Physik.

HIGH POWER GAS LASER FOR MATERIAL PROCESSING OF ORGANIC AND INORGANIC MATERIAL Final Report

Gerd Herziger and Karlheinz Banse Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 36 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-025; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20,40

Gas lasers in the ultraviolet range were tested with respect to their applicability for micromachining of thin films. A system which is able to remove volumes < 1 cu micron of target supporting layers, without damaging them or their surroundings was developed. A KrF TEA excimer laser proved to be best suited. With this system, the projected performance (P = 50.000W T = or > 2 X 10E minus 8sec) is exceeded. The direct absorption of 40 to 100 nsec laser pulses in the target yields shock free material processing. Long pulse TEA laser action, however, is only realized if preionization and system parameters are properly adjusted so that the laser discharge is homogeneous throughout the whole pulse length. The expected advantages of short wavelengths with regard to direct absorption of radiation in the target at reduced shock load was demonstrated. Author (ESA)

N82-14518# Haas (Carl) G.m.b.H. und Co., Schramberg (West Germany). Geschaeftsbereich Strahltechnik.

LASER TOOL: PULSED SOLID STATE LASER FOR WELDING AND ABLATION OF MATERIAL Final Report, Sep. 1979

Paul Seiler Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 20 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-043; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4,20

A system of lasers, focusing and viewing optics, control and power electronics, coolers and mechanical components, was designed. The incorporated Nd-glass pulsed lasers have pulse energies up to 100 Wsec and average output powers up to 100 W. The machines are used in precision and electrical engineering, mainly combined with industrial handling. Being ideally suited for automation, this method has a wide range of application in the field of spot and seam welding of small parts and is widely used to make electric contacts. Author (ESA)

N82-14389# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

KrF LASER PUMPING BY ELECTRON BEAM DISCHARGE

Jean Bonnet, Gerard Fournier, and Daniel Pigache *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 3-7 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-14519*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

APPLICATION OF SURFACE ANALYSIS TO SOLVE PROBLEMS OF WEAR

Donald H. Buckley 1981 35 p refs Presented at the Ideele Traeger der SURTEC Berlin '81, West Germany, 29 Jun. - 3 Jul. 1981
(NASA-TM-82753; E-1069) Avail: NTIS HC A03/MF A01 CSCL 20K

Results are presented for the use of surface analytical tools including field ion microscopy, Auger emission spectroscopy analysis (AES), cylindrical mirror Auger analysis and X-ray photoelectron spectroscopy (XPS). Data from the field ion microscope reveal adhesive transfer (wear) at the atomic level with the formation of surface compounds not found in the bulk, and AES reveals that this transfer will occur even in the presence of surface oxides. Both AES and XPS reveal that in abrasive wear with silicon carbide and diamond contacting the transition metals, the surface and the abrasive undergo a chemical or structural change which effects wear. With silicon carbide, silicon volatilizes leaving behind a pseudo-graphitic surface and the surface of diamond is observed to graphitize. B.W.

N82-14520# Massachusetts Inst. of Tech., Cambridge. National Magnet Lab.

CONCEPTUAL DESIGN OF SUPERCONDUCTING MAGNET SYSTEM FOR MAGNETOHYDRODYNAMIC (MHD) ENGINEERING TEST FACILITY (ETF) 200 MWe POWER PLANT Final Report

Nov. 1981 259 p refs
(Grant NAG3-100)
(NASA-CR-165053; FBNML-NAS-E-2) Avail: NTIS HC A12/MF A01 CSCL 14B

A super conducting magnet system conceptual design to meet the requirements of a magnetohydrodynamic test facility power train is presented. A detailed description of the magnet is accompanied by numerous engineering drawings. Functional requirements, system interfaces, and design criteria are reviewed. System limits, safety precautions, operational procedures, and maintenance procedures are discussed. R.J.F.

N82-14521# Ballistic Research Labs., Aberdeen Proving Ground, Md.

MEASUREMENT PROBLEMS IN HIGH VELOCITY IMPACT EXPERIMENTS Final Report

William Lawrence Sep. 1981 39 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A105550; ARBRL-MR-03135) Avail: NTIS
HC A03/MF A01 CSCL 19/4

Reverse-ballistic experiments have been performed at the Ballistic Research Laboratory using a light-gas gun to launch targets against stationary long-rod projectiles instrumented with foil type resistance strain gages. Signals from the strain gages are recorded, measured and analyzed to obtain information about the dynamic behavior of the projectile as it penetrates the target. Signals from the strain gages are commonly divided so that part of the signal may be displayed at higher amplification for better resolution of detail at low strains. Data recorded at different deflection sensitivities and data from gages at diametrically opposed locations on the projectiles are combined for the analysis. Error in the data reduction, especially error in time, is apparent from the poor agreement of the combined data. Different sources of error have been identified but the primary source is optical distortion in the oscilloscope cameras and in the copying camera. This report briefly reviews the instrumented rod experiment and the analytical procedure but primarily considers sources of error. A modified calibration procedure is introduced to minimize the error in the data reduction. Author (GRA)

N82-14522# Petro-Lewis Corp., Denver, Colo.
FIELD DEMONSTRATION OF THE CONVENTIONAL STEAM DRIVE PROCESS WITH ANCILLARY MATERIALS Quarterly Report, Jul. - Sep. 1980
David R. Alden and Rod L. Eson (Chemical Oil Recovery Co., Bakersfield, Calif.) 7 Oct. 1980 13 p
(Contract DE-FC03-79SF-10762)
(DE81-026849; DOE/SF-10762/T2) Avail: NTIS
HC A02/MF A01

This field test demonstrates an improved oil recovery process through the use of ancillary materials to steam drive injectors. The ancillary materials are used to reduce injection in steam channels and thus force the injected steam to enter alternate flow paths. Evaluation of the injection well production curves shows that currently there is over 125 incremental barrels of oil per day being produced by the four patterns receiving ancillary materials and that the incremental oil rate has been steadily increasing since the initial treatment in January, 1980. Preliminary work began on the evaluation of the producing temperatures, steam injection profiles, chemical tracer surveys, casing vent gas emissions and residual oil saturations in the six observation wells drilled. DOE

N82-14523# Chemical Oil Recovery Co., Bakersfield, Calif.
FIELD DEMONSTRATION OF THE CONVENTIONAL STEAM DRIVE PROCESS WITH ANCILLARY MATERIALS Quarterly Report, Oct. - Dec. 1980
Rod L. Eson and A. M. Shannon (Petro-Lewis Corp., Denver) Jan. 1981 28 p
(Contract DE-FC03-79SF-10762)
(DE81-026962; DOE/SF-10762/T1) Avail: NTIS
HC A03/MF A01

This field test demonstrates an improved oil recovery process through the use of ancillary materials to steam drive injectors. The ancillary materials are used to reduce injection in steam channels and thus force the injected steam to enter alternate flow paths. During the first two months of this quarter up to 190 incremental barrels of oil per day were produced by the four patterns receiving ancillary materials. The evaluation of the producing temperatures, steam injection profiles, chemical tracer surveys, casing vent gas emissions and residual oil saturations in the six observation wells drilled is addressed. DOE

N82-14524# Institut de Soudure, Paris (France).
STUDY OF PROBLEMS POSED BY THE EMISSION OF FUMES DURING WELDING Final Report [ETUDE DES PROBLEMES POSES PAR L'EMISSION DE FUMEES AU COURS DU SOUDAGE]
Senlis, France Centre Technique des Industries Mecaniques Jan. 1981 78 p refs In FRENCH
(Contract CETIM-4-76-2693)
(CETIM-12-Y-213; IS-7-989) Avail: NTIS HC A05/MF A01

Application of a measurement method for sampling and analyzing dust in the fumes is described. Arc welding using a rutile coated electrode of painted sheet metal is characterized. Results show the instantaneous dust concentration to which a welder is subjected at his work station. The measuring equipment is depicted and its functioning is explained. Author (ESA)

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-14525# General Electric Co., St. Petersburg, Fla. Atomic Power Lab.
ULTRASONIC INSPECTION OF FULL-SIZE BOLTING SPECIMENS
T. A. Wagner, P. Anderson, and D. A. Gavin Nov. 1980 20 p
Presented at the ASNT Fall Conf., Atlanta, 12 Oct. 1981
(Contract DE-AC12-76SN-00052)
(KAPL-4129; CONF-811003-1) Avail: NTIS
HC A02/MF A01

The development and use of an automatic ultrasonic inspection procedure for bolts with heater bores are described. Application of the procedure to accelerated lifetime studies in full-size bolting specimens is explained. Inspection results and conclusions are given. DOE

N82-14526# Centre National d'Etudes Spatiales, Toulouse (France). Centre Spatial.
COMPUTER PROGRAM DESIGN: METHODOLOGY, RELIABILITY, AND QUALITY CONTROL [GENIE LOGICIEL: METHODOLOGIE, ASSURANCE ET CONTROLE QUALITE]
Elie Dorio Jan. 1981 289 p In FRENCH; ENGLISH summary
(CNES-NT-98) Avail: NTIS HC A13/MF A01

Software methodologies are considered, including definition of program requirements, program design, coding, tests and maintenance. Project management on the levels of computer program production, verification, and certification is discussed. The need for discipline in software engineering practices in order to find realistic solutions to programming problems is emphasized. A program quality control method is presented as an example. Inspection techniques, operations organization, objectives and expected results are specified. Author (ESA)

N82-14527# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
CONTROL METHODOLOGY: NONDESTRUCTIVE TESTING IN THE AERONAUTICS INDUSTRY [METHODOLOGIE DE CONTROLE: CONTROLE NON DESTRUCTIF DOMAINE AERONAUTIQUE]
J. Odorico 12 Jun. 1980 39 p refs In FRENCH Presented at l'Ecole d'Ete Franco-Quebecoise Conf., Montreal, 14-23 Jul. 1980
(SNIAS-812-551-110) Avail: NTIS HC A03/MF A01

Quality control in aircraft production using nondestructive tests is considered. Training and administration are covered. Examples of procedures involving suppliers, constructors, and clients are given. Topics include: use of X-rays; holography; examination of alloys; and ultrasonic testing. The need for an integrated approach is stressed, involving client, inspectors, etc. Author (ESA)

N82-14158# Mathematischer Beratungs- und Programmierungsdienst G.m.b.H. Dortmund (West Germany).
QUALITY CONTROL FOR MISSION-CRITICAL FLIGHT DYNAMIC OPERATIONS
H. Mueller and R. E. Muench (ESOC, Darmstadt, West Germany) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 333-340 ref
(For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20 % others)

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N82-14528# Indian Inst. of Tech., Bombay. Dept. of Aeronautical Engineering.
COUPLED FLEXURAL TORSIONAL VIBRATION OF AN ECCENTRICALLY STRETCHED STRIP
S. Suryanarayan and Ashok Joshi Mar. 1981 14 p
(AE-TN-8131) Avail: NTIS HC A02/MF A01

Flat rectangular strips subjected to an eccentric axial load exhibit coupled transverse lateral torsional modes of vibration. The coupling between the transverse lateral and torsional modes depends on the axial load and the amount of eccentricity. The effect is to increase the torsional frequency and to decrease the transverse lateral frequency. S.L.

N82-14529*# Flow Research, Inc., Kent, Wash.
DEVELOPMENT OF AN EFFICIENT PROCEDURE FOR CALCULATING THE AERODYNAMIC EFFECTS OF PLANFORM VARIATION Final Report
J. E. Mercer and E. W. Geller Washington NASA Dec. 1981 36 p refs
(Contract NAS1-15977)
(NASA-CR-3489; FLOW-RR-186) Avail: NTIS HC A03/MF A01 CSCL 20K

Numerical procedures to compute gradients in aerodynamic loading due to planform shape changes using panel method codes were studied. Two procedures were investigated: one computed the aerodynamic perturbation directly; the other computed the aerodynamic loading on the perturbed planform and on the base planform and then differenced these values to obtain the perturbation in loading. It is indicated that computing the perturbed values directly can not be done satisfactorily without proper aerodynamic representation of the pressure singularity at the leading edge of a thin wing. For the alternative procedure, a technique was developed which saves most of the time-consuming computations from a panel method calculation for the base planform. Using this procedure the perturbed loading can be calculated in about one-tenth the time of that for the base solution. Author

N82-14530*# Rohr Industries, Inc., Chula Vista, Calif.
FABRICATION OF TITANIUM MULTIWALL THERMAL PROTECTION SYSTEM (TPS) CURVED PANEL Interim Report
W. Blair Hampton, Va. NASA. Langley Research Center Aug. 1981 29 p refs
(Contract NAS1-15646)
(NASA-CR-165754) Avail: NTIS HC A03/MF A01 CSCL 20K

A method is described for fabricating curved T1-6Al-4V multiwall panels having a single radius of curvature of 30.5 cm (12 inches). A panel 30.5 x 30.5 x 1.7 cm (12 x 12 x .688 inch) having 4 dimpled sheets, 5 undimpled sheets, and stepped side closures was designed, fabricated and delivered for evaluation. Tool design for skin and dimpled sheet forming are described as well as layup and liquid interface diffusion bonding. A.R.H.

N82-14531*# Arizona Univ., Tucson. Dept. of Aerospace and Mechanical Engineering.
THE APPLICATION OF PROBABILISTIC DESIGN THEORY TO HIGH TEMPERATURE LOW CYCLE FATIGUE
Paul H. Wirsching Nov. 1981 224 p refs
(Grant NAG3-41)
(NASA-CR-165488) Avail: NTIS HC A10/MF A01 CSCL 20K

Metal fatigue under stress and thermal cycling is a principal mode of failure in gas turbine engine hot section components such as turbine blades and disks and combustor liners. Designing for fatigue is subject to considerable uncertainty, e.g., scatter in cycles to failure, available fatigue test data and operating environment data, uncertainties in the models used to predict stresses, etc. Methods of analyzing fatigue test data for probabilistic design purposes are summarized. The general strain life as well as homo- and hetero-scedastic models are considered. Modern probabilistic design theory is reviewed and examples are presented which illustrate application to reliability analysis of gas turbine engine components. A.R.H.

N82-14532# Technische Hogeschool, Delft (Netherlands).
A GEOMETRICALLY NONLINEAR FINITE ELEMENT SHELL THEORY Ph.D. Thesis
Leo Johan Ernst 1981 265 p refs
Avail: NTIS HC A12/MF A01

A curved triangular thin, elastic finite shell element is presented with expressions for the deformation tensors in terms of cartesian displacement components. In deriving these expressions the element is considered and originally flat plate with initial curvature. Approximations are accepted in the specification of the element geometry. Consequently the expressions for the deformation tensors are approximations are provided. An important parameter used in the error estimates is the maximum slope, theta, of middle surface of the element with respect to its basic triangle. This parameter vanished with continuously decreasing linear dimensions of the elements. Approximate deformation tensors are derived both in terms of displacement components with respect to the original reference position and with respect to a special reference position. The latter description is especially suitable for caes with arbitrary large displacements and rotations, since a possible rigid body motion of the element is separated from the displacement pattern. S.L.

N82-14533*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
USE OF TWO-DIMENSIONAL TRANSMISSION PHOTOELASTIC MODELS TO STUDY STRESSES IN DOUBLE-LAP BOLTED JOINTS Contractor Report, Apr. 1980 - Jun. 1981
M. W. Hyer and D. H. Liu Nov. 1981 111 p refs Sponsored in part by Army
(Grant NsG-1621)
(NASA-CR-165812) Avail: NTIS HC A06/MF A01 CSCL 20K

The stress distribution in two hole connectors in a double lap joint configuration was studied. The following steps are described: (1) fabrication of photoelastic models of double lap double hole joints designed to determine the stresses in the inner lap; (2) assessment of the effects of joint geometry on the stresses in the inner lap; and (3) quantification of differences in the stresses near the two holes. The two holes were on the centerline of the joint and the joints were loaded in tension, parallel to the centerline. Acrylic slip fit pins through the holes served as fasteners. Two dimensional transmission photoelastic models were fabricated by using transparent acrylic outer laps and a photoelastic model material for the inner laps. It is concluded that the photoelastic fringe patterns which are visible when the models are loaded are due almost entirely to stresses in the inner lap. E.A.K.

N82-14534# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Applied Mathematics Group.
DETERMINATION OF COMPLEX CHARACTERISTICS VALUES AND VECTORS FROM SINUSOIDAL EXCITATIONS AT NEAR RESONANCE FREQUENCIES Interim Report, Aug. 1978 - Jun. 1980
C. L. Keller Jun. 1981 133 p refs
(AF Proj. 2304)
(AD-A105624; AFWAL-TR-80-3136) Avail: NTIS HC A07/MF A01 CSCL 20/11

In this report an iterative procedure for determining complex characteristic values and vectors from measured values of the steady state response to sinusoidal excitations is described. An extension of the procedure which enables it to cope with the case of two close characteristic values is presented also. Results of numerical experiments performed to investigate these procedures are given. This report contains also extensive background material and an examination of the methods of Ibrahim, of Wittmeyer and of Link and Vollan. Author (GRA)

N82-14535# California Univ., Berkeley. Dept. of Mechanical Engineering.

SMALL STRAIN ACCOMPANIED BY MODERATE ROTATION

P. M. Naghdi and L. Vongsarnpigoon Aug. 1981 58 p refs
(Contract N00014-75-C-0148; NR Proj. 064-436)
(AD-A105592; UCB/AM-81-4) Avail: NTIS HC A04/MF A01 CSCL 20/11

This paper is mainly concerned with the construction of a theory of material behavior with infinitesimal strain accompanied by moderate rotation. After introducing a definition for moderate rotation and establishing a number of theorems pertaining to its properties, precise estimates are obtained for the (local) moderate rotation and related kinematical results in terms of infinitesimal strain. For motions which result in small strain accompanied by moderate rotation, the invariance of constitutive equations under arbitrary superposed rigid body motions is discussed with particular reference to an elastic material. Author (GRA)

N82-14536# Maryland Univ., College Park. School of Engineering.

STRESS DISTRIBUTION AROUND A CIRCULAR HOLE IN SQUARE PLATES, LOADED UNIFORMLY IN THE PLANE, ON TWO OPPOSITE SIDES OF THE SQUARE. OPTIMUM SHAPES OF CENTRAL HOLES IN SQUARE PLATES SUBJECTED TO UNIAXIAL UNIFORM LOAD. OPTIMIZATION OF HOLE SHAPES IN CIRCULAR CYLINDRICAL SHELLS UNDER AXIAL TENSION

M. Erickson, A. J. Durelli, and K. Rajaiah Sep. 1981 39 p refs
(Contracts N00014-81-K-0186; N00014-76-C-0487)
(AD-A105598; Rept-55; Rept-56; Rept-57) Avail: NTIS HC A03/MF A01 CSCL 20/11

The following three reports are being distributed together and reprints of the papers previously published with their texts in scientific journals are used for the purpose. Circumstantial reasons, primarily cost, made this procedure advisable. One of the reports (56) deals with the optimization of the shape of an originally circular hole present in a square plate, loaded uniformly and uniaxially in its plane. A second report (57) deals with the optimization of the shape of the hole, when the hole is present in a cylindrical shell subjected to axial tension. The third report (55) deals with the necessary background for the optimization of the hole in the square plate. GRA

N82-14537# Naval Weapons Center, China Lake, Calif.

STRESS IN SINGLE LAP JOINTS OF DISSIMILAR MATERIALS Research Report, 1979 - 1980

W. J. Stronge and O. E. R. Heimdahl Jun. 1981 22 p refs
(ZR0000101)
(AD-A105519; AD-E900131; NWC-TP-6264) Avail: NTIS HC A02/MF A01 CSCL 13/5

Two overlapping, semi-infinite plates may be joined by a thin adhesive bond. The stresses in these joints when the plates are loaded in tension are of interest for determining joint strength. A two-dimensional, plane strain, finite element analysis of bonded lap joints between dissimilar plates has been performed. The analysis includes stretching and bending of the plates and rotation of the joint. The stress distributions obtained for the lap joint depend on the elastic moduli and Poisson ratios of the adherends, and on the ratio of relative thickness of the plates to bond length. GRA

N82-14538# Oak Ridge National Lab., Tenn.

TESTING PROGRAM FOR CONCRETE AT TEMPERATURES TO 894 DEG K

D. J. Naus, C. B. Oland, and G. C. Robinson 1981 15 p refs Presented at the 6th Intern. Conf. on Struct. Mech. in Reactor Technol., Paris, 17 Aug. 1981
(Contract W-7405-eng-26)
(DE81-029144; CONF-810801-53) Avail: NTIS HC A02/MF A01

The variations in mechanical properties of a limestone aggregate concrete and a lightweight insulating concrete exposed to elevated temperatures were defined. Four test series were conducted: (1) unconfined compression; (2) shear; (3) rebar bond; and (4) sustained loading (creep). DOE

N82-14539# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

HIGH-TEMPERATURE FATIGUE BEHAVIOR OF UNIRRADIATED V-15Cr-5Ti TESTED IN VACUUM

K. C. Liu 1981 5 p refs Presented at Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028557; CONF-810831-19) Avail: NTIS HC A02/MF A01

In vacuum fatigue tests for unirradiated V-15Cr-5Ti tested at room temperature, 550 and 650 C, respectively, are presented. A power law equation to correlate the total strain range and cycles to failure was analyzed. It is shown that on the basis of strain range the vanadium alloy is about the same as the stainless steel below 10,000 cycles to failure but becomes superior above the point. It is suggested that endurance limits may exist at strain ranges of approximately 0.7 and 0.6% at 550 and 650 C, respectively. DOE

N82-14540# Rockwell International Corp., Canoga Park, Calif. Energy Systems Group.

ELEVATED-TEMPERATURE (600 DEG F), MANUAL CONTACT ULTRASONIC EXAMINATION

C. W. Donnelly 1981 8 p Presented at the ASNT Fall Conf., Atlanta, 12 Oct. 1981
(Contract DE-AC15-76CL-02395)
(CONF-811003-2) Avail: NTIS HC A02/MF A01

Manual contact ultrasonic examination at temperatures above 250 F is not successful in providing meaningful results because the sensitivity of standard transducers degrades rapidly at 250 F and above. By using standard transducers and commercially available wedges and couplants in combination with a couplant/cooler system, manual contact ultrasonic examination is performed at 600 F for an essentially 100 percent duty cycle in conformance to the sensitivity requirement of the ASME B and PV Code. DOE

N82-14541# Institut de Soudure, Paris (France).

STUDY OF THE FATIGUE BEHAVIOR OF WELDED JOINTS, CROSS STRESSED Final Report [ETUDE DU COMPORTEMENT A LA FATIGUE DE JOINTS SOUDES SOLLICITES SELON LE TRAVERS COURT]

F. Maltrud Senlis, France Centre Technique des Industries Mecaniques 28 Aug. 1980 57 p In FRENCH
(Contract CETIM-4-76-2692)
(CETIM-12-Y-200; IS-10-830) Avail: NTIS HC A04/MF A01

Fatigue tests were carried out on welded steel specimens. The influence of inclusions in the welded specimens on fatigue resistance was studied. Results show that inclusions influence fatigue behavior only when they provoke damage before fatigue testing. For example, damage can occur due to stresses which develop during welding of flanged specimens. Barring damage beforehand, fatigue performance of cross stressed assemblies is independent of the presence of inclusions. This behavior is illustrated by the ultrasonic detection of inclusions in specimens and by measurements of crack propagation velocity. Author (ESA)

N82-14542# Institut de Soudure, Paris (France).

FATIGUE TEST PROGRAM ON NOTCHED IMPLANTED SPECIMENS, CRACKED AND UNCRACKED Final Report [PROGRAMME D'ESSAIS DE FATIGUE SUR IMPLANTS ENTAILLES, FISSURES OU NON]

M. S. Debiez and J. P. Doucet Senlis, France Centre Technique des Industries Mecaniques Sep. 1980 42 p refs In FRENCH
(Contract CETIM-4-77-5622)
(CETIM-12-Y-261; IS-10-882) Avail: NTIS HC A03/MF A01

The influence of the geometry as well as of the presence of a cold crack on the fatigue behavior of zones subjected to thermal stresses was studied. The S-N curves do not show the expected differences for the variables tested, but rather indicate that crack geometry and presence are not determining factors with a notch of acute dimensions. The minimal endurance obtained for three types of steel (annealed E 36, E 620, and 25 CD 4) is 150 N/sq mm under cyclic traction. A fracture mechanical analysis was also performed. Results are only valid for uncracked notched specimens. Crack initiation and propagation phases are described and their coefficients are shown dependent on structure. Author (ESA)

N82-14543# Ecole Nationale Superieure de Techniques Avancees, Paris (France).
STRESS-STRAIN ANALYSIS OF VERY THICK PLATES Ph.D. Thesis - Paris Univ. 6 [ANALYSE DES CONTRAINTES ET DES DEPLACEMENTS DANS LES PLAQUES TRES EPAISSES]
El Dessouki El Said ElSoaly Sep. 1980 251 p refs In FRENCH; ENGLISH summary
(Rept-138) Avail: NTIS HC A12/MF A01

Theoretical, experimental and numerical analyses of thick isotropic homogeneous plates under different loading conditions are presented. The theory takes into account the effects of transverse shear deformation. The analysis uses a variational theorem, having the longitudinal displacements, the transverse shear stresses and the transverse normal stress as variables. The displacement and stress fields are expressed as finite series. Each term of these series is the product of two functions: the first is a given function of the normal transverse variable and the second is an unknown function of the middle plane variables. These expressions are handled as a functional. The third equation of equilibrium and the boundary conditions on the upper and lower surfaces of the plate are satisfied by introducing a Lagrange multiplier which has the significance of a generalized deflection. A complete system of partial differential equations and boundary conditions is sufficient to determine all the unknown functions results. Author (ESA)

N82-14544# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Werkstoff-Forschung.
THE CRACK GROWTH RESISTANCE CURVE AS A ONE-PARAMETER REPRESENTATION OF STABLE CRACK PROPAGATION IN THIN-WALLED STRUCTURES Ph.D. Thesis - Ruhr Univ.
Werner Setz Oct. 1980 268 p refs In GERMAN; ENGLISH summary Report will also be announced as translation ESA-TT-727
(DFVLR-FB-80-35; ESA-TT-727) Avail: NTIS HC A12/MF A01; DFVLR, Cologne DM 41,60

Tensile tests were performed on center cracked specimens with aluminum alloys. The effect of the variation in specimen width and the initial crack length growth resistance curve (R-curve) was investigated. The crack length was measured simultaneously by the potential and the compliance method. The potential method yields less scatter than the compliance method. The potential based R-curves were used to predict failure by the R-curve concept. The failure prediction for elastic plastic behavior supports a standard test method using R-curve measurements. Author (ESA)

N82-14545 Rensselaer Polytechnic Inst., Troy, N. Y.
LASER SPECKLE DOPPLER VELOCIMETER TECHNIQUE APPLIED TO MEASURE TORSIONAL VIBRATIONS OF ROTATING SURFACES Ph.D. Thesis
Seetha Ramaiah Mannava 1981 245 p
Avail: Univ. Microfilms Order No. 8123386

A dual beam Laser Speckle Doppler Velocimeter technique was developed to measure torsional vibrations of rotating surfaces. A closed form analytical solution of this noncontact optical sensor was developed from fundamental principles using electromagnetic Helmholtz formulation of Huygens-Fresnel principle with Kirchhoff's approximations of the boundary conditions for the scattered light from a rough surface whose height above a certain mean level is approximated by a Gaussian probability density function. Laboratory experiments conducted using the Laser Speckle Doppler Velocimeter on a rotating disk spinning at 60 r/s and torsionally excited in the frequency range of zero to 10 Hz are in excellent agreement with the analytical results. Dissert. Abstr.

N82-14546 Purdue Univ., Lafayette, Ind.
DYNAMIC SAFETY ANALYSIS Ph.D. Thesis
H. Scott Norville 1981 117 p
Avail: Univ. Microfilms Order No. 8123685

A method is developed to compute first-passage probabilities for linear elastic structures subjected to random base accelerators. The base accelerations consist of both horizontal and vertical components. Specifically, the effect of the vertical accelerations on the first passage probabilities are investigated. The solution of the first-passage problem is accomplished by discretizing the process in both space and time. Spatial barriers are placed on the response process of the structure. The probabilities associated with the structural response remaining within the specified barriers are computed. For a single-story frame undergoing horizontal accelerations, the model of the frame is seen to have a significant effect on first passage probabilities. For a two-story frame, only a shear frame model is used. First-passage probabilities are computed for arbitrary barriers on the displacement responses of the stories under the action of horizontal base accelerations only. Dissert. Abstr.

N82-14547 California Univ., Los Angeles.
INFLUENCE OF A FREE SURFACE ON THE ELASTODYNAMIC FIELD OF A FINITE CRACK Ph.D. Thesis
Steven F. Stone 1981 190 p
Avail: Univ. Microfilms Order No. 8122857

The effects of the presence of a free surface on the stress and displacement field in the neighborhood of and at large distances away from a crack of finite length subject to time dependent loading is studied. The crack is assumed to be arbitrarily oriented and an arbitrary distance from the free surface. Both antiplane and inplane cases are considered. For each problem, the low and intermediate frequency dependent crack opening displacements and stress factors are calculated by solving the integral equations. High frequency asymptotic methods are employed to complete the solution. Expressions are developed for diffracted fields and surface displacements for incident Rayleigh waves calculated for the inplane problem. Results indicate the location and orientation of a crack with respect to a free surface can profoundly effect the field quantities in the neighborhood of the crack and the subsequent tendency of the crack to propagate. Dissert. Abstr.

N82-14391# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
DESCRIPTION AND NUMERICAL SIMULATION OF THERMAL FATIGUE TESTS ON SMOOTH SPECIMENS
Georges Cailletaud, Jean-Pierre Culie, and Henri Kaczmarek *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 21-33 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

N82-14392# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
HOMOGENIZATION METHOD FOR REINFORCED PLATE BUCKLING PREDICTION
Pierre Suquet *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 35-43 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981 (For primary document see N82-14388 05-31)
Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N82-14548*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

RADAR CORRELATION WITH ICE DEPOLARIZATION MEASUREMENTS OF THE 28.56 GHz COMSTAR BEACON AND ASSOCIATED CROSS POLARIZATION STATISTICS

Julius Goldhirsh Aug. 1980 51 p refs
(NASA-CR-166717; JHU/APL-SIR-80U-026)
HC A04/MF A01 CSCL 08L

Two cases of radar correlation with significant ice depolarization events accompanied by low copolarization fades of the 28.56 GHz COMSTAR beacon signal are described. The copol and cross polarization levels of the 28.56 GHz beacon signal were sequentially monitored. A nearby high resolution S band radar pointing along the Earth satellite path monitored the simultaneous ice and rain reflectivity. For the first case, excellent correlation is noted between the cross polarization events and relatively large and extended ice reflectivities along a segment of the Earth satellite path at altitudes near and above the 0 C isotherm. In the second case, the radar and receiver data strongly suggest the cross polarization mechanism is due to a hailshaft which intersects the path at altitudes well below the 0 C isotherm. Extracted depolarization signals were statistically characterized for the 1979 data base in terms of a cumulative distribution as well as monthly and time of day statistics under the given condition that the copol fade is less than 2 dB. B.W.

N82-14549*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A SIMULATION STUDY OF THE RECESSION COEFFICIENT FOR ANTECEDENT PRECIPITATION INDEX

Bhaskar J. Choudhury and Bruce J. Blanchard Nov. 1981 25 p refs Submitted for publication
(NASA-TM-83860) Avail: NTIS HC A02/MF A01 CSCL 08M

The antecedent precipitation index (API) is a useful indicator of soil moisture conditions for watershed runoff calculations and recent attempts to correlate this index with spaceborne microwave observations have been fairly successful. It is shown that the prognostic equation for soil moisture used in some of the atmospheric general circulation models together with Thornthwaite-Mather parameterization of actual evapotranspiration leads to API equations. The recession coefficient for API is found to depend on climatic factors through potential evapotranspiration and on soil texture through the field capacity and the permanent wilting point. Climatologial data for Wisconsin together with a recently developed model for global isolation are used to simulate the annual trend of the recession coefficient. Good quantitative agreement is shown with the observed trend at Fennimore and Colby watersheds in Wisconsin. It is suggested that API could be a unifying vocabulary for watershed and atmospheric general circulation modelers. Author

N82-14550*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SPECTRAL ATMOSPHERIC OBSERVATIONS AT NANTUCKET ISLAND, MAY 7-14, 1981

T. A. Talay and L. R. Poole Nov. 1981 56 p refs
(NASA-TM-83196) Avail: NTIS HC A04/MF A01 CSCL 04A

An experiment was conducted by the National Langley Research Center to measure atmospheric optical conditions using a 10-channel solar spectral photometer system. This experiment was part of a larger series of multidisciplinary experiments performed in the area of Nantucket Shoals aimed at studying the dynamics of phytoplankton production processes. Analysis of the collected atmospheric data yield total and aerosol optical depths, transmittances, normalized sky radiance distributions, and total and sky irradiances. Results of this analysis may aid in atmospheric corrections of remote sensor data obtained by several sensors overflying the Nantucket Shoals area. Recommendations are presented concerning future experiments using the described solar photometer system and calibration and operational deficiencies uncovered during the experiment. A.R.H.

N82-14551# Technische Hogeschool, Delft (Netherlands). Dept. of Physics.

WATER AERATION WITH PLUNGING JETS

Jan vandeDonk 1981 169 p refs
(ISBN-90-6231-088-5) Avail: NTIS HC A08/MF A01

Application of plunging water jets to large scale aeration processes is studied. Entrainment measurements made with various nozzle types with diameters up to 10 centimeters are given. A hydrodynamic model in which the plunging jet is continued below the water surface in a conical form is described. The entrained air in this biphasic cone is broken up into fine bubbles. This model contains four parameters which describe: (1) the water entrainment by the jet, (2) the gas fraction of the recirculating fluid, (3) the liquid velocity at which bubbles escape from the cone and (4) the ratio between the width of the downflowing liquid velocity and gas fraction profiles. The oxygen transfer from the air bubbles into the water of the plunging jet aerator is studied as well as the influence of contaminants on the aeration constant. Two examples of practical application of the plunging water jet: an aeration basin for the treatment of waste water and a fermentor for the production of yeast are presented. These examples confirm that plunging jet aerators can achieve mass transfer efficiencies up to 2 kgO2/kWh using air in commercial scale applications. R.J.F.

N82-14552*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

RELIABLE AERIAL THERMOGRAPHY FOR ENERGY CONSERVATION Final Report

John R. Jack and Robert L. Bowman Aug. 1981 35 p refs
Original contains color illustrations
(Contract DE-AI01-79CS-20270)
(NASA-TM-81766; DOE/NASA/20270-1; E-828) Avail: NTIS HC A03/MF A01 CSCL 08B

A method for energy conservation, the aerial thermography survey, is discussed. It locates sources of energy losses and wasteful energy management practices. An operational map is presented for clear sky conditions. The map outlines the key environmental conditions conductive to obtaining reliable aerial thermography. The map is developed from defined visual and heat loss discrimination criteria which are quantized based on flat roof heat transfer calculations. E.A.K.

N82-14553# European Space Agency, Paris (France).

APPLICATION OF REMOTE SENSING DATA ON THE CONTINENTAL SHELF: PROCEEDINGS OF AN EARSeL-ESA SYMPOSIUM

N. Longdon, comp. and G. Levy, comp. Jul. 1981 298 p refs Symp. held in Voss, Norway, 19-20 May 1981 Prepared in cooperation with Royal Norwegian Council for Scientific and Industrial Research, Kjeller
(ESA-SP-167; ISSN-0379-6566) Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

A symposium which studied the application of remote sensing techniques to oceanography, fishing, pollution monitoring, and coastal zone management is reported. National programs, operational requirements, and state of the art are reviewed. The use of satellites, including LANDSAT, Seasat and ERS is highlighted. For individual titles, see N82-14554 through N82-14588.

N82-14554# European Space Agency, Paris (France). Directorate of Application Programmes.

ERS-1: MISSION OBJECTIVES AND SYSTEM CONCEPT

G. Duchossois and D. Lennertz *In its* Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 5-16 (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The objectives of the first ESA remote sensing (ERS-1) satellite program are the development and promotion of commercial applications related to a better knowledge of ocean parameters; monitoring of sea ice and icebergs for industrial oceanic activities at high latitudes; and to increase understanding of coastal zones and global ocean processes which, together with the monitoring of the polar regions, can provide a major contribution to the World Climate Research Program. The ERS-1 system (space segment and ground segment) is described including the instruments which are part of the Earth applications payload, active microwave instrumentation, an ocean color monitor, and a radar altimeter. The procedures used in selecting the Earth sciences payload complement, the parameters which can be obtained from the applications payload, and a development plan for the ERS-1 system are outlined. Author (ESA)

N82-14555# European Space Agency, Paris (France).

THE NEED FOR INTEGRATED OFF-SHORE, REAL-TIME INFORMATION AND MANAGEMENT SYSTEMS

L. W. Morley *In its* Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 17-21 refs (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Integrated planning, in which data from ships, aircraft, data buoys, and shore or satellite-borne radar are used for ocean surveillance is urged. The Atlantic coast of Canada is used as an example of the inefficiency of current management methods. Traffic control, search and rescue missions, pollution control, weather forecasting, and fisheries management are directed by separate government agencies, each with its own information system. A coordinated approach would reduce waste and allow full advantage to be taken of technological developments, e.g., satellites, unknown when the agencies were created. Author (ESA)

N82-14556# Naval Oceanographic Office, Washington, D. C.

THE POTENTIAL AND REQUIREMENTS FOR SPACE OCEANOGRAPHY

Ross N. Williams *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 23-27 refs (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The use of satellite systems for communications, navigation, weather, oceanographic, and military purposes is reviewed. The trend is towards automated measurement, analysis, forecast and display of environmental effects. Both Marisat and Fleetsatcom, the shore based naval environmental data network and the commercial satellite data distribution system solve display and dissemination problems; and large dedicated computer capacity and atmospheric prediction models solve analysis and prediction software problems. Meteorological satellite programs together with more traditional atmospheric and oceanographic data imputs is used to demonstrate that globally sensed oceanographic data to initialize the models is not yet fully available, but could be determined with improved accuracy and resolution by employing an ocean satellite system, such as NOSS. Author (ESA)

N82-14557# Conoco Norway, Inc., Oslo.

OFFSHORE PETROLEUM INDUSTRY ENVIRONMENTAL DATA REQUIREMENTS: EMPHASIS ON REMOTE SENSING

Ronald L. Gratz *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 31-43 refs (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Data quality and coverage requirements for the remote sensing of oceanographic and meteorological factors affecting the development of offshore hydrocarbon resources are considered, using a combination of fine-grid hindcasting and surface truth measurements. The establishment of data banks able to accumulate 20-30 years of climatological data for use in future designs is recommended. Special measurement programs are planned for data collection during storms. Remote sensing was used to measure several factors important to the petroleum industry, i.e., waves, winds, currents, and sea ice. Application to weather forecasting is shown. The use of surface truth data in the calibration and verification of measurements for remote sensing is suggested. Possible communications channels for the exchange of remote sensing data are assessed. Author (ESA)

N82-14558# Nice Univ. (France). Lab. d'Ocenagraphie Biologique.

REQUIREMENTS IN POLLUTION MONITORING AND COASTAL MANAGEMENT

J. Constans (Fondation Cousteau, Monaco) and G. Leger *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 45-46 (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Results of tests during a survey of Mediterranean coasts by the research vessel Calypso show general chemical pollution to be too low to justify the rapid decrease in fish, seaweed, and phanerogam populations. However, mechanical and/or physical attacks on the environment, such as land filling and associated constructions, or massive discharges of warm effluents have a devastating impact on coastal ecosystems. Development decision are based on individual/local perspectives. An approach, based on clear, overall, long-term strategies is called for before irreversible damage is done. Optimum use should be made of existing data aquisition techniques, such as ESA and Telespazio satellite imagery. Author (ESA)

N82-14559# Institute of Marine Research, Bergen (Norway).

FISHERIES INVESTIGATIONS AND MANAGEMENT BENEFITS FROM REMOTE SENSING

R. Ljoeen *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 47-54 refs (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Physical and biological research in areas of particular interest to Norwegian fisheries is described and present problems connected with the management of cod, haddock and mackerel are indicated. Echo sounding techniques are used and salinity and water temperature at different depths are noted. The significance of ice edge dynamics, ocean fronts, and vertical stratification to biological conditions and fish distribution is surveyed. The application of remote sensing is primarily valued as a tool for providing real time physical data in order to optimize biological sampling programs and for indicating drift and variable distributions of eggs and young fish. The utility of IR and visible images from polar orbiting satellites for monitoring purposes is briefly considered. Author (ESA)

N82-14560# Centre National d'Etudes Spatiales, Toulouse (France).

STATE-OF-THE-ART IN USING A SPACEBORNE ALTIMETER AND SCATTEROMETER FOR THE DETERMINATION OF WIND, SEA STATE, AND MARINE AND ICE DYNAMICS

M. Lefebvre and J.-L. Hyacinthe (Centre National pour l'Exploitation des Oceans, Paris) *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 57-58 (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The accuracy of Seasat altimeter and scatterometer data is discussed. Sea state obtained through altimeter pulse shape and wind data obtained by altimeter pulse amplitude or, with direction by the scatterometer backscatter, are compared with model and map values. The altimeter performs well, but not the scatterometer. Altimeter data can be used to investigate marine and ice dynamics on a large scale, e.g., a sea. For seasonal and interannual fluctuation of oceanic circulation, a few cm accuracy on the relative satellite trajectory without geoid accuracy is needed. For the mean ocean circulation and the absolute determination of current, a 10 cm accurate geoid is needed. Author (ESA)

N82-14561# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE SEASAT COMMERCIAL DEMONSTRATION PROGRAM

S. W. McCandless (User Systems Engineering, Annandale, Va.), B. P. Miller (Econ, Inc., Princeton, N.J.), and D. R. Montgomery *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 59-72 refs (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The background and development of the Seasat commercial demonstration program are reviewed and the Seasat spacecraft and its sensors (altimeter, wind field scatterometer, synthetic aperture radar, and scanning multichannel microwave radiometer) are described. The satellite data distribution system allows for selected sets of data, reformatted or tailored to specific needs and geographical regions, to be available to commercial users. Products include sea level and upper atmospheric pressure, sea surface temperature, marine winds, significant wave heights, primary wave direction and period, and spectral wave data. The results of a set of retrospective case studies performed for the commercial demonstration program are described. These are in areas of application such as marine weather and ocean condition forecasting, offshore resource exploration and development, commercial fishing, and marine transportation. Author (ESA)

N82-14562# Copenhagen Univ. (Denmark). Inst. of Physical Oceanography.

THE COLOR OF THE SEA AND ITS RELATION TO SURFACE CHLOROPHYLL AND DEPTH OF THE EUPHOTIC ZONE

N. K. Hoejerslev *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 73-76 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Algorithms based on signal ratios from the available channels in Nimbus 7, for the estimation of chlorophyll and phaeophytin are found to be inadequate. This is shown for coastal waters where the concentration of yellow substance (dissolved organic matter) which masks the chlorophyll signal can be variable by orders of more than 10. However, a single globally valid algorithm, based on two wavelengths in the blue and green parts of the spectrum, gives a good estimation of the depth of the euphotic zone as well as for intermediate quanta percentage levels. It is suggested that a relationship be sought involving the depth of the euphotic zone and plankton pigments, standing stock, and primary productivity. Author (ESA)

N82-14563# Canada Centre for Remote Sensing, Ottawa (Ontario).

A RECOMMENDED SENSOR PACKAGE FOR THE DETECTION AND TRACKING OF OIL SPILLS

H. H. Zwick, R. A. Neville, and R. A. ONeil *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 77-88 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Oil on open water under clear skies is a relatively easy target, oil under ice is very difficult. Results of remote sensing experiments acquiring data for system specification are discussed. Instruments assessed include active microwave sensors for the measurement of backscatter from oil slicks, scanners for oil thickness determination from the spectral character of reflected radiation and solar heating effects, and laser fluorosensors for oil-specific detection in oil and water and/or ice mixtures and for Raman scattering from the surface. The most effective system for the wide variety of conditions experienced in Canada consists of a laser fluorosensor, an ultraviolet/infrared line scanner, a side-looking airborne radar, low light level television and photographic cameras. These sensors are supported by real time data annotation, display, and analysis systems. Author (ESA)

N82-14564# Oceanroutes, Inc., Palo Alto, Calif.

AN EVALUATION OF SEASAT-A DATA IN RELATION TO OPTIMUM TRACK SHIP WEATHER ROUTING AND SITE SPECIFIC FORECASTING FOR THE OFFSHORE OIL INDUSTRY

C. Daley, R. G. Johnson, and J. C. Thomson *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 93-102 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The usefulness of Seasat-A SASS and altimeter measurements is reviewed. Five oceanic areas were selected: the Gulf of Alaska, central and western north Atlantic, eastern north Pacific, southern Indian Ocean, and the North Sea. Both Seasat-aided and conventional analyses were used in offshore hindcast and optimum ship routing situations. Where conventional observations are relatively dense, Seasat wind and wave data have greater impact in determining the shape of major map features than in positioning the features. In data sparse areas, Seasat data permit greater definition of surface features as well as their precise location. The use of Seasat data in optimum ship routing is quantified by means of comparative studies in the Gulf of Alaska. Author (ESA)

N82-14565# University Coll., Galway (Ireland).

DETERMINATION OF SURFACE WIND SPEED FROM REMOTELY MEASURED WHITECAP COVERAGE, A FEASIBILITY ASSESSMENT

E. C. Monahan, I. G. Muircheartaigh, and M. P. Fitzgerald *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 103-109 refs (For primary document see N82-14553 05-43)
(Grant N00014-78-G-0052)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The relationship between wind speed and oceanic whitecap coverage was determined to facilitate the development of an algorithm for the remote determination of low elevation wind speed from the teledetected enhancement of sea surface microwave brightness temperature due to the presence of whitecaps. A basis is provided for estimating (and correcting for) the contribution to radiance, coming from whitecaps, in the various visible bands measured by satellite instruments. Combining results of the JASIN experiment with earlier observations, the effect of variations in air and sea surface temperature on this relationship is investigated. The wind speed at which whitecaps appear, and thus the lowest wind speed susceptible to teledetection via whiecap signature, is reassessed. Author (ESA)

N82-14566*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

THE NORWEGIAN REMOTE SENSING EXPERIMENT (NORSEX) IN A MARGINAL ICE ZONE

B. Farrelly (Bergen Univ.), J. Johannessen (Bergen Univ.), O. M. Johannessen (Bergen Univ.), E. Svendson (Bergen Univ.), K. Kloster (C. Michelson Inst.), I. Horjen (Norwegian Hydrodynamic Labs.), W. J. Campbell (Geological Survey, Tacoma, Wash.), J. Crawford, R. Harrington, L. Jones et al *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 113-118 refs Sponsored in cooperation with NASA Bergen Univ., and Royal Norwegian Council for Scientific and Industrial Research (For primary document see N82-14553 05-43)
(Grants N00014-80-G-0003; NATO-9-4-02-SRG.19)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125 CSCL 17I

Passive and active microwave measurements from surface based, airborne, and satellite instruments were obtained together with surface observations northwest of Svalbard. Emissivities of different ice patches in the ice edge region over the spectral range from 4.9 to 94 GHz are presented. The combination of a 6.6 GHz microwave radiometer with a 14.6 GHz scatterometer demonstrates the usefulness of an active/passive system in ice classification. A variety of mesoscale features under different meteorological conditions is revealed by a 1.36 GHz synthetic aperture radar. Ice edge location by Nimbus 7 scanning multifrequency microwave radiometer is shown accurate to 10 km when the 37 GHz horizontal polarized channel is used. Author (ESA)

N82-14567# Institute of Oceanographic Sciences, Wormley (England).

A PRELIMINARY EVALUATION OF SEASAT PERFORMANCE OVER THE AREA OF JASIN AND ITS RELEVANCE TO ERS-1

T. D. Allan and T. H. Guymer *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 119-127 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The microwave sensor data of Seasat was checked using Joint Air-Sea Interaction Experiment surface observations. The results of passes under light, and moderate to strong winds, show that sea surface conditions are revealed more accurately by Seasat than by weather charts based on ship reports. Wind observations are similar for satellite and surface observers. Author (ESA)

N82-14568# Centre National d'Etudes Spatiales, Paris (France).

SPOT DATA SIMULATIONS: LITTORAL APPLICATIONS

N. Lannelongue *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 129-130 (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Remote sensing SPOT imagery was simulated. User plans for taking advantage of the data are elaborated and the adequacy of SPOT specifications is assessed. Since actual satellite data are not available, a set of aerial remote sensing images with a photographic camera and multispectral scanner was used. The Loire estuary is being studied. Data in the visible and near infrared, of high resolution and good accessibility, are being collected. Simulations show that images can be used immediately after launch. Author (ESA)

N82-14569# National Inst. of Oceanography, Goa (India).

STUDIES OF THE INDIAN CONTINENTAL SHELF: APPLICATION OF REMOTE SENSING DATA

L. V. GangadharaRao and V. R. Rao (Indian Space Research Organization, Bangalore) *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 131-141 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Early studies of coastal areas of India are reviewed and the state of the art of current studies is presented, including the identification of possible applications of remote sensing data in the context of ongoing programs and future study needs. Multidisciplinary studies with the Indian oceanographic research vessel RV Gaveshani are considered. Ocean engineering and coastal zone management (with application to offshore drilling and harbor development, fisheries, and pollution monitoring are discussed. Remote sensing data from satellites can contribute significantly to this program. Author (ESA)

N82-14570# Centre d'Etudes de Meteorologie Spatiale, Lannion (France). Antenne ORSTOM.

A SHORT REVIEW OF AN OCEANOGRAPHIC USE OF METEOSAT DATA BY THE ORSTOM REMOTE SENSING SERVICE

J. Citeau and F. Domain (Centre Oceanologique de Bretagne, France) *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 145-156 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Using the thermal infrared band, migration of schools of fish along coasts of Mauritania and Senegal was determined according to the latidudinal position of a thermal front and equatorial upwelling in the Gulf of Guinea was detected. For the latter study, an oceanographic program was instigated to furnish sea truth data. Despite a high degree of cloud cover, the Meteosat data shows good agreement on sea surface temperature. The beginning and development of the equatorial upwelling are adequately followed. The zonal extension of a large warm water band confirms that this upwelling is a phenomenon related to the equatorial process and that no advection from southern latitudes appears on the surface. Author (ESA)

N82-14571# Dundee Univ. (Scotland). Carnegie Lab. of Physics.

COASTAL ZONE RESEARCH USING REMOTE SENSING TECHNIQUES

A. P. Cracknell and S. M. Singh *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 157-168 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

For the prelaunch exercise in connection with the EURASEP project, sea truth data was analyzed with data collected simultaneously from LANDSAT. Maps of chlorophyll and suspended sediment distributions over a substantial area of the North Sea off the Belgian and Dutch coastlines were generated. Analysis results of simultaneous airborne ocean color scanner data are compared. The NIMBUS 7 coastal zone color scanner (CZCS) in flight calibration data are compared with preflight calibration constants. Atmospheric corrections are applied. A satisfactory set of procedures for calibrating CZCS data, correlating that data with sea truth measurements, were established. Author (ESA)

N82-14572# Ecole Nationale Superieure des Mines, Sophia-Antipolis (France). Centre de Teledetection et d'Analyse des Milieux Naturels.

OIL SPILLS: LARGE SCALE MONITORING BY LANDSAT

M. Albuisson, J. M. Monget, and L. Wald *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 171-172 refs Sponsored by Joint Research Center of the European Communities (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Oil pollution at sea using the LANDSAT multispectral scanner channel was detected. The variations of the reflection coefficient between rough sea and the oil spill was measured. The oil spill flattens the sea and reflects in only one direction while the capillary waves of rough sea scatter the light; a fraction of the incident light only reaches the satellite. An underestimate of pollution is expected during winter because of low solar elevation angles. This method is used to inventory pollution by hydrocarbons in the Mediterranean Sea. An estimation from 800 images shows the cumulative area covered by hydrocarbons, spread over the Mediterranean Sea each year, as 175,000 sq km. Author (ESA)

N82-14573# Ministere de l'Environment et du Cadre de Vie, Neuilly (France). Direction de la Prevention des Pollutions.

THE OPERATIONAL OIL POLLUTION SURVEILLANCE SYSTEM BEING USED IN FRANCE: FORECASTED FUTURE DEVELOPMENTS IN CONSIDERATION OF THE NATO/CCMS REMOTE SENSING PILOT STUDY CONCLUSIONS

J. M. Massin *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 173-180 ref (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The requirements of an ideal system for detecting, identifying, classifying, mapping, and tracking oil spills are defined. A core package consisting of a human observer, photographic cameras, side-looking airborne radar, infrared/ultraviolet line scanner, and passive television is proposed. The French airborne remote sensing system is shown to satisfy these requirements. Problems with a remote sensing system able to operate under all weather conditions, transmitting specific information in real time which permits the identification of hydrocarbons without having to check in situ, are discussed. Satellite possibilities are estimated. Author (ESA)

N82-14574# Centre d'Etudes Techniques de l'Equipment, Aix-en-Provence (France).

OPERATIONAL USE OF REMOTE SENSING FOR COASTAL ZONE MANAGEMENT AND POSSIBLE CONTRIBUTION OF SPECIALIZED SATELLITES

C. Valerio *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 183-188 (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

A multispectral remote sensing system, based on aerial photography, was developed in order to satisfy the requirements of coastal zone management. Data requirements (hydrodynamics, nature of the sea bottom, shore and land use) are interpreted in remote sensing terms. Technoeconomic results for study of the sewage treatment in Antibes on the Mediterranean coast are taken as a remote sensing example. Surface currents were investigated under different wind and climatic conditions. Vertical temperature and salinity profiles show vertical thermal stratification of the sea in that area. Author (ESA)

N82-14575# Canada Centre for Remote Sensing, Ottawa (Ontario).

RECENT WORK IN PASSIVE OPTICAL IMAGING OF WATER

H. H. Zwick and S. C. Jain (Moniteq Ltd.) *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 189-194 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The estimation of water quality and bathymetry with passive optical multispectral data imagery are described. A water quality algorithm was developed from a coordinated set of airborne, multispectral scanner, in situ water, and ground based atmospheric measurements made during coastal zone color scanner NIMBUS 7 passes over Lake Ontario. Modeling of atmosphere, the air water interface, and macroscopic as well as microscopic water optical characteristics gives fresh water estimates of the independently varying chlorophyll-a and total suspended mineral concentrations. Remotely measured radiances are corrected for atmosphere, specular sky reflection, and water refractivity in effects. The required parameters are estimated using a computer optimization routine. Author (ESA)

N82-14576# Swedish Meteorological and Hydrological Inst., Norkoeping.

MARINE ACTIVITIES IN SWEDEN FOR WHICH REMOTE SENSING DATA MAY BE OF INTEREST

Thomas Thompson *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 195-196 (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Coastal and offshore activities (physical oceanography, marine meteorology, fishing, marine transportation, environmental protection, and climatology) for which satellite data, particularly microwave measurements available on an operational basis is useful, were reviewed. These involve weather analyses and forecasting, ship routing, ice accretion measurement, sea ice surveillance, sea surface temperature measurement, wave analyses and forecasts, pollution surveillance, sea water level measurement, and surface currents monitoring. Present data has many deficiencies which can be remedied by remote sensing techniques, but a fully operational system is required. Author (ESA)

N82-14577# Belfotop P.v.b.a., Wemmel (Belgium).

AIRBORNE REMOTE SENSING OF THE COASTAL ZONE

J. L. vanGenderen and G. DeMan *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 197-202 (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Using the European remote sensing aircraft platform, equipped with a digital multispectral scanner, two metric cameras, a realtime imaging system, and a digital navigation system, coastal zones were studied. The airborne platform and its operation are described. Practical problems associated with coastal airborne remote sensing are discussed (position fixing over water; day-night imaging; film processing; digital multispectral data processing) and examples from oil pollution monitoring, thermal discharge studies, coastal erosion, and surface wave direction analysis are given. Author (ESA)

N82-14578# Consiglio Nazionale delle Ricerche, Venice (Italy).

MULTITEMPORAL CALIBRATION OF LANDSAT IMAGES: A METHOD FOR IMPROVING THE MARINE PHENOMENA RECOGNITION, WITH AS EXAMPLE THE VENICE LAGOON

L. Alberotanza and A. Zandonella (Telespazio S.p.a.) *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 205-209 refs (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

A method for LANDSAT data multitemporal calibration, developed during work on pollution diffusion in the Venice lagoon, was examined. The method consists of a projection, onto a like signal feature space, of images recorded in different time periods, with the aim of enhancing and analyzing the common features. An application in marine phenomena recognition (discrimination between water brightness image and haze image) is discussed together with the results. Author (ESA)

N82-14579# Roskilde Univ. (Denmark). Institute of Geography, Socio-Economic Analysis and Computer Science.

MAPPING OF SURFACE CURRENTS IN GREENLAND FIORDS BY MEANS OF LANDSAT IMAGES

Sten Folving *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 211-219 refs (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Data from LANDSAT were used to study the propagation of meltwater into Soendre Stroemfjord. Water masses are classified on the basis of intensity profiles. These data trace meltwater sediment plumes and the character of the fronts between meltwater and pure fiord water. The main currents are mapped. River discharge from the south side is always up fiord due to pronounced Coriolis influence. A permanent down fiord current is found on the north side, with very complex patterns of current arising when the direction of the fiord channel shifts significantly. Author (ESA)

N82-14580# Southampton Univ. (England).

THE USE OF LANDSAT MSS TO OBSERVE SEDIMENT DISTRIBUTION AND MOVEMENT IN THE SOLENT COASTAL AREA

I. S. Robinson and D. Srisaengthong *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul 1981 p 221-232 refs Sponsored by UK Dept. of Industry (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The LANDSAT multispectral data from the Solent area was used to explore the potential value to marine scientists of archived data on estuaries and coastal regions. Ten images from the archives were digitally enhanced by color slicing, yielding useful qualitative information when interpreted as suspended sediment. Two further clear weather images were obtained. An approximate calibration algorithm based on six archives band-5 images and non coincident field observations show good agreement with a synoptic calibration of the last two images. The calibrated archived images show similar seasonal variations to those observed. The possibility, for certain estuaries, of obtaining quantitive information from archived data, using only recent field observations, is suggested. Author (ESA)

N82-14581# University Coll., Galway (Ireland).

THE FEASIBILITY OF USING REMOTELY SENSED COLOR AS AN INDEX OF IRISH COASTAL WATER PROPERTIES

E. C. Monahan, I. G. OMuircheartaigh, and M. P. Fitzgerald *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 233-237 refs (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Sea truth data collected at 250 oceanographic stations in coastal waters south and west of Ireland are used with statistical methodologies (including least squares fitting and the approach of Box and Cox) to obtain, where feasible, expressions for the relationships between water color and other surface water properties. Close correlation is found between surface salinity, Gelbstoff concentration and water color as expressed by Munsell hue. For the same waters, poor correlation is found between surface chlorophyll-a and water color. Such satellite instruments as the coastal zone color scanner are applicable to the delineation of coastal and offshore water boundaries near Ireland, but are not appropriate for estimating the standing crop of phytoplankton. Author (ESA)

N82-14582# Instituto de Investigaciones Pesqueras, Barcelona (Spain).

NECESSITY OF REMOTE SENSING FOR OCEAN STUDIES. PART 1: NORTHWEST AFRICAN MISSIONS, SAHARA-1 AND ATLOR-1

A. Ballester Nolla and C. Romeu Nedwed *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 239-241 refs (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Results of two oceanographic missions studying the general conditions of the northwest African offshore upwelling are summarized. Strong correlation between temperature, nutrients (nitrate, phosphate, and silicate) and chlorophyll is found. The upwelling area, 60 to 100 miles offshore, does not correspond to normally accepted mechanisms. Preliminary results suggest a collision between intermediate subequatorial water masses and the southward surface Canary current. The hypothesis is supported by tests comparing sea truth data with remotely sensed temperature data (NOAA 2 VHRR). The employment of remotely sensed data as a formal method of study, and not simply as a complementary aid, is discussed. Author (ESA)

N82-14583# Bergen Univ. (Norway). Dept. of Chemistry.

OIL SPILL IDENTIFICATION BY CHEMICAL ANALYSIS

O. Grahl-Nielsen and S. Wilhelmsen (Inst. of Marine Research, Bergen) *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 243-244 refs (For primary document see N82-14553 05-43)

Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Gas chromatographic analyses of the relative amounts of phenanthrene and dibenzothiophene and their alkylated derivatives are shown to distinguish crude oils from different parts of the world and crude oils from different fields in the North Sea Ekofisk area. These aromatic hydrocarbons are relatively unaffected by weathering and can be used for matching oils from oil spills with unweathered samples from the suspected source. The method was used to identify the source of an oil spill in Bergen harbor. It is shown that analysis of the relative amounts of dibenzothiophenes is sufficient to discriminate between crude oils in most cases. Author (ESA)

N82-14584# Norwegian Defence Research Establishment, Kjeller.

SEASAT SAR PROCESSING AT THE NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT

E. A. Herland *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 247-253 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

A digital processor which processes synthetic aperture radar (SAR) images from raw data gathered by a satellite platform is described. The basic principles of SAR are explained; the algorithms for the digital processor are given in terms of a block diagram, the different parts of which are considered separately. A routine for achieving automatic focusing in azimuth compression without satellite orbit information is discussed. Examples of imagery obtained by applying the algorithms to raw data from the Seasat-1 SAR system are shown. These indicate that it is possible to detect ships and that the system can be used for maritime surveillance purposes. Author (ESA)

N82-14585# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Optoelektronik.

MARITIME APPLICATIONS OF IMAGE PROCESSING AT DFVLR, OBERPFAFFENHOFEN, WEST GERMANY

Klaus A. Ulbricht *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 255-261 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

A digital interactive image analysis system is described and plans for a larger system are summarized. Examples of digital image processing of LANDSAT multispectral scanner images, showing contents otherwise easily missed, are given. Zones of different reflectivity, representing currents or drifts, are pointed out. The LANDSAT pictures of the Baltic Sea from four multispectral channels, processed to display the mass appearance of blue green algae, are included. Phytoplankton development in nearshore and inshore waters of the southwest Baltic, and its drift to deeper areas, are followed. Complexes of banks and channels revealed by LANDSAT in the Tay river and its delta in northeast Scotland are compared with current charts and maps of sediments. Author (ESA)

N82-14586# Atomic Energy Research Establishment, Harwell (England). Marine Technology Support Unit.

A LOOK AT NONSATELLITE REMOTE SENSING SYSTEMS FOR MARINE USE

R. J. Moulton *In* ESA Appl. of Remote Sensing Data of the Continental Shelf Jul. 1981 p 263-271 refs Sponsored by UK Dept. of Industry (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Cost/benefit figures are given (but in some cases the costs are distorted by military investment). The main applications of remote sensing are fish location, pollution monitoring, shallow water bathymetry, and sea state measurement (with its implications for optimum ship routing). User needs for a system are classified by choice of function, operational choices, technical decisions, relevant sensors, and sensing techniques (H.F.; radar; u.v.; fluorimetry; pulsed laser bathymetry; low light television; cameras; passive multifrequency microwave imaging. The U.S. oil surveillance system as well as Swedish and French systems are described. Nonsatellite systems can be best used to verify satellite data. Author (ESA)

N82-14587# Indian Space Research Organization, Bangalore.

SCIENTIFIC STUDIES USING BHASKARA SATELLITE MICROWAVE RADIOMETER (SAMIR) DATA: A SHORT OVERVIEW

V. R. Rao IN ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 273-278 refs (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

The three-channel microwave radiometric system SAMIR (two frequencies at 19 GHz and one at 22 Ghz) which is one of the two payloads on board the Bhaskara satellite, is described; along with the satellite itself and its complete payload. Data quality and methods of analysis are reviewed and the use of the data for investigation of sea states, water vapor and liquid water content in the atmosphere and over oceans adjoining India is examined. The derivation of these and further ocean related parameters (sea surface winds; rainfall rates) for monitoring sea state conditions in India was demonstrated. Author (ESA)

N82-14588# Norwegian Air Survey Co., Oslo.

USE OF SIDE LOOKING AIRBORNE RADAR (SLAR) FOR OIL POLLUTION MONITORING IN NORWAY

Svein Erik Hoest *In* ESA Appl. of Remote Sensing Data on the Continental Shelf Jul. 1981 p 281-282 ref (For primary document see N82-14553 05-43)
Avail: NTIS HC A13/MF A01; ESA, Paris FF 125

Integration of the system with a data annotation unit and a navigation system is outlined. Position data, date, time, and missinn parameters are annotated on film. Data are also displayed on a TV monitor while the radar image and data can be recorded on an onboard video cassette recorder. The installation of the system and its operation are covered and its potential use in oil spill monitoring (particularly at night and in low visibility) is explained. Other possible uses are summarized (search and rescue missions, geology, oceanography) together with possible future extensions of the sensor package and survey aircraft.
Author (ESA)

N82-14589# Virginia Univ., Charlottesville. Dept. of Environmental Sciences.

THE EFFECT OF SPATIAL VARIABILITY IN PRECIPITATION ON STREAMFLOW

Keith J. Beven and George M. Hornberger Sep. 1981 40 p refs Submitted for publication Prepared in cooperation with Illinois State Water Survey, Urbana
(Contract DAAG29-80-K-0053; Grant NSF ATM-78-08865)
(AD-A105955; TR-6; ARO-16816.3-GS) Avail: NTIS HC A03/MF A01 CSCL 04/2

In most approaches to modelling the rainfall/runoff process, a spatially lumped description of precipitation has been assumed adequate for modelling the important aspects of catchment response. However, theories of catchment hydrology as well as some recent modelling studies suggest that spatial variability in precipitation may be important in determining the characteristics of streamflow hydrographs. Data from two intensive rainfall recording experiments in Illinois have been used to examine the effects of rainfall pattern on stream hydrographs for summer convective storms. A threshold analysis was used to distinguish storms of markedly different pattern. A mixed deterministic/stochastic modelling procedure was used to determine the length of record required to differentiate the hydrograph characteristics resulting from storms of different patterns. It was found that differences in peak timing were highly significant but that differences in the distributions of peak flow and stormflow volumes were generally insignificant even given a long period of record.
Author (GRA)

N82-14590# Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.

SENSITIVITY ANALYSIS OF A MESOSCALE MOISTURE MODEL Final Report

James L. Cogan Mar. 1981 53 p refs
(DA Proj. 1L1-61102-B-53A)
(AD-A101528; ERADCOM/ASL-TR-0079) Avail: NTIS HC A04/MF A01 CSCL 04/1

Results from the model were computed for a variety of atmospheres and terrain types. A limited sensitivity analysis showed the effect of different model input parameters on meteorological variables for one vertical column through the atmosphere at a central horizontal grid point. A detailed analysis of selected cases for the entire domain of the model indicated the effect of input parameters on vertical velocity, precipitation amount, and precipitation rate. For one set of input parameters, analyses were performed of the variation of vertical velocity and precipitation every 2 hours for a 12-hour period. An example of a potential application to electro-optical algorithms is discussed and suggestions are made for future work. T.M.

N82-14591# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
SATELLITE OBSERVATIONS OF THE MT. ST. HELENS' ERUPTION OF 18 MAY 1980
Carl J. Rice 21 Aug. 1981 32 p refs
(Contract F04701-80-C-0081)
(AD-A105784; TR-0081(6640)-3; SD-TR-81-70) Avail: NTIS
HC A03/MF A01 CSCL 08/7

The explosive eruption of Mt. St. Helens on 18 May 1980 was monitored by infrared sensors aboard two U.S. Air Force satellites. Essentially continuous data are available following the initial sighting of the eruption cloud less than one minute after the earthquake which triggered the eruption. Dual monitoring permits triangulation so that both the horizontal and vertical development of the eruption can be determined with good temporal resolution. The sequence of events occurring early in the eruption can therefore be established. Author (GRA)

N82-14592# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
MEASUREMENTS OF RADAR BACKSCATTER FROM ARCTIC SEA ICE IN THE SUMMER
R. G. Onstott, S. Gogineni, C. V. Delker, and R. K. Moore Jul. 1981 16 p
(Contract N00014-76-C-1105)
(AD-A105586; CRINC/RSL-TR-331-20) Avail: NTIS
HC A02/MF A01 CSCL 17/9

Measurements of radar backscatter from sea ice located near Svalbarb and Greenland were made during the summer of 1980 as part of Project YMER. These data were acquired using the University of Kansas helicopter-borne microwave active spectrometer (HELOSCAT II) which operated over a frequency range of 8 to 18 GHz and an angle of incidence range of 0 degrees to 50 degrees. The presence of meltponds, the transformation of the snowpack into an ice layer, and the warmer temperatures have contributed to radar signatures that may be significantly different than those observed during the winter and spring. A wide variety of ice conditions were investigated. These included multiyear, thick first-year, thin first-year, young, new, and pressure-ridged ice. The measurement program is described herein. Author (GRA)

N82-14593# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
MEASUREMENTS OF RADAR BACKSCATTER FROM ARCTIC SEA ICE IN THE SUMMER. APPENDICES A AND B
R. G. Onstott, S. Gogineni, R. K. Moore, and C. V. Delker Jul. 1981 96 p
(Contract N00014-76-C-1105)
(AD-A105736; CRINC/RSL-TR-331-22) Avail: NTIS
HC A05/MF A01 CSCL 17/9

Computer output measurements of radar backscatter from arctic sea ice in the summer are presented, including raw radar backscatter data and sea ice salinity profiles N.W.

N82-14594# Department of Energy, Laramie, Wyo.
BIBLIOGRAPHY OF PUBLICATIONS DEALING WITH TAR SANDS
Sep. 1981 296 p
(DE81-026146; DOE/LETC/RI-81/2) Avail: NTIS
HC A13/MF A01

A compilation of technical reports, patents, journal articles and books on the development of tar sands (oil sands). The emphasis is on the US resource and its development. Included are articles on nondomestic tar sand and related heavy oil resources and their development. The subjects include: geology and resource evaluation; chemical and physical properties; in situ recovery; upgrading and refining; history; environmental; and miscellaneous (includes general survey papers; resource development, health and safety, economics, etc.). DOE

N82-14595# Tetra Tech, Inc., Columbus, Ohio.
EVALUATION OF DEVONIAN SHALE POTENTIAL IN EASTERN KENTUCKY/TENNESSEE
1981 104 p refs
(Contract DE-AC21-79MC-10389)
(DE82-001164; DOE/METC-121) Avail: NTIS
HC A06/MF A01

The US Department of Energy's Eastern Gas Shales Project is designed not only to identify the resource, but also to test improved methods of inducing permeability to facilitate gas drainage, collection, and production. Results as they pertain to the Devonian gas shales of the Appalachian basin in eastern Kentucky and Tennessee are presented. Geologic data and interpretations are summarized, and areas where the accumulation of gas may be large enough to justify commercial production are outlined. DOE

N82-14596# Tetra Tech, Inc., Columbus, Ohio.
EVALUATION OF THE EASTERN GAS SHALES IN PENNSYLVANIA
1981 103 p refs
(Contract DE-AC21-79MC-10389)
(DE82-001165; DOE/METC-119) Avail: NTIS
HC A06/MF A01

Areas in Pennsylvania where the accumulation of gas may be large enough to justify commercial production are outlined. Methods of inducing permeability to facilitate gas drainage, collection, and production are considered. DOE

N82-14597# Tetra Tech, Inc., Columbus, Ohio.
EVALUATION OF DEVONIAN SHALE POTENTIAL IN NEW YORK
1981 70 p refs
(Contract DE-AC21-79MC-10389)
(DE82-001163; DOE/METC-118) Avail: NTIS
HC A04/MF A01

A overview of preliminary geologic interpretations developed from the Eastern Gas Shales Project (EGSP) and related data concerning the deposition of the black shale facies and generation of natural gas in the Devonian shale sequence is presented. In New York, historical stratigraphic as well as current EGSP work established the Devonian clastic facies as the type section for eastern North America. Since the initial documented shale gas well was drilled in 1821 near Fredonia, New York, numerous shale gas wells and/or deeper wells with gas shows in the shale section have been reported in western and central New York. Organic rich, black shale facies were documented and defined to project potential favorable trends. DOE

N82-14598# Rockwell International Corp., Canoga Park, Calif. Energy Systems Group.
PASCO BASIN HYDROMETEOROLOGICAL STUDY
P. J. Gutknecht, W. A. Rice, C. R. Cole, and M. D. Freshley Apr. 1980 258 p refs Prepared in cooperation with Pacific Northwest Lab., Richland, Wash.
(Contract DE-AC06-77RL-01030)
(DE82-000283; RHO-BWI-C-98; PNL-3855) Avail: NTIS
HC A12/MF A01

Precipitation and evapotranspiration distributions for the Pasco Basin for use in groundwater recharge calculations are shown on maps. The parameters, calculation methods, sensitivity determinations, and fitting methods used in the development of these maps are discussed. DOE

N82-14599# Carson Helicopters, Inc., Perkasie, Pa. Geoscience Div.
NURE AERIAL GAMMA-RAY AND MAGNETIC RECONNAISSANCE SURVEY OF MAINE AND PORTIONS OF NEW YORK. VOLUME 1: DATA ACQUISITION, REDUCTION AND INTERPRETATION Final Report
Aug. 1981 273 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-000650; GJBX-327-81-Vol-1) Avail: NTIS
HC A12/MF A01

A rotary wing high sensitivity radiometric and magnetic survey of the State of Maine and of Binghamton, Ogdensubrg and Utica in New York State was performed. The survey was flown with a Sikorsky S58T helicopter equipped with a high sensitivity calibrated gamma ray spectrometer. The radiometric data were processed to compensate for Compton scattering effects and altitude ariations. The data were normalized to 400 feet terrain clearance. The reduced data are presented in the form of stacked profiles, standard deviation anomaly plots, histogram plots and microfiche listings. DOE

N82-14600# Carson Helicopters, Inc., Perkasie, Pa.
NURE AERIAL GAMMA-RAY AND MAGNETIC RECONNAISSANCE SURVEY OF MAINE AND PORTIONS OF NEW YORK, VOLUME 2 Final Report
Jul. 1981 124 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-000781; GJBX-327-81-Vol-2-SHERBROOKE) Avail: NTIS HC A06/MF A01

Contents includes: the flight line base map, anomaly maps (uranium, thorium, potassium, uranium/thorium, uranium/potassium, thorium/potassium), total count map, magnetic field map, uranium map, thorium map, potassium map, ratio maps for uranium/thorium, uranium/potassium, thorium/potassium, radiometric multiple-parameter stacked profiles, magnetic and ancillary stacked profile data, and histograms. DOE

N82-14601# Carson Helicopters, Inc., Perkasie, Pa.
NURE AERIAL GAMMA-RAY AND MAGNETIC RECONNAISSANCE SURVEY OF MAINE AND PORTIONS OF NEW YORK, VOLUME 2 Final Report
Jul. 1981 140 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-000401; GJBX-327-81-Vol-2-OGDENSBURG) Avail: NTIS HC A07/MF A01

Content includes: the flight line base map anomaly maps (uranium, thorium, potassium, uranium/thorium, uranium/potassium, thorium/potassium), total count map, magnetic field map, uranium map, thorium map, potassium map, ratio maps for uranium/thorium, uranium/potassium, thorium/potassium, radiometric multiple-parameter stacked profiles, magnetic and ancillary stacked profile data, and historgrams. DOE

N82-14602# Carson Helicopters, Inc., Perkasie, Pa.
NURE AERIAL GAMMA-RAY AND MAGNETIC RECONNAISSANCE SURVEY OF MAINE AND PORTIONS OF NEW YORK, VOLUME 2 Final Report
Jun. 1981 168 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-000780; GJBX-327-81-Vol-2-MILLINOCKET) Avail: NTIS HC A08/MF A01

Content contains: the flight line base map, anomaly maps (uranium, thorium, potassium, uranium/thorium, uranium/potassium, thorium/potassium), total count map, potassium map, ratio maps for uranium/thorium, uranium/potassium, thorium/potassium, rdiometric multiple-parameter stacked profiles, magnetic and ancillary stacked profile data, and histograms. DOE

N82-14603# Carson Helicopters, Inc., Perkasie, Pa.
NURE AERIAL GAMMA-RAY AND MAGNETIC RECONNAISSANCE SURVEY OF MAINE AND PORTIONS OF NEW YORK, VOLUME 2 Final Report
Jul. 1981 80 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-000872; GJBX-327-81-Vol-2-LEWISTON) Avail: NTIS HC A05/MF A01

Content contains: the flight line base map, anomaly maps (uranium, thorium, potassium, uranium/thorium, uranium/potassium, thorium/potassium), total count map, magnetic field map, uranium map, thorium map, potassium map, ratio maps for U/T, U/K, T/K, radiometric multiple-parameter stacked profiles, magnetic and ancillary stacked profile data, and histograms. DOE

N82-14604# Carson Helicopters, Inc., Perkasie, Pa.
NURE AERIAL GAMMA-RAY AND MAGNETIC RECONNAISSANCE SURVEY OF MAINE AND PORTIONS OF NEW YORK, VOLUME 2 Final Report
Jun. 1981 306 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-000772; GJBX-327-81-Vol-2-FREDERICTON) Avail: NTIS HC A14/MF A01

Content contains: the flight path maps, anomaly maps (uranium, thorium, potassium, uranium/thorium, uranium/potassium, thorium/potassium), radiometric multiple parameter stacked profiles, magnetic and ancillary stacked profile data, histograms, total count maps, magnetic field maps, uranium maps, thorium maps, potassium maps, ratio maps for U/T, U/K, and T/K. DOE

N82-14605# Carson Helicopters, Inc., Perkasie, Pa.
NURE AERIAL GAMMA-RAY AND MAGNETIC RECONNAISSANCE SURVEY OF MAINE AND PORTIONS OF NEW YORK, VOLUME 2 Final Report
Jun. 1981 242 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-000785; GJBX-327-81-Vol-2-EDMUNDSTON) Avail: NTIS HC A11/MF A01

Content contains: the flight line base maps, nomaly maps (uranium, thorium, potassium, uranium/thorium, uranium/potassium, thorium/potassium), radiometric multiple parameter stacked profiles, magnetic and ancillary stacked profile data, histograms, total count maps, magnetic field maps, uranium maps, thorium maps, potassium maps, ratio maps for U/T, U/K, and T/K. DOE

N82-14606# Carson Helicopters, Inc., Perkasie, Pa.
NURE AERIAL GAMMA-RAY AND MAGNETIC RECONNAISSANCE SURVEY OF MAINE AND PORTIONS OF NEW YORK, VOLUME 2 Final Report
Jul. 1981 150 p refs
(Contract DE-AC13-76GT-01664)
(DE82-000869; GJBX-327-81-Vol-2-BINGHAMTON) Avail: NTIS HC A07/MF A01

Content contains: the flight line base map, anomaly maps (uranium, thorium, potassium, uranium/thorium, uranium/potassium, thorium/potassium), total count map, magnetic field map, uranium map, thorium map, potassium map, ratio maps for U/T, U/K, T/K, radiometric multiple parameter stacked profiles, magnetic and ancillary stacked profile data, and histograms. DOE

N82-14607# Carson Helicopters, Inc., Perkasie, Pa.
NURE AERIAL GAMMA-RAY AND MAGNETIC RECONNAISSANCE SURVEY OF MAINE AND PORTIONS OF NEW YORK, VOLUME 2 Final Report
Jul. 1981 260 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-000794; GJBX-327-81-Vol-2-BANGOR) Avail: NTIS HC A12/MF A01

Content contains: the flight line base maps, anomaly maps (uranium, thorium, potassium, uranium/thorium, uranium/potassium, thorium/potassium), total count maps, magnetic field maps, uranium maps, thorium maps, potassium maps, ratio maps for U/T, U/K, T/K, radiometric multiple parameter stacked profiles, magnetic and ancillary stacked profile data, and histograms. DOE

N82-14608# Carson Helicopters, Inc., Perkasie, Pa.
NURE AERIAL GAMMA-RAY AND MAGNETIC RECONNAISSANCE SURVEY OF MAINE AND PORTIONS OF NEW YORK, VOLUME 2 Final Report
Jul. 1981 166 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-000784; GJBX-327-81-Vol-2-UTICA) Avail: NTIS HC A08/MF A01

Content contains: the flight line base map, anomaly maps (uranium, thorium, potassium, uranium/thorium, uranium/potassium, thorium/potassium), radiometric multiple parameter stacked profiles, magnetic and ancillary stacked profile data, histograms, total count map, magnetic field map, uranium map, thorium map, potassium map, ratio maps for U/T, U/K, and T/K. DOE

N82-14609# Battelle Pacific Northwest Labs., Richland, Wash.
DEALING WITH REGIONAL HYDROLOGIC DATA-BASE LIMITATIONS. CASE EXAMPLE: THE COLUMBIA RIVER BASALTS
R. Schalla and L. S. Leonhart (Rockwell-Hanford Operations, Richland, Wash.) 1981 15 p refs Presented at the Symp. on Uncertainties Assoc. with the Regulation of the Geol. Disposal of High-Level Radioact. Waste, Gatlinburg, Tenn., 9 Mar. 1981
(Contract DE-AC06-76RL-01830)

(DE81-030086; PNL-SA-9094; CONF-810372-12) Avail: NTIS HC A02/MF A01

Limitations encountered in assembling hydrologic data for a broad geographic region, into a conceptual model of the hydrologic system may become resonant in subsequent numerical simulations of hydrologic system behavior. Such data limitations include irregular spatial distributions of data, decreases in information with increasing depth from the land surface, uncertainties about the reliability of reported hydrologic data, disparities in time dependent parameters, and lack of field verification of data. The case example of preparing a hydrologic system description for the Columbia Plateau, as required for repository siting, illustrates methods of determining the accuracy of certain data, compensating for data limitations, evaluating the need for acquiring additional data, and refining data through iterative techniques. Emphasis is placed on professional subjectivity, which has proven to be essential in data base evaluation and refinement. DOE

N82-14610# Oak Ridge Gaseous Diffusion Plant, Tenn.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR BROKEN BOW NTMS QUADRANGLE, NEBRASKA

30 Jun. 1981 206 p refs
(Contract W-6405-eng-26)
(DE81-030295; GJBX-274-81; K/UR-154) Avail: NTIS HC A10/MF A01

Statistical data and areal distributions for uranium and uranium related variables are presented for 578 groundwater and 442 stream sediment samples. Groundwater data indicate that uranium concentrations above the 85th percentile occur primarily in the southeastern and central portion of the quadrangle. Water containing high concentrations of uranium are predominantly in the Pliocene Ogallala Formation and are also found in waters derived from the Niobrara Chalk and alluvial deposits. High uranium concentrations are associated with high values of specific conductance, boron, calcium, potassium, lithium, magnesium, sodium, strontium, and total alkalinity. Uranium concentrations above the 85th percentile occur in randomly scattered sediments, with no apparent trends visible. Sediments with high uranium value are derived primarily from glacial and alluvial deposits. Sediments with high U-FL values are associated with high values of chromium, lithium, iron, magnesium, scandium, yttrium, and zirconium. Sediments with high U-NT values are generally associated with high values of cerium, titanium, and zirconium. DOE

N82-14611# Oak Ridge Gaseous Diffusion Plant, Tenn.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR MILBANK NTMS QUADRANGLE, MINNESOTA; NORTH DAKOTA; SOUTH DAKOTA

15 Jun. 1981 258 p refs
(Contract W-7405-eng-26)
(DE81-029657; GJBX-271-81; K-UR-156) Avail: NTIS HC A12/MF A01

Results of a geochemical survey are reported for the Milbank Quadrangle, Minnesota; North Dakota; South Dakota. Statistical data and areal distributions for uranium and uranium related variables are presented for 662 groundwater and 319 stream sediment samples. The location and geologic setting are also described. DOE

N82-14612# Department of Energy, Pittsburgh, Pa. Mining Technology Center.

LONGWALL MINING OF THIN SEAMS

Ernest A. Curth 1981 22 p refs Presented at the 1st Ann. Conf. on Ground Control in Mining, Morgantown, W. Va., 27 Jul. 1981
(DE81-028042; CONF-810714-2) Avail: NTIS HC A02/MF A01

Thin seam operations pose a challenge to the ingenuity of mining engineers to overcome the factor of human inconvenience in the restricted environment and associated high cost production. Suprisingly, low seam longwalls in the Federal Republic of Germany in an average thickness of 35 in. and dipping less than 18 deg come close to achieving the average production rate of all German longwall operations. They are all plow faces, and a consistent production of 3300 tons per day and a productivity of 40 tons per man shift are reported from one of the thin seam longwalls. These results were attained by reliable high capacity equipment and roof support by shields that can be collapsed to as low as 22 inches. Maximum mining height for plow operated faces lies at 31.5 inches. Technology development for the future is discussed. DOE

N82-14613# California Univ., Livermore. Lawrence Livermore Lab.

MATHEMATICAL MODELLING OF SOME CHEMICAL AND PHYSICAL PROCESSES IN UNDERGROUND COAL GASIFICATION

John R. Creighton Aug. 1981 5 p Presented at the Eastern Section: The Combustion Inst. Conf., Pittsburgh, 27-29 Oct. 1981 Submitted for publication
(DE81-027941; UCRL-86518; CONF-811027-1) Avail: NTIS HC A02/MF A01

The chemical and physical processes governing underground coal gasification were conducted on laboratory scale experiments accompanied by mathematical modelling. Blocks of selected coal types are cut to fit 55 gallon oil drums and sealed in place with plaster. A 1 cm. diameter hole is drilled the length of the block and plumbing attached to provide a flow of air or oxygen/steam mixture. After an instrumented burn the block is sawed open to examine the cavity. Mathematical modelling is directed towards predicting the cavity shape. Sub models and their impact on predicted cavity shapes are examined. DOE

N82-14614# Sandia Labs., Albuquerque, N. Mex. Geothermal Technology Development Div.

ACCESSING THE GEOTHERMAL RESOURCES

James R. Kelsey 1981 6 p refs Presented at the Showcase for Technol. Conf., Albuquerque, N. Mex., 28 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025396; SAND-81-1384C; CONF-811018-1) Avail: NTIS HC A02/MF A01

The technology development efforts in the areas of drilling, completion, and logging instrumentation are described. These development efforts are aimed at solving the problems associated with the high temperatures, hard-fractured geological formations, and corrosive formation fluids. DOE

N82-14615# Erno Raumfahrttechnik G.m.b.H., Bremen (West Germany). Abteilung Satelliten und Sonden PRV-1.

STUDY OF A COMBINED SATELLITE SYSTEM FOR REMOTE SENSING AND EARTH-ORIENTED RESEARCH (LOCSS) Final Report, Jul. 1980

HansJuergen Guenther, Wolfgang Gericke, Hansjoerg Klotz, Rainer Krieger, Birgit Metzgar, Joachim Nauck, Klaus Plate, Rudolf Rohr, Gernot Schmidt, and Gerhard Schneider Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 222 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-002; ISSN-0170-1339) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 38.60

The suitability of three European satellite platforms (ERD-SAT, SPAS, SPOT) for a combined satellite system (remote sensing and Earth-oriented research) is discussed. The system consists of two Sun-synchronous orbiting satellites with a combined remote sensing and Earth-oriented research payload and of a pure climatography satellite on a drift orbit. All platforms can accommodate the basic payload, but SPAS offers some advantages and is the only platform able to accommodate the extended payload. The combined three-satellite system offers cost advantages over the four-satellite system only if the space shuttle is used as launcher. Hence, SPAS should be given preference over the other platforms for such a system. The subsystem design is presented and problem areas are discussed. Data acquisition and data processing of image and climatic data are the bottlenecks in existing systems. Author (ESA)

N82-14616# Royal Aircraft Establishment, Farnborough (England). Remote Sensing Unit.

REMOTE SENSING INFORMATION BULLETIN; ISSUE NUMBER 6

Jul. 1981 33 p
Avail: NTIS HC A03/MF A01

The activities of the Center up to July 1981 are reported. Topics include: the United Kingdom report to the seventh Earthnet meeting, in June 1981; satellite status reports for LANDSAT 1, 2, 3, and D; microwave remote sensing, including Seasat synthetic aperture radar; Mapsat feasibility study; Eros field office; and symposia and conferences organized by the Center, including a summer school on remote sensing applications in marine science and technology. Author (ESA)

N82-14617# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group: Physics.

PROJECT NOORDWIJK. PART 1: MEASUREMENTS OF THE RADAR BACKSCATTER COEFFICIENT GAMMA (SIGMA DEG) IN 1977 AND 1978

G. P. deLoor Nov. 1979 42 p refs 2 Vol.
(PHL-1979-49-Pt-1; TDCK-73426) Avail: NTIS HC A03/MF A01

Radar backscatter measurements obtained from a sea platform are compared with airborne and spaceborne observations. A short range FM radar was mounted beside a television camera and directed into the prevailing winds. Upwind and crosswind data were collected, but downwind data are scarce, and more windspeed data are required. A systematic difference is observed between airborne and ground based data. The value of gamma is dependent on windspeed; dependency differs for the specular region (low incidence angles) and the diffuse (incidence angles > 45 deg). Author (ESA)

N82-14618# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 4: Microwaves.

PROJECT NOORDWIJK. PART 2: RESULTS OF NORTH SEA CLUTTER MEASUREMENTS IN THE I-BAND PERFORMED FROM THE PLATFORM NOORDWIJK IN SEPTEMBER/OCTOBER 1977

H. Sittrop and H. Gravesteijn Aug. 1980 79 p refs 2 Vol.
(PHL-1980-28-Pt-2; TDCK-74302) Avail: NTIS HC A05/MF A01

Radar backscatter off the sea at low incidence angles was measured. A low frequency spectral analysis method is used to show that an appreciable periodic content exists in the sea return. This component in the scintillation spectra is 0.14 Hz and is related to the sea wave period. Wind-wave interaction effects are observed for up, down and crosswind directions. The clutter patch size and the incidence angle are used as a parameter. An optimum spectral response exists for upwind observations at an incidence angle of 1 deg and pulselength 0.08 microsec. The radar cross section per unit area measured is compared with an experimental sea clutter model. For wind directions resulting in an adequate fetch over open sea, reasonable agreement is found. No significant conclusions can be drawn with respect to megaripple observations. Author (ESA)

N82-14619# New Mexico State Univ., Las Cruces.

WATER PROBLEMS AND RESEARCH NEEDS FOR NEW MEXICO

Sep. 1980 60 p refs Sponsored by Office of Water Research and Technology
(PB81-231979; W81-04319) Avail: NTIS HC A04/MF A01 CSCL 13B

New Mexico faces serious water problems in the years ahead. Surface water supplies are scarce and virtually fully appropriated, so that no further appropriations can be made unless some existing water rights are retired. Fresh groundwater seriously depleted in some parts of the State from heavy drawdown. Existing fresh water supplies will not be adequate to meet all projected demands over the next 40 years. Significant aquifer recharge occurs only in the Rio Grande Basin, where unconsolidated sand and gravel reaches a charge thickness of up to 10,000 feet. Agricultural use annually depletes about 90% of fresh water withdrawals. It is unlikely that New Mexico will discover new water resources over the next few decades, so that water conservation in agriculture is critically important. GRA

N82-14620# Illinois State Geological Survey, Champaign.

HYDROGEOLOGY OF SPOIL AT THREE ABANDONED SURFACE MINES IN ILLINOIS: PRELIMINARY RESULTS Environmental Geology Notes, May 1981

David E. Lindorff, Keros Cartwright, and Beverly L. Herzog Apr. 1981 24 p refs
(PB81-231664; IL/SGS/EGN-98) Avail: NTIS HC A02/MF A01 CSCL 08H

The impact of surface coal mining on the geologic materials and ground water in different geologic settings is under investigation at three abandoned surface mines in Illinois. At a site near Ottawa, the overburden prior to mining consisted largely of pyritic shale, sand was the major component of the overburden and spoil at a mine near Coal City. Clays, lacustrine silts, and some shale and limestone were the predominant premining overburden materials at a mine near Harrisburg. Ground water elevations at Coal City and Harrisburg are approximately at premining levels, where at Ottawa they are near the base of the spoil. Ground water quality has deteriorated at all three sites, especially at Ottawa and Harrisburg. GRA

N82-14621# North Carolina Water Resources Research Inst., Raleigh.

ALGAL ASSAY STUDIES OF THE CHOWAN RIVER, NORTH CAROLINA

Mary M. Sauer and Edward J. Kuenzler Apr. 1981 91 p refs
(Contract DI-14-34-0001-0274)
(PB81-231821; W81-04303; OWRT-B-127-NC(2)) Avail: NTIS HC A05/MF A01 CSCL 08H

Assays were conducted on water collected from three stations to investigate the presence of limiting nutrients during the summer of 1980. Two types of algal inocula were used: the laboratory cultured green alga Selenastrum capricornutum and samples of the natural Chowan River phytoplankton. Phosphorus and nitrogen simultaneously limited total algal growth in most experiments; other nutrients did not significantly limit growth. Species-specific responses to nutrient enrichment occurred. Single additions of phosphorus increased numbers of nitrogen fixing blue-green algae. Therefore, phosphorus is the more critical limiting nutrient to growth of the bloomforming genera Anabaena and Aphanizomenon. GRA

N82-14622# Illinois State Geological Survey, Champaign.

GEOCHEMISTRY OF RECENT LAKE MICHIGAN SEDIMENTS

Richard A. Cahill 1981 102 p refs
(PB81-234429; IL/SGS/CIRC-517) Avail: NTIS HC A06/MF A01 CSCL 08H

A systematic sediment sampling of Lake Michigan was conducted. Distributions are reported for concentrations of 48 chemical elements for pH and Eh, and for grain size of 286 samples. Evaluating measurements of grain size and chemical composition led to classifying Lake Michigan surficial sediments by origin, as being from either depositional or nondepositional areas. The depositional areas include a number of sub-basins that have similar sediment properties and chemical composition. The distribution of trace elements, including heavy metals of anthropogenic origin, correlates positively with the abundance of fine-grained sediment. Clay minerals and organic materials are hosts for the relative enrichment of many of the trace elements in surficial sediments of the depositional basins. GRA

N82-14623# Utah Water Research Lab., Logan.

CALCIUM CARBONATE PRECIPITATION AS INFLUENCED BY STREAM PRIMARY PRODUCTION

Gretchen L. Rupp and V. Dean Adams Apr. 1981 62 p refs
(Contract DI-14-34-0001-9047)
(PB81-231946; UWRL/Q-81/02; W81-04316; OWRT-A-044-UTAH(1)) Avail: NTIS HC A04/MF A01 CSCL 08H

The water chemistry, hydrology, and benthic primary production of the Logan River, in the Bear River Mountains in northern Utah, were monitored for one year to study the potential influence of periphyton photosynthesis and calcium carbonate precipitation in the river. Radioisotopic tracers were used to measure periphyton photosynthesis and calcium carbonate precipitation concurrently in laboratory experiments to investigate the effects of water temperature, velocity and macronutrient concentration on calcium carbonate precipitation induced by photosynthesis. GRA

N82-14624# Utah Agricultural Experiment Station, Logan.

SALT RELEASE FROM SUSPENDED SEDIMENTS: A

SIMULATED MODEL
Stanley R. Peterson, J. J. Jurinak, and R. J. Wagenet Dec. 1980 184 p refs
(Contract DI-14-34-0001-9047)
(PB81-231839; RR-62; W81-04304; OWRT-A-045-UTAH(1))
Avail: NTIS CSCL 08H

The effects of particle size, soil to water ratio and time on the rate of release of salts from Mancos Shale derived soils were studied by taking four different size fractions at three different dilutions of soil to water. The kinetic model was formulated using data obtained from a soil dominated by highly soluble salts (evaporites) and using dimensional analysis. The chemical equilibrium model was based on ion association theory. The requisite chemical equations programmed were solved by iterative techniques (successive approximations). The chemical model was interfaced with the kinetic model. The equilibrium model calculated the concentrations, activities, and activity coefficients for all ions and their soluble complexes. The model also predicted which salts were dissolving and by determining the saturation indices how quickly individual mineral salts approached equilibrium. GRA

N82-14625# GKY and Associates, Inc., Springfield, Va.
FLOOD PLAIN MAPPING USING COMPUTER GRAPHICS Final Draft Report
28 May 1981 81 p refs Prepared jointly with Ideamatics, Inc., Washington, D.C.
(Contract DI-14-34-0001-9630)
(PB81-231870; W81-04308; OWRT-C-90088-G(9630)(1))
Avail: NTIS HC A05/MF A01 CSCL 13B

The feasibility of using computer graphics to specify flood limits to Federal flood insurance and local flood easement delineation was investigated and demonstrated. Complex mathematical models were adapted to computer graphics output; HEC-2 water surface profiles, a state-of-the-art computer program developed by the Corps of Engineers, was adapted for use in this program. The computer configuration consisted of a PDP 11/45 mini-computer, a Sumagraphics digitizing tablet, and a Tektronix 4014-1 display terminal with a 4631 hard copier. Nine tasks were performed, including interfacing with the user community, adapting HEC-2 to an interactive/graphical output environment, selecting the hardware system most responsive to user capabilities; coding; debugging; testing the software; writing user manuals, and conducting demonstrations. GRA

N82-14171# Officine Galileo S.p.A., Florence (Italy).
INFRARED RADIANCE MODEL VARIATION BY SENSOR FLIGHT MEASUREMENTS
R. BaldassiniFontana, D. Sciacovelli (ESTEC, Noordwijk, Netherlands), and L. Fraiture (ESOC, Darmstadt, West Germany) *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 461-478 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-14626# Open Univ., Milton (England). Energy Research Group.
THE NUCLEAR CONTROVERSY: UNEQUAL COMPETITION IN PUBLIC POLICY-MAKING
Ian Sanderson May 1980 76 p refs
(ERG-035) Avail: NTIS HC A05/MF A01

The public policy making process as regards nuclear power is analized and the epistemological basis for such an analysis is examined. It is asserted that disputes over the development of nuclear power are not primarily about the objective facts of the matter but rather derive from differences in basic assumptions about, and evaluatory perceptions of, society, technology and the nature of progress. The balance of power in such disputes is therefore not mainly determined by the 'correctness' of the facts upon which a position rests but rather by the extent to which underlying assumptions and values accord with prevailing ideological themes. A meaningful debate can be guaranteed only through the establishment of institutional structures which provide a framework of truely democratic participation and equality of power and influence. M.G.

N82-14627*# DHR, Inc., Washington, D.C.
MARKET ASSESSMENT OF PHOTOVOLTAIC POWER SYSTEMS FOR AGRICULTURAL APPLICATIONS IN MOROCCO Final Report
Henry Steingass and Itil Asmon (ARD, Inc.) Sep. 1981 157 p refs
(Contract DEN3-180; DE-AI01-79ET-20485)
(NASA-CR-165477; DOE/NASA/0180-2; C4100-50) Avail: NTIS HC A08/MF A01 CSCL 10A

Results of a month-long study in Morocco aimed at assessing the market potential for stand-alone photovoltaic systems in agriculture and rural service applications are presented. The following applications, requiring less than 15 kW of power, are described: irrigation, cattle watering, refrigeration, crop processing, potable water and educational TV. Telecommunications and transportation signalling applications, descriptions of power and energy use profiles, assessments of business environment, government and private sector attitudes towards photovoltaics, and financing were also considered. The Moroccan market presents both advantages and disadvantages for American PV manufacturers. The principle advantages of the Moroccan market are: a limited grid, interest in and present use of PV in communications applications, attractive investment incentives, and a stated policy favoring American investment. Disadvantages include: lack of government incentives for PV use, general unfamiliarity with PV technology, high first cost of PV, a well-established market network for diesel generators, and difficulty with financing. The market for PV in Morocco (1981-1986), will be relatively small, about 340 kwp. The market for PV is likely to be more favorable in telecommunications, transport signalling and some rural services. The primary market appears to be in the public (i.e., government) rather than private sector, due to financial constraints and the high price of PV relative to conventional power sector. M.D.K.

N82-14628*# Institute of Gas Technology, Chicago, Ill.
STABILIZING PLATINUM IN PHOSPHORIC ACID FUEL CELLS Quarterly Report
Robert J. Remick Oct. 1981 19 p refs
(Contracts DEN3-208; DE-1101-80ET-17088)
(NASA-CR-165483; DOE/NASA-0208/3; IGT-61051; QR-3) CSCL 10A

A carbon substrate for use in fabricating phosphoric acid fuel cell cathodes was modified by catalytic oxidation to stabilize the platinum catalyst by retarding the sintering of small platinum crystallites. Results of 100-hour operational tests confirmed that the rate of platinum surface area loss observed on catalytically oxidized supports was less than that observed with unmodified supports of the same starting material. Fuel cell electrodes fabricated from Vulcan XC-72R, which was modified by catalytic in a nitric oxide atmosphere, produced low platium sintering rates and high activity for the reduction of oxygen in the phosphoric acid environment. N.W.

N82-14629*# Ross (Bernd) Associates, San Diego, Calif.
DEVELOPMENT OF AN ALL-METAL THICK FILM COST AFFECTIVE METALLIZATION SYSTEM FOR SOLAR CELLS Quarterly Report, Aug. - Oct. 1980
Bernd Ross Sep. 1981 32 p refs
(Contract JPL-955688)
(NASA-CR-165044; QR-2; DOE/JPL-955688-80/2; JPL-9950-599) Avail: NTIS HC A03/MF A01 CSCL 10A

An economical thick film solar cell contact for high volume production of low cost silicon solar array modules was investigated. All metal screenable pastes using base metals were studied. Solar cells with junction depths varying by a factor of 3.3, with and without a deposited oxide coating were used. Cells were screened and fired by a two step firing process. Adhesion and metallurgical results are unsatisfactory. No electrical information is obtained due to inadequate contact adhesion. S.L.

N82-14630*# Ross (Bernd) Associates, San Diego, Calif.
DEVELOPMENT OF AN ALL-METAL THICK FILM COST EFFECTIVE METALLIZATION SYSTEM FOR SOLAR CELLS Quarterly Report, Nov. 1980 - Apr. 1981
Bernd Ross Sep. 1981 40 p refs
(Contract JPL-955688)
(NASA-CR-165043; DOE/JPL-955688-80/3; JPL-9950-604; QR-3) Avail: NTIS HC A03/MF A01 CSCL 10A

The objectives of the investigation were to provide all-metal screenable pastes using economical base metals, suitable for application to low-to-high conductivity silicon of either conductivity type and possibly to aluminum surfaces. Experiments were conducted with variations in paste parameters, firing conditions, including gas ambients, furnace furniture, silicon surface and others. A liquid medium, intended to provide transport during the carbon fluoride decomposition was incorporated in the paste with promising results. T.M.

N82-14631*# Solarelectronics, Inc., Bellingham, Mass.
FLAT-PLATE SOLAR ARRAY PROJECT. TASK 1: SILICON MATERIAL: INVESTIGATION OF THE HYDROCHLORINATION OF SiC1SUB4 Quarterly Report, 9 Jul. - 30 Sep. 1981
Jeffrey Y. P. Mui 1 Oct. 1981 17 p refs
(Contract JPL-956061)
(NASA-CR-165042; DOE/JPL-956061/1; JPL-9950-607) Avail: NTIS HC A02/MF A01 CSCL 10A

A two inch-diameter stainless steel reactor was designed to operate at pressure up to 500 psig and at temperature up to 600 C in order to study the hydrochlorination of silicon tetrachloride and metallurgical grade (m.g.) silicon metal to trichlorosilane. The hydrochlorination apparatus is described and operation safety and pollution control are discussed. A.R.H.

N82-14632*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DESIGN OF AN ENERGY CONSERVATION BUILDING
Ronald N. Jensen Nov. 1981 32 p refs
(NASA-TM-83175) Avail: NTIS HC A03/MF A01 CSCL 10A

The concepts in designing and predicting energy consumption in a low energy use building are summarized. The building will use less than 30,000 Btu/sq.ft./yr. of boarder energy. The building's primary energy conservation features include heavy concrete walls with external insulation, a highly insulated ceiling, and large amounts of glass for natural lighting. A solar collector air system is integrated into the south wall. Calculations for energy conservation features were performed using NASA's NECAP Energy Program. T.M.

N82-14633*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ALUMINUM BLADE DEVELOPMENT FOR THE MOD-OA 200-KILOWATT WIND TURBINE Final Report
Bradford S. Linscott, Richard K. Shaltens, and A. G. Eggers (Westinghouse Electric Corp., Pittsburg) Dec. 1981 43 p refs
(Contract DE-AB29-76ET-20370)
(NASA-TM-82594; DOE/NASA-20370/20) Avail: NTIS HC A03/MF A01 CSCL 10A

The rotor blade configuration, fabrication methods, analyses, operating experience, design modifications, and cost are described. Each 60-ft.-(18.3-m-) long aluminum blade used current aircraft fixed wing and rotary wing design and fabrication technologies. Structural damage, repairs, and modifications that occurred during 6500 hours of operation are summarized. T.M.

N82-14634*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SATELLITE POWER SYSTEM: CONCEPT DEVELOPMENT AND EVALUATION PROGRAM. VOLUME 4: ENERGY CONVERSION AND POWER MANAGEMENT
Nov. 1981 369 p refs
(NASA-TM-58237-Vol-4) Avail: NTIS HC A16/MF A01 CSCL 10A

Additional analyses that were performed to supplement the NASA/Department of Energy (DOE) Satellite Power System (SPS) reference system concept are presented in this volume. A brief review of the reference concept is provided together with detailed descriptions of energy conversion, power distribution, and power management for solar photovoltaics (silicon and gallium arsenide), solar thermal (Brayton and Rankine cycles), and concept comparisons (solar thermal and energy conversion). Results of other studies concerning energy conversion and power management (environmental impacts, annealing, nuclear SPS concept, and thermionic) are included. The data presented were taken from the SPS Concept Definition Studies performed under the direction of NASA by Rockwell International Corporation and Boeing Aerospace Company. Author

N82-14635*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SATELLITE POWER SYSTEM: CONCEPT DEVELOPMENT AND EVALUATION PROGRAM. VOLUME 7: SPACE TRANSPORTATION
Nov. 1981 258 p refs
(NASA-TM-58238-Vol-7) Avail: NTIS HC A12/MF A01 CSCL 10A

During the several phases of the Satellite Power System (SPS) Concept Definition Study, various transportation system elements were synthesized and evaluated on the basis of their potential to satisfy overall SPS transportation requirements and their sensitivities, interfaces, and impact on the SPS. Additional analyses and investigations were conducted to further define transportation system concepts that will be needed for the developmental and operational phases of an SPS program. To accomplish these objectives, transportation systems such as the Shuttle and its derivatives have been identified; new heavy-lift launch vehicle (HLLV) concepts, cargo and personnel orbital transfer vehicles (COTV and POTV), and intra-orbit transfer vehicle (IOTV) concepts have been evaluated; and, to a limited degree, the program implications of their operations and costs were assessed. The results of these analyses have been integrated into other elements of the overall SPS concept definition studies. Author

N82-14636*# General Dynamics/Convair, San Diego, Calif.
STUDY OF MULTI-MEGAWATT TECHNOLOGY NEEDS FOR PHOTOVOLTAIC SPACE POWER SYSTEMS. VOLUME 1: EXECUTIVE SUMMARY
D. M. Peterson and R. L. Pleasant 1 Aug. 1981 28 p refs 2 Vol.
(Contract NAS3-21951)
(NASA-CR-165323-Vol-1; Rept-111-2401-204) Avail: NTIS HC A03/MF A01 CSCL 10A

Possible missions requiring multimegawatt photovoltaic space power systems in the 1990's time frame and associated power system technology needs are examined. The following concepts for photovoltaic power approaches are considered: planar arrays, concentrating arrays, hybrid systems using Rankine engines, thermophotovoltaic and AC/DC power management approaches, battery, fuel cell, flywheel energy storage, and interactions with the electrical ion engine injection and stationkeeping system. The levels of modularity for efficient, safe, constructable, serviceable, and cost effective system design are analyzed, and the benefits of alternate approaches developed. Both manned low Earth orbit and unmanned geosynchronous Earth orbit applications were examined for technological development. Technology developments applicable to power systems which appear to have benefits independent of the absolute power level are suggested. M.D.K.

N82-14637*# General Dynamics/Convair, San Diego, Calif.
STUDY OF MULTI-MEGAWATT TECHNOLOGY NEEDS FOR PHOTOVOLTAIC SPACE POWER SYSTEMS, VOLUME 2 Final Report
D. M. Peterson and R. L. Pleasant 19 Mar. 1981 285 p refs 2 Vol.
(Contract NAS3-21951)
(NASA-CR-165323-Vol-2; GDC-AST-81-019-Vol-2) Avail: NTIS HC A13/MF A01 CSCL 10A

Possible missions requiring multimegawatt photovoltaic space power systems in the 1990's time frame and power system technology needs associated with these missions are examined. Four specific task areas were considered: (1) missions requiring power in the 1-10 megawatt average power region; (2) alternative power systems and component technologies; (3) technology goals and sensitivity trades and analyses; and (4) technology recommendations. Specific concepts for photovoltaic power approaches considered were: planar arrays, concentrating arrays, hybrid systems using Rankine engines, thermophotovoltaic approaches; all with various photovoltaic cell component technologies. Various AC/DC power management approaches, and battery, fuel cell, and flywheel energy storage concepts are evaluated. Interactions with the electrical ion engine injection and stationkeeping system are also considered. M.D.K.

N82-14638# Texas Technological Univ., Lubbock. Plasma and Switching Lab.
PULSED POWER RESEARCH COLLOQUIUM Annual Report
M. Kristiansen, A. H. Guenther (Kirtland AFB, Albuquerque, N.M.), John Ungvarsky (AFWL, Kirtland AFB, Albuquerque, N.M.), F. C. Brockhurst (Air Force Inst. of Technology, Wright-Patterson, AFB, Ohio), R. D. Franklin (AFWAL), A. K. Hyder (AFOSR), and R. L. Gullickson (Defense Nuclear Agency) 9 Jul. 1981 10 p refs
(Grant AF-AFOSR-3675-78; AF Proj. 2301)
(AD-A105770; AFOSR-81-0686TR) Avail: NTIS HC A02/MF A01 CSCL 10/2

A Pulsed Power Lecture Series is being conducted by Texas Tech University for the U.S. Air Force. Modular instructional material for use in this lecture series is being developed. Each module is a self consistent discussion of some aspect of pulsed power technology. The contents range from the very basic (e.g. basic EM field theory) to advanced, modern topics, such as magnetic switching. The lectures are delivered every two weeks at the Air Force Institute of Technology and the Air Force Weapons Laboratory. The speakers then provide a written text of their lecture, which is edited and published in modular form by Texas Tech University. It is planned to reissue these modules in report or book form at a later date. A total of about 50 modules are planned. Some 30 lecturers have been presented, to date, and about 12 modules have been issued. Author (GRA)

N82-14639# Pope, Evans, and Robbins, Inc., New York.
EVALUATION OF COAL GASIFICATION/COMBINED CYCLE POWER PLANT FEASIBILITY AT THE SEWELLS POINT NAVAL COMPLEX, NORFOLK, VIRGINIA Final Report
Jul. 1981 235 p refs
(Contract N62470-80-C-3736)
(AD-A103674) Avail: NTIS HC A11/MF A01 CSCL 10/2

The feasibility of installing a coal gasification/combined cycle cogeneration plant at Sewells Point Naval Complex, Norfolk, Virginia is evaluated. Current gasification technology, combined cycle thermodynamics, environmental control requirements, and conventional coal fired cogeneration cycles are addressed. The utility interface, site considerations, and economic analyses are also presented. It is concluded that a coal gasification/combined cycle cogeneration plant supplying 50 MW of electric power and 290,000 lb/hr of steam is technically feasible. M.D.K.

N82-14640# Imperial Coll. of Science and Technology, London (England). Unit for Solid State Ionics.
LITHIUM BASED ANODES FOR SOLID STATE BATTERIES Final Scientific Report, 30 Sep. 1977 - 30 Sep. 1980
R. A. H. Edwards, J. R. Owen, and B. C. H. Steele 30 Jun. 1981 39 p refs
(Grant AF-AFOSR-3460-77; AF Proj. 2303)
(AD-A105518; AFOSR-81-0652TR) Avail: NTIS HC A03/MF A01 CSCL 10/3

Two previous reports are reviewed and last year's work is detailed. The latter involved the use of 'staircase wave cyclic voltammetry,' a technique designed to characterize the transport properties of an electrode material over a wide composition range. This technique was applied to the compounds Fe, Si, a glassy metal of composition (FeSi)B, and a newly found prospective negative plate material HgxLi. An analysis of composite electrodes - those containing an additional ionic conductor, e.g. a solid electrolyte, as the grain boundary phase of the charge storage material shows that the criteria initially applied to the selection of an electrode may be significantly relaxed. Experiments with the composite of lithium-aluminum alloy with the solid electrolyte polyethylene oxide-lithium trifluoromethane sulphonate have verified the analysis which can be applied to many more systems. Author (GRA)

N82-14641# Boeing Aerospace Co., Seattle, Wash.
HIGH VOLTAGE TESTING Interim Report, 24 Sep. 1979 - 20 Jan. 1981
W. G. Dunbar Wright-Patterson AFB, Ohio AFWAL Aug. 1981 93 p refs
(Contract F33615-79-C-2067; AF Proj. 3145)
(AD-A106029; AFWAL-TR-81-2023) Avail: NTIS HC A05/MF A01 CSCL 10/2

The High Voltage Design Guide and High Voltage Specifications and Tests Documents referred to in this report pertain to high voltage/high power airborne equipment. A test plan was designed to evaluate and verify test parameters specified in these documents. This was done by writing detailed test procedures, obtaining representative test samples, and testing the specified parameters. In addition, a standard test fixture and corona-free 150 kV, 400 Hz power supply was specified, evaluated, and delivered for use with a partial discharge test set. Author (GRA)

N82-14642# United Technologies Corp., South Windsor, Conn. Power Systems Div.
INVESTIGATION OF THE IN-SITU OXIDATION OF METHANOL IN FUEL CELLS Final Report, Jun. 1980 - May 1981
D. A. Landsman and F. J. Luczak Sep. 1981 32 p refs
(Contract DAAK70-80-C-0049; DA Proj. 1L1-61102-AH-51)
(AD-A105947; FCR-3463) Avail: NTIS HC A03/MF A01 CSCL 10/2

Direct anodic oxidation and internal reforming were examined as ways of using methanol as fuel in a phosphoric acid fuel cell. The literature was reviewed to identify the most effective catalysts for the direct electrochemical oxidation of methanol. It is shown that, even with the best of these catalysts, anode polarization at practical current densities is 300 mV higher on methanol than on hydrogen. It was also found that unreacted methanol which diffuses across the cell can cause severe polarization of the cathode. Theoretical and experimental studies of internal reforming showed that a fuel cell will generate sufficient waste heat to sustain the methanol steam reforming reaction. Thus, thermally integrated, internal reforming is a feasible alternative to external reforming. The reforming catalyst is preferably located in separate chambers built into the stack, since this prevents phosphoric acid from attacking the reforming catalyst and methanol from migrating to the cathode. Author (GRA)

N82-14643# Arabian Exhibition Management Ltd., Manama (Bahrain).
SOLTECH 80
1980 174 p Conf. held at Bahrain, 10-11 Nov. 1980
(DE81-901931; CONF-801178) Avail: NTIS (US Sales Only) HC A08/MF A01; DOE Depository Libraries

Three solar related activities: solar radiation monitoring, effects of dust accumulation on collector performance, and salt gradient solar pond analytical and experimental studies are described. Measurements of total horizontal and direct radiation are made continuously, and the data are presented in a user oriented format on an hourly basis. Diffuse radiation and total radiation on a surface tilted to the local latitude angle are calculated. The system is presently being expanded to allow measurement of several additional radiation parameters of interest as well as six meteorological parameters. The effects of atmospheric dust on radiation attenuation, as well as the clearness index, anti K/sub T/ are shown. The impact of surface dust accumulation on the performance of photovoltaic and thermal collectors is also studied. DOE

N82-14644# American Bar Association, Washington, D.C. Special Committee on Energy Law.
NEED FOR POWER AND THE CHOICE OF TECHNOLOGIES: STATE DECISIONS ON ELECTRIC POWER FACILITIES
Jun. 1981 221 p refs
(Contract DE-AC01-79RG-10004)
(DE81-025960; DOE/EP-10004/1) Avail: NTIS HC A10/MF A01

The decision-making processes at the state level regarding the licensing of electric generating facilities were assessed. The basic issues addressed are the need for power and choice of technology; state decisions which directly influence and affect the nation's energy supply, and the tradeoffs involved in meeting energy demand. The areas of special emphasis included the legal mechanisms and regulatory procedures used to determine and resolve these issues. The effectiveness of state decision-making was assessed, focusing on legal and administrative histories and accommodation of interests of concerned parties. Recent innovations to enhance the decision-making process were also assessed where applicable. No particular substantive results are advocated in the findings. The recommendations presented are broad in scope. DOE

N82-14645# Natural Resources Defense Council, Inc., San Francisco, Calif.
PROJECTING REGIONAL POTENTIALS FOR COST-EFFECTIVE ENERGY CONSERVATION AND RENEWABLE RESOURCE APPLICATIONS: A FEASIBILITY STUDY
1980 52 p refs
(Contract DE-FG03-79CS-10045)
(DOE/CS-10045/T3) Avail: NTIS HC A04/MF A01

The feasibility is discussed of preparing an instruction manual that would enable a modeler in a particular region to set up a calculation method or predicting energy use. Such a manual would concern itself primarily with the three energy-consuming sectors most relevant to utilities' demand projections. Data requirements for each of the three sectors (residential, commercial, and industrial) are described and some initial guidance is provided as to how these needs can be filled. The methods for separate calculations of energy consumed by each end use in each sector are described. Each end use is discussed separately for the residential sector, but only in aggregate for the commercial and industrial sectors. DOE

N82-14646# Westinghouse Electric Corp., Concordville, Pa. Combustion Turbine Systems Div.
COMPRESSED AIR ENERGY STORAGE PRELIMINARY DESIGN AND SITE DEVELOPMENT PROGRAM IN AN AQUIFER. VOLUME 5, PART 2, APPENDIX F, DYNAMIC SYSTEM COMPUTER MODEL Final Report
P. A. Berman, J. S. Bonk, W. F. Kobett, N. S. Kosanovich, L. J. Long, and D. J. Marinacci 31 Jul. 1981 489 p refs Sponsored in part by Electric Power Research Inst., Palo Alto, Calif. Prepared for Public Service Company of Indiana, Inc.
(Contracts DE-AC02-78ET-29232; ET-78-C-01-2159; EPRI Proj. 1081-3)
(DE82-000671; DOE/ET-29232/T4-Vol-5-Pt-2) Avail: NTIS HC A21/MF A01

The computer program and subroutines written to provide a general purpose modeling tool for a compressed air energy storage (CAES) power plant system are documented. The CAES plant was modeled using FORTRAN and a Control Data Corporation 7600 digital computer. The system model was developed to learn the transient response characteristics of the complete CAES plant; provide a tool for evaluating the requirements and performance of control systems proposed for the CAES plant; provide a general purpose digital-computer-based dynamic modeling tool; and provide power plant component models as FORTRAN subroutines which can be used, with appropriate parameter data, as modules in complete CAES power plant models. DOE

N82-14647# California Univ., Livermore. Lawrence Livermore Lab.
ENERGY AND TECHNOLOGY REVIEW
Sep. 1981 40 p refs
(Contract W-7405-eng-48)
(DE82-000304; UCRL-5200-81-9) Avail: NTIS HC A03/MF A01

Three articles on optical fibers used in nuclear test diagnostics, understanding the physics of explosion products, and arms control in the eighties are presented. Advantages of optical fiber systems incorporating wavelength multiplexers and efficient scintillators compared with the coaxial cables used in nuclear detonation diagnosis are discussed. Thermodynamic data on detonation properties of various high explosives are evaluated. Arms control policies and negotiating goals discussed by representatives from government and academia are reported. DOE

N82-14648# Purdue Univ., Lafayette, Ind. Energy Policy Research and Information Program.
PROGRESS REPORT TO THE DEPARTMENT OF ENERGY IN SUPPORT OF BASIC ENERGY AND POLICY RESEARCH
15 Jul. 1981 326 p refs
(Contract DE-AS02-79ER-10044)
(DE81-025882; DOE/ER-10044/T1) Avail: NTIS HC A15/MF A01

Research areas include: light path of carbon reduction in photosynthesis; heat transfer in coal-ash slags; mechanism of plant cell enlargement in Gymnosperms; emulsion stability in enhanced oil recovery; selective transfer phenomenon in friction and wear; conceptual design of the Purdue Compact Torus/Passive Liner Fusion Reactor; integration of farm level alcohol production consistent with the economic and labor constraints of a farming operation, and newsmedia coverage of selected energy policy proposals. DOE

N82-14649# California Univ., Livermore. Lawrence Livermore Lab.
FIRE-PROTECTION RESEARCH FOR ENERGY TECHNOLOGY: FY 80 YEAR END REPORT
H. K. Hasegawa, N. J. Alvares, A. E. Lipska, H. Ford, S. Priante, and D. G. Beason 26 May 1981 118 p refs
(Contract W-7405-eng-48)
(DE82-000970; UCRL-53179) Avail: NTIS HC A06/MF A01

This continuing research program was initiated in order to advance fire protection strategies for Fusion Energy Experiments (FEE). The program expanded to encompass other forms of energy research. Accomplishments for fiscal year 1980 were: finalization of the fault-free analysis of the Shiva fire management system; development of a second-generation, fire-growth analysis using an alternate model and new LLNL combustion dynamics data; improvements of techniques for chemical smoke aerosol analysis; development and test of a simple method to assess the corrosive potential of smoke aerosols; development of an initial aerosol dilution system; completion of primary small-scale tests for measurements of the dynamics of cable fires; finalization of primary survey format for non-LLNL energy technology facilities; and studies of fire dynamics and aerosol production from electrical insulation and computer tape cassettes. DOE

N82-14650# Argonne National Lab., Ill. Integrated Assessments and Policy Evaluation Group.
ANALYSIS OF POTENTIAL COGENERATION IMPACTS ON ELECTRICITY GENERATION BY THE CENTRAL MAINE POWER COMPANY
Jerry L. Gillette and Kenneth A. Hub Apr. 1981 36 p refs
(Contract W-31-109-eng-38)
(DE81-029991; ANL/CNSV-TM-76) Avail: NTIS HC A03/MF A01

Two types of cogeneration design - one utilizing a backpressure turbine, the other an extraction turbine - were studied. It was assumed that these facilities were constructed to produce electricity that could be sold to the electric utility. The analysis included a single-year study of two different capacity-purchase options under consideration by the electric utility. An extended period was also analyzed so that the effects of demand growth and additions and subtractions of capacity on the cogeneration potential could be examined. It is found that some savings of oil could be realized with coal-based cogeneration, and that the quantity of such savings are somewhat dependent on the purchase option, the demand growth rate, and the cogenerator design. It is concluded that both cogenerator designs have some economic viability, but that the backpressure turbine type has a decided advantage due to its significantly lower heat rate. T.M.

N82-14651# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
ANALYSIS OF THE ENERGY IMPACTS OF THE DOE APPROPRIATE ENERGY TECHNOLOGY SMALL GRANTS PROGRAM: METHOD AND RESULTS
Bert Lucarelli, Jeff Kessel, Josh Kay, Janet Linse, Susan Tompson, and Mark Homer Aug. 1981 43 p refs

(Contract W-7405-eng-48)
(DE81-029844; LBL-12253-Rev) Avail: NTIS HC A03/MF A01

Methods for assessing the energy savings of projects in the appropriate technology program (AT) and how to apply these methods to obtain estimates of energy impacts was studied. Program energy savings were estimated from project savings by statistical inference. Direct energy savings and methods and results of the economic analysis are discussed. Indirect energy savings and program energy savings and the methods used to obtain them are estimated. Improvement of project selection which increase program energy savings and two approaches for conducting future energy impact studies are presented. DOE

N82-14652# Battelle Pacific Northwest Labs., Richland, Wash. Office of Seasonal Thermal Energy Storage Program.

WASTE HEAT AND CHILL STORAGE IN AQUIFER SYSTEMS

Jay R. Eliason 1981 10 p refs Presented at the 3rd Conf. on Waste Heat Management and Utilization, Miami, Fla., 12 May 1981
(Contract DE-AC06-76RL-01830)
(DE81-028016; PNL-SA-9164; CONF-810545-6) Avail: NTIS HC A02/MF A01

Seasonal storage of thermal energy in aquifers is discussed. Winter chill, summer heat, and various forms of industrial waste heat and chill can be stored for future demand, reducing the need for generating primary energy. This seasonal storage of heat and chill in aquifer systems is assessed. DOE

N82-14653# Department of Energy, Washington, D. C. Office of Market Analysis.

INTERNATIONAL ENERGY INDICATORS

R. M. Weiss, ed. Jul. 1981 30 p
(DE81-028117; DOE/IA-0010/13) Avail: NTIS HC A03/MF A01

Data are presented in graphs and tables on the following: world crude oil production by area, annually, 1974 through 1980, and monthly, October 1980 through April 1981; OPEC crude oil productive capacity, installed, maximum sustainable, and available, by country; world crude oil and refined product inventory levels, 1975 through 1981; oil consumption in OCED countries, 1975 through 1981; USSR crude oil production and exports, 1975 through April 1981; free world (by country) and US nuclear electricity generation, 1973 through 1980 and January to May 1981 and current capacity by country; US domestic oil supply (monthly) 1977 through 1980; US gross imports of crude oil and products, 1973 and 1974 annually, and 1975 through 1980 and monthly from January to June 1981; cost of Saudi crude oil in current and 1974 dollars from December 1974 through March 1981; US coal trade from January 1975 to March 1981; US natural gas trade from January 1975 through April 1981; summary of US merchandise trade, quarterly, from Quarter I, 1977 through Quarter I, 1981; and US energy/GNP ratio, annually, 1974 through 1980, and quarterly from 1974 through March 1981. DOE

N82-14654# Gould, Inc., Rolling Meadows, Ill.

THERMAL BEHAVIOR OF AN EXPERIMENTAL 2.5-KWH LITHIUM/IRON SULFIDE BATTERY

C. C. Chen, T. W. Olszanski, and H. F. Gibbard Oct. 1981 5 p refs Presented at the Electrochem. Soc. Conf., Denver, 11 Oct. 1981 Prepared for California Univ., Berkeley. Lawrence Berkeley Lab.
(Contracts W-7405-eng-48; W-31-109-eng-38)
(DE81-029861; LBL-13076; CONF-811013-3) Avail: NTIS HC A02/MF A01

The thermal energy generation and the gross thermal energy balance in the battery systems was studied. High temperature lithium/iron sulfide batteries for electric vehicle applications were developed. The preferred battery temperature range during operation and idle periods is 400 to 500 C. Thermal management is an essential part of battery design, the battery requires a thermal insulation vessel to minimize heat loss and heating and cooling systems to control temperature. Results of temperature measurements performed on a 2.5-kWh battery module, which was built to gain information for the design of larger systems are reported. DOE

N82-14655# California Univ., Livermore. Lawrence Livermore Lab.

FLYWHEEL ROTOR AND CONTAINMENT TECHNOLOGY DEVELOPMENT

S. V. Kulkarni 11 Aug. 1981 14 p refs Presented at the Mech., Magnetic, and Underground Energy Storage 1981 Ann. Contractors' Rev. Meeting, Washington, D.C., 24-27 Aug. 1981
(Contract W-7405-eng-48)
(DE81-028047; UCRL-86557; CONF-810833-7) Avail: NTIS HC A02/MF A01

An economical and practical composite flywheel with an energy density of 88 Wh/kg at failure, an operational energy density of 44 to 55 Wh/kg, and an energy storage capacity of approximately 1 kWh was developed. The suitability of various manufacturing processes for low cost rotor fabrication is determined, flywheel and flywheel systems dynamics are investigated. Prototype rotors for use in transportation and stationary applications and a fail safe, lightweight, and low cost flywheel containment are evaluated. DOE

N82-14656# Lincoln Lab., Mass. Inst. of Tech., Lexington.

PHOTOVOLTAIC SYSTEMS PERFORMANCE EXPERIENCE

F. J. Solman 1981 8 p refs Presented at IEEE Photovoltaic Specialists Conf., Orlando, Fla., 11-15 May 1981
(Contract DE-AC02-76ET-20279)
(DE81-025725; DOE/ET-20279/147; CONF-810526-39) Avail: NTIS HC A02/MF A01

The photovoltaic power systems at Natural Bridges National Monument in southeastern Utah and at radio station WBNO in Bryan, Ohio, provided reliability experience and case histories on failures and repairs of large photovoltaic systems. The PV systems are used for illustration of potential sources of system outages and measures that can be taken to improve the reliability and repair economy of present and future PV systems. Both systems have experienced lighting strikes, and the results are reported. E.A.K.

N82-14657# Lincoln Lab., Mass. Inst. of Tech., Lexington.

SOLAR PHOTOVOLTAIC RESIDENTIAL PROJECT. PROJECT INTEGRATION MEETING, AGENDA AND ABSTRACTS

1981 63 p refs Presented at Solar Photovoltaic Residential Project Integration Meeting, Cambridge, Mass., 24-25 Jun. 1981
(Contract DE-AC02-76ET-20279)
(DE81-028433; DOE/ET-20279/150; CONF-8106143) Avail: NTIS

Thirty three abstracts are presented covering: residential photovoltaic design, economics and requirements, balance of system components, PV/thermal collectors, PV interfaced with passive solar design, and utilities related aspects. DOE

N82-14658# Midwest Research Inst., Golden, Colo.

SYSTEMS ANALYSIS OF THERMAL STORAGE

R. J. Copeland Aug. 1981 8 p refs Presented at the Ann. Meeting on Thermal and Chem. Storage, Tysons Corner, Va., 14-16 Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-030288; SERI/TP-253-1369; CONF-81940-2) Avail: NTIS HC A02/MF A01

Analyses were conducted on thermal storage concepts for solar thermal applications. These studies include estimates of both the obtainable costs of thermal storage concepts and their worth to a user (i.e., value). Based on obtainable costs and performance, an in-depth study evaluated thermal storage concepts for water/steam, organic fluid, and gas/Brayton solar thermal receivers. Promising and nonpromising concepts were identified. Thermal storage concepts were evaluated for a liquid metal receiver. The value of thermal storage in a solar thermal industrial process heat application was analyzed. Several advanced concepts studied, include ground-mounted thermal storage for parabolic dishes with Stirling engines. DOE

N82-14659# Energy, Inc., Idaho Falls, Idaho.

ENERGY RECOVERY FROM MUNICIPAL WASTE DEVELOPMENT PROGRAM FOR IDAHO FALLS, IDAHO Final Report

Jul. 1981 155 p refs

(Contract DE-AC01-79CS-20240)
(DE81-029999; DOE/CS-20240/1) Avail: NTIS HC A08/MF A01

The development of a demonstration facility to show that fluidized-bed technology is a viable means to recover resources from municipal wastes in Idaho Falls is described. The tasks described include: (1) evaluation of the energy market of Idaho Falls to identify potential customers for recovered energy and to determine what form of energy would be economically viable; (2) evaluation of the municipal solid waste of Idaho Falls, determining its approximate composition, heating value, production rates, and seasonal variations; (3) development of a resource recovery facility concept that will be economically attractive to the city and technically feasible; and (4) evaluation of such topics as zoning, legal limitations, and environmental aspects of the facility to determine its compatibility with the city of Idaho Falls. DOE

N82-14660# Iowa State Univ. of Science and Technology, Ames. Dept. of Agricultural Engineering.
DEVELOPMENT OF A BIOMASS ENERGY SYSTEM FOR DRYING CORN Final Report, 1 Jul. 1979 - 30 Jun. 1981
W. F. Buchele, P. W. Claar, II, and S. J. Marley 1981 109 p refs
(Contracts DE-AS02-78CS-40059; EM-78-S-02-4916)
(DE81-029027; DOE/CS-40059/T1; COO-4916) Avail: NTIS HC A06/MF A01

A direct-combustion furnace for burning agricultural crop residue was developed. The design and operating parameters of an incinerator-type furnace were evaluated along with existing furnace types for application to burning agricultural crop residue. The design, fabrication, and evaluation of three direct-combustion, biomass-fueled furnaces were accomplished. Economic and energy analysis for the utilization of agricultural crop residue on a cornbelt farm were performed and the quantities of corn residue produced on a cornbelt farm and the effect of residue removal harvest rates on the amount of cover remaining and the resulting impact on soil erosion hazard were determined. DOE

N82-14661# Mid-American Solar Energy Complex, Minneapolis, Minn.
SEMINARS FOR PRIVATE COLLEGE ADMINISTRATORS ON SOLAR APPLICATIONS FOR COLLEGE BUILDINGS
Jun. 1981 8 p
(Contract DE-AC02-79CS-30150)
(DE81-027981; MASEC-CF-81-038) Avail: NTIS HC A02/MF A01

The objective of this project was to increase the working knowledge of key private college decision makers on passive and active solar fundamentals, proven passive and active technology, and conservation means integral to these technologies in the renovation of college buildings or their energy systems, to be achieved by conducting a series of three seminars. A summary of the project activities and a brief summary of workshop evaluations are given. DOE

N82-14662# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
POTENTIAL ENERGY SAVINGS IN THE RESIDENTIAL SECTOR OF THE UNITED STATES
John Ingersoll Jun. 1981 11 p refs Presented at the Intern. Conf. on Energy Use Management, West Berlin, 26-30 Oct. 1981
(Contract W-7405-eng-48)
(DE81-028873; LBL-12862; CONF-811006-3) Avail: NTIS HC A02/MF A01

The state-of-the-art computer program, DOE 2.1, was used to simulate the hour-by-hour thermal performance of residential buildings in the four major climate zones of the United States, and a life-cycle cost analysis was applied to determine the optimal energy requirement of a typical house demonstrate that present levels of energy consumption can be reduced by a factor of two without compromising health and comfort standards. Within present technology, additional energy savings can be achieved but not yet in a cost-effective way. DOE

N82-14663# Battelle Pacific Northwest Labs., Richland, Wash.
PROGRESS ON CATALYZED STEAM GASIFICATION OF BIOMASS
L. K. Mudge, D. H. Mitchell, S. L. Weber, L. J. Sealock, Jr., and R. J. Robertus Mar. 1981 54 p refs Presented at the 12th Biomass Thermochem. Conversion Contractors Meeting, Washington, D.C., 18-19 Mar. 1981
(Contract DE-AC06-76RL-01830)
(DE81-028198; PNL-SA-9350; CONF-810360-4) Avail: NTIS HC A04/MF A01

Operations in the process development unit (PDU) on evaluation of yields with a wood feedstock were completed at atmospheric pressure, after which modifications for operations at 10 psig were initiated. The economics of two plants for generation of methane from wood and methanol from wood were determined; evaluations were based on data from the PDU. The ASPEN computer code developed for updating process economics and for evaluating alternative processing schemes is described. Catalyst life, regeneration, and characterization for systems that generate a synthesis gas and a methane rich gas from wood are addressed. Development of a durable catalyst for the PDU and a catalyst resistant to carbon deposition was also studied. The thermal behavior of wood with and without impregnated potassium carbonate was determined from pyrolysis conditions. Wood was gasified with steam with and without a secondary nickel catalyst. Plant capacities of 2000 and 200 dry tons/day were considered. Changes in process yields and requirements resulted from contained studies in the laboratory and PDU. DOE

N82-14664# Oak Ridge Associated Universities, Tenn.
EDUCATION AND TRAINING IMPLICATIONS OF BIOMASS ENERGY SYSTEM USE
S. E. Bell, R. M. Gove, and J. R. Little Aug. 1981 44 p refs
(Contract DE-AC05-76OR-00033)
(DE81-029956; ORAU-182) Avail: NTIS HC A03/MF A01

Direct observations of 189 biomass-related operations combined with existing reports, feasibility studies, and expert opinion are used to assess the education and training implications of biomass energy system use. The number of permanent jobs in activities related to biomass energy production could easily reach the hundreds of thousands by the end of the century. However, national employment related to biomass energy will represent only a very small portion of the employment in any major occupational category. In addition, an analysis of occupational skill requirements suggests that the impacts on education and training institutions are likely to be minimal. Regional shortages could develop for foresters, forestry technicians, chemists, laboratory technicians, process operators, and certain engineers; but these are likely to be in response to economy-wide growth rather than biomass energy-related activity alone. DOE

N82-14665# Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
REPEAT FACILITY. REPORT FOR MAY, JUNE, JULY Progress Report, May - Jul. 1981
C. Byron Winn Aug. 1981 79 p refs
(Contract DE-AS02-80CS-30259)
(DE81-028156; DOE/CS-30259/6) Avail: NTIS HC A05/MF A01

The construction of the REPEAT facility, a test facility for passive and hybrid solar heating systems is reported. The development of a simulation program for envelope type passive solar systems, constructing an envelope test cell, collecting data to validate the program, and application of the program to determine the best envelope type design are discussed. A low cost monitoring system using a dedicated microprocessor system, an inexpensive, high accuracy A/D converter, and minimum system hardware is developed. A method to determine the average temperature and the average daily temperature variation inside a passively heated solar building is presented. DOE

N82-14666# Bonn Univ. (West Germany). Inst. fuer Physikalische Chemie.
ELECTRODES AND DIAPHRAGMS FOR FUEL CELLS Final Report, Dec. 1979
Wolf Vielstich and Ernst Knauf Bundesministerium fuer Forschung und Technologie Feb. 1981 45 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-047; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9.50

Nickel whisker electrodes with variations in network structure, pore size, and metal coatings were produced for use in water electrolytic cells and fuel cells. The resistance due to gas bubbles was decreased considerably by slits milled into the electrode. Platinization was optimized for use in glycol/air cells and glycol anodes with constantly good anode potentials were obtained with whisker structures by standardization of the platinization process. It is concluded that the activity of the glycol anodes depends strongly on the procedure of deposition of the noble metals and less on the whisker structure as such. Author (ESA)

N82-14667# Centre National d'Etudes Spatiales, Toulouse (France). Div. Stabilization Structures Thermique.

MODAL ANALYSIS OF STRUCTURES WITH PRESTRESS EFFECTS: APPLICATION TO FLEXIBLE SOLAR GENERATORS [ANALYSE MODALE DE STRUCTURES AVEC EFFETS DE RECONTRAINTE. APPLICATION AUX GENERATEURS SOLAIRES SOUPLES]

B. Boissin 20 May 1981 76 p refs In FRENCH
(CNES-81/CT/PRT/SST/SM/178) Avail: NTIS HC A05/MF A01

A model of the dynamic behavior of a flexible solar array which is part of a satellite-borne solar generator for spacecraft power supply (4 to 10kW) is presented. Results are appropriate for solving problems of spacecraft attitude control. The array is depicted as a skin covered by solar cells. Modal characterization of prestressed structures is explained for the calculation of differential rigidity. The method is demonstrated for a beam loaded at each end and for a square plate loaded along two opposite sides. Results for an array which is deployed along a telescoping mast are shown. Author (ESA)

N82-14668# Department of Agriculture, Washington, D.C. National Economics Div.

SOLAR-SUPPLEMENTED, NATURAL AIR DRYING OF SHELLED CORN: THE ECONOMIC LIMITATIONS

Walter G. Heid, Jr. and David F. Aldis Jun. 1981 45 p refs
(PB81-235681; TB-1654) Avail: NTIS HC A03/MF A01 CSCL 02C

It is not economically feasible to supplement natural air drying of high-moisture shelled corn by adding heat (solar and otherwise). In some cases, that drying method speeds product deterioration. A simulation analysis of the west central Great Plains determined that benefits from adding solar heat to batch-in-bin and layer-in-bin grain drying methods failed to offset the solar heat installation costs and product deterioration losses. Findings also suggest that high-speed, high-temperature drying is necessary to avoid field losses and to ensure marketable corn of high quality. GRA

N82-14669# National Weather Service, Salt Lake City, Utah.

SOLAR RADIATION AS A SOLE SOURCE OF ENERGY FOR PHOTOVOLTAICS IN LAS VEGAS, NEVADA, FOR JULY AND DECEMBER

Darryl Randerson Apr. 1981 23 p refs
(PB81-224503; NOAA-TM-NWS-WR-161; NOAA-81050702) Avail: NTIS HC A02/MF A01 CSCL 10B

Global radiation data represent the total direct solar radiation plus diffuse sky radiation received by a horizontal surface. The median, maximum, and minimum radiation days for both July and December are identified. In addition, the diurnal variation in the cumulative frequency distribution of the hourly global radiation data was graphed for both months. Based on photovoltaics, these charts are used to evaluate the expected solar energy supply for a given area of exposure. Example calculations are given to demonstrate how to find the total area of solar cells needed to supply the total energy demands of an all-electric home. T.M.

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-14670# Comptroller General of the United States, Washington, D.C.

BILLIONS COULD BE SAVED THROUGH WAIVERS FOR COASTAL WASTEWATER TREATMENT PLANTS Report to the Congress

22 May 1981 66 p refs
(CED-81-68) Avail: NTIS HC A04/MF A01

The effectiveness of the secondary treatment waiver provision to allow effluent discharge into marine coastal waters and its administration by the Environmental Protection Agency (EPA) in achieving desired levels of environmental quality in a practical and cost effective manner are studied. It is concluded that discharges of primary treated municipal wastes are not harmful to the marine environment and that giving waivers to coastal communities in these locations so that they do not have to build Federally required secondary treatment facilities could save billions of dollars. It is recommended that the Congress and EPA should reopen, modify, and continue the waiver application process. R.J.F.

N82-14671# Comptroller General of the United States, Washington, D.C.

HAZARDOUS WASTE SITES POSE INVESTIGATION, EVALUATION, SCIENTIFIC, AND LEGAL PROBLEMS Report to the Congress

24 Apr. 1981 74 p
(CED-81-57) Avail: NTIS HC A04/MF A01

The kind of scientific evidence necessary to determine whether or not a particular disposal site poses a significant hazard to the public's health is discussed. The capacity to collect and substantiate the kind of evidence required to prove the presence of a hazard or of a relationship between a disposal site and impaired health is discussed. Issues of legal liability, legislation, transportation of hazardous materials, and funding are also treated. R.J.F.

N82-14672*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

APPLICATION OF A GAUSSIAN MULTILAYER DIFFUSION MODEL TO CHARACTERIZE DISPERSION OF VERTICAL HCl COLUMN DENSITY IN ROCKET EXHAUST CLOUDS

G. L. Pellett and W. L. Staton Dec. 1981 74 p refs
(NASA-TP-1956; L-14715) Avail: NTIS HC A04/MF A01 CSCL 13B

Solid rocket exhaust cloud dispersion cases, based on seven meteorological regimes for overland advection in the Cape Canaveral, Florida, area, are examined for launch vehicle environmental impacts. They include a space shuttle case and all seven meteorological cases for the Titan 3, which exhausts 60% less HCl. The C(HCl) decays are also compared with recent in cloud peak HCl data from eight Titan 3 launches. It is stipulated that while good overall agreement provides validation of the model, its limitations are considerable and a dynamics model is needed to handle local convective situations. E.A.K.

N82-14673*# National Aeronautics and Space Administration, Washington, D. C.

EFFECTS OF AIRCRAFT NOISE ON THE EQUILIBRIUM OF AIRPORT RESIDENTS: SUPPLEMENTARY ANALYSES TO THE STUDY CARRIED OUT AROUND ORLY

J. Francois Sep. 1981 43 p Transl. into ENGLISH of "Repercussion du bruit des avions sur l'equilibre des reverains des aeroports--Analyses complementaires de l'enquete realisee autour d'Orly" Aug. 1977 42 p Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Inst. Francais d'Opinion Publique, Paris
(Contract NASw-3542)
(NASA-TM-76627) Avail: NTIS HC A03/MF A01 CSCL 13B

The effects of aircraft noise on humans living near airports were studied. Two main questions were considered: do residents give evidence of psychological or physiological disturbances in unusually intense noise sectors; and do personality or health factors account for the high interindividual variability of annoyance? The methodology used and results obtained are presented. Samples of the survey questionnaires are included. E.A.K.

N82-14674*# National Aeronautics and Space Administration, Washington, D. C.

TAKING INTO ACCOUNT NIGHTTIME ANNOYANCE IN THE CALCULATION OF THE PSOPHIC INDEX

Jacques Francois May 1981 30 p ref Transl. into ENGLISH of "La Prise en Compte de la Gene Nocturne dans le Calcul de l'Indice Psophique" Rept., France, Feb. 1977 p 1-33 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Inst. Francaise d'Opinion Publique (IFOP), Paris
(Contract NASw-3199)
(NASA-TM-76580) Avail: NTIS HC A03/MF A01 CSCL 13B

The annoyance factor caused by air traffic noise on the residents of areas near airports is discussed. The psophic index is used to predict the level of overall annoyance suffered on the average by residents around airports. The calculation method differentiates between daytime and nighttime annoyance. E.A.K.

N82-14675*# National Aeronautics and Space Administration, Washington, D. C.

ATTITUDES OF THE PEOPLE OF FRANCE TOWARDS THE SUPERSONIC BANG Final Report

May 1981 77 p refs Transl. into ENGLISH of "Attitudes de la Population Francaise a l'Egard du Bang Supersonique" Rept. Centre d'Etudes et de Recherches Psychologiques Air de l'Armee de l'Air, France, Oct. 1971 p 1-91 Original language document was announced as A75-17371 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Centre d'Etudes et de Recherches Psychologiques Air de l'Armee de l'Air, Saint-Cyr-l'Ecole, France
(Contract NASw-3199)
(NASA-TM-76581) Avail: NTIS HC A05/MF A01 CSCL 13B

The attitudes and opinions of the people of France towards the supersonic boom were surveyed. The information provided answers to the following questions: (1) how does the boom rank among today's pollutants? (2) is perception of the boom objective? (3) does the frequency of exposure to the boom influence attitudes? (4) does sensitivity to the boom or annoyance from the boom increase linearly with the frequency? E.A.K.

N82-14676# Army Armament Research and Development Command, Dover, N. J.

THE CHEMICAL CHARACTERIZATION OF POLLUTANTS IN WASTE WATER FROM VOLUNTEER ARMY AMMUNITION PLANT Final Report

C. Ribaudo, C. Campbell, S. Bulusu, W. Fisco, T. Chen, H. Kramer, and T. Castorina Aug. 1981 61 p refs
(DA Proj. 1T7-62720-D-048)
(AD-A105705; AD-E400686; ARLCD-TR-81028) Avail: NTIS HC A04/MF A01 CSCL 13/2

The separation and identification of dissolved species and estimation of the concentrations of identified components are described. Inorganic pollutants were identified and estimated by spark source mass spectrometry and conventional wet chemical techniques. Organic pollutants were extracted from the waste waters with methylene chloride and the extracts were characterized by means of classical and multi-development thin-layer chromatography, gas chromatography, infrared spectrophotometry, mass spectrometry, and tandem gas chromatography mass spectrometry. The waste waters are shown to be exceedingly complex mixtures of nitroaromatic compounds derived from the TNT manufacturing process and heavy metal ions leached from the stainless steel reaction vessels. The concentration levels of many of the inorganic pollutants in the waste waters discharged into public waters exceeded the concentrations permitted by federal and state environmental pollution standards. T.M.

N82-14677# Sandia Labs., Albuquerque, N. Mex.

BENEFICIAL USES OF NUCLEAR WASTE PROGRAM SEWAGE-SLUDGE IRRADIATION PROJECT Progress Report, Oct. 1980 - Mar. 1981

R. W. Lynch, ed. Aug. 1981 96 p refs
(Contract DE-AC04-76DP-00789)
(DE82-000440; SAND-81-1685) Avail: NTIS HC A05/MF A01

The sewage sludge irradiation project which develops and transfers sludge irradiation technology to the municipal sector is discussed. Sludge irradiation is beneficial by reducing the pathogen content of sludge sufficiently to permit broad agricultural use without compromising public health and safety. A number of architect/engineer (A and E) firms are participating in the design, licensing, construction and stort up of sludge irradiation plants. DOE

N82-14678# Argonne National Lab., Ill. Radiological and Environmental Research Div.

RADIOLOGICAL AND ENVIRONMENTAL RESEARCH 1980: ECOLOGY Annual Report, Jan. - Dec. 1980

Jul. 1981 131 p refs
(Contract W-31-109-eng-38)
(DE82-000154; ANL-80-115-Pt-3) Avail: NTIS HC A07/MF A01

Field grown and greenhouse grown soybeans are studied to determine the effects of sulfur dioxide, nitrogen dioxide, ozone, etc. on their crop yield. The effects of radioactive wastes on the Lake Michigan and its ecology are also studied. S.L.

N82-14679# Rockwell International Corp., Golden, Colo. Energy Systems Group.

VOLUME REDUCTION OF USED HIGH-EFFICIENCY PARTICULATE AIR (HEPA) FILTERS

O. I. Buttedahl, R. D. Howerton, ed., and M. Morales 3 Aug. 1981 15 p
(Contract DE-AC04-76DP-03533)
(DE81-028529; RFP-3132) Avail: NTIS HC A02/MF A01

A device to reduce the volume of used high efficiency particulate air (HEPA) filters from air filtration systems was constructed. A model of a three axis hydraulic compactor was developed for compacting 8 x 8 x 6 in. filters. It is demonstrated that HEPA filter volume reductions in excess of 90% can be achieved. A production model was built to accept Size 5 HEPA filters, which measure 2 x 2 x 1 ft. Use of the production model provides significant savings in both waste packaging and terminal waste storage. DOE

N82-14680# Oak Ridge National Lab., Tenn.

COAL CONVERSION SOLID WASTE DISPOSAL

C. W. Francis, W. J. Boegly, Jr., R. R. Turner, and E. C. Davis 1981 21 p refs Presented at the Am. Soc. of Civil Engr. Ann. Meeting, Vail, Colo., 3 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028567; CONF-81086-1) Avail: NTIS HC A02/MF A01

The major solid waste produced at coal conversion facilities will be gasification slag or ash. To evaluate the impact of this waste on the environment, extensive characterization and leaching studies were conducted on ash/slags that were generated in bench-scale operations, pilot plants, and/or process development units for the Cogas, British Gas/Lurgi, Grace/Texaco, U-Gas, Foster Wheeler/Stoic, SRC-I/Koppers-Totzek, SRC-II/Texaco, and Combustion Engineering gasification processes. These studies, designed to assess the consequences of disposal in landfills, showed that none of the leachates from these eight wastes exceeded the US Environmental Protection Agency's toxicity limits established as a result of the Resource Conservation and Recovery Act of 1976. The major environmental impact associated with disposal of these solid wastes appears to be the dissolution of sulfate and the potential acidification of ground water. DOE

N82-14681# Argonne National Lab., Ill.

ENVIRONMENTAL ASSESSMENT AND INDUSTRIAL COGENERATION DEMONSTRATION PLANT AT THE HOFFMANN-LA ROCHE PLANT SITE, BELVIDERE, NEW JERSEY

Jul. 1981 128 p refs
(Contract W-31-109-eng-38)
(DE81-030180; DOE/TIC-11487) Avail: NTIS HC A07/MF A01

The potential environmental, health and safety, and socioeconomic impacts of a proposed industrial cogeneration demonstration plant in Warren County, New Jersey was assessed. The proposed cogeneration system will produce steam for plant process operations. Impacts associated with the proposed action on topography and climatology, geology and soils, air quality, water resources and quality, ecological resources, socioeconomics, land use plans and policies, health and safety, utilities and services, energy resources, and cultural resources and aesthetics are detailed. It is found that the potential environmental impacts from the proposed action, the operation of the proposed industrial cogeneration demonstration project on No. 6 fuel oil asits primary energy source will have no significant impact on the human and natural environments. Any potential environmental impacts will be mitigated by application of appropriate control technology and related measures. DOE

N82-14682# Institut de Recherche des Transports, Arcueil (France). Centre d'Evaluation et de Recherche des Nuisances et de l'Energie.

PATTERNS OF BEHAVIOR IN LODGINGS SUBJECT TO TRAFFIC NOISE

Jacques Lambert, Francois Simonnet, and Michel Vallet Sep. 1980 165 p refs In FRENCH; ENGLISH summary
(IRT-47; ISBN-2-85782-075-5) Avail: NTIS HC A08/MF A01

Threshold values at which public services should intervene to attenuate the noise nuisance are defined. Observations were made in the field of daily life at home. Data were collected on the use of lodgings, on effects of noise on health and sleep, and on the incidence of running away from home. A correlation was also made with the equipment and noise insulation of lodgings. The results show that above 65 dB in daytime, there are behavior patterns that are extreme so far as they modify in a considerable manner the way of life of people, living both in collective housing (apartments) and in individual houses. Author (ESA)

N82-14683# Maine Univ. at Orono.

REMOTE SENSING OF NON-POINT SOURCE SEDIMENT IN NORTHERN MAINE M.S. Thesis

Rachel Sabena Smith May 1981 89 p refs Sponsored by Office of Water Research and Technology
(PB81-233603; W81-04365; OWRT-A-049-ME(3)) Avail: NTIS HC A05/MF A01 CSCL 14B

Remote sensing techniques were used in connection with appropriate ground sampling to evaluate sediment loading caused by agricultural erosion. A two-year project was undertaken to develop and test procedures for quantitative monitoring of nonpoint source pollution in Aroostook County, Maine. The methodology developed has limited potential as a tool for detecting, quantifying and recording nonpoint source pollution due to low ambient turbidity levels and narrow stream widths. GRA

N82-14684# Walk, Hydel and Associates, Inc., New Orleans, La.

LABORATORY STUDIES OF PRIORITY POLLUTANT TREATABILITY Final Report, Apr. 1978 - Mar. 1980

James K. Smith, Robert J. Planchet, E. Jasper Westbrook, and Frederick J. Zak Jul. 1981 138 p refs
(Contract EPA-68-03-2579)
(PB81-231235; EPA-600/2-81-129) Avail: NTIS HC A07/MF A01 CSCL 13B

Several methods currently available to reduce the level of pollutants in an industrial plant wastewater stream were investigated. Five priority pollutants were selected for testing the effectiveness of carbon adsorption, resin adsorption, and steam stripping. The results indicate high removal efficiency for these five priority pollutants by carbon adsorption and resin adsorption. Although steam stripping reduced chlorobenzene, p-dichlorobenzene and nitrobenzene concentrations by at least fifty percent, it is not effective, under the test conditions, for the priority pollutants phenol or dinitrotoluene. Cost effectiveness may favor use of carbon adsorption over resin adsorption. T.M.

N82-14685# Industrial Environmental Research Lab., Research Triangle Park, N. C.

PROCEEDING OF THE JOINT SYMPOSIUM ON STATIONARY COMBUSTION NOx CONTROL. VOLUME 1: NOx EMISSION USERS AND INVITED PAPERS

Robert E. Hall and J. Edward Cichanowicz Aug. 1981 98 p refs Proceedings of Conf. held in Denver, 6-9 Oct. 1980 Sponsored in part by EPRI
(PB81-236119; EPA-600/9-81-028A; IERL-RTP-1083A) Avail: NTIS HC A05/MF A01 CSCL 13B

Issues on stationary combustion and NOx emission were discussed. Main topics include: (1) utility boiler field tests; (2) NOx flue gas treatment; (3) advanced combustion processes; (4) environmental assessments; (5) industrial, commercial, and residential combustion sources; and (6) fundamental combustion research. GRA

N82-14686# Industrial Environmental Research Lab., Research Triangle Park, N. C.

PROCEEDINGS OF THE JOINT SYMPOSIUM ON STATIONARY COMBUSTION NOx CONTROL. VOLUME 2: UTILITY BOILER NO SUB X CONTROL BY COMBUSTION MODIFICATION

Robert E. Hall and J. E. Cichanowicz Aug. 1981 536 p refs Symp. held at Denver, 6-9 Oct. 1980 Sponsored by EPRI
(PB81-236127; EPA-600/9-81-028B; IERL-RTP-1084a) Avail: NTIS HC A23/MF A01; also available in set of 5 reports HC A99 as PB81-236101 CSCL 13B

The use of combustion modification to control NOx emissions from utility boilers was discussed. Main topics include: utility boiler field tests; NOx flue gas treatment; advanced combustion processes; environmental assessments; industrial, commercial, and residential combustion sources; and fundamental combustion research. GRA

N82-14687# Industrial Environmental Research Lab., Research Triangle Park, N. C.

PROCEEDINGS OF THE JOINT SYMPOSIUM ON STATIONARY COMBUSTION NOx CONTROL. VOLUME 3: UTILITY BOILER NO SUB X CONTROL BY FLUE GAS TREATMENT

Robert E. Hall and J. Edward Cichanowicz Aug. 1981 277 p refs Proceedings of Conf. held in Denver, 6-9 Oct. 1980 Sponsored in part by EPRI
(PB81-236135; EPA-600/9-81-028C; IERL-RTP-1085A) Avail: NTIS HC A13/MF A01 CSCL 13B

The treatment of flue gases from utility boilers to control NOx emissions are discussed. Main topics include: utility boiler field tests; NOx flue gas treatment; advanced combustion processes; environmental assessments; industrial, commercial, and residential combustion sources; and fundamental combustion research. GRA

N82-14688# Industrial Environmental Research Lab., Research Triangle Park, N. C.

PROCEEDINGS OF THE JOINT SYMPOSIUM ON STATIONARY COMBUSTION NOx CONTROL. VOLUME 4: NOx CONTROL AND ENVIRONMENTAL ASSESSMENT OF INDUSTRIAL PROCESS EQUIPMENT, ENGINES, AND SMALL STATIONARY SOURCES

Robert E. Hall and J. Edward Cichanowicz Aug. 1981 446 p refs Proceedings of the Conf. held in Denver, 6-9 Oct. 1980 Sponsored in part by EPRI
(PB81-236143; EPA-600/9-81-028D; IERL-RTP-1086A) Avail: NTIS HC A19/MF A01 CSCL 13B

The NOx control and environmental assessment of industrial process equipment, engines, and small stationary sources are related. Main topics include: utility boiler field tests; NOx flue gas treatment; advanced combustion processes; environmental assessments; industrial, commercial, and residential combustion sources; and fundamental combustion research. GRA

N82-14689# Industrial Environmental Research Lab., Research Triangle Park, N. C.

PROCEEDINGS OF THE JOINT SYMPOSIUM ON STATIONARY COMBUSTION NOx CONTROL. VOLUME 5: FUNDAMENTAL COMBUSTION RESEARCH AND ADVANCED PROCESSES

Robert E. Hall and J. Edward Cichanowicz Aug. 1981 325 p refs Proceedings of Conf. at Denver, 6-9 Oct. 1980 Sponsored in part by EPRI
(PB81-236150; EPA-600/9-81-028E; IERL-RTP-1087A) Avail: NTIS HC A14/MF A01 CSCL 13B

The NOx control and its application to combustion research and advanced processes is discussed. Main topics include: utility boiler field tests; NOx flue gas treatment; advanced combustion processes; environmental assessments; industrial, commercial, and residential combustion sources; and fundamental combustion research. GRA

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N82-14690*# California Univ., San Diego, La Jolla. Inst. of Geophysics and Planetary Physics.
THE SEISMOTECTONICS OF PLATE BOUNDARIES Final Report, 1 Nov. 1973 - 30 Jun. 1981
John Berger, James N. Brune, John Goodkind, Frank Wyatt, Duncan C. Agnew, and Christopher Beaumont (Dalhousie Univ.) 30 Jun. 1981 85 p refs
(Grant NGR-05-009-246)
(NASA-CR-165050) Avail: NTIS HC A01/MF A01 CSCL 08G

Research on the seismotectonics of plate boundaries is summarized. Instrumental development and an observational program designed to study various aspects of the seismotectonics of southern California and the northern Gulf of California are described. A unique superconducting gravimeter was further developed and supported under this program for deployment and operation at several sites. Work on Earth tides is also discussed.
M.D.K.

N82-14691*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STRATOSPHERIC AEROSOLS
M. Patrick McCormick Nov. 1981 20 p refs
(NASA-TM-83217) Avail: NTIS HC A02/MF A01 CSCL 04A

The current state of information on stratospheric aerosols is reviewed. Aerosol properties such as size, size distribution, composition, refractive index, number density, extinction, optical depth, and single scattering albedo are considered and generalized as much as possible to be representative of the global aerosol in times of volcanic and nonvolcanic (background) periods. Data are presented that show the global distribution of stratospheric aerosols as measured by the stratospheric aerosol and gas experiment (SAGE) satellite system for background and volcanic (post-Mount St. Helens) conditions. In addition, lidar and dustsonde data are presented that show the changes in stratospheric aerosol over an 8-year period.
A.R.H.

N82-14692# Technische Hogeschool, Delft (Netherlands).
GRAVITY WAVES ON WATER WITH NON-UNIFORM DEPTH AND CURRENT Ph.D. Thesis
Nico Booij 19 May 1981 130 p refs
Avail: NTIS HC A07/MF A01

A mathematical model for the combined refraction-diffraction of linear periodic gravity waves on water is developed, in which the influence of inhomogeneities of depth and current is taken into account. The model is used to compute partial reflection of waves crossing a gully or an undersea slope, with influence of a current. The model is also applied to prismatic wave channels with reflecting side-walls. For a gully bounded by shallows the model predicts the decay of wave height due to radiation of energy in lateral direction. For practical application in regions with arbitrary bottom and current topography a parabolic approximation of the model is derived. This is used as a basis for numerical calculation of waves in a sea region near the coast.
Author

N82-14693*# National Aeronautics and Space Administration, Washington, D. C.
STUDIES ON THE BEHAVIOR OF AMMONIA AND AMMONIUM SALTS IN THE ATMOSPHERE (1) - FRACTIONAL COLLECTION OF AMMONIA GAS AND PARTICULATE AMMONIUM
Kiko Kiin, Mosturu Fujimura, and Yoshikazu Hashimoto May 1981 10 p refs Transl. into ENGLISH from the Journal of the Japan Soc. of Air Pollution (Japan), v. 14, no. 10, 1979 p 30-33 Original language document was announced as A80-28118 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3198)
(NASA-TM-76582) Avail: NTIS HC A02/MF A01 CSCL 04A

Methods for the fractional collection of trace amounts of atmospheric ammonia gas and ammonium particles on a two staged glass fiber filter are summarized. A standard glass fiber filter washed with distilled water and dried at 120 to 130 C was used. A second filter was impregnated with a mixture of 3% boric acid and 25% glycerin solution. The blank of glass fiber filters impregnated with a mixture of the above solution was very low for ammonia, i.e. 0.06 micrograms in a filter of 47 mm in diameter. The mean concentrations of ammonia and ammonium in air at Kawasaki, a polluted area, were 7.6 and 2.3 micrograms cu m, and those at Sanriku, an unpolluted area 0.9 and 0.2 micrograms cu m, respectively. Ratios of concentration levels of ammonium to total ammonia in the atmosphere were 0.3 and 0.2 for the polluted and unpolluted areas, respectively. Ammonium salts in air at both areas were not correlated with relative humidity. Variations in time of ammonia concentrations and sources in surrounding areas are also considered.
M.D.K.

N82-14694# Institut fuer Astrophysik und Extraterrestrische Forschung, Bonn (West Germany).
ON THE IDENTIFICATION OF PLANETARY-SCALE WAVES DURING DISTURBED CONDITIONS
G. W. Proelss 1981 13 p refs In ENGLISH; GERMAN abstract
(ISSN-0340-9821; Rept-94) Avail: NTIS HC A02/MF A01

Thermospheric density variations previously interpreted as propagating gravity waves are investigated. These variations are primarily spatial in nature and are attributed to the quasi-stationary daytime geomagnetic activity effect.
S.L.

N82-14695# Teledyne Geotechnical, Alexandria, Va. Seismic Data Analysis Center.
SINGLE CHANNEL SEISMIC EVENT DETECTION
Robert R. Blandford, David Racine, and Raleigh Romine Alexandria, Va. VELA Seismological Center 7 Oct. 1981 153 p refs
(Contract F08606-79-C-0007; DARPA Order 2551)
(AD-A105469; SDAC-TR-81-7; VSC-TR-81-8) Avail: NTIS HC A08/MF A01 CSCL 17/10

Several types of seismic signal detectors were tested on NORSAR and Pinedale, Wyoming signals buried every 10 minutes in approximately 22 hours of phase scrambled noise. All plausible detectors including human analysts operate within 0.1 mb of the mean value including the present on-line 'IBM' STA/LTA detector, a 'Z' detector, detectors with fixed or optimum filters, a 'deflection' detector, the MARS detector, a detector which cascades a recursive digital filter with Walsh transforms, and human analysts viewing unfiltered Calcomp plots. The best detector was a log-Z transform aided by a recursively updated optimum sq(S/N) filter. Among the worst were human analysts when operating in the pick everything mode, the deflection detector, and a prediction error type detector. The human analyst could, however, improve to be nearly the best if sufficient care was taken. With a modest amount of care, any detector can be modified to perform well as an element of an operational system and the choice of single channel detector can be made on other grounds than pure detection such as availability or computation speed. In this report also we outline the features of the existing on-line detector at the SDAC which, in addition to pure detection, also classifies events as spikes, drop outs, regionals, and teleseisms and calculates a refined start time.
Author (GRA)

N82-14696# Teledyne Geotechnical, Alexandria, Va. Seismic Data Analysis Center.
REGIONAL PHASE PROCESSORS
Eugene Smart and Helene Sproules VELA Seismological Center 7 Oct. 1981 39 p refs
(Contract F08606-79-C-0007; Grant ARPA Order 2552)
(AD-A105470; SDAC-TR-81-1; VSC-TR-81-19) Avail: NTIS HC A03/MF A01 CSCL 17/10

The Smart processor technique and the propagation direction of regional seismic phases by operating on a comprehensive data set were evaluated. The Smart single station maximum likelihood surface wave processor relies on three component particle motion analysis, demonstrates its utility for automatic signal azimuth determination. The Smart processor maximizes the ratio of energy between components. The P-wave azimuth is determined by minimizing the transverse component, the L(g) by maximizing the transverse and the emergence cycle by finding the best rectilinear motion fit to three components of data. The F-statistic computed by these processors serves to seperate poor azimuthal estimates from the population. E.A.K.

N82-14697# Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
SOME OPTICAL PROPERTIES OF BLOWING SNOW Final Report
Mary Ann Seagraves Jun. 1981 40 p refs
(DA Proj. 1L1-61102-B-53-A)
(AD-A103288; ASL-ERADCOM/ASL-TR-0091) Avail: NTIS
HC A03/MF A01 CSCL 04/1

Windblown snow causes severe reduction in visibility and is a principal cause of obscuration in some regions of the world. Mechanisms of snow transport are presented along with particle size distributions, shape, and fall velocity. Relationships between visibility and windspeed and also between visibility and mass density in blowing snow are discussed. Variation of visible and infrared extinction coefficients with height were derived. T.M.

N82-14698# Fraunhofer-Inst. fuer Atmosphaerische Umweltforschung, Garmisch-Partenkirchen (West Germany).
ATMOSPHERIC DUST AND AEROSOL STUDY Data Report, Mar. 1976 - Dec. 1978
Reinhold Reiter, Hans Muller, and Rudolf Sladkovic Apr. 1981
57 p refs
(Grant DA-ERO-77-G-035; DA Proj. 1T1-61102-BH-57)
(AD-A100658) Avail: NTIS HC A04/MF A01 CSCL 04/1

Fluorescent particle tracer experiments were conducted to study the dispersion processes in the north-alpine Loisach River Valley for a variety of meteorological conditions including inversion cases. This report summarizes the details of the experiments and presents all results, in particular the particle concentrations measured at various downwind locations by H-shaped Rotorod samplers together with the relevant meteorological conditions, in tabular form. The report is intended to serve as a data base for further analysis. Author

N82-14699# Naval Research Lab., Washington, D. C. Plasma Physics Div.
NONLINEAR EVOLUTION OF PLASMA ENHANCEMENTS IN THE AURORAL IONOSPHERE 1: LONG WAVELENGTH IRREGULARITIES
M. J. Keskinen and S. L. Ossakow 5 Oct. 1981 32 p refs
Sponsored in part by Defense Nuclear Agency
(RR0330244)
(AD-A105553; NRL-MR-4611) Avail: NTIS
HC A03/MF A01 CSCL 04/1

The linear stability and nonlinear evolution of plasma enhancements in arbitrary ambient electric fields in the diffuse auroral F region ionosphere have been studied using analytical and numerical simulation techniques. Our results indicate that equatorward convecting plasma slabs initially limited in latitudinal extent are primarily destabilized on their poleward sides by a combination of the effects of convection and field aligned currents. Furthermore we find that the plasma enhancements break up into primary striation-like structures (elongated in the north-south direction for equatorward convection) which can form and cascade from large (approx. = 100 km) to smaller (approx. = 3 km) scale sizes on the order of an hour. The primary and associated smaller scale structures can be oriented either in the north-south or east-west (L-shell alignment) direction depending on the ambient electric field magnitude and direction. GRA

N82-14700# Naval Ocean Systems Center, San Diego, Calif.
ELECTRO-OPTICAL ATMOSPHERIC TRANSMISSION EFFORT IN THE MARINE ENVIRONMENT Interim Report, 1978 - 1981
Juergen H. Richter and Herbert G. Hughes 12 May 1981
52 p refs
(ZF599551002)
(AD-A105665; NOSC/TR-696) Avail: NTIS
HC A04/MF A01 CSCL 20/3

This report reviews the Navy's effort and addresses accomplishments, status, and future plans in the electro-optical atmosphere transmission areas of systems performance modeling, climatologies, modeling of aerosol distributions, aerosol propagation effects, and instrumentation. The Navy's EO atmospheric transmission program has yielded significant results in the areas of systems performance assessment, worldwide climatologies, aerosol measurement and modeling, and instrumentation development. Future effort will continue in these areas, with an increased emphasis on development of instrumentation for the operational assessment of the propagation environment. GRA

N82-14701# Mission Research Corp., Santa Barbara, Calif.
THE EFFECT OF MULTIBURST NO PRODUCTION ON ELECTRON DENSITIES AND HF ATTENUATION AT 60 KM ALTITUDE Final Report, 1 Dec. 1978 - 31 May 1980
Murray Scheibe 1 Oct. 1980 30 p refs
(Contract DNA001-79-C-0089; S99QAXH)
(AD-A105676; MRC-R-584; DNA-5473F) Avail: NTIS
HC A03/MF A01 CSCL 04/1

The effect of large scale production of NO due to a large number of nuclear bursts on the steady state electron densities at 60 km altitude was investigated. It was found, for ionization rates of 16 and 1600 ion-pairs/cubic cm-sec, that the electron densities decreased significantly below that expected for ambient conditions for NO concentrations greater than 10 to the 9th/cubic cm. Since this is the region of maximum HF attenuation, the effects of multiburst NO production on HF communication systems could also be significant. Further calculations are planned. Author (GRA)

N82-14702# Physical Dynamics, Inc., Bellvue, Wash.
A COMPUTER MODEL FOR HIGH-LATITUDE PHASE SCINTILLATION BASED ON WIDEBAND SATELLITE DATA FROM POKER FLAT Final Report, 15 Aug. 1979 - 28 Feb. 1981
Edward J. Fremouw and John M. Lansinger 28 Feb. 1981
55 p refs
(Contract DNA001-79-C-0372; DNA Proj. S99-QAXH)
(AD-A105620; PD-NW-81-240R; DNA-5686F) Avail: NTIS
HC A04/MF A01 CSCL 04/1

A mathematical model has been developed for describing plasma-density irregularities responsible for radiowave scintillation produced in the auroral ionosphere, and the model has been committed to an applications-oriented computer code, WBMOD. The model characterizes the three-dimensional configuration, gradient sharpness, and height-integrated strength of irregularities represented by a power-law spatial spectrum as functions of geomagnetic latitude, time of day, sunspot number, and planetary geomagnetic activity index. Program WBMOD permits calculation of the power-law index and spectral strength (at a fluctuation frequency of 1 Hz) of phase scintillation, together with scintillation indices (variances) for phase and intensity, using a phase-screen scattering theory. The model has been calibrated and iteratively tested against phase-scintillation data from the DNA Wideband Satellite Experiment, collected at Poker Flat, Alaska. It does not account for seasonal variations in high-latitude scintillation observed in other longitude sectors. The program contains a model for middle-latitude and equatorial irregularities as well as for auroral latitudes, but only the latter has been tested extensively against high-quality scintillation data. Author (GRA)

N82-14703# Sandia Labs., Albuquerque, N. Mex.
ANALYSIS OF DATE FROM LINE-SOURCE THERMAL-CONDUCTIVITY MEASUREMENTS TAKEN IN SITU IN DOME SALT AT THE IVERY ISLAND MINE
D. F. McVey Aug. 1981 79 p refs
(Contract DE-AC04-76DP-00789)
(DE82-000517; SAND-81-1232) Avail: NTIS
HC A05/MF A01

The thermal conductivity was determined to be 5.8 W/m-K at about 26 C and 5.6 W/m-K at about 31 C. Because the influence of contact resistance and two-dimensional effects prevented the temperature rise from attaining the log-time linear asymptote classically used to analyze line source probe data, a new data reduction procedure using parameter estimation techniques was developed. The procedure obtains a least-squares-best-fit of a classic line source integral solution to the non-linear early time temperature data. In the fit, contact resistence and thermal conductivity are free parameters. The technique removes many of the classic assumptions that restrict the usefulness of line source probes for in situ measurements. T.M.

N82-14704# Battelle Pacific Northwest Labs., Richland, Wash.

ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS: THE AEGIS GEOLOGIC SIMULATION MODEL

M. G. Foley and G. M. Petrie Feb. 1981 17 p refs Presented at the Symp. on Uncertainties Assoc. with the Regulation of the Geol. Disposal of High-Level Radioact. Waste, Gatlinburg, Tenn., 9 Mar. 1981
(Contract DE-AC06-76RL-01830)
(DE81-028007; PNL-SA-9111; CONF-810372-11) Avail: NTIS HC A02/MF A01

Assessment of the post-closure performance of a nuclear waste repository has two basic components: the identification and analysis of potentially disruptive sequences and the pattern of geologic events and processes causing each sequence, and the identification and analysis of the environmental consequences of radionuclide transport and interactions subsequent to disruption of a repository. The AEGIS Scenario Analysis Task is charged with identifying and analyzing poteníally disruptive sequences of geologic events and processes. The Geologic Simulation Model (GSM) was developed to evaluate the geologic/hydrologic system surrounding an underground repository, and describe the phenomena that alone, or in concert, could perturb the system and possibly cause a loss of repository integrity. DOE

N82-14705# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Mechanical Engineering.

DAYLIGHTING CALCULATIONS FOR NONRECTANGULAR INTERIOR SPACES WITH SHADING DEVICES

M. F. Modest (Univ. of Southern California, Los Angeles) Jun. 1981 35 p refs Presented at Illuminating Engr. Soc. Ann. Tech. Conf., Toronto, 9 Aug. 1981
(Contract W-7405-eng-48)
(DE81-027962; LBL-12599; EEB-W-81-05; W-81; CONF-810862-1) Avail: NTIS HC A03/MF A01

Employing a general numerical model for the calculation of daylighting in interior spaces the sensitivity of daylighting to nonrectangular rooms, such as L-shaped rooms, and to other internal visual obstructions, such as light shelves, is discussed. Opaque, semitransparent, and translucent window overhangs, which may be positioned at any or all sides of a window are also treated. The model has the capability of graphical output. Results are shown in the form of contour plots, showing room outline, sunny areas, and constant illumination or constant daylight factor lines. DOE

N82-14706# California Univ., Berkeley. Lawrence Berkeley Lab. Energy Efficient Buildings Program Office.

HEMISPHERICAL SKY SIMULATOR FOR DAYLIGHTING MODEL STUDIES

S. Selkowitz Jul. 1981 6 p refs Presented at the 6th Natl. Passive Conf., Portland, Oreg., 8-12 Sep. 1981
(Contract W-7405-eng-48)
(DE81-028130; LBL-12967; CONF-810925-18; EEB-W-81-11; W-93) Avail: NTIS HC A02/MF A01

The design of a 24 foot diameter hemispherical sky simulator is described. A facility in which large models is tested, which is suitable for research, teaching, and design which could provide a uniform sky, an overcast sky, and several clear sky luminance distributions, as well as accommodating an artificial sun was produced. Initial operating experience with the facility is described, the sky simulator capabilities are reviewed, and its strengths and weaknesses relative to outdoor modelling tests are discussed. DOE

N82-14707# Midwest Research Inst., Golden, Colo. Measurement Research and Support Branch.

ALL-SKY, VIDEO-BASED LUMINANCE MAPPER FOR DAYLIGHTING RESEARCH

Theodore W. Cannon and Leo D. Dwyer Jul. 1981 5 p refs Presented at the 6th Natl. Passive Conf., Portland, Oreg., 8-12 Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-029276; SERI/TP-643-1324; CONF-810925-20) Avail: NTIS HC A02/MF A01

A video based system for acquisition and luminance analysis of all sky and interior surface images are developed. The system uses an orthographic projection fisheye lens and transfer lens combination to produce an image of the entire sky dome on the camera's vidicon target. Video data for each image are digitized in real time to produce a field of data which is analyzed to produce meaningful measurements. The camera system is described and examples of all sky luminance mapping as well as application to interior surface mapping of daylighting models are presented. DOE

N82-14708# Los Alamos Scientific Lab., N. Mex.

GEOLOGY AND GEOCHEMISTRY OF SAMPLES FROM LOS ALAMOS NATIONAL LABORATORY HDR WELL EE-2, FENTON HILL, NEW MEXICO

R. Laney, A. W. Laughlin, and M. J. Aldrich, Jr. Jul. 1981 33 p refs
(Contract W-7405-eng-36)
(DE81-026068; LA-8923-MS) Avail: NTIS HC A03/MF A01

A method of extracting geothermal energy from rocks of low natural permeability was investigated. The deeper part of the Precambrian section at Fenton Hill, New Mexico is composed primarily of a very heterogeneous and structurally anisotropic metamorphic complex, locally intruded by dikes and sills of granodioritic and monzogranitic composition. In borehole none of the igneous bodies approach in size the 335 m thick biotite-granodiorite body encountered at 2591 m depth beneath Fenton Hill in the other two drill holes. Contacts between the igneous and metamorphic rocks range from sharp and discordant to gradational. It is indicated that clay rich alteration zones are relatively common in the openhole portion of EE-2. These zones average about 20 m in thickness. Slickensided fault planes are present in a core taken from a true vertical depth of 4195 m. It is suggested that the faults dip steeply and trend between N.42 deg and 59 deg E. DOE

N82-14709# Technische Universitaet, Brunswick (West Germany). Inst. fuer Nachrichtentechnik.

SOUNDING ROCKET PROGRAM MAGNETOSPHERE: THE SEARCH COIL MAGNETOMETER EXPERIMENT IN THE SUBSTORM PHENOMENA PAYLOAD Final Report, Jun. 1980

Guenther Dehmel and Burkhard Theile Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 51 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-010; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,70

Single axis search coil magnetometers were in order to study plasma waves in the magnetosphere. The instruments are sensitive to magnetic field variations in the frequency range from 100 Hz to 5.2 kHz and complement the electromagnetic wave detector measurements. The sensor consists of a coil, a micro-metal core and a preamplifier. Analog amplifiers and filters are contained in the main electronics package. Electromagnetic interferences during payload tests are discussed. All four flights were successful, even though interferences during activation of the attitude control system deteriorated some data. The data are presented as amplitude-time diagrams and as spectra in the frequency range 200 Hz to 5 kHz (100 Hz bandwidth). Author (ESA)

N82-14710# Centre de Recherches en Physique de l'Environnement Terrestre et Planetaire, Orleans (France). Dept. PCE.

EXPERIMENTAL STUDY OF INSTABILITIES AND MOTION OF A STREAMING IONOSPHERIC PLASMA IN THE POLAR ZONE [ETUDE EXPERIMENTALE DES INSTABILITES ET MOUVEMENTS DE DERIVE DU PLASMA IONOSPHERIQUE EN ZONE POLAIRE]

Jacques Pignard Sep. 1979 119 p refs In FRENCH
(CRPE-NT-78) Avail: NTIS HC A06/MF A01

A space environment simulator was used in order to show the effect of plasma drift rate on the transfer impedance of a quadruple HF probe. Results allow for interpretation of the self oscillation frequency shift between the interferometric self oscillating probes onboard the sounding rocket experiment IPOCAMP 2. Data processing for the IPOCAMP 2 experiment, i.e. measurement of the electron density and of the continuous

(0 to 20 Hz) and alternating (10 to 200 Hz) electric fields, is explained. Physical parameters of the polar ionosphere were determined. Measurements contribute to a geophysical model of double band plasma instability observed in the E region of the auroral zone. Author (ESA)

N82-14711 Iowa Univ., Oakdale.
STRATIGRAPHY AND DEPOSITIONAL HISTORY OF THE IOLA LIMESTONE UPPER PENNSYLVANIAN (MISSOURIAN), NORTHERN MIDCONTINENT U.S. Ph.D. Thesis
John Charles Mitchell 1981 379 p
Avail: Univ. Microfilms Order No. 8123341

The Iola Limestone, one of the best developed and most laterally extensive, yet least studied Missourian cyclic carbonates in the Midcontinent Upper Pennsyvlanian, was studied. Along with adjacent shales, five members constitute the Iola cyclothem, a typical Kansas cyclothem. In ascending order these are: Chanute Shale; Paola Limestone; Munice Creek Shale; Raytown Limestone; and Lane/Bonner Springs Shale. Although traditional interpretation of cyclothems regarded all shale as nearshore, shallow-water deposits, Iola lithology and stratigraphy support the more recent hypothesis that the cyclothem represents a single transgressive-regressive event, with maximum transgression occurring during deposition of the Muncie Creek Shale. Distribution of conodonts reflects the depositional pattern of the Iola cyclothem. Vertical variation far outweighs lateral variation in abundance and diversity. Dissert. Abstr.

N82-14712 Iowa State Univ. of Science and Technology, Ames.
A FINITE-ELEMENT SEA-BREEZE MODEL Ph.D. Thesis
Lang-Ping Chang 1981 220 p
Avail: Univ. Microfilms Order No. 8123118

A two-dimensional finite element planetary boundary layer model was developed and successfully applied to the simulation of the sea-breeze phenomenon. The model solves the horizontal equations for conservation of momentum, the hydrostatic, the thermodynamic energy, and the continuity equations by the Galerkin finite element method. Profiles of the vertical exchange coefficients for momentum and heat are obtained from the O'Brien exchange-coefficient profile, together with Deardorff's formula for computing the height of the planetary boundary layer. The Coriolis effect is built in but the gradient of any quantity except for the synoptic-scale pressure in the alongshore direction is assumed to vanish. The synoptic pressure gradient is represented by the geostrophic wind relation and is assumed to stay steady during the integration process. A modified Crank-Nicholson time differentiating scheme is used to linearize the resulting algebraic system of equations in the iterative time integration process. Dissert. Abstr.

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-14713# Finnish Meteorological Inst., Helsinki.
LIGHTNING FLASH COUNTER MEASUREMENTS IN FINLAND DURING 1978 AND 1979
Leila Laitinen 1981 31 p refs In FINNISH; ENGLISH summary
(Rept-86; ISBN-951-697-135-0; ISSN-0355-1717) Avail: NTIS HC A03/MF A01

Lightning flash counter measurements in Finland are given. Transistorized counters were placed at weather stations throughout the country with the aim of finding the best measurement site for every counter in order to make the results as comparable as possible. Data are presented in the form of tables, graphs, and maps. R.J.F.

N82-14714*# National Aeronautics and Space Administration, Washington, D. C.
***MEASUREMENT OF CHARACTERISTICS OF LIGHTNING AT HIGH ALTITUDES Final Report**
M. Coquelet and D. Gall Dec. 1981 80 p Transl. into ENGLISH of 'Mesure des Caracteristiques de la Foudre en Altitude'' Test No. 76/650000 P.4, Final Report, Toulouse, May 1979 74 p Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prepared by CEAT
(Contract NASw-3541)
(NASA-TM-76669) Avail: NTIS HC A05/MF A01 CSCL 04B

New development in aeronautical technology -- the use of composite materials, new electronic components, electric flight controls -- have made aircraft potentially more and more vulnerable to the effects of lightning. In-flight tests were conducted to evaluate the current in a bolt of lightning, to measure voltage surge in the onboard circuitry and in certain pieces of equipment, and to document the relationship lightning bolt current and the voltage surge so as to develop a theoretical model and thuds to become acquainted with the significant T.M.

N82-14715# Technische Hogeschool, Delft (Netherlands).
THE DIRECTIONAL ENERGY DISTRIBUTION OF WIND GENERATED WAVES AS INFERRED FROM STEREOPHOTOGRAPHIC OBSERVATIONS OF THE SEA SURFACE Ph.D. Thesis
L. H. Holthuijsen 26 May 1981 198 p refs
Avail: NTIS HC A09/MF A01

Characteristics of the directional energy distribution of wind generated waves on the basis of observations with a relatively high resolution was determined. Approximately 75 observations are studied. They are selected from five spectra determined from stereophotographic observations of the sea surface. Three of these spectra were obtained in a so-called ideal generation situation. This is a situation where a homogeneous, stationary wind blows perpendicularly off a straight coast over deep water. The other two spectra were observed in similar situations. The difference with the ideal situation is for one spectrum that the wind was slanting across the coastline and for the other that the coastline was irregular. The observed distributions are compared with the model introduced by Longuet-Higgins et al. The differences between the observations and this model can be quantified due to the high resolution of the observations. It is found in the ideal situation that the model agrees well for most practical purposes with the observed distributions. In the other two situations it is found that the shape of the directional energy distribution is strongly influenced by the geometry of the upwind coastline. Author

N82-14716# European Space Agency, Paris (France).
NOWCASTING: MESOSCALE OBSERVATIONS AND SHORT-RANGE PREDICTION
B. Battrick, comp. and J. Mort, comp. Jun. 1981 427 p refs Symp. held in Hamburg, 25-28 Aug. 1981; sponsored by International Commission on Cloud Physics, International Association of Meteorology and Atmospheric Physics, WMO and COSPAR Original contains color illustrations
(ESA-SP-165; ISSN-0379-6566) Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Mesoscale weather systems, the analysis of observational data concerning mesoscale phenomena, and very short range weather forecasting based on mesoscale data are considered. For individual titles, see N82-14717 through N82-14781.

N82-14717*# Chicago Univ., Ill. Dept. of the Geophysical Sciences.
MESOSCALE ASPECTS OF CONVECTIVE STORMS
T. Theodore Fujita *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 3-10 refs (For primary document see N82-14716 05-47)
(Grants NGR-14-001-008; NA80AA-D-00001; NSF ATM-79-21260)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The structure, evolution and mechanisms of mesoscale convective disturbances are reviewed and observation techniques for 'nowcasting' their nature are discussed. A generalized mesometeorological scale is given, classifying both low and high pressure systems. Mesoscale storms are shown often to induce strong winds, but their wind speeds are significantly less than those accompanied by submesoscale disturbances, such as tornadoes, downbursts, and microbursts. Mesoscale convective complexes, severe storm wakes, and flash floods are considered. The understanding of the evolution of supercells is essential for improving nowcasting capabilities and a very accurate combination of radar and satellite measurements is required. Author (ESA)

N82-14718# Purdue Univ., Lafayette, Ind. Dept. of Geosciences.
MESOSCALE WEATHER PATTERNS DURING APRIL 10-11, 1979: SEVERE WEATHER OUTBREAK IN THE SOUTHWESTERN UNITED STATES
Dayton G. Vincent, Thomas Q. Carney, Jeffrey Homan, and Richard Fulton *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 11-16 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Mesoscale weather patterns are diagnosed for a severe weather outbreak, using surface data and a special set of upper air observations taken as part of a severe environmental storms and mesoscale experiment. The upper air network was twice as dense as normal and observations were taken at three hourly intervals. Analyses show that prior to severe weather the surface pressure falls rapidly. The advent of thunderstorm activity is accompanied by strong upward motion, heavy precipitation and an intense upper, as well as developing middle level, tropospheric jet stream. There is a rapid increase in kinetic energy which appears to be linked to deep convection. Author (ESA)

N82-14719# Japan Meteorological Agency, Tokyo.
MESOSCALE DISTURBANCES CAUSING A HEAVY SNOWFALL OVER THE COASTAL AREA OF THE SEA OF JAPAN
H. Uemura *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 17-21 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Three types of mesoscale cloud systems causing heavy snowfall over the Sea of Japan, observed by meteorological satellites, are described. First, a band-shaped cloud system appearing under the intense winter monsoon, having a surface trough line along the west side of the Sea of Japan is considered. Centered along this line, a mesoscale vertical circulation system is revealed in the cold air under the inversion layer around the 700 mb level. Second, an arc-shaped cloud system, developing from the band-shaped system and characterized by anticyclonic circulation in the lower troposphere, is discussed. Third, a mesoscale cyclone with vertical cloud pattern, growing from a coupling between a stationary disturbance in the lower troposphere with a cold vortex moving eastward along the upper westerly current, is studied. The study of cloud system evolution permits the structural change to be understood. The 'nowcast' snow predictions allow a synoptic evaluation of the evolution. Author (ESA)

N82-14720# Japan Meteorological Agency, Tokyo.
SUBSYNOPTIC SCALE CLOUD SYSTEM WHICH MOVES WESTWARD AND DEVELOPS OFF THE SOUTH COAST OF JAPAN
Michio Hitsuma *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 23-28 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A cloud system revealed by satellite observations is described. After its formation, the system turned around and moved eastward, causing occasionally unexpected rain along the south coast of Japan. At first, the cloud system is identified as a simple band-shaped pattern and gradually grows into a hook or sea horse like pattern. There is a marked inversion layer at about the 700 mb level in the air mass including the cloud system and the cloud top height is confined below the layer. The cloud system develops when an upward motion area ahead of a synoptic scale upper trough approaches the system from the west. The westward motion and the development themselves were not analyzed and can not be predicted. Author (ESA)

N82-14721# Washington Univ., Seattle. Dept. of Atmospheric Sciences.
MESOSCALE STRUCTURES IN MIDLATITUDE FRONTAL SYSTEMS
Peter V. Hobbs *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 29-36, refs Sponsored by NSF, AFOSR, US Army Research Office and NOAA (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Observational studies of the dynamics, organization and structure of clouds and precipitation on the mesoscale in extratropical cyclones are reviewed. The regions of heaviest precipitation are generally organized into large mesoscale rainbands which are classified into six types: warm frontal, warm sector, wide cold frontal, narrow cold frontal, prefrontal cold surge, and postfrontal. Often, precipitation within the rainbands is further organized on the small mesoscale. Likely mechanisms for the large and small mesoscale organizations are identified. Author (ESA)

N82-14722# Yale Univ., New Haven, Conn. Dept. Of Geology and Geophysics.
THE INFLUENCE OF MOUNTAINS ON THE ATMOSPHERE: RECENT ADVANCES
Ronald B. Smith *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 37-41 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The theory and observation of orographic influence on the atmosphere are reviewed. The formation of orographic cirrus clouds, observations and theory of orographically disturbed surface pressure, the mechanism of severe downslope winds; orographic enhancement of precipitation; and lee cyclogenesis are discussed. Author (ESA)

N82-14723# Meteorological Office, Bracknell (England).
MESOSCALE STUDIES OF WEATHER HAZARDS TO AVIATION
W. T. Roach *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 43-47 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Mesoscale studies on the forecasting of aviation weather hazards, such as fog, icing, wind shear, and clear air turbulence (CAT), are reviewed. Mesoscale observations of the boundary layer were obtained by the deployment of minisondes at outstations. They are shown to have potential for improving the local forecasting of fog and cloud layer. The feasibility of operating a wind shear warning service and the representativeness of the wind data given by air traffic control to pilots about to land or take off are assessed. A regression analysis is presented and used to identify the combination of meteorological parameters determining CAT. Preliminary tests indicate success in forecasting CAT. Author (ESA)

N82-14724# National Oceanic and Atmospheric Administration, Washington, D. C. Nationale Earth Satellite Service.
ANALYSIS OF RAINFALL FROM FLASH FLOOD PRODUCING THUNDERSTORMS, USING GOES DATA
Roderick A. Scofield *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 51-58 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The use of the Scofield-Oliver GOES technique for estimating convective precipitation from flash flood producing thunderstorms is discussed. The technique is applied using imagery displayed with a digital enhancement curve. Estimates of convective rainfall are done by comparing the changes in two consecutive pictures, both infrared and high resolution visible. The method is applied to two flash flood events. The estimates as compared to the observed rainfall are good. However, a warm top modification is needed for thunderstorms whose expected anvil temperatures are warmer than -62C. Author (ESA)

N82-14725# Japan Meteorological Agency, Tokyo.
INFRARED PARAMETERS FOR NOWCASTING SEVERE RAINSTORMS
H. Yamashita, Y. Miki, N. Shibata (Meteorological Satellite Center), and N. Shimizu (Meteorological Satellite Center) *In* ESA Nowcasting: Mesoscale Observations and Short-Range Predictions Jun. 1981 p 59-62 (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The relation between convective cloud cluster and the resultant rainfall intensity was studied in order to establish a quantitative vector for information on severe convective clouds outside the radar network of local weather services. Two cases are considered. First the activity of a distant cloud cluster is quantified by the product of the standard deviation of the equivalent blackbody temperature (TBB) and the cloud cover percentage as established in coarse mesh satellite observations. This product is shown to be a good indicator for the mean rainfall rate. Second, the relation between TBB and rainfall rate in small scale areas is established, using echo maps of radar to draw isotherms of TBB in fine meshes. The colder cloud area enclosed by the isotherm of 230 K is shown to be important for the nowcasting of severe rainstorms. Author (ESA)

N82-14726# Meteorological Office, Bracknell (England).
IMPROVEMENT OF HUMIDITY ANALYSES BY DIRECT USE OF METEOSAT WATER VAPOUR CHANNEL RADIANCES
J. R. Eyre *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 63-66 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Satellite measured radiances are compared with radiances simulated from initial estimates of atmospheric temperature and humidity fields. The calculated differences used to improve the analyses of those fields are given. This approach was applied to the analysis of humidity in the middle and upper troposphere, using Meteosat water vapor channel data. Results show that a significant gain in structure can be achieved and that few iterations are needed. Author (ESA)

N82-14727# University Coll., London (England). Lab. for Planetary Atmospheres.
A STUDY OF SUMMER THUNDERSTORMS DEVELOPING OVER EUROPE USING METEOSAT
N. R. Ward and R. W. Saunders *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 67-72 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The growth of summer thunderstorms over Europe is studied, using color-sliced sequential infrared images from METEOSAT which were Mercator projected. The images were processed and analyzed, using an interactive planetary image processing system (IPIPS). Upper level winds derived from tracking clouds and suitably enhanced water vapor features agree well with radiosonde winds. Vertical fluxes of mass and latent heat were measured from the expansion of the storm tops, and the fluxes of the largest storms are found to be of comparable magnitude to some tropical storms. The applicability of a system such as IPIPS, in conjunction with images from a geostationary satellite, to nowcasting is demonstrated. Author (ESA)

N82-14728*# Maryland Univ., College Park. Dept. of Meteorology.
TRANSFER AND DISTORTION OF ATMOSPHERIC INFORMATION IN THE SATELLITE TEMPERATURE RETRIEVAL PROBLEM
Owen E. Thompson *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 73-76 refs (For primary document see N82-14716 05-47)
(Grant NSG-5209)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (20% others) CSCL 04B

A systematic approach to investigating the transfer of basic ambient temperature information and its distortion by satellite systems and subsequent analysis algorithms is discussed. The retrieval analysis cycle is derived, the variance spectrum of information is examined as it takes different forms in that process, and the quality and quantity of information existing at each step is compared with the initial ambient temperature information. Temperature retrieval algorithms can smooth, add, or further distort information, depending on how stable the algorithm is, and how heavily influenced by a priori data. Author (ESA)

N82-14729*# Maryland Univ., College Park. Dept. of Meteorology.
SATELLITE TEMPERATURE SOUNDINGS: MICROWAVE SATELLITE OBSERVATIONS
Sigmund Fritz *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 77-81 refs Sponsored in cooperation with National Environmental Satellite Service (For primary document see N82-14716 05-47)
(Grants NsG-5209; NA80AA-D-00035)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 04B

Tiros satellite microwave measurements together with radiosonde data are used to illustrate a method for deriving vertical temperature distributions in the atmosphere on the scale of 100 km. The method employs N equations in N unknowns. The unknowns are the N coefficients which are needed at each pressure level to multiply the measured N radiances in order to retrieve the vertical temperature distributions. As an example, the spatial variation of the tropopause characteristics is derived over a cyclone. Diurnal variations in the radiances and the consistency of radiosondes and satellite radiance data need further investigation. Author (ESA)

N82-14730# Central Inst. for Weather Forecasting, Budapest (Hungary).
STRUCTURE FUNCTION ANALYSIS OF NIMBUS 5 SCR DATA AT THE MESOSCALE
G. Molnar *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 83-87 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A statistical structure function analysis of infrared satellite radiances, recorded by the selective chopper radiometer on Nimbus 5, is presented and its prospects for nowcasting purposes are assessed. From analysis of daily, lower tropospheric structure functions preceded by a noise level determination, a reasonably clear delineation is obtained between meteorologically active and nonactive days, regarding thunderstorm activity. An acceptable prediction of the occurrence of subsequent convective activity is shown possible. The results indicate that these structure functions lead to threshold values in terms of radiance, e.g., temperature gradients for nowcasting of certain types of convective activity. Author (ESA)

N82-14731# Australian Numerical Meteorology Research Center, Melbourne.
THE USE OF DIRECT READOUT TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) DATA FROM TIRON N AND NOAA 6 SPACECRAFT TO STUDY A CUT-OFF LOW AND ASSOCIATED MESOSCALE COLD POOLS
G. A. Kelly, B. W. Forgan, P. E. Powers, and J. LeMarshall (Bureau of Meteorology, Melbourne) *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 89-98 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The capabilities offered by the high horizontal resolution of TOVS soundings for the analysis of mesoscale systems are illustrated by a detailed account on the evolution of a cut-off low and associated cold pools developing over southern Australia. The observations and retrieval analyses include cloud imagery, 1000 to 500 mb thickness analyses, temperature analyses using infrared and microwave soundings, geopotential heights, geostrophic winds, and temperature wind and potential temperature wind cross sections. In view of the successful implementation, TOVS data are routinely used. Author (ESA)

N82-14732# Technische Universitaet, Hanover (West Germany). Inst. fuer Meteorologie und Klimatologie.

TOPOCLIMATOLOGICAL MEASUREMENTS AT BIELEFELD AND ITS SURROUNDINGS AS AN EXAMPLE OF MESOSCALE OBSERVATIONS

H. Bangert and A. Witting (Gesamthochschule Paderorn, West Germany) *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 101-107 refs (For primary document see N82-14716 05-47)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The topoclimatological differences in Bielefeld-West were collected from point data and line data records of ground stations in order to investigate the possibility of frost forecasting. Air temperature and relative humidity were collected continuously during six months at 11 fixed stations by means of a mobile unit. Although local topology as well as the prevailing weather conditions are shown to be responsible for temperature differences of up to 10 K between the daily practice stations and the surrounding area, advance frost warning proves possible from a combination of minimum temperature prediction and the knowledge of the expected night weather. Author (ESA)

N82-14733# Institute of Meteorology and Water Management, Podlesna (Poland).

ON THE COMPLEX CONTROL METHOD

Jan Parfiniewcz *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 109-110 refs (For primary document see N82-14716 05-47)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A retrieval procedure for erroneously rejected information is presented. A two stage scanning method for qualitative data control using a decision algorithm based on the chi-square test which allows for classifying error types is described. Although the method was mainly verified on aerological data, its extension to other types of meteorological data is straightforward. Author (ESA)

N82-14734# Air Force Geophysics Lab., Hanscom AFB, Mass. Mesoscale Forecasting Branch.

AUTOMATED AIRFIELD CLOUD OBSERVATION AND PREDICTION

Donald A. Chisholm, Edward B. Geisler, and James C. Weyman *In* ESA Nowcasting: Mesoscale Observations and short-range Prediction Jun. 1981 p 111-114 refs (For primary document see N82-14716 05-47)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The processing of rotating beam ceilometer (RBC) output was automated by application of microprocessor technology. The method comprises: (1) small dot matrix display of each RBC scan after evaluation, validation and smoothing; (2) objective cloud base height determination used in an hierarchical clustering algorithm to define cloud observation; and (3) short range prediction through the application of statistical methods. Specification and prediction test results and comparisons are presented. Application of the developed capability as an aid to the weather observer/forecaster or as a fully automated component of a remote or unmanned weather support unit is advocated. Author (ESA)

N82-14735# Royal Signals and Radar Establishment, Malvern (England). Meteorological Office Radar Research Lab.

A TOTAL SYSTEM APPROACH TO A WEATHER RADAR NETWORK

K. A. Browning *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 115-122 refs Original contains color illustrations (For primary document see N82-14716 05-47)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Members States, AU, CN and NO (+20% others)

The operational use of radar data for real time surveillance and short period forecasting of surface rain is discussed. A system is outlined which provides analyzed actual rainfall patterns and hourly forecast rainfall for 1 to 6 hours ahead over a large area, using data from a network of radars. Analytical procedures designed to cope with the intrinsic error characteristics of weather radar are described. Interpretation of radar data within a wider meteorological context, using an advanced man computer interactive image display system is judged of prime importance. The approach is presented as a radical departure from traditional methods of dealing with radar data. Author (ESA)

N82-14736# National Center for Atmospheric Research, Boulder, Colo.

NOWCASTING APPLICATIONS OF DOPPLER RADAR

James W. Wilson and Kenneth E. Wilk (National Severe Storms Lab., Norman, Okalahoma) *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 121-134 refs Sponsored in part by NSF Original contains color illustrations (For primary document see N82-14716 05-47)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Applications of Doppler radar, color displays and interactive graphical techniques for nowcasting and short period forecasting are presented. Specific examples of weather phenomena (clear air, widespread precipitation and convective precipication) are shown with special emphasis on Doppler velocity measurement. They include: (1) vertical profiles of the horizontal and vertical wind, and divergence and deformation of the horizontal component; (2) wind shift lines; (3) horizontal divergence fields; (4) gust fronts and downbursts; (5) tornadoes; (6) wind shear and turbulence hazardous to aircraft; and (7) precipitation and rate. Intensive man machine interaction is needed to derive Doppler radar products, whereby the nowcaster must be capable of integrating Doppler, satellite, surface and upper air data and be highly skilled in mesoscale forecasting. Author (ESA)

N82-14737# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.

GROUND BASED REMOTE SENSING FOR METEOROLOGICAL NOWCASTING

C. Gordon Little *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 135-142 refs (For primary document see N82-14716 05-47)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Ground-based remote sensors for monitoring middle and upper atmospheric parameters are discussed. These are: (1) optical scintillation devices for the measurement of transverse wind and precipitation; (2) acoustic echo sounding systems for monitoring the height of low level temperature inversions, boundary layer wind, and turbulence profiles; (3) optical radar infrared, and radio systems for monitoring drainage winds, gust fronts, boundary layer wind, turbulence profiles, and aerosol distributions; and (4) clear-air Doppler radar and multichannel microwave radiometry for measurements of vertical wind profiles, temperature, and humidity up to tropopause heights. The potential advantages of remote sensors over equivalent arrays of in situ sensors are stressed. Author (ESA)

N82-14738# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).

THE CAPABILITIES OF VHF RADAR FOR METEOROLOGICAL OBSERVATIONS

J. Roettger *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 143-148 refs (For primary document see N82-14716 05-47)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A VHF radar system applying the spaced antenna drifts method is proposed for real time provision of relevant meteorological information. Examples obtained with the SOUSY VHF radar are discussed include: (1) measurements of tropospheric and stratospheric wind profiles; (2) the radar determined tropopause; (3) structure of a frontal system, including observations of stability, vertical velocity and short-term horizontal velocity variations due to thermal winds; (4) the detection of turbulence layers. It is stressed that this information can represent a considerable contribution for nowcasting purposes. Author (ESA)

N82-14739# Centre National de la Recherche Scientifique, Verrieres-le-Buisson (France). Service d'Aeronomie.

LIDAR MONITORING OF THE TROPOSPHERIC WATER VAPOR MIXING RATIO

C. Cahen, G. Megie, and P. Flamant (Ecole Polytechnique, Palaiseau, France) *In* ESA Nowcasting: Mesoscale Observations

and Short-Range Prediction Jun. 1981 p 149-152 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Lidar measurements of the water vapor mixing ratio in the troposphere were performed, using the differential absorption laser technique. Vertical profiles are retrieved up to 9 km with a relative accuracy better than 15% for an integration time of a few minutes. Comparisons with local radio soundings (44 deg N, 5 deg S) show good agreement between the two techniques. This method allows continuous monitoring of the water vapor profiles over long observational periods. Author (ESA)

N82-14740# South Dakota School of Mines and Technology, Rapid City. Inst. of Atmospheric Sciences.

THE ROLE OF MESOSCALE SURFACE MOTIONS IN THE LIFE OF A CONVECTIVE STORM IN A DRY CONTINENTAL CLIMATE

Andre A. Doneaud, James R. Miller, David L. Priegnitz, and Thomas Engel (Dept. of Natural Resources and Conservation, Miles City, Mont.) *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 155-160 refs (For primary document see N82-14716 05-47)
(Contract DI-8-07-83-V0009)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The role of surface wind and moisture fields in the formation of a convective storm is examined in association with synoptic scale perturbations. In order to get a better understanding of the coupling mechanism between the synoptic and mesoscale phenomena in the development of convective cloud systems, a mesoscale surface network system supported by 5 cm radar was used to observe the atmosphere at short intervals in time and space. Results show that for the storm analyzed, frontal passage plays a principal role in the formation of precipitating cells. The surface mesoscale fields of divergence and vorticity provide an estimate of storm mass and moisture transports, while the surface field of deformation provides an estimate of the superimposed frontal effect. The average size and magnitude of moisture convergence and the storm efficiency are identified as potential predictors for the total amount of rainfall. Author (ESA)

N82-14741*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. Dept. of Environmental Sciences.

THE ROLE OF NEAR SURFACE OUTFLOW IN MAINTAINING CONVECTIVE ACTIVITY

M. Garstang (Virginia Univ.) and H. J. Cooper *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 161-167 refs Sponsored in cooperation with Dept. of Army (For primary document see N82-14716 05-47)
(Grant NSF ATM-78-08865)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 04B

Continuous measurements of horizontal velocity, temperature and humidity at the surface over a dense network of stations were used to examine the behavior, at the surface, of a large number of convective storms. Feedback between storm outflow at the surface and the generation of convective cells is demonstrated. The outflow is shown in the surface divergence fields once rain begins, with characteristics common to storms in distinctly different meteorological environments, such as summertime Florida and Illinois. This commencement precedes the occurence of rainfall and radar echo in the location of the cell by some tens of minutes up to more than 100 mins. Given surface measurements with a spacing of no more than 10 km, the direction of propagation, timing of the future occurence of rainfall and the intensity of the rainfall generated in the cell can be determined. Author (ESA)

N82-14742# High Mountain Geophysical Inst., Nalchik (USSR).

FORECAST OF SEVERE HAIL PROCESSES

L. M. Fedchenko and V. A. Belenstsova *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 169-172 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The parametrical dependence of hail formation and hail growth was studied experimentally by radiosondes, radar and satellite as well as statistically. A graphical method for dangerous hailfall forecast is proposed in which thermodynamic conditions in the hail formation and growth region, subcloud layer energetic potential, frontal surface characteristics, and transport in the midtroposphere are quantitatively taken into account. Provided a detailed monitoring of the subcloud layer in the lower troposphere is available, the proposed method allows for forecasting severe hailfall events. Author (ESA)

N82-14743# Central Inst. for Atmospheric Physics, Budapest (Hungary).

SHORT RANGE PREDICTION OF PRECIPITATION

T. Taenczer *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 173-175 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Forecasts of average precipitation in a mesoscale region, having a 200 km diameter, 6 to 18 hours ahead are presented. A statistically established relation between the air state and the rainfall data is used in a 12 hour extrapolation of the air state. The wind run is computed on the actual 700 mb contour chart. The air state itself is characterized by eight parameters or predictors which include geostrophic vorticity, a moisture index derived from satellite images, and an instability index. Results show a correlation coefficient between forecasted and actual precipitation data of 0.55 with a maximum error in the forecasting of dry weather. The limitations of the methods are discussed and possible extensions are indicated. Author (ESA)

N82-14744# Washington Univ., Seattle. Dept. of Atmospheric Sciences.

THE USE OF A SINGLE DOPPLER RADAR IN SHORT RANGE FORECASTING AND REAL TIME ANALYSIS OF EXTRATROPICAL CYCLONES

Thomas J. Matejka and Peter V. Hobbs *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 177-182 refs Sponsored by NSF, AFOSR, U.S. Army Research Office and NOAA Original contains color illustrations (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A basis for interpretation and analysis of radar data on cyclones is derived and illustrated as a tool for nowcasting. The structure of extratropical cyclones is described, following the Norwegian cyclone model supplemented with a mesoscale cyclonic structure for the frontal organization, the horizontal precipitation pattern, and the structure of rainbands. Using these models, it is shown that forecasting warm frontal passages is possible by observing the decreasing height of the warm frontal surface aloft and by measuring the advancing region of fairly uniform post warm frontal winds at low levels. The cold frontal zone aloft, behind the passage of a cold front, is manifest in Doppler radar velocity scans at elevations greater than 6 deg as a layer in which the wind direction backs strongly with increasing height. It is expected that Doppler radar techniques can considerably further insight into the mesoscale structure of weather systems. Author (ESA)

N82-14745# McGill Univ., Montreal (Quebec). Stormy Weather Group.

COMBINING SATELLITE AND RADAR DATA FOR THE SHORT RANGE FORECASTING OF PRECIPITATION

G. L. Austin *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 183-192 refs Sponsored by Atmospheric Environment Service and Natural Sciences and Engineering Research Council of Canada (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

An algorithm was developed that yields the probability of rain in an area of 2000 x 1500 km from visible and infrared GOES satellite imagery and simultaneous radar data. The satellite image was mapped by means of a conic projection on a constant resolution cartesian grid to facilitate overlay with synoptic charts. A pattern recognition technique was then applied to 16 subareas of the entire map to track the displacement of the probability of rain contours on maps taken 1 hour apart. Results indicate that the absence of easily recognizable features or a too high coverage percentage can lead to erratic motion: suitable criteria for rejection need to be introduced. The displacements of rain zones can be successfully forecasted. The trajectories of these rain areas correlate well with 700 mb wind. Author (ESA)

N82-14746# Air Force Geophysics Lab., Hanscom AFB, Mass. Mesoscale Forecasting Branch.

SIMPLE SHORT RANGE MODELS USING SATELLITE IMAGERY DATA

H. S. Muench *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 193-197 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 120 Member States, AU, CN and NO (+20% others)

A simple model was developed, using GOES satellite imagery to make short range cloud and precipitation forecasts. The method treats imagery parameters, such as cloud reflectivity and thermal emission, as conservative and predicts future values by means of motion vectors. Algorithms, relating these parameters to cloud amount and precipitation probability, give the forecasts. Motion vector tests, conversion algorithms, and test forecasts are described. Results show that the forecasts are 20% to 40% better than persistence at 4 to 6 hours, but have weak performance at short periods because of specification errors. More complexity must be built into future models. Author (ESA)

N82-14747# Japan Meteorological Agency, Tokyo.

COMBINED USE OF RADAR WITH MESOSCALE SURFACE NETWORK FOR VERY SHORT RANGE PREDICTION OF PRECIPITATION

Ryozo Tatehira, Yoshihisa Makino, and Michio Hitsuma *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 199-200 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A method for very short range forecasting of rainfall with radar data was developed. The method consists in extrapolating the initial digitized echo pattern, using the advection of 700 mb winds, followed by time integration and multiplication by calibration coefficients obtained comparing echo intensity with rain gage data. Results show that the predictions are 40% better than persistence. In order to improve the accuracy, it is suggested that the extrapolation procedure be improved by utilizing the surface wind field analyzed in a dense surface network. Combined use of radar and a surface network is proposed. Author (ESA)

N82-14748# Royal Signals and Radar Establishment, Malvern (England). Meteorological Office Radar Research Lab.

OBJECTIVE RAINFALL FORECASTING USING DATA FROM THE UNITED KINGDOM WEATHER RADAR NETWORK

C. G. Collier *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 201-206 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A procedure for forecasting rainfall was developed for use with data derived from a radar network. Forecasting is based on the identification of radar echoes, using a single linkage clustering technique, and the linear extrapolation of objectively derived motion vectors. The data and algorithms used are described and the accuracy of forecasts up to 6 hours ahead together with the contribution of various errors to the overall performance of the procedure are analyzed. Ways of improving the forecasts, using objective techniques at the radar sites together with subjective quality control implemented at the network center, are proposed. Author (ESA)

N82-14749# Royal Signals and Radar Establishment, Malvern (England). Meteorological Office Radar Research Lab.

THE USE OF CLIMATOLOGICAL AND SYNOPTIC DATA FOR FORECASTING OROGRAPHIC ENHANCEMENT OF RAINFALL

F. F. Hill and K. A. Browning *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 207-212 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A method is presented that applies mountain induced climatological enhancement fields to rainfall analyses and forecasts from radar and other data. A simplified orographic climatology was derived for England and Wales which is discussed in relationship with the physical mechanisms responsible for orographic rain. The fields of enhancement are held in computer as look-up tables, categorized as a function of synoptic parameters, such as low level wind velocity and humidity. After a selection by the forecaster of the appropriate synoptic category, the computer then automatically applies the enhancement to the rain forecasts derived by extrapolation of the radar rainfall pattern. The limited warning of rapidly approaching rain provided by coastal radar and the uncertainties in the forecast of low level humidity are identified. Author (ESA)

N82-14750# Szolgalat Meteorological Organization, Budapest (Hungary).

USE OF PRECIPITATION MEASUREMENTS BY RADAR IN SHORT RANGE FORECASTING OF PRECIPITATION

E. Bodolai-Jakus *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 213-219 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A diagnostic procedure and a forecasting method for mesoscale precipitation structures is described and applied to instability lines of the precipitation system of two regional cyclones and of the precipitation band at the periphery of an anticyclone. The translation speed of 30 linearly arranged precipitation systems allowed their speed of movement to be determined, for the pseudofront of the mesosystem constituted by the echoes, and not by the individual (even intense) isoechoes. Author (ESA)

N82-14751# Virginia Univ., Charlottesville. Dept. of Environmental Sciences.

THE USE OF MESOSCALE METEOROLOGICAL AND CLIMATOLOGICAL INFORMATION IN NOWCASTING AND SHORT RANGE PREDICTION

Roger A. Pielke *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 223-229 refs Sponsored by NSF (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Mesoscale atmospheric phenomena affecting nowcasting, efficient modeling in forecasting, and of procedures capable of improving dissemination of nowcast information are reviewed. A distinction is made between terrain-forced mesoscale systems, which are amenable to accurate predictions, and synoptically-forced mesoscale systems generated by highly variable synoptic circulation. Specific examples are shown of terrain-forced systems which demonstrate that even for these systems current procedures for disseminating forecast information are inadequate. Upgrading of forecasts through large scale modeling is advocated along two lines: mesoscale integration from initial and boundary conditions established one or more times daily, or archiving of typical synoptic situations with parametric classification. Procedures to improve the distribution of mesoscale information are suggested. Author (ESA)

N82-14752# Meteorological Office, Bracknell (England).

A MESOSCALE FORECAST FOR 25 AUGUST 1975: THE HAMPSTEAD STORM

M. J. Bailey, K. M. Carpenter, L. R. Lowther, and C. W. Passant *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 231-236 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A three-dimensional numerical atmospheric model was used to obtain a forecast for the afternoon when an intense stationary multicell storm formed over London and produced extensive flooding. Whether early warning of that event was possible is discussed. Starting from synoptic surface pressure analysis and radiosonde ascent data, a finite difference evolution computation was carried out, involving the nonhydrostatic compressible equations of motion on a three-dimensional grid. The forecast shows a well defined area of convergence at the right place, but about 4 hours later than the actual storm. Possible explanations for this discrepancy are put forward. Shading by an observed layer of medium level cloud has an important effect on the forecast. Author (ESA)

N82-14753# Royal Netherlands Meteorological Inst., De Bilt.

DESCRIPTION OF AN ADVECTIVE BOUNDARY LAYER MODEL USING TRAJECTORIES

D. Blaauboer, H. A. R. deBruin, J. Reiff, and A. P. vanUlden *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jul. 1981 p 237-239 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

For short range forecasting purposes, a model of the atmospheric boundary layer (BL) was developed, including exchange of heat and water vapor at the Earth surface, entrainment at the top of the BL, and taking horizontal advection into account with a trajectory model. The evolution of temperature and height of the BL is discussed for both stable and unstable boundary layers and composed with measurements. Although the preliminary simulation results are encouraging, it is not shown whether advection is important. Further improvements are indicated. Author (ESA)

N82-14754# Royal Netherlands Meteorological Inst., De Bilt.

SHORT RANGE PREDICTION OF CLOUDS USING TRAJECTORIES

P. W. Rosier, J. Reiff, C. J. vanderGoot, and A. Steenhuisen *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 241-243 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Temperature and humidity profiles for 24 hours forecasting, obtained by reconstruction of the source areas of inflowing air with a trajectory method are discussed. The procedure involves wind direction prediction and trajectory derivation for the 300, 500, 850, and 1000 mbar levels and analysis of radiosonde data taken in the different source areas 24 hours ahead. The source areas arriving at different heights are situated at different geographical positions and pressure levels. Strong vertical mixing can limit the applicability of the method. Comparisons between forecast and persistency for temperature and dew point depression are given and indicate forecast improvement in 20 to 30% of the test cases. The forecasting of amount and type of clouds is also shown to be improved. Author (ESA)

N82-14755# Pennsylvania State Univ., University Park. Dept. of Meteorology.

IMPACT OF DATA AND INITIALIZATION PROCEDURES ON VARIATIONS OF VERTICAL MOTION AND PRECIPITATION IN MESOSCALE MODELS

Richard A. Anthes, Eirh-Yu Hsie, Daniel Keyser, and Ying-Hwa Kuo *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 245-257 refs (For primary document see N82-14716 05-47)
(Contract N00014-78-C-0775; Grant NSF ATM-78-02699)
Avail: NTIS HC A19/MF A01; ESA, PARIS FF 160 Member States, AU, CN and NO (+20% others)

The sensitivity of mesoscale models to variations in initial data was investigated. A two-dimensional model of frontogenesis that contains prognostic equations for cloud and precipitation water is used to help establish the resolution in the moisture, temperature, divergence and vorticity fields that is necessary to predict precipitation on the mesoscale. In these simulations, the precipitation forecast over a 15 hr period does not depend strongly on mesoscale detail in the initial conditions of these variables. In 12 hr forecasts using real data, the frequency and amplitude of inertia-gravity waves is insensitive to the initial divergence and temperature fields. The 12 hr forecasts of precipitation are also insensitive to the variations in initial divergence tested. Author (ESA)

N82-14756*# Air Force Global Weather Central, Offutt AFB, Nebraska.

THE INITIALIZATION OF A MESOSCALE WEATHER PREDICTION MODEL USING SATELLITE AND PRECIPITATION DATA

Terry C. Tarbell, Thomas T. Warner (Pennsylvania State Univ., University Park), and Stephen W. Wolcott (US Geological Survey, Albany, New York) *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 259-264 refs Sponsored in cooperation with NSF (For primary document see N82-14716 05-47)
(Grants NsG-5205; EPA-R-805669-01)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 04B

An analysis and initialization procedure was developed capable of utilizing mesoscale satellite and radar data to resolve features in moisture and momentum fields on a finer scale than is discernible from radiosonde observation networks. The radiosonde moisture field is enhanced, using infrared satellite imagery and precipitation data from the surface observation network (also obtainable from the radar network) while the observed mesoscale rainfall rates are also used to define the initial divergent wind component. Results show that the predicted rainfall amounts are significantly improved when these additional data are taken into account. Author (ESA)

N82-14757# Wisconsin Univ., Madison. Dept. of Meteorology.

UTILIZING SATELLITE WIND DATA IN A MESOSCALE NUMERICAL MODEL

Dong Kyou Lee and David D. Houghton *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 265-270 refs (For primary document see N82-14716 05-47)
(Grants NSF ATM-77-20231; NSF ATM-80-05369)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

High resolution satellite and surface wind data were incorporated into a mesoscale numerical prediction model of the south central United States. Mesoscale data sets approach the level of comprehensiveness for mesoscale phenomena and for their simulation by numerical techniques. Correspondence of the satellite data to rawinsonde observations is analyzed. Differences between forecasts with and without the special initial wind data identify the impact of this data. Oscillations indicative of adjustement processes with time scales of 0.5 and 3 hr are evident in the insertion cases. The primary impact of the inserted data is to alter the amplitude of mesoscale features that develop in the control forecast. Author (ESA)

N82-14758# Australian Numerical Meteorology Research Center, Melbourne.

THE NUMERICAL SIMULATION OF INTENSE FRONTAL DISCONTINUITIES OVER SOUTHEASTERN AUSTRALIA

D. J. Gautlett *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 271-275 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The development and movement of an intense frontal discontinuity up the New South Wales coast of Australia using a nested, moveable fine mesh (MFM) model was studied. This model is based on full primitive equations and incorporates orographic effects, convection and relevant boundary layer fluxes. The resolution of the interior moving grid was set at 60 km. It is demonstrated that the the capacity of the MFM model simulates the essential features of the front and identifies it as a coastally trapped gravity current. Author (ESA)

N82-14759# Oregon State Univ., Corvallis. Dept. of Atmospheric Sciences.

SHORT-RANGE WEATHER FORECASTS AND CURRENT WEATHER INFORMATION: USER REQUIREMENTS AND ECONOMIC VALUES

Allan H. Murphy and Barbara G. Brown *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 279-290 refs (For primary document see N82-14716 05-47)
(Grant NSF ATM-80-04680)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

User requirements and economic values of short range forecasts and current weather information are reviewed. Methods of determining requirements and estimating values are described. The results of selected user requirement and economic value studies related to short range weather forecasts are reviewed. Topics are examined decision analytically. Market investigations are recommended to precisely define requirements and allocate resources. Author (ESA)

N82-14760# Wessex Water Authority, Bristol (England).
REQUIREMENTS OF A WATER AUTHORITY FOR SHORT PERIOD LOCAL FORECASTS
M. R. Senior *In* ESA Nowcasting: Mesoscale Observations and Range-Short Prediction Jun. 1981 p 291-294 (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The principal functions of a water authority are introduced and data used in heavy rainfall predictions for flood warning purposes, in the operation of regulating reservoirs, penned drainage channels and sewage treatment works are discussed. Requirements for predictions such as wind and temperature, for preparation for tidal flooding and inland flooding due to snowmelt, are outlined. Author (ESA)

N82-14761# Royal Netherlands Meteorological Inst., De Bilt.
A BEACH COMFORT INDEX USED BY THE NATIONAL WEATHER SERVICE IN THE NETHERLANDS
J. F. denTonkelaar *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 295-298 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The relation between the weather and the feeling of physical comfort of visitors of seaside resorts was investigated. A beach comfort index was established for forecast communication to the general public. The beach comfort index is determined on a scale from 1 to 10, relating the opinions obtained in interviews to specific combinations of effective degree of cloudiness, wind speed, and air temperature. Data recorded in diagram form. Forecasts are issued during the summer and for easy communication to the public, are phrased in descriptive terms (poor, rather poor, moderate, rather good, good, and very good). Author (ESA)

N82-14762# Gulf Coast Weather Service, Tampa, Fla. WTVT Weather Service.
WEATHERVISION: A FORECASTING AND DISSEMINATION TOOL FOR THE 1980'S
Roy Leep *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 299-302 ref (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The Weathervision system a medium sized computer for meteorological broadcasting which is capable of generating color television graphics in near real time is discussed. The system stores a great deal of weather data, and is designed for presenting real time analyses for nowcasting from satellite, radar and facsimile data. Each of the pertinent subsystems are described as well as the remote color graphic terminals at distant locations for additional forecast offices. It is found that the weathervision system is flexible and reliable. Author (ESA)

N82-14763# Air Force Geophysics Lab., Hanscom AFB, Mass. Mesoscale Forecasting Branch.
THE MODULAR AUTOMATED WEATHER SYSTEM (MAWS) CONCEPT
Donald A. Chisholm, Richard H. Lynch, and James C. Weyman *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 303-307 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A modular automated weather system (MAWS) which is a supervisory microprocessor that manages, disseminates and archives visibility, wind, temperature, and dew point measurements as well as outputs from ceilometers, transmissometers, digital altimeters, and digital clocks is discussed. Results are assessed for: (1) aviation weather elements and sensors suitable for automation; (2) sensor siting requirements for aviation critical weather elements; (3) performance potential of microprocessor components, display devices and communication systems; (4) the importance of met watch parameters in support of aviation operations; and (5) utility of short range forecast guidance based on simple statistical models. A microprocessor based MAWS system satisfies most automated observation requirements and provides an essential data base for the development of operational prototypes. Author (ESA)

N82-14764# Swedish Military Weather Service, Stockholm.
WEATHER 80
Fritz Larsson and Gustav Grandin *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 309-310 (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A meteorological data transfer system which provides forecasters at an airbase with tailored information from regional centers, is described. The regional centers transmit weather maps, thermodynamic diagrams at 4800 bits/sec to the bases, with alphanumerical and graphical displays. The system is faster and more accurate than manual handling of teleprinter lists or reception of radio facsimile maps. Author (ESA)

N82-14765# European Cooperation in the Field of Scientific and Technical Research, Helsinki (Finland).
COST 72: EUROPEAN WEATHER RADAR PROJECT
G. A. Clift *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 313-316 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The European weather radar project (COST 72), aimed at establishing an integrated European weather radar network suitable for operational purposes is assessed. Benefits expected include better short term forecasting of precipitation intensities, better timing of forecasts, flood warnings, and water resource management. User requirements of a great many organizations are considered in relation to data exchange, radar/rain gage comparisons, production of software specifications, establishment of a trial network, and merging of radar data with those from other meteorological sources. Author (ESA)

N82-14766# Swiss Inst. of Meteorology, Locarno-Monti. Osservatorio Ticinese.
THE SWISS NETWORK OF 2 DIGITAL RADARS AND 60 AUTOMATIC WEATHER STATIONS
H. P. Roesli *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 317-322 (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Two networks for mesoscale observation are presented: (1) the ANETZ system, involving some 60 automatic weather stations, and (2) a radar network of two digital weather radars. The radars are under the control of a minicomputer which generates ground plan and side views of the maximum reflectivities. The limits of operational quantitative measurements are discussed. In ANETZ, a minicomputer collects, processes and distributes the observations. Examples of access to real time data are given and their use in nowcasting is illustrated. It is shown that the networks stimulate the development of different methods in nowcasting and in display of meteorological data. Author (ESA)

N82-14767# Royal Signals and Radar Establishment, Malvern (England). Meteorological Office Radar Research Lab.
A SYSTEM FOR THE COMBINED USE OF DATA FROM MULTIPLE RADARS AND SATELLITES IN THE UNITED KINGDOM
C. G. Collier *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 323-330 refs Original contains color illustrations (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A weather forecasting pilot project, consisting of a network of four weather radars along with digital facilities for receiving

satellite and conventional meteorological data is discussed. Data processing is carried out in real time within a minicomputer network, mostly over communication lines. Instantaneous fields of precipitation as well as rainfall totals integrated for short periods over areas defined by users are distributed from each radar site. At the network center, a precipitation picture and forecasts of precipitation 6 hr ahead covering a wide area are prepared. The further development of the central facilities, leading to a prototype operational interactive computer system, forecasting rain optimised using new techniques of interactive enhanced radar and satellite system (FRONTIERS) is also discussed.
Author (ESA)

N82-14768# Swedish Meteorological and Hydrological Inst., Norkoeping.
AUTOMATED TECHNIQUES FOR SATELLITE IMAGERY ANALYSIS
Erik Liljas *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 331-339 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The role of geostationary and polar orbiting weather satellites in an observational network for nowcasting is discussed. The operational satellite systems and work on the use of satellite information is reviewed. An operational technique for automatic multispectral analysis for advanced very high resolution data from Tiros N satellites which yields cloud type and precipitation intensity displayed on color television is presented. It is indicated that functioning over sea areas, in frontal precipitation and in mesoscale cloud clusters take place.
Author (ESA)

N82-14769# Japan Meteorological Agency, Tokyo.
THE MESOSCALE OBSERVATIONAL NETWORK IN JAPAN
Ryozo Tatehira, Michio Hitsuma, and Yoshihisa Makino *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 341-346 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Systems to analyze and forecast mesoscale weather phenomena in Japan are presented. The systems comprise: (1) a weather radar network, involving 20 sites, capable of 2 km resolution and equipped with standardized digitizers, giving composite echo patterns with a 5 km mesh; (2) an automated meteorological data acquisition system, grouping 1300 stations for precipitation monitoring and some 800 stations for surface wind, temperature and sunshine measurements; and (3) the geostationary meteorological satellite, (GMS), providing cloud images, with a resolution of 2 km in the visible channel and 7 km in the infrared channel. Because of a 40 min time lag in the reception of the GMS pictures, system (3) is not suited for nowcasting.
Author (ESA)

N82-14770# National Oceanic and Atmospheric Administration, Boulder, Colo. PROFS Program Office.
DESIGN OF A SHORT RANGE FORECASTING SYSTEM
Donald W. Beran and Alexander E. MacDonald *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 347-350 (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The complexity of designing a total short range forecasting system is discussed. A design methodology (PROFS program) which produces optimum specifications for operational forecast systems is proposed. In the PROFS design, data sets are drawn from all conventional synoptic scale information, a dense surface network, conventional and Doppler radar, high resolution satellite data, and continuous upper air profiles. The worth of each data set is examined in combination with others; optimum combination and communication techniques form the basis for functional design specifications.
Author (ESA)

N82-14771# Swedish Meteorological and Hydrological Inst., Norkoeping.
PROMIS-90: FUTURE SWEDISH WEATHER SERVICE SYSTEM
Svante Bodin *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 351-355 (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A weather service system, providing both nowcasting and long range forecasting capabilities is presented. The noncasting function are performed by a regionalized system based on modern weather radar, satellite data, automatic stations, and real time data collection systems. Long range forecasting is carried out by computer models and statistical techniques, largely automated. User requirement analysis, system descriptions, and staff estimates are included.
Author (ESA)

N82-14772# Logica Ltd., Cobham (England).
THE DESIGN OF THE FRONTIERS INTERACTIVE DISPLAY SYSTEM
N. J. Saker *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 357-361 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The design plans of the FRONTIERS system, which combines radar, satellite, and synoptic weather data in an interactive graphic display to produce real time analyses and forecasts of rainfall are outlined. Rapid interaction with the display computer to perform quality control of input data or to modify objective forecasts is emphasized. The data processing of radar and satellite data and the overall system design, comprising display computer, graphic display unit, interface with the forecaster and software facilities are discussed. The development of the software is described.
Author (ESA)

N82-14773# Air Force Geophysics Lab., Hanscom AFB, Mass. Mesoscale Forecasting Branch.
AN ASSESSMENT OF MESOSCALE FORECAST EXPERIMENTS
H. S. Muench and D. A. Chisholm *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 363-367 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A mesoscale network which provides short range forecasting at airfield terminals, and a number of objective techniques developed in that process are described. The visibility forecast problem was treated. Objective techniques for forecasting radiation fog, advection fog and convective showers were developed and skill scores, relative to Markov, for each technique are presented. It is indicated that, although improvement over persistence can be obtained, the behavior of low visibility patterns is quite complex and can only partially be forecasted by simple extrapolation. Deployment of interactive computer graphics increases the analysis capabilities and improvements in nowcasting are expected.
Author (ESA)

N82-14774# Swedish Military Weather Service, Stockholm.
AN OPERATIONAL METHOD FOR FORECASTING STRATUS AND FOG
Gustav Grandin *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 369-372 (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A short range forecast model of increase and dissolution of the cloud base of stratus, or fog, is described. Solar short wave radiation is estimated from latitude, season, and time of day. Radiation absorbed at the surface, and long wave radiation from higher clouds and moist air above the stratus are calculated. The balance between cooling, due to long wave radiation, and surface heating, caused by short wave solar radiation, determines the cloud base development. It is assumed that the cloud top has a constant height, or to increase due to an empirical function, and when the cloud base reaches cloud top it is dissolved. A mean deviation of ± 11 m for a forecast time of 2 hrs, where no horizontal advections are considered is shown. It is concluded that surface albedo has little effect, but long wave radiation is crucial in cloud base development.
Author (ESA)

N82-14775*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MESOSCALE ASPECTS OF JET STREAK COUPLING AND IMPLICATIONS FOR THE SHORT TERM FORECASTING OF SEVERE CONVECTIVE STORMS
Louis W. Uccellini and Paul J. Kocin *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 375-380 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others) CSCL 04B

An analysis of a tornado outbreak in Wichita Falls, Texas was analyzed. The coupling of upper and lower tropospheric jet streaks, leading to severe storm outbreaks is illustrated. The high resolution SESAME data sets indicate that mass and momentum adjustments which couple upper and lower tropospheric jets occur within a 3 to 6 hr time frame over a 100 to 500 km domain, and establish the role of isallobaric forcing in the storm development. It is suggested that the output rate of data from the existing 12 hr network be increased to provide better temporal resolution of wind, mass and moisture data.
Author (ESA)

N82-14776# National Center for Atmospheric Research, Boulder, Colo.
LIFE CYCLE OF MESOSCALE CONVECTIVE SYSTEMS
Edward J. Zipser *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 381-386 refs Sponsored by NSF (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

Structural features of tropical convective systems are reviewed, and the interaction between convective clouds and associated mesoscale stratiform cloud systems which evolve with time are emphasized. A typical life cycle is illustrated, and differences between tropical and mid latitude systems are discussed. Awareness of the typical evolution of such systems can improve interpretation of a real time mesoscale data stream. Possible uses of a life cycle model in very short range forecasting are discussed.
Author (ESA)

N82-14777# Hydrometeorological Centre of the USSR (Moscow).
MESOSCALE STRUCTURE OF ATMOSPHERIC FRONTS IN THE EUROPEAN PART OF THE U.S.S.R.
A. A. Lyakov and Nathalie P. Shakina *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 387-392 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The structure of a slowly moving cold front and of two occluded and regenerating cyclones were analyzed, using rawinsonde data, spectral analysis and air flow stability theory. Hyperbaroclinic zones in the middle troposphere and air flow of the conveyor belt type are shown. The possible effects of symmetric instability on the periodic structure formation are also discussed.
Author (ESA)

N82-14778# Colorado State Univ., Fort Collins. Applications Lab.
COMBINING SATELLITE AND CONVENTIONAL DATA FOR VERY SHORT RANGE FORECASTING PURPOSES
James F. W. Purdom *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 393-400 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The importance of satellite data for nowcasting is illustrated and convection is emphasized. The clouds and cloud patterns observed in satellite images represent the integrated effect of ongoing dynamic and thermodynamic processes. The GOES system is described. Data, mesoscale applications, using GOES imagery in the areas of morning stratus and fog, and convective storms are considered. The unique capability of satellite imagery in the detection of precursor or trigger mechanisms for strong convection is emphasized.
Author (ESA)

N82-14779# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
GEM: A SIMPLE METEOROLOGICAL BUOY WITH SATELLITE TELEMETRY
R. Michael Reynolds *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 401-404 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A small, easily deployable and inexpensive buoy was developed for mesoscale research. The synthesis of the detailed parameter fields necessary for mesometeorology necessitates the deployment of a network of buoys that are less expensive than most standard designs. Vector averaged winds, scaler winds, air temperature, water temperature, and gusts are measured. Compass readings provide surface current direction. The buoy transmits data via the GOES satellite which eliminates the need for internal tape recording. Computer processing of the data is described. Proper counterbalancing and vector averaging are shown to reduce the effects of buoy motion.
Author (ESA)

N82-14780# Institute for Storm Research, Inc., Houston, Tex.
A LAYERED MESOSCALE PREDICTION MODEL INITIALIZED AND VERIFIED BY SATELLITE DATA
John C. Freeman and Jill F. Hasling *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 405-410 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A mesoscale meteorological model that takes into account horizontally propagating gravity waves, vertical wind shear, moisture, variations in orography, rotation of the Earth, and friction was developed. It can be used with satellite data on clouds and precipitation. It is shown that if an area is covered with clouds for a sufficient time, there is sufficient data on cloud motion and heights to allow the development and continued computation of the full motion and cloud field over the whole area. Examples are shown on the evolution of thunderstorms behind a cold front.
Author (ESA)

N82-14781# Finnish Meteorological Inst., Helsinki.
OPERATIVE WARNINGS; ROUTINE SERVICES AND ONGOING EXPERIMENTAL WORK IN FINLAND
Marianne Saagborn *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 413-415 refs (For primary document see N82-14716 05-47)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

The requirements of potential users of short range weather forecasts and measures to be taken to fulfill those needs in Finland are reviewed. In addition to routine short range weather predictions, specific warning on operational effects of small scale meteorological phenomena, such as wind shear or slipperiness, is required for aviation. The importance of a specialized weather service for road maintenance was borne out on slipperiness, fog and crosswind, both economically and operationally.
Author (ESA)

N82-14782# Weather Wing (5th), Langley AFB, Va.
TERMINAL FORECAST REFERENCE NOTEBOOK, DETACHMENT 9, 12TH WEATHER SQUADRON (MAC), TYNDALL AFB, FLORIDA Final Report
1 Feb. 1981 120 p
(AD-A105085; AD-E850102; Rept-5WW-TFRN-81/003) Avail: NTIS HC A06/MF A01 CSCL 04/2

This terminal forecast reference notebook is for Tyndall AFB, Florida. It describes the following topics concerning forecasting weather at Tyndall AFB: location, topography, and local effects; impact of weather on supported units; synoptic climatology; climatic aids; operationally significant forecast problems; approved forecast studies; rules-of-thumb; and special synoptic studies and reference.
GRA

N82-14783# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
MECHANISM OF ICE CRYSTAL GROWTH HABIT AND SHAPE INSTABILITY DEVELOPMENT BELOW WATER SATURATION M.S. Thesis - Univ. of Utah
Gerald Douglass Swoboda Aug. 1981 139 p refs
(Grant NSF ATM-80-04108)
(AD-A105520; AFIT-CI-81-32T) Avail: NTIS

HC A07/MF A01 CSCL 08/12

Ice phase process in supercooled clouds play dominant roles in development of updrafts and downdrafts as well as various forms of precipitation. In a supercooled cloud, an ice phase process begins normally with vapor diffusional growth of ice crystals. Consequently, the vapor diffusional growth of ice crystals is of importance in cloud physics. Starting from the concept of the wedge-shaped ice thermal diffusion chamber of Schaller and Fukuta, where ice crystals can be grown under a range of ice supersaturations at a constant temperature in quiescent, temperature-stratified air, and by considering design and operational limitations, a new wedge-shaped ice thermal diffusion chamber was designed and constructed for this study of ice crystal growth habit and shape instability. This chamber and supporting apparatus define an experimental system capable of adequately controlling the temperature and supersaturation fields around the growing crystal. In addition to the wedge-shaped chamber, apparatus defining this experimental system are the pre-chamber, ice crystal slide mechanism, lateral microscope slide mechanism, sample transfer device, and outer environmental chamber. GRA

N82-14784# Institut Royal Meteorologique de Belgique, Brussels.
A STATISTICAL MODEL OF WIND DISTRIBUTION IN FORCE AND IN DIRECTION: APPLICATION TO UCCLE (BRUSSELS) DATA AND VALIDITY OF THE MODEL FOR BELGIUM [UN MODELE STATISTIQUE DE LA REPARTITION DES VENTS EN FORCE ET EN DIRECTION: APPLICATION AUX DONNEES D'UCCLE (BRUXELLES) ET VALIDITE DU MODELE POUR LA BELGIQUE]
R. Sneyers 1980 21 p refs In FRENCH; ENGLISH summary Presented at 16th Congr. de Meteorol. Alpine, Aix-les-Bains, France, Sep. 1980
(PUBL-SER-B-107) Avail: NTIS HC A02/MF A01

The adjustment of a statistical model of wind so that the entire set of empirical data obtained for each of the 12 months of the year can be taken into account was studied. The resultant model can be used to determine, for whatever time of year and for whatever wind direction, the probability of the associated wind of given velocity. The distribution at Uccle of the wind speeds is represented through gamma distributions, the shape parameter of which can be considered independent of both wind direction and time of year. The mean speed thus fully characterizes each distribution. The mean speed is shown as a periodic function of the time of year as well as of the wind direction. Author (ESA)

N82-14785# Institut Royal Meteorologique de Belgique, Brussels.
ON THE METEOROLOGICAL MEANING OF THE TERMS GUST, STORM, AND HURRICANE [SUR LE SENS METEOROLOGIQUE DES TERMES COUP DE VENT, TEMPETE ET OURAGAN]
L. Dufour 1981 27 p refs In FRENCH
(PUBL-SER-B-109) Avail: NTIS HC A03/MF A01

Meteorological terms, associated with the Beaufort anemometrical scale, are considered. Meteorological connotations and lexicological references are cited. The terms are defined as to wind velocity calculated over 10 min intervals, i.e. gust: 34 to 40 knots; storm: 48 to 55 knots; hurricane: > 64 knots. Author (ESA)

N82-14786# National Oceanic and Atmospheric Administration, Kansas City, Mo.
THE ENHANCED V, A SATELLITE OBSERVABLE SEVERE STORM SIGNATURE
Donald W. McCann Mar. 1981 38 p refs
(PB81-230328; NOAA-TM-NWS-NSSFC-4; NOAA-81052202) Avail: NTIS HC A03/MF A01 CSCL 04B

Enhanced infrared satellite imagery was used to examine severe thunderstorms that display a warm spot accompanied by a signature called an enhanced V, formed when strong upper level winds are diverted around an overshooting thunderstorm top. When a storm has an enhanced V, it has a high probability of subsequently producing severe weather. Two rules for identification of an enhanced V are established. The median lead time from enhanced V identification to the first severe weather report was 30 minutes. A low false alarm ratio makes this identification technique a potential severe storm warning tool. GRA

N82-14787# National Oceanic and Atmospheric Administration, Washington, D. C. National Earth Satellite Service.
THE EFFECT OF PRECIPITATION ON MICROWAVE SOUNDINGS IN LOW LATITUDES
Lester F. Hubert, Norman C. Grody, Andrew Timchalk, and William C. Shen Apr. 1981 43 p refs
(PB81-225062; NOAA-TR-NESS-82; NOAA-81061405) Avail: NTIS HC A03/MF A01 CSCL 04B

The use of the Scanning Microwave Spectrometer (SCAMS) data to derive atmospheric temperature profiles in tropical latitudes was studied. A cold low which passed to the south of Hawaii, Feb. 1976, is investigated. SCAMS clear atmosphere and cloud cluster retrievals with nearby rawinsonde temperatures are compared. It is suggested that either the area of active cloud convection contains vigorous updrafts over much more than 5% of the cloud area or that liquid water densities in the upper part of the clouds are much greater than 2.0 g/cu m. It is indicated that precipitation induced errors in the microwave retrievals are greatest and most frequent in convective cloud areas. GRA

N82-14788 Iowa Univ., Oakdale.
VARIABILITY OF SEASONAL PRECIPITATION OVER THE CONTERMINOUS UNITED STATES, 1948-1976 Ph.D. Thesis
Marie Rose Popp Klugman 1981 192 p
Avail: Univ. Microfilms Order No. 8123329

The variability of seasonal precipitation for 104 climatological stations in the conterminous United States was investigated. A statistically sound procedure for testing the significance of precipitation variations which was outlined and circulation anomalies which are related to precipitation extremes or use in seasonal forecasting were identified. A variance components model was used to test the significance of the precipitation variability for each of the four seasons at each station. A chain-dependent model which incorporates Markov chains was used to model the daily data. The Schwarz Bayesian Criterion was employed to determine the order of Markov chain dependence in the daily data. The source of anomalous component of the airflow into areas with significant precipitation variability was traced to land areas and cold oceans in low precipitation years and to warm water bodies in high precipitation years. These relationships can be used as the basis for predicting anomalous seasonal preciptation amounts. Dissert. Abstr.

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-14789*# Illinois Univ., Urbana. Radio Research Lab.
REMOTE SENSING OF SEA STATE BY LASER ALTIMETERS
B. Tsai and C. S. Gardner Dec. 1981 51 p refs
(Grant NsG-5049)
(NASA-CR-165049; RRL-Publ-514) Avail: NTIS HC A04/MF A01 CSCL 08C

The reflection of short laser pulses from the ocean surface was analyzed based on the specular point theory of scattering. The expressions for the averaged received signal, shot noise and speckle induced noise were derived for a direct detection system. It is found that the reflected laser pulses have an average shape closely related to the probability density function associated with the surface profile. This result is applied to estimate the mean sea level and significant wave height from the receiver output of the laser altimeter. T.M.

N82-14790*# National Aeronautics and Space Administration, Washington, D. C.
LIGHT FIELDS IN THE OCEAN
V. N. Pelevin and M. V. Kozlyaninov Nov. 1981 267 p refs Transl. into ENGLISH from the book "Svetovyye Polya v Okeane" Moscow, 1979 p 1-232, 243-258 Transl. by Scientific Translation

Service, Santa Barbara, Calif. Original doc. prep. by Academy of Sciences (USSR)
(Contract NASw-3542)
(NASA-TM-76731) Avail: NTIS HC A12/MF A01 CSCL 08C

The problem of light fields in the ocean is in basic ocean optics. Twenty-six separate studies discuss: (1) the field of solar radiation in the ocean; (2) stationary and nonstationary light fields created in the sea by artificial sources; and (3) the use of optical methods to study biological and hydrodynamic characteristics of the sea. A.R.H.

N82-14791# Naval Surface Weapons Center, Dahlgren, Va.
GLOBAL OCEAN TIDES. PART 4: THE SEMIDIURNAL ELLIPTICAL LUNAR TIDE (N2). ATLAS OF TIDAL CHARTS AND MAPS Final Report
E. W. Schwiderski May 1981 88 p refs
(ZR0000101)
(AD-A105949; NSWC/TR-81-218-Pt-4) Avail: NTIS HC A05/MF A01 CSCL 08/3

In Part I (Schwiderski, 1978a) of this report, a unique hydrodynamical interpolation technique was introduced, extensively tested, and evaluated in order to compute partial global ocean tides in great detail and with a high degree of accuracy. This novel method has been applied to construct the semidiurnal elliptical lunar (N2) ocean tide with a relative accuracy of better than 5 cm anywhere in the open oceans. The resulting tidal amplitudes and phases are tabulated on a 1 deg x 1 deg grid system in an atlas of 42 deg x 71 deg overlapping charts covering the whole oceanic globe. A corresponding atlas of global corange and cotidal maps is included to provide the reader with a quick general overview of the major tidal phenomena. The specifying hydrodynamical parameters of the model are listed along with quoted sources of empirical tide data, and significant tidal features are explained and discussed. The semidiurnal N2 ocean tide is found to resemble closely the semidiurnal M2 and S2 tides (compare Parts II and III). As mentioned in Parts II, III, IV, and V only qualitative similarities are displayed between the semidiurnal and diurnal ocean tides. Author (GRA)

N82-14792# Naval Surface Weapons Center, Dahlgren, Va.
THE NSWC GLOBAL OCEAN TIDE DATA TAPE (GOTD). ITS FEATURES AND APPLICATION: RANDOM-POINT TIDE PROGRAM
E. W. Schwiderski and L. T. Szeto Jun. 1981 41 p
(ZR0000101)
(AD-A105974; NSWC/TR-81-254) Avail: NTIS HC A03/MF A01 CSCL 08/3

In the following report, the authors highlight briefly the major qualitative and quantitative features of the NSWC ocean tide models, which now include the nine components (M2, S2, N2, K2), (K1, O1, P1, Q1), and Mf with models for Mn and Ssa nearing completion. Special characteristics of those models are pointed out, which require indispensable attention in various applications particularly in coastal areas with rapidly varying tides. Since the tide models interpolate hydrodynamically empirical tide data at over 2000 continental and island stations, certain simple corrections in the numerical procedures are presented. Plans for more extensive local and perhaps global refinements and improvements of the tide models are mentioned. In the final part of this report, the authors describe the NSWC Global Ocean Tide Data (GOTD) tape including the data arrangement and the standard format. The report ends with a program that computes from the taped harmonic tidal constants instantaneous oceanic and geocentric tides at specified random points and instances in the Random-Point Tide (RPTIDE) program. Author (GRA)

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-14793 Emory Univ., Atlanta, Ga.
STUDIES IN IN VIVO ELECTROCHEMISTRY Ph.D. Thesis
Wayne Stuart Lindsay 1981 303 p
Avail: Univ. Microfilms Order No. 8124252

The design and construction of instrumentation for in vivo electrochemistry, solution and in vivo characterization of microworking electrodes, the use of the multielectrode system for pharmacological and behavioral studies, statistical analysis of data, simulation studies, and the first chronoamperometric recording from a rhesus monkey are presented. In vivo data using different values for some of the experimental parameters in the simulation equation were compared to simulated data. Chronoamperometric recordings were made from the brain of an unanesthetized rhesus monkey. The electrochemical signal increased during emotional excitation and feeding. Dissert. Abstr.

N82-14794*# National Aeronautics and Space Administration, Washington, D. C.
POLYPLOIDIZATION DELAY IN RAT HEPATOCYTES UNDER LIVER GROWTH INHIBITION BY HYPOKINESIA
V. M. Faktor, V. F. Malyutin, S. Y. Li, and V. Ya. Brodskiy Jul. 1981 10 p refs Transl. into ENGLISH from Tsitologiya (USSR), v. 21, no. 4, 1979 p 397-400
(Contract NASw-3199)
(NASA-TM-76515) Avail: NTIS HC A02/MF A01 CSCL 06C

A study of young rats, weighing 55 to 59 g, after being for 10 days in conditions of limited mobility, shows a retardation of body growth as well as that of liver growth. The decrease in the rate of growth is accompanied by a reduction of cell proliferation and by delay polyploidization of hepatocytes in the liver of experimental rats. The materials, methods, and results of research are discussed. M.D.K.

N82-14795# Jackson Lab., Bar Harbor, Maine.
INBORN ANEMIAS IN MICE Progress Report, 1 Aug. 1980 - 1 Jun. 1981
Seldon E. Bernstein, Jane E. Barker, and Elizabeth S. Russell Jun. 1981 36 p
(Contract DE-AC02-76EV-03264)
(DE81-029128; DOE/EV-03264/20) Avail: NTIS HC A03/MF A01

Four macrocytic anemias, five hemolytic anemias, nonhemolytic microcytic anemia, transitory siderocytic anemia, sex-linked iron-transport anemia, an alpha-thalassemia, and a new target-cell anemia were studied. Each of these blood dyscrasias is caused by the action of a unique mutant gene, which determines the structure of different intracellular molecules, and thus controls a different metabolic process. The potential for uncovering different aspects of hemopoietic homeostatic mechanisms in the mouse is considered. Each anemia is studied through: (1) characterization of peripheral blood values, (2) determinations of radiosensitivity under a variety of conditions, (3) measurements of iron metabolism and heme synthesis, (4) histological and biochemical study of bloodforming tissue, (5) functional tests of the stem cell component, (6) examination of responses to erythroid stimuli, and (7) transplantation of tissue between individuals of differently affected genotypes. DOE

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-14796# Southwest Research Inst., San Antonio, Tex.
PLAN OF ACTION AND MILESTONES FOR NAVY COMBUSTION TOXICITY Final Report
R. E. Adler, H. Kaplan, and M. D. Fish 1 Jan. 1981 33 p
(Contract N00173-80-C-0125)
(AD-A106023) Avail: NTIS HC A03/MF A01 CSCL 13/10

This report reviews the Workshop on Toxicology of Combustion Products held at the Naval Research Laboratory on 15-16 October 1980. Participants included U.S. Navy, other government activities, and U.S. Industry. The use of plastic materials has become more prevalent in the design of equipment and in shipboard construction. Use of these materials in quantity can create severe generation of toxic gases which can incapacitate or kill personnel in shipboard fires even if they are not in the immediate fire area. Author (GRA)

N82-14797# Mitre Corp., McLean, Va.
EVALUATION OF SHORT-TERM BIOASSAYS TO PREDICT FUNCTIONAL IMPAIRMENT. SELECTED SHORT-TERM PULMONARY TOXICITY TESTS Final Report, Sep. 1978 - Jul. 1980
Steve Drill and Richard Thomas Oct. 1980 131 p refs
(Contract DAMD17-78-C-8068)
(AD-A103766; MTR-80W00233) Avail: NTIS HC A07/MF A01 CSCL 06/20

Short term bluessays which demonstrate ability to assess and predict impairment of the pulmonary system resulting from exposure to chemicals were evaluated. Test procedured for determining toxic effects on the lungs and other components of the plumonary system are reviewed. The procedures are discussed in sections on morphology, respiratory mechanics, gas exchange, circulation, defense mechanisms and biochemistry. Author

N82-14798# Mitre Corp., McLean, Va.
EVALUATION OF SHORT-TERM BIOASSAYS TO PREDICT FUNCTIONAL IMPAIRMENT. DEVELOPMENT OF PULMONARY BIOASSAYS IN SMALL ANIMALS: DIRECTORY OF INSTITUTIONS; INDIVIDUALS INVOLVED IN UTILIZATION Final Report
Steve Drill, Richard Thomas, and Terry Zimmerman Oct. 1980 133 p
(Contract DAMD17-78-C-8068)
(AD-A103767; WP-79W00222) Avail: NTIS HC A07/MF A01 CSCL 06/20

Short term bioassays which demonstrated ability to evaluate and predict pulmonary impairment resulting from toxicant exposures were evaluated. This directory describes available pulmonary testing protocols and assesses their suitability for a screening program. Organizations currently engaged in pulmonary bioassay utilization or development are catalogued and information concerning specific measurements performed, test systems employed, compounds tested, requirements for anesthesia and terminal nature of the test are provided. Author

N82-14799# Oak Ridge National Lab., Tenn. Industrial Safety and Applied Health Physics Div.
INTDOS: A COMPUTER CODE FOR ESTIMATING INTERNAL RADIATION DOSE USING RECOMMENDATIONS OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION
M. T. Ryan Sep. 1981 25 p refs
(Contract W-7405-eng-26)
(DE82-000507; ORNL/TM-7928) Avail: NTIS HC A02/MF A01

A user oriented computer code, INTDOS, to calculate estimates of internal radiation dose commitment resulting from the acute inhalation intake of various radionuclides was designed. The user must identify the radionuclide name, solubility class, particle size, time since exposure, and the measured lung burden. The INTDOS calculates the fraction of the lung burden remaining at time, t, postexposure considering the solubility class and particle size information. Effective committed dose equivalents to various organs and tissues of the body are calculated using inhalation committed dose factors. DOE

N82-14800# Brookhaven National Lab., Upton, N. Y. Biology Dept.
REPAIR OF RADIATION DAMAGE IN MAMMALIAN CELLS
R. B. Setlow 1981 16 p refs Presented at the NATO CNEN Conf., Rome, 24 Aug. 1981.
(Contract DE-AC02-76CH-00016)
(DE81-030824; BNL-30056; B10-3766; CONF-810873-2) Avail: NTIS HC A02/MF A01

The responses as survival, mutation, and carcinogenesis, of mammalian cells and tissues to radiation which are dependent not only on the magnitude of the damage to macromolecular structures (DNA, RNA, protein, and membranes) but on the rates of macromolecular syntheses of cells relative to the half lives of the damages are discussed. Cells possess a number of mechanisms for repairing damage to DNA. The effects of radiation and the repair of radiation damage can be explained by epidemiological data which allows the construction of dose response curves for humans. The shapes of such curves or the magnitude of the response depends on repair. Radiation damage is emphasized because: (1) radiation dosimetry is excellent compared to chemical dosimetry; (2) a number of cancer prone diseases show defects in DNA repair and radiation results in more chromosomal damage in cells from such individuals than in cells from normal individuals; (3) specific radiation products in DNA have been correlated with biological effects, and (4) many chemical effects seem to mimic radiation effects. It is indicated that damages to DNA can be the initiating events in carcinogenesis. DOE

N82-14801# Michigan Research Center, Inc., East Lansing.
EVALUATIVE STUDIES IN NUCLEAR MEDICINE RESEARCH. EMISSION-COMPUTED TOMOGRAPHY ASSESSMENT Progress Report, 1 Jan. - 15 Aug. 1981
E. James Potchen 15 Aug. 1981 18 p refs
(Contract DE-AS02-76EV-02777)
(DE81-030168; DOE/EV-02777/5) Avail: NTIS HC A02/MF A01

Imaging performance goals which need to be met to produce effective biomedical research using positron emission computer tomography are discussed. The realization of those performance goals by imaging systems, and the dependence of currently unachieved performance goals on design an operational factors along with refinement of economic estimates for the capital and operating costs of a research facility are addressed. DOE

N82-14802# Cornell Univ., Ithaca, N. Y. Materials Science Center.
FIELD-ION-MICROSCOPE OBSERVATIONS OF RADIATION EFFECTS
David N. Seidman Aug. 1981 8 p refs
(Contract DE-AS02-76ER-03158)
(DE81-030934; DOE/ER-03158/99; MSC-4555) Avail: NTIS HC A02/MF A01

The unique advantages and capabilities of the field ion microscope (FIM) and atom probe FIM for the study of the effects of particle radiation on metals are reviewed. Some contrast effects caused by radiation induced defects are discussed. DOE

N82-14803# Battelle Pacific Northwest Labs., Richland, Wash.
CARCINOGENIC EFFECTS OF COAL-CONVERSION MATERIALS
R. A. Renne and L. G. Smith Apr. 1981 29 p refs Presented at the Ind. Hyg. and Occupational Med. in Coal Conversion Proj. Workshop, Washington, D.C., 7 Nov. 1980 Submitted for publication
(Contract DE-AC06-76RL-01830)
(DE81-028108; PNL-SA-9516; CONF-801143-2) Avail: NTIS HC A03/MF A01

The correlation between mutagenesis and carcinogenesis data on complex mixtures (synfuel materials) was determined. The heavy distillate is highly mutagenic compared with the other materials tested and it was also highly carcinogenic in a mouse skin painting assay. The fractions, we give different results from those of the mutagenesis assays. The basic tar and the neutral tar skin carcinogenesis data correlate fairly well with the mutagenesis data. The need for caution against depending heavily on equating PNA content with carcinogenic activity is emphasized. It is recommended that primary aromatic amines are also monitored. DOE

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-14804*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INFLUENCE OF DISPLAY AND CONTROL COMPATIBILITY ON PILOT-INDUCED OSCILLATIONS
Marvin C. Waller, Randall L. Harris, Sr., and Lee H. Person, Jr. Dec. 1981 40 p refs
(NASA-TP-1936; L-14364) Avail: NTIS HC A03/MF A01 CSCL 05I

The differences in techniques used by seven pilots to acquire information from an advanced display for instrument approaches to and landings on a runway were investigated. A fixed base simulator programmed with dynamics resembling the terminal configured vehicle (TCV) was studied. It is shown that the seven pilots can be divided into two groups which used the display with distinctly different strategies for controlling the airplane. A related pattern of performance differences resulted. It is found that pilots who primarily use raw flight path information experience longitudinal oscillations while pilots using attitude information did not. E.A.K.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-14805# Fabrique Nationale d'Armes de Guerre, Herstal-les-Liege (Belgium).

INITIATION INTO THE UTILIZATION OF PROGRAMMABLE INDUSTRIAL ROBOTS: GRAFCET [INITIATION A L'UTILISATION DES AUTOMATES PROGRAMMABLES INDUSTRIELS]

P. Krzesinski Mar. 1981 25 p refs In FRENCH

Avail: NTIS HC A02/MF A01

A technique for expressing automation problems, i.e., graph of command stage and transition (GraFcet), is presented. It is intended as a methodological tool which aids in the communication of automated systems specifications between client and contractor. The language GraFcet comprehends two levels of specification. The first level describes the behavior of the command part of a system in relation to the operating part (functional specifications). The second level sets technological and environmental specifications with which the command part of a system must operate (operational specifications). Fundamental notions and the practical use of GraFcet are explained. Author (ESA)

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N82-14806*# Duke Univ., Durham, N. C. Dept. of Computer Science.

A TUTORIAL ON THE CARE III APPROACH TO RELIABILITY MODELING Interim Report

Kishor S. Trivedi and Robert M. Geist Washington NASA Dec. 1981 63 p refs

(Grant NAG1-70)

(NASA-CR-3488) Avail: NTIS HC A04/MF A01 CSCL 14D

The CARE 3 reliability model for aircraft avionics and control systems is described by utilizing a number of examples which frequently use state-of-the-art mathematical modeling techniques as a basis for their exposition. Behavioral decomposition followed by aggregration were used in an attempt to deal with reliability models with a large number of states. A comprehensive set of models of the fault-handling processes in a typical fault-tolerant system was used. These models were semi-Markov in nature, thus removing the usual restrictions of exponential holding times within the coverage model. The aggregate model is a non-homogeneous Markov chain, thus allowing the times to failure to posses Weibull-like distributions. Because of the departures from traditional models, the solution method employed is that of Kolmogorov integral equations, which are evaluated numerically. R.J.F.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering*.

N82-14807# Network Analysis Corp., Vienna, Va.

DATA COMMUNICATIONS SUPPORT FOR THE ATC COMPUTER REPLACEMENT PROGRAM (1988-1996) Final Report

Washington FAA Nov. 1981 200 p refs

(Contract DOT-FA79WA-4335)

(DOT/FAA/RD-81/104; FR-303H.01) Avail: NTIS HC A09/MF A01

A 'look-ahead' is provided to the data communicatons capabilities needed during the FAA's enroute computer replacement program. The support of normal ATC functions and the planned advanced enroute automation functions are considered in addition to the computer replacement requirements themselves. A mixture of packet-switched and dedicated networks utilizing both terrestrial and satellite facilities was found to be the most attractive approach to provide such support. The terrestrial packet-switched network should be highly interconnected with switches in each center and should provide virtual circuit and alternate routing capabilities between all centers. Concentrating or multiplexing should also be considered at major air terminals. Results of this task also provide feedback on the data communications impact of the concepts related to center backup and terminal consolidation. A.R.H.

N82-14808# University of Southern California, Los Angeles. Electronic Sciences Lab.

ANALYSIS AND DESIGN OF FAULT-TOLERANT COMPUTER SYSTEMS Final Technical Report, 1 Jul. 1977 - 30 Jun. 1981

John P Hayes 15 Aug. 1981 26 p refs

(Grant AF-AFOSR-3352-77; AF Proj. 2304)

(AD-A105491; AFOSR-81-0671TR) Avail: NTIS HC A03/MF A01 CSCL 09/2

This is the final report of a four-year investigation of fault-tolerant computer systems. A comprehensive theory of fault tolerance for a class of computer interconnection networks called beta-networks was developed. Reconfiguration and recovery strategies in multiprocessor systems were studied using graph theoretical models. The testing requirements of bit-sliced computers were investigated, and a new approach to the design of easily testable bit-sliced systems was developed. The testing of complex LSI/VLSI systems was examined using a high-level and expandable representation of test data called vector sequences. Author (GRA)

N82-14809# Harvard Univ., Cambridge, Mass. Center for Research in Computer Technology.

FUNCTIONALLY SPECIALIZED MULTI-PROCESSOR ARCHITECTURES Final Report

15 Aug. 1981 19 p ref

(Contract N00014-76-C-0914)

(AD-A105662) Avail: NTIS HC A02/MF A01 CSCL 09/2

This report summarizes the results obtained in the various areas of research as well as some of the key publications that resulted from the work. The research strategy pursued areas where, in our opinion, fundamental generalizations of the current knowledge base for computing system design was required. The areas in question are as follows: Data management, Resource management, Network management, and CPU architectures. GRA

N82-14810# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
A LOWER BOUND FOR THE TIME TO ASSURE INTERACTIVE CONSISTENCY
Michael J. Fischer (Yale Univ.) and Nancy A. Lynch Sep. 1981 10 p refs
(Contracts DAAG29-79-C-0155; N00014-79-C-0873; N00014-80-C-0221; Grants NSF MCS-77-25628; NSF MCS-77-02474; NSF MCS-80-03337)
(AD-A105946; GIT-ICS-81/13; ARO-16451.12-EL) Avail: NTIS HC A02/MF A01 CSCL 09/2

The problem of 'assuring interactive consistency' is defined in (PSL). It is assumed that there are n isolated processors, of which at most m are faulty. The processors can communicate by means of two-party messages, using a medium which is reliable and of negligible delay. The sender of a message is always identifiable by the receiver. Each processor p has a private value sigma(p). The problem is to devise an algorithm that will allow each processor p to compute a value for each processor r, such that (a) if p and r are nonfaulty then p computes r's private value sigma(r), and (b) all the nonfaulty processors compute the same value for each processor r. It is shown in (PSL) that if n < 3m + 1, then there is no algorithm which assures interactive consistency. On the other hand, if n > or = 3m + 1, then an algorithm does exist. The algorithm presented in (PSL) uses m + 1 rounds of communication, and thus can be said to require 'time' m + 1. An obvious question is whether fewer rounds of communication suffice to solve the problem. In this paper, we answer this question in the negative. That is, we show that any algorithm which assures interactive consistency in the presence of m faulty processors requires at least m + 1 rounds of communication. Author (GRA)

N82-14811# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
DEVELOPMENT OF A METHODOLOGY FOR THE DETECTION OF SYSTEM FAILURES AND FOR THE DESIGN OF FAULT-TOLERANT CONTROL SYSTEMS Progress Report, 1 Oct. 1980 - 30 Sep. 1981
Alan S. Willsky and Edward Y. Chow Jul. 1981 36 p refs
(Contract N00014-77-C-0224)
(AD-A105900; LIDS-SR-1145; LIDS-P-1109; PR-5) Avail: NTIS HC A03/MF A01 CSCL 09/2

A brief description of the research on Information and Decision Systems is described. The scope of this contract is the development of an overall failure detection system design methodology and of methods for fault-tolerant control. We overview the research that has been performed in these areas during the indicated time period. A list of the papers and reports that have been and are being written as a result of research performed under this contract are included. GRA

N82-14812# Engins Matra, Velizy (France). Lab. Connection Reseaux.
FABRICATION OF A PROCESSOR ADAPTED TO NUMERICAL FILTERING [REALISATION D'UN PROCESSEUR ADAPTE AU FILTRAGE NUMERIQUE]
Nadia Karouche and Denis Jelsh 1981 121 p refs In FRENCH
(TEL/KAR/81) Avail: NTIS HC A06/MF A01

A fast universal processor able to carry out numerical filtering operations in real time was designed and built. Two filtering algorithms were considered: transversal filtering (finite impulse response); and recursive filtering (infinite impulse response). The feasibility of such a universal structure demonstrated. However, only the transversal filter could be realized, based on a microprocessor architecture. Performance of the filter is satisfactory. Author (ESA)

N82-14813# SRI International Corp., Menlo Park, Calif.
DIRECTIONS FOR FUTURE RESEARCH AND DEVELOPMENT IN MULTICOMPUTER SYSTEMS Final Report, Jun. 1981
Peter G. Neumann, David H. Brandin, Joseph A. Goguen, Jack Goldberg, and Michael A. Placko Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 110 p refs
Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-DV-81-003; ISSN-0170-9011) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21.90

Research into multiprocessors, dispersed networks, local networks and distributed systems, data flow systems, highly parallel and internally concurrent systems, secure systems, and reliable and fault tolerant systems were surveyed. Multicomputer architectures are reviewed. The impact of programming languages on architecture, and vice versa, is considered. Theoretical computation models needed for describing systems are presented. Author (ESA)

N82-14814 Stanford Univ., Calif.
SYNTHESIS AND OPTIMIZATION OF PROGRAMMABLE LOGIC ARRAYS Ph.D. Thesis
Sungho Kang 1981 228 p
Avail: Univ. Microfilms Order No. 8124091

Programmable logic arrays minimization algorithms are discussed based on products, inputs and outputs. A heuristic produce minimization algorithm based on iterative improvement is analyzed and the improvement of its efficiency is studied. The algorithm proposed is efficient enough to accept large switching functions whose minimization is inconceivable with previous algorithms. Several input and output minimization techniques and algorithms are discussed in detail. PLA partitioning algorithms are discussed and results show that by replacing a large PLA by several smaller PLA's, a reduced chip area can be achieved. The algorithms presented are heuristic and based on the concept of independence of internal PLA patterns. An automatic PLA synthesis procedure from a register transfer level language was developed. The synthesis procedure proposed uses a PLA for implementing the control circuit of the system. Dissert. Abstr.

N82-14815 California Univ., Los Angeles.
COMPUTER AIDED DESIGN AND RELIABILITY OF A GENERAL LSI LOGIC STRUCTURE FOR CUSTOM VLSI Ph.D. Thesis
Michael Wayne Sievers 1981 214 p
Avail: Univ. Microfilms Order No. 8122838

The design and reliability issues to be faced in very large scale integration (VLSI) systems are investigated. A highly regular array, called a general logic structure, is presented as a means for not only simplifying the design problem but also as a means to limit failure mechanisms to a well defined set. This lattice attribute is essential for the design of testable or fault tolerant VLSI. A computer aided design system is also presented for the structure. Dissert. Abstr.

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-14816 Oregon State Univ., Corvallis.
SPECIFICATION OF PARALLEL PROCESSING USING PRODUCTION SYSTEMS Ph.D. Thesis
Mohammed G. Gazaly 1982 276 p
Avail: Univ. Microfilms Order No. 8124328

The use of production systems as a model of parallel processing was investigated in an effort to provide a suitable medium within which parallel processing systems can be systematically specified, analyzed, and designed. Some existing models of parallel processing are reviewed. Production systems are formally defined and their computation power demonstrated. Production system specification of synchronization policies of access to shared resources is systematically analyzed for compatibility, liveness and fairness. Systematic design procedures for specifying systems of competing concurrent processes which are guaranteed to be compatible, live and fair are developed. The property of maximal compatibility is investigated and a systematic procedure to derive implementations of the synchronization policy specifications within production systems is presented. Production systems are compared to the other parallel processing models. The interactions between the different properties of synchronization policies, namely, maximal compatibility, liveness, and fairness are also investigated. Dissert. Abstr.

N82-14817*# California State Univ., Fullerton. Dept. of Management Science.
REAL TIME SIMULATION OF COMPUTER-ASSISTED SEQUENCING OF TERMINAL AREA OPERATIONS Final Report, Jul. 1978 - Jan. 1981
Roger G. Dear 31 Jan. 1981 115 p refs
(Contract NCA2-OR253-801)
(NASA-CR-166195) Avail: NTIS HC A06/MF A01 CSCL 09B

A simulation was developed to investigate the utilization of computer assisted decision making for the task of sequencing and scheduling aircraft in a high density terminal area. The simulation incorporates a decision methodology termed Constrained Position Shifting. This methodology accounts for aircraft velocity profiles, routes, and weight classes in dynamically sequencing and scheduling arriving aircraft. A sample demonstration of Constrained Position Shifting is presented where six aircraft types (including both light and heavy aircraft) are sequenced to land at Denver's Stapleton International Airport. A graphical display is utilized and Constrained Position Shifting with a maximum shift of four positions (rearward or forward) is compared to first come, first serve with respect to arrival at the runway. The implementation of computer assisted sequencing and scheduling methodologies is investigated. A time based control concept will be required and design considerations for such a system are discussed. Author

N82-14818*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GRID SYSTEMS FOR EARTH RADIATION BUDGET EXPERIMENT APPLICATIONS
David R. Brooks Dec. 1981 42 p refs
(NASA-TM-83233; L-14843) Avail: NTIS HC A03/MF A01 CSCL 09B

Spatial coordinate transformations are developed for several global grid systems of interest to the Earth Radiation Budget Experiment. The grid boxes are defined in terms of a regional identifier and longitude-latitude indexes. The transformations associate longitude with a particular grid box. The reverse transformations identify the center location of a given grid box. Transformations are given to relate the rotating (Earth-based) grid systems to solar position expressed in an inertial (nonrotating) coordinate system. The FORTRAN implementations of the transformations are given, along with sample input and output. Author

N82-14819*# Technology, Inc., Houston, Tex. Life Sciences Div.
LABORATORY DATA MANIPULATION TOOLS BASIC DATA HANDLING PROGRAMS. VOLUME 2: DETAILED SOFTWARE/HARDWARE DOCUMENTATION Final Report
30 Sep. 1981 187 p refs
(Contract NAS9-14880)
(NASA-CR-167478-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 09B

The set of computer programs described allows for data definition, data input, and data transfer between the LSI-11 microcomputers and the VAX-11/780 minicomputer. Program VAXCOM allows for a simple method of textual file transfer from the LSI to the VAX. Program LSICOM allows for easy file transfer from the VAX to the LSI. Program TTY changes the LSI-11 operators console to the LSI's printing device. Program DICTIN provides a means for defining a data set for input to either computer. Program DATAIN is a simple to operate data entry program which is capale of building data files on either machine. Program LEDITV is an extremely powerful, easy to use, line oriented text editor. Program COPYSBF is designed to print out textual files on the line printer without character loss from FORTRAN carriage control or wide record transfer. A.R.H.

N82-14820# Rockwell International Corp., Richardson, Tex.
COMPUTER PROGRAM TO SUPPORT REMOTE MANIPULATOR SYSTEM FLIGHT PLANNING ANALYSIS
[1982] 161 p
Avail: NTIS HC A08/MF A01 CSCL 09B

The basic flight control software functions for the Remote Manipulator Flight Control System (RMS) were programmed for the Hewlett-Packard desk top computer mode HP-9845. This provides an engineering analysis tool for flight planning as well as to support the generation of level C flight parametes. The logic described is intended for onboard computer code but is also used for the flight planning/level C parameter generation exercises. The Kinematic Data Generation (KDG) function calculates point of resolution (POR) position and rate components from joint angles and rates. The Inverse Trigonometric Function (ITF) logic solves for a set of angles from a given POR position vector and a set of attitude angles. The analysis strategy starts with a desired end of trajectory position and orientation of the end effector nrl uses the ITF logic to find the end of trajectory values at the six joint angles. Then with the help of a set of initial joint angles, the time history of desired joint angles is calculated which moves along a desired trajectory using the KDG logic. R.D.F.

N82-14821# Naval Postgraduate School, Monterey, Calif.
VOICE RECOGNITION AS AN INPUT MODALITY FOR THE TACCO PREFLIGHT DATA INSERTION TASK IN THE P-3C AIRCRAFT M.S. Thesis
John Laughlin Taggart, Jr. and Charles Darwin Wolfe Mar. 1981 150 p refs
(AD-A105568) Avail: NTIS HC A07/MF A01 CSCL 09/2

An experiment was conducted to compare accuracy and entry speed capabilities of a standard keyboard with the Threshold Technology T-600 voice recognition unit in the performance of an operational data entry task in the P-3C aircraft. A computer program was written to simulate the data entry capabilities of the P-3C operational software. Thirteen military officers executed a P-3C Tactical Coordinator's preflight task of entering data into the Stores Management and Navigation Preflight tableaux. Overall, voice entry was found to be faster for the Stores Management data entry task and slower for the Navigation Preflight tableau task, with comparable accuracy. But, for subjects with prior voice input experience, voice input was faster than keyboard entry for both tableaux. Author (GRA)

N82-14822# Polytechnic Inst. of New York, Brooklyn.
SOFTWARE MODELING STUDIES EXECUTIVE SUMMARY Final Technical Report, Jan. 1978 - Oct 1980
Martin L. Shooman and Henry Ruston Griffiss AFB, N.Y. RADC Jul. 1981 80 p refs
(Contract F30602-78-C-0067; AF Proj. 2304)
(AD-A105810; POLY-EE80-006; RADC-TR-81-183-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report documents the research performed under RADC Contract by Polytechnic Institute of New York in the area of complexity measures, test models and techniques, methods for developing programs with low error content, software reliability models and software management models. In this volume research described in previous progress reports, technical reports and in Volumes 2, 3, and 4 is summarized. Unfinished work, not previously reported, is described. Significant results are highlighted with their interrelation and potential. Author (GRA)

N82-14823# Princeton Univ., N. J. Dept. of Statistics.
GEOMETRIC DATA ANALYSIS: AN INTERACTIVE GRAPHICS PROGRAM FOR SHAPE COMPARISON
Andrew F. Siegel Apr. 1981 32 p refs
(Contract DAAG29-79-C-0205)
(AD-A105858; TR-193-SER-2; ARO-16669.11-M) Avail: NTIS HC A03/MF A01 CSCL 09/2

Two shapes, each consisting of n homologous points, can be rotated, scaled, and translated to obtain a close fit to each other by several methods. An interactive graphical computer program is presented that implements two methods: least squares and repeated medians, a robust method. Examples are given and the use of the system is discussed. Author (GRA)

N82-14824# Polytechnic Inst. of New York, Brooklyn.
SOFTWARE MODELING STUDIES EXPERIMENTAL STUDY OF A TWO DIMENSIONAL LANGUAGE VERSUS FORTRAN FOR FIRST-COURSE PROGRAMMERS, VOLUME 3 Final Technical Report, Jan. 1978 - Oct. 1980
Melvin Klerer Griffiss AFB, N.Y. RADC Jul. 1981 81 p refs

(Contract F30602-78-C-0057: AF Proj. 2304)
(AD-A106034: RADC-TR-81-193-Vol-3) Avail: NTIS HC A05/MF A01 CSCL 09/2

The purpose of this study was to obtain quantitative measures of the relative performance of two very different programming languages. One language was FORTRAN and the other was the Klerer-May two dimensional language. The report describes the experiments conducted, presents the experimental results and provides a discussion of the results obtained. Author (GRA)

N82-14825# Centre de Recherches en Physique de l'Environnement Terrestre et Planetaire, Orleans (France).
COMPUTER PROGRAM FOR SOLVING AN INVERSE PROBLEM WITH ONE VARIABLE: PART 1: METHODOLOGY [LOGICIEL DE RESOLUTION D'UN PROBLEME INVERSE A 1 VARIABLE. 1: EXPOSE DES METHODES]
C. Delannoy, F. Lefeuvre, and C. R. P. E. Orleans Mar. 1981 42 p refs In FRENCH 2 Vol.
(CRPE-NT-80-Vol-1) Avail: NTIS HC A03/MF A01

A nonnegative real function of one real variable is determined, using computer programming that integrates a certain number of known linear functionals. The program wants a maximum entropy solution. An approximation is made either through discretization or by finding a mean solution, i.e. the Dirichlet kernel. The program is capable of four operations: finding a discrete solution; finding a mean solution; finding a maximum entropy solution, initiated by and finding a maximum entropy solution, user interactively initiated. Random electromagnetic wave fields were analyzed with good results. Author (ESA)

N82-14826# Centre de Recherches en Physique de l'Environnement Terrestre et Planetaire, Orleans (France).
COMPUTER PROGRAM FOR SOLVING AN INVERSE PROBLEM WITH ONE VARIABLE. PART 2: USER MANUAL [LOGICIEL DE RESOLUTION D'UN PROBLEME INVERSE A 1 VARIABLE. 2: DOCUMENTATION D'UTILISATION]
C. Delannoy and F. Lefeuvre Apr. 1981 41 p refs In FRENCH 2 Vol.
(CRPE-NT-81-Vol-2) Avail: NTIS HC A03/MF A01

The program is capable of four operations: (1) finding a discrete solution; (2) finding a mean solution; (3) find a maximum entropy solution, initiated by either (1) or (2); and (4) find a maximum entropy solution, user interactively initiated. The complete use of the program is explained, stressing the general nature of the software. A listing is shown for the numerical integration of five kernel functions. Author (ESA)

N82-14827 California Univ., Los Angeles.
THE DESIGN, SPECIFICATION, AND IMPLEMENTATION OF OBJ-T: A LANGUAGE FOR WRITING AND TESTING ABSTRACT ALGEBRAIC PROGRAM SPECIFICATIONS Ph.D. Thesis
Joseph John Tardo 1981 269 p
Avail: Univ. Microfilms Order No. 8122865

The application of algebraic techniques to the problem of generating formal program specifications is investigated. The design, implementation, and application of OBJ-T, a formal language for writing and testing abstract algebraic program specifications is described. A conceptually simple and elegant semantic foundation for OBJ-T which reflects the simplicity of its syntax is used. The language is based upon a data oriented, initial algebra model f computation. The mathematical foundations of this algebraic model are described and then used to characterize the mathematical semantics of OBJ-T. Dissert. Abstr.

N82-14828 Iowa Univ., Oakdale.
AN INVESTIGATION INTO THE CURRENT ATTITUDES AND PERCEPTIONS HELD BY EDUCATORS TOWARD COMPUTER-ASSISTED-INSTRUCTION Ph.D. Thesis
Diedrus Uvonne Brown 1981 164 p
Avail: Univ. Microfilms Order No. 8123303

In order to determine the current attitudes and perceptions of educators toward computer assisted instruction (CAL), an instrument which consisted of eight questions was designed to ascertain background information on each participant, and the extent of CAL use in their particular school. Also, the survey instrument consisted of forty carefully scrutinized ideas, opinions, and/or conclusions found in the relevant literature in this area. It was concluded that educators, regardless of position, hold similar attitudes and perceptions toward CAL, that age had no significant bearing on how educators view CAL, and that if, in fact, there were varying attitudes, it would be in the general area of how CAL and/or computers affect students and how educators themselves view CAL and/or computers.
Dissert. Abstr.

N82-14151# European Space Operations Center, Darmstadt (West Germany).
SOFTWARE FOR THE RESCUE OF NONNOMINAL MISSIONS
Guy Janin *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 281-283 ref (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14169# Science Research Council, Chilton (England). Rutherford and Appleton Labs.
ACS PERFORMANCE VERTIFICATION FOR IRAS: SOFTWARE ENGINEERING AT THE OPERATIONS CONTROL CENTRE
L. P. Baldwin *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 443-450 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

62 COMPUTER SYSTEMS

Includes computer networks.

N82-14829*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RUGGEDIZED MINICOMPUTER HARDWARE AND SOFTWARE TOPICS, 1981: PROCEEDINGS OF THE 4TH ROLM MIL-SPEC COMPUTER USER'S GROUP CONFERENCE
Dec. 1981 214 p refs Conf. held in San Diego, Calif., 22-25 Feb. 1981
(NASA-CP-2206; L-14886) Avail: NTIS HC A11/MF A01 CSCL 09B

Presentations of a conference on the use of ruggedized minicomputers are summarized. The following topics are discussed: (1) the role of minicomputers in the development and/or certification of commercial or military airplanes in both the United States and Europe; (2) generalized software error detection techniques; (3) real time software development tools; (4) a redundancy management research tool for aircraft navigation/flight control sensors; (5) extended memory management techniques using a high order language; and (6) some comments on establishing a system maintenance scheme. Copies of presentation slides are also included. For individual titles, see N82-14830 through N82-14842.

N82-14830*# Boeing Commercial Airplane Co., Seattle, Wash.
AIRBORNE DATA ANALYSIS/MONITOR SYSTEM
Darryl B. Stephison *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 1-21 (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

An Airborne Data Analysis/Monitor System (ADAMS), a ROLM 1666 computer based system installed onboard test airplanes used during experimental testing is evaluated. In addition to the 1666 computer, the ADAMS hardware includes a DDC System 90 fixed head disk and a Miltape DD400 floppy disk. Boeing designed a DMA interface to the data acquisition system and an intelligent terminal to reduce system overhead and simplify operator commands. The ADAMS software includes RMX/RTOS and both ROLM FORTRAN and assembly language are used. The ADAMS provides real time displays that enable onboard test engineers to make rapid decisions about test conduct thus reducing the cost and time required to certify new model airplanes, and improved the quality of data derived from the test, leading to more rapid development of improvements resulting in quieter, safer, and more efficient airplanes. The availability of airborne data processing removes most of the weather and geographical restrictions imposed by telemetered flight test data systems. A data base is maintained to describe the airplane, the data acquisition system, the type of testing, and the conditions under which the test is performed. M.D.K.

N82-14831*# Boeing Commercial Airplane Co., Seattle, Wash.
ADAMS EXECUTIVE AND OPERATING SYSTEM
W. D. Pittman *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 23-31 (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

The ADAMS Executive and Operating System, a multitasking environment under which a variety of data reduction, display and utility programs are executed, a system which provides a high level of isolation between programs allowing them to be developed and modified independently, is described. The Airborne Data Analysis/Monitor System (ADAMS) was developed to provide a real time data monitoring and analysis capability onboard Boeing commercial airplanes during flight testing. It inputs sensor data from an airplane performance data by applying transforms to the collected sensor data, and presents this data to test personnel via various display media. Current utilization and future development are addressed. M.D.K.

N82-14832*# Boeing Commercial Airplane Co., Seattle, Wash.
SYSTEM PERFORMANCE ANALYZER
H. R. Helbig *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 33-46 (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

The System Performance Analyzer (SPA) designed to provide accurate real time information about the operation of complex systems and developed for use on the Airborne Data Analysis/Monitor System (ADAMS), a ROLM 1666 based system is described. The system uses an external processor to operate an intelligent, simulated control panel. Also provided are functions to trace operations, determine frequency of use of memory areas, and time or count user tasks in a multitask environment. This augments the information available from the standard debugger and control panel, and reduces the time and effort needed by ROLM 1666 users in optimizing their system, as well as providing documentation of the effect of any changes. The operation and state of the system are evaluated. M.D.K.

N82-14833*# Societe Nationale Industrielle Aerospatiale, Toulouse (France). Flight Test Management Dept.
ON-BOARD COMPUTER PROGRESS IN DEVELOPMENT OF A 310 FLIGHT TESTING PROGRAM
Pierre Reau *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 47-57 (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

Onboard computer progress in development of an Airbus A 310 flight testing program is described. Minicomputers were installed onboard three A 310 airplanes in 1979 in order to: (1) assure the flight safety by exercising a limit check of a given set of parameters; (2) improve the efficiency of flight tests and allow cost reduction; and (3) perform test analysis on an external basis by utilizing onboard flight types. The following program considerations are discussed: (1) conclusions based on simulation of an onboard computer system; (2) brief descriptions of A 310 airborne computer equipment, specifically the onboard universal calculator (CUB) consisting of a ROLM 1666 system and visualization system using an AFIGRAF CRT; (3) the ground system and flight information inputs; and (4) specifications and execution priorities for temporary and permanent programs. M.D.K.

N82-14834*# Naval Material Command, Washington, D. C. Office of the Executive Director for Acquisition.
NEW STARTS IN RESEARCH AND DEVELOPMENT, 1982
Joseph Grosson *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 59-107 (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

An outline in slide form, of some areas of U.S. Navy research and development utilizing airborne minicomptuers is presented. The following program considerations are addressed: (1) research and engineering management; (2) budgeting; (3) equipment specifications and construction materials; (4) computer applications; (5) technological capabilities, utilization, and transfer; and (6) military applications. M.D.K.

N82-14835*# Comptek Research, Inc., Santa Barbara, Calif.
SOFTWARE ERROR DETECTION
Wolfgang Buechler and A. Gilliam Tucker *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 109-114 refs (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

Several methods were employed to detect both the occurrence and source of errors in the operational software of the AN/SLQ-32. A large embedded real time electronic warfare command and control system for the ROLM 1606 computer are presented. The ROLM computer provides information about invalid addressing, improper use of privileged instructions, stack overflows, and unimplemented instructions. Additionally, software techniques were developed to detect invalid jumps, indices out of range, infinte loops, stack underflows, and field size errors. Finally, data are saved to provide information about the status of the system when an error is detected. This information includes I/O buffers, interrupt counts, stack contents, and recently passed locations. The various errors detected, techniques to assist in debugging problems, and segment simulation on a nontarget computer are discussed. These error detection techniques were a major factor in the success of finding the primary cause of error in 98% of over 500 system dumps. M.D.K.

N82-14836*# Command Control and Communications Corp., Torrance, Calif.
ARTS BETA TESTING REPORT
Michael C. McCune *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 115-132 (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

The advanced real time system (ARTS) was tested utilizing existing commercial system hardware and software which has been operating under advanced operating system (AOS) for several years in a multitasking, multiprocessing, and multiple computer environment. Experiences with ARTS in terms of compatibility with AOS, ease of transmission between AOS and ARTS, and functional areas of ARTS which were tested are discussed. Relative and absolute performance of ARTS versus AOS as measured in the system environment are also presented. S.L.

N82-14837*# E-Systems, Inc., Falls Church, Va. Melpar Div.
REAL TIME SOFTWARE TOOLS AND METHODOLOGIES
M. J. Christofferson *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 133-149 ref (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

Real time systems are characterized by high speed processing and throughput as well as asynchronous event processing requirements. These requirements give rise to particular implementations of parallel or pipeline multitasking structures, of intertask or interprocess communications mechanisms, and finally of message (buffer) routing or switching mechanisms. These mechanisms or structures, along with the data structure, describe the essential character of the system. These common structural elements and mechanisms are identified, their implementation in the form of routines, tasks or macros - in other words, tools are formalized. The tools developed support or make available the following: reentrant task creation, generalized message routing techniques, generalized task structures/task families, standardized intertask communications mechanisms, and pipeline and parallel processing architectures in a multitasking environment. Tools development raise some interesting prospects in the areas of software instrumentation and software portability. These issues are discussed following the description of the tools themselves. S.L.

N82-14838*# E-Systems, Inc., Falls Church, Va. Melpar Div.
USE OF SOFTWARE TOOLS IN THE DEVELOPMENT OF REAL TIME SOFTWARE SYSTEMS

Robert C. Garvey *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 151-169 ref (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

The transformation of a preexisting software system into a larger and more versatile system with different mission requirements is discussed. The history of this transformation is used to illustrate the use of structured real time programming techniques and tools to produce maintainable and somewhat transportable systems. The predecessor system is a single ground diagnostic system; its purpose is to exercise a computer controlled hardware set prior to its deployment in its functional environment, as well as test the equipment set by supplying certain well known stimulas. The successor system (FTE) is required to perform certain testing and control functions while this hardware set is in its functional environment. Both systems must deal with heavy user input/output loads and a new I/O requirement is included in the design of the FTF system. Human factors are enhanced by adding an improved console interface and special function keyboard handler. The additional features require the inclusion of much new software to the original set from which FTF was developed. As a result, it is necessary to split the system into a duel programming configuration with high rates of interground communications. A generalized information routing mechanism is used to support this configuration. S.L.

N82-14839*# National Aerospace Lab., Amsterdam (Netherlands).
ROLM COMPUTERS IN THE FLIGHT TESTING OF THE FOKKER F29 AIRCRAFT
P. J. Manders *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 171-192 (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

The design, development, installation, and operation of the test equipment (MRVS) is discussed. The main feature of the MRVS is continuous recording on an instrumentation recorder data of up to 1500 parameters with a total sample rate of up to 10,000 samples per second. In order to compress the evaluation and calibration time period, the following additional requirements were set for two test systems: (1) recording of selected parameters, time tagged on computer compatible tape (CCT); (2) recording of selected high bandwidth signals and ad hoc parameters on analog tape; (3) onboard presentation of calibrated parameter data, in engineering units, in numerical as well as graphical form for: system checkout during pre-, in- and post-flight, and quick look analysis during in-flight; (4) real time presentation on the ground by telemetry for: flight monitoring, takeoff and landing measurements, and noise measurements; and (5) data processing on the ground on the Fokker-NLR computer network. S.L.

N82-14840*# Westinghouse Electric Corp., Baltimore, Md.
FAULT ISOLATION TECHNIQUES
Al Dumas *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 193-196 (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

Three major areas that are considered in the development of an overall maintenance scheme of computer equipment are described. The areas of concern related to fault isolation techniques are: the programmer (or user), company and its policies, and the manufacturer of the equipment. S.L.

N82-14841*# GTE Sylvania, Inc., Mountain View, Calif.
EXTENDED MEMORY MANAGEMENT UNDER RTOS
Mark Plummer *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 197-207 ref (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

A technique for extended memory management in ROLM 1666 computers using FORTRAN is presented. A general software system is described for which the technique can be ideally applied. The memory manager interface with the system is described. The protocols by which the manager is invoked are presented, as well as the methods used by the manager. S.L.

N82-14842*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Flight Electronics Div.
DESCRIPTION OF A DUAL FAIL OPERATIONAL REDUNDANT STRAPDOWN INERTIAL MEASUREMENT UNIT FOR INTEGRATED AVIONICS SYSTEMS RESEARCH
W. H. Bryant and F. R. Morrell *In its* Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 209-217 refs (For primary document see N82-14829 05-62)
Avail: NTIS HC A11/MF A01 CSCL 09B

An experimental redundant strapdown inertial measurement unit (RSDIMU) is developed as a link to satisfy safety and reliability considerations in the integrated avionics concept. The unit includes four two degree-of-freedom tuned rotor gyros, and four accelerometers in a skewed and separable semioctahedral array. These sensors are coupled to four microprocessors which compensate sensor errors. These microprocessors are interfaced with two flight computers which process failure detection, isolation, redundancy management, and general flight control/navigation algorithms. Since the RSDIMU is a developmental unit, it is imperative that the flight computers provide special visibility and facility in algorithm modification. S.L.

N82-14843 Oregon State Univ., Corvallis.
MIKE: A NETWORK OPERATING SYSTEM FOR THE DISTRIBUTED DOUBLE-LOOP COMPUTER NETWORK Ph.D. Thesis
Duen-Ping Tsay 1981 151 p
Avail: Univ. Microfilms Order No. 8121864

A network operating system called Multicomputer Integrator Kernel (MIKE) and its supporting architecture is proposed for use in distributed systems in general and in the Distributed Double Loop Computer Network in particular. The system provides system transparent operation for users and maintains cooperative autonomy among local hosts. Its underlying architecture provides additional hardware/firmware mechanisms to support the logical structure of MIKE. Modern operating system design principles used to cope with complexity and vulnerability include data abstraction, capability based addressing, and domain based protection. The use of these concepts contributes to several characteristics whose presence is essential in a distributed environment. Among these characteristics are extensibility/configurability, reliability/robustness, system transparency, and local autonomy. Dissert. Abstr.

N82-14844 California Univ., Los Angeles.
SCHEME OF ATTRIBUTES IN MULTILEVEL DESIGN OF COMPUTER SYSTEMS Ph.D. Thesis
Antonio Benedito Coimbra Sampaio 1981 456 p
Avail: Univ. Microfilms Order No. 8122835

Abstraction and checking methods which are supported by a scheme called the scheme of attributes are defined. The methods can be used to enhance design methodologies towards producing correct computer systems. The abstraction method is similar to data abstraction techniques currently used to specify, design, and verify programs. The abstraction method is used to formally specify hardware building blocks (a multiplexer AM25LS157 and the microprocessor AM2930) and to illustrate composition of hardware systems from building blocks. The basic strategy of the check method is to identify primitive attributes of computer structures and the rules regulating their use, so that inconsistencies can be uncovered early by detecting rule violations when operating on attributes used in the design of a system. The check method also uses the notion of synthesized and inherited attributes of Knuthian semantics in order to derive attributes of a computer structure from attributes associated with computer structures at the same level or at lower levels, therefore allowing multilevel checks. Dissert. Abstr.

N82-14845 California Univ., Los Angeles.
FLOW CONTROL IN STORE-AND-FORWARD COMPUTER NETWORK Ph.D. Thesis
Chong-Wei Tseng 1981 109 p
Avail: Univ. Microfilms Order No. 8122871

The broad area of flow control and sequencing in computer communication networks was studied. A special case of message sequencing is shown to reduce a Markov process. An end-to-end flow control scheme is shown for use in computer communication networks that can be modeled as a closed network of queues.

A flow control scheme based on limiting the permit generation rates is also analyzed. This effective scheme involves essentially no computational complexity thus enabling measurement and adjustment of the network performance with little difficulty. The simplicity also allows incorporaton of more realistic aspects of network protocols such as piggy-back acknowledgement, time-out, and gate functions in analysis. Two simple but effective distributed dynamic flow control schemes are proposed and analyzed. With either of these two schemes, a network is shown to respond well to the dynamically changing environment. Dissert. Abstr.

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N82-14846# Naval Ocean Systems Center, San Diego, Calif.
C2 RELEVANCE OF SELECTED ARTIFICIAL INTELLIGENCE SYSTEMS. BRIEF EXAMINATION OF SEVERAL EXISTING AL SYSTEMS FOR USE IN FUTURE COMMAND AND CONTROL APPLICATIONS Interim Report, 1 Oct. 1980 - 30 Apr. 1981
R. J. Bechtel 7 Jul. 1981 26 p refs
(XF21241100)
(AD-A105876; NOSC/TR-706) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report provides a very brief examination of several existing artificial intelligence systems which have been judged to be worth further investigation for use in future command and control applications. It represents the current state of an ongoing process which began with a much longer list of artificial intelligence systems. Each system on the long list was given a very quick evaluation on scales measuring availability, applicability, and maturity. Within each broad category of artificial intelligence effort (e.g. natural language, inference) the highest ranking systems were selected for further examination. This is the result of that examination. Author (GRA)

N82-14847# Brown Univ., Providence, R. I. Center for Dynamical Systems.
NUMERICAL METHODS AND APPROXIMATION AND MODELLING PROBLEMS IN STOCHASTIC CONTROL THEORY Final Report, 1 Jul. 1980 - 30 Jun. 1981
Harold J. Kushner and Wendell H. Fleming 20 Aug. 1981 4 p
(Grant AF-AFOSR-3063-76; AF Proj. 2304)
(AD-A105490; AFOSR-81-0672TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report summarizes the results of research produced under this grant, and lists titles of papers produced. Author (GRA)

N82-14148# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil). Inst. de Pesquisas Espacias.
OPTIMAL LINEAR ESTIMATION AND SUBOPTIMAL NUMERICAL SOLUTIONS OF DYNAMICAL SYSTEMS CONTROL PROBLEMS
Atair Rios Neto and Luiz A. Waack Bambace *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 233-237 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

N82-14149# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
LINEAR PROGRAMMING AND SUBOPTIMAL SOLUTIONS OF DYNAMICAL SYSTEMS CONTROL PROBLEMS
Decio Castilho Ceballos and Atair Rios Neto *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 239-243 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-14848 California Univ., Santa Cruz.
NORMAL FORMS, VERSAL DEFORMATIONS AND QUADRATIC INTEGRALS OF LINEAR HAMILTONIAN SYSTEMS Ph.D. Thesis
Huseyin Kocak 1980 171 p
Avail: Univ. Microfilms Order No. 8123242

Equivalence classes of time independant, linear, real Hamiltonian systems can be identified, up to canonical transformations with the orbits of the adjoint action of the real symplectic group on its Lie albegra. A set of representatives, also called normal forms, for those orbits is given. Versal deformations of systems in normal form are constructed. Bifurcation diagrams of system in general position with small codimension are calculated. Also centralizers of elements of the real symplectic algebra are explicitly found. Finally, a proof of a theorem of Williamson is presented: any linear real Hamiltonian set of differential equations is completely integrable with quadratic integrals. Dissert. Abstr.

N82-14849*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
APPLICATION OF INTEGRATION ALGORITHMS IN A PARALLEL PROCESSING ENVIRONMENT FOR THE SIMULATION OF JET ENGINES
Susan M. Krosel and Edward J. Milner 1982 25 p refs To be presented at the 15th Ann. Simulation Symp., Tampa, Fla., 17-19 Mar. 1982
(NASA-TM-82746; E-1059) Avail: NTIS HC A02/MF A01 CSCL 12A

The application of Predictor corrector integration algorithms developed for the digital parallel processing environment are investigated. The algorithms are implemented and evaluated through the use of a software simulator which provides an approximate representation of the parallel processing hardware. Test cases which focus on the use of the algorithms are presented and a specific application using a linear model of a turbofan engine is considered. Results are presented showing the effects of integration step size and the number of processors on simulation accuracy. Real time performance, interprocessor communication, and algorithm startup are also discussed. B.W.

N82-14850# Wisconsin Univ. - Madison. Dept. of Computer Sciences.
BLOCK ITERATIVE METHODS FOR ELLIPTIC AND PARABOLIC DIFFERENCE EQUATIONS
Seymour V. Parter and Michael Steuerwalt (Los Alamos Scientific Lab.) Sep. 1981 45 p refs
(Contracts W-7405-eng-36; N00014-76-C-0341; NR Proj. 044-356)
(AD-A105898; CSTR-447; LA-UR-812576) Avail: NTIS HC A03/MF A01 CSCL 12/1

Direct iterative methods for solving the linear system $AX = Y$ split A into a difference $M-N$. By viewing N as a weak multiplication operator, the convergence rates of block direct iterative methods for elliptic and parabolic difference equations may be determined. The difference equations may arise from very general partial differential equations on general domains in m space dimensions. GRA

N82-14851# North Carolina Univ. at Chapel Hill.
COMPACT COVARIANCE OPERATORS
Charles R. Baker and Ian W. McKeague Aug. 1981 10 p refs
(Contract N00014-75-C-0491)
(AD-A105658) Avail: NTIS HC A02/MF A01 CSCL 12/1

The study of covariance operators is a major component in the theory of probability measures on Banach spaces. The covariance operators of a strong second-order measure is always compact however, the covariance operator of a weak second-order measure need not be compact. In this paper we first characterize series representations of covariance operators, and then give a set of necessary and sufficient conditions for a covariance operator to be compact. The classical Mercer's theorem can be obtained as an immediate corollary. These results are then applied to extend a result of Prohorov and Sazanov on relative compactness of probability measures from Hilbert space to Banach space. GRA

N82-14852# Florida Univ., Gainesville. Center for Mathematical System Theory.
RESEARCH IN APPLIED MATHEMATICS RELATED TO NONLINEAR SYSTEM THEORY Final Report, 10 Sep. 1977 - 31 Mar. 1981
R. E. Kalman Sep. 1981 16 p refs
(Contract DAAG29-80-C-0050; Grant DAAG29-77-G-0225)
(AD-A106091; ARO-15077.26-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

Special emphasis was given to the following areas: (1) Finite-dimensional linear system theory by algebraic methods: linear systems over a ring, algebraic methods in the study of feedback, polynomial methods for the study of linear systems, F mod G invariant subspaces; (2) Infinite-dimensional linear systems: realization theory of infinite-dimensional linear systems; (3) Nonlinear system theory: basic properties of polynomial (discrete-time) systems and their realization theory; and (4) Identification problems in economics; study of econometric model building. GRA

N82-14853# New Mexico Univ., Albuquerque. Dept. of Mathematics and Statistics.
RESEARCH IN PARTIAL DIFFERENTIAL EQUATIONS AND APPLICATIONS Final Report, 1 Mar. 1976 - 30 Jun. 1981
Alfred S. Carasso 30 Aug. 1981 7 p refs
(Grants DAAG29-76-G-0153; DAAG29-78-G-0091)
(AD-A105859; ARO-13355.5-M; ARO-15568.4-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

The research deals with the analysis and efficient computation of several ill-posed initial value problems, linear and nonlinear. These problems originate in digital image restoration, plasma compression by magnetic pistons, and heat transfer in gun barrels. The analyses and computational algorithms developed are closely tied to the contextual origin of each problem studied. Author (GRA)

N82-14854# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
MATHEMATICAL SOFTWARE FOR LINEAR CONTROL AND ESTIMATION THEORY Final Report, 10 Feb. 1979 - 9 May 1981
Virginia Klema 15 Sep. 1981 3 p
(Contract DAAG29-79-C-0031)
(AD-A106000; ARO-16257.3-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

The final report for the project, Mathematical Software for Linear Control and Estimation Theory, includes a list of publications, conference proceedings, and invited talks by the principal investigators. Emphasis throughout the project was placed on interdisciplinary work in control theory, numerical methods suitable for certain control problems and mathematical software to do the frequency response problem. Numerically stable methods were used, and portability of the mathematical software was stressed. Author (GRA)

N82-14855# University Coll. of Swansea (Wales). Dept. of Civil Engineering.
HIERARCHICAL FINITE ELEMENT APPROACHES ERROR ESTIMATES AND ADAPTIVE REFINEMENT
O. C. Zienkiewicz, D. W. Kelly, J. Gago, and I. Babuska (Maryland Univ.) Jul. 1981 36 p refs Presented at the Math. of Finite Elem. and Appl. MAFELAP 1981, Uxbridge, Engl., Apr. 1981 Sponsored in part by the Gulbenkian Foundation Lisbon and by Technical Univ. of Lisbon
(Contract N00014-77-C-0623)
(AD-A105899; C/R/382/81) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper is concerned with the identification of the discretization error in finite element solution and the definition of optimal refinement processes. The advantages and limitations of the hierarchical approach will be discussed and it will be shown how the intelligent enrichment of the finite element grid can be left to the computer if a capacity for a-posteriori error estimation exists within the finite element code. GRA

N82-14856# Maryland Univ., College Park. Computer Vision Lab.
FAST PARALLEL EXACT COMPUTATION OF THE GENERALIZED INVERSE AND RANK OF A MATRIX
E. V. Krishnamurthy Jul. 1981 10 p refs
(Grant AF-AFOSR-3271-77; AF Proj. 2304)
(AD-A105566; TR-1079; AFOSR-81-0659TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Based on the fast parallel matrix multiplication scheme of Krishnamurthy and Klette, O(log m) step algorithms using m matrix processors are described for the exact determination of the Moore-Penrose generalized inverse and the rank of an (MXM) matrix with integer entries. Author (GRA)

N82-14857# Naval Ship Research and Development Center, Bethesda, Md. Computation Mathematics/Logistics Dept.
OPTIMIZATION OF REINFORCEMENT FOR A CLASS OF OPENINGS IN PLATE STRUCTURES Interim Report, Oct. 1980 - Aug. 1981
Surendra K. Dhir Sep. 1981 21 p refs
(AD-A105718; DTNSRDC/CMLD-81-25) Avail: NTIS HC A02/MF A01 CSCL 12/1

A numerical/analytical procedure has been developed which yields the optimum amount of reinforcement for a given hole shape in a large elastic plate under prescribed boundary stresses. This procedure is based on determining the usual two complex potentials which describe the entire stress field, constructing the strain energy density function in terms of the unknown amount of reinforcement, integrating this function around the opening boundary, and finally minimizing this integral with respect to the reinforcement. The method is first developed for a general hole shape and then demonstrated in some detail for a circular and a square-like opening. Author (GRA)

N82-14858# Stanford Univ., Calif. Systems Optimization Lab.
ON THE RELATIONSHIP BETWEEN THE HAUSDORFF DISTANCE AND MATRIC DISTANCES OF ELLIPSOIDS
Alan J. Hoffman and Jean-Louis Goffin Aug. 1981 19 p refs
(Contracts N00014-75-C-0267; DE-AM03-76SF-00326; DE-AT03-76ER-72018; Grants NSF MSC-76-81259; NSF MCS-79-26009; NSF ECS-80-12974)
(AD-A105880; SU-SOL-81-10) Avail: NTIS HC A02/MF A01 CSCL 12/1

The space of ellipsoids may be metrized by the Hausdorff distance or by the sum of the distance between their centers and a distance between matrices. Various inequalities between metrices are established. It implies that the square root of positive semidefinite symmetric matrices satisfies a Lipschitz condition, with a constant which depends only on the dimension of the space. Author (GRA)

N82-14859# Stanford Univ., Calif. Systems Optimization Lab.
EXACT AND APPROXIMATION ALGORITHMS FOR A SCHEDULING PROBLEM
Gregory Dobson Jul. 1981 42 p refs
(Contracts N00014-75-C-0267; DE-AM03-76SF-00326; DE-AT03-76ER-72013; Grants NSF MCS-76-81259; NSF MCS-79-26009; NSF ECS-80-12974)
(AD-A105881; SU-SOL-81-9) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper discusses problems that arose in calendaring cases for an appellate court. The first problem is to distribute cases among panels of judges so as to equalize work loads. We give a worst case analysis of a heuristic for this NP-complete problem. For a given distribution denote by z the heaviest work load. We wish to minimize z. The ratio of the heuristic value z-bar to that of the true optimum z^* is shown to be z-bar/z^* < or = (k + 3)/(k + 2) where all the case weights in (0, (1/k)z^*), generalizing a result of Graham on multiprocessor scheduling. Under a restrictive assumption on the case weights, some generalizations of this scheduling problem are solved. Characterizations for feasible calendars and polynomial algorithms for finding these feasible solutions are given. Algorithms are given for choosing an optimal subset of the backlogged cases that can be calendered. Author (GRA)

N82-14860# Stanford Univ., Calif.

A FURTHER INVESTIGATION OF EFFICIENT HEURISTIC PROCEDURES FOR INTEGER LINEAR PROGRAMMING WITH AN INTERIOR

Frederick S. Hillier Aug. 1981 66 p
(Contract N00014-76-C-0418; Grant NSF MCS-76-81259)
(AD-A106027; SU-SOL-81-11) Avail: NTIS HC A04/MF A01 CSCL 12/1

Some heuristic procedures for seeking a good approximate solution of any pure integer linear programming problem are evaluated. It was found that the procedures are extremely efficient, being computationally feasible for problems having hundreds of variables and constraints. Furthermore, they proved to be very effective in identifying good solutions, often obtaining optimal ones. Thus, the procedures provide a way of dealing with the frequently encountered integer programming problems that are beyond the computational capability of existing algorithms. For smaller problems, they also provide an advanced start for accelerating certain primal algorithms, including the author's Bound-and-Scan algorithm and Faaland and Hillier's Accelerated Bound-and-Scan algorithm. In addition, Jeroslow and Smith have found that imbedding the first part of one of these procedures inside the iterative step of a branch-and-bound algorithm can greatly improve the latter's efficiency in locating solutions whose objective function value is within a specified percentage of that for the optimal solution. GRA

N82-14861# Stanford Univ., Calif. Systems Optimization Lab.

OPTIMIZATION OF UNCONSTRAINED FUNCTIONS WITH SPARSE HESSIAN MATRICES: QUASI-NEWTON METHODS

Mukund N. Thapa Aug. 1981 40 p refs
(Contracts N00014-75-C-0267; DE-AM03-76SF-00326; DE-AT03-76ER-72018; Grants NSF MCS-76-81259; NSF MCS-79-26009; NSF ECS-80-12974)
(AD-A106028; SU-SOL-81-12) Avail: NTIS HC A03/MF A01 CSCL 12/1

Newton-type methods and quasi-Newton methods have proven to be very successful in solving dense unconstrained optimization problems. Recently there has been considerable interest in extending these methods to solving large problems when the Hessian matrix has a known a priori sparsity pattern. This paper treats sparse quasi-Newton methods in a uniform fashion and shows the effect of loss of positive-definiteness in generating updates. These sparse quasi-Newton methods coupled with a modified Cholesky factorization to take into account the loss of positive-definiteness when solving the linear systems associated with these methods were tested on a large set of problems. The overall conclusions are that these methods perform poorly in general-the Hessian matrix becomes indefinite even close to the solution and superlinear convergence is not observed in practice. Author (GRA)

N82-14862# Ecole Nationale Superieure de Techniques Avancees, Paris (France).

LINEAR AND GEOMETRIC NONLINEAR ANALYSIS OF SHELLS BY AN ISOPARAMETRIC THREE DIMENSIONAL DEGENERATED ELEMENT Ph.D. Thesis [ANALYSE LINEAIRE ET NON LINEAIRE GEOMETRIQUE DES COQUES PAR ELEMENTS FINIS ISOPARAMETRIQUES TRIDIMENSIONNELS DEGENERES]

G. Fezans (Ecole Nationale Superieure de l'Aeronautique et de l'Espace) Jan. 1981 256 p refs In FRENCH; ENGLISH summary
(Rept-140) Avail: NTIS HC A12/MF A01

The performances of quadratic and cubic, Serendip and Lagrange elements with normal and reduced integration are compared through plate and shell examples. The performances of these elements in the analysis of thin structures and the problems of numerical conditioning induced by their utilization in this domain are emphasized. The geometric nonlinear formulation of the isoparametric threedimensional degenerated elements is presented. A total Lagrangian formulation was used. The nonlinear problem is solved by a modified Newton-Raphson method with incremental loading. Examples of highly nonlinear problems demonstrate the effectiveness of the element. Author (ESA)

N82-14863 California Univ., Los Angeles.

FLOATING-POINT ON-LINE ARITHMETIC FOR HIGHLY CONCURRENT DIGIT-SERIAL COMPUTATION: APPLICATION TO MESH PROBLEMS Ph.D. Thesis

Osaaki Watanuki 1981 165 p
Avail: Univ. Microfilms Order No. 8122880

Quasi-normalization, floating point algorithms for on-line arithmetic operations are presented. The properties of redundant number system in mantissa representation are studied and the range of redundant mantissa is derived by a method of error analysis. From the range of mantissa and the absolute error of on-line operations, the maximum relative representation error is defined and analyzed for redundant floating-point numbers. The developed floating point on-line algorithms were applied to a linear iterative method for solving the elliptic partial differential equations. It is shown that the bandwidth of the routing network of the array of processors is reduced by the digit serial computation using on-line arithmetic without degrading the performance. The performance is analyzed using speedup and effectiveness measures. Dissert. Abstr.

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-14864# Florida State Univ., Tallahassee. Dept. of Statistics

NEW ESTIMATION METHODS FOR LOG-LINEAR MODELS

Thomas C. Redman Aug. 1981 39 p refs
(Contracts N00014-76-C-0394; N00014-80-C-0093)
(AD-A105745; FSU-STATISTICS-M562; TR-151-ONR) Avail: NTIS HC A03/MF A01 CSCL 12/1

Two new methods for estimation of parameters in log-linear models are proposed and their properties considered in this article. Conditions for the existence of the new estimators are derived, and the new estimators are shown to possess appropriate asymptotic properties. GRA

N82-14865# Florida State Univ., Tallahassee. Dept. of Statistics.

PROPER BAYES MINIMAX ESTIMATORS FOR A MULTIVARIATE NORMAL MEAN WITH UNKNOWN COMMON VARIANCE UNDER A CONVEX LOSS FUNCTION

Pi-Erh Lin and Amany Mousa Sep. 1981 31 p refs
(Contract N00014-80-C-0093)
(AD-A105746; FSU-STATISTICS-M593; TR-155-ONR) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper considers the estimation of Mu relative to a convex loss function. Two classes of minimax estimators are obtained for the estimated Mu when p > or = 3; the first is a new result and the second is a generalization of a result of Strawderman. A proper Bayes estimator is also obtained which is shown to satisfy the conditions of the second class of minimax estimators. The paper concludes by discussing the estimation of Mu relative to another convex loss function. GRA

N82-14866# Princeton Univ., N. J. Dept. of Statistics.

SOME ADVANCE THOUGHTS ON THE DATA ANALYSIS INVOLVED IN CONFIGURAL POLYSAMPLING DIRECTED TOWARD HIGH PERFORMANCE ESTIMATES

John W. Tukey 16 Mar. 1981 20 p Prepared in cooperation with Bell Labs., Murray Hill, N.J.
(Contract DAAG29-79-C-0205)
(AD-A105906; TR-189-SER-2; ARO-16669.8-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

Using configural polysampling to identify high-performance estimates proceeds in two phases: (1) estimating the best compromise to make at each configuration polysampled, and (2) choosing a generally-defined estimate whose performance comes close to that of this estimated optimum. In the first

step, shadow pricing of the criteria for the difference situations involved is helpful. In the second step, whether one uses a regression or selection-by-sectors approach, or combine both, the same shadow prices are useful. This report sketches some of the approaches to the two steps that seem natural.
Author (GRA)

N82-14867# Princeton Univ., N. J. Dept. of Statistics.
KINDS OF POLYCONFIDENCE INTERVALS FOR CENTERS, AND SOME THOUGHTS ON IDENTIFICATION AND SELECTION OF CONFIDENCE PROCEDURES USING CONFIGURAL POLYSAMPLING
John W. Tukey 16 Apr. 1981 34 p Prepared jointly with Bell Telephone Labs., Murray Hill, N.J.
(Contract DAAG29-79-C-0205)
(AD-A105907; TR-190-SER-2; ARO-16669.9-M) Avail: NTIS HC A03/MF A01 CSCL 12/1

If we deal initially only with single situations, monoconfidence intervals can be either required only to be weak, to have proper confidence when averaged over all configurations, or to be strong, when they must have the appropriate properties conditionally for each configuration. Assuming location-and-scale invariance throughout both for situations and confidence intervals. When one considers a plot involving several situations, three kinds of polyconfidence intervals seem worth mention: (1) doubly-strong, whose properties hold separately for each combination of a situation and a configuration, (2) weak, whose properties hold on average for each situation, (3) singly strong, where the properties hold, first on average for each situation and, second, for each configuration and one situation. These notions, as well as that of balance in a conservative sense, are explored in the framework of configurations.
Author (GRA)

N82-14868# Princeton Univ., N. J. Dept. of Statistics.
SOME COMPUTATIONAL DETAILS OF CONFIGURAL SAMPLING METHODS
Katherine Bell and Daryl Pregibon 30 Mar. 1981 39 p
(Contract DAAG29-79-C-0205)
(AD-A105932; TR-191-SER-2; ARO-16669.10-M) Avail: NTIS HC A03/MF A01 CSCL 12/1

Numerical evaluation of the optimum estimate via configural sampling involves evaluation of several double integrals. These integrals represent expectations over a distribution conditioned on the observed configuration. Theoretically, any location-scale invariant definition of the configuration will suffice, though numerically, some choices are better than others. A related concern is the change-of-variables used to map the region of integration, originally the half-plane, onto a fixed region, such as the unit square. This report is of use to the reader both as a guide to the pitfalls and curiosities of the computations presently recommended.
Author (GRA)

N82-14869# Princeton Univ., N. J. Dept. of Statistics.
ASSESSING THE BEHAVIOR OF ROBUST ESTIMATES OF LOCATION IN SMALL SAMPLES: INTRODUCTION TO CONFIGURAL POLYSAMPLING
Daryl Pregibon and John W. Tukey Mar. 1981 16 p refs
(Contract DAAG29-79-C-0205)
(AD-A105956; TR-192-SER-2; ARO-16669.6-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

Configural polysampling offers an effective alternative to both usual Monte Carlo techniques and small sample asymptotics in studying and improving robust estimates. Attention here is restricted to location estimators that are location and scale invariant. The methods are applicable to both simple and compound sampling situations. Several possible aspects of such studies include: (a) the determination of the minimum attainable variance in each sampling situation, (b) the determination of the maximum attainable polyefficiency over several sampling situations, (c) the fine-tuning of robust estimates with the intent of increasing their polyefficiency for small n, and (d) the identification of data configurations where one can a priori expect poor performance with certain estimators.
Author (GRA)

N82-14870# Princeton Univ., N. J. Dept. of Statistics.
THE SECOND REPRESENTING FUNCTION FOR COMPOUND SITUATIONS
Andrew Bruce, Daryl Pregibon, and John W. Tukey 6 Mar. 1981 16 p refs
(Contract DAAG29-79-C-0205)
(AD-A105960; TR-186-SER-2; ARO-16669.7-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper provides a convenient method of computing the low-order moments of compound situation order statistics based on higher order representing function. The explicit derivation of the second representing function is given. The one-wild-Gaussian situation is used to illustrate the method. Tables of one-wild-Gaussian order-statistic moments are displayed for selected sample sizes.
GRA

N82-14871 Tennessee Univ., Knoxville.
A SIMPLIFIED APPROACH TO SPECTRUM ESTIMATION OF STOCHASTIC PROCESSES Ph.D. Thesis
Mukta Lal Kar 1981 113 p
Avail: Univ. Microfilms Order No. 8123164

A simple approach to spectrum estimation for randomly sampled data was investigated. This approach is based on the Fourier series and the method of modified least squares fit to estimate the Fourier coefficients. The estimator is algebraically very simple and produces an alias free spectrum if a sufficient number of data points are available. This is true even if the mean sampling rate is less than the Nyquist rate required for spectral computation when using equi-spaced data samples. Detailed statistical and error analysis are presented for the estimator. A statistical analysis shows the estimator to be asymptotically unbiased and consistent. Also, a number of simulation experiments were conducted using both computer generated data and the data acquired in practial laboratory setups. For some cases the same data were input to other algorithms for comparison. The experimental results verify the analytic solutions in the majority of the cases.
Dissert. Abstr.

N82-14872 Oklahoma State Univ., Stillwater.
ESTIMATION AND TESTING PROCEDURES FOR THE PARAMETERS OF THE NEGATIVE BINOMIAL DISTRIBUTION Ph.D. Thesis
Linda Jean Willson 1981 107 p
Avail: Univ. Microfilms Order No. 8123476

The parameterization of a negative binomial distribution was studied. Where Mu is the single unknown parameter, three sequential procedures designed to estimate Mu with a desired level of precision were developed: (1) estmating Mu with a specified coefficient of variation of the estimate 'C' (2) estimating Mu within a proportion 'p' of Mu with confidence 1 - alpha, and (3) estimating Mu within 'd' units with confidence 1 - alpha. A nonparameteric, sequential procedure is developed to estimate the mean with a specific coefficient of variation of the estimate 'C'. For the two-parameter negative binomial distribution, a multistage procedure for estimating 'k' is proposed and compared, by the use of simulation, with the methods of moments and maximum likelihood estimators. The weighted regression approach to estimation and testing for a common 'k' is investigated and compared with one based on the maximum likelihood estimator and the likelihood ratio test. There are indications that the likelihood-based procedure produces more precise estimates and has greater power than the weighted regression method.
Dissert. Abstr.

N82-14873 Oklahoma State Univ., Stillwater.
BAYESIAN FORECASTING FOR SWITCHING REGRESSION AND AUTOREGRESSIVE PROCESSES Ph.D. Thesis
Margaret Foster Land 1981 60 p
Avail: Univ. Microfilms Order No. 8123840

Bayesian predictive density for switching regression models and for autoregressive processes was developed and investigated. For the switching regression with variance known, switch point known, and vague priors, the resulting predictive density was a normal. If the switch point was unknown, then the predictive density was a mixture of normal densities. If the variance was unknown then the predictive density involved a univariate general density if the switch point was known and a mixture of general dencities if the switch point was unknown. For the linear model, all parameters unknown, and conjugate priors, the predictive density was a mixture of matrix densities. For an m-th autoregressive process with vague priors, the predictive density of the

next k future values was derived. This is the most general case.
Dissert. Abstr.

N82-14874 Tennessee Univ., Knoxville.
INFLUENCES ON FACTORIAL ACCURACY: A MONTE CARLO INVESTIGATION Ph.D. Thesis
Thomas Joseph Fahey, Jr. 1981 152 p
Avail: Univ. Microfilms Order No. 8123150

Twenty-seven population correlation matrices were randomly generated with specified numbers of factors, proportions of common variance, ratios of the numbers of variables to the numbers of factors. The correct numbers of factors in these 27 population correlation matrices were extracted via the principal axes factoring procedure using the true population communalities in the diagonals. The correct numbers of factors were rotated via the normalized Varimax procedure. Sixteen hundred and twenty sample correlation matrices with different ratios of observations per variable were randomly generated from the 27 population correlation matrices. Mean accuracy indices were compared via dependent sample tests for the conditions of overfactoring versus underfactoring. Results indicate that far fewer observations are needed than were previously throught, and that overfactoring is superior to underfactoring. When there are few factors, many variables, and a high proportion of common variance in the population, samples can be based on fewer observations than variables and still be highly replicable. Dissert. Abstr.

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis, and operations research.

N82-14875# University of Southern California, Los Angeles. Social Science Research Inst.
VALUE TREE ANALYSIS OF ENERGY SUPPLY ALTERNATIVES
William G. Stillwell, Detlof vonWinterfeldt, and Richard S. John Jun. 1981 41 p refs
(Contract MDA903-80-C-0194)
(AD-A105629; SSRI-81-2) Avail: NTIS HC A03/MF A01 CSCL 05/10

The use of value trees in multiattribute evaluations of energy supply alternatives was examined. A value tree relating general values and concerns to specific value relevant attributes was constructed to compare three energy options: nuclear, coal, and a combined geothermal and conservation package. Both hierarchical and non-hierarchical weighting procedures were used to rate the energy options. Several additive multiattribute models were constructed and compared with holistic rankings and ratings of the three options. Three basic findings were: (1) hierarchical weights were steeper than non-hierarchical weights; (2) groups identified by their holistic first choice showed substantial agreement in their assessment of attribute weights; (3) convergence of MAU model parameters resulted in a 'common model', consistent with holistic evaluations of the pro-conservation group, and generally inconsistent with those of the pro-nuclear group. This differential consistency between model composites and holistic evaluations is interpreted as a result of weight parameter distortions due to social desirability and a neglect to consider attribute value ranges when making weight judgments. Author

N82-14876# Maryland Univ., College Park. Dept. of Computer Science.
A FUNCTIONAL TECHNIQUE FOR DECOMPOSING THE COMPLEXITY OF REQUIREMENTS ANALYSIS
Pamela Zave Aug. 1981 25 p refs
(Contract F49620-80-C-0001; AF Proj. 2304)
(AD-A105517; AFOSR-81-0663TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

This paper is based on an 'operational' approach to requirements specification for embedded systems, in which a requirements specification is an executable model of the proposed system interacting with its environment. The operational model is described in terms of asynchronously interacting digital processes. This paper addresses directly the question: How can such specifications for complex systems be developed? The proposed technique exploits an identification of intuitively recognizable system functions with processes in the formal specification of that system, so that its process structure can be determined during early analysis. Since the formal language supports incremental development of a specification, one process at a time, the requirements analyst can then elaborate the requirements one function at a time. Since the elaboration of each function entails quite a number of decisions, significant decomposition of complexity is achieved. The technique is illustrated within the domain of process-control systems, but its extensibility to other applications is argued. The specifications produced are good with respect to several important criteria, including modifiability and representation of performance constraints. Author (GRA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

No abstracts in this category.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

No abstracts in this category.

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-14877 Defence Research Information Centre, Orpington (England).
NEAR AND FAR FIELD TECHNIQUES IN THE ANALYSIS OF NOISE GENERATION MECHANISMS. PART 1: LOCALIZATION LEVELS AND METHODS OF REPRESENTING SOURCE FIELDS, INTUITIVE INTRODUCTION TO NEAR FIELD ANTENNAE
L. Gaudriot and M. Mercusot Sep. 1981 34 p refs Transl. into ENGLISH of 'Tech. de champ proche et lointain pour l'anal. des mecanismes de creation du bruit. Premiere partie: Niveaux de localisation et modes de representation de champs sources; introduction intuitive aux antennes de champ proche' (france)
(DRIC-T-6338; BR80434) Copyright. Avail: Issuing Activity

A technique for analyzing acoustic fields, using double layer microphones, was developed. Near field antennas were used since they permit work in an externally noisy environment to the extent that the proximity effect favors the source being studied. They can also be mounted on mobile vehicles. Wave equations were solved for vibration waves at casing surfaces and for internal stress waves in machines. Good representations of the acoustic field at the source, and of the far field, are obtained.
Author (ESA)

N82-14878*# Aeronautical Research Associates of Princeton, Inc., N. J.
A STUDY OF THE VISCOUS DISSIPATION AND SURFACE LOADING ON A VIBRATING SURFACE Progress Report
John E. Yates Washington NASA Dec. 1981 51 p refs
(Contract NAS1-16365)
(NASA-CR-3499; ARAP-451) Avail: NTIS HC A04/MF A01 CSCL 20A

The energy dissipated by viscosity at the edge of a vibrating flat plate is calculated and compared to the radiated acoustic energy. A correction to the Kirchhoff integral estimate of the noise is derived. For Helmholtz number of order unity and smaller the dissipation can be comparable to or greater than the acoustic energy. A viscous compressible theory of the load distribution on a vibrating two dimensional body is developed. First it is shown that load calculations based on potential theory and the Newmann uniqueness condition (continuity of potential or pressure on the surface) are not in agreement with experiment or the more correct viscous theory. For a flat plate airfoil the eigensolution of potential theory is indeterminant while viscous theory yields a unique solution that has square root singularities at the edges. It is also shown that for compact surfaces the far field acoustics depend only on the magnitude of the eigensolutions of potential theoy and so will be uniquely determined by the viscous theory. It is suggested that the general viscous theory of vibrating surfaces with cross sectional geometry will lead to results in agreement with expermentally measured load distributions. Author

N82-14879*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPERIMENTAL STUDY OF NOISE REDUCTION FOR AN UNSTIFFENED CYLINDRICAL MODEL OF AN AIRPLANE FUSELAGE
Conrad M. Willis and Edward F. Daniels Dec. 1981 36 p refs
(NASA-TP-1964; L-14878) Avail: NTIS HC A03/MF A01 CSCL 20A

Noise reduction measurements were made for a simplified model of an airplane fuselage consisting of an unstiffened aluminum cylinder 0.5 m in diameter by 1.2 m long with a 1.6-mm-thick wall. Noise reduction was first measured with a reverberant field pink-noise load on the cylinder exterior. Next, noise reduction was measured by using a propeller to provide a more realistic noise load on the cylinder. Structural resonance frequencies and acoustic reverberation times for the cylinder interior volume were also measured. Comparison of data from the relatively simple test using reverberant-field noise with data from the more complex propeller-noise tests indicates some similarity in both the overall noise reduction and the spectral distribution. However, all of the test parameters investigated (propeller speed, blade pitch, and tip clearance) had some effect on the noise-reduction spectra. Thus, the amount of noise reduction achieved appears to be somewhat dependent upon the spectral and spatial characteristics of the flight conditions. Information is also presented on cylinder resonance frequencies, damping, and characteristics of propeller-noise loads. Author

N82-14880*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PREDICTION OF FLYOVER JET NOISE SPECTRA FROM STATIC TESTS
Ulf Michel and Alfons Michalke (Technische Univ., Berlin) Dec. 1981 27 p refs Presented at the 100th Meeting of the Acoust. Soc. of Am., Los Angeles, Nov. 1980
(NASA-TM-83219; L-14953) Avail: NTIS HC A03/MF A01 CSCL 20A

A scaling law is derived for predicting the flyover noise spectra of a single-stream shock-free circular jet from static experiments. The theory is based on the Lighthill approach to jet noise. Density terms are retained to include the effects of jet heating. The influence of flight on the turbulent flow field is considered by an experimentally supported similarity assumption. The resulting scaling laws for the difference between one-third-octave spectra and the overall sound pressure level compare very well with flyover experiments with a jet engine and with wind tunnel experiments with a heated model jet. Author

N82-14881*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MODE PROPAGATION IN NONUNIFORM CIRCULAR DUCTS WITH POTENTIAL FLOW
Y. C. Cho and K. U. Ingard (MIT) 1982 15 p refs Presented at the 20th Aerospace Sci. Conf., Orlando, Fla., 11-14 Jan. 1982
(NASA-TM-82776; E-1086; AIAA-Paper-82-0122) Avail: NTIS HC A02/MF A01 CSCL 20A

A previously reported closed form solution is expended to determine effects of isentropic mean flow on mode propagation in a slowly converging-diverging duct, a circular cosh duct. On the assumption of uniform steady fluid density, the mean flow increases the power transmission coefficient. The increase is directly related to the increase of the cutoff ratio at the duct throat. With the negligible transverse gradients of the steady fluid variables, the conversion from one mode to another is negligible, and the power transmission coefficient remains unchanged with the mean flow direction reversed. With a proper choice of frequency parameter, many different modes can be made subject to a single value of the power transmission loss. A systematic method to include the effects of the gradients of the steady fluid variables is also described. B.W.

N82-14882# SACLANT ASW Research Center, La Spezia (Italy).
VARIABILITY OF ACOUSTIC TRANSMISSIONS IN A SHALLOW WATER AREA
Erik Sevaldsen 1 May 1981 52 p refs
(AD-A103278; SACLANTCEN-SR-46) Avail: NTIS HC A04/MF A01 CSCL 20/1

A series of experiments on the variability of acoustic transmissions in a shallow water area is described. The variables considered are time (short period and seasons), frequency of transmission (1 to 6 kHz), and space (location and depth of source, depth of receiver). The variables are studied mainly in terms of transmission loss fluctuations and spreading in frequency and delay of phase coherent pulse signals. Short period transmission loss fluctuations were found to be within + or - dB of the mean, with some few significant exceptions in summer. Delay spreading (3 dB) was found to be rather small, mostly near 5 ms, because there was usually only one strong arrival/arrival cluster. The measured frequency spreading is classified in two groups, one showing very little spreading, delta f epsilon (0.05 to 0.1) Hz, the other showing much more spread, delta f > 1 Hz. This is interpreted as the result of internal wave action under the existing sound propagation conditions. Author

N82-14883# Naval Postgraduate School, Monterey, Calif.
ON THE DESIGN OF AN ACOUSTICALLY ISOLATING BUBBLE SCREEN FOR THE CARR INLET ACOUSTIC RANGE M.S. Thesis
Kenneth William Marr Jun. 1981 93 p refs
(AD-A105830) Avail: NTIS HC A05/MF A01 CSCL 20/1

The theoretical acoustic behavior of an underwater bubble screen is examined using Rayleigh reflection theory. A microcomputer model simulates the acoustic impedance mismatch at the interfaces of an ideal, bubble screen. A sensitivity analysis indicates that the angle of incidence of sound energy and the speed of sound in the layer are the most important screen properties for predicting the insulating capability of a bubble screen. Frequencies for which the screen thickness is an integral number of half wavelengths, the interference results in a reduced reflection coefficient and a corresponding increase in transmission through the screen. For a broad band spectrum wide enough to cover a number of such frequencies, the attenuation to be expected exceeds 10 dB only over about 90 percent of the spectrum. Author

N82-14884# Hydroacoustics, Inc., Rochester, N.Y.
DESIGN STUDY OF HYDROACOUSTIC IMPULSE SOURCE FOR DEEP TOWING, PHASE 2 Final Report
21 Sep. 1981 29 p
(Contract N00014-80-C-0357)
(AD-A106066; HA-115-81) Avail: NTIS HC A03/MF A01 CSCL 17/1

The results of the second phase of a design study of the DEEPSHOCK impulse sound source for use in a deepp-towed seismic profiling system are summarized. This phase of the program focused on the oil-backed impulse source identified in the first phase of the source development program. Included herein are a description of the source operation, a summary of the computer model and design interation task, a description of the source evolution, and a detailed description of the source with layout drawings and materials list. Author

N82-14885# Naval Ocean Systems Center, San Diego, Calif.
WAVE STRUCTURE DETECTION THROUGH TWO-DIMENSIONAL FILTERING Final Report, 1 Jul. - 30 Sep. 1980

C. Mirabile 10 Jan. 1981 26 p
(ZF11111003)
(AD-A105554; NOSC/TR-694) Avail: NTIS
HC A03/MF A01 CSCL 20/1

This report contains an analysis of the potential of using a noncoherent two dimensional filter technique to extract a ridge-like signal from a two dimensional surface. The two dimensional surface consists of the signal plus white Gaussian noise. It is demonstrated that the technique shows promise both in visual ridge detection and in automatic energy ratio detection. It is suggested that a more elegant form of the filter used here (complex coefficient) be used to further enhance the ridge-like signal structure. Author (GRA)

N82-14886# Naval Postgraduate School, Monterey, Calif.
THE EFFECT OF SCATTERING AND ABSORPTION ON NOISE FROM A CAVITATING NOISE SOURCE IN THE SUBSURFACE OCEAN LAYER M.S. Thesis
Yngvar Dag Tronstad Jun. 1981 177 p refs
(AD-A105758) Avail: NTIS HC A09/MF A01 CSCL 20/1

When investigating the detection performance of a passive homing torpedo used against shallow draft surface ships, certain environmental factors such as the rough sea surface and the bubble dominated inhomogeneous layer near the sea surface have to be considered. This thesis attempts to gain some insight into the behavior of a homing torpedo system during its critical attack phase, as well as getting some indications of the relative importance of the scattering mechanisms and the induced tactical limitations. An idealized propagation model was used as reference of comparison. For a given sea state and target speed the results stress the importance of low operating frequency as well as a high maximum turn rate. They also point to the importance of having a search depth below the bubble-dominated subsurface layer, and a variable speed capability during the torpedo's attack phase. Author (GRA)

N82-14887# Naval Postgraduate School, Monterey, Calif.
ACOUSTOOPTICAL SPECTRUM ANALYSIS MODELING M.S. Thesis, 1 Oct. 1980 - 30 Jun. 1981
Michael James Carmody Jun. 1981 115 p refs
(AD-A105866; NPS-62-18-033) Avail: NTIS
HC A06/MF A01 CSCL 20/1

A summary of Bragg deflection theory and various approaches to direct detection acoustooptic spectrum analysis (AOSA) modeling is presented. A suitable model is chosen and extended to include the effects of diffraction efficiency, transducer efficiency, irradiance profiles of incident laser illumination, aperture size of the Bragg cell, and the acoustic attenuation experienced by the acoustic wavetrain generated by the input r-f signal. A FORTRAN program is developed to model the AOSA and predict the output image plane intensity profiles. A second version of the program includes a time variable permitting dynamic simulation of the system response. Author (GRA)

N82-14888# Catholic Univ. of America, Washington, D.C. Dept. of Physics.
INTERIOR AND EXTERIOR RESONANCES IN ACOUSTIC SCATTERING. 1: SPHERICAL TARGETS. 2: TARGETS OF ARBITRARY SHAPE (T-MATRIX APPROACH) Interim Report, 1 Feb. - 30 Sep. 1981
G. C. Gaunaurd, E. Tanglis, H. Ueberall, and D. Brill (Naval Academy) 14 Sep. 1981 65 p refs Prepared in cooperation with Naval Surface Weapons Center, White Oak, Md.
(Contract N00014-76-C-0430; NR Proj. 384-914; RR011008001)
(AD-A105534) Avail: NTIS HC A04/MF A01 CSCL 20/1

Spherical targets. In acoustic scattering from elastic objects, resonances features appear in the returned echo at frequencies where the objects eigenfrequencies are located, which are explained by the excitation of interior creeping waves. Corresponding resonance terms may be split off from the total scattering amplitude, leaving behind an apparently nonresonant background amplitude. This is demonstrated here for scatterers of spherical geometry, and in the following companion paper also for scatterers or arbitrary geometry, using the T-matrix approach. For the case of near-impenetrable spheres, it is subsequently shown that the background amplitude can be split further into specularly reflected contributions, plus highly attenuated resonance terms which are explained by the excitation of exterior (Franz-type) creeping waves. The singularity structure of the scattering function is shown mathematically, using the R-matrix approach of Nuclear scattering theory, as that of a meromorphic function without any additional 'entire function' (as had been postulated by the Singularity Expansion Method). Author (GRA)

N82-14889# Pennsylvania State Univ., University Park. Applied Research Lab.
A SCATTERING FUNCTION APPROACH TO UNDERWATER ACOUSTIC DETECTION AND SIGNAL DESIGN Ph.D. Thesis
Lawrence J. Ziomek 7 Oct. 1981 300 p refs
(Contract N00024-79-C-6043)
(AD-A105593; ARL/PSU/TM-81-144) Avail: NTIS
HC A13/MF A01 CSCL 20/1

In this dissertation, the design of transmit and processing waveforms is used to maximize the signal-to-interference ratio (SIR) to improve the detectability of a doubly spread target return in the presence of volume and/or surface reverberation plus white Gaussian noise. The SIR is dependent upon target and reverberation scattering functions and the cross-ambiguity function of the transmit and processing waveforms. Volume reverberation, target, and surface reverberation scattering functions are derived. Volume reverberation is modelled as the spatially uncorrelated scattered field from randomly distributed point scatterers in deterministic plus random translational motion. A single scattering approximation is used and general, frequency dependent transmit and receive arrays are included in all derivations. The doubly spread target is modelled as a linear array of discrete highlights in deterministic translational motion. A target scattering function is obtained from the general bistatic volume reverberation scattering function by appropriately specifying the volume density function of the discrete point scatterers for a monostatic geometry. GRA

N82-14890# Naval Underwater Systems Center, New London, Conn. Surface Ship Sonar Dept.
THE EFFECT OF THE MID-ATLANTIC RIDGE ON LONG RANGE SOUND PROPAGATION
R. F. LaPlante, P. D. Koenigs, and D. G. Browning 1 Oct. 1981 16 p Presented at the 101st Meeting of the Acoust. Soc. of Am., Ottawa, 20 May 1981
(AD-A105747; NUSC-TD-6555) Avail: NTIS
HC A02/MF A01 CSCL 20/1

This document contains the oral and visual presentation given at the 101st Meeting of the Acoustical Society of America, 20 May 1981, Ottawa, Canada. Previous long range acoustic experiments show that the Mid-Atlantic Ridge, a major topographic feature rising to the deep sound channel axis can have a significant effect on SOFAR propagation. (R. J. Urick, J. Acoust. Soc. Am. 35(9), 1413, 1963.) In order to quantify this effect, data have been analyzed from a recent SOFAR experiment that deployed SUS charges during several transits across the Ridge. The signals were received on a hydrophone located near Bermuda, a distance of approximately 2500 km. These results are comapared with data from Atlantic seamounts of similar height and ridges in other oceans. (K. M. Guthrie, J. Acoust. Soc. Am., 68(S1), S52(A), 1980.) The enhancement or shadowing of SOFAR propagation is presented as a function of source depth and frequency for various geometries. Author (GRA)

N82-14891# Naval Underwater Systems Center, New London, Conn. Surface Ship Sonar Dept.
MEASUREMENTS OF THE LOW-FREQUENCY WIND-GENERATED AMBIENT NOISE IN THE DEEP OCEAN
R. W. Bannister, R. N. Denham, K. M. Guthrie, and D. G. Browning 1 Oct. 1981 15 p Presented at the 101st Meeting of the Acoust. Soc. Am., Ottawa, Canada, 21 May 1981
(AD-A105748; NUSC-TD-6565) Avail: NTIS
HC A02/MF A01 CSCL 20/1

This document presents the oral and visual presentation entitled 'Measurements of the Low-Frequency Wind-Generated Ambient Noise in the Deep Ocean,' presented at the 101st Meeting of the Acoustical Society of America, 21 May 1981, in Ottawa, Ontario, Canada. Southern Hemisphere oceans provide unique conditions for the measurements of low-frequency wind-generated ambient noise due to their relatively low shipping densities. Results (10-500 Hz) for a single location in the South Fiji Basin supported the two principal noise generation mechanisms that have been suggested: turbulence, bubbles and spray. For a given local wind speed, higher noise levels were observed than have been reported for the North Atlantic Ocean. This paper is an analysis of wind-generated noise data from additional sites throughout the Tasman Sea-Fiji Basin region. Variation in measured level is compared to wind speed, sea state, and propagation conditions. It appears that local wind speed is not an absolute indicator of wind generated ambient noise level. GRA

N82-14892# Naval Ship Research and Development Center, Bethesda, Md. Central Instrumentation Dept.
A DATA REDUCTION PROCEDURE FOR CAVITATION NOISE FROM AN OSCILLATING HYDROFOIL
Robert D. Pierce Jul. 1981 40 p refs
(AD-A105719; DTNSRDC/CID-81/2) Avail: NTIS HC A03/MF A01 CSCL 20/1

An improved computerized technique has been used to analyze nonstationary cavitation noise from an oscillating hydrofoil. Combined analog and digital signal processing procedures were developed that use ensemble averaging techniques to quantify the average sound pressure variance as a function of the foil's angle of attack. The averages provide a quantitative basis for comparing cavitation noise produced by this hydrofoil under a finite spectrum of specific test conditions. Author (GRA)

N82-14893 Purdue Univ., Lafayette, Ind.
ULTRASOUND CHARACTERIZATION OF DISTURBED FLOW PATTERNS Ph.D. Thesis
Lionel Joseph DLuna 1981 348 p
Avail: Univ. Microfilms Order No. 8123639

Techniques to observe flow patterns using pulsed RF Doppler ultrasound were investigated and experimental measurements on disturbed vortex shedding flows carried out. Vortex structure and the possible characteristics that are manifest in the Doppler signals were analyzed. It was found that the best geometry is to observe the flow pattern with the ultrasound beam normal to the flow direction. A realistic acoustic scattering model was developed from which the Doppler signals pertaining to a known Karman vortex velocity field are simulated. Experimental measurements were made on steady channel flows and the ability of the ultrasonic techniques to detect isolated vortices was determined. In vitro bio-fluid flows were studied under steady and pulsatile conditions. Stenosis sections of fifty percent and seventy-five percent occlusion were introduced into a tube flow and the flow patterns distal to the stenoses are measured. Dissert. Abstr.

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-14894 Temple Univ., Philadelphia, Pa.
NEUTRINO, MAXWELL AND SCALAR FIELDS IN CYLINDRICAL AND SPHERICAL RELATIVISTIC SPACES Ph.D. Thesis
David Frank Cattell 1981 226 p
Avail: Univ. Microfilms Order No 8124556

The quantum-mechanical theory of neutrino, Maxwell and zero-mass scalar fields treated as test fields in two different fixed background spacetimes representing respectively spatial cylindrical and spherical symmetries are discussed. The metrics for these spacetimes are exact solutions of the Einstein gravitational field equations. In the first case the background metrics is that of the static, cylindrically symmetric magnetic or plasm universe whose theory has been given by Melvin. In the second case the background metric is that of the Schwarzschild geometry external to an isolated spherically-symmetric source of gravity. An analogy between the plasm universe and a dielectric medium (or wave guide) is made for the case of electromagnetic waves (with m = o) traveling at an angle with respect to the plasm universe z-axis; these waves are shown to be transverse in the radiation zone. Dissert. Abstr.

N82-14895# Rochester Univ., N. Y. Dept. of Chemistry.
GORDON RESEARCH CONFERENCE ON MOLECULAR ENERGY TRANSFER Final Technical Report
Thomas F. George Jul. 1981 13 p Conf. held at Wolfeboro, N.H., 29 Jun. - 3 Jul., 1981; sponsored by Rhode Island Univ. (Grant AF-AFOSR-0173-81; AF Proj. 2303)
(AD-A105441; AFOSR-81-0640TR) Avail: NTIS HC A02/MF A01 CSCL 20/8

The 1981 Gordon Research Conference on Molecular Energy Transfer brought together an international group of both experimentalists and theorists working in a wide variety of topics in the gaseous, liquid and solid phases. State-of-the-art techniques were presented and analyzed, and the Conference was beneficial to all participants. Author (GRA)

N82-14896# Naval Postgraduate School, Monterey, Calif.
CERENKOV RADIATION PRODUCED BY 100 MeV ELECTRONS M.S. Thesis
David Earl McLaughlin Jun. 1981 49 p refs
(AD-A105864) Avail: NTIS HC A03/MF A01 CSCL 20/8

It is proposed that electromagnetic radiation of a specified frequency can be produced as a result of stimulated Cerenkov radiation in a dielectric resonator excited by a superluminal electron beam. The frequency generated is a function of three physical parameters. They are the electron energy, the thickness of the dielectric resonator and its index of refraction. This work provides a theoretical derivation for predicting the frequency of stimulated Cerenkov radiation in a dielectric slab. The first experimental results using extremely relativistic electrons are reported, and the problems encountered are outlined with some suggestions for improvements. The results of this validation show that the observed frequency differs from the predicted frequency by less than 1.5%. Incidental to the conduct of this experiment, ordinary Cerenkov radiation in the usual cone was observed in air at microwave frequencies. A possible application of the stimulated Cerenkov process as an electron beam monitor is briefly discussed. Author (GRA)

N82-14897# New York Univ., N. Y. Dept. of Physics.
THEORETICAL STUDIES RELATING TO THE INTERACTION OF RADIATION WITH MATTER: ATOMIC COLLISION PROCESSES OCCURRING IN THE PRESENCE OF RADIATION FIELDS Annual Report, 1 Aug. 1980 - 31 Jul. 1981
P. R. Berman 15 Sep. 1981 147 p refs
(Contract N00014-77-C-0553)
(AD-A105789; AR-4) Avail: NTIS HC A07/MF A01 CSCL 20/8

Work is reported in the areas of: Two-Level Atom and Radiation Pulse; Effects of Collisions on Atomic Coherences; Effects of Collisions on Zeeman Coherences; Collision Effects in Degenerate-Four-Wave-Mixing; and Dressed-Atom Picture in Laser Spectroscopy. Author (GRA)

N82-14898# California Univ., Livermore. Lawrence Livermore Lab.
SIMPLE MODEL OF BEAM TRANSPORT IN LOW-PRESSURE ION-FOCUSED REGIMES
R. J. Briggs 1 Sep. 1981 15 p refs
(Contracts W-7405-eng-48; N60921-81-LT-W0009; N60921-81-LT-W0026; DARPA Order 3718)
(DE82-000242; UCID-19187) Avail: NTIS HC A02/MF A01

A simple model of self-focused beam transport at very low gas pressures is presented. Fractional electric neutralization is incomplete and secondary electrons are expelled from the beam region. DOE

N82-14899# Georgia Inst. of Tech., Atlanta. School of Physics.
NUCLEAR STRUCTURE FROM RADIOACTIVE DECAY Annual Progress Report
J. L. Wood 30 Sep. 1981 13 p refs
(Contract DE-AS05-80ER-10599)
(DE82-000423; DOE/ER-10599/T1) Avail: NTIS HC A02/MF A01

The neutron-deficient nuclei around the Z = 82 shell closure is studied, with special emphasis on the levels of the odd-mass Pt, Au, Hq and Tl isotopes. The low-energy structural features of sequences of isotopes (and isotones) were examined over many adjacent mass numbers. This has a two-fold purpose. First, it enables one to build up a very complete picture of nuclear structure that connects the regions of stable nuclei (where, e.g., transfer reactions and Coulomb excitation permit the measurement of detailed spectroscopic properties) with regions far from stability, where detailed spectroscopic information is very limited. Second, it provides a map of the excitation degrees of freedom as a function of the changing proton and neutron number over broad mass regions. DOE

N82-14900# Teknekron, Inc., McLean, Va.
ENVIRONMENTAL READINESS DOCUMENT. ADVANCED ISOTOPE SEPARATION PROGRAM
Aug. 1981 56 p refs
(Contract DE-AC01-79EV-10292)
(DE81-029952; DOE/EP-0029) Avail: NTIS HC A04/MF A01

The uncertainties to be resolved through research development and those that constitute a limit on the confidence that can be placed in the conclusions are addressed. The conclusions are presented, giving the probabilities of an adverse finding resulting from further environmental research. The impacts and concerns are treated without reference to specific sites or location. The technology from which the environmental concerns emerge is described. Drawn from the technology program office and the Environmental Development plan for the Advanced Isotope Separation Program (AIS) is provided. The likelihood of adverse findings concerning the environmental acceptability of the technology, the problems and uncertainties stemming from current or anticipated environmental regulation, and the environmental and control considerations is examined. On this basis, an assessment is offered of the existing or potential barriers to commercialization. Environmental control research is discussed and associated costs are addressed. The impact of environmental-related costs on the cost of enriching uranium by the AIS techniques is also addressed. Current and possible new standards related to this technology are identified. Estimates of relative chemical hazards are provided. The feed and product associated with the current nuclear fuel cycle facilities and the changes that may be required by introduction of AIS into the enrichment enterprise are characterized. A glossary is included. DOE

N82-14901# Battelle Pacific Northwest Labs., Richland, Wash.
EFFECT OF ORGANIC COMPLEXANTS ON THE MOBILITY OF LOW-LEVEL WASTE RADIONUCLIDES IN SOILS: STATUS REPORT
J. L. Swanson Sep. 1981 33 p refs
(Contract DE-AC06-76RL-01830)
(DE81-030409; PNL-3927) Avail: NTIS HC A03/MF A01

The effects of some organic complexants on the sorption by soil of some elements typical of those present in low-level wastes are evaluated and procedures are developed to efficiently obtain valid sorption data. Data were obtained with Hanford soil and the elements europium, nickel, cobalt, cesium, and strontium. Complexants studied include: ethylenediaminetetraacetic acid (EDTA), diethylenetriaminepentaacetic acid (DTPA), and humic acid. The sorption of cesium and strontium was found to be affected very little by EDTA or DTPA. These complexants were found to greatly reduce the sorption of europium, nickel, or cobalt by the soil. The Eu/EDTA system was found to be well behaved, and the effect of the complexant on the sorption by soil was quantified. With nickel and cobalt kinetic problems were encountered, and the effects of complexants on the sorption by soil have not yet been quantified. DOE

N82-14902# Sandia Labs., Albuquerque, N. Mex.
TEMPERATURE DEPENDENCE OF H SATURATION AND ISOTOPE EXCHANGE
B. L. Doyle, W. R. Wampler, and D. K. Brice 1981 5 p refs
Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(DE-AC04-76DP-00789)
(DE81-026633; SAND-81-0291C; CONF-810831-34) Avail: NTIS HC A02/MF A01

The retention, release, and isotope exchange of ion implanted hydrogen and deuterium in carbon and TiC were investigated as a function of temperature. The implantations were performed both at room and elevated temperatures. In addition, samples implanted at room temperature were annealed isochronally to measure the thermal release of hydrogen. The results of the experiments indicate that both the saturation and isotopic exchange properties of hydrogen have significant temperature dependence. DOE

N82-14903# Brookhaven National Lab., Upton, N. Y. Dept. of Chemistry.
ELECTRON TRANSFER IN WEAKLY INTERACTING SYSTEMS
Norman Sutin and Bruce S. Brunschwig 1981 33 p refs
Presented at Symp. on Inorganic Reaction Mechanisms, Detroit, 10 Jun. 1981
(DE81-026134; BNL-29895; CONF-8106139-3) Avail: NTIS HC A03/MF A01

A recently proposed semiclassical model, in which an electronic transmission coefficient and a nuclear tunneling factor are introduced as corrections to the classical activated-complex expression, is described. The nuclear tunneling corrections are shown to be important only at low temperatures or when the electron transfer is very exothermic. By contrast, corrections for nonadiabaticity may be significant for most outer-sphere reactions of metal complexes. The rate constants for electron exchange reactions predicted by the semiclassical model are in very good agreement with the observed values. The implications of the model for optically-induced electron transfer in mixed-valence systems are noted. DOE

N82-14904 Stanford Univ., Calif.
DESIGN AND PERFORMANCE OF TIME-FREQUENCY-CODED SIGNALS FOR SPREAD-SPECTRUM SYSTEMS Ph.D. Thesis
Khiem Van Cai 1981 222 p
Avail: Univ. Microfilms Order No. 8123615

A fundamental problem in multiple-access communication systems employing spread-spectrum signals is that of designing a large set of signals that have uniformly small crosscorrelation properties. The uniformly small crosscorrelation property is necessary to permit the signals to be detected with matched filters and a threshold operation. The size of the signal set should be as large as possible in order that the greatest number of potential users, each having a uniquely assigned signal, can be accommodated by the system. Dissert. Abstr.

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-14905# Oak Ridge National Lab., Tenn. Engineering Physics Div.
REPRESENTATION OF THE NEUTRON CROSS SECTIONS OF SEVERAL FERTILE AND FISSILE NUCLEI IN THE RESONANCE REGIONS
G. deSaussure and R. B. Perez Sep. 1981 42 p refs
(Contract W-7405-eng-26)
(DE82-000504; ORNL/TM-7945; ENDF-312) Avail: NTIS HC A03/MF A01

Several problems related to the measurement, analysis and evaluation of the neutron cross sections of the main fertile and fissile nuclides in the resonance region are reviewed. In particular, the ENDF/B-V representation of these cross sections are discussed. In recent years little progress has been made in improving knowledge of the resolved resonance parameters of the fertile nuclei. It is suggested that this absence of progress is due to a lack of adequate methodologies to deal with the systematic errors arising from uncertainties in the analysis of the measurements. The ENDF/B treatment of the unresolved resonance is discussed, and the validation of the unresolved resonance range evaluations with appropriate transmission and self-indication measurements is recommended. DOE

N82-14906# California Univ., Livermore. Lawrence Livermore Lab.

ATA INJECTOR-GUN CALCULATIONS

A. C. Paul 3 Aug. 1981 54 p refs
(Contracts W-7405-eng-48; N60921-81-LT-W0009; N60921-81-LT-W0026; DARPA Order 3718)
(DE82-001149; UCID-19197) Avail: NTIS HC A04/MF A01

ATA is a pulsed, 50 ns 10 KA, 50 MeV linear induction electron accelerator at LLNL. The ETA could be used as an injector for ATA. However the possibility of building a new injector gun for ATA, raised the question as to what changes from the ETA gun in electrode dimensions or potentials, if any, should be considered. In this report the EBQ code results for the four electrode configurations are reviewed and an attempt is made to determine the geometrical scaling laws appropriate to these ETA type gun geometries. Comparison of these scaling laws will be made to ETA operation. The characteristic operating curves for these geometries will also be presented and the effect of washer position determined. It will be shown that emittance growth will impose a limitation on beam current for a given anode potential before the virtual cathode limit is reached. DOE

N82-14907# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

CHARACTERIZATION OF MATERIALS FOR WASTE-CANISTER COMPATIBILITY STUDIES

H. McCoy and J. E. Mack Oct. 1981 33 p refs
(Contract W-7405-eng-26)
(DE82-000902; ORNL/TM-7917) Avail: NTIS HC A03/MF A01

Sample materials of severn radioactive waste forms and fifteen canister materials were procured for compatability tests. A test capsule was designed for the tests in which disks of a single waste form were contacted with duplicate samples of canister materials under modest spring compression. The program involved long-term tests at 100 C and 300 C temperatures typical of storage, and tests at 800 C to simulate temperatures that might occur as a result of a fire in a transportation accident. DOE

N82-14908# Battelle Pacific Northwest Labs., Richland, Wash.

APPLICATION OF A SITE-BINDING, ELECTRICAL, DOUBLE-LAYER MODEL TO NUCLEAR WASTE DISPOSAL

J. F. Relyea and R. J. Silva Sep. 1981 28 p refs
(Contract DE-AC06-76RL-01830)
(DE81-030231; PNL-3898) Avail: NTIS HC A03/MF A01

A site-binding, electrical, double-layer adsorption model was applied to adsorption of Cs for both a montmorillonite clay and powdered SiO2. Agreement between experimental and predicted results indicates that Cs(+) is adsorbed by a simple cation-exchange mechanism. Further application of a combination equilibrium thermodynamic model and site-binding, electrical, double-layer adsorption model was made to predict the behavior of U(VI) in solutions contacting either the montmorillonite clay or powdered SIO2. Given the existing information about the probable U solution species, it was possible to determine that UO2(+2) is most likely adsorbed by cation-exchange at pH 5. At higher values (pH 7 and 9), it was shown that UO2(OH)2(0) is probably the most strongly adsorbed U solution species. It was also found that high NaCl solution concentrations at higher pH values lowered U concentrations. DOE

N82-14909# Battelle Pacific Northwest Labs., Richland, Wash.

BEHAVIOR OF RADIOACTIVE IODINE AND TECHNETIUM IN THE SPRAY CALCINATION OF HIGH-LEVEL WASTE

C. A. Knox and R. K. Farnsworth Aug. 1981 22 p refs
(Contract DE-AC06-76RL-01830)
(DE81-028405; PNL-3741) Avail: NTIS HC A02/MF A01

The Remote Laboratory-Scale Waste Treatment Facility (RLSWTF) was designed and built as a part of the High-Level Waste Immobilization Program (now the High-Level Waste Process Development Program) at the Pacific Northwest Laboratory. In facility, installed in a radiochemical cell, is described in which installed in a radiochemical cell is described in which small volumes of radioactive liquid wastes can be solidified, the process off gas can be analyzed, and the methods for decontaminating this off gas can be tested. During the spray calcination of commercial high-level liquid waste spiked with Tc-99 and I-131 and 31 wt% loss of I-131 past the sintered-metal filters. These filters and venturi scrubber were very efficient in removing particulates and Tc-99 from the the off-gas stream. Liquid scrubbers were not efficient in removing I-131 as 25% of the total lost went to the building off-gas system. Therefore, solid adsorbents are needed to remove iodine. For all future operations where iodine is present, a silver zeolite adsorber is to be used. DOE

N82-14910# Battelle Pacific Northwest Labs., Richland, Wash.

COMPARISON OF POTENTIAL RADIOLOGICAL CONSEQUENCES FROM A SPENT-FUEL REPOSITORY VERSUS NATURAL-URANIUM DEPOSITS

M. O. Cloninger and O. J. Wick Dec. 1980 15 p refs Presented at the ANS Waste Management Conf., Tucson, Ariz., 23-26 Feb. 1981
(Contract DE-AC06-76RL-01830)
(DE81-028232; PNL-SA-8881; CONF-810217-19) Avail: NTIS HC A02/MF A01

The long term hazard from spent fuel in a geologic repository is found to be comparable to that of a large ore deposit, although the specific nuclide concentration in an individual fuel element is not duplicated in nature. A repository constructed within reasonable constraints present no greater hazard than a large ore deposit. The natural hazard due to some observed radioactive releases to the biosphere in the United States far exceeds any that could reasonably be expected from a spent-fuel repository. Use natural ore deposits as a basis for criteria for nuclear waste repositories is so variable that it does not allow a specific criterion to be stated in absolute terms. If the naturally radioactive environment is to be used as a criterion for repositories, the radiological quality of the environment in the immediate region of a specific repository, and an acceptable potential increase in that radiological content due to the existence of the repository should be considered. M.D.K.

N82-14911# Sandia Labs., Albuquerque, N. Mex. Plasma Theory Div.

ELECTROMAGNETIC EFFECTS ON THE FORMATION OF POTENTIAL WELLS FOR ION ACCELERATION

J. W. Poukey Jul. 1981 18 p refs
(Contract DE-AC04-76DP-00789)
(DE81-028240; SAND-81-1637) Avail: NTIS HC A02/MF A01

The new 2-D electromagnetic particle code MAGIC was used to study the formation of potential wells with relativistic electron beams injected through a foil into a conducting cavity. The basic results are shown to agree with quasi-static work published 5 to 10 years ago. DOE

N82-14912# Oak Ridge National Lab., Tenn.

DESIGN STUDY FOR SUPERCONDUCTING MAIN FIELD COILS FOR THE OAK RIDGE ISOCHRONOUS CYCLOTRON

S. W. Schwenterly, P. S. Litherland, J. K. Ballou, R. L. Brown, W. A. Fietz, W. H. Gray, E. D. Hudson, R. S. Lord, M. S. Lubell, J. A. Martin et al 1981 8 p refs Presented at the 1981 Cryogenic Eng. Conf., San Diego, Calif., 10 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028066; CONF-810835-9) Avail: NTIS HC A02/MF A01

A design study to describe the feasibility of replacing the existing ORIC coils with superconducting magnets is described. The design is quite conservative, requires no usual technology, and should result in a coil system with good reliability and durability. The operating regime of ORIC will be considerably extended, and running costs should be reduced. A proposal to continue with detailed design and coil fabrication is currently under review and has been submitted to the Nuclear Science Advisory Committee. DOE

74 OPTICS

Includes light phenomena.

N82-14913 Defence Research Information Centre, Orpington (England).

THIRD ORDER ABERRATIONS OF CLASSICAL MIRROR LENSES WITH SPHERICAL SURFACES
Ludvik Canzek Aug. 1981 17 p refs Transl. into ENGLISH from Optik, West Germany, v. 57, no. 1, 1980 p 1-8
(DRIC-T-6359; BR80027) Copyright. Avail: Issuing Activity

The Seidel analysis of third order aberrations is proposed as an aid for correcting geometric aberrations. The Seidel aberrations are shown to be functions of the central obstruction only where the focal point coincides with the apex of the primary mirror. Catadioptric lenses are regarded, for correction purposes as classical mirror systems supplemented with lenses. This is illustrated by considering Newton, Cassegrain, and Swarzschild systems. The Swarzschild combination provides an exceptional means of correction and exhibits minimal zonal aberration.
Author (ESA)

N82-14914# Helsinki Univ. of Technology, Otaniemi (Finland). Dept. of Technical Physics.
STUDIES OF RESONANCE-LIGHT PRESSURE Ph.D. Thesis
Juha Javanainen 1980 23 p refs
(ISBN-951-45-2131-5) Avail: NTIS HC A02/MF A01

A Fokker-Planck equation for the projection of the atomic velocity distribution onto the wave vector direction of a plane wave of light is presented. The formula is also applied to the cooling of gases. The isotope separation by selective deflection of the desired isotope out of an atomic beam is investigated. The laser cooling of an ion trapped in a parabolic potential well, and the three dimensional problem of a trapped ion with an arbitrary direction of the incident laser beam are examined. The center of mass motion of the ion is analyzed in the representation of the harmonic oscillator eigenstates. The rate equations presuppose that either the intensity is low, or that the frequency of the mechanical oscillator exceeds the power broadened linewidth of the transition.
S.L.

N82-14915# Centre National de la Recherche Scientifique, Marseilles (France). Lab. d'Astronomie Spatiale.
FOC F/96 POLARIZERS
M. Saisse 17 Sep. 1980 103 p refs
Avail: NTIS HC A06/MF A01

Vacuum ultraviolet optical properties are studied. A MgF2 prism, useful as a polarizer or analyzer, is described. Applications of anomalous dispersion effects at short wavelengths for sapphire and MgF2 are discussed in relation to optical pumping and chromatography. For individual titles, see N82-14916 through N82-14917.

N82-14916*# Arizona Univ., Tucson. Lunar and Planetary Lab.
A POLARIZER FOR VACUUM ULTRAVIOLET
D. L. Steinmetz, W. G. Phillips, M. Wirick, and F. F. Forbes *In* CNES FOC F/96 Polarizers 17 Sep. 1980 4 p refs Repr. from Appl. Opt., v. 6, no. 6, Jun. 1967 p 1001-1004 Revised Sponsored by NASA (For primary document see N82-14915 05-74)
Avail: NTIS HC A06/MF A01 CSCL 20F

An MgF2 double Rochon prism, useful as a polarizer or analyzer in wavelengths longer than 1300A is described. Measurements of MgF2 transmission and of polarizer angular beam deviation from 1150 to 2900A are presented. The prism is comprised of 2.25 mm, MgF2 depolarizers, optically contacted. At normal incidence, a 4% transmission gain was measured from 6000 to 2200A, compared with air spaced elements. One depolarizer was vibrated to 40 g from 20 to 3500 Hz without deterioration in optical contact. Transmissions below 1400A are not good. In thin samples, surface loss is twice absorption loss in the range 1150 to 1500A. Refraction indices and a computer ray trace were used in processing photographic beam divergence data. If care is taken to remedy scattering effects, the prism is an efficient on-axis polarizer in the 1300 to 3000A range.
Author (ESA)

N82-14917# Centre National de la Recherche Scientifique, Bellevue (France). Lab. des Hautes Pressions.
ANOMALOUS DISPERSION OF BIREFRINGENCE OF SAPPHIRE AND MAGNESIUM FLUORIDE IN THE VACUUM ULTRAVIOLET
V. Chandrasekharan and H. Damany *In its* FOC F/96 Polarizers 17 Sep. 1980 5 p refs Repr. from Appl. Opt., v. 8, no. 3 Mar. 1969 p 671-675 (For primary document see N82-14915 05-74)
Avail: NTIS HC A06/MF A01

Previous measurements of the birefringence of sapphire and magnesium fluoride were extended to their respective limits of transparency, revealing anomalous dispersion effects at short wavelengths, e.g. a change of birefringence sign after passing through zero, in the case of MgF2. Applications of these effects are proposed. The stationary nature of retardation near lambda g, 1390A for MgF2 and 1555A for sapphire, is equivalent to achromatism which can be exploited over a limited domain of about 40A near lambda g. Near lambda 0, 1194 and 1426A, phase retardation change arises from the rapid variation of delta n, 0.0143 and 0.0130. The various orders are closely spaced, so relatively thin plates of MgF2 could be used as birefringent Lyot filters to study a weak line in the presence of a strong line from 1140 to 1250A. In optical pumping experiments on atomic hydrogen, a quarter wave MgF2 phase retarder is more practical than reflection by Al mirrors at 45 deg azimuth.
Author (ESA)

N82-14918# Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
DUST CLOUD MODELS: SENSITIVITY OF CALCULATED TRANSMITTANCES TO VARIATIONS IN INPUT PARAMETERS Final Report
Melvin G. Heaps Jun. 1981 57 p refs
(DA Proj. 1L1-601102-B-53-AB)
(AD-A103310; ERADCOM/ASL-TR-0090) Avail: NTIS HC A04/MF A01 CSCL 20/6

The modeling of the transmission of visible an infrared radiation through artillery produced dust clouds depends on several quantities, processes, and assumptions which are parameterized either as scaling laws and multiplicative factors or are specified directly as input values. Several parameters from the different phases of dust cloud transmission problems are varied within appropriate ranges. The more important parameters which can cause wide variations in the calculated transmittance are: the fraction of the actual crater mass remaining airborne, which affects the degree of obscuration; wind direction, which affects the position of the cloud with respect to the transmisssion line of sight; and the dust particle size distribution within the cloud, which affects the wavelength dependence of the obscuration.
Author

N82-14919# ITT Electro-Optical Products Div., Roanoke, Va.
MANUFACTURING METHODS AND TECHNOLOGY PROGRAM FOR RUGGEDIZED TACTICAL FIBER OPTIC CABLE Progress Report, Jul. 1980 - Mar. 1981
J. Smith and C. Hand Fort Monmouth, N.J. Army Communication Research and Development Command Apr. 1981 50 p
(Contract DAAK80-79-C-0789)
(AD-A105717; CORADCOM-79-0789-5; PR-5) Avail: NTIS HC A03/MF A01 CSCL 20/6

This report covers manufacturing methods and technology program for ruggedized tactical fiber optic cable. The scope of this effort, as reported herein, includes the following tasks and achievements: (a) Cable process optimization -- (1) Produce trial runs of confirmatory; (2) Complete lay length samples (two lays); (3) Perform optical and mechanical tests on trial confirmatory samples; and (4) Produce samples and evaluate polyurethanes (three types). (b) Use of facilities -- (1) Operate high speed strander, Kevlar braider, and extruder at production speeds. (c) Secondary performance -- (1) Evaluate low temperature performance.
GRA

N82-14920# Naval Postgraduate School, Monterey, Calif.
STUDY OF THE PERFORMANCE PARAMETERS OF A FLIR SYSTEM M.S. Thesis
Yong Bok Lee and Chang Hyun Park Jun. 1981 40 p refs
(AD-A105865) Avail: NTIS HC A03/MF A01 CSCL 17/5

The performance parameters of Detectivity and Noise Equivalent Temperature Difference for a Forward Looking Infra-Red (FLIR) system were measured after optimization of the system. The achieved performance approached the theoretically evaluated limiting values.
GRA

N82-14921# Farrand Optical Co., Inc., Valhalla, N.Y.
LOW COST, WIDE ANGLE INFINITY OPTICS VISUAL SYSTEM Final Report
Jose R. Magarinos, Daniel J. Coleman, and Ted Lenezowski Brooks AFB, Tex. Air Force Human Resources Lab. Sep. 1981 144 p
(Contract F33615-76-C-0055; AF Proj. 1958)
(AD-A105508; AFHRL-TR-80-54) Avail: NTIS HC A07/MF A01 CSCL 14/5

Holographic beamsplitter spherical mirrors have been introduced in the Pancake Window visual simulators as a low-cost and low-weight substitute for the classical glass beamsplitter spherical mirrors. The goal of this project was the production of a three-channel visual simulator consisting of a mosaic of three holographic Pancake Windows in which these beamsplitter spherical mirrors are used. The field of view of the complete display is 45 deg vertical and 140 deg horizontal and will be used to demonstrate a dynamic, unprogrammed visual simulation imagery generated by T.V. camera/model and gantry image generator. Prior to the production of the holograms, holographic research was carried out to investigate and resolve problems which have affected the quality and the repeatability of the final product. Specific attention was given to holographic ghost images which seriously impaired the contrast and the resolution of the images produced by the holographic Pancake Window and to the effects of environmental controls. The final production of the holographic beamsplitter was delayed by a stability problem in the wet cell used to support the holographic plate during the holographic exposure. The phosphors in the CRT displays were originally designed to be P-44 narrow band phosphors but were later changed to a wide-band emission phosphor. The reason for this was a wavelength peak response shift of the holograms with large field-of-view angles. The use of a wide-band phosphor, although it penalized the transmission of the holographic Pancake Window, required less stringent wavelength peak location in the manufacture of these holographic beamsplitter mirrors. GRA

N82-14922# Oak Ridge National Lab., Tenn. Instrument and Controls Div.
EVALUATION OF FIBER OPTICS FOR IN-LINE PHOTOMETRY IN HOSTILE ENVIRONMENTS
M. L. Bauer, D. A. Bostick, and J. E. Strain 1981 12 p refs Presented at the 25th Ann. Intern. Tech. Symp. and Exhibit of the Soc. of Photo-Opt. Instrumentation Engr., San Diego, Calif., 24-28 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028139; CONF-810810-21) Avail: NTIS HC A02/MF A01

Commercial fiber optics cables, both bundled and single-fiber, are evaluated for application in an in line photometer being developed for monitoring uranium and plutonium concentrations in high radiation environments in nuclear fuel reprocessing plants. The relative attenuation of the optical signals due to both the radiation damage and to the couplings between lengths of optical cable was determined for specimen cables. An ultraviolet enhanced fiber bundle demonstrated good radiation resistance to a total dose of one hundred million rads, which is the dose estimated to be received during a 1-y lifetime of the in cell portion of the photometer. The photometer is designed to use a single fiber optical cable with adequate radiation shielding. DOE

N82-14923# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
SUB-GAP AND BAND EDGE OPTICAL ABSORPTION IN A-Si:H BY PHOTOTHERMAL DEFLECTION SPECTROSCOPY
W. B. Jackson and Nabil M. Amer Jul. 1981 4 p refs Presented at the 9th Intern. Conf. on Amorphous and Liquid Semicond., Grenoble, France, 2-8 Jul. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-028040; LBL-13040; CONF-810719-2) Avail: NTIS HC A02/MF A01

Using photothermal deflection spectroscopy, the optical absorption of various a-Si:H films was investigated in the range of 2.1 to 0.6 eV. An absorption shoulder which depends on deposition conditions and on doping was found and was attributed to dangling bonds. The exponential edge broadens with increasing spin density. DOE

N82-14924# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 1: Physics.
STATISTICAL MEASUREMENT OF THE 1978 LIDAR MEASUREMENTS
C. W. Lamberts Nov. 1980 64 p refs Document includes a microfiche supplement
(Contract A78/KL/121)
(PHL-1980-41; TDCK-75026) Avail: NTIS HC A04/MF A01

Analysis for combined lidar aerosol and meteorological measurements are presented. The data are used for the remote deduction of atmospheric parameters. Analytical relations are based on statistics, not on physical laws. Results show that wind direction has an important influence on visibility, backscatter, and extinction. Extinction is difficult to calculate, especially when visibility is good, so a large range of measured extinction is shown. An increasing spread in backscatter is present at high visibility due to aerosol distribution properties. Aerosol properties can be deduced from meteorological and/or lidar measurement. Author (ESA)

N82-14153# European Space Operations Center, Darmstadt (West Germany).
A SIMPLE APPROACH TO SOLVE THE METEOSAT IMAGE DEFORMATION PROBLEM BASED ON HORIZON EXTRACTION FROM IMAGE DATA AND ORBIT INFORMATION
T. Wolff *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 293-298 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-14925# Naval Research Lab., Washington, D. C.
PLASMA CONDITIONS REQUIRED FOR ATTAINMENT OF MAXIMUM GAIN IN RESONANTLY PHOTO-PUMPED Al 12 AND Ne 9
J. P. Apruzese (Science Applications, Inc., McLean, Va.), J. Davis, and K. G. Whitney 9 Oct. 1981 25 p refs Sponsored in part by Defense Nuclear Agency
(AD-A105779; NRL-MR-4618) Avail: NTIS HC A02/MF A01 CSCL 20/9

We present a detailed analysis of the plasma conditions required to optimize gain in two proposed X-ray lasing schemes using resonant photo-pumping. In one proposed configuration, the Si XIII line 1s2-1s2p1P at 6.650 A pumps Al XII 1s2-1s3p1P at 6.635 A, inverting the Al XII n=3 and N=2 levels which are separated by 44 A. A similar approach which utilizes the Na X 1s2-1s2p1P line at 11.00 A to pump the Ne IX 1s2-1s4p 1P line at 11.001 A would invert the n=3 and n=2 levels of Ne IX, separated by 82 A. Conditions in the pumped neon and aluminum plasmas, and in the pumping silicon plasma, are calculated using a multistage, multilevel atomic model with multi-frequency radiation transport. Temperatures required to maximize gain in the pumped plasmas are found to be 50 eV and 100 eV, for neon and aluminum, respectively. Plasmas of lower temperature do not contain enough of the active ion species, whereas at higher temperatures the photon pumping of the upper levels results in excessive ionization from these levels to the hydrogen-like species. Finally, since the pumping silicon and pumped aluminum lines are slightly off resonance, we have investigated the effect of streaming the plasmas toward each other at various velocities to offset some or all of the wavelength difference. GRA

N82-14926# Naval Research Lab., Washington, D. C.
MIROWAVE ENERGY DEPOSITION, BREAKDOWN AND HEATING OF NITROGEN AND AIR
C. L. Yee (Mission Research Corp., Alexandria, Va.) and A. W. Ali 16 Oct. 1981 37 p refs
(WF34388501)
(AD-A105749; NRL-MR-4617) Avail: NTIS HC A03/MF A01 CSCL 09/3

A comprehensive code is developed for the microwave energy deposition in N2 to describe the breakdown and heating of nitrogen. The microwave absorption and reflection from a nitrogen plasma is based on wave optics. The ionization and the deionization of N2, however, is described in detail by an N2 chemistry code (CHEM-N2) which provides plasma diagnostics capabilities by calculating emission intensities of the second positive and the first negative band systems of N2 and N2+. The code is applied to breakdown calculations in N2 and the results are in reasonable accord with experimental data. The wave optics code for energy deposition is also coupled to an air chemistry code (CHMAIR) to describe the breakdown off a reflecting surface. An insight is provided into the plasma absorption by using a simple lab density profile for the electrons. This models roughly the profile expected in air breakdown off a reflecting surface. Simulation results show a steep localized electron density profile at the interference maximum. GRA

N82-14927# Universal Energy Systems, Inc., Dayton, Ohio.
INVESTIGATION OF PLASMA EXCITATION. VOLUME 1: ELECTRON IMPACT STUDIES OF SELECTED GROUND STATE AND EXCITED STATE RARE GAS ATOMS Final Report, 7 Jun. 1977 - 20 Sep. 1980
Max L. Lake Wright-Patterson AFB, Ohio AFWAL Aug. 1981 44 p refs 3 Vol.
(Contract F33615-77-C-3113; AF Proj. 2301)
(AD-A105494; AFWAL-TR-81-2082-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 20/4

Experiments were undertaken to determine electron impact cross sections of atoms in metastable states. One or two electron guns were used to first produce atoms in metastable states, then further excite these atoms to other levels. Limits on certain cross sections of helium atoms were obtained, but the detection limits of the apparatus prevented exhaustive study. Excitation functions and cross sections of xenon were obtained in the wavelength range from 3000 A to 9000 A. GRA

N82-14928# Universal Energy Systems, Inc., Dayton, Ohio.
INVESTIGATION OF PLASMA EXCITATION. VOLUME 2: MICROWAVE PLASMAS Final Report, 7 Jun. 1977 - 20 Sep. 1980
V. E. Merchant Wright-Patterson AFB, Ohio AFWAL Aug. 1981 109 p refs 3 Vol.
(Contract F33615-77-C-3113; AF Proj. 2301)
(AD-A105495; Rept-707-2-F; AFWAL-TR-81-2082-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 07/4

Two different commercially available microwave applications were used to excite plasmas in electrodeless discharge tubes. Plasmas in a variety of gases and gas mixtures were investigated, including mercury, mercury bromide, xenon and hydrogen chloride, thallium iodide and mercury, thallium iodide and xenon, and sulfur. Approximately 35% of the total emission from tubes containing mercury and metallic halide additives occurred in the ultra-violet (220-350 nm). However, extensive self-trapping occurred, and the emission was greatest in tubes with low partial pressures, about 100 Torr of the component materials. Pulsed discharges in mercury bromide produced emission from mercurous bromide, but the application of continuous microwave power resulted in total dissociation and the observed emission was due to atomic mercury. Pulsed microwave discharges in tubes containing xenon and hydrogen chloride resulted in emission from two bands of the xenon chloride excimer. No excimer emission was seen from discharge tubes containing xenon and thallium iodide, or mercury and thallium iodide. In both cases, the density of the volatile component could not be increased with the available equipment to the value necessary for excimer formation. Discharges in tubes containing sulfur resulted in emission from diatomic sulfur which extended from 280 nm to 500 nm. GRA

N82-14929# Universal Energy Systems, Inc., Dayton, Ohio.
INVESTIGATION OF PLASMA EXCITATION. VOLUME 3: ADVANCED OPTICAL DIAGNOSTICS OF PLASMAS Final Report, 7 Jun. 1977 - 20 Sep. 1980
C. A. DeJoseph Wright-Patterson AFB, Ohio AFWAL Aug. 1981 126 p refs 3 Vol.
(Contract F33615-77-C-3113; AF Proj. 2301)
(AD-A105496; Rept-707-3-F; AFWAL-TR-81-2082-Vol-3) Avail: NTIS HC A07/MF A01 CSCL 20/9

A fourier transform infrared spectrometer was used to identify infrared absorption spectra of impurities that might be present in carbon dioxide laser discharges. Spectral regions free from interference from the primary constituents and common impurities such as water vapor were identified for several of the nitrogen oxides, and the detection sensitivities were determined. This information was used in a study of impurity buildup during discharges in an electron-beam excited closed cycle (EBCC) system and in a TEA CO2 laser. It was found that after an hour of irradiation in the continuous EBCC system, the oxides of nitrogen had built up to the ten parts per mission range while the carbon monoxide concentration was of the order of a few hundred parts per million. When the initial gas mix contained oxygen, the concentration of carbon monoxide and the nitrogen oxides increased. The addition of hydrogen to an oxygen free gas mix was found to produce water vapor at about ten percent of the initial hydrogen concentration, increase the production of N2O and of CO, and decrease the production of NO and NO2. A technique has been developed for determining the rotational temperature and vibrational population distribution of non-homonuclear molecules under nonequilibrium conditions. The technique was applied to carbon monoxide under the conditions present in an electrical discharge. GRA

N82-14930# Oak Ridge National Lab., Tenn. Fusion Energy Div.
FIELD ERRORS IN EBT AND THEIR EFFECTS ON THE AMBIPOLAR POTENTIAL
T. Uckan, F. M. Bieniosek (Rensselaer Polytechnic Inst., Troy, N.Y.), and L. Solensten (Rensselaer Polytechnic Inst., Troy, N.Y.) Oct. 1981 36 p refs
(Contract W-7405-eng-26)
(DE82-000828; ORNL/TM-7912) Avail: NTIS HC A03/MF A01

Because the ELMO Bumpy Torus (EBT) is a closed field line device, it is very sensitive to small magnetic field asymmetries - field errors (RADICAL) B/B less than or equal to 1.5 x 10(+4)). Such field errors are unavoidable due to minute coil misalignments (0.25 mm) and the ubiquitous Earth's field (B approx. 5 x 10(+5) T). If the inherent error field of the device is large enough, it causes: (1) a distortion of the poloidal symmetry of the potential profile and even a total disappearance of the ambipolar potential well, leading in turn to a deterioration of the plasma confinement parameters; (2) the establishment of a toroidal current and, therefore, enhancement of fluctuations; and (3) an opening of the confined closed drift surfaces that increase particular diffusion. DOE

N82-14931# Oak Ridge National Lab., Tenn.
REVIEW OR RECENT EBT COUPLED RING-CORE STABILITY THEORY
D. A. Spong Oct. 1981 32 p refs
(Contract W-7405-eng-26)
(DE82-000880; ORNL/TM-8021) Avail: NTIS HC A03/MF A01

During the past several years Elmo Bumpy Torus (EBT) stability calculations have evolved with respect to treatment of ring-core plasma coupling effects. This evolution began with recognition of the important role of ring compressibility and paramagnetic effects on core beta limits. Since then, models have continued to increase in sophistication, incuding ring-core frequency coupling, velocity space and hot electron distribution function effects, and radially dependent models. Some of these features resulted in wide variations in predicted plasma performance limitations. A number of the models are reviewed and assumptions to which they are particularly sensitive are discussed. DOE

N82-14932# Columbia Univ., New York. School of Engineering and Applied Science.
DARK-GROUND ILLUMINATION: A QUANTITATIVE DIAGNOSTIC FOR PLASMA DENSITY Ph.D. Thesis
Stephen Frederick Paul 1981 175 p refs
(Contract DE-AS02-76ET-53016)
(DE82-000442; DOE/ET-53016/74) Avail: NTIS HC A08/MF A01

Radial electron density profiles of a toroidal belt pinch plasma were obtained by a single measurement. Collimated ruby laser light, incident on the plasma, is focused to a diffraction limited spot (100 (SIGMA)m). The technique, a variation of the dark-ground microscope, involves masking the center of the plasma diffraction pattern with a thin wire. Undiffracted light is blocked by a thin wire, whereas light diffracted by the plasma passes around the wire and onto a photoplate. The resulting interference generates a high contrast fringe pattern whose intensity varies as 1-cosine (RADICAL) phi, where (RADICAL) phi is the phase shift induced by the plasma. The fringes are recorded on Polaroid type 46L transparency film. Using this technique, radial density profiles of the plasma produced in the Columbia Torus 1 belt pinch have been measured. The plasma minor cross section is elliptical with a approx. 2 cm, Beta approx. 30 cm and < n(0) > approx. 3 x 10 to the 16th power/cu cm (3) . Average densities as low as 2 x 10 to the 15th power/cu cm (3) were measured. DOE

N82-14933# California Univ., Livermore. Lawrence Livermore Lab.
TANDEM-MIRROR TECHNOLOGY DEMONSTRATION FACILITY
T. Kenneth Fowler and B. Grant Logan 16 Sep. 1981 13 p ref
(Contract W-7405-eng-48)
(DE81-030878; UCID-19193) Avail: NTIS HC A02/MF A01

Preliminary calculations for a technology demonstration facility consisting of a tandem mirror machine are reported. This machine produces 12 MW of DT neutrons in steady state from a plasma column 0.08 m in radius and 8 m in length. Allowing space for neutral beam injectors at each end of the column, this permits testing of blanket modules and components at 1 MW/sq m neutron wall load over a cylindrical surface 8 sq m in area at a radius o 0.25 m; or irradiation of thousands of small samples at 2 MW/sq m at r = 0.125 m (4 sq m area). DOE

N82-14934# California Univ., Berkeley. Charged Particle Research Lab.
INVESTIGATION OF METHODS FOR FABRICATING, CHARACTERIZING AND TRANSPORTING CRYOGENIC INERTIAL-CONFINEMENT-FUSION TARGETS
James J. Fanning and Kyekydon Kim Jan. 1981 94 p refs
Prepared for California Univ., Berkeley Lawrence Berkeley Lab.
(Contract W-7405-eng-48)
(DE81-029737; UCRL-15360; Rept-1-81) Avail: NTIS HC A05/MF A01

A microprocessor-based data acquisition system was built that converts a complete target image to digital data, which are then analyzed by automated software procedures. The low temperatures required to freeze the hydrogen isotopes contained in a target is provided by a cryogenic cold chamber capable of attaining 15 K. A method for target manipulation and positioning is studied that employs molecular gas beams to levitate a target and an electrostatic quadrupole structure to provide for its lateral containment. Since the electrostatic target-positioning scheme requires that the targets be charged, preliminary investigation has been carried out for a target-charging mechanism based on ion-bombardment. DOE

N82-14935# Paris-Sud Univ., Orsay (France). Lab. de Physique des Plasmas.
STUDY OF METASTABLE STATES OF ATOMIC NITROGEN IN LUMINESCENT DISCHARGES [ETUDE DES ETATS METASTABLES DE L'AZOTE ATOMIQUE DANS DES DECHARGES LUMINESCENTES]
G. Cernogora Jan. 1981 202 p refs In FRENCH
(LP-185) Avail: NTIS HC A10/MF A01

For the first and second metastable states of nitrogen atoms, the diffusion coefficient and the coefficient of occurrence of these states due to electronic collisions were determined. The kinetic behavior of these metastable atoms was established by optical absorption measurement in the far UV. Results show that the coefficients of electronic excitations can be deduced from measurements of the concentration of these states in a luminescent discharge. The diffusion coefficient is found by analyzing the evolution of their concentration in a post-discharge. The saturation limit at which concentration of metastable states no longer increases with electron density is also identified. Author (ESA)

N82-14936# Centre National de la Recherche Scientifique, Meudon (France). Lab. d'Aerothermique.
A THERMODYNAMIC APPROACH TO METAL-PLASMA INTERACTION IN ONE-DIMENSIONAL STATIONARY EVOLUTION [UNE APPROCHE THERMODYNAMIQUE DE L'INTERACTION METAL-PLASMA EN EVOLUTION UNIDIMENSIONNELLE STATIONAIRE]
Roger PrudHomme and Michel Dudeck Jan. 1981 88 p refs In FRENCH
(Rept-81-1; Publ-638) Avail: NTIS HC A05/MF A01

The production of entropy and phenomenological relations in a thermally unstable plasma are discussed. Evolution of the plasma electric potential is described macroscopically. A metallic surface in the presence of heat transfer and electrical conduction is depicted one dimensionally. A system of difference equations was solved. Expressions for the characteristic equation near equilibrium and for the specific rates of adsorption and desorption in function of electron density, electron energy, and plasma flow are given. The significance of the coefficients of diffusion is pointed out. Author (ESA)

N82-14937# Paris-Sud Univ., Orsay (France). Lab. de Physique des Plasmas.
STUDY OF A DISCHARGE CAUSED BY A SURFACE WAVE [ETUDE D'UNE DECHARGE CREEE PAR UNE ONDE DE SURFACE]
M. Chaker, P. Nghiem, E. Bloyet, P. Leprince, and J. Marec May 1981 159 p refs In FRENCH
(LP-190) Avail: NTIS HC A08/MF A01

A plasma generation theory is elaborated which is based on surface wave propagation characteristics and the hypothesis that the energy absorbed from the wave is proportional to the number of electrons in the plasma, the proportionality factor being independent of the power. Experimentally, the validity of this hypothesis was verified in a rare gas cavity resonator. Direct application of this model makes possible calculation of the effective collision frequency for each experimental condition (excitation frequency). From the collision rate, the mean electron temperature is deduced, assuming a Maxwell distribution. An approximation of losses in the plasma is obtained. Author (ESA)

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

N82-14938# Helsinki Univ. of Technology, Otaniemi (Finland). Dept. of Mining and Metallurgy.
STUDIES OF VACANCY: TYPE DEFECTS IN METALS Ph.D. Thesis
Juhani Johansson 1981 27 p refs Sponsored in part by the Jenny and Antti Wihuri Foundation, the Eemil Aaltonen Foundation, the Finnish Cultural Foundation, CNRS and ACTIM
Avail: NTIS HC A03/MF A01

The positron annihilation technique was applied in studying the elementary properties of vacancies, vacancy interaction with impurities and vacancy clustering in metals on such an atomic scale that these phenomena are not detectable in the electron microscope. The vacancy migration temperature and some features of the vacancy-carbon interaction in iron, the vacancy properties and behavior of irradiated silver, the annealing behavior of electron irradiated chromium, and the quenched-in, irradiation induced and thermal vacancies in magnesium are considered. A.R.H.

N82-14939# Katholieke Universiteit, Nijmegen (Netherlands).
KINETICS STUDIES ON THE NUCLEATION AND GROWTH OF SILICON VIA CHEMICAL VAPOUR DEPOSITION Ph.D. Thesis
Wilhelmus Antonius Petrus Claassen 27 Feb. 1981 178 p refs
Avail: NTIS HC A09/MF A01

The grain size in polycrystalline silicon layers is subject to various external conditions among which the initial nucleation of silicon on the substrate may play a decisive role. This article describes experiments with silicon on SiO2 and Si3N4 substrates in the SiH4-HCl-H2 system for temperatures between 925 and 1200 C. The saturation cluster densities are determined as a function of gas phase composition and temperature and could be varied between 10 to the fourth power - 10 to the eleventh power per sq cm. The experimental results are compared with predictions of existing nucleation theories using analysis of the monomer silicon adatom concentration. In this way the nucleation can be described satisfactorily and approximate values for the size of the critical cluster can be derived. Author

N82-14940# EIC, Inc., Newton, Mass.
PHOTOELECTROCHEMICAL DEPOSITIONS OF MICROSCOPIC METAL FILM PATTERNS ON Si AND GaAs
Ronald H. Micheels, Allan D. Darrow, II, and R. David Rauh May 1981 18 p refs
(Contract N00014-79-C-0700; NR Proj. 359-723)
(AD-A099456; TR-2) Avail: NTIS HC A02/MF A01 CSCL 20/12

Microscopic metal film patterns were imaged on p-Si and n- and p-GaAs by photoelectrochemical deposition from standard aqueous plating solutions. The photodeposition of Cu, Ni, Pd and Au films was investigated. Resolution exceeding 10 microns was achieved for deposits on Au on p-GaAs and Cu on p-Si. Author

N82-14941# Indiana Univ. at Bloomington. Dept. of Chemistry.
CRYSTAL AND MOLECULAR STRUCTURE OF Mo6O10 (OPr (I))12: A SERPENTINE CHAIN OF MOLYBDENUM ATOMS AND OBSERVATION OF SEMIBRIDGING ALKOXY LIGANDS
Malcolm H. Chisholm, Kirsten Folting, John C. Huffman, and Charles C. Kirkpatrick 14 Oct. 1981 12 p refs Submitted for publication
(Contract N00014-79-C-0044)
(AD-A105769; TR-81-5) Avail: NTIS HC A02/MF A01 CSCL 20/2

Mo6O10(OPr(1)12, an intermediate in the reaction between Mo2 (OPr(1))6 and molecular oxygen which yields (MoO2 (OPr(1)) 2)n, has been structurally characterized and found to contain a serpentine chain of molybdenum atoms connected by bridging oxo and alkoxy ligands; there is also a pair of alkoxy ligands which are semibridging. GRA

N82-14942# Lincoln Lab., Mass. Inst. of Tech., Lexington.
AMORPHOUS-CRYSTALLINE BOUNDARY DYNAMICS IN LASER CRYSTALLIZATION
Herbert J. Zeiger, John Chin C. Fan, Barbara J. Palm, Ralph L. Chapman, and Ronald P. Gale 25 Aug. 1981 76 p refs
(Contract F19628-80-C-0002; AF Proj. 649L)
(AD-A105811; TR-558; ESD-TR-81-85) Avail: NTIS HC A05/MF A01 CSCL 20/5

Two theoretical descriptions have been developed for the phase boundary dynamics during crystallization of amorphous films by scanning with the slit image of a cw laser or of any cw energy beam. The first reduces the problem to the solution of a one-dimensional integral equation, which allows a choice of initial conditions. Depending on the background temperature, numerical solutions yield either periodic or runaway motion of the amorphous-crystalline (a-c) boundary, as observed in experiments on scanned laser crystallization of thin films of a-Ge on fused-silica substrates. The calculations give a semiquantitative fit to the experimental results for the spatial periodicity observed in the crystallized films as a function of background temperature. Profiles of film temperature as a function of distance from the laser image at successive times have been computed for both the periodic and runaway cases. The model qualitatively explains many of the effects observed during scanned cw laser crystallization, including periodic fluctuations in light emission. The second theoretical description is a more exact two-dimensional treatment, applicable only to cases of steady-state motion of the a-c boundary, which rigorously handles heat flow into the substrate. This treatment has been used to calculate the boundary velocity during steady-state runaway. GRA

N82-14943# Cornell Univ., Ithaca, N. Y. Materials Science Center.
POINT DEFECTS IN CRYSTALS (INCLUDING GROUPED DEFECTS)
David N. Seidman Aug. 1981 21 p refs
(Contract DE-AS02-76ER-03158)
(DE82-000395; DOE/ER-03158/97; MSC-4548) Avail: NTIS HC A02/MF A01

The fundamental properties of point defects, vacancies and self-interstitial atoms, in pure fcc and bcc metals is reviewed. Point defects created by both thermally-activated and irradiation processes are considered. The roles played by vacancies and self-interstitial atoms in thermal equilibrium are discussed and the best values of the enthalpy of formation of these point defects, in a number of metals, are given. Methods for obtaining fundamental properties of vacancies, such as activation volumes, mobilities, and binding enthalpies are discussed. Selected best values of mobilities and binding enthalpies of vacancies, as deduced from recovery experiments on a number of different quenched metals are listed. The problem of the production of single self-interstitial atoms and their configuration(s) is discussed. The clustering of single self-interstitials into small clusters is also considered. The physical origin of the extremely high low-temperature mobility of self-interstitials in the so-called Stage 1 recovery regime is also discussed. DOE

N82-14944# Cornell Univ., Ithaca, N. Y.
POINT-DEFECT SOURCES AND SINKS
D. N. Seidman Aug. 1981 9 p refs
(Contract DE-AS02-76ER-03158)
(DE82-000655; DOE/ER-03158/98) Avail: NTIS HC A02/MF A01

The role played by sources and sinks of point defects is of importance in understanding a wide range of physical phenomena. The problem of the efficiency (eta) of a sink (or sources) and its relatonship to the super (or sub) saturation of point defects which drives the process is considered. A qualitative discussion is given of the atomic mechanisms by which the following defects act as sources and sinks: (a) the free surface; (b) voids; (c) dislocation loops; and (d) grain boundaries. Examples of specific values of eta are given for different experimental situations. DOE

N82-14945# Oak Ridge National Lab., Tenn.
DAMAGE STRUCTURE IN NIMONIC PE16 ALLOY ION BOMBARDED TO HIGH DOSES AND GAS LEVELS
K. Farrell and N. H. Packan 1981 4 p refs Presented at the Fusion Reactor Materials Meeting, Seattle, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028562; CONF-810831-25) Avail: NTIS HC A02/MF A01

The Nimonic PE16 alloy in solution-treated-and-aged condition was bombarded simultaneously with nickel ions and alpha and deuteron beams at 625 C to doses of 80 to 313 dpa at He/dpa - 10 and D/dpa = 25. Microstructural changes consisted of the introduction of dislocations and of cavities, and the redistribution of gamma prime precipitates to these defects. Cavitational swelling remained below 1%. Cavities were represented by several distinct size classes, the smaller ones believed to be gas bubbles, and some larger ones associated with preferred growth of precipitate. Formation of bubbles at grain boundaries, and large cavities at incoherent twins intensified the possibility of mechanical separation of interfaces under high-gas irradiation conditions. DOE

N82-14946# Los Alamos Scientific Lab., N. Mex.
RELAXATION EFFECTS IN SHOCK-INDUCED TRANSITIONS IN BISMUTH
T. R. Neal 1981 6 p refs Presented at the 8th AIRAPT Conf. and 19th EHPRG Conf., Uppsala, 17 Aug. 1981
(Contract W-7405-eng-36)
(DE81-028728; LA-UR-81-2338; CONF-810827-6) Avail: NTIS HC A02/MF A01

The baratol experiments indicate that as the shock in the mixed region progresses and decays, the lead state does not change along a stable Hugoniot but appears to change from a sort of metastable Hugoniot, in accordance with Romain's data, to a stable Hugoniot reminiscent of the earlier results. If this is so, then the Bi I-III transition is exhibiting a relaxation effect similar to that seen in the Sb I-III transition. The transition detected by Romain could then be interpreted as the II-III transition seen in the metastable region. The few experiments outlined here merely hint at an explanation. Additional precision work in the stress range 6 to 10 GPa, some with thin samples, is needed to resolve this behavior. DOE

N82-14947# Sandia Labs., Albuquerque, N. Mex.
ION-IMPLANTATION EFFECTS IN GLASSES
G. W. Arnold 1981 37 p refs Presented at the Intern. Conf. on Radiation Effects in Glasses, Arco, Italy, 30 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-027208; SAND-81-0819C; CONF-8106132-1) Avail: NTIS HC A03/MF A01

Ion implantation can be used to introduce network damage and to alter the chemical composition in glasses. Structural changes can be inferred from IR measurements near 1000 per cm and by optical absorption near 2150 A. Implantation induced damage decreases the implanted volume in fused silica with consequent changes in the refractive index, near-surface hardness, and surface tensile stress. Prior work in these areas is reviewed. Implantation into alkali silicate glasses depletes the alkali content in the implanted region. These changes allow preferential surface crystallization in Li2O 2SiO2 glasses. Crystallization of amorphous SiO2 can be induced by implantation of Li. Insight into the crystallization process is obtained by observing the associated ion movement using elastic recoil detection and optical techniques. Results are of interest to studies of corrosion in glasses considered for nuclear waste encapsulation and for components in fusion reactors. DOE

N82-14948# Wacker-Chemie G.m.b.H. Burghausen (West Germany). Bereich GA.
RESEARCH AND DEVELOPMENT ON TECHNOLOGIES FOR THE PREPARATION OF III-V SEMICONDUCTOR MATERIALS AND ON METHODS FOR EVALUATION OF THE QUALITY OF THESE MATERIALS: PRODUCTION OF GALLIUM PHOSPHIDE CRYSTALS Final Report
Michael Blaette Bonn Bundesministerium fuer Forschung und Technologie Mar. 1981 28 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technol.
(BMFT-FB-T-81-021; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5.70

Methods for economic synthesis and crystal growth of gallium phosphide were developed. Polycrystalline ingots up to 800 gr of the dense and homogeneous quality necessary for crystal growth are currently produced with very good yield. The conditions for high pressure crystal growth by the liquid encapsulation technique were thoroughly investigated and optimized in a manner that permits industrial production of substrate quality crystals with a weight of 700 grams and a diameter of 50 mm. Diameter variations, common in the growth of GaP crystals, can be reduced to a few millimeters by a monitoring system based on crystal weighing. Author (ESA)

N82-14949# Wacker-Chemie G.m.b.H. Burghausen (West Germany). Bereich GA.
RESEARCH AND DEVELOPMENT ON TECHNOLOGIES FOR THE PREPARATION OF III-V SEMICONDUCTOR MATERIALS AND ON METHODS FOR EVALUATION OF THE QUALITY OF THESE MATERIALS: GALLIUM ARSENIDE CRYSTALS, CRUCIBLE PULLING OF Ga As CRYSTALS Final Report
Michael Blaette Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 38 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-022; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7.80

The economic synthesis of the polycrystalline starting material was investigated. For the industrial production of gallium arsenide crystals, which are used as substrates for the epitaxial growth of basic material for light emitting diodes, the Czochralski liquid encapsulation technique was developed. After preliminary experiments in a small puller, the parameters for crystal growth were tested and optimized in pulling equipment which was specially constructed for this purpose. Methods for diameter control were tested as well. By means of production scale pulling of crystals with a diameter of 50 mm and a weight of 1.4 kg with dislocation densities of 50,000/sq. cm the objective was fully achieved. Author (ESA)

N82-14950# Wacker-Chemie G.m.b.H. Burghausen (West Germany). Bereich GA.
RESEARCH AND DEVELOPMENT ON TECHNOLOGIES FOR THE PREPARATION OF III-V SEMICONDUCTOR MATERIALS AND ON METHODS FOR EVALUATION OF THE QUALITY OF THESE MATERIALS: GALLIUM ARSENIDE CRYSTALS, GRADIENT FREEZE CRYSTAL GROWTH AND MEASUREMENT TECHNIQUES Final Report
Franz Kuhn-Kuhnenfeld Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 75 p refs Partly in GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-023; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15.50

A gradient freeze technique was developed for the growth of GaAs crystals with low dislocation densities in closed quartz containers, using directional solidification. Such GaAs substrates are required for the manufacture of infrared light emitting diodes and other III-V devices. Crystal size (up to 1kg) and quality (crystal densities from 1000 to 10,000 cm E-2) are in accordance with present market requirements. The electrical parameters of III-V materials were determined by the van der Pauw method, and also by an eddy current method. Crystal perfection was evaluated by selective photoetching and chemical etching in H2SO4-H2O2-HF solution. Photoluminescense and photoelasticity measurements were also conducted on the III-V-materials. Author (ESA)

N82-14951# Max-Planck-Institut fuer Festkoerperforschung, Stuttgart (West Germany).
PREPARATION OF GaAs/AlxGa1-XAs MULTILAYER STRUCTURES WITH PREDETERMINED OPTICAL AND ELECTRICAL PROPERTIES BY MOLECULAR BEAM EPITAXY Final Report, Jun. 1980
Klaus Ploog and Albrecht Fischer Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 68 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-042; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14.30

Semiconductor structures of GaAs-AlAs multilayers were developed for fundamental research microwave technology and optoelectronics applications. Measuring and evaluation procedures for molecular beam epitaxy (MBE) layers and semiconductor diodes were elaborated. Two semiconductor structures were studied: (1) periodic p/n doping multilayer structures ('nipi' structures) in GaAs consisting of a periodic sequence of ultrathin alternating p and n-doped GaAs layers, possibly with intrinsic (i-) layers in between, and (2) one-sided abrupt GaAs/n+-AlXgAl-XAs heterostructures producing two-dimensional carrier confinement and enhanced mobilities at the interface. The method performs better than previous MBE technologies. Author (ESA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

N82-14952 California Univ., Los Angeles.
CALCULATIONAL ASPECTS OF QUANTUM GRAVITY Ph.D. Thesis
Walter Mark Wilcox 1981 174 p

Avail: Univ. Microfilms Order No. 8122886

Weak field gravitational effects in the context of Schwinger's Source Theory are investigated. The first type of calculation considered is particle scattering from a weak, immoblie gravitational scattering center. Physical cross sections for scalar, vector (including photon) and graviton scattering from the weak source are developed. Next, gravitational scattering events between identical and nonidentical scalar particles are considered. The last cross section derived is for scalar-graviton scattering. Quantum gravitational corrections to physical processes are begun by calculating the first order correction to the photon propagation function. A series of causal calculations, aimed at isolating the gravitational contribution to the electron (or muon or tau) magnetic moment is then described. The regularization method used to carry out the last calculation is shown to respect the gravitational and electromagnetic gauge invariances. Dissert. Abstr.

N82-14953# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Res. Div.

THERMODYNAMICS OF ELECTROLYTE SOLUTIONS OVER THE ENTIRE MISCIBILITY RANGE

Kenneth S. Pitzer Mar. 1981 9 p refs Presented at 2nd World Congr. of Chem. Engr., Thermodyn. of Electrolytes Session, Montreal, 4-8 Oct. 1981
(Contract W-7405-eng-48)
(LBL-12377; CONF-811007-1) Avail: NTIS HC A02/MF A01

It is shown that the properties of fully ionized aqueous electrolyte systems can be represented by relatively simple equations over wide ranges of composition. There are only a few systems for which data are available over the full range to fused salt. A simple equation commonly used for nonelectrolytes fits the measured vapor pressure of water reasonably well and further refinements are clearly possible. Over the somewhat more limited composition range up to saturation of typical salts such as NaCl, the equations representing thermodynamic properties with a Debye-Hueckel term plus second and third virial coefficients are very successful and these coefficients are known for nearly 300 electrolytes at room temperature. These same equations effectively predict the properties of mixed electrolytes. DOE

N82-14954 Oregon Univ., Eugene.

PHENOMENOLOGICAL APPLICATIONS OF PERTURBATIVE QUANTUM CHROMODYNAMICS Ph.D. Thesis

Muhammad Sajjad Z. Zahir 1981 172 p
Avail: Univ. Microfilms Order No. 8123604

Topics in high energy particle physics, each of which is a case of theoretical and phenomenological application of perturbative quantum chromodynamics, are investigated. The first topic is the structure of nucleons as probed in deep inelastic lepton nucleon scattering. The structure functions of the nucleon are analyzed in the framework of the valon model in which a nucleon is assumed to be a bound state of three valence quark clusters (valons). In the second topic, the production of massive dimuons at large transverse momentum in Drell-Yan process where it is believed that the dimuons acquire large transverse momentum through the emission of absorption of hard gluons is studied. The third topic discusses how high energy photons can replace hadrons in a new lepton pair production process. Dissert. Abstr.

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N82-14955*# National Aeronautics and Space Administration, Washington, D. C.

ORDERS OF MAGNITUDE: A HISTORY OF NACA AND NASA, 1915 - 1980

Frank W. Anderson, Jr. 1981 113 p refs
(NASA-SP-4403) Avail: NTIS MF A01; HC SOD $4.75 CSCL 05D

The history of NACA and NASA from 1915 to 1980 is narrated. The impact of two world wars on aeronautics is reviewed. Research activity before and during World War II is presented. Postwar exploitation of new technologies is summarized. The creation of NASA and a comprehensive space program is discussed. Long range planning for a lunar mission is described. The Gemini project is reviewed. The Apollo project and side effects includng NASA's university and technology transfer programs are presented. Numerous scientific and application satellite projects are reviewed. The impact of budget reductions is explained. The value of space exploration is emphasized. Development of the Space Shuttle is reported. N.W.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-14956# University of Southern California, Los Angeles. Social Science Research Inst.

RELIABILITY VS. DIAGNOSTICITY IN HIERARCHICAL INFERENCE

Gregory M. Griffin and Ward Edwards Jun. 1981 32 p refs
Sponsored in part by Decisions and Designs, Inc.
(Contract MDA903-80-C-0194)
(AD-A105628; SSRI-81-3) Avail: NTIS HC A03/MF A01 CSCL 05/1

This study examined the performance of subjects in a cascaded inference task where two subjects worked together, one subject having diagnosticity information and the other having reliability information. This was compared to a condition in which a single subject received both types of information. Additionally, the effects of different 'experts' having the power to make the final decision in the two-person conditions was explored. Seventy-two subjects made inferences about the probability of success vs. failure of hypothetical job applicants presented in a personnel manager scenario. Subjects were paid bonuses according to their performance on the task. Contrary to hypotheses, there were no between conditions differences. Single subjects performed just as well as subjects working together. This study replicates previous work using single subjects in the general pattern of responses: subjects were somewhat radical in comparison to the normative model. GRA

N82-14957# Stanford Univ., Calif. Center for Materials Research.

MATERIALS RESEARCH AT STANFORD UNIVERSITY Annual Report, 1 Jul. 1980 - 30 Jun. 1981

Jul. 1981 475 p refs
(Grant NSF DMR-77-24222)
(AD-A106108; CMR-81-7; AR-20) Avail: NTIS HC A20/MF A01 CSCL 05/1

This Twentieth Annual Report includes the total research activity related to the science of materials at Stanford University during the period July 1, 1980 through June 30, 1981. It contains brief descriptions of research programs active during this period. The report of the research programs is organized into two groupings: (1) the research programs of CMR Members who have participated in one of the five major Thrust group programs supported by the NSF-MRL block grant including their work on the Thrust program and other related research, and (2) individual research programs; when appropriate, members are included in both the Thrust and individual programs. As indicated in their descriptions, some of the research programs were supported by private sources. GRA

N82-14958# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

[AEROSPACE RESEARCH ACTIVITIES] Annual Report, 1980

1981 238 p refs
Avail: NTIS HC A11/MF A01

The activities of the ONERA in 1980 are reported. Research is reported in: fluid mechanics; aerodynamics; wind tunnel tests; structural design; engine design; measurement techniques; light alloys and composites; integrated systems; and control techniques. Author (ESA)

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N82-14959# Comptroller General of the United States, Washington, D.C.

MILLIONS WASTED TRYING TO DEVELOP MAJOR ENERGY INFORMATION SYSTEM Report to the Congress

15 May 1981 81 p refs
(AFMD-81-40) Avail: NTIS HC A05/MF A01

A Federal energy information system created to improve Federal and State energy regulation by providing computerized access to current energy data is reviewed. It is concluded that the system failed because management deficiencies existed in planning, development, and implementation. Moreover, the cost and progress of the system was not monitored. Poor communication among system developers and intended users at the Federal and State levels, lack of continuous involvement and support from top Federal management, and disruptions in both organization and personnel are also cited as reasons for the system's failure. R.J.F.

N82-14960*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

TECHNICAL COMMUNICATION: PERSPECTIVES FOR THE EIGHTIES, PART 1. PROCEEDINGS OF THE TECHNICAL COMMUNICATIONS SESSIONS AT THE 32ND ANNUAL MEETING OF THE CONFERENCE ON COLLEGE COMPOSITION AND COMMUNICATION

J. C. Mathes, comp. (Michigan Univ., Ann Arbor) and Thomas E. Pinelli, comp. Dec. 1981 307 p refs Conf. held in Dallas, 26-28 Mar. 1981
(NASA-CP-2203-Pt-1; L-14899) Avail: NTIS HC A14/MF A01 CSCL 05B

Proceeding of the technical communication sessions at the 32nd annual meeting of the Conference on College Composition and Communication held in Dallas, Texas, March 26-28, 1981 are summarized. The proceeding suggest that technical communication has become an important subfield and is becoming an intrinsic part of many undergraduate curricula. Technical communication as a separate discipline, however, is relatively new. For that reason, proceedings that can make current research available as quickly as possible are suggested for preparation. The following topics were addressed: (1) a history and definition of technical writing, (2) the case method is technical communication (3) teaching technical writing (4) oral communication and rhetorical theory, and (5) new approaches in and practical applications of technical writing. For individual titles, see N82-14961 through N82-14979.

N82-14961*# Michigan Univ., Ann Arbor. Dept. of Electrical and Computer Engineering.

WHAT IS TECHNICAL WRITING? PROLEGOMENON TO A CONTEXTUAL DEFINITION

Ben F. Barton and Marthalee S. Barton *In* NASA. Langley Research Center Tech. Commun. Pt. 1 Dec. 1981 p 3-14 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The question, 'What is Technical Writing?', is addressed. Interest about the stance a teacher assumes in a classroom, the orientation of textbooks, and the shape of curricula are considered. Technical writing is considered of age, definitions abound and the time is ripe for a metaperspective on the question. This analyzes pitfalls in representative definitions of technical writing suggest a direction for future inquiry. M.D.K.

N82-14962*# Pittsburg State Univ., Kans.

TECHNICAL WRITING IN AMERICA: A HISTORICAL PERSPECTIVE

Michael E. Connaughton *In* NASA. Langley Research Center Tech. Commun. Pt. 1 Dec. 1981 p 15-24 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The standard distinction between poetic and referential language, the gulf between science and the humanities, and the distress many teachers of English feel when faced for the first time with the prospect of teaching technical writing are discussed. In the introduction of many technical writing textbooks. Technical communication is divorced from other forms of linguistic experience by making language limiting and reductive rather than creative and expansive. The emphasis on technical/scientific writing as radically different had blinded people to those traits it has in common with all species of composition and has led to a neglect of research, on fundamental rhetorical issues. A complete rhetorical theory of technical discourse should include information about the attitudes and motives of writers, the situations which motivate (or coerce) them to write, definitive features of technical style and form, interrelationship of expression and creativity, and functions of communication in shaping and preserving scientific networds and institutions. The previous areas should be explored with respect to contemporary practice and within an historical perspective. M.D.K.

N82-14963*# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Language, Literature and Communication.

TECHNICAL COMMUNICATION: NOTES TOWARD DEFINING DISCIPLINE

Philip M. Rubens *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 25-31 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

In the field of technical communication, definitions posited in virtually any major text violate every major rule of definitions. The most popular method for defining the field is to state that technical writing is any writing that supports technology or technological activities. There is a need for a nice yardstick for measuring what 'technology' is. Some ways in which the field can be defined in a tightly structured empirical way and some implications of technical communication for a humanistic education in a technological age are suggested. M.D.K.

N82-14964*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

MARKETING INFORMATION: THE TECHNICAL REPORT AS PRODUCT

Freda F. Stoher (Old Dominion Univ.) and Thomas E. Pinelli *In its* Tech. Commun., Pt. 1 Dec. 1981 p 33-42 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

Technical reports constitute a product, the primary means for communicating the results of research to the user. The Langley scientific and technical information (STI) review and evaluation project undertook a review of the technical report as an effective product for information communication. Style manuals describing theory and practice in technical report preparation; publication manuals covering such factors as design, layout, and type style; and copies of technical reports were obtained from industrial, academic, governmental, and research organizations. Based on an analysis of this material, criteria will be established for the report components, for the relationship of the components within the report context, and for the overall report organization. The criteria will be used as bench marks and compared with the publication standards currently used to prepare NASA technical reports. M.D.K.

N82-14965*# Wayne State Univ., Detroit, Mich.

HOW TO DEVELOP AND WRITE A CASE FOR TECHNICAL WRITING

Barbara Couture and Jone Goldstein *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 73-84 refs Submitted for publication (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

Case of different sizes and shapes for teaching technical writing to engineers at Wayne State University have been developed. The case approach was adopted for some assignments because sophomores and juniors lacked technical expertise and professional knowledge of the engineering world. Cases were found to be good exercises, providing realistic practice in specific writing tasks or isolating particular skills in the composing process. A special kind of case which narrates the experiences of one technical person engaged in the problem-solving process in a professional rhetorical situation was developed. This type of long, realistic fiction is called a an 'holistic' case. Rather than asking students to role-play a character, an holistic case realistically encompasses the whole of the technical writing process. It allows students to experience the total communication act in which the technical task and data are fully integrated into the rhetorical situation and gives an opportunity to perform in a realistic context, using skills and knowledge required in communication on the job. It is believed that the holistic case most fully exploits the advantages of the case method for students of professional communication. M.D.K.

N82-14966*# Illinois Inst. of Tech., Chicago. Dept. of Humanities.

EVALUATING THE EFFECTIVENESS OF CASE METHOD INSTRUCTION IN TECHNICAL COMMUNICATION

Susan G. Feinberg *In* NASA. Langley Research Center Techn. Commun., Pt. 1 Dec. 1981 p 85-91 Submitted for publication (For primary document see N82-14960 05-82)

Avail: NTIS HC A14/MF A01 CSCL 05B

The effectiveness of the case method as an instructional technique in improving technical writing was evaluated. The development of a self-report instrument that attempts to measure changes in attitude toward technical communication and the presentation results change are the purpose of this paper. Standards for developing a case set forth by Goldstein and Couture, were used to design an evaluation instrument to measure the effect instruction on student attitude toward technical communication. This self-report instrument is based on model developed and tested by Daly and Miller who studied writer attitude and apprehension toward writing. It was the most important objective of any evaluation is to provide information for improving the program. M.D.K.

N82-14967*# Cincinnati Technical Coll., Ohio.

USING CASE STUDIES TO TEACH AN ENGINEERING TECHNOLOGY TECHNICAL WRITING CLASS

Marcus M. Green *In* NASA. Langley Research Center Tech. Commun. Pt. 1 Dec. 1981 p 93-98 refs (For primary document see N82-14960 05-82)

Avail: NTIS HC A14/MF A01 CSCL 05B

The use of the case method in teaching various technical communication skills is described. Features of the method considered include: solving communication problems, identifying an audience, planning written communications, presenting written communications, and using visual aids. S.L.

N82-14968*# Saint Louis Community Coll. at Meramec, Mo.

WHY USE CASE STUDIES RATHER THAN SIMULATION-GAMING TECHNIQUES OR LIBRARY RESEARCH? c02

Susan W. McDonald *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 99-103 refs (For primary document see N82-14960 05-82)

Avail: NTIS HC A14/MF A01 CSCL 05B

Method which present a student with a more challenging and true to life situation of needing to conduct research in a problem solving context--and not thinking about organization of format until research and thinking are complete are investigated. Simulation-gaming techniques which attempt to teach initiative and creativity that library research are used for this purpose. However, it is shown case studies provide the greatest opportunities to engage the students in probelm solving situations in which they develop skills as researchers and writers. S.L.

N82-14969*# Southwest Missouri State Univ., Springfield.

TEACHING GRAPHICS IN TECHNICAL COMMUNICATION CLASSES

Kristene C. Spurgeon *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 115-129 refs (For primary document see N82-14960 05-82)

Avail: NTIS HC A14/MF A01 CSCL 05B

Graphic aids convey and clarify information more efficiently and accurately than words alone therefore, most technical writing includes the use of graphics. Ways of accumulating and presenting graphics illustrations on a shoestring budget are suggested. These include collecting graphics from companies, annual reports and laminating them for workshop use or putting them on a flip chart for classroom presentation, creating overhead transparencies to demonstrate different levels of effectiveness of graphic aids, and bringing in grahic artistis for question/answer periods or in class workshops. Also included are an extensive handout as an introduction to graphics, sample assignments, and a selected and annotated bibliography. S.L.

N82-14970*# Rensselaer Polytechnic Inst., Troy, N. Y.

A GRAPHICS PRIMER FOR ENGLISH TEACHERS

L. V. Brillhart (Triton Coll., River Grove, Ill.) and M. B. Debs *In* NASA. Langley Research Center Tech. Commun. Pt. 1 Dec. 1981 p 131-143 (For primary document see N82-14960 05-82)

Avail: NTIS HC A14/MF A01 CSCL 05B

Skills necessary for teaching graphics are addressed. A simple, step by step method of teaching students how to draw different types of graphs is presented. Each step is illustrated by a drawing. Some audience analysis for the determination of appropriateness of the use of different types of graphs is included. S.L.

N82-14971*# Case Western Reserve Univ., Cleveland, Ohio.

APPLIED TAGMEMICS: A HEURISTIC APPROACH TO THE USE OF GRAPHIC AIDS IN TECHNICAL WRITING

Pamela P. Brownlee and Mary K. Kirtz *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 145-151 refs (For primary document see N82-14960 05-82)

Avail: NTIS HC A14/MF A01 CSCL 05B

In technical report writing, two needs which must be met if reports are to be useable by an audience are the language needs and the technical needs of that particular audience. A heuristic analysis helps to decide the most suitable format for information; that is, whether the information should be presented verbally or visually. The report writing process should be seen as an organic whole which can be divided and subdivided according to the writer's purpose, but which always functions as a totality. The tagmemic heuristic, because it itself follows a process of deconstructing and reconstructing information, lends itself to being a useful approach to the teaching of technical writing. By applying the abstract questions this heuristic asks to specific parts of the report. The language and technical needs of the audience are analyzed by examining the viability of the solution within the givens of the corporate structure, and by deciding which graphic or verbal format will best suit the writer's purpose. By following such a method, answers which are both specific and thorough in their range of application are found. S.L.

N82-14972*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

CLINICAL REPORT WRITING: PROCESS AND PERSPECTIVE

Helen Rothschild Ewald *In its* Tech. Commun. Pt. 1 Dec. 1981 p 163-171 refs (For primary document see N82-14960 05-82)

Avail: NTIS HC A14/MF A01 CSCL 05B

Clinical report writing in psychology and psychiatry is addressed. Audience/use analysis and the basic procedures of information gathering, diagnosis, and prognosis are described. Two interlinking processes are involved: the process of creation and the process of communication. Techniques for good report writing are presented. S.L.

N82-14973*# Syracuse Univ., N. Y.

PREPARING FOR AN INFLUX OF FOREIGN STUDENTS IN TECHNICAL WRITING COURSES: UNDERSTANDING THEIR BACKGROUND

Carol S. Lipson *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 173-179 refs (For primary document see N82-14960 05-82)

Avail: NTIS HC A14/MF A01 CSCL 05B

The cultural and historical influences that students from foreign countries bring with them to technical and report writing classes, in particular those influences that would affect their receipt of instruction in American principles for written prose are examined. The grouping of sentences into idea units and into paragraphs, and the grouping of the paragraphs into whole structures are considered. The different cultures, different habits and norms for handling prose, and the dictates for style and structure and sufficiency and approach are also considered. S.L.

N82-14974*# Florida Atlantic Univ., Boca Raton. Dept. of Communication.
ENLIGHTENED USE OF PASSIVE VOICE IN TECHNICAL WRITING
M. K. Trammell *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 181-190 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The passive voice as a normal, acceptable, and established syntactic form in technical writing is defended. Passive/active verb ratios, taken from sources including 'antipassivist' text books, are considered. The suitability of the passive voice in technical writing which involves unknown or irrelevant agents is explored. Three 'myths' that the passive (1) utilizes an abnormal and artificial word order, (2) is lifeless, and (3) is indirect are considered. Awkward and abnormal sounding examples encountered in text books are addressed in terms of original context. Unattractive or incoherent passive sentences are explained in terms of inappropriate conversion from active sentences having (1) short nominal or pronominal subjects or (2) verbs with restrictions on their passive use. N.W.

N82-14975*# Arizona Univ., Tucson. Dept. of English.
THE PROBLEMS INHERENT IN TEACHING TECHNICAL WRITING AND REPORT WRITING TO NATIVE AMERICANS
Jean Zukowski/Faust *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 199-209 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01

Teaching technical writing to Native Americans contending with a second language and culture is addressed. Learning difficulties arising from differences between native and acquired language and cultural systems are examined. Compartmentalized teaching, which presents the ideals of technical writing in minimal units, and skills development are considered. Rhetorical problems treated include logic of arrangement, selection of support and scope of detail, and time and space. Specific problems selected include the concept of promptness, the contextualization of purpose, interpersonal relationships, wordiness, mixture of registers, and the problem of abstracting. Four inductive procedures for students having writing and perception problems are included. Four sample exercises and a bibliography of 13 references are also included. N.W.

N82-14976*# Washington Univ., Seattle. Scientific and Technical Communication Program.
WRITING AS DECISION-MAKING
James W. Souther *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 239-243 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The need to teach informational writing as a decision-making process is discussed. Situational analysis, its relationship to decisions in writing, and the need for relevant assignments are considrered. Teaching students to ask the right questions is covered. The need to teach writing responsiveness is described. Three steps to get started and four teaching techniques are described. The information needs of the 'expert' and the 'manager' are contrasted. N.W.

N82-14977*# Delaware Univ., Newark. Dept. of English.
INTEGRATE ORAL COMMUNICATION WITH TECHNICAL WRITING: TOWARDS A RATIONALE
Terry Skelton *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 255-259 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

Integrating oral communication and technical writing instruction, to give students the opportunity to learn and practice interpersonal skills, is proposed. By linking speech and writing the importance of small-group interaction in developing transferable ideas is acknowledged. Three reasons for integration are examined: workday activities, application of role-taking to writing, and conflict resolution. Four advantages of integration are stated. N.W.

N82-14978*# Michigan Technological Univ., Houghton. Dept. of Humanities.
TOWARD DEFINING GOOD WRITING: A RHETORICAL ANALYSIS OF THE WORDS, SENTENCES, AND PARAGRAPHS IN 16 INDUSTRIAL SCRIPTS
Randall R. Freisinger and Bruce T. Petersen *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 291-304 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The assumption that teachers of technical writing agree on a definition of good writing was found to be without basis. Resolution of disagreements arising from close reading and textual analysis is described. Writing samples from corporate sources including IBM, ALCOA, Exxon, Weyerhaeuser, Bell Labs, Underwriters Laboratories, Dow Chemical, and US Steel were requested. A mixture of informative and persuasive examples, and examples directed at lay and specialist audiences were received. Analyses of 16 writing samples are reported. Analysis of word level, sentence level, and paragraph level, was completed. Syllabism, verb selection, nominalizations, vocabulary choices, t-units, subordination, sentence and clause length, syntactic order, patterns, development, topic sentences, propositional order, and transitions were analyzed. N.W.

N82-14979*# Michigan Univ., Ann Arbor. Dept. of Humanities.
RESEARCH IN THE COMPREHENSION OF ENGINEERING LECTURES BY NON-NATIVE SPEAKERS
Leslie A. Olsen and Thomas N. Huckin *In* NASA. Langley Research Center Tech. Commun., Pt. 1 Dec. 1981 p 305-311 refs (For primary document see N82-14960 05-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

Failure by foreign students to perceive the rhetorical structure or overall organization of an engineering lecture, rendering them unable to understand it, is discussed. Equally serious failure by such students to percieve the organizing role of theory in structuring the activities in their field is reported. Failure to identify the role of theory in the problem-solving process that underlies engineering is emphasized. Engineering was not seen as a series of on-going problems where each stage of solution exposed new problems to be solved. Implications for course planners and material designers are discussed. N.W.

N82-14980# Defense Technical Information Center, Alexandria, Va. Office of Information Systems and Technology.
DEFENSE TECHNICAL INFORMATION CENTER FREE TEXT EXPERIMENT: MANAGEMENT DATA BASES Information Retrieval Report, Jan. - Jul. 1981
Carlyen J. Thompson Oct. 1981 35 p refs
(AD-A105570) Avail: NTIS HC A03/MF A01 CSCL 05/2

DTIC has conducted an experiment that utilizes the free text inversion technique to retrieve records from the DROLS management data bases. It was felt that free text inversion as a form of retrieval would be beneficial in supporting DTIC's revitalized role in the transfer of technical information. The intent of this project was to determine if the free text inversion technique could be implemented in the management data bases without severely impacting the on-line system. Response time, storage capacity and relevance of reports were the major areas of concern. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N82-14981# Strasbourg Univ. (France). Bureau d'Economie Theorique et Appliquee.
ECONOMIC EFFECTS INDUCED BY ESA CONTRACTS, PHASE 2. VOLUME 1: SUMMARY [LES EFFETS ECONOMIQUES INDUITS DES CONTRATS DE L'ESA. PHASE 2. VOLUME 1: RESUME]
Patrice Brendle, Patrick Cohendet, Jean-Alain Heraud, Regis LaruedeTournemine, Helwig Schmied, Daniel Vitry, and Ehud Zuscovitch Paris ESA Jun. 1980 22 p In FRENCH 3 Vol.

(Contract ESA-3702/78/F-DKR(SC))
(ESA-CR(P)-1462-Vol-1) Avail: NTIS HC A02/MF A01

Different effects are classified by: technological advantages: commercial gains; organization and methodological advances; and impact on employment. Exports and limiting, or substitution for, imports are considered. Advantages other than space research were estimated for each sector of the economy and by country. Project Meteosat is shown to be of particular value. Results show that innovations due to ESA funding center on two essential activities: processing, storage and dissemination of information; and conditioning, storage and distribution of energy. Author (ESA)

N82-14982# Strasbourg Univ. (France). Bureau d'Economie Theorique et Appliquee.
ECONOMIC EFFECTS INDUCED BY ESA CONTRACTS, PHASE 2. VOLUME 2: MAIN REPORT [LES EFFETS ECONOMIQUES INDUITS DES CONTRATS DE L'ESA. PHASE 2. VOLUME 2: RAPPORT PRINCIPAL]
Patrice Brendle, Patrick Cohendet, Jean-Alain Heraud, Regis LaruedeTournemine, Helwig Schmeid, Daniel Vitry, and Ehud Zuscovitch Paris ESA Jun. 1980 148 p refs In FRENCH 3 Vol.
(Contract ESA-3702/78/F-DKR(SC))
(ESA-CR(P)-1462-Vol-2) Avail: NTIS HC A07/MF A01

Technological advantages, commercial gains, organizational and methodological advances, and impact on employment are discussed. Quantitative results are given by sector of the economy, country and by contracting industry. The exceptional utility of project Meteosat is revealed. Innovations achieved in the distribution of productivity and technological independence won through ESA efforts are considered. Author (ESA)

N82-14983# Strasbourg Univ. (France). Bureau d'Economie Theorique et Appliquee.
ECONOMIC EFFECTS INDUCED BY ESA CONTRACTS. PHASE 2. VOLUME 3: THEORY AND METHOD [LES EFFETS ECONOMIQUES INDUITS DES CONTRATS DE L'ESA. VOLUME 3: RAPPORTS THEORIQUE ET METHODOLOGIQUE]
Patrice Brendle, Patrick Cohendet, Jean-Alain Heraud, Regis LaruedeTournemine, Helwig Schmied, Daniel Vitry, and Ehud Zuscovitch Paris ESA Jun. 1980 57 p refs In FRENCH 3 Vol.
(Contract ESA-3702/78/F-DKR(SC))
(ESA-CR(P)-1462-Vol-3) Avail: NTIS HC A04/MF A01

The economic utility of ESA contracts to the European community was determined. The economic impact of R and D was cost/benefit analyzed, macroeconomically and microeconomically. Results are given as: technological effects; commercial gains; organizational and methodological advances; and influences of ESA contracts on contractor personel. Project Meteosat is taken as an example. Data acquisition is discussed. The statistical significance of the sample is shown. Author (ESA)

N82-14984# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abteilung Flugverkehrswissenschaft.
SCENARIOS OF ECONOMIC DEVELOPMENT WITHIN THE EUROPEAN COMMUNITY UNTIL THE YEAR 2000
Hermann Keimel and Alfons Schmitt Feb. 1981 174 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-730)
(DFVLR-FB-81-08) Avail: NTIS HC A08/MF A01; DFVLR, Cologne DM 28,70

A tendency scenario is projected in order to assess the influence of the European economy on the need for long-distance transportation, i.e. by air. The tendency scenario is supplemented with two additional scenarios which illustrate possible trends in the European Economic Community either towards a technology based economy or towards a service economy. In the technology scenario it is assumed that after a stagnative period of transition economic growth impetus will result from technological innovations and world trade expansion. The service economy scenario describes a situation of low economic growth paralleled by strong expansion in the service sector. Based on the qualitative characteristics of the scenarios, quantitative forecasts are made on economic structure. Author (ESA)

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-14198# British Telecom International (England).
THE USE OF OTS IN THE COST 211 PROJECT
J. R. Taylor *In* ESA OTS: 3rd Year in Orbit Aug. 1981 p 132-133 (For primary document see N82-14173 05-12)
Avail: NTIS HC A10/MF A01

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

N82-14985*# New York Univ., N. Y. Center for Science and Technology Policy.
THE CHANGING TIDE: FEDERAL SUPPORT OF CIVILIAN-SECTOR R AND D
Herbert I. Fusfeld, Richard N. Langlois, and Richard R. Nelson 1 Nov. 1981 151 p refs
(Grant NsG-7636)
(NASA-CR-165048) Avail: NTIS HC A08/MF A01 CSCL 05A

The involvement of the Federal government in civilian sector research and development is discussed. Relevant policies are put in an historical perspective. The roles played by industrial research and public funding are reveiwed. Government support of basic an generic research, clientele-oriented applied research, and research with commercial ends is studied. Procurement, anti-trust, and patent policies, all of which affect the climate for private research and development, are examined. R.J.F.

N82-14986*# New York Univ., N. Y. Center for Science and Technology Policy.
TECHNICAL CHANGE IN US INDUSTRY: A CROSS-INDUSTRY ANALYSIS
Richard R. Nelson, ed. 1 Nov. 1981 482 p refs
(Grant NsG-7636)
(NASA-CR-165047) Avail: NTIS HC A21/MF A01 CSCL 05A

The nature of the public policies which have influenced the pace and pattern of technical progress in a number of American industries is studied with the view of assessing the broad effects of these policies. The industries studied are agriculture, pharmaceuticals, semiconductors, computers, civil aircraft, automobiles and residential construction. The policies considered include research and development funding as well as government procurement, education, information dissemination, patent protection, licensing, regulations, and anti-trust policies. R.J.F.

N82-14987# California Univ., Livermore. Lawrence Livermore Lab.
FUTURE OF ELECTRICITY FOR AUTOMOBILES: ADVANCED ELECTRIC VEHICLE CONCEPTS
Lawrence G. OConnell 29 Jul. 1981 14 p refs Presented at 6th Elec. Vehicle Council Symp., Baltimore, 21 Oct. 1981
(Contract W-7405-eng-48)
(DE81-028235; UCRL-85526; CONF-811010-3) Avail: NTIS HC A02/MF A01

An electric vehicle, hybrid vehicle, and other nonpetroleum electricity based systems, such as a fuel cell vehicle are evaluated. Performance criteria for such vehicles are presented and, in addition, various concepts that may be suitable for these vehicles are identified-their capabilities are discussed as well as the difficulties that must be overcome prior to commercialization in each case. DOE

N82-14988# Ecole Nationale Superieure de Techniques Avancees, Paris (France).
[RESEARCH ACTIVITIES REPORT IN ADVANCED TECHNOLOGY] Annual Report, 1980 [RAPPORT D'ACTIVITE SUR LES RECHERCHES A L'ECOLE NATIONALE SUPERIEURE DE TECHNIQUES AVANCEES EN 1980]
1980 124 p refs In FRENCH Original contains color illustrations
Avail: NTIS HC A06/MF A01

Scientific and experimental research is reported on. Work centers on chemistry, hydrothermodynamics data processing and information sciences, materials science, structural engineering, and optics. Author (ESA)

N82-14989# Approved Engineering Test Labs., Fullerton, Calif.
OCCUPANT RESPONSE AND VEHICLE ACCELERATION IN A 30 MPH FRONTIAL IMPACT TEST, 1981 SUBARU DL, 4 WHEEL DRIVE, 4 DOOR WAGON, NHTSA 811301 Final Report, Jan. - Feb. 1981
D. H. Hand 10 Jun. 1981 111 p
(Contract DOT-HS-9-02273)
(PB81-228769; DOT-HS-805917; Rept-971-3882-35) Avail: NTIS HC A06/MF A01 CSCL 13F

Occupant and vehicle research is interested in obtaining information on various impact modes and vehicles types through staged collisions. The information collected includes occupant injury measurements as well as seat belt loads, and vehicle acceleration. T.M.

N82-14990# General Motors Technical Center, Warren, Mich. Transportation Systems Div.
SYSTEMS OPERATION STUDIES FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS. FEEDER SYSTEMS MODEL FUNCTIONAL SPECIFICATION Final Report
T. M. Linden Jun. 1981 37 p
(Contract DOT-TSC-1220)
(PB81-233496; DOT-TSC-UMTA-81-14;
UMTA-MA-06-0048-81-1) Avail: NTIS HC A03/MF A01; also available in set of 5 reports HC E15 as PB81-223488 CSCL 13F

The objective of the FSM is to map the zone-to-zone transit patronage demand onto AGT station pairs and to generate feeder system performance data. The output of this model can be used in conjunction with AGT data in order to provide normalized comparisons between different AGT systems operating in the same demand environment with both conventional feeder service/AGT operation and dual mode feeder/AGT operation. Because of its generic nature, the model is recommended for representative AGT deployments comparison only. GRA

N82-14991# General Motors Technical Center, Warren, Mich.
SYSTEMS OPERATION STUDIES FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS: SYSTEM AVAILABILITY MODEL USER'S MANUAL Final Report
Robert Oglesby Jun. 1981 70 p refs
(Contract DOT-TSC-1220)
(PB81-233504; DOT-TSC-UMTA-81-12;
UMTA-MA-06-0048-81-2) Avail: NTIS HC A04/MF A01 CSCL 13F

The System Availability Model (SAM) is a system level model which provides measures of vehicle and passenger availability. The SAM operates in conjunction with the AGT discrete Event Simulation Model (DESM). The DESM output is the normal source of the delays information portion of the SAM's input data set. There is no inherent restriction on the systems applicability of the SAM. Therefore, the range of applicability of the DESM defines the ranges of applicability for the SAM. This SAM user's manual describes the program, its input requirements, and its operating procedures. The maintenance and standby fleet size required to support the operational fleet are also determined. GRA

N82-14992# General Motors Technical Center, Warren, Mich. Transportation Systems Div.
SYSTEMS OPERATION STUDIES FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS. AVAILABILITY MODEL FUNCTIONAL SPECIFICATION Final Report
T. M. Linden and J. D. Boldig Jun. 1981 54 p
(Contract DOT-TSC-1220)
(PB81-233512; DOT-TSC-UMTA-81-15;
UMTA-MA-06-0048-81-3) Avail: NTIS HC A04/MF A01; also available in set of 5 reports HC E15 as PB81-233488 CSCL 13F

The System Availability Model (SAM) is a system level model which provides measures of vehicle and passenger availability. The SAM evaluates the system level influence of availability concepts employed in AGT systems. This functional specification identifies the functions performed, the types of hardware required and the modeling techniques employed by the SAM. This model is sufficiently flexible to aid transportation system planners in AGT system selection. GRA

N82-14993# General Motors Technical Center, Warren, Mich. Tranportation Systems Div.
SYSTEMS OPERATION STUDIES FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS. SYSTEM AVAILABILITY MODEL PROGRAMMER'S MANUAL Final Report
Robert Oglesby Jun. 1981 153 p
(Contract DOT-TSC-1220)
(PB81-233520; DOT-TSC-UMTA-81-13;
UMTA-MA-06-0048-81-4) Avail: NTIS HC A08/MF A01 CSCL 13F

The manual describes the program's functions, organization, variables, and processing algorithms. Debug tools built into the model, a global variable dictionary, subprogram logic tables, and subprogram descriptions are also described to aid maintenance and modification of this model. T.M.

N82-14994# General Motors Technical Center, Warren, Mich. Transportation Systems Div.
SYSTEMS OPERATION STUDIES FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS. DETAILED STATION MODEL FUNCTIONAL SPECIFICATION Final Report
J. Bender Jul. 1981 48 p
(Contract DOT-TSC-1220)
(PB81-233538; DOT-TSC-UMTA-81-16;
UMTA-MA-06-0048-81-5) Avail: NTIS HC A03/MF A01; also available in set of 5 reports HC E15 as PB81-233488 CSCL 13F

The Detailed Station Model (DSM) is a discrete event model representing the interrelated queueing processes associated with vehicle and passenger activities in an AGT station. The DSM provides operational and performance measures of alternative station configurations and management policies with respect to vehicle and passenger handling capabilities and provides an analytic tool to support trade studies. Its architecture facilitates interchange of alternative operational strategy algorithms and station traffic flow patterns to assist in the initial design selection by planners. GRA

88 SPACE SCIENCES (GENERAL)

N82-14995# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
INTERSTELLAR GRAINS INVESTIGATED AND COMETS PROPOSED AS A VEHICLE FOR PANSPERMIA
F. Hoyle and N. C. Wickramasinghe Nov. 1980 49 p refs
Submitted for publication
(Preprint-65) Avail: NTIS HC A03/MF A01

The nature and composition of interstellar grains, and the role of comets in bringing life to Earth, are discussed. For individual titles, see N82-14996 through N82-14997.

N82-14996# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
INTERSTELLAR GRAINS **c90**
F. Hoyle and N. C. Wickramasinghe *In its* Interstellar Grains Investigated and Comets Proposed as a Vehicle for Panspermia

Nov. 1980 26 p refs (For primary document see N82-14995 05-88)
Avail: NTIS HC A03/MF A01

Interstellar extinction of starlight was observed and plotted as a function of inverse wavelength. Agreement with the calculated effects of the particle distribution is shown. The main kinds of grain distinguished are: (1) graphite spheres of radius 0.02 microns, making up 10% of the total grain mass; (2) small dielectric spheres of radius 0.04 microns making up 25%; and (3) hollow dielectric cylinders containing metallic iron, with diameters of 2/3 microns making up 45%. The remaining 20% consists of other metals, metal oxides, and polysiloxanes. Absorption factor evidence suggests that the main dielectric component of the grains is organic material. Author (ESA)

N82-14997# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
COMETS: A VEHICLE FOR PANSPERMIA c91
Fred Hoyle and Chandra Wickramasinghe *In its* Interstellar Grains Investigated and Comets Proposed as a Vehicle for Panspermia Nov. 1980 22 p refs Presented at 5th College Park Colloq. on Chemical Evolution, College Park, MD., 29-31 Oct. 1980 (For primary document see N82-14995 05-88)
Avail: NTIS HC A03/MF A01

Arguments are given for life being a cosmic phenomenon, which comets carry amplify and disperse throughout the universe. The overall atomic composition of comets agrees well with that of living materials. Since organic matter and water are present in comets, there is potentially an excellent culture medium for some types of microorganism. The melted interiors of comets are well suited to the amplification of autotrophic anaerobic bacteria. The frozen exteriors could preserve almost all forms of microorganism known to exist on Earth today. The Earth receives over 10 to the 18th power viable cells per year as a result of the deposition of cometary particles at the top of the atmosphere. The various environments of the Earth offer ample scope for development to the particles which do not perish. Author (ESA)

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-14998# Royal Observatory, Edinburgh (Scotland).
OPTICAL PERFORMANCE DATA FOR THE UK INFRARED TELESCOPE: ATMOSPHERIC SEEING EFFECTS IN THE INFRARED
C. M. Humphries and T. E. Purkins 1 Dec. 1980 25 p refs (UKIRT-16; ISSN-0260-9983) Avail: NTIS HC A02/MF A01

Aperture diffraction modulation transfer functions (MTF) were calculated at wavelengths from 0.5 to 10 microns, for a primary aperture of 3.8m, and a secondary diameter of 0.95m. Measured MTF at 0.5 to 4 microns for UKIRT optics is compared with aperture diffraction MTF, including the effect of average seeing conditions. Wavelength dependent MTF under good atmospheric seeing conditions, i.e. 0.5, 1, and 2 arcsec seeing, are presented with point spread functions. Performance matches predictions. The theory of MTF is introduced. It measures the modulation or contrast of features in the exit pupil at various spatial frequencies and expresses them in linear or angular separation distances. Author (ESA)

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-14999*# California Univ., Berkeley. Space Sciences Lab.
UNIVERSITY OF CALIFORNIA ELECTRON AND X-RAY EXPERIMENTS ON ISEE-3, SERIES 22, ISSUE 5 Technical Progress Report, 1 Feb. 1980 - 28 Feb. 1981
Kinsey A. Anderson Mar. 1981 10 p refs
(Contracts NAS5-22307; NAS5-25980)
(NASA-CR-166725) CSCL 03B

Some results of the solar electron and X-ray experiments onboard the International Sun Earth Explorer 3 are briefly discussed. The production of plasma waves and the generation of type 3 solar radio emission were analyzed using measurements of the electron distribution function. Measurements of bow shock particles far upstream from Earth and of low energy electrons and ions during long-lived solar particle events were examined. An analysis of the propagation of low energy electrons indicates that the pitch angle distributions of solar electrons are highly varied, complex and rapidly changing. The use of X-ray data to investigate solar flares is described. M.G.

N82-15000*# TRW Defense and Space Systems Group, Redondo Beach, Calif. Space Sciences Dept.
PLASMA WAVE EXPERIMENT FOR THE ISEE-3 MISSION Semiannual Report, 20 Feb. - 19 Aug. 1981
Frederick L. Scarf 19 Aug. 1981 70 p refs
(Contracts NAS5-20682; NAS5-20093; NAS7-100; Grant NGL-16-001-043)
(NASA-CR-166730; Rept-23499-6024-UT-00; SAR-3) CSCL 03B

Analyses of data from the scientific instrument designed to study solar wind and plasma wave phenomena on the International Sun Earth Explorer 3 are presented. Plasma turbulence upstream and downstream of interplanetary shocks was detected. The microscopic plasma waves associated with interplanetary shocks were studied in the broad context of a discussion of some potential contributions to collisionless shock and cosmic ray acceleration theories. The central issue here was whether heated ions create magnetohydrodynamic turbulence as part of the quasi-parallel shock structure. The analysis suggests that the plasma physics near the Earth's bow shock may apply to interplanetary shocks on a far larger scale. Additional analyses concerning whistler mode wave propagation and Earth's foreshock structure are briefly described. R.J.F.

N82-15001*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE DISCOVERY OF 50 MINUTE PERIODIC ABSORPTION EVENTS FROM 4U1915-05
N. E. White and J. H. Swank Oct. 1981 18 p refs Submitted for publication
(NASA-TM-83839) Avail: NTIS HC A02/MF A01 CSCL 03B

The steady flux from 4U1916-05 which undergoes periodic absorption dips every 50 minutes was demonstrated. This period represents the underlying orbital period of the system. It is suggested that variations in the depth and duration of these events are caused by a bulge in the edge of the accretion disk, at the point where the gas stream impacts the disk. The mass losing star in this system is probably a low mass white dwarf. The spectrum of the dips indicates that the metallicity of the absorbing material is at least a factor 17 below solar values. E.A.K.

N82-15002# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
THE 3.4 MICRON INTERSTELLAR ABSORPTION FEATURE AND THE ORGANIC COMPOSITION OF INTERSTELLAR GRAINS
D. T. Wickramasinghe, D. A. Allen, F. Hoyle, and N. C. Wickramasinghe Jun. 1980 16 p refs Submitted for publication
(Preprint-61) Avail: NTIS HC A02/MF A01

The nature of interstellar matter is examined by infrared spectroscopy. The 3.4 micron absorption feature is believed to arise in the general interstellar medium. The interstellar grains are organic, existing in polymeric form. For individual titles, see N82-15003 through N82-15004.

N82-15003# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
THE 3.4 MICROMETER INTERSTELLAR ABSORPTION FEATURE
D. T. Wickramasinghe (Royal Observatory, Edinburgh) and D. A. Allen (Anglo-Australian Observatory, Epping, Australia) *In its*

The 3.4 Micron Interstellar Absorption Feature and the Organic Composition of Interstellar Grains Jun. 1980 9 p refs Submitted for publication (For primary document see N82-15002 05-90)
Avail: NTIS HC A02/MF A01

The presence of the 3.4 micrometer absorption feature in the source IRS 7 is shown. The ratio of the absorption coefficient of grains at 3.4 micrometers to the extinction coefficient at lambda V = 5500A is shown to be in the range 0.003 to 0.006. The wavelength of the peak absorption is 3.39 micrometers, + or - 0.03 micrometers; the equivalent width 330A, and the intrinsic full width at half maximum 0.13 micrometers. The 3.4 micrometer absorption is believed to arise in the general interstellar medium, and not in the dense molecular clouds where absorption due to other CH and CC bonds is known to occur. A circumstellar origin is also discounted. A substantial fraction of carbon in the interstellar medium is deduced to be in the form of organic molecules in grains. Visual extinction coefficient equals 5500A. This is consistent with observational data. The band center varies slightly from one polysaccharide to another but is again consistent with observational data. Author (ESA)

N82-15004# University Coll., Cardiff (Wales) Dept. of Applied Mathematics and Astronomy.
THE ORGANIC COMPOSITION OF INTERSTELLAR GRAINS
D. T. Wickramasinghe (Royal Observatory, Edinburgh), F. Hoyle, and N. C. Wickramasinghe *In its* The 3.4 Micron Interstellar Absorption Feature and the Organic Composition of Interstellar Grains Jun. 1980 6 p refs Submitted for publication (For primary document see N82-15002 05-90)
Avail: NTIS HC A02/MF A01

Polyformaldehyde is examined as a possible organic component of interstellar grains. Absorption coefficients are determined from calibrated infrared spectra. The CH band center is at 3.4 microns and the visual extinction coefficient equals 5500A. This is consistent with observational data. The band center varies slightly from one polysaccharide to another but is always consistent with observational data. Grains are thus thought to exist in polymeric form. Author (ESA)

N82-15005# State Univ. of New York, Albany.
RESEARCH IN NUCLEAR ASTROPHYSICS: STELLAR COLLAPSE AND SUPERNOVAE Progress Report, 1 Dec. 1981 - 30 Nov. 1984
T. J. Mazurek and J. M. Lattimer 1981 40 p refs Prepared in cooperation with State Univ. of New York at Stony Brook
(Contract DE-AC02-80ER-10719)
(DE81-030041; DOE/ER-10719/T1) Avail: NTIS HC A03/MF A01

The implications of nuclear theory for the final collapse of massive stars is examined. The development of an appropriate nuclear equation of state and its implementation in hydrodynamics are studied. The influence of nuclear dissociation and neutrino emission on the formation and propagation of shocks are investigated. The long term evolution of collapsed stellar cores after the initial hydrodynamic bounce, neutrino production and emission in all phases are derived, and potential effects of pion condensation and neutrino instabilities are explored. DOE

N82-15006 California Univ., Santa Cruz.
ROTATIONAL VELOCITIES AND AGES OF SOLAR-TYPE STARS Ph.D. Thesis
David Robert Soderblom 1980 88 p
Avail: Univ. Microfilms Order No. 8123249

Data needed to discuss the rotational history of solar-type stars and the relation of angular momentum loss to other physical phenomena are provided. High resolution spectral lin profiles were obtained for 82 stars and were modeled to yield rotational velocities. The available Li data were reanalyzed to derive an age calibration for field stars. The Li age relation indicates that stars of solar mass one have undergone pre-main-sequence Li depletion by a factor of two to five. The field star and cluster data indicate a relation that was predicted from models of angular momentum loss through stellar wind forced to corotate by a magnetic field. Rapid rotation does not enhance Li depletion, nor is it likely that it enhances the mass loss rate or the Alfven radius. It is possible, but not certain; that slow rotation inhibits Li depletion. Dissert. Abstr.

N82-14996# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
INTERSTELLAR GRAINS
F. Hoyle and N. C. Wickramasinghe *In its* Interstellar Grains Investigated and Comets Proposed as a Vehicle for Panspermia Nov. 1980 26 p refs (For primary document see N82-14995 05-88)
Avail: NTIS HC A03/MF A01

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-15007*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Space Sciences Lab.
KOHOUTEK, PHOTOMETRIC PHOTOGRAPHY EXPERIMENT (S233) Final Report
C. A. Lundquist and Paul D. Craven Oct. 1981 35 p refs
(NASA-TM-82449) Avail: NTIS HC A03/MF A01 CSCL 03B

The final results of the Skylab 4 experiment S233, Kohoutek photometric photography experiment, which undertook a series of visible light photographs suitable for photometry and for a photographic history of Comet Kohoutek are described. The experiment concept, the data reduction method, and the results obtained are discussed. B.W.

N82-14109# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Astrophysik.
PLASMA FLOW AND MAGNETIC FIELDS IN COMETS
H. U. Schmidt and R. Wegmann *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 3-7 refs (For primary document see N82-14107 05-12)
Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

N82-14114# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).
SIZE DISTRIBUTION, STRUCTURE, AND CHEMICAL COMPOSITION OF COMETARY DUST PARTICLES
Hugo Fechtig *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 47-52 refs (For primary document see N82-14107 05-12)
Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

N82-14117# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
DYNAMICS AND CHEMISTRY OF COMETARY COMAS: A PRE-GIOTTO VIEW
W.-H. Ip *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 79-91 refs (For primary document see N82-14107 05-12)
Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

N82-14119*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
NOTES ON THE P/HALLEY NUCLEUS
Fred L. Whipple *In* ESA Sci. and Exptl. Aspects of the Giotto Mission Jun. 1981 p 101-103 refs (For primary document see N82-14107 05-12)
(Grant NsG-7082)
Avail: NTIS HC A08/MF A01; ESA, Paris FF 180 Member States, AU, CN and NO (+20% others)

N82-14127# European Space Operations Center, Darmstadt (West Germany).
LUNAR GRAVITATIONAL FIELD DETERMINATION
W. Flury *In* ESA Spacecraft Flight Dyn. Aug. 1981 p 37-45 refs (For primary document see N82-14123 05-12)
Avail: NTIS HC A22/MF A01; ESA, Paris FF 160 Member States, AU, CN and No (+20% others)

N82-14997# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
COMETS: A VEHICLE FOR PANSPERMIA
Fred Hoyle and Chandra Wickramasinghe *In its* Interstellar Grains Investigated and Comets Proposed as a Vehicle for Panspermia Nov. 1980 22 p refs Presented at 5th College Park Colloq. on Chemical Evolution, College Park, MD., 29-31 Oct. 1980 (For primary document see N82-14995 05-88)
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92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

No abstracts in this category.

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

No abstracts in this category.

99 GENERAL

N82-15008* National Aeronautics and Space Administration, Washington, D. C.
HIGHLIGHTS OF 1981 ACTIVITIES
23 Dec. 1981 20 p
(NASA-News-Release-81-199; P81-10203) Avail: NTIS Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 22B

The highlights of NASA's 1981 activities are presented, including the results of the two flights of the space shuttle Columbia and the Voyager 2 encounter with Saturn. Accomplishments in the areas of space transportation operations; space science; aeronautical, energy, and space research and development; as well as space tracking, international activities, and 1981 launch activities are discussed. S.L.

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SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 20 NUMBER 5

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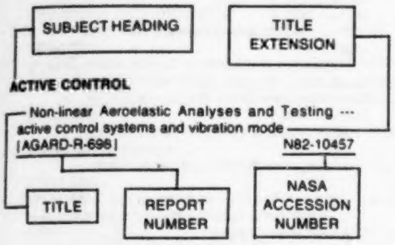

The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7050).

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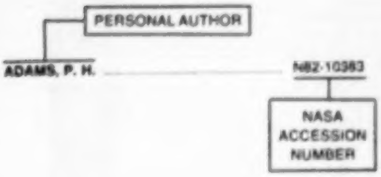

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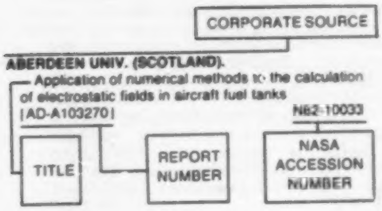
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Numerical studies of laminar and turbulent drag reduction
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CAMBRIDGE UNIV. (ENGLAND).

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Structure function analysis of Nimbus 5 SCR data at the mesoscale N82-14730

CENTRE D'ETUDES DE METEOROLOGIE SPATIALE, LANNION (FRANCE).

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CENTRE D'ETUDES ET DE RECHERCHES, TOULOUSE (FRANCE).

Charging characteristics of silica fabrics
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CENTRE D'ETUDES TECHNIQUES DE L'EQUIPMENT, AIX-EN-PROVENCE (FRANCE).

Operational use of remote sensing for coastal zone management and possible contribution of specialized satellites N82-14574

CENTRE DE RECHERCHES EN PHYSIQUE DE L'ENVIRONNEMENT TERRESTRE ET PLANETAIRE, ORLEANS (FRANCE).

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[CRPE-1076] N82-14279

Experimental study of instabilities and motion of a streaming ionospheric plasma in the polar zone
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CENTRE DE RECHERCHES SCIENTIFIQUES ET TECHNIQUES DE L'INDUSTRIE DES FABRICATIONS METALLIQUES, BRUSSELS (BELGIUM).

Scientific and technical research activities report in industrial fabrication N82-14404

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SPOT data simulations: Littoral applications
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CENTRE NATIONAL D'ETUDES SPATIALES, TOULOUSE (FRANCE).

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CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, MARSEILLES (FRANCE).

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CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, MEUDON (FRANCE).

A thermodynamic approach to metal-plasma interaction in one-dimensional stationary evolution
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CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, VERRIERES-LE-BUISSON (FRANCE).

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CENTRE TECHNIQUE DES INDUSTRIES MECANIQUES, SENLIS (FRANCE).

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CHEMICAL RECOVERY SYSTEMS, HANOVER, MAINE.

Nickel recovery from electroplating rinsewaters by electrodialysis
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CHINESE ACADEMY OF SCIENCES, PEKING.

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COLORADO UNIV. AT BOULDER.

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COLUMBIA UNIV., NEW YORK.

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Offshore petroleum industry environmental data requirements: Emphasis on remote sensing
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The color of the sea and its relation to surface chlorophyll and depth of the euphotic zone
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Field-ion-microscope observations of radiation effects
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A stark cell for frequency control of a waveguide CO2 laser
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Angle of arrival and irradiance statistics of laser beams in turbulence
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DEFENCE RESEARCH INFORMATION CENTRE, ORPINGTON (ENGLAND).

Application of resonance Raman spectrometry in high performance liquid chromatography
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Quantitative determination of fluorine in steel-making slags by the ion selective electrode
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DEFENSE INTELLIGENCE AGENCY, WASHINGTON, D.C.

Bibliography of Soviet laser developments, no. 47, May - June 1980
[AD-A105585] N82-14510

Bibliography of Soviet laser developments, no. 48, July - August 1980
[AD-A105578] N82-14511

DEFENSE NUCLEAR AGENCY, WASHINGTON, D.C.

Spacecraft charging technology in the satellite X-ray test facility N82-14267

DEFENSE TECHNICAL INFORMATION CENTER, ALEXANDRIA, VA.

Defense Technical Information Center free text experiment: Management data bases
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DELAWARE UNIV., NEWARK.

Development of superior denitrogenation and isomerization catalysts for processing crude oil derived from shale, part 1
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Integrate oral communication with technical writing: Towards a rationale N82-14977

DEPARTMENT OF AGRICULTURE, WASHINGTON, D.C.

Solar-supplemented, natural air drying of shelled corn: The economic limitations
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DEPARTMENT OF ENERGY, LARAMIE, WYO.

Sixth Underground Coal-Conversion Symposium
[DE81-027669] N82-14374

Bibliography of publications dealing with tar sands
[DE81-026146] N82-14594

DEPARTMENT OF ENERGY, PITTSBURGH, PA.

Longwall mining of thin seams
[DE81-028042] N82-14612

DEPARTMENT OF ENERGY, WASHINGTON, D. C.

International energy indicators
[DE81-028117] N82-14653

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BERLIN (WEST GERMANY).

Experimental investigation of the influence of the casing geometry upon the flow conditions and the noise of a centrifugal fan
[DFVLR-FB-81-20] N82-14472

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).

Analysis of two air traffic samples in the terminal area of Frankfurt/Main, August 4th 1978
[DFVLR-MITT-81-12] N82-14073

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).

Colloquium on composite materials N82-14289

Fracture mechanics in fiber reinforced composite materials, taking as examples B/Al and CFRP
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[DFVLR-FB-81-06] N82-14984

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, GOETTINGEN (WEST GERMANY).

Time linearized calculation of two dimensional unsteady transonic potential flow at small disturbances
[DFVLR-FB-81-01] N82-14070

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, OBERPFAFFENHOFEN (WEST GERMANY).

On the accuracy of radio location in media with indirect wave propagation
[DFVLR-FB-81-02] N82-14436

Results of a slant range visibility field experiment with the modified DFVLR-minilidar
[DFVLR-MITT-81-01] N82-14439

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DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, WESSELING (WEST GERMANY).

Station acquisition and stationkeeping with low thrust systems N82-14142

DHR, INC., WASHINGTON, D.C.

Market assessment of photovoltaic power systems for agricultural applications in Morocco
[NASA-CR-165477] N82-14627

DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN (WEST GERMANY).

Critical analysis of gradient and isothermal furnace concepts for use in Spacelab with special regard for heat pipe technology and connected basic requirements
[BMFT-FB-W-81-019] N82-14200

Analysis and calculation of special system aspects for the conical scan radiometer (phase A)
[BMFT-FB-W-81-003] N82-14505

DORNIER-WERKE G.M.B.H., MUNICH (WEST GERMANY).

An overview of the design and construction of small Earth stations used with OTS N82-14196

DSM/NV NEDERLANDSE STAATSMIJNEN, GELEEN.

Design of a control system for the optimum heating of batch reactors
[MS-1296] N82-14387

DUKE UNIV., DURHAM, N. C.

A tutorial on the CARE III approach to reliability modeling
[NASA-CR-3488] N82-14806

DUNDEE UNIV. (SCOTLAND).
Coastal zone research using remote sensing techniques N82-14571

DVORAK FARMS, INC., WHITELAW, WISC.
Technical and economic feasibility study for a 1,500,000 gallon per year anhydrous ethanol manufacturing plant
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Real time software tools and methodologies N82-14837
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ECOLE NATIONALE SUPERIEURE DE TECHNIQUES AVANCEES, PARIS (FRANCE).
Stress-strain analysis of very thick plates
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Linear and geometric nonlinear analysis of shells by an isoparametric three dimensional degenerated element
[REPT-140] N82-14862
Research activities report in advanced technology N82-14988

ECOLE NATIONALE SUPERIEURE DES MINES, SOPHIA-ANTIPOLIS (FRANCE).
Oil spills: Large scale monitoring by LANDSAT N82-14572

ECOLE NATIONALE SUPERIEURE DES TELECOMMUNICATIONS, PARIS (FRANCE).
Activities of the Department of Systems and Communications
[ENST-D-81003] N82-14434

EIC, INC., NEWTON, MASS.
Photoelectrochemical depositions of microscopic metal film patterns on Si and GaAs
[AD-A099456] N82-14940

EMORY UNIV., ATLANTA, GA.
Studies in in vivo electrochemistry N82-14793

ENERGY, INC., IDAHO FALLS, IDAHO.
Energy recovery from municipal waste development program for Idaho Falls, Idaho
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ENGINS MATRA, VELIZY (FRANCE).
Thrustor performance modeling and parameters estimation N82-14172
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ENVIRONMENTAL PROTECTION POLYMERS, INC., HAWTHORNE, CALIF.
Securing containerized hazardous wastes with welded polyethylene encapsulates
[PB81-231292] N82-14370

ERNO RAUMFAHRTTECHNIK G.M.B.H., BREMEN (WEST GERMANY).
Study of a combined satellite system for remote sensing and earth-oriented research (LOCSS)
[BMFT-FB-W-81-002] N82-14615

EUROPEAN COOPERATION IN THE FIELD OF SCIENTIFIC AND TECHNICAL RESEARCH, HELSINKI (FINLAND).
Cost 72: European weather radar project N82-14765

EUROPEAN SPACE AGENCY, NOORDWIKJ (NETHERLANDS).
Platform performance factors affecting link budgets of geosynchronous communication satellites N82-14181
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EUROPEAN SPACE AGENCY, PARIS (FRANCE).
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Scientific and experimental aspects of the Giotto mission
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Spacecraft Flight Dynamics
[ESA-SP-160] N82-14123
OTS: 3rd Year in Orbit
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Nowcasting: Mesoscale observations and short-range prediction
[ESA-SP-165] N82-14716

EUROPEAN SPACE AGENCY, TOULOUSE (FRANCE).
A European flight dynamics experiment N82-14144

EUROPEAN SPACE OPERATIONS CENTER, DARMSTADT (WEST GERMANY).
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All-sky, video-based luminance mapper for daylighting research
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MINISTERE DE L'ENVIRONMENT ET DU CADRE DE VIE, NEUILLY (FRANCE).

The operational oil pollution surveillance system being used in France: Forecasted future developments in consideration of the NATO/CCMS remote sensing pilot study conclusions N82-14573

MINISTRY OF HOUSING, OTTAWA (ONTARIO).

Residential site design and energy conservation. Part 1: General report
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Charging and discharging Teflon N82-14217

MISSION RESEARCH CORP., SANTA BARBARA, CALIF.

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Requirements for instrument approaches to triple parallel runways
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Microstructural analysis of Kovar/molybdenum and copper/molybdenum interdiffusion
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.

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Highlights of 1981 activities
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.

MLS vertical guidance and navigation for a STOL airplane landing on an elevated STOLport
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Experimental and analytical investigation of axisymmetric supersonic cruise nozzle geometry at Mach numbers from 0.60 to 1.30
[NASA-TP-1953] N82-14052

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[NASA-TM-83222] N82-14054

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[NASA-TM-83226] N82-14058

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[NASA-TM-83231] N82-14075

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Comparative analyses of space-to-space central power stations
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Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference
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Description of a dual fail operational redundant strapdown inertial measurement unit for integrated avionics systems research N82-14842

Experimental study of noise reduction for an unstiffened cylindrical model of an airplane fuselage
[NASA-TP-1964] N82-14879

Prediction of flyover jet noise spectra from static tests
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Technical communication: Perspectives for the eighties, part 1. Proceedings of the technical communications sessions at the 32nd Annual Meeting of the Conference on College Composition and Communication
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

System analysis approach to deriving design criteria (loads) for Space Shuttle and its payloads. Volume 1: General statement of approach
[NASA-TP-1949] N82-14203

Numerical stability of an explicit finite difference scheme for the solution of transient conduction in composite media
[NASA-TM-82453] N82-14476

Satellite power system: Concept development and evaluation program. Volume 4: Energy conversion and power management
[NASA-TM-58237-VOL-4] N82-14634

Satellite power system: Concept development and evaluation program. Volume 7: Space transportation
[NASA-TM-58238-VOL-7] N82-14635

Kohoutek, photometric photography experiment (S233)
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NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.

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Atmospheric sounding user's guide
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NATIONAL SPACE DEVELOPMENT AGENCY, IBARAKI (JAPAN).

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NATURAL RESOURCES DEFENSE COUNCIL, INC., SAN FRANCISCO, CALIF.

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NAVAL ELECTRONIC SYSTEMS COMMAND, WASHINGTON, D. C.

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Proceedings of the molecular electronic devices workshop
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NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.

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NORWEGIAN AIR SURVEY CO., OSLO.

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OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).

La Recherche Aerospatiale, Bi-monthly Bulletin No. 1981-2, March - April 1981
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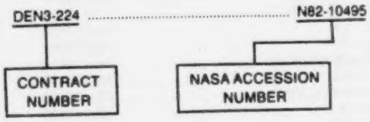

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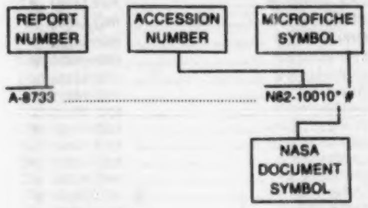

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Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

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SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

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Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

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SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.

For related information see also *Geosciences.*

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Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

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Includes cosmology; and interstellar and interplanetary gases and dust.

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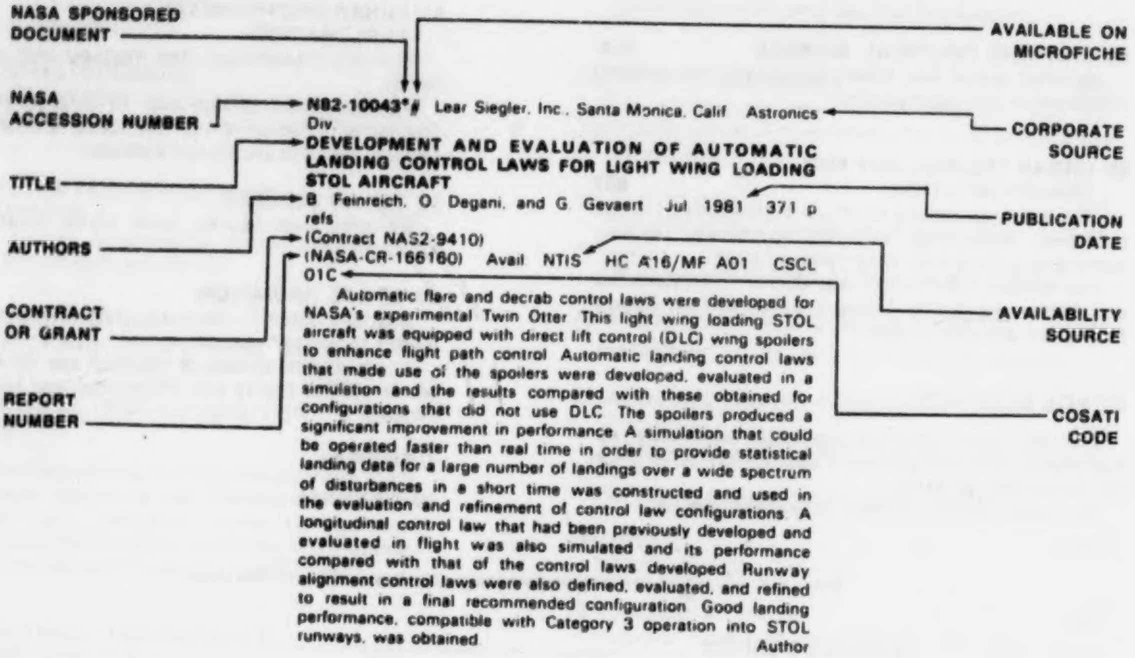
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N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
(Contract NAS2-9410)
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

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Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-15009# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Direction de la Qualite.
THE AIRBUS PROGRAM: QUALITY POLICY [LE PROGRAMME AIRBUS: STRATEGIE DE LA QUALITE]
Georges Sertour 1981 17 p In FRENCH Presented at Congr. EOQC, Jun. 1981
(SNIAS-812-551-101) Avail: NTIS HC A02/MF A01

The organization of a management system for quality which is based on key points, compromise quality/cost, optimization and intention to satisfy certification authorities and customers alike is described. The commercial success of Airbus is reviewed. Marketing and the manufacturing consortium are discussed. The principal phases of product construction and life are treated, (design, procurement, fabrication, inspection, and utilization). Particularities of the management system for quality are revealed at each stage. Author (ESA)

N82-15010# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
AERONAUTICAL APPLICATIONS OF BONDING [LES APPLICATIONS AERONAUTIQUES DU COLLAGE]
G. Briens 23 Jun. 1981 23 p In FRENCH Presented at Journee d'Information sur le Collage Organisee, Senlis, France, 17 Jun. 1981; sponsored by Federation des Industries Mecaniques et Transformatrices des Metaux and Centre Technique des Industries Mecaniques
(SNIAS-812-551-102; C.42-886) Avail: NTIS HC A02/MF A01

Adhesive bonding agents and techniques and their utilization in aircraft construction are reviewed. Adhesives are classified by their physical presentation, chemical nature, normal application, hardening temperature, and by service temperature and life. The principal structures in which adhesives are used include: honeycomb sandwich constructions, panel stiffeners, reinforcing backing, crack arresters, and laminates. Advantages in bonding assembly are mentioned. Mechanical limitations like shear strength, tensile strength, and resistance to peeling or cleaving, are discussed. The growing importance of bonding in the aerospace industry is emphasized. Author (ESA)

N82-15011# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
ADVANTAGES AND LIMITATIONS IN THE USE OF DIVERSE MATERIALS FOR AIRCRAFT CONSTRUCTION [ATOUTS ET LIMITES D'EMPLOIS DES DIVERS MATERIAUX UTILISES DANS LA CONSTRUCTION DES CELLULES]
G. Hilaire 1981 37 p In FRENCH Presented at 9th Colloq. Aciers et Alliages Speciaux dans les Ind. Aerospatiales, Le Bourget, France, 11 Jun. 1981
(SNIAS-811-551-104) Avail: NTIS HC A03/MF A01

The properties and applications of steels, light alloys, titanium, and carbon composites are compared. A percentage evaluation of their use in civil aircraft, military aircraft, helicopters, and spacecraft shows trends in airframe materials selection. Criteria for the choice of materials are discussed. Mechanical static characteristics, fatigue behavior, ruggedness, and cost are considered. A more widespread utilization of composites is indicated. Author (ESA)

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-15012 Ecole Polytechnique Federale de Lausanne (Switzerland).
INFLUENCE OF THREE-DIMENSIONAL EFFECTS ON THE SUPERSONIC FLOW FIELD AT THE LEADING EDGE OF A TURBOMACHINE CASCADE [EINFLUSS VON DREIDIMENSIONALEN EFFEKTEN AUF DIE VORDERKANTENSTROEMUNG AN UEBERSCHALL-TURBOMASCHINENSCHAUFEN]
Herms Schelle Zurich Juris-Verlag 1980 84 p refs In GERMAN; ENGLISH summary
(EPFL-ITA-9; ISBN-3-260-04851-0) Avail: Issuing Activity

A three-dimensional bi-characteristic method was developed. Results are compared with those of two-dimensional models. Three-dimensional effects are expected to play an important role because of the variation of flow velocity along the turbine radius cascade height. The mathematical model, the system of characteristic equations, the numerical algorithm and the test procedures are discussed. Results of the shock wave position and of the flow characteristics behind the shock as a function of logarithmic pressure function, Laval velocity, entropy, direction of velocity and edge angle show little or no difference between the three-dimensional analysis and a piecewise two-dimensional one. Author (ESA)

N82-15013*# Cincinnati Univ., Ohio. Dept. of Aerospace Engineering and Applied Mechanics.
FLAG-LAG-TORSIONAL DYNAMICS OR EXTENSIONAL AND INEXTENSIONAL ROTOR BLADES IN HOVER AND IN FORWARD FLIGHT Semiannual Progress Report, Jul. - Dec 1981
M. R. M. CrespoDaSilva Dec. 1981 6 p refs
(Grant NAG2-38)
(NASA-CR-165078) Avail: NTIS HC A02/MF A01 CSCL 01A

The differential equations describing the flap-lag-torsional motion of a flexible rotor blade including third-order nonlinearities were derived for hover and forward flight. Making use of the two boundary conditions, those equations were reduced to a set of three integro partial differential equations written in terms of the flexural deflections and the torsional variable. L.F.M.

N82-15014*# Vigyan Research Associates, Inc., Hampton, Va.

SUBSONIC BALANCE AND PRESSURE INVESTIGATION OF A 60-DEG DELTA WING WITH LEADING-EDGE DEVICES (DATA REPORT)

Dhanvada M. Rao and Stephen A. Tingas (North Carolina State Univ., Raleigh) Hampton, Va. NASA. Langley Research Center Nov. 1981 126 p refs
(Contract NAS1-16259)
(NASA-CR-165806) Avail: NTIS HC A07/MF A01 CSCL 01A

The drag reduction potential of leading edge devices on a 60 degree delta wing at high lift was examined. Geometric variations of fences, chordwise slots, pylon type vortex generators, leading edge vortex flaps, and sharp leading edge extensions were tested individually and in specific combinations to improve high-alpha drag performance with a minimum of low-alpha drag penalty. The force, moment, and surface static pressure data for angles of attack up to 23 degrees, at Mach and Reynolds numbers of 0.16 and 3.85 x 10 to the 6th power per meter are documented.
E.A.K.

N82-15015*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

LOW-SPEED AERODYNAMIC PERFORMANCE OF A HIGH-ASPECT-RATIO SUPERCRITICAL-WING TRANSPORT MODEL EQUIPPED WITH FULL-SPAN SLAT AND PART-SPAN DOUBLE-SLOTTED FLAPS

Harry L. Morgan, Jr. and John W. Paulson, Jr. Dec. 1979 145 p refs
(NASA-TP-1580; L-13201) Avail: NTIS HC A07/MF A01 CSCL 01A

An investigation was conducted in the Langley V/STOL tunnel to determine the static longitudinal and lateral-directional aerodynamic characteristics of an advanced high-aspect-ratio supercritical-wing transport model equipped with a full-span leading-edge slat and part-span double-slotted trailing-edge flaps. This wide-body transport model was also equipped with spoiler and aileron control surfaces, flow-through nacelles, landing gear, movable horizontal tails, and interchangeable wing tips with aspect ratios of 10 and 12. The model was tested with leading-edge slat and trailing-edge flap combinations representative of cruise, climb, takeoff, and landing wing configurations. The tests were conducted at free-stream conditions corresponding to Reynolds numbers (based on mean geometric chord) of 0.97 to 1.63 x 10 to the 6th power and corresponding Mach numbers of 0.12 to 0.20, through an angle-of-attack range of -2 deg to 24 deg and a sideslip-angle range of -10 deg to 5 deg.
Author

N82-15016*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DONBOL: A COMPUTER PROGRAM FOR PREDICTING AXISYMMETRIC NOZZLE AFTERBODY PRESSURE DISTRIBUTIONS AND DRAG AT SUBSONIC SPEEDS

Lawrence E. Putnam May 1979 99 p refs
(NASA-TM-78779; L-12658) Avail: NTIS HC A05/MF A01 CSCL 01A

A Neumann solution for inviscid external flow was coupled to a modified Reshotko-Tucker integral boundary-layer technique, the control volume method of Presz for calculating flow in the separated region, and an inviscid one-dimensional solution for the jet exhaust flow in order to predict axisymmetric nozzle afterbody pressure distributions and drag. The viscous and inviscid flows are solved iteratively until convergence is obtained. A computer algorithm of this procedure was written and is called DONBOL. A description of the computer program and a guide to its use is given. Comparisons of the predictions of this method with experiments show that the method accurately predicts the pressure distributions of boattail afterbodies which have the jet exhaust flow simulated by solid bodies. For nozzle configurations which have the jet exhaust simulated by high-pressure air, the present method significantly underpredicts the magnitude of nozzle pressure drag. This deficiency results because the method neglects the effects of jet plume entrainment. This method is limited to subsonic free-stream Mach numbers below that for which the flow over the body of revolution becomes sonic.
Author

N82-15017*# Boeing Commercial Airplane Co., Seattle, Wash. Preliminary Design Dept.

HIGH LIFT SELECTED CONCEPTS Final Report, Aug. 1977 - Jul. 1978

M. L. Henderson Hampton, Va. NASA Aug. 1979 108 p refs
(Contract NAS1-14742)
(NASA-CR-159093) Avail: NTIS HC A06/MF A01 CSCL 01A

The benefits to high lift system maximum life and, alternatively, to high lift system complexity, of applying analytic design and analysis techniques to the design of high lift sections for flight conditions were determined and two high lift sections were designed to flight conditions. The influence of the high lift section on the sizing and economics of a specific energy efficient transport (EET) was clarified using a computerized sizing technique and an existing advanced airplane design data base. The impact of the best design resulting from the design applications studies on EET sizing and economics were evaluated. Flap technology trade studies, climb and descent studies, and augmented stability studies are included along with a description of the baseline high lift system geometry, a calculation of lift and pitching moment when separation is present, and an inverse boundary layer technique for pressure distribution synthesis and optimization.
A.R.H.

N82-15018*# Boeing Commercial Airplane Co., Seattle, Wash. Preliminary Design Dept.

NATURAL LAMINAR FLOW AIRFOIL ANALYSIS AND TRADE STUDIES Final Report, Aug. 1977 - Jun. 1978

May 1979 86 p refs
(Contract NAS1-14742)
(NASA-CR-159029; B-7220) Avail: NTIS HC A05/MF A01 CSCL 01A

An analysis of an airfoil for a large commercial transport cruising at Mach 0.8 and the use of advanced computer techniques to perform the analysis are described. Incorporation of the airfoil into a natural laminar flow transport configuration is addressed and a comparison of fuel requirements and operating costs between the natural laminar flow transport and an equivalent turbulent flow transport is addressed.
Author

N82-15019*# Oklahoma State Univ., Stillwater. School of Mechanical and Aerospace Engineering.

CORRELATION OF TRANSONIC-CONE PRESTON-TUBE DATA AND SKIN FRICTION Semiannual Progress Report, May - Oct. 1981

T. D. Reed Oct. 1981 144 p refs
(Grant NAG2-76)
(NASA-CR-165065) Avail: NTIS HC A07/MF A01 CSCL 01A

The distribution of Preston tube pressures within turbulent boundary layers along the surface of a sharp-nosed, ten degree cone was correlated with theoretical values of turbulent skin friction for freestream Mach numbers less than one. The mini-basic computer code, the Wu and Lock computer code, and the STAN-5 computer code were used to analyze the data and to solve the boundary layer conservation equations. The skin friction which results from using Preston tube pressures in the correlation equation, has a rms error of 1.125 percent. It was found that the effective center of the probe is not a constant but increases as the surface distance increases. For a specified unit Reynolds number, the effective center of the probe decreases as the Mach number increases. The variation of the fluid (air) properties across the face of the probe may be neglected for subsonic flows. The possible transverse errors caused by the use of the concept of a vitural origin for the turbulent boundary layer were investigated and found to be negligible.
A.R.H.

N82-15020*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

COMPARISON OF TWO AND THREE DIMENSIONAL FLOW COMPUTATIONS WITH LASER ANEMOMETER MEASUREMENTS IN A TRANSONIC COMPRESSOR ROTOR

Rodrick V. Chima and Anthony J. Strazisar 1982 16 p refs
Proposed for presentation at the 27th Gas Turbine Conf., London, 18-22 Apr. 1982; sponsored by ASME
(NASA-TM-82777; E-1007) Avail: NTIS HC A02/MF A01 CSCL 01A

A procedure for using an efficient axisymmetric code to generate downstream pressure input for more costly Euler codes is discussed. Two and three dimensional inviscid solutions for the flow within a transonic axial compressor rotor at design speed are compared to laser anemometer measurements at maximum flow and near stall operating points. Computational details of the 2-D axisymmetric stream function solution and the 3-D full Euler solution are described. Relative Mach number contours, shock location, and shock strength as measured and as predicted by the 3-D code are compared. Downstream of the rotor the inviscid computations agree with each other but predict higher pressure ratios than those measured. Euler codes require a downstream pressure as input. Since that pressure controls the computed mass flow and shock system, it must be consistent with an inviscid solution. E.A.K.

N82-15021# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Theoretische Stroemungsmechanik.

COMPUTATION OF SUBSONIC FLOW AROUND AIRFOIL SYSTEMS WITH MULTIPLE SEPARATION

Klaus Jacob 1981 64 p refs In GERMAN; ENGLISH summary

(DFVLR-FB-81-24) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 13.10

A numerical method for computing the subsonic flow around multielement airfoil systems was developed allowing for flow separation at one or more elements. Besides multiple rear separation, short bubbles on the upper surface and cove bubbles can be taken into account. Also, compressibility effects for pure subsonic flow are accounted for. After presentation the method is applied to several examples and improved in some details. Finally the limitations and desirable extensions are discussed. Author

N82-15022# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.

STABILITY MEASURING AND DISPERSION OF SHELLS WITH DIFFERENT LENGTHS OF LOW AERODYNAMIC DRAG TIP [STABILITETSMAETNING OCH SPRIDNINGSSKJUTNINGAV PROJEKTILER MED OLIKA LAANG LAAGMOTSTAANDSSPETS. MALFOM 4.4831 ETAPP 6]

Sven Nordstroen Jul. 1981 68 p refs In SWEDISH; ENGLISH summary

(FOA-C-20418-D2) Avail: NTIS HC A04/MF A01

All four types had sufficient static (gyroscopic) as well as dynamic stability, except the shortest type at subsonic velocity, where three of six rounds were dynamically unstable, indicating a state of equilibrium at a yaw amplitude of approx. 3 deg. The range increases with increasing nose length. The dispersion is almost independent of the nose length and is of the same magnitude as that of the original HE shell. The only exception is the projectile with the next longest nose at the highest velocity, where an assumed big initial yaw amplitude in some rounds has caused a decrease of the mean range and approx. 65% greater dispersion. A gain in range of 15 to 20 percent relative to the original shell should be obtainable by decreasing the bearing length and increasing the nose length to 3.5 - 4.0 caliber. The short bearing length caused no greater initial yaw than what was measured in several tests with earlier types. A.R.H.

N82-15023*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. Flight Performance Branch of the Sounding Rockets Div.

DEVELOPMENT OF THE ARIES PARACHUTE SYSTEM

William B. Pepper (Sandia National Labs., Albuquerque) and Francis M. Collins 1981 11 p refs Presented at the 7th AIAA Aerodyn. Decelerator and Balloon Technol. Conf., San Diego, Calif., 21-23 Oct. 1981

(Contract DE-AC04-76DP-00789)

(NASA-TM-84082; DE81-012161; SAND-81-0208C; CONF-811002-1) Avail: NTIS HC A02/MF A01 CSCL 01A

The design and testing of a two-stage parachute system to recover a space telescope weighing up to 2000 pounds is described. The system consists of a 15-ft dia ribbon parachute reefed to 50% for 10 seconds and a 73-ft dia paraform or cross second stage reefed to 10% for 10 seconds. The results of eight drop tests and one operational rocket launched flight and recovery are presented. A successful operational recovery of a 1600-lb NASA space telescope was conducted. The payload was launched by a second stage Minuteman rocket to an altitude of about 300 miles above sea level. DOE

N82-15024# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugmechanik.

DESIGN, PERFORMANCE, AND SIMILARITY LAWS OF SUBSONIC PARACHUTES

C. Saliais Bonn Bundesministerium der Verteidigung 1981 39 p refs In GERMAN; ENGLISH summary

(Contract DEA-AF-68-G-7415)

(BMVg-FBWT-81-4) Avail: NTIS HC A03/MF A01; DOKZENTBw, Bonn DM 30

The performance data of ribless subsonic parachutes were determined theoretically and experimentally, with special consideration of scale effects. A theoretical model for parachute behavior during opening was developed, showing satisfactory agreement with experiments on filling force, filling time and load velocity. The Froude number Fr and the massparameter mu/sub T/, i.e., the ratio of the total mass to that of the displaced air, are identified as the most important dimensionless numbers. The parachute strength and stability were also tested and the test facilities and equipment are described. All results and those of similar experiments by other groups were stored in a data bank. Author (ESA)

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N82-15025*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

NASA AVIATION SAFETY REPORTING SYSTEM Quarterly Report

Sep. 1981 57 p refs Prepared in cooperation with Battelle Columbus Labs., Mountain View, Calif.

(NASA-TM-81274; A-8504; QR-13) Avail: NTIS HC A04/MF A01 CSCL 01C

Aviation safety reports that relate to loss of control in flight, problems that occur as a result of similar sounding alphanumerics, and pilot incapacitation are presented. Problems related to the go around maneuver in air carrier operations, and bulletins (and FAA responses to them) that pertain to air traffic control systems and procedures are included. S.L.

N82-15026# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

DETECTION OF OBSTACLES BY LOW FLYING AIRCRAFT

Dietmar Letalick Aug. 1981 42 p refs

(FOA-C-30227-E1) Avail: NTIS HC A03/MF A01

A model which calculates reflection from cylindrical obstacle surfaces, e.g., power cables is presented. Measurements of reflection of 10.6 micron radiation from various types of wires, cables and framework are reported. The measurements were performed in the laboratory using a CO2 laser and direct detection, with the targets a few meters away. Detection at distances of 500 and 1100 m using a coherent laser was also performed. Calculations of detection range for typical situations indicate that detection at km distances is possible. Author (ESA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications*.

N82-15027*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.
AUTOMATED PILOT ADVISORY SYSTEM Final Report
John L. Parks, Jr. and James G. Haidt (Research Triangle Inst., N.C.) Nov. 1981 184 p refs
(NASA-TM-73296) Avail: NTIS HC A09/MF A01 CSCL 17G

An Automated Pilot Advisory System (APAS) was developed and operationally tested to demonstrate the concept that low cost automated systems can provide air traffic and aviation weather advisory information at high density uncontrolled airports. The system was designed to enhance the see and be seen rule of flight, and pilots who used the system preferred it over the self announcement system presently used at uncontrolled airports.
S.L.

N82-15028# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abt. Flugzeugsteuerung und -regelung.
ANALYSIS OF TWO AIR TRAFFIC SAMPLES IN THE TERMINAL AREA OF FRANKFURT AM MAIN, 3 AUGUST 1979
Manfred Schubert and Uwe Voelckers Jun. 1981 119 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-740)
(DFVLR-Mitt-81-17; ESA-TT-740) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 26,50

The random deviation of air traffic arrivals in the terminal area, the different structure of standard arrival routes and a multitude of operational procedures effect the overall planning of arrival traffic. The necessary time-balance between arrivals can be established partly by coordination between approach control and enroute controller and by flight path planning within the terminal area. The effect of the applied control procedures on arrival distributions, traffic handling, traffic sequence, and traffic density in the terminal area are analyzed for the recorded air traffic periods on August 3rd, 1979. The findings are discussed in comparison with the results of a proceeding analysis of approach traffic on August 4th, 1978.
Author

N82-15029# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Arteilung flugzeugsteuerung und -regelung.
ANALYSIS OF TWO AIR TRAFFIC SAMPLES IN THE TERMINAL AREA OF FRANKFURT AM MAIN, 4 AUGUST 1978
Uwe Voelckers, Manfred Schubert, and Albrecht Seyfried Jun. 1981 128 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-739)
(DFVLR-Mitt-81-12; ESA-TT-739) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 28

Two 'arrival peaks' in the near terminal area of Frankfurt/Main were analyzed. Extensive computer-programs were used to combine the recorded data from seven different data-sources. The traffic analysis includes the quantitative evaluation of traffic density, studies of air traffic distributions relating to space and time, the investigation of air traffic control procedures, the determination of the approach control planning strategies and a basic investigation of traffic vectoring in the terminal area. The two traffic samples are discussed and compared.
A.R.H.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-15030*# Boeing Vertol Co., Philadelphia, Pa.
XV-15 TILT ROTOR FLY-BY-WIRE COLLECTIVE CONTROL DEMONSTRATOR DEVELOPMENT SPECIFICATIONS Final Report, Mar. 1981
R. J. Meuleners Mar. 1981 34 p
(Contract NAS2-10160)
(NASA-CR-166262; D210-11819-1) Avail: NTIS HC A03/MF A01 CSCL 01C

A fly by wire system in the collective control system for XV-15 Tilt Rotor Research Aircraft was evaluated. The collective control system was selected because it requires a system tracking accuracy between right and left rotors of approximately 0.1%. The performance characteristics of the collectors axel provide typical axis control response data. The demonstrator is bread boarded as a dual system instead of the triplex system. E.A.K.

N82-15031*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
A THEORETICAL INVESTIGATION OF WING ROCKING Semiannual Status Report, 1 Jul. - 31 Dec. 1981
C. Edward Lan and Chung-Hao Hsu 31 Dec. 1981 36 p refs
(Contract NAG1-134)
(NASA-CR-165058) Avail: NTIS HC A03/MF A01 CSCL 01A

A semiempirical method to predict vortex breakdown effects on aerodynamic characteristics of slender wings is described. The method is based on Polhamus' method of suction analogy. Both longitudinal and lateral directional characteristics are predicted.
S.L.

N82-15032*# Connecticut Univ., Storrs.
STOCHASTIC CONTROL AND IDENTIFICATION OF HELICOPTER DYNAMIC MODES Semiannual Progress Report, 1 Jul. - 31 Dec. 1981
J. Molusis and Y. Bar-Shalom Dec. 1981 35 p refs
(Grant NAG2-72)
(NASA-CR-165057) Avail: NTIS HC A03/MF A01 CSCL 01C

Simulations of ground resonance model with constant and periodic coefficient measurement models were made. The extended Kalman filters, as an identification method, and it's convergence properties were reviewed. Free response data for identification of damping for ground resonance was used and the ground resonance parameter identification results for constant coefficient and periodic coefficient measurement models are presented.
S.L.

N82-15033*# Boeing Co., Seattle, Wash.
SELECTED ADVANCED AERODYNAMIC AND ACTIVE CONTROL CONCEPTS DEVELOPMENT Summary Report, 10 Aug. 1977 - 9 Aug. 1979
Washington, D.C. NASA Jan. 1980 56 p refs
(Contract NAS1-14742)
(NASA-CR-3220; D6-46705) Avail: NTIS HC A04/MF A01 CSCL 01C

A summary is presented of results obtained during analysis, design and test activities on six selected technical tasks directed at exploratory improvement of fuel efficiency for new and derivative transports. The work included investigations into the potential offered by natural laminar flow, improved surface coatings and advanced high lift concepts. Similar investigations covering optimum low-energy flight path control, integrated application of active controls and evaluation of primary flight control systems reliability and maintenance are also summarized. Recommendations are included for future work needed to exploit potential advancements.
Author

N82-15034*# Boeing Commercial Airplane Co., Seattle, Wash.
DEVELOPMENT OF INTEGRATED PROGRAMS FOR

AEROSPACE-VEHICLE DESIGN (IPAD) - IPAD USER REQUIREMENTS Final Report
G. L. Anderton Mar. 1979 103 p
(Contract NAS1-14700)
(NASA-CR-2985; D6-IPAD-70013-D) Avail: NTIS HC A06/MF A01 CSCL 01C

Results of a requirements analysis task for Integrated Programs for Aerospace Vehicle Design (IPAD) are presented. User requirements which, in part, will shape the IPAD system design are given. Requirements considered were: generation, modification, storage, retrieval, communication, reporting, and protection of information. Data manipulation and controls on the system and the information were also considered. Specific needs relative to the product design process are also discussed. M.D.K.

N82-15035# Textron Bell Helicopter, Fort Worth, Tex.
HELICOPTER LANDING GEAR DESIGN AND TEST CRITERIA INVESTIGATION Final Report
David Crist and L. H. Symes Aug. 1981 192 p refs
(Contract DAAK51-79-C-8011; DA Proj. 1L1-62209-AH-76)
(AD-A105512; BHT-699-099-026;
USAAVRADCOM-TR-81-D-15) Avail: NTIS HC A09/MF A01 CSCL 01/3

This program was an investigation of the criteria relating to helicopter landing gears. A computerized literature search was conducted and a bibliography is included in this report. Existing criteria were reviewed and conflicts were identified. An analysis of survivable Army helicopter accidents was performed. The results were used to formulate a tentative criterion. A design study was conducted to evaluate the practicality of the tentative criteria. This investigation compared wheel and skid-type landing gears designed to the tentative criteria and to MIL-S-8698. A crashworthiness analysis of the tentative criteria tailwheel tricycle gear was performed. Weights and landing loads were calculated. A cost comparison was made between tailwheel tricycle gears designed to the two criteria. The gear designed to the new criteria was cost-effective. The results of the investigation were used to modify the tentative criteria and recommendations were made for a new helicopter landing gear military specification and for changes to the existing criteria. Author (GRA)

N82-15036# Fraunhofer-Inst. fuer Informations- und Datenverarbeitung, Karlsruhe (West Germany).
SURVEY OF THE OBSERVER'S PERFORMANCE WITH REMOTELY PILOTED VEHICLES
H. Mutschler Bonn Bundesministerium der Verteidigung 1981 61 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-81-3) Avail: NTIS HC A04/MF A01; DOKZENTBw, Bonn DM 30

The parameters affecting observer performance in air to surface target recognition with remotely piloted vehicles (RPV) under reconnaissance mission conditions and using television sensors are surveyed. The parameters are divided into scene, system and observer parameters. Contrast and context are identified as the most important scene parameters. The system is defined as the RPV and the television system. Image quality, monitor times and resolution are of prime importance and their dependence on flight conditions and the sensor system are discussed. The observer parameters concern the sensory and cognitive capabilities of the observer. A critical evaluation of the combined effects of these parameters leads to the conclusion that RPV operation is capable of only rough and incomplete target recognition. Improvements are expected from image storage applications and, primarily, from image quality improvements. Author (ESA)

N82-15037# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).
ESTIMATION METHODS FOR THE DETERMINATION OF DYNAMIC RESPONSES OF ELASTIC AIRCRAFT
S. Vogel Bonn Bundesministerium der Verteidigung 1981 123 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-81-6) Avail: NTIS HC A06/MF A01; DOKZENTBw, Bonn DM 40

A method for establishing the dynamic response of an elastic aircraft structure to external excitation, such as random gusts or arbitrarily timed maneuver loads is presented. The solution is based on an analytic representation of the admittance functions by partical fractions. The time response frequency dependence of the aerodynamic forces induced by motion are approximated to allow analytical solutions which are shown to be as accurate, but more economical, than more elaborate numerical Fourier methods. Elasticity is introduced through eigenfrequencies and generalized masses. Several examples are shown which also include the influence of control systems and of elasticity on loads and accelerations. Depending on the quality of the structural and aerodynamical input, the method may be used as an estimation method or as an inexpensive approximation method for all dynamic problems in which elasticity, control systems and excitation time lag effects play a role. Author (ESA)

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

N82-15038# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Flugzeugsteuerung und -regelung.
INTEGRATION OF A DIGITAL AIR DATA COMPUTER INTO THE TEST AIRCRAFT HFB-320
Rainer Dombrowsky and Volkmar Adam May 1981 82 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-81-09) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 16

The digital air data computer HG 280 D5 is presented with its essential characteristics, output signals, and failure test facilities. Integration with the measuring equipment of the test aircraft HFB 320 as well as the hard and software developed for the signal interface of the onboard computer are described. The system processes flight data, such as rate of climb and descent, and altitude. Author (ESA)

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-15039*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPUTER PROGRAM FOR AERODYNAMIC AND BLADING DESIGN OF MULTISTAGE AXIAL-FLOW COMPRESSORS
James E. Crouse and William T. Gorrell Dec. 1981 105 p refs Prepared in cooperation with Army Aviation Research and Development Command, St. Louis, Mo.
(NASA-TP-1946; AVRADCOM-TR-80-C-21; E-280) Avail: NTIS HC A06/MF A01 CSCL 21E

A code for computing the aerodynamic design of a multistage axial-flow compressor and, if desired, the associated blading geometry input for internal flow analysis codes is presented. Compressible flow, which is assumed to be steady and axisymmetric, is the basis for a two-dimensional solution in the meridional plane with viscous effects modeled by pressure loss coefficients and boundary layer blockage. The radial equation of motion and the continuity equation are solved with the streamline curvature method on calculation stations outside the blade rows. The annulus profile, mass flow, pressure ratio, and rotative speed are input. A number of other input parameters specify and control the blade row aerodynamics and geometry. In particular, blade element centerlines and thicknesses can be specified with fourth degree polynomials for two segments. The output includes a detailed aerodynamic solution and, if desired, blading coordinates that can be used for internal flow analysis codes. Author

N82-15040*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF FUEL INJECTOR TYPE ON PERFORMANCE AND EMISSIONS OF REVERSE-FLOW COMBUSTOR

Carl T. Norgren and Stephen M. Riddlebaugh Dec. 1981 40 p refs

(NASA-TP-1945; E-556) Avail: NTIS HC A03/MF A01 CSCL 21E

The combustion process in a reverse-flow combustor suitable for a small gas turbine engine was investigated to evaluate the effect of fuel injector type on performance and emissions. Fuel injector configurations using pressure-atomizing, spill-flow, air blast, and air-assist techniques were compared and evaluated on the basis of performance obtained in a full-scale experimental combustor operated at inlet conditions corresponding to takeoff, cruise, low power, and idle and typical of a 16:1-pressure-ratio turbine engine. Major differences in combustor performance and emissions characteristics were experienced with each injector type even though the aerodynamic configuration was common to most combustor models. Performance characteristics obtained with the various fuel injector types could not have been predicted from bench-test injector spray characteristics. The effect of the number of operating fuel injectors on performance and emissions is also presented. Author

N82-15041*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

INTERACTIVE-GRAPHIC FLOWPATH PLOTTING FOR TURBINE ENGINES

Robert R. Corban Nov. 1981 51 p refs

(NASA-TM-82756; E-1074) Avail: NTIS HC A04/MF A01 CSCL 21E

An engine cycle program capable of simulating the design and off-design performance of arbitrary turbine engines, and a computer code which, when used in conjunction with the cycle code, can predict the weight of the engines are described. A graphics subroutine was added to the code to enable the engineer to visualize the designed engine with more clarity by producing an overall view of the designed engine for output on a graphics device using IBM-370 graphics subroutines. In addition, with the engine drawn on a graphics screen, the program allows for the interactive user to make changes to the inputs to the code for the engine to be redrawn and reweighed. These improvements allow better use of the code in conjunction with the engine program. T.M.

N82-15042 Ecole Polytechnique Federale de Lausanne (Switzerland). Inst. de Thermique Appliquee.

AEROELASTICITY IN TURBOMACHINES

P. Suter, ed. Zurich Juris-Verlag 1981 487 p refs Proc. of 2nd Intern. Symposium, Lausanne, Switzerland, 8-12 Sep. 1980

(EPFL-ITA-10; ISBN-3-260-04871-5) Avail: Issuing Activity

The understanding and prevention of failures in turbomachines caused by aeroelastic blade vibrations is considered. Calculation of subsonic cascades, cascade tests, vibration measurements and annular cascade tests, unsteady supersonic flow in cascades, and theoretical methods are discussed. For individual titles, see N82-15043 through N82-15070.

N82-15043 Akademiya Nauk SSSR, Novosibirsk. Inst. of Hydrodynamics.

CALCULATION OF HYDRODYNAMIC INTERACTION OF THE ARBITRARY PROFILE CASCADES IN THE FLOW OF IDEAL LIQUID

V. E. Saren and V. A. Yudin *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 17-26 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

The influence of blade shape on the intensity of cascades potential interaction and the influence of vortex wakes on the forces emerging on the downstream cascade blades are examined. Hydrodynamic interaction of two mutually moving blade cascades is based, first, on the displacement of each cascade in nonuniform potential flow in the neighborhood of the adjacent cascade (potential interaction) and, second, on the intersection of vortex wakes due to boundary layer coming off the upstream cascade blades (vortex interaction) by the downstream cascade blades. The contribution of either mechanism to nonstationary lift depends presumably on the axial distance between cascades and on cascade blade shape. Comparison results of the calculations of potential interaction and the interaction including vortex wakes with experimental data show that both models correctly reflect the qualitative nature of the nonstationary force to time relationship. Author (ESA)

N82-15044 Tennessee Univ., Tullahoma. Space Inst.

AERODYNAMIC ANALYSIS OF CASCADED AIRFOILS IN UNSTEADY ROTATIONAL FLOW

John E. Caruthers *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 31-64 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

An analytical numerical method for the prediction of wake and vibration-induced unsteady pressure distributions acting on thick, cambered airfoils in cascade is presented. The unsteady method is two dimensional, rotational and compressible. The unsteady flow field is treated as a small nonpotential perturbation about a mean nonlinear potential flow field. The unsteady velocity field is further split into potential and nonpotential parts. Linearized field equations are obtained for the perturbation entropy, vorticity, rotational velocity, and perturbation potential which are solved successively, using a combination of analytical and numerical methods. The pressure distributions on the airfoil surfaces are obtained after solution of the field equations from the integrated linearized momentum equation. Comparisons are made with results for rigid body translation of a 20% thick double circular arc airfoil and for flat plate cascades. Computations are also made for wake gust excitation of a cambered compressor stator. Author (ESA)

N82-15045 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Aeroelastik.

UNSTEADY PRESSURE DISTRIBUTIONS IN A CASCADE TAKING INTO ACCOUNT PROFILE THICKNESS AND STEADY CIRCULATION

V. Carstens *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 65-83 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

Based on the assumption of an inviscid incompressible flow, the Martensen procedure for calculating unsteady pressure and lift on harmonically oscillating cascades with arbitrarily shaped profiles is described. Application of this procedure then allows the description of parameter interaction in a very complicated, but linear integral equation. Numerical calculations were performed for bending oscillations with the two standard profiles NACA 0012 and NACA 8412. The results for pressure distributions are presented, showing the influence of reduced frequency, turning angle and profile shape. The sharp increase in unsteady blade loading when the reduced frequency is doubled accompanied by a phase shift between real and imaginary parts is revealed. It seems that aerodynamic damping represented by the imaginary part of the pressure, increases with growing turning angle, whereas the real part remains nearly constant. Author (ESA)

N82-15046 Cambridge Univ. (England). Dept. of Engineering.

FORCE AND MOMENT COEFFICIENTS FOR HIGH DEFLECTION CASCADES

D. S. Whitehead and R. J. Grant (Central Electricity Generating Board, Southampton, England) *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 85-127 refs Sponsored by Rolls Royce Ltd. (For primary document see N82-15042 06-07)

Avail: Issuing Activity

A computer program using a finite element approach for the prediction of force and moment coefficients for the vibration of compressor and turbine blades having a large amount of deflection of the mean flow is explained. The program is limited to subsonic inlet and outlet flows (but can deal with local supersonic patches) and to flow without inlet vorticity and without shock waves. In order to deal with the effects of camber, incidence, or blade thickness, the unsteady flow is assumed to be a small perturbation of a steady flow with substantial deflection of the fluid as it passes through the cascade. For blades which have substantial camber and thickness, as is usual with turbine blades, it is necessary to use a field method of calculation; hence finite elements. Results for the moment coefficients on a turbine cascade show good agreement with experiment. Author (ESA)

N82-15047 Tokyo Univ. (Japan). Inst. of Space and Aeronautical Sciences.

AERODYNAMIC RESPONSE OF A BLADE IN PITCHING OSCILLATION WITH PARTIAL AND FULL SEPARATION

H. Tanaka, I. Fujimoto, and S. Ishii *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 129-142 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

The aerodynamic responses of a blade in pitching oscillation with separation bubble and trailing edge separation are analyzed, and the mechanism of energy transfer between the oscillating blade and the air flow is elucidated. In the state of partial separation and leading edge separation, the aerodynamic response of a Goe801 model airfoil vibrating in pitching motion around a midchord of the blade was observed in a blowdown low speed wind tunnel. The dynamic pressure distribution along the blade surface was measured. By considering physical phenomena on the blade surface, it is understood how the phase shift of the unsteady pressure on the blade surface is affected by the deformation of the pressure wave caused by the movement of the reattaching point of the separation bubble and the separation point of trailing edge separation. Author (ESA)

N82-15048 Ecole Polytechnique Federale de Lausanne (Switzerland).

DAMPING FOR TURBOMACHINE BLADE VARIATIONS IN SUBSONIC FLOW

G. S. Pisarenko, A. A. Kaminer, V. A. Balalayev, N. Y. Nastenko, A. L. Stelmach, and A. V. Dunayev *In its* Aeroelasticity in Turbomachinery 1981 p 151-161 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

The reduction of dynamic stresses in turbomachine blades through an increase in aerodynamic damping of blade vibration is discussed. The influence of camber and stagger angle are investigated. An aeroelastic damping analysis for the case of stalled flow is presented. An experimental investigation of aerodynamic damping for planar bending and torsional vibrations of a flat cascade of model blades was carried out. In the range of camber variation from 0.025 to 1.0 dependence turns out not to be substantial; increased aerodynamic damping that never exceeds 10 to 15% accompanies an increase in camber. The influence of stagger angle on damping is also revealed to be relatively slight for angle variations from 0 to 60 deg.
Author (ESA)

N82-15049 Toshiba Research and Development Center, Kawasaki (Japan). Research and Development Center.

SELF EXCITED FLOW OSCILLATION IN THE LOW PRESSURE STEAM TURBINE CASCADE

T. Araki, Y. Okamoto, and F. Ohtomo *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 171-186 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

The problem of unsteady flow in a turbine cascade with subsonic inlet and supersonic outlet flow was approached through experiments. The type of flow considered occurs at the tip of the last stages of low pressure steam turbine rotors. Experiments were made on a linear cascade over a range of outlet Mach numbers up to 1.8. The measurements included unsteady flow visualization by the Schlieren method and time traces of pressure on the blade surface by transducers on nonoscillating and oscillating blades. In addition, unsteady aerodynamic moments were measured. Results show that the transonic flow field at the tip section of the rotor blades of large steam turbines is steady, operating at rated conditions. Operating under partial load, the steady flow breaks down. Aerodynamic damping in pitching motion for unsteady flow conditions is negative, leading to the possibility that self excited vibration exists in the case of a free standing blade. Author (ESA)

N82-15050 Notre Dame Univ., Ind. Dept. of Aerospace and Mechanical Engineering.

STABILITY AND FLUTTER ANALYSIS OF TURBINE BLADES AT LOW SPEED

T. J. Akai and H. Atassi *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 187-201 refs (For primary document see N82-15042 06-07)
(Contract F49620-76-C-0014)

Avail: Issuing Activity

An aeroelastic analysis for highly loaded turbine blades at low speed is carried out for various vibratory modes. These include pure bending and torsion as well as coupled oscillatory modes. The analysis is based on a complete aerodynamic theory which fully accounts for the blade geometry, flow conditions and cascade parameters. A damping coefficient simulating structural damping is also included. The results clearly show that classical flutter can occur for low speed turbine cascades at typical operating conditions. This is directly attributable to high blade loading and thickness. Author (ESA)

N82-15051 Akademiya Nauk SSSR, Novosibirsk. Inst. of Hydrodynamics.

CALCULATION OF QUASI-STATIONARY AERODYNAMIC FORCE ACTING ON A CASCADE OF OSCILLATING AIRFOILS IN SUBSONIC FLOW

V. B. Kurzin and V. P. Ryabchenko *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 203-210 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

Nonstationary aerodynamic characteristics of the cascade of thin airfoils in a subsonic gas flow are investigated showing that the influence of gas compressibility on their behavior can be characterized by two parameters: Mach number M and the wave number K. For the cascade of arbitrary airfoils, a theoretical statement of this problem for K tends to zero is considered; here nonstationary aerodynamic characteristics of the cascade are described well by their quasi-stationary approximation. A mathematical model of the nonstationary ideal gas flow at subsonic velocities through an arbitrary airfoil cascade in a quasi-stationary state is formulated. In accordance with the model, functions for the velocity potential wholly define the nonstationary gas flow through the cascade in a quasi-stationary approximation at any time moment. The determination problems for these functions are solved, using Chaplygin's approximation. Author (ESA)

N82-15052 Ecole Polytechnique Federale de Lausanne (Switzerland). Inst. de Thermique Appliquee.

NUMERICAL EXPERIMENTS ON UNSTEADY FLOWS THROUGH VIBRATING CASCADES

Maurizio Pandolfi *In its* Aeroelasticity of Turbomachines 1981 p 211-228 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

A numerical approach is presented for computing the inviscid compressible two-dimensional unsteady flow in a vibrating cascade. The full Euler equations are considered and no restrictive assumptions are required about geometry of the blading. The analysis is confined to subsonic flows. The modeling of the boundaries and the numerical methodology is described. Particular attention is paid to the explicit treatment of the wake behind the blade during the unsteady flow. Checks on the accuracy of the computations are made. Calculation results on the steady shockless transonic flow in an impulse cascade, where the exact solution is available, show acceptable agreement at least for the space-like discretization. Further evaluation of accuracy is hindered by a lack of benchmark solutions with which to compare. Author (ESA)

N82-15053 Ecole Polytechnique Federale de Lausanne (Switzerland).

COMPUTER AIDED INVESTIGATION OF TURBOMACHINE AERODYNAMICS AND AEROELASTICITY

S. M. Belotserkovskii, A. S. Volmir, V. V. Kuleshov, M. I. Nisht, G. U. Stepanov, and R. M. Ejodorov *In its* Aeroelasticity of Turbomachines 1981 p 229-249 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

Computer aided solutions of aeroelasticity problems related to turbomachines are presented. A synthesis of numerical methods from nonstationary aerodynamics and elasticity theory are employed. Solutions derive from an understanding of general characteristics and aerodynamic loads acting on each turbomachine blade while taking into account the interference of the blades and blade rows. Aerodynamic stationary characteristics, aerodynamic derivatives at various values of the vibration frequencies, and aerodynamic characteristics with arbitrary dependence of the kinematic parameters on time were investigated. Elastic deformation of blade and blade/disk systems is explained. A flow chart for the computerized evaluation of these phenomena is shown, the results of which support a turbomachine aeroelasticity mathematical model. Author (ESA)

N82-15054 Mitsubishi Heavy-Industries Ltd., Nagasaki (Japan). Nagasaki Technical Inst.

ON THE NUMERICAL ANALYSIS OF STALL FLUTTER IN TURBINE CASCADES

S. Takahara, T. Adachi, and Y. Kadoya *In* Ecole Polytechnique de Lausanne Aerolasticity of Turbomachines 1981 p 251-262 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

A numerical method using a triangular finite element mesh pattern is applied in order to solve the problem of unsteady stalled flow through a turbine cascade. The flow in the blade-to-blade plane is assumed to be viscous, and in addition, the friction drag on the blade surface is considered. The basic equations for two-dimensional compressible viscous flow are described. Boundary conditions and a vibration condition are also explained. Numerical results for low pressure end blades of a steam turbine are compared with flutter test data on aerodynamic damping and satisfactory agreement is obtained between calculation and experiment. Author (ESA)

N82-15055 Imperial Coll. of Science and Technology, London (England).

A METHOD FOR FORCE DETERMINATION FROM VIBRATION RESPONSE MEASUREMENTS

D. J. Ewins and B. Hillary *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 263-283 refs Sponsored by Rolls Royce Ltd. (For primary document see N82-15042 06-07)

Avail: Issuing Activity

Dynamic force determination from response measurements was studied numerically and experimentally. Application to turbomachine blades undergoing steady or transient vibration is considered. In theory, the case of harmonic excitation and response is expressed as an inverse input/output equation. A cantilever beam and an isolated turbomachine blade were used as test pieces for the experimental study. Results show that application of the pseudoinverse force determination method is subject to a form of conditioning in the region of the fundamental mode. However, the results of tests on an actual compressor blade suggest that with very accurate dynamic modeling of the test structure and careful curve fitting this method is feasible, using current techniques and equipment. Author (ESA)

N82-15056 Brown, Boveri and Co., Ltd., Baden (Switzerland).

CONTROL OF VIBRATION IN AEROELASTIC CASCADE EXPERIMENTS

A. Krischner, B. Fosco, and E. Muller *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 285-295 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

The aeroelastic behavior of an annular, transonic turbine cascade with three degrees of freedom and an electromagnetic excitation system was investigated. Excitation and vibration control which allows measurement of effective damping in the stable operating domain of the cascade is discussed. The vibration control system demonstrates its capability to maintain preset vibration amplitudes and interblade phase angles throughout the resonance range if sufficient damping is present. Author (ESA)

N82-15057 New South Wales Univ., Kensington (Australia). School of Mechanical and Industrial Engineering.

STABILITY ANALYSIS OF THE TWIN MODE MODEL OF COUPLED FLEXION/TORSION VIBRATIONS IN TURBOFANS

R. A. J. Ford *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 297-308 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

The twin mode representation of coupled flexion/torsion vibrations in turbofans, a linear feedback system which depicts flutter as a system instability, is reviewed. An analysis which uses classical automatic control theory is presented. A stability analysis for zero phase lag on aerodynamic coupling is developed. A transfer function for the system is found, and determination of stability using Routh's criterion is explained. A more versatile characterization of flutter behavior for the twin orthogonal mode model results. Author (ESA)

N82-15058 Rolls-Royce Ltd., Derby (England). Aero Div.

AERODYNAMIC CONSIDERATIONS IN THE PREDICTION OF UNSTALLED SUPERSONIC FLUTTER IN TRANSONIC FANS

D. G. Halliwell *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 309-322 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

Two methods for the prediction of unsteady lift and moment coefficients for blades with supersonic entry flow pertaining to coupled flutter in turbofans are discussed. The first method uses a linearized supersonic model, with only weak pressure waves, while the second uses a strong normal shock model, however both are based on flat plate cascades. A basic problem in the application of the first model is discussed and a correction procedure to obtain a more rational solution is suggested. For the second model, although its shock structure is closer to the real case, overall comparison with experiment shows no improvement on the simpler model. However, results are qualitatively consistent with implied working line differences. Author (ESA)

N82-15059 Kyushu Univ., Fukuoka (Japan). Dept. of Aeronautical Engineering.

EFFECT OF MEAN BLADE LOADING ON SUPERSONIC CASCADE FLUTTER

M. Namba and R. Minami *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 323-332 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

A theory for supersonic cascade flutter with nonzero mean blade loadings was developed. An inviscid supersonic flow past a rectilinear two-dimensional cascade with subsonic leading edge locus was investigated. The theory allows for the effect of displacement of mass source and body force singular points which represent blades with nonzero thickness and mean lift force, but it neglects the effect of deviation of the local convection velocity and local speed of sound from the undisturbed uniform ones. The theory also predicts the occurrence of supersonic bending flutter at higher blade loadings. Author (ESA)

N82-15060 Technische Hochschule, Aachen (West Germany). Inst. fuer Strahlantriebe und Turboarbeitsmashinen.

A METHOD OF CHARACTERISTICS SOLUTION FOR A FINITE OSCILLATING SUPERSONIC CASCADE WITH THICKNESS EFFECTS

K. Vogeler *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 333-347 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

A method of characteristics approach to a nonlinear oscillating supersonic cascade is presented. The method is extended to a complete cascade computation for cascades with blades of nonzero thickness on the upper and lower sides. The flow field behind a single oscillating airfoil in a supersonic flow is treated and compared with an analytical flat plate solution. The technique is merged with an existing algorithm. The performance is compared with flat plate and slender blade solutions for infinite cascades. The effect of slender blades in comparison with flat plates on the unsteady aerodynamic response of an oscillating supersonic cascade are calculated for a nonlinear cascade in both the subresonant and superresonant region. Author (ESA)

N82-15061 Akademiya Nauk SSSR, Novosibirsk. Inst. of Hydrodynamics.

CALCULATION OF NONSTATIONARY FORCE RATIOS ON BLADES OF A ROTATING ROW IN INCOMPRESSIBLE FLOW

V. P. Ryabchenko *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 349-356 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

A numerical solution to a three-dimensional problem of unsteady vortex-free (in the coordinate system coupled with the cascade) flow of ideal incompressible fluid past a rotating annular cascade, based on propeller vortex and finite wing span theory, is presented. The geometry of blade edge is modeled as an annular cascade whose blades are parts of helical surfaces. Aerodynamic force calculations are given only for a large number of blades since it is essential to this method. Analysis results also show the effect of flow three-dimensionality on aerodynamic forces acting on the annular cascade blade when their number is small. Author (ESA)

N82-15062 Tokyo Univ. (Japan). Dept. of Aeronautics.

THREE-DIMENSIONAL ANALYSIS OF CASCADE FLUTTER IN PARALLEL SHEAR FLOW

S. Kaji, H. Takata, and N. Niwa *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 357-370 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

The effect of spanwise nonuniformity of stream velocity as well as that of oscillation amplitude on flutter characteristics were studied. The main stream is assumed incompressible and to be a parallel shear flow with linear velocity profile. Flutter characteristics vary in spanwise direction in accordance with the variation of flow incidence and flow velocity. The cascade model of a semiactuator disk composed of a number of flat plate blades undergoing bending oscillation is used. It is indicated that the flow shear effect becomes noticeable in connection with oscillation modes. For uniform oscillation it is weak and for linear and quadratic modes it is significant. It is found that weak shear deteriorates aerodynamic damping and extends the unstable frequency range. Author (ESA)

N82-15063 Imperial Coll. of Science and Technology, London (England). Dept. of Aeronautics.

THE EFFECT OF ASPECT RATIO ON THE UNSTEADY AERODYNAMIC FORCES INDUCED BY VIBRATION OF A CASCADE BLADE

J. M. R. Graham and I. Kullar *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 371-381 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

A correction for three dimensionality made to strip theory when calculating the aerodynamic forces due to vibration of a cascade blade in incompressible flow is discussed. The three dimensional effects arise from the spanwise variation of unsteady velocity induced at the blade by the mode of vibration. Results are presented for simple cantilever type modes of vibration, using a three dimensional unsteady cascade theory for the Fourier transform of the spanwise upwash distribution. An integral equation is formulated which is solved numerically. The integral equation is also used to derive a perturbation solution for the correction terms as a series in inverse powers of the blade aspect ratio. The effect of three dimensionality on the critical reduced frequency for torsional flutter. Author (ESA)

N82-15064* Notre Dame Univ., Ind. Dept. of Aerospace and Mechanical Engineering.

THREE-DIMENSIONAL PERIODIC DISTURBANCES ACTING UPON AIRFOILS IN CASCADE

H. Atassi *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 383-398 refs (For primary document see N82-15042 06-07)

(Grant NsG-3195; Contract F49620-76-C-0014)

Avail: Issuing Activity CSCL 21E

A theory for three dimensional periodic gusts interacting with loaded airfoils was developed. The unsteady disturbances are linearized with respect to the mean potential flow of the airfoils. The vorticity transport equation is integrated analytically in a Lagrangian form. The vorticity vector shows strong variations in its magnitude and wavelength as it interacts with the flow field of a lifting airfoil. The streamwise component of vorticity increases significantly with flow acceleration and flow turning. The rectangular fan approximation is used and a single Helmholtz equation is derived that characterizes the unsteady three dimensional flow field. Author (ESA)

N82-15065 Ecole Polytechnique Federale de Lausanne (Switzerland).

PRACTICAL EXPERIENCE WITH A NONCONTACT BLADE VIBRATION MEASURING SYSTEM IN INDUSTRIAL TURBOCOMPRESSORS

R. Jenny, C. Gremli, and H. B. Guemoes *In its* Aeroelasticity in Turbomachines 1981 p 419-428 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

Blade vibration measurement with noncontact stationary probes in turbomachines is discussed. Due to the low sampling rate, the problem of nondefinite vibration reconstruction arises. This complicates vibration mode identification which is necessary for stress calculation. A method of probability analysis of the stress amplitude in connection with frequency analysis is presented. Two examples are given and blade flutter and rotating stall identification from turbocompressor measurements are shown. Author (ESA)

N82-15066 Tokyo Univ. (Japan). Inst. of Space and Aeronautical Science.

INLET DISTORTION AND BLADE VIBRATION IN COMPRESSIBLE FLOW BETWEEN PARALLEL WALLS

Y. Tanida and T. Nagashima *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 429-441 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

The two dimensional semiactuator disk model which obtains a three dimensional disturbance model with uniform mean flow between parallel walls is discussed. The inertial effects of the fluid inside the blade passages and the distortion induced vibration of rotor blades are considered. Under the assumption of small perturbations on compressible, isentropic, uniform mean flow, the equations of continuity, momentum and the isentropic flow relationship are linearized. Perturbations outside the cascade and cascade field perturbations are solved. The solutions in the usptream, cascade, and downstream flow fields are matched at the leading and trailing edges of the cascade by conservation laws of mass, momentum and total enthalpy. Bending vibration of blades is derived. Author (ESA)

N82-15067 Tennessee Univ., Tullahoma. Space Inst.

LINEAR AND NONLINEAR ANALYSIS OF VORTEX WHISTLE: ANOTHER BLADE BUSTER

M. Kurosaka *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 443-453 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

A flow induced vibration problem in gas turbines, the vortex whistles, is discussed. The whistle is caused by high swirl flow and its characteristics are such that the frequency of fluctuation is discrete (a pure tone). The frequency becomes higher as the swirl or flow rate increases. An incident of vortex whistle is cited. Besides dynamic behavior of the flow field, the data reveal an unexpected change in the steady or time averaged flow field when the whistle is present. It is implicated that dynamic flow can affect even the steady flow field in turbomachinery, which causes damage. Author (ESA)

N82-15068 Mitsubishi Heavy-Industries Ltd., Takasago (Japan). Tagasago Technical Inst.

STUDY OF ACOUSTIC RESONANCE OF CASCADES

M. Honjo and T. Tominaga *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 455-464 refs (For primary document see N82-15042 06-07)

Avail: Issuing Activity

The discrete sound generated by guide vanes was investigated experimentally. A two dimensional cascade test and a three dimensional duct guide vane model test were carried out. It is shown that the discrete noise generated by guide vanes is an

acoustic resonance effect in the flow path of the vanes. The main excitation source which induces resonance is wake vortex shedding off the trailing edges of the vanes. Bubble vortices on the concave surfaces or leading edges are not excitation sources.
Author (ESA)

N82-15069# Akademiya Nauk SSSR, Novosibirsk. Inst. of Hydrodynamics.
ASPECTS OF ACOUSTIC RESONANCE PHENOMENA IN TURBOMACHINES c08
V. B. Kurzin *In* Ecole Polytechnique de Lauzanne Aeroelasticity of Turbomachines 1981 p 465-468 refs (For primary document see N82-15042 06-07)
Avail: Issuing Activity

Natural gas oscillations around a cascade of blades and of the acoustic resonance phenomenon was analyzed. Emanation conditions allow exponential growth of natural functions at infinity. The solution is based on the adhesion method, using Green's formula for a triangular domain. Under solution periodicity along the cascade front, the discreteness of problem eigenvalues is proven and the domain of their existence is defined. A numerical analysis of the dependencies of complex eigenvalues on the Mach number of the oncoming flow, on pitch and on cascade stagger angle is made.
Author (ESA)

N82-15070 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany).
TECHNICAL EVALUATION REPORT ON THE AEROELASTICITY IN TURBOMACHINES SYMPOSIUM
H. Foershing *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 469-477 refs (For primary document see N82-15042 06-07)
Avail: Issuing Activity

Papers presented at the symposium on aeroelasticity in turbomachines are reviewed. Emphasis is on fluid mechanics of aeroelasticity in turbomachines, motion induced fluid dynamic forces, and unsteady fluid dynamic disturbance forces along with forced blade vibrations. Also covered are classic blade flutter, stalled flow, stall flutter and other unsteady phenomena.
Author (ESA)

N82-15071# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Werkstoff-Forschung.
COST 50: MATERIALS FOR GAS TURBINES Progress Report
Wolfgang Bunk and Joern Hansen 7 Jun. 1981 126 p refs Partly in GERMAN and ENGLISH
Avail: NTIS HC A07/MF A01

Welding tests with samples U 700 PM/U were performed varying the welding parameters within a wide area. Good bonding qualities could only be achieved using high welding temperatures. Contaminants and oxide inclusions in the welding zone were eliminated by using a multiple chemical cleaning procedure combined with an additional annealing of the separated specimen halfs under high vacuum conditions immediately before welding. Diffusion bonding experiments for welding IN 100 PM/IN 100 PM were carried out within a temperature range between 870 and 1100 C. Welds below 1000 C resulted in unsatisfactory bonds. Promising but not yet enough reproducible bonding strength could be obtained at welding temperatures between 1050 and 1100 C. Using special hot tensile test equipment, which is linked to an electron scanning microscope, the origin and progress of fracture processes were investigated for selected diffusion welded samples of U 700 PM. In the field of electron-beam welding some more outgassing experiments were carried out using different PM-materials of Udimet 700/Astroloy and IN 100 including wire material. Results show differences, expecially in the argon-, hydrogen- and carbon-contents. To get more exact data, similar experiments should be performed within small UHV-equipment.
Author

N82-15072# Thyssen Giesserei A.G., Bochum (West Germany). Feingusswerk.
INVESTIGATION CONCERNING THE PRODUCTION OF TURBINE BLADES AND VANES USING HIGH TEMPERATURE HIGH STRENGTH IN-SITU COMPOSITES Final Report, Jul. 1980
Adolf Donner Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 90 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-039; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,90

Techniques of directional solidification for air cooled turbine blades and vanes made of eutectic alloys were evaluated based on results for rod-like specimens. Directionally solidified eutectic alloys (in situ composites) show superior creep properties in comparison with common superalloys used both in aeronautical and industrial gas turbines. An adequate facility for the process of directional solidification (D S) was designed and built; suitable D S parameters, ceramic shell molds and ceramic cores were developed. The results of the experiments prove the possibility of production of air cooled aeronautical engine blades and vanes by application of the D S process on eutectic alloys of type C 73, using ceramic cores. The D S process is also satisfactory as to the production of large blades for industrial gas turbines. Regarding the macrostructure of large internally cooled vanes, the process still needs improvement. Author (ESA)

N82-15073# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
ADVANCED COMPRESSOR COMPONENTS. PHASE 1: 1978 TO 1979 Final Report, May 1980
Wolfgang Weiler, Franz Strasser, Eberhard Knodel, and Herbert Merz Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 250 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-025; ISSN-0170-1339) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 42,50

An advanced 800 kW aero engine type compressor was developed. The design is of the axial centrifugal type where the cascades of the axial part have supercritical profiles. Detailed layouts are shown and the aerodynamic design and optimization techniques for the cascades are given. The application of fiber reinforced materials is actively investigated for both the compressor housing and its rotor and a detailed catalog of the various functions of and solicitations for such materials is appended.
Author (ESA)

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-15074*# Calspan Advanced Technology Center, Buffalo, N.Y.
IN-FLIGHT INVESTIGATION OF THE EFFECTS OF PILOT LOCATION AND CONTROL SYSTEM DESIGN ON AIRPLANE FLYING QUALITIES FOR APPROACH AND LANDING Final Report
Norman C. Weingarten and Charles R. Chalk Jan. 1982 215 p refs Sponsored jointly by Dryden Flight Research Facility and USAF Flight Dynamis Labs.
(Contract F33615-79-C-3618)
(NASA-CR-163115; CALSPAN-6645-F-7) Avail: NTIS HC A10/MF A01 CSCL 01C

The handling qualities of large airplanes in the approach and landing flight phase were studied. The primary variables were relative pilot position with respect to center of rotation, command path time delays and phase shifts, augmentation schemes and levels of augmentation. It is indicated that the approach and landing task with large airplanes is a low bandwidth task. Low equivalent short period frequencies and relatively long time delays are tolerated only when the pilot is located at considerable distance forward of the center of rotation. The control problem experienced by the pilots, when seated behind the center of rotation, tended to occur at low altitude when they were using visual cues of rate of sink and altitude. A direct lift controller improved final flight path control of the shuttle like configurations. E.A.K.

N82-15075*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LONGITUDINAL AND LATERAL STATIC STABILITY AND CONTROL CHARACTERISTICS OF A 1/6-SCALE MODEL OF A REMOTELY PILOTED RESEARCH VEHICLE WITH A SUPERCRITICAL WING
Thomas A. Byrdsong and James B. Hallissy May 1979 118 p refs
(NASA-TP-1360; L-12059) Avail: NTIS HC A06/MF A01 CSCL 01C

An investigation was conducted in the Langley 8-foot transonic pressure tunnel to determine the longitudinal and lateral-directional static stability and control characteristics of a 1/6-scale force model of a remotely piloted research vehicle. The model was equipped with a supercritical wing and employed elevons for pitch and roll control. Test conditions were as follows: Reynolds number of about 6.6 x 10 to the 6th power per meter, variations of sideslip from -6 deg to 6 deg, elevon deflection angle (symmetrically and asymmetrically) from -9 deg to 3 deg, and rudder deflection angle from 0 deg to -10 deg. The model was longitudinally statically stable at angles of attack up to about 7 deg, which is significantly greater than the angle of attack for the cruise condition (approximately 4 deg). In the range of test Mach numbers, the model was directionally stable and had positive effective dihedral, sufficient pitch control, and positive effectiveness of roll and yaw control. Author

N82-15076*# Lockheed-California Co., Burbank.
ACCELERATED DEVELOPMENT AND FLIGHT EVALUATION OF ACTIVE CONTROLS CONCEPTS FOR SUBSONIC TRANSPORT AIRCRAFT. VOLUME 1: LOAD ALLEVIATION/EXTENDED SPAN DEVELOPMENT AND FLIGHT TESTS Final Report
J. F. Johnston Sep. 1979 261 p refs
(Contract NAS1-14690)
(NASA-CR-159097; LR-29003-1-Vol-1) Avail: NTIS HC A12/MF A01 CSCL 01C

Active wing load alleviation to extend the wing span by 5.8 percent, giving a 3 percent reduction in cruise drag is covered. The active wing load alleviation used symmetric motions of the outboard ailerons for maneuver load control (MLC) and elastic mode suppression (EMS), and stabilizer motions for gust load alleviation (GLA). Slow maneuvers verified the MLC, and open and closed-loop flight frequency response tests verified the aircraft dynamic response to symmetric aileron and stabilizer drives as well as the active system performance. Flight tests in turbulence verified the effectiveness of the active controls in reducing gust-induced wing loads. It is concluded that active wing load alleviation/extended span is proven in the L-1011 and is ready for application to airline service; it is a very practical way to obtain the increased efficiency of a higher aspect ratio wing with minimum structural impact. T.M.

N82-15077*# Lockheed-California Co., Burbank.
ACCELERATED DEVELOPMENT AND FLIGHT EVALUATION OF ACTIVE CONTROLS CONCEPTS FOR SUBSONIC TRANSPORT AIRCRAFT. VOLUME 2: AFT C.G. SIMULATION AND ANALYSIS Final Report
D. M. Urie Hampton, Va. NASA Sep. 1979 89 p
(Contract NAS1-14690)
(NASA-CR-159098; LR-29003-Vol-2) Avail: NTIS HC A05/MF A01 CSCL 01C

Relaxed static stability and stability augmentation with active controls were investigated for subsonic transport aircraft. Analytical and simulator evaluations were done using a contemporary wide body transport as a baseline. Criteria for augmentation system performance and unaugmented flying qualities were evaluated. Augmentation control laws were defined based on selected frequency response and time history criteria. Flying qualities evaluations were conducted by pilots using a moving base simulator with a transport cab. Static margin and air turbulence intensity were varied in test with and without augmentation. Suitability of a simple pitch control law was verified at neutral static margin in cruise and landing flight tasks. Neutral stability was found to be marginally acceptable in heavy turbulence in both cruise and landing conditions. Author

N82-15078# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abt. Flugzeugsteuerung und -regelung.
AN OBSERVER APPROACH TO THE IDENTIFICATION AND ISOLATION OF SENSOR FAILURES IN FLIGHT CONTROL SYSTEMS Ph.D. Thesis - Tech. Univ., Carolo-Wilhelmina, West Germany
Norbert Stuckenberg Jul. 1981 140 p refs Report will also be announced as translation (ESA-TT-738)
(DFVLR-FB-81-26; ESA-TT-738) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 32

A reliability concept for flight control sensors is presented providing a duplex sensor configuration with fail-operational capabilities by using analytical redundancy with deterministic observers. Without disregarding disturbances and plant parameter variations the identification performance is evaluated with respect to the failure signal properties. The concept is applied to a command and stability augmentation system for the lateral motion of the executive aircraft HFB 320. Author

N82-15069# Akademiya Nauk SSSR, Novosibirsk. Inst. of Hydrodynamics.
ASPECTS OF ACOUSTIC RESONANCE PHENOMENA IN TURBOMACHINES
V. B. Kurzin *In* Ecole Polytechnique de Lauzanne Aeroelasticity of Turbomachines 1981 p 465-468 refs (For primary document see N82-15042 06-07)
Avail: Issuing Activity

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-15079*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
NASA DRYDEN FLIGHT LOADS RESEARCH FACILITY
Walter J. Sefic Dec. 1981 43 p refs
(NASA-TM-81368) Avail: NTIS HC A03/MF A01 CSCL 14B

The Dryden Flight Loads Research Facility (NASA) and the associated equipment for simulating the loading and heating of aircraft or their components are described. Particular emphasis is placed on various fail-safe devices which are built into the equipment to minimize the possibility of damage to flight vehicles. The equipment described includes the ground vibration and moment of inertia equipment, the data acquisition system, and the instrumentation available in the facility for measuring load, position, strain, temperature, and acceleration. R.J.F.

N82-15080# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
THE LINK-MILES DRIVER TRAINING SIMULATOR FOR TRACKED VEHICLES: A VALIDATION STUDY
J. Moraal and K. J. Poll 1979 29 p refs In DUTCH; ENGLISH summary
(Contract A76/KL/148)
(IZF-1979-23; TDCK-73404) Avail: NTIS HC A03/MF A01

The validity of the Link-Miles driver training simulator was investigated for tracked vehicles in use with the Dutch Army. Transfer of training, behavioral validity and required training time could be assessed for four different driving tasks, based on the performance of experienced as well as inexperienced subjects. It is concluded that the simulator is to be regarded as a valuable training aid, provided that: (1) a number of technical imperfections are corrected; (2) the users' know-how with regard to possibilities and limitations of the simulator is increased; and (3) the demands made on the instructors and the contents of the instruction

program are reconsidered, as well as the way the simulator is used in the context of the complete military training program.
Author

N82-15081# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
OPTICAL PROPERTIES OF AIRFIELD LIGHTING FIXTURES OF THE ROYAL NETHERLANDS AIRFORCE. PART 1: COLOR MEASUREMENTS
P. Padmos and R. vanLeeuwen 1980 20 p In DUTCH; ENGLISH summary 2 Vol.
(Contract A78/KLu/085)
(IZF-1980-1-Vol-1; TDCK-73414) Avail: NTIS HC A02/MF A01

Airfield lighting fixtures in use in the Royal Netherlands' Airforce were sampled and used to measure to what extent the chromaticity coordinates are corresponding to the NATO-Standardization Agreements. For the yellow and red filters, especially, it is important to measure the chromaticity of the mounted lamp-filter combinations, because heating may cause a considerable shift in chromaticity. For each fixture the measurements were performed at nominal maximum luminous intensity. Moreover, for a number of representative colors, measurements were made at the reduced intensity settings normally in use. Conclusions regarding, rejecting, or accepting are tabulated.
Author

N82-15082# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
OPTICAL PROPERTIES OF AIRFIELD LIGHTING FIXTURES OF THE ROYAL NETHERLANDS AIRFORCE. PART 2: INTENSITY MEASUREMENTS
P. Padmos and R. vanLeeuwen 1980 38 p In DUTCH; ENGLISH summary 2 Vol.
(Contract A78/KLu/085)
(IZF-1980-12-Vol-2; TDCK-75011) Avail: NTIS HC A03/MF A01

Most lighting fixtures did not fulfill NATO-Standardization requirements in one or another way. The most conspicuous error was found in a taxiway fixture, where the beam maximum appeared to be directed downwards. Many red filters have a deep red color, which lessens the light output. In most cases a considerable improvement in light output can be obtained by applying a more orange-red-color, for which the color requirements give room. It appears that for some red glass filters the transmission is lowered considerably by heating. Author

N82-15083# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Experimental Aerodynamics.
DEVELOPMENT AND TRIAL OF A ROTARY BALANCE FOR THE 3 m-LOW SPEED WIND TUNNELS IN THE FEDERAL REPUBLIC OF GERMANY Final Report, Dec. 1979
Bernd Schulze Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 70 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-022; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,70

A rotary balance was developed for determining aerodynamic damping due to rolling by means of a stationary measuring procedure. Due to the uniform rotation around the wind tunnel axis, vortex relaxation effects that might result from oscillatory balances are avoided. Layout, instrumentation, and data processing are described. Results obtained by using the apparatus during different wind tunnel tests with a calibration model correlate well with existing reference data and flight test data. Dynamic stability derivates due to rolling can be measured for angles of attack up to 90 deg and for extreme angles of inclination.
Author (ESA)

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-15084*# General Electric Co., Philadelphia, Pa. Space Systems Div.
FEASIBILITY STUDY: ATMOSPHERIC GENERAL CIRCULATION EXPERIMENT, VOLUME 1 Final Report
R. J. Homsey, ed. 1 Sep. 1981 97 p refs 2 Vol.
(Contract NAS8-34049)
(NASA-CR-161889-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 22A

The atmospheric general circulation experiment (AGCE) uses a rotating fluid flow cell assembly. The key technical areas affecting the feasibility of the design and operation of the AGCE are investigated. The areas investigated include materials for the flow cell assembly, thermal design, high voltage power supply design, effective retrieval and handling of experiment data and apparatus configuration. Several materials, DMSO and m-tolunitrile, were selected as candidate fluids for the flow cell principally for their high dielectric constant which permits the high voltage power supply design to be held to 15 kV and still simulate terrestrial gravity. Achievement of a low dissipation factor in the fluid to minimize internal heating from the applied electrical field depends strongly on purification and handling procedures. The use of sapphire as the outer hemisphere for the flow cell provides excellent viewing conditions without a significant impact on attaining the desired thermal gradients. Birefringent effects from sapphire can be held to acceptably low limits. Visualization of flow fluid is achieved through the motion of a dot matrix formed by photochromic dyes. Two dyes found compatible with the candidate fluids are spiropyran and triarylmethane. The observation of the dot motion is accomplished using a flying spot scanner.
S.L.

N82-15085*# General Electric Co., Philadelphia, Pa. Space Systems Div.
FEASIBILITY STUDY: ATMOSPHERIC GENERAL CIRCULATION EXPERIMENT, VOLUME 2 Final Report
R. J. Homsey, ed. 1 Sep. 1981 604 p refs 2 Vol.
(Contract NAS8-34049)
(NASA-CR-161889-Vol-2) Avail: NTIS HC A99/MF A01 CSCL 20D

The feasibility analysis of the atmospheric general circulation experiment (AGCE) are documented. The analysis performed in each technical area, the rationale and substantiation for the design approaches selected for the hardware, and the design details for the baseline AGCE are presented. S.L.

N82-15086# Technische Univ., Berlin (West Germany). Anorganische Werkstoffe.
EXPERIMENTS FOR THE PREPARATION OF PURE NONMETALLIC INORGANIC MATERIALS UNDER SPACE CONDITIONS Final Report, Dec. 1979
Gerhard Brekow Bonn Bundesministerium fuer Forschung und Technologie Apr. 1981 150 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-014; ISSN-0170-1339) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 31,50

The diffusion kinetics of the oxidation and nitridation of silica and the oxidation of aluminum were investigated below and above the melting point of the two metals under high-purity conditions. The electromagnetic levitation technique was used for the containerless positioning of the metal melts in a gas stream. Using gravimetric data, the growth constants, the diffusion coefficients and activation energies were calculated. With the experimental conditions presented here, Al_2O_3 and SiO_2 samples can be prepared at time intervals which can be expected to be available during the future Spacelab missions. The levitation technique could not be used for the nitridation of Si-melts at temperatures higher than 1540 C because of instabilities in positioning and increased decomposition rates. T.M.

N82-15087# Maschinenfabrik Augsburg-Nuernberg A.G., Munich (West Germany). Bereich Neue Technologie.
APPLICATION OF SKIN TECHNOLOGY: TEXUS 2 EXPERIMENT Final Report, Dec. 1979
Heinz Sprenger and Klaus Schweitzer (Motoren- und Turbinen-Union Muenchen GmbH) Bonn Bundesministerium fuer

Forschung und Technologie Aug. 1981 63 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-028; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,25

To avoid the deformation caused by the volume expansion of the sample during melting observed in TEXUS 1, the samples were provided with a small hole in order to compensate for this effect. The possibility of transforming a powder metallurgically prepared sample into a case uniform structure was investigated. The sample consisted of a yttria-dispersed IN 738 superalloy. Though the heating chamber failed in the TEXUS 2 flight before reaching the final temperature, the samples were melted up to half their volume. The shape retaining effect of the skin was however not very pronounced because one of the samples had been free flying within the cartridge and had been in contact with the TZM material, while the second sample became inflated due to gas left in the micropores after the powder-metallurgical processing. Author

N82-15088# Bundesanstalt fuer Materialpruefung, Berlin (West Germany).
PREPARATION, IMPLEMENTATION AND EVALUATION OF MATERIAL SCIENCE EXPERIMENTS UNDER THE SLN PROGRAM TEXUS 2 Final Report, Jan. 1980
Hartmut Schlecker and Peter Szimkowiak Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 44 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie Prepared in cooperation with Technische Hochschule, Vienna
(BMFT-FB-W-81-033; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9,25

In order to evaluate the effects of microgravity on vacuum brazing and the phenomena involved (i.e., flow of braze metal, joint filling, microstructure), an experiment was performed in the isothermal heating furnace of the TEXUS II sounding rocket. The specimen, consisting of four Ni-cylinders inserted one inside the other to form a 200 um cylindrical gap and a 0-2000 um sickle-shaped gap, was brazed with a near eutectic Ag-Cu alloy. This brazing alloy contained a small amount of Li to promote spreading (58 Ag: 39 Cu: 3 Li at. pct), and radioactive 110 m Ag as tracer metal. The specimen was evaluated by X-ray radiography, autoradiography and metallographic techniques. This experiment was carried out in preparation of the FSLP-experiment ES 304/ES 305. Author

N82-15089# Battelle Inst., Frankfurt am Main (West Germany).
INTERNAL CONVECTION UNDER LOW GRAVITY DUE TO ORTHOGONAL GRADIENTS OF TEMPERATURE AND CONCENTRATION Final Report, Dec. 1980
Bernd Fuessel, Wolfgang Kottler, and Dieter Langbein Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 106 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-041; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22,30

The existence of an interface energy between miscible fluids was demonstrated with the system methanol-cyclohexane. When carefully overlaying methanol saturated with cyclohexane on pure methanol, the saturated methanol forms distinct droplets, which migrate aside and dissolve within a few seconds. After about twenty minutes a curved interface develops between the pure methanol at the bottom and the overlayed methanol, which then contains only about four mol percent cyclohexane. Internal convection in the presence of non-parallel gradients of temperature and concentration is made evident by detailed investigations into the intermolecular attraction. The basic equations of this attraction were derived. Internal convection arises whenever it reduces the medium distance of molecules of the same species, i.e., if regions of equal concentration approach each other. T.M.

N82-15090# Technische Universitaet, Munich (West Germany). Lehrstuhl fuer Raumfahrttechnik.
INVESTIGATIONS OF MICROMETEORITE IMPACTS ON LARGE SURFACES AND DURING LONG-TERM MISSIONS [UNTERSUCHUNGEN VON MIKROMETEORITEN-EINSCHLAEGEN IN GROSSEN FLAECHEN UND BEI LANGZEITMISSIONEN]
E. Igenbergs and H. Fechtig (Max-Planck Inst. fuer Kernphysik) Oct. 1980 73 p refs In GERMAN Sponsored by Bundesministerium fuer Forschung und Technology
(TUM-RT-TB-80/12) Avail: NTIS HC A04/MF A01

The number of dust particle impacts expected during space missions was investigated and a long-term experiment is presented in order to study the suitability of Spacelab as a micrometeorite detector. A detailed inventory was made of available information on the dust environment. The dust particle expectancy values are given for several planetary and interplanetary missions mentioned in the Lunar and Planetary Mission Handbook. The heat shield surface of Spacelab modules is not suited for micrometeorite detection due to the relatively short flight time. An experiment is proposed for the second mission of the Long Duration Exposure Facility. This experiment is to obtain information on the dust environment close to the Earth and is to contribute to the development of interplanetary dust measuring devices. Author (ESA)

N82-15091# Technische Univ., Berlin (West Germany). Inst. fuer Nichtmetallische Werkstoffe.
INVESTIGATION ON THE APPLICABILITY OF SLIP CASTING FOR THE PRODUCTION OF CERMETS UNDER MICROGRAVITY CONDITIONS Final Report, Jul. 1978
Gisela Seufert Bonn Bundesministerium fuer Forschung und Technologie Apr. 1981 77 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium Forschung und Technologie
(BMFT-FB-W-81-017; ISSN-0170-1339) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16,20

The feasibility of slip casting for the production of cermets, with homogeneous distribution of metal particles in the ceramic matrix to establish whether phase separation by sedimentation is so critical that it necessitates space processing was studied. Procedures were developed for the casting of compositions of 95% oxide and 5% metal powder of grain. It is shown that sedimentation of the metal particles does not occur below some density and viscosity threshold of the slip and that the solvent concentration plays a lesser role. Conditions are found where an homogeneous distribution is obtained, as borne out by X-ray and electron microscope testing. Author (ESA)

N82-15092# Freiburg Univ. (West Germany). Kristallographisches Inst.
PREPARATION OF SPACELAB EXPERIMENTS ON Si, CdTe, AND ZnS CRYSTAL GROWTH DURING THE E1 AND D1 MISSIONS AND CONSTRUCTION AND TESTING OF A SINGLE ELLIPSOID MIRROR HEATING FACILITY Final Report, May 1980
Achim Eyer, Harald Leiste, Magarete Schumacher, and Herbert Walcher Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 189 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-023; ISSN-0170-1339) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 35,40

Spacelab experiments on the growth of Si, CdTe, and ZnS crystals were prepared by improving growth techniques, by adapting existing furnaces, and by the development of heating facilities. Dislocation-free silicon single crystals were grown by the floating-zone technique. Space experiments are indicated to be extremely useful in determining which type of convection in the melt is responsible for the striations observed in all crystals. Purification of Cd and Te, synthesis of high purity CdTe, and C coated growth ampules were improved. Growth by sublimation is shown to yield numerous twinned single crystals. High purity ZnS could be synthesized and single crystals were grown in a resistance furnace in quartz ampules with well defined gaseous zones. Single ellipsoid mirror furnaces were constructed which are particularly suited for growth experiments in ampules. Their thermal properties were studied and compared with those of the existing double ellipsoid furnace. The latter was further improved and supplemented by a control system regulating the integral radiation of the furnace. Author (ESA)

N82-15093# Hochschule der Bundeswehr, Hamburg (West Germany). Lab. fuer Werkstoffkunde und Schweisstechnik.
INVESTIGATIONS ON THE INFLUENCE OF GRAVITY ON JOINING PROCESSES WITH LIQUID MELTS, AND OF BRAZING AND WELDING EXPERIMENTS UNDER WEIGHTLESSNESS Final Report, Jul. 1980
Hans Hoffmeister and Juergen Ruediger Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 94 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-024; ISSN-0170-1339) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,75

Physical mechanisms in welding and brazing likely to be affected by space conditions are considered and the literature on actual space experiments is reviewed. Proposed Spacelab test experiments and complementary testing on Earth are described. Further development needs are identified in arc welding. It is proposed to analyze the influence of gravity on material transfer, on the shape and structure of seam, and on the segregation of the phases by: (1) taking advantage of rotary motions on Earth in order to raise the g level or to create short time weightlessness; (2) working in an aircraft or rocket under longer microgravity conditions; and (3) performing arc-spot welding in a vacuum so as to develop this process for use in space. Author (ESA)

N82-15094# Max-Planck-Institut fuer Metallforschung, Stuttgart (West Germany). Pulvermetallurgisches Lab.
THE ROLE OF THE WETTABILITY FOR THE PRODUCTION OF COMPOSITE MATERIALS IN SPACE: QUANTITIES, INFLUENCES AND MODELS Final Report, Mar. 1980
Josef Haag Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 283 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Bundesministerium
(BMFT-FB-W-81-021; ISSN-0170-1339) Avail: NTIS HC A13/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 44,80

Unsatisfactory first results of remelting pressed powder mixtures in American and German space experiments form the basis for a discussion of the role of wettability in processing particle composites in space. Considering the meaning of Young's wetting angle for the description of wetting behavior, the character of a non-equilibrium wetting angle as a geometric value is clearly established. A geometric dependence of the kinetics also results from the wetting kinetics, which is usually described using the energetic driving force, namely the wetting tension. As a consequence, the geometry changes during the remelting and wetting process have to be considered. Regarding special materials combinations, it was attempted to give access to surface to thermodynamic properties from both experimental and theoretical ways of getting the data and estimating possible external influences. Author

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

No abstracts in this category.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N82-15095*# Computer Technology Associates, Arlington, Va.
OFFICE OF SPACE TERRESTRIAL APPLICATIONS (OSTA)/APPLICATIONS DATA SERVICE (ADS) DATA SYSTEMS STANDARDS
Barbara A. Walton, ed. Washington Dec. 1981 270 p refs Proceedings of Workshop held at Greenbelt, Md., 27-29 May 1981
(NASA-CP-2196) Avail: NTIS HC A12/MF A01 CSCL 14B

Standards needed to interconnect applications data service pilots for data sharing were identified. Current pilot methodologies are assessed. Recommendations for future work are made. A preliminary set of requirements for guidelines and standards for catalogues, directories, and dictionaries was identified. The user was considered to be a scientist at a terminal. Existing and emerging national and international telecommunication standards were adopted where possible in view of new and unproven standards. For individual titles, see N82-15096 through N82-15104.

N82-15096*# Computer Technology Associates, Arlington, Va.
OSTA DATA SYSTEMS PLANNING WORKSHOP RECOMMENDATIONS
Richard DesJardins *In* NASA. Goddard Space Flight Center Office of Space and Terrest. Appl. (OSTA)/Appl. Data Serv. (ADS) Data Systems Std. Dec. 1981 p 5-10 (For primary document see N82-15095 06-14)
Avail: NTIS HC A12/MF A01 CSCL 14B

The Integrated Discipline Requirements are presented, including the following needs: (1) quality data sets, (2) a systematic treatment of problems with present data, (3) a single integrated catalog or master directory, (4) continuity of data formats, (5) a standard geographic and time basis, (6) data delivery in terms of easy rather than immediate accessibility, (7) data archives, and (8) cooperation with user agencies. N.W.

N82-15097*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE ROLE OF PILOTS
J. Patrick Gary *In its* Office of Space and Terrest. Appl. (OSTA)/Appl. Data Serv. (ADS) Data Systems Std. Dec. 1981 p 11-18 (For primary document see N82-15095 06-14)
Avail: NTIS HC A12/MF A01 CSCL 14B

The need for detailed specifications is addressed. Candidates for standardization include hardware interfaces, communication protocols, and data exchange services. Atmosphere, Ocean, and Resource pilot programs, utilization of current techniques and technologies in the use and exchange of data and to facilitate access to data are discussed. Pilot objectives aim to: (1) demonstrate the use of advanced technologies, (2) provide a test bed environment for data handling technique evaluation, (3) evolve requirements and capabilities, and (4) document validated methodologies as standards and guidelines for data systems planning use. A user oriented catalog system, data set management, a network communication system, and a user interface are also discussed. N.W.

N82-15098*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OSTA/ADS STANDARDS DEVELOPMENT PROCESS
Barbara Walton *In its* Office of Space and Terrest. Appl. (OSTA)/App. Data Serv. (ADS) Data Systems Std. Dec. 1981 p 19-26 (For primary document see N82-15095 06-14)
Avail: NTIS HC A12/MF A01 CSCL 14B

A phased approach to data systems standards was developed. The standards survey, user requirements, methodology survey, and evaluation criteria were completed. Remaining to be done are data system planning interim standards, a concept for implementation of a core applications data service, a data systems policy definition, and full capability data services definition. N.W.

N82-15099*# Mitre Corp., McLean, Va.
OVERVIEW OF THE CURRENT MITRE EFFORT
Terry Kuch and Rick Sakamoto *In* NASA. Goddard Space Flight Center Office of Space and Terrest. Appl. (OSTA)/Appl. Data Serv. (ADS) Data Systems Std. Dec. 1981 p 27-31 (For primary document see N82-15095 06-14)
Avail: NTIS HC A12/MF A01 CSCL 14B

A logical view of the applications data service (ADS) as a distributed system was adopted. A hierarchical classification scheme of ADS features comprising 70 modes was developed. The framework for a preliminary assessment of the applicability Federal, national, and international standards to ADS was provided by the classification. Approximately 300 standards were gathered, screened, and documented. The survey was enlarged to incorporate standards from NASA headquarters and centers. Two efforts were initiated to (1) survey methodologies of the three ADS pilots, and (2) identify the requirements for standards of ADS members based on a survey of the pilots and on representative future members. Preliminary results of the requirements survey were used in the development of criteria for the evaluation of candidate standards. An evaluation process was designed incorporating these criteria. N.W.

N82-15100*# Mitre Corp., McLean, Va.
ADS PILOT METHODOLOGIES AS CANDIDATES FOR ADS STANDARDS
Paul Giragosian *In* NASA. Goddard Space Flight Center Office of Space and Terrest. Appl. (OSTA)/Appl. Data Serv. (ADS) Data Systems Std. Dec. 1981 p 32-37 (For primary document see N82-15095 06-14)
Avail: NTIS HC A12/MF A01 CSCL 14B

Panel presentations and activities aimed at a critical assessment of the completeness and accuracy of a pilot methodology survey for an Applications Data Service are presented. Standards for interconnecting pilot programs for data sharing are outlined. Panel responsibilities and assignments for the session are given. M.D.K.

N82-15101*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PANEL A REPORT: STANDARDS NEEDED TO INTERCONNECT ADS PILOTS FOR DATA SHARING FOR CATALOGUES, DIRECTORIES, AND DICTIONARIES
In its Office of Space and Terrest. Appl. (OSTA)/Appl. Data Serv. (ADS) Data Systems Std. Dec. 1981 p 38-44 refs (For primary document see N82-15095 06-14)
Avail: NTIS HC A12/MF A01 CSCL 14B

User requirements, guidelines, and standards for interconnecting an Applications Data Service (ADS) program for data sharing are discussed. Methods for effective sharing of information (catalogues, directories, and dictionaries) among member installations are addressed. An ADS Directory/Catalog architectural model is also given. M.D.K.

N82-15102*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PANEL B REPORT: STANDARDS NEEDED TO INTERCONNECT ADS PILOTS FOR DATA SHARING FOR USER INTERFACES
In its Office of Space and Terrest. Appl. (OSTA)/Appl. Data Serv. (ADS) Data Systems Std. Dec. 1981 p 45-52 (For primary document see N82-15095 06-14)
Avail: NTIS HC A12/MF A01 CSCL 14B

Requirements for standards and guidelines related to user interfaces for interconnecting an Applications Data Service pilot program are discussed. Key elements considered were: (1) dial up procedures, (2) terminals (minimum, desirable, extended capability), (3) common capabilities, (4) language interfaces (query, command, menu), and (5) display capabilities. M.D.K.

N82-15103*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PANEL C REPORT: STANDARDS NEEDED FOR THE USE OF ISO OPEN SYSTEMS INTERCONNECTION - BASIC REFERENCE MODEL
In its Office of Space and Terrest. Appl. (OSTA)/Appl. Data Serv. (ADS) Data Systems Std. Dec. 1981 p 55-66 (For primary document see N82-15095 06-14)
Avail: NTIS HC A12/MF A01 CSCL 14B

The use of an International Standards Organization (ISO) Open Systems Interconnection (OSI) Reference Model and its relevance to interconnecting an Applications Data Service (ADS) pilot program for data sharing is discussed. A top level mapping between the conjectured ADS requirements and identified layers within the OSI Reference Model was performed. It was concluded that the OSI model represents an orderly architecture for the ADS networking planning and that the protocols being developed by the National Bureau of Standards offer the best available implementation approach. M.D.K.

N82-15104*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PANEL D REPORT: STANDARDS NEEDED TO INTERCONNECT ADS PILOTS FOR DATA SHARING IN DATA FORMATS AND DESCRIPTIONS
In its Office of Space and Terrest. Appl. (OSTA)/Appl. Data Serv. (ADS) Data Systems Std. Dec. 1981 p 67-70 (For primary document see N82-15095 06-14)
Avail: NTIS HC A12/MF A01 CSCL 14B

Data exchange specifications and standards needed to facilitate the interchange of information between three pilot modes in an Applications Data Service program are addressed. In designing standards, the following considerations were considered important: (1) accessible, understandable Data Base Management Systems (DBMS) catalogs, (2) formatting conventions, (3) archival data records and data descriptions formats, (4) standardized terminology, and (5) optimization of data formats by individual DBMS. M.D.K.

N82-15105# Prins Maurits Lab. TNO, Rijswijk (Netherlands). Inst. voor Chemische en Technologische Research.
STRUCTURAL SAFETY ANALYSIS OF PROPOSED HARPOON TEST FACILITY [VEILIGHEIDSANALYSE HARPOON TESTCELLEN]
J. Schippers Nov. 1979 32 p refs In DUTCH; ENGLISH summary
(Contract A77/KM/149)
(PML-1979-74; TDCK-73394) Avail: NTIS HC A03/MF A01

An analysis was performed on the basis of existing plans to build two missile test cells. The first solution is a cell with reinforced concrete walls and one wall functioning as a venting surface and the second a cell with walls consisting of multiple layers through which the effect of the explosion is contained in the cell structure. Disadvantages of the first solution are the fairly large structural deformations of the walls, the occurrence of spalling and the loading of the neighboring buildings by the shock wave emerging from the cell. The advantage of this method is that it is a conventional solution whose dangerous aspects are known. The advantage of the second solution is the fact that the entire explosion is confined in a special cell structure. The effect on the environment will be negligible. Disadvantage of this solution is that it is a new, unknown and untested technique. T.M.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-15106*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SYSTEM ANALYSIS APPROACH TO DERIVING DESIGN CRITERIA (LOADS) FOR SPACE SHUTTLE AND ITS PAYLOADS. VOLUME 2: TYPICAL EXAMPLES
Robert S. Ryan, Tulon Bullock, Wayne B. Holland, Dennis A. Kross, and Larry A. Kiefling Dec. 1981 128 p refs
(NASA-TP-1950; M-359-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 22B

The achievement of an optimized design from the system standpoint under the low cost, high risk constraints of the present day environment was analyzed. Space Shuttle illustrates the requirement for an analysis approach that considers all major disciplines (coupling between structures control, propulsion, thermal, aeroelastic, and performance), simultaneously. The Space Shuttle and certain payloads, Space Telescope and Spacelab, are examined. The requirements for system analysis approaches and criteria, including dynamic modeling requirements, test requirements, control requirements, and the resulting design verification approaches are illustrated. A survey of the problem, potential approaches available as solutions, implications for future systems, and projected technology development areas are addressed. E.A.K.

N82-15107*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT: RCA-C1/DELTA LAUNCH
[1982] 26 p
(NASA-TM-84087; Rept-0-492-206-82-05) Avail: NTIS HC A03/MF A01 CSCL 22B

The prelaunch mission operation report for the launch of RCA Satcom C(1) on a Delta 3910 launch vehicle is presented. The spacecraft and launch vehicle are described. S.L.

N82-15108# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
ROBISAT: CONCEPT AND FEASIBILITY STUDY, PHASE A Final Report
Eberhard Achtermann, Karl-Ludwig Bitzer, Ludwig Borucki, Klaus Ernsberger, Paul Gillett, Manfred Granzow, Wolfgang Kriegl, Guenter Lehn, Gerhard Lippner, Rolf Ockert et al Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 35 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-80-033; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,20

The results of a feasibility study on an X-ray satellite (ROBISAT) are summarized. Within the framework of this study alternative systems concepts were analyzed, and a preferred satellite concept has evolved for a telescope with 80 cm aperture. It is shown that the required sky survey can easily be accomplished by means of a spinning satellite in a Sun-synchronous dawn-dusk orbit. J.M.S.

N82-15109# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).
AERONOMY SATELLITES AEROS A AND B: THE ASSISTANCE TO THE PROJECT BY THE PROJECT SCIENTIST Final Report, Apr. 1981
Peter Laemmerzahl Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 43 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-029; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9,05

With the German-U.S. research satellite AEROS-A and the German satellite AEROS-B the most important aeronomic parameters in the upper atmosphere were measured between December 1972 and September 1975. Simultaneous observations of densities, composition, and temperatures of both the atmospheric neutral gas and the ionospheric plasma and, in addition, of the solar energy influx in the extreme ultraviolet was essential to allow for an integrated analysis of the aeronomic interactive processes. The responsibility within the project management for all scientific matters was with the project scientist, and this report is on his contribution to meet the goal of the mission. Also the experimental and mission aspects, the management organization, the project development, and the major science return from the AEROS program are explained. Author

N82-15110# Air Force Systems Command, Wright-Patterson AFB, Ohio.
METEOROLOGICAL SATELLITES
16 Oct. 1981 7 p refs Transl. into ENGLISH from Skrzydlata Polska (Poland) no. 27, 1979 21 p
(AD-A107427; FTD-ID(RS)T-1059-81) Avail: NTIS HC A02/MF A01 CSCL 22B

Meteor-2 (second generation meteorological satellite) and an experimental satellite on which instruments are being tested and modified for the requirements of hydrometeorology and a determination of natural resources are presently operational in the U.S.S.R. Television devices with a 1-10 km terrain image resolution operating in the visible and infrared region are used to determine the space system, velocity and direction of cloud movements and provide information about the snow and ice cover, cyclones, storms, vortices in the atmosphere, and velocity and direction of wind. Images with a 50-1000 m resolution make possible geological and hydrological surveys, an evaluation of the state of vegetation and crops, detection of forest fires, determination of pollution of the atmosphere and sea and determination of optimal fishing regions in the ocean. Measurement of the intensity of atmospheric radiation in narrow infrared regions and very high frequencies allows remote evaluation of the temperature and humidity distribution in the vertical cross section of the Earth's atmosphere. Author

N82-15111# Fraunhofer-Inst. fuer Naturwissenschaftlich-Technische Trendanalysen, Euskirchen (West Germany).
SENSOR FOOTPRINTS AND HOMING RANGE OF TERMINAL GUIDANCE MUNITION [SENSOR-FOOTPRINT UND NACHLENKBEREICH BEI ENDPHASENGELENKTER MUNITION]
K.-D. Leuthaeuser and H. Wessel Bonn Bundesministerium der Verteidigund 1981 56 p refs In GERMAN Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-81-5) Avail: NTIS HC A04/MF A01; DOKZENTBw, Bonn DM 30

The footprints of terminal guidance projectiles were analyzed. These footprints, which correspond to the accessible target range on the surface, depend on the vision range of the sensor and on the homing range of the projectile. The sensor vision range is calculated as a function of trajectory parameters, sensor aperture, and sensor range. The extent of the homing range is determined for the special case of circular trajectories, i.e., proportional navigation, in dependence of flight height, angle of incidence, and maximal transverse acceleration. The resulting footprints are represented in overlay diagrams. Author (ESA)

N82-15112# Technische Hochschule, Aachen (West Germany). Lehrgebiet fuer Verfahren der Prozessdatenverarbeitung und Prozessfuehrung.
MICROCOMPUTER FOR ATTITUDE CONTROL SYSTEMS Final Report
Klaus Werner Plessmann Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 39 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-040; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8,2

The problem of attitude control was examined by investigating the use of single integrated circuits in microcomputers. This consideration results from space availability and maximum electrical power availability. Several 16-bit systems are considered. T.M.

N82-15113# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Raumflugdynamik.
THE ATLAS-C MISSION
J. Puls, R. Naehle, A. Pietrass, H. P. Schmidt, and M. Schroeder Jun. 1981 131 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-735)
(DFVLR-FB-81-19; ESA-TT-735) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 21,30

A spaceflight mission in which a camera will be operated for cartographic purposes above selected test areas is described. The African continent is given as an example. The limited storage capacity of the film, optimal orbits adapted to different focal lengths of the camera objective, and launch and retrieval with the space shuttle are among the topics studied. The satellite system is based on the concept of a small modular subsatellite and thruster platform. J.M.S.

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N82-15114*# Axiomatix, Los Angeles, Calif.
ENGINEERING EVALUATIONS AND STUDIES. REPORT FOR IUS STUDIES Final Annual Report, 1981
20 Oct. 1981 44 p refs
(Contract NAS9-16067)
(NASA-CR-167459; R8110-3) Avail: NTIS HC A03/MF A01 CSCL 22B

The reviews, investigations, and analyses of the Inertial Upper Stage (IUS) Spacecraft Tracking and Data Network (STDN) transponder are reviewed. Carrier lock detector performance for Tracking and Data Relay Satellite System (TDRSS) dual-mode operation is discussed, as is the problem of predicting instantaneous frequency error in the carrier loop. Coastal loop performance analysis is critiqued and the static tracking phase error induced by thermal noise biases is discussed. R.J.F.

N82-15115*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
SPACE TRANSPORTATION SYSTEM CARGO PROJECTS: INERTIAL STAGE/SPACECRAFT INTEGRATION PLAN. VOLUME 1: MANAGEMENT PLAN
15 Dec. 1981 76 p
(NASA-CR-165068; KSC-K-DPM-09.1-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 22A

The Kennedy Space Center (KSC) Management System for the Inertial Upper Stage (IUS) - spacecraft processing from KSC arrival through launch is described. The roles and responsibilities of the agencies and test team organizations involved in IUS-S/C processing at KSC for non-Department of Defense missions are described. Working relationships are defined with respect to documentation preparation, coordination and aproval, schedule development and maintenance, test conduct and control, configuration management, quality control and safety. The policy regarding the use of spacecraft contractor test procedures, IUS contractor detailed operating procedures and KSC operations and maintenance instructions is defined. Review and approval requirements for each documentation system are described. R.J.F.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-15116*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE AERODYNAMICS OF BODIES IN A RAREFIED IONIZED GAS WITH APPLICATIONS TO SPACECRAFT ENVIRONMENTAL DYNAMICS
Nobie H. Stone Nov. 1981 320 p refs
(NASA-TP-1933; M-361) Avail: NTIS HC A14/MF A01 CSCL 22B

The objectives are to provide a parametric description of the electrostatic interaction of a mesosonic, collisionless plasma with conducting bodies on the order of 1 to 10 Debye lengths in size, and to extend this description to the satellite-ionospheric interaction, where possible. Experimental findings include: the wake of the geometrically complex body appears to be a linear superposition of the wakes of its simple geometric components; and vector ion flux measurements show converging ion streams at the wake axis and direct evidence of ion streams deflected from the wake axis by the positive space charge potential associated with the axial ion peak. The extension to the satellite-ionospheric interaction utilizes qualitative scaling and indicates that similar, but smaller amplitude, wake structures may be expected for small or highly charged bodies. However, for large bodies at small potentials, the structure may be diffused by the thermal ion motion and the dispersion resulting for space charge potentials. T.M.

N82-15117*# Martin Marietta Corp., Bethesda, Md.
CRYOGENIC FLUID MANAGEMENT EXPERIMENT Final Report, Dec. 1978 - Oct. 1981
R. N. Eberhardt, W. J. Bailey, and D. A. Fester Oct. 1981 237 p refs
(Contract NAS3-21591)
(NASA-CR-165495; MCR-81-597) Avail: NTIS HC A11/MF A01 CSCL 22B

The cryogenic fluid management experiment (CFME), designed to characterize subcritical liquid hydrogen storage and expulsion in the low-g space environment, is discussed. The experiment utilizes a fine mesh screen fluid management device to accomplish gas-free liquid expulsion and a thermodynamic vent system to intercept heat leak and control tank pressure. The experiment design evolved from a single flight prototype to provision for a multimission (up to 7) capability. A detailed design of the CFME, a dynamic test article, and dedicated ground support equipment were generated. All materials and parts were identified, and components were selected and specifications prepared. Long lead titanium pressurant spheres and the flight tape recorder and ground reproduce unit were procured. Experiment integration with the shuttle orbiter, Spacelab, and KSC ground operations was coordinated with the appropriate NASA centers, and experiment interfaces were defined. Phase 1 ground and flight safety reviews were conducted. Costs were estimated for fabrication and assembly of the CFME, which will become the storage and supply tank for a cryogenic fluid management facility to investigate fluid management in space. R.J.F.

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-15118# British Aerospace Dynamics Group, Stevenage (England). Space and Communications Div.

ELECTROTHERMAL HYDRAZINE THRUSTER Final Report
C. B. Taylor Paris ESA 1981 203 p
(Contract ESTEC-2067/73/HP)
(BAe-RPT/EHT/40212-Vol-1; ESA-CR(P)-1466) Avail: NTIS HC A10/MF A01

An electrothermal hydrazine thruster used for satellite attitude and orbit control was designed. A series of laboratory and engineering models verified mathematical analyses and design concept. The final engineering model showed diminished performance due to a build up of metallic sponge in the screen pack, which caused progressive reduction in gas flow. The contaminant was absorbed by the hydrazine from the supply system and carried in solution to the thruster. Results of 500,000 100 msec pulses show that the required holding condition temperature and pulse mode performance are achieved. Author (ESA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-15119*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMODYNAMICS AND KINETICS OF THE SULFATION OF POROUS CALCIUM SILICATE
Robert A. Miller and Fred J. Kohl 1981 18 p refs Presented at the Fall Meeting of the Electrochem. Soc., Inc., Denver, 11-17 Oct. 1981
(NASA-TM-82769; E-1023) Avail: NTIS HC A02/MF A01 CSCL 11G

The sulfation of plasma sprayed calcium silicate in flowing SO2/air mixtures at 900 and 1000 C was investigated thermogravimetrically. Reaction products were analyzed using electron microprobe and X-ray diffraction analysis techniques, and results were compared with thermodynamic predictions. The percentage, by volume, of SO2 in air was varied between 0.036 and 10 percent. At 10 percent SO2 the weight gain curve displays a concave downward shoulder early in the sulfation process. An analytical model was developed which treats the initial process as one which decays exponentially with increasing time and the subsequent process as one which decays exponentially with increasing weight gain. At lower SO2 levels the initial rate is controlled by the reactant flow rate. At 1100 C and 0.036 percent SO2 there is no reaction, in agreement with thermodynamic predictions. S.L.

N82-15120# Metallgesellschaft, A.G., Frankfurt am Main (West Germany).
DEVELOPMENT AND TESTING OF MATERIALS FOR SEAWATER DESALINATION PLANTS Final Report, Oct. 1980
Bernd Nichtweiss Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 157 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-M-81-001; ISSN-0340-8868) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karslruhe, West Germany DM 32,10

An R and D program for decreasing the investment and running costs of a distillation desalinization plant by the development of cheap, reliable and corrosion resistant materials is reported. Production, manufacturing and testing of longitudinally welded nonferrous tubes; profile shaping of heat exchanger tubes for increased heat transfer; production of a plant for laminating the inside of desalinization tubes with plastic; and development of cheap corrosion resistant CuNiFe-alloys and optimization of their welding were investigated. Corrosion test procedures and results are described for various copper and aluminum alloys in seawater loops and in coastal and harbor water. Author (ESA)

N82-15121*# National Bureau of Standards, Washington, D.C.
NBS: MATERIALS MEASUREMENTS Annual Report, 1 Apr. 1980 - 31 Mar. 1981
J. R. Manning Jun. 1981 149 p refs
(NASA Order H-27954B)
(NASA-CR-165076; PB81-238537; NBSIR-81-2295) Avail: NTIS HC A07/MF A01 CSCL 07D

Measurement of materials properties and thermophysical properties is described. The topics discussed are: surface tensions and their variations with temperature and impurities; convection during unidirectional solidification; measurement of high temperature thermophysical properties of tungsten liquid and solid; thermodynamic properties of refractory materials at high temperatures; and experimental and theoretical studies in wetting and multilayer adsorption. Author

24 COMPOSITE MATERIALS

Includes laminates.

N82-15122*# Materials Sciences Corp., Spring House, Pa.
DEVELOPMENT OF AN ENGINEERING ANALYSIS OF PROGRESSIVE DAMAGE IN COMPOSITES DURING LOW VELOCITY IMPACT Final Report, 3 Aug. 1979 - 15 Sep. 1981
E. A. Humphreys Jul. 1981 118 p refs
(Contract NAS1-15888)
(NASA-CR-165778; MSC-TFR-1205/0208) Avail: NTIS HC A06/MF A01 CSCL 11D

A computerized, analytical methodology was developed to study damage accumulation during low velocity lateral impact of layered composite plates. The impact event was modeled as perfectly plastic with complete momentum transfer to the plate structure. A transient dynamic finite element approach was selected to predict the displacement time response of the plate structure. Composite ply and interlaminar stresses were computed at selected time intervals and subsequently evaluated to predict layer and interlaminar damage. The effects of damage on elemental stiffness were then incorporated back into the analysis for subsequent time steps. Damage predicted included fiber failure, matrix ply failure and interlaminar delamination. Author

N82-15123*# Purdue Univ., Lafayette, Ind. Composite Materials Lab.
INDENTATION LAW FOR COMPOSITE LAMINATES
S. H. Yang 31 Jul. 1981 47 p refs
(Grant NsG-3185)
(NASA-CR-165460; CML-81-1) Avail: NTIS HC A03/MF A01 CSCL 11D

Static indentation tests are described for glass/epoxy and graphite/epoxy composite laminates with steel balls as the indentor. Beam specimens clamped at various spans were used for the tests. Loading, unloading, and reloading data were obtained and fitted into power laws. Results show that: (1) contact behavior is not appreciably affected by the span; (2) loading and reloading curves seem to follow the 1.5 power law; and (3) unloading curves are described quite well by a 2.5 power law. In addition, values were determined for the critical indentation, alpha sub cr which can be used to predict permanent indentations in unloading. Since alpha sub cr only depends on composite material properties, only the loading and an unloading curve are needed to establish the complete loading-unloading-reloading behavior. Author

N82-15124*# Materials Sciences Corp., Blue Bell, Pa.
THERMOMECHANICAL RESPONSE OF Gr/PI COMPOSITES Final Report, 1 Oct. 1979 - 30 Mar. 1981
B. Walter Rosen, Aniruddha P. Nagarkar, and Zvi Hashin Mar. 1981 93 p refs
(Contract NAS1-15841)
(NASA-CR-165753; MSC-TFR-1202/0207) Avail: NTIS HC A05/MF A01 CSCL 11D

The effects of temperature changes upon the stresses and strains in composite laminates having carbon fibers in a polyimide matrix were evaluated. Composites having laminae in which there were nonlinear stress-strain relations for stresses transverse to the fibers and for axial shear stresses were treated. Material properties were considered to be temperature dependent. Separately, the effects of laminae viscoelastic response were also treated. The results suggest that, for this material, nonlinearities due either to stress or time dependent effects do not appear to be of major practical importance for conventional high temperature composite structures. B.W.

N82-15125*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
FEASIBILITY STUDY OF DEFORMATION MODES OF DEFORMING COMPOSITE MATERIALS USING VISIOPLASTICITY METHOD Final Report, 16 May - 15 Aug. 1981
Surendra N. Dwivedi Nov. 1981 34 p refs
(Grant NAG1-191)
(NASA-CR-165067) Avail: NTIS HC A03/MF A01 CSCL 11D

The impact resistance and the effect of impact on fiber reinforced composite materials was investigated. The visioplastic method for studying deformation modes and transient impact distribution is described and the basic equations used in the visioplastic method are presented. The subroutine for digitizing the input data and a computer program (STRESS) for calculating the strains and stresses of deforming projectiles are presented. J.D.H.

N82-15126# Comelin, Limours (France).
GROUPE MATRA COMPOSITES CONFERENCE [JOURNEE COMPOSITE DU GROUPE MATRA]
1981 112 p In FRENCH Presented at Velizy, France, 24 Apr. 1981 Original contains color illustrations
Avail: NTIS HC A06/MF A01

Technology based on the use of composite materials is reviewed. Various topics include: composite structures; applications of composites in missiles; and quality control. Filament winding and manufacturing stamping tools of resin are also discussed. For individual titles, see N82-15127 through N82-15133.

N82-15127# Engins Matra, Velizy (France).
STUDY AND DEVELOPMENT OF HIGH STRENGTH COMPOSITE MATERIAL STRUCTURES BY THE THERMOMECHANICAL DEPARTMENT OF THE SPACE DIVISION OF MATRA [ETUDES ET DEVELOPPEMENT DE STRUCTURES EN MATERIAUX COMPOSITES A HAUTES CARACTERISTIQUES REALISEES PAR LE DEPARTEMENT MECANIQUE ET THERMIQUE DE MATRA DIVISION ESPACE]
J. P. Allard *In* COMELIN Groupe Matra Composites Conf. 1981 26 p In FRENCH (For primary document see N82-15126 06-24)
Avail: NTIS HC A06/MF A01

Equipment structures were developed, using fiber reinforced composite materials with elevated mechanical characteristics and low coefficients of thermal expansion. Structures for the Ariane launch vehicle nose cone, for an optical measuring device, and for the SPOT satellite sensor are discussed. Design problems linked to materials used in space structures are identified. Composite materials are compared with metals. Results illustrate material selection criteria in terms of low weight and high rigidity. Dimensional stability is expressed as a function of the coefficient of thermal expansion. Examples of composite assemblies (riveted; bolted; tongue in groove) are shown. Author (ESA)

N82-15128# Engins Matra, Velizy (France). Dept. Mecanique et Structure.
APPLICATIONS OF COMPOSITES IN MISSILES AND MISSILE LAUNCHERS [APPLICATIONS COMPOSITES AUX MISSILES ET LANCES-MISSILES]
M. Rouillot *In* COMELIN Groupe Matra Composites Conf. 1981 14 p In FRENCH (For primary document see N82-15126 06-24)
Avail: NTIS HC A06/MF A01

Conditions under which application of resin-fiber composite materials is possible are defined. Materials were characterized (thermomechanical, electrical, electromechanical and aging properties) and their utilization was examined. Results show that applications of composites in missiles and missile launchers are much more limited than in aircraft manufacturing. In particular, for short-range missiles of small diameter, composites are not as cost effective as metal materials, e.g., aluminum. However, when weight reduction is of primary concern, wider use of composites can be expected. Author (ESA)

N82-15129# Comelin, Limours (France).
STUDY OF HIGH QUALITY COMPOSITE MATERIALS AT LIMOURS, FRANCE [LES MATERIAUX COMPOSITES A HAUTES PERFORMANCES A LIMOURS]
G. Galay *In its* Groupe Matra Composites Conf. 1981 8 p In FRENCH (For primary document see N82-15126 06-24)
Avail: NTIS HC A06/MF A01

The organization of R and D in composite materials and structures is discussed. Advantages in the use of composites are cited and the fabrication of various parts, particularly the series production of a missile fin, is described. Technologies used, i.e. bonding and molding, are considered. An adequate quality control methodology is also outlined. Author (ESA)

N82-15130# Engins Matra, Velizy (France).
QUALITY CONTROL OF COMPOSITES: ACTIVITIES AND INSTITUTED MEANS [QUALITE CONTROLE DES COMPOSITES: ACTIONS ET MOYENS MISES EN OEUVRES]
A. Pays and P. deRigne *In* COMELIN Groupe Matra Composites Conf. 1981 19 p In FRENCH (For primary document see N82-15126 06-24)
(N-25.855/R.E.Q.C.) Avail: NTIS HC A06/MF A01

Quality control of raw materials, of the fabrication process, and of the finished composite part is described. The organization of a quality control methodology is considered. Raw material quality characteristics are defined. Parameterization of composite materials fabrication is explained. The testing of finished materials is discussed. Three methods are presented: thermal analysis; scanning electron microscopy; and nondestructive examination by ultrasonics. Author (ESA)

N82-15131# Manurhin (France).
FILAMENT WINDING [L'ENROULEMENT FILAMENTAIRE]
Pierre Huber *In* COMELIN Groupe Matra Composites Conf. 1981 22 p In FRENCH (For primary document see N82-15126 06-24)
Avail: NTIS HC A06/MF A01

Filament wound construction of tubes and containers is discussed. Materials used (reinforcing; thermosetting resins) and manufacturing equipment are described. Kinematic operating principles of a winding machine with constant, or nonlinear, advance are considered. Peripheral machines (bobbin controller; impregnation device; drier; combing devive) are also treated. Filament choice is reviewed along with stress calculation methods. Quality control is also covered. Author (ESA)

N82-15132# LeBranchu (Rene) et Fils S.A., Courbevoie (France).
STAMPING TOOLS MADE OF RESIN [OUTILLAGES D'EMBOUTISSAGE EN BETON DE RESINE]
J. L. Billet *In* COMELIN Groupe Matra Composites Conf. 1981 8 p In FRENCH (For primary document see N82-15126 06-24)
Avail: NTIS HC A06/MF A01

Fabrication of die press tools, using epoxy resins, is described. These tools can be employed on hydraulic presses (50 to 2000 MT) with maximum platen dimensions of 3250 x 2500 mm. The use of three types of composite tool is discussed: standard resin, high strength resin, and mixed metal/resin. Mechanical characteristics are given. The design and manufacturing of these tools are considered for cost and delivery delay. Author (ESA)

N82-15133# MATRA Automobile, Salbris (France).
MATRA AUTOMOBILES: THEILLAY CENTER [PRESENTATION DES TECHNIQUES DE MOULAGE UTILISEES AU THEILLAY]
M. Caussin *In* COMELIN Groupe Matra Composites Conf. 1981 7 p In FRENCH (For primary document see N82-15126 06-24)
Avail: NTIS HC A06/MF A01

A manufacturing installation which produces glass fiber reinforced plastic structures is described. Molding technology is discussed. Besides economic aspects, the development of molding technology for quality and rapidity is reviewed. The capacity of the plant and quality control methodology are revealed. Author (ESA)

N82-15134# Technische Hochschule, Aachen (West Germany). Inst. fuer Kunststoffverarbeitung in Industrie und Handwerk.
SELECTION AND TESTING OF SUITABLE COATING SYSTEMS FOR STEEL PIPES USED FOR LONG DISTANCE HEAT TRANSFER Final Report, May 1980
Ernst Breches Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 85 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-138; ISSN-0340-7608) Avail: NTIS HC A05/MF A01

Anticorrosion properties of buried, plastics-coated steel pipes for long-distance heat supply lines, with regard to the possible application limits are considered. Quantitative measuring methods were used to determine the influence of various media, temperatures, and temperature changes on the protective effect of the composites systems. Electrochemical measuring methods (impedance and potential measurement), bond strength measurements and optical tests were employed. It was possible to achieve a very good differentiation between the level of protection offered by the individual coating systems and show how they were affected by the various kinds of stress applied. The electrochemical measuring methods, in particular, were outstandingly suitable for a quasi-nondestructive evaluation of a composite system subjected to various stresses. It was also possible to show that the PU coating system did not lose any of its protective properties in any of the tests. J.M.S.

N82-15135# Oak Ridge National Lab., Tenn.
TESTING RESULTS OF MF-NbSUB3Sn
S. S. Shen and W. K. McDonald 1981 10 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10 Aug. 1981 Prepared in cooperation with Teledyne Wah Chang
(Contract W-7405-eng-26)
(DE81-028632; CONF-810835-7) Avail: NTIS HC A02/MF A01

A new method to produce multifilamentary (MF) Nb3Sn superconductor called modified jellyroll has been recently developed by Teledyne Wah Chang, Albany. The novel technique shows real promise to simplify the manufacture of MF superconducting wires. Unlike the conventional, internal bronze process which employs niobium in either rod or tube form, modified jellyroll (MJR) uses an expanded niobium foil in its billet assembly. Simply by rolling thin expanded niobium foil along with other metal sheets, as desired (e.g., copper, bronze, tantalum, etc.), into a jellyroll form, the resultant billet can then be extruded and processed as conventional wires. This paper presents results of systematic evaluation tests performed on such composites. The results are analyzed and discussed in terms of critical current density, diffusion time constant, ac losses (magnetization), and the effective filamentary diameter. DOE

N82-15136# Mound Lab., Miamisburg, Ohio.
DISSOLUTION OF SURFACE OXIDE LAYERS ON TITANIUM AND TITANIUM SUBHYDRIDE BETWEEN 25 AND 700 C
T. N. Wittberg (Dayton Univ.) and P. S. Wang 1981 18 p refs Presented at the 11th Symp. on Explosives and Pyrotechniques, Philadelphia, 15 Sep. 1981
(Contract DE-AC04-76DP-00053)
(DE81-028044; MLM-2856-OP; CONF-810926-4) Avail: NTIS HC A02/MF A01

The surface sensitive, spectroscopic techniques of Auger electron spectroscopy (AES) and X-ray photoelectron spectroscopy (XPS) have been applied to the study of oxide dissolution on titanium and titanium subhydride. It was shown that the rate of oxygen dissolution into titanium increased sharply at about 350 C temperatures at which an exothermic reaction, corresponding to the reaction of free titanium with atmospheric oxygen, was occurring. The work has been expanded to include studies of TiH/ sub x/ (x = 1.15, 1.62). It was found that dissolution of the native oxide on titanium subhydride occurs at a substantially higher temperature (about 500 C) than for titanium. It appears that the onward diffusion of hydrogen is inhibiting the inward diffusion of oxygen on the subhydride samples below 500 C. Studies in the range of 300 to 350 C have shown a semilogarithmic relationship between the surface oxygen level and the time at temperatue, in agreement with earlier gravimetric studies on titanium oxidation in this tempesture range. DOE

N82-15137# Sandia Labs., Albuquerque, N. Mex.
HIGH TEMPERATURE ELECTRICAL CONDUCTIVITY AND THERMAL DECOMPOSITION OF PHENOLIC AND SILICON BASED DIELECTRICS FOR FIRESET HOUSINGS
R. T. Johnson, Jr. and R. M. Biefeld Aug. 1981 67 p refs
(Contract DE-AC04-76DP-00789)
(DE81-031919; SAND-81-0780) Avail: NTIS HC A04/MF A01

The temperature dependence of the electrical conductivity and thermal decomposition characteristics of several phenolic- and silicone-based materials of interest for fireset case housings have been measured to 600 C to 700 C. The materials are phenolic or silicone resins reinforced with glass chopped fabric or cloth. The conductivity temperature dependence was measured during decomposition in a nitrogen atmosphere at a heating rate of approximately 10 C/minute. Applied electric fields were from 4 x 400 to 4000 volts/cm. Thermal decomposition characteristics were investigated by mass spectroscopy in vacuum and thermal gravimetric analysis in nitrogen and air. Nearly ohmic voltage-current characteristics were obtained, except where decomposition and/or outgassing was pronounced. DOE

N82-15138# Ecole Nationale Superieure de Techniques Avancees, Paris (France).
STUDY OF TRACTION RUPTURE STRENGTH OF GRAPHITE-EPOXY COMPOSITE MATERIAL LAMINATES T300/5208, WITH AND WITHOUT A CENTRAL HOLE Ph.D. Thesis - Univ. of Technol. de Compiegne, France [ETUDE JUSQU'A RUPTURE EN TRACTION DE STRATIFIES EN MATERIAU COMPOSITE GRAPHITE-EPOXY T 300/5208, AVEC OU SANS TROU CENTRAL]
Tat Sinh Vong Sep. 1980 283 p refs In FRENCH; ENGLISH summary
(Rept-137) Avail: NTIS HC A13/MF A01

Composite laminated plates were subjected to traction uniaxial loading and their failure behavior was studied. Theory is proposed for specimen geometry effects, i.e., free edges, stacking sequence, and hole diameter. Load transfer mechanisms and damage propagation to complete failure are explained by a variational approach to the uniform extension problem. Tensile test results are interpreted with the T300/5208 graphite-epoxy unidirectional composite taken as a transverse isotropic material and all the elastic moduli are found. Experiments confirm that the hole diameter effect can be predicted with an approximation. Analysis based on the finite element method gives the distribution of the in-plane stresses within each ply (distant, near or around the hole). An incremental procedure determines the propagation of damage and the stress redistribution of broken fibers; the initiation of damage is shown to be near the hole and perpendicular to the tension axis. Author (ESA)

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-15139*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemistry.
CHEMICAL MODIFICATION OF TiO2 SURFACES WITH METHYLSILANES AND CHARACTERIZATION BY INFRARED ABSORPTION SPECTROSCOPY
Harry O. Finklea and R. Vithanage [1982] 14 p refs
(Grant NAG1-89)
(NASA-CR-165063) Avail: NTIS HC A02/MF A01 CSCL 07D

Infrared absorption spectra of methylsilanes bonded to a TiO2 powder were obtained. The reacting silanes include Me sub (4-n)SiX sub n (n = 1-4; X = Cl, OMe) and hexamethyldisilazane (HMDS). Reactions were performed on hydroxylated-but-anhydrous TiO2 surfaces in the gas phase. IR spectra confirm the presence of a bonded silane layer. Terminal surface OH groups are found to react more readily than bridging OH groups. By-products of the modification adsorp tenaciously to the surface. The various silanes show only small differences in their ability to sequester surface OH groups. Following hydrolysis in moist air, Si-OH groups are observed only for the tetrafunctional silanes. Author

N82-15140*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemistry.

CHEMICAL MODIFICATION OF SEMICONDUCTOR SURFACES Final Report, 1 Sep. 1980 - 30 Nov. 1981

Harry O. Finklea 30 Nov. 1981 3 p
(Grant NAG1-89)
(NASA-CR-165066) Avail: NTIS HC A02/MF A01 CSCL 07D

Results of research on the chemical modification of TiO_2 powders in the gas phase and the examination of the modified powders by infrared absorption spectroscopy are comprehensively summarized. The range of information obtainable by IR spectroscopy of chemically modified semiconductors, and a definition of the optimum reaction conditions for synthesizing a monolayer of methylsilanes using vapor phase reaction conditions were considered. M.D.K.

N82-15141# Eisen und Metall A.G., Gelsenkirchen (West Germany).

RECOVERY OF RAW MATERIALS BY PYROLYSIS Final Report

Bernd Andreas, Walter Birckenstaedt (VEBA OEL AG), Gerd-Peter Bracker (Mannesmann Veba Umwelttechnik GmbH), Erich Michel (Mannesmann Veba Umwelttechnik GmbH), Gerd Collin (Ruetgerswerke AG), Georg Grigoleit (Ruetgerswerke AG), and Maximilian Zander (Ruetgerswerke AG) Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 264 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-017; ISSN-0340-7608) Avail: NTIS HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 42,80

With the conventional pyrolysis technologies it was formerly possible to treat one specific waste only. A new technology which enables to process a great number of hydrocarbonaceous industrial wastes, even in mixture was developed. The technology was developed in both, a laboratory and in a testing plant with a capacity of 200 kg/h and within 3000 operating hours successfully proved. Residues from car shredding plants, plastics, used cables and acid tars were pyrolysed separately as well as in a mixture. The pyrolysis products thus gained are upgraded in a succeeding stage to meet market demands or for use in a secondary refinery. The calculation of profitability for a large plant proves that a balanced operating result can be reached. In industrial areas this technology will play an important part with regard to waste disposal as well as resource recovery. Author

N82-15142# Walther Cie A.G., Cologne (West Germany).

PROCESS FOR REMOVING SULFUR OXIDES FROM GASES WITH DIRECT PRODUCTION OF A USABLE FINISHED REACTION PRODUCT Final Report, Oct. 1980

Heinz Juergen Fischer and Georg Kremer Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 38 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-102; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8

During the described phase of testing, the waste-water-free Walther-process could be advanced considerably and tried in the final process conception after a coal-fired power-station block. The ammonia sulfate obtained as a waste-product, meets the requirements of the fertilizer industry. Further processing of this pulverous waste-product to obtain a marketable end-product was investigated and demonstrated in a pelletizing unit with subsequent drying in a drum-type drier. The possibility of reheating the gases in a FGD-plant (flue-gas desulfurization plant) without application of energy from foreign source was proven by the use of a regenerative heat exchanger. As regards spray-drying, a variant was investigated: a partial flow of the high-temperature flue-gas was branched before the airheater and spray-drying of the oxidized scrubbing liquid resulting from the desulfurization process was carried out in this partial flow. Author

N82-15143# Stuttgart Univ. (West Germany). Physikalisches Inst., Teil 4.

MATERIALS CHARACTERIZATION OF SILICON AND ANALYSIS OF COMBINATION PROCESSES AND IMPURITIES Final Report, Jul. 1980

Wolfgang Schmid and Manfred H. Pilkuhn Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 80 p refs Partly in GERMAN; Partly in ENGLISH Sponsored by Bundesministerium fuer Forschung und Technologie und Deutsche Forschungsgemeinschaft
(BMFT-FB-T-81-114; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16,80

Photoluminescence of silicon is discussed as a method of materials characterization, and an analysis of impurities, defects and lifetimes is made. The nature and concentration of shallow impurities can be determined by bound exciton luminescence. In silicon, an isoelectronic defect was discovered and investigated. Silicon liquid phase epitaxy layers were produced for the investigation of the deep acceptor In. These layers exhibited significant changes in the defect properties, e.g., discrete donor acceptor pair spectra. A quantitative relation between minority carrier lifetime and the concentration of majority carriers was determined for a device modelling. The case of the simultaneous presence of gold recombination centers was of particular interest. M.G.

N82-15144# Siemens A.G., Munich (West Germany). Forschungslab.

ON TWO-SIX THIN FILM TECHNOLOGY FOR THE PREPARATION OF ACTIVE LUMINESCING AREAS Final Report, Dec. 1979

Dietmar Theis Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 71 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-118; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15

For many display applications active, flat solid state panels are gaining increasing interest. The aim of this investigation was the determination of the relevant preparational parameters as well as the electro-optic characterization of the transducer. Electroluminescing MISIM (metal-Al_2O_3 - II-VI semiconductor - Al_2O_3-metal) structures were prepared by sputtering and evaporation techniques. The most efficient layers were produced with yellow emitting ZnS.0.5 weight percent Mn films. Luminance values above 3000 cd/sq m, good multiplexability due to extremely nonlinear voltage-brightness relation and luminous efficiency of 0.5 lm/W could be achieved. The long-time stability of the devices, however, still has to be improved. Author

N82-15145# Brigham Young Univ., Provo, Utah. Dept. of Chemical Engineering.

THE ELECTROCHEMISTRY OF MOLTEN LITHIUM CHLORATE AND ITS POSSIBLE USE WITH LITHIUM IN A BATTERY

Su-Chee Simon Wang and Douglas N. Bennion Dec. 1980 36 p refs Submitted for publication
(Contract N00014-80-C-0345; NR Proj. 359-551)
(AD-A105968; BYU-TR-1) Avail: NTIS HC A03/MF A01 CSCL 07/4

Lithium chlorate, $LiClO_3$, has a reported melting point of 127.6 C or 129 C. The specific conductance of molten lithium chlorate is relatively high compared to most electrolytic solutions used at room temperature. Therefore, lithium chlorate offers the chance to operate a new lithium battery system at a temperature between 130 C and 150 C. It is found from experiments that lithium chlorate is stable in the potential range between 3.2 V and 4.6 V. A Li-Cl_2 secondary battery system has an open circuit potential of 3.97 V, making a Li-Cl_2 secondary battery in molten lithium chlorate, in principle, possible. Lithium negative electrode performance is hindered by corrosion and possible runaway reactions with $LiClO_3$ and dendrite formation on charging. The solubility of Li_2O and LiCl in $LiClO_3$ at 145 C is .000075 mol/cubic cm and .00178 mol/cubic cm respectively. The diffusion coefficients are 1.5 x 10 to the -7th power sq cm/s for Li2O and 3.4 x 10 to the -7th power sq. cm/s for LiCl. Platinum appeared to be an inert positive electrode for chlorate, chlorine, or oxygen reactions for short term runs, order of several hours. Nickel shows active-passive behavior and appears suitable for primary cell, cathodic discharge of LiClO3, but not suitable for a Cl2 or O2 electrode. GRA

N82-15146# Duke Univ., Durham, N. C. Dept. of Chemistry.
STEREOCHEMISTRY OF REACTION INVOLVING CYCLIC PEROXIDES Final Report, 1 May 1978 - 30 Apr. 1981
Ned A. Porter 25 Sep. 1981 11 p refs
(Grant NSF CHE-77-26088)
(AD-A105999; ARO-15618.1-C) Avail: NTIS HC A02/MF A01 CSCL 07/4

Several aspects of chemistry related to autoxidation, peroxy free radicals, and peroxides have been explored. Methods for preparation of complex unsaturated hydroperoxides have been developed and peroxy radicals derived from these hydroperoxides were studied as models for polyunsaturated fatty acid and polyolefin (i.e., polybutadiene and polyisoprene) autoxidation. We have established that peroxy radical cyclization and bicyclization occurs in models of polyunsaturated fatty acid oxidation and a new type of cyclization, serial cyclization, has been observed in polybutadiene oxidation models. Kinetic and stereochemical aspects of these cyclization reactions have been explored. The free radical oxidation of polyunsaturated fattv acids has been studied mechanistically. In particular, we believe that the H atom donating ability of the medium in which oxidation occurs is an important factor in determining the partitioning of peroxy free radicals between competitive pathways (i.e., beta scission and cyclization). The results of these studies provide a firm basis for understanding the degradation of materials, foodstuffs, etc. Author (GRA)

N82-15147# North Carolina Univ. at Chapel Hill. Lab. of Chemistry.
CHEMICALLY MODIFIED ELECTRODES FOR ELECTROCATALYSIS
Royce W. Murray 8 Sep. 1981 39 p refs Prepared for publication
(Contract N00014-76-C-0817; NR Proj. 350-623)
(AD-A105563; TR-18) Avail: NTIS HC A03/MF A01 CSCL 07/4

At a modified electrode, electrocatalysis is accomplished by an immobilized redox substance acting as an electron transfer mediator between the electrode and a reaction substrate. Such mediated electrocatalysis is possible with monomolecular and multimolecular layers of the redox substance. The electron transfer mediation can assume several special forms which are identified and experimental examples are given. The differences between electrocatalytic behavior of monomolecular and multimolecular layers are discussed; electrocatalysis in the latter circumstance can include reaction rate elements of electrochemical charge and substrate migration through the multilayer in addition to the chemical rate. Theoretical ideas are presented which interconnect these three rate elements, to show that either all of the multilayer sites can participate in the electrocatalytic reaction, or only ca. a monolayer's worth, depending on the relative rates of the electrochemical charge transport, the diffusion of the substrate, and the chemical reaction rate. Author (GRA)

N82-15148# Westgate Research Corp., Los Angeles, Calif.
CHEMISTRY AND APPLICATION OF OZONE AND OZONE/UV LIGHT FOR WATER REUSE Final Technical Report, 15 Sep. 1979 - 15 Sep. 1980
E. Leitis, J. D. Zeft, and M. M. Smith 8 May 1981 152 p refs
(Contract DI-14-34-0001-9436)
(PB81-238576; W81-04656; OWRT-C-90110-R(9436)(1); OWRT/RU-80/14) Avail: NTIS HC A08/MF A01 CSCL 07D

Ways to reduce fixed and operating costs of ultraviolet light (UV) enhancement of ozone (O3) oxidation of refractory organics in wastewater and the chemistry involved as well as the predictability of degradation rates for different classes of refractory compounds were investigated. Major emphasis was placed on: (1) role of UV wavelength and intensity on the oxidation rate of organics; (2) effect of pH and concentration of substrates on ozonation and UV ozonation rates; and (3) feasibility of using Oc/UV to oxidize phenanthrene, used as a model compound of polyclear aromatic hydrocarbons found in synthetic fuel wastewater. Experimental results indicate that there is a concerted attack by UV light and ozone on the carbon-halogen bond, followed by a reaction of the dehalogenated carbon with ozone. Additional results are described. GRA

N82-15149# Brookhaven National Lab., Upton, N. Y.
SEPARATION OF HYDROGEN ISOTOPES VIA SINGLE COLUMN PRESSURE SWING ADSORPTION
Y. W. Wong and F. B. Hill 1981 8 p refs Presented at the 2nd World Congr. of Chem. Eng., Montreal, 4 Oct. 1981
(Contract DE-AC02-76CH-00016)
(DE81-015658; BNL-29364; CONF-811007-2) Avail: NTIS HC A02/MF A01

Separation of hydrogen isotopes based on kinetic isotope effects was studied. The mixture separated was hydrogen containing a trace of tritium as HT and the hydride was vanadium monohydride. The separation was achieved using the single-column pressure swing process. Stage separation factors are larger and product cuts smaller than for a two-column pressure swing process operated in the same monohydride phase. DOE

N82-15150# Brookhaven National Lab., Upton, N. Y.
PHOTOTHERMAL SPECTROSCOPY OF AEROSOLS
Anthony J. Campillo and Horn Bond Lin Apr. 1981 10 p refs Presented at the SPIE Tecnical Symp., Washington, D.C., 20 Apr. 1981 Submitted for publication
(Contract DE-AC02-76CH-00016)
(DE81-026098; BNL-29792; CONF-8104104-1) Avail: NTIS HC A02/MF A01

In situ aerosol absorption spectroscopy was performed using two novel photothermal detection schemes. The first, based on a photorefractive effect and coherent detection, called phase fluctuation optical heterodyne spectroscopy, yields, depending on the geometry employed, particle specific or particle and gas absorption data. Single particles of graphite as small as 1 micrometer were detected in the particle specific mode. In another geometrical configuration, the total absorption (both gas and particle) of submicron sized aerosols of ammonium sulfate particles in equilibrium with gaseous ammonia and water vapor were measured at varying CO2 laser frequencies. The second scheme is a hybrid visible Mie scattering scheme incorporating photothermal modulation. Particle specific data on ammonium sulfate droplets were obtained. DOE

N82-15151# Stanford Linear Accelerator Center, Calif.
EXCLUSIVE PROCESSES IN QUANTUM CHROMODYNAMICS
Stanley J. Brodsky and G. Peter Lepage Jun. 1981 26 p refs Presented at the Conf. on Perturbative QCD, Tallahassee, Florida, 25-28 Mar. 1981
(Contract DE-AC03-76SF-00515)
(DE81-028233; SLAC-PUB-2762; CONF-810368-4) Avail: NTIS HC A03/MF A01

Large momentum transfer exclusive processes and the short distance structure of hadronic wave functions are systematically analyzed within the context of perturbative quantum chromodynamics (QCD). Predictions for meson form factors, two photon processes gamma gamma yield M anti M, hadronic decays of heavy quark systems, and a number of other related QCD phenomena are reviewed. DOE

N82-15152# Oak Ridge National Lab., Tenn.
THERMOLYSIS OF NAPHTHOLS
M. L. Poutsma and C. W. Dyer 1981 6 p refs Presented at the Intern. Conf. on Coal Sci., Dusseldorf, 7 Sep. 1981
(Contract W-7405-eng-26)
(DE81-029684; CONF-810914-6) Avail: NTIS HC A02/MF A01

A significant portion of the oxygen content of native coals and of the coal-derived liquids used as process solvents during hydroliquefaction of coal is present as phenolic hydroxyl groups. Various reported phenomenological effects of the phenolic content of process solvents on liquefaction performance were reviewed.

Background data concerning the chemical behavior of phenols under conditions representative of liquefaction were found lacking. The thermolysis of representative phenols under carefully defined conditions was studied. The behavior of the isomeric naphthols at 400 C in the absence of any purposely added reagents or catalysts is described. The results reveal a set of previously unrecognized thermal reactions by which phenols may be condensed to furans, be deoxygenated to arenes, and serve as hydrogen donors. These processes, the latter two generally desirable and the former one undesirable, are inherently related.
M.D.K.

N82-15153# Pacific Northwest Lab., Richland, Wash. Physical Sciences Dept.
PRECISE TRACE RARE EARTH ANALYSIS BY RADIOCHEMICAL NEUTRON ACTIVATION
J. C. Laul, E. A. Lepel, W. C. Weimer, and N. A. Wogman Jun. 1981 19 p refs From the Modern Trends in Activation Anal. Conf., Toronto, 15-19 Jun. 1981 Submitted for publication
(Contract DE-AC06-76RL-01830)
(DE81-030009; PNL-SA-9143; CONF-8106153-1) Avail: NTIS HC A02/MF A01

A rare Earth group separation scheme followed by normal Ge(Li), low energy photon detector (LEPD), and Ge(Li)-NaI(T1) coincidence-noncoincidence spectrometry, significantly enhances the detection sensitivity of individual rare Earth elements (REE) at or below the ppB level. Based on the selected gamma ray energies, normal Ge(Li) counting is favored for 140La, 170Tb, and 169Yb; LEPD is favored for low gamma ray energies of 147Nd, 153Sm, 166 Ho, and 169Yb; and noncoincidence counting is favored for 141Ce, 143Ce, 142Pr, 153Sm, 171Er, and 175Yb. The detection of radicnuclides 152mEu, 159Gd, and 177 Lu is equally sensitive by normal Ge(Li) and noncoincidence counting; 152Eu is equally sensitive by LEPD and normal Ge(Li); and 153Gd and 170Tm are equally favored by all the counting modes. Noncoincidence counting is favored for most of the REE. Precise measurements of the REE were made in geological and biological standards.
DOE

N82-15154# Belgrade Univ. (Yugoslavia). Inst. for Electrochemistry.
OXIDATION OF FORMIC ACID AND METHANOL ON SINGLE CRYSTAL PLATINUM ELECTRODES
R. R. Adzic, A. V. Tripkovic, and W. E. Grady (Brookhaven National Lab.) 1981 13 p refs Presented at the Symp. on Electrocatalysis, Minneapolis, 10-15 May 1981
(Contract DE-AC02-76CH-00016)
(DE81-028330; BNL-29817; CONF-8105105-3) Avail: NTIS HC A02/MF A01

The oxidation of formic acid and methanol involves strong adsorption prior to the charge transfer process and the intermediates formed in these reactions are even more strongly adsorbed. It was found that these processes are highly dependent on the surface orientation of the single crystal electrodes. The highest activity has been found with (111) orientation and the lowest with (100). The highest activity of (111) orientation was explained with the low hydrogen adsorption on this plane, and the low adsorption of strong bond intermediates which require two or three sites for their adsorption. This more than compensates for the low reactivity of the (111) plane toward formic acid and methanol themselves. Further studies of this oxidation are summarized.
M.D.K.

N82-15155# Central Electricity Generating Board, Southampton (England). Engineering Labs.
INTERFACIAL STRUCTURES IN NICKEL-BASED TRANSITION JOINTS AFTER LONG TERM SERVICE
R. D. Nicholson Sep. 1980 26 p refs
(DE81-903971; RD/M/N-1131) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

Three transition joints were examined after service of between 57,087 and 65,396 hours at temperatures of 570 to 605 C. Specimens were examined using microhardness, optical and scanning electron microscopy (SEM). Variations in chemical composition across the joints were determined using the EDAX attachment on the SEM. For detailed examination of the ferritic/weld metal interface, carbon extraction replicas were examined in the transmission electron microscope and selected area electron diffraction and EDAX analysis used to identify the precipitates. The effects of renormalizing for 1/2 hour at 960 C and subsequently stress relieving for 3 hours at 700 C on the interfacial structure of the joints were also investigated. Factors determining the interfacial structures are discussed and a mechanism for the formation of the long term aged structure is suggested.
DOE

N82-15156# California Univ., Livermore. Lawrence Livermore Lab.
USE OF ALKALI METAL-ACID PHOSPHATES FOR ELEVATED TEMPERATURE WATER ELECTROLYSIS
P. Shell, Margaret Steinbugler, and Oscar H. Krikorian 31 Aug. 1981 4 p Presented at the Intern. Energy Agency Annex 1 Workshop on Thermochem. Hydrogen, Juelich, West Germany 23-25 Sep. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-029607; UCRL-86623; CONF-810942-3) Avail: NTIS HC A02/MF A01

The use of molten salts containing water as electrolytes for the high temperature electrolysis of water is being investigated as part of a research program on thermochemical cycles for the production of hydrogen. The behavior of phosphate-based electrolytes during electrolysis was observed. The cell potential was measured as a function of time at constant current densities up to 1 A/cu cm using platinum electrodes. The cell resistance monitored before and after polarization in order to correlate the electrolyte conductivity to the degree of dehydration. The following characteristics of the electrolyte were observed: tendency to dehydrate in an open container; dehydration effect was most pronounced in the sodium-and lithium-based electrolytes, with the potassium-based electrolytes showing a relatively slow dehydration rate; tendency of the sodium-and lithium-based electrolytes to become viscous and form hard crusts on the electrolyte surface; the potassium electrolyte did not form these viscous melts or surface crusts; lowest cell potentials were obtained for the sodium- and potassium-based electrolytes at 300 and 350 C.
DOE

N82-15157# Pennsylvania State Univ., University Park. Dept. of Chemistry.
MECHANISTIC STUDIES OF CARBON MONOXIDE REDUCTION Progress Report, 1 Aug. 1980 - 1 Aug. 1981
Gregory L. Geoffroy 20 Jul. 1981 42 p refs
(Contract DE-AC02-79ER-10345)
(DE81-030063; DOE/ER-10345/2) Avail: NTIS HC A03/MF A01

The mechanisms by which carbon monoxide is reduced by hydrogen on the surface of metal particles and in homogeneous solutions is investigated. The mechanism of the heterogeneous, metal particle catalyzed reduction of carbon monoxide is investigated by using transition metal cluster complexes to model the metal surfaces. The mechanism of synthesis gas chemistry is carried out in homogeneous solution, focusing on a few key mechanistic steps. Methanol homologation reaction is considered. Progress reports are presented for stepwise reduction of CO to CH_4 on a triosmium cluster face; conversion of $Os_3(CO)_{11}$ (muCH_2) into $H_2Os_3(CO)_g(CCO)$ - a model for chain growth on metal surface; structures of tetranuclear FeRu clusters as models for CO activation; reactions directed toward the preparation of acyl and alkyl substituted clusters; and fragmentation of tetranuclear mixed metal clusters by reaction with CO.
DOE

N82-15158# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
ALPHA-SPECTROSCOPIC TECHNIQUES FOR FIELD MEASUREMENT OF RADON DAUGHTERS
W. W. Nazaroff, A. V. Nero, and K. L. Revzan Jun. 1981 15 p refs Presented at the 2nd Spec. Symp. on Nat. Radiation Environ., Bombay, 19-23 Jan. 1981
(Contract W-7405-eng-48)
(DE81-029846; LBL-10769; CONF-810153-1) Avail: NTIS HC A02/MF A01

Alpha spectroscopic techniques using portable instruments to measure the low concentrations of radon daughters typically found indoors are evaluated. One of two procedures may be used, two-count or single-count, depending on whether precision of measurement or rapidity of measurement is the more important objective. The two-count method permits individual radon daughter concentrations to be measured at the low level of one picocurie per liter with a relative standard deviation of about 20 percent within a total measurement time of 40 minutes (assuming the product of detector efficiency and sampling flow rate is one liter per minute). With the single-count procedure, using the same assumption, potential alpha energy concentration can be estimated within a total measurement time of 11 minutes with less than 20 percent relative procedural error for common equilibrium conditions; the relative standard deviation is about 20 percent at 0.005 working level. These findings are compared with results obtained by other commonly used procedures. DOE

N82-15159# Stanford Linear Accelerator Center, Calif.
QUARKONIUM SPECTROSCOPY
Daniel L. Scharre Jun. 1981 86 p refs Presented at the Intern. Conf. on Phys. in Collision: High Energy ee/ep/pp Interactions, Blacksburg, Va., 28-31 May 1981
(Contract DE-AC03-76SF-00515)
(DE81-028229; SLAC-Pub-2761; CONF-8105109-1) Avail: NTIS HC A05/MF A01

Recent experimental investigations of heavy quark-antiquark bound state systems are reviewed. Results from SPEAR on charmonium spectroscopy and from DORIS and CESR on bottomonium spectroscopy are presented. The current status of the search for top is also discussed. DOE

N82-15160# AEG-Telefunken, Frankfurt am Main (West Germany). Forschungsinst.
MICROANALYSIS BY ELECTRON-SPINNING SPECTROMETER FOR MATERIAL AND PROCESS CONTROL IN SEMICONDUCTOR TECHNOLOGY Final Report, Mar. 1980
Horst Neubrand Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 82 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-193; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17.20

A K-band electron spin resonance (ESR) spectrometer for high sensitivity detection of impurities in silicon semiconductor slices was constructed. Spectrometer characteristics are superheterodyne detection, low frequency field modulation, and variable sample temperature between 4 and 300K. Detection sensitivity is, e.g., 2 exp 11 P cm exp (-3), 4 exp 10 Fe cm exp (-3), with sample dimensions of 1.7 X 2.3 X 0.04 cm exp 3. The time needed for sample change and spectrum registration is about one hour. The occurence and the behavior of iron in silicon after high temperature processes were investigated with the ESR spectrometer. The time dependent pairing of iron and boron in silicon samples at room temperature was studied. Author (ESA)

N82-15161# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATION BY MEANS OF LASER MAGNETIC RESONANCE OF THE OH/HO2 REACTION YIELDING H2O/O2 [UNTERSUCHUNG DER REAKTION OH + HO2 YIELDS H2O + O2 MIT HILFE DER LASER-MAGNETISCHEN RESONANZ]
F. Temps and H. G. Wagner Sep. 1980 44 p refs In GERMAN
(MPIS-18A/1980; ISSN-0436-1199) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9.60

The rate constants of the reactions OH + HO2 yields H2O + O2 and OH + H2O2 yields HO2 + H2O were measured at room temperature in an isothermal discharge flow reactor. The O-atoms and OH- or HO2-radicals were monitored with an optically pumped lmr-spectrometer. For the investigation of the second reaction, OH-radicals were produced by F+H2O yields OH+HF. The rate constant was found to be k sub 2 (296 K) = (1.05 + or - 0.20) time 10 to the 12th power cu cm/mol s. The rate constant of the first reaction was measured in three different kinetic systems using the HO2-sources, F+H2O2 yields HO2+HF or H+O2+M yields HO2+M and was found to be k sub 1 (296 K) = (3.9 + or - 1.5) x 10 to the 13th power cu cm/mol s. In the range 2 mbar < or - P < or - 14 mbar, k sub 1 is invariant with pressure. Author

N82-15162# National Standard Reference Data System. Molten Salts Data Center.
PHYSICAL PROPERTIES DATA COMPILATIONS RELEVANT TO ENERGY STORAGE. 4: MOLTON SALTS: DATA ON ADDITIONAL SINGLE AND MULTI-COMPONENT SALT SYSTEMS
G. J. Janz and R. P. T. Tomkins Jul. 1981 873 p refs Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, N.Y.
(PB81-244121; NSRDS-NBS-61-Pt-4; LC-77-10824) Avail: NTIS HC A99/MF A01 CSCL 07D

Selected data are presented with value judgements for an additional set of 107 salt systems of interest as candidate materials for thermal energy storage sub-systems, for electrochemical energy storage systems, and in electrochemical aluminum production. The physical properties assessed are: melting points; phase diagrams; eutectic compositions; density; surface tension; viscosity; electrical conductivity; diffusion constants for ions; heat of fusion; heat capacity; volume change on fusion; vapor pressure; thermal conductivity (liquid and solid); and cryoscopic constant. The status of corrosion studies in the form of annotated bibliographic summaries, and salient observations on safety and hazards are also reported. A summarizing series of tables is provided as index to the data-gaps status for this set of candidate materials. GRA

N82-15163# National Bureau of Standards, Washington, D.C. Center for Analytical Chemistry.
THE MASS SPECTRA AND ISOTOPIC PURITY OF COMPOUNDS PROPOSED FOR USE IN THE MASTER ANALYTICAL SCHEME FOR THE ANALYSIS OF ORGANIC COMPOUNDS IN WATER
E. White, V. J. M. Welch, and H. S. Hertz Nov. 1980 62 p
(PB81-238453; NBSIR-80-2160) Avail: NTIS HC A04/MF A01 CSCL 07D

Mass spectra for 24 deuterated organic compounds are given in tabular and graphical form. The mole percent deuterium at labelled positions as determined by mass spectrometry for 23 compounds is given. GRA

N82-15164# National Bureau of Standards, Washington, D.C.
JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS. VOLUME 86, NO. 4, JULY - AUGUST 1981 Bimonthly Report, Jul. - Aug. 1981
1981 64 p
(PB81-247017; LC-63-37059) Avail: NTIS HC A04/MF A01 CSCL 07D

Contents: A method of calculating tunneling corrections for Eckart potential barriers; Generator columns and high pressure liquid chromatography for determining aqueous solubilities and octanol-water partition coefficients of hydrophobic substances; Enthalpies of solution of the nucleic acid bases. 6. Guanine in aqueous HCl and NaOH, and quanine hydrochlorides in aqueous HCl; Player aggregation in noncooperative games, II. Author

N82-15165# National Bureau of Standards, Washington, D.C. High Temperature Processes Group.
VAPORIZATION AND CHEMICAL TRANSPORT UNDER COAL GASIFICATION CONDITIONS
J. W. Hastie, D. W. Bonnell, E. R. Plante, and W. S. Horton Dec. 1980 114 p refs
(Contract DOE-EA-77-A-01-6010)
(PB81-245839; NBSIR-80-2178-DOE) Avail: NTIS HC A06/MF A01 CSCL 07D

Transpiration mass spectrometry for the quantitative analysis of high vapor temperature gases and vapors is described. This technique was applied to vapor transport and thermodynamic activity determinations for real and synthetic coal slag samples in reactive coal gas components at atmospheric pressure. A highly nonideal and nonmonotonic (with temperature and composition variables) behavior for alkali metal vapor transport was indicated. Thus a priori predictions of alkali metal transport in coal gasifiers without actual activity data are virtually impossible at the present time. Surface segregation and diffusion limitations of alkali species in slags are also possible complicating effects. Author

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-15166*# Iowa Univ., Iowa City. Div. of Materials Engineering.
EFFECTS OF MISALIGNMENT ON MECHANICAL BEHAVIOR OF METALS IN CREEP Final Report
Han C. Wu 20 Dec. 1981 14 p refs
(Grant NsG-1499)
(NASA-CR-165055; G302-81-003) Avail: NTIS HC A02/MF A01 CSCL 11F

Creep tests were conducted by means of a closed loop servocontrolled materials test system. The strain history prior to creep is carefully monitored. Tests were performed for aluminum alloy 6061-O at 150 C and were monitored by a PDP 11/04 minicomputer at a preset constant plastic strain rate prehistory. The results show that the plastic strain rate prior to creep plays a significant role in creep behavior. The endochronic theory of viscoplasticity was applied to describe the observed creep curves. Intrinsic time and strain rate sensitivity function concepts are employed and modified according to the present observation. S.L.

N82-15167*# Iowa Univ., Iowa City. Div. of Materials Engineering.
CREEP RECOVERY AND STRESS RELAXATION TESTS OF 6061-0 ALUMINUM
Han C. Wu and J. C. Yao 15 Dec. 1981 25 p refs
(Grant NsG-1499)
(NASA-CR-165056; G302-81-002) Avail: NTIS HC A02/MF A01 CSCL 11F

The investigation of creep recovery and stress relaxation in aluminum using a closed loop servo-hydraulic test system is described. The practicality of a computer controlled test system for constant plastic strain rate tension tests is demonstrated. The plastic strain rate and the magnitude of the initial strain are shown to have a noticeable effect on subsequent creep behavior of aluminum. J.D.H.

N82-15168# KHD Humboldt Wedag A.G., Cologne (West Germany). Haupabteilung Forschung und Entwicklung.
BAKING OF CARBON ANODES FOR THE ELECTROLYSIS OF ALUMINUM BY ELECTRIC RESISTANCE HEATING Final Report, Apr. 1980
Ernst Schultze-Rhonhof Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 41 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-168; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8,60

A distinct reduction of the energy input compared with the usual methods is possible when electric energy is substituted for fossil energy. Carbon anodes in a 1:1 scale can be baked uniformly by direct electric resistance heating. The characteristic chemical and physical data meets all requirements of the aluminum industry. The energy input has not yet come up to expectations. A.R.H.

N82-15169# Garrett Turbine Engine Co., Phoenix, Ariz.
HOT ISOSTATIC PRESSING OF ALUMINUM ALLOY CASTINGS Final Report, Oct. 1979 - Feb. 1981
S. J. Vonk, G. S. Hoppin, and K. W. Benn 15 Jun. 1981 64 p
(Contract N00019-79-C-0649)
(AD-A105562; Rept-31-3968) Avail: NTIS HC A04/MF A01 CSCL 11/6

The program documented in this final report was directed at identifying HIP parameters that would provide the greatest improvement in mechanical properties of A201 aluminum castings through closure of internal porosity. Author (GRA)

N82-15170# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
HIGH-TEMPERATURE FATIGUE LIFE OF TYPE 316 STAINLESS STEEL CONTAINING IRRADIATION INDUCED HELIUM
M. L. Grossbeck and K. C. Liu 1981 5 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028879; CONF-810831-28) Avail: NTIS HC A02/MF A01

Specimens of 20%-cold-worked AISI type 316 stainless steel were irradiated in the High Flux Isotope Reactor at 550 C to a maximum damage level of 15 dpa and a transmutation produced helium level of 820 at. ppM. Fully reversed strain controlled fatigue tests were performed in a vacuum at 550 C. No significant effect of the irradiation on low-cycle fatigue life was observed; however, the strain range of the 10 to the 7th power cycle endurance limit decreased from 0.35 to 0.30%. The relation between total strain range and number of cycles to failure was found to be Delta epsilon sub Tau = 0.02 Nu sub f(-06) for Nu sub f < 10 to the 7th power cycles. DOE

N82-15171# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
SWELLING, MICROSTRUCTURAL DEVELOPMENT AND HELIUM EFFECTS IN TYPE 316 STAINLESS STEEL IRRADIATED IN HFIR AND EBR-II
P. J. Maziasz and M. L. Grossbeck 1981 5 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028603; CONF-810831-29) Avail: NTIS HC A02/MF A01

The swelling and microstructural development of a single heat of 20 percent-cold-worked type 316 stainless steel irradiated to produce displacement damage and a high, continuous helium generation rate, in the High Flux Isotope Reactor (HFIR) are examined. Similar irradiation of the same heat of steel in the Experimental Breeder Reactor EBR-2 is used as a base line for comparing displacement damage accompanying a very low continuous helium generation rate. At temperatures above and below the void swelling regime approximately 350 C to 625 C swelling is greater in HFIR than in EBR-2. In the temperature range of 350 C to 625 C, cavity formation, precipitation and dislocation recovery are both enhanced and accelerated in HFIR. In HFIR cavities appear to be bubbles rather than voids and are smaller and more numerous than voids in EBR-2. Swelling becomes greater in EBR-2 than in HFIR for 20 percent-CW 316 in the void swelling temperature ranges as fluence increases. DOE

N82-15172# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
CORROSION OF TYPE 316 STAINLESS STEEL IN MOLTEN LiF-LiCl-LiBr
P. F. Tortorelli, J. H. DeVan, and J. R. Keiser 1981 11 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028633; CONF-810831-27) Avail: NTIS HC A02/MF A01

The corrosion of type 316 stainless steel by flowing (about 15 mm/s) LiF-LiCl-LiBr salt at a maximum temperature of 535 C was studied to determine whether the salt is compatible with the structural material. The corrosion rate was found to be < 2 microns/year except immediately after the addition of a small amount of lithium metal to the salt. The lithium addition increased the corrosion rate to 13.5 microns/year at 535 C (approximately that of type 316 stainless steel exposed to lithium flowing at a similar velocity). At the proposed operating temperature it appears that type 316 stainless steel has acceptable compatibility with the tritium processing salt LiF-LiCl-LiBr for use with a fusion reactor lithium blanket. DOE

N82-15173# Oak Ridge National Lab., Tenn. Fossil Energy Program.
CORROSION OF HIGH-TEMPERATURE MATERIALS IN AFBC ENVIRONMENTS. PART 2: 4500-h TESTS
T. G. Godfrey and J. H. DeVan Aug. 1981 82 p refs
(Contract W-7405-eng-26)
(DE81-028024; ORNL/TM-7734/P2) Avail: NTIS HC A04/MF A01

Candidate heat exchanger tube materials were tested for times to 4500 h in a small atmospheric-pressure fluidized bed combustor (AFBC). The materials included alloy 800H; types 304, 310, and 316 stainless steel; and aluminized alloy 800H and type 310 stainless steel. These air-cooled tubes were exposed to the AFBC environment with wall temperatures ranging from 820 to 875 C, a Ca/S molar ratio of 3.3 to 5.3, 2.5 to 3.5 percent excess O2, and a fluidizing velocity of 0.7 m/s (2.3 fps). A set of low-temperature tubes also included in the test for the final 3000-h period, were composites of 2-1/4 Cr/1Mo steel and type 304 stainless steel and were air-cooled to temperatures in the range 480 C to 590 C. Tubes were given metallographic examination. Metal wastage was at the lower limit of detection and intergranular corrosion was not not severe. Most high-temperature samples contained subsurface specks of metal sulfides, primarily of manganese, extending to depths of about 50 micrometers. The position of the one affected tube in the bed may have been a more significant corrosion factor than the steel composition per se.
DOE

N82-15174# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

PRECIPITATION AND CAVITY FORMATION IN AUSTENITIC STAINLESS STEELS DURING IRRADIATION

E. H. Lee, A. F. Rowcliffe, and L. K. Mansur 1981 6 p refs
Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028062; CONF-810831-33) Avail: NTIS
HC A02/MF A01

Microstructural evolution in austenitic stainless steels subjected to displacement damage at high temperature is strongly influenced by the interactions between helium atoms and second phase particles. Cavity nucleation occurs by the trapping of helium at partially coherent particle-matrix interfaces. The recent precipitate point defect collector theory describes the more rapid growth of precipitate-attached cavities compared to matrix cavities where the precitate-matrix interface collects point defects to augment the normal point deflect flux to the cavity.Data are presented which support these ideas. It is shown that during nickel ion irradiation of a titanium modified stainless steel at 675 C the rate of injection of helium has a strong effect on the total swelling and also on the nature and distribution of precipitate phases.
DOE

N82-15175# Argonne National Lab., Ill.

COMPUTER SIMULATION OF BULK AND SURFACE CHEMICAL DIFFUSION OF LIGHT ATOMS IN METALS

1981 15 p refs Presented at the Symp. on Interatomic Potentials and Computer Simulation of Defects in Metals, Pittsburgh, 6-7 Oct. 1981
(Contract W-31-109-eng-38)
(DE81-025159; CONF-811019-1) Avail: NTIS
HC A02/MF A01

The lattice gas as a model for interstitial solid solution and adsorption systems is reviewed with emphasis on the generation of ordered structures. Then, as a prelude to the main discourse on chemical diffusion, the tracer diffusion coefficient is discussed in conjunction with the presentation of Monte Carlo results. Chemical diffusion is treated in detail with emphasis on the Danken equation. Monte Carlo results are then presented for the chemical diffusion coefficient. The large maximum in the chemical diffusivity observed within the ordered phase is traced back to the very strong driving force provided by the chemical potential derivative.
DOE

N82-15176# Battelle Pacific Northwest Labs., Richland, Wash.

SPUTTER DEPOSITION WITH NEARLY-PARALLEL COATING FLUX

J. W. Patten, E. D. McClanahan, P. W. Moss, and M. A. Bayne (Exxon Nuclear Co., Inc., Richland, Wash.) Apr. 1981 22 p refs
(Contract DE-AC06-76RL-01830)
(DE81-030107; PNL-SA-8969A) Avail: NTIS
HC A02/MF A01

A method for producing a dense, nearly-parallel flux of sputtered atoms, that allows sputter depositing films having substantially 100% of theoretical density is described. The experimental sputtering chamber contains a target having a surface that is substantially parallel to the direction of the particles impinging upon the substrate surface, the distance between the most remote portion of the substrate surface receiving the particles and the target surface emitting the particles in a direction parallel to the substrate surface being relatively small. The pressure in the vessel is maintained less than about .65 Pa to limit scattering and permit line-of-sight deposition. Angles of incidence of the particles impinging upon the substrate surface do not vary greatly. Deposition rates are given as a function of distance from the target edge and distance from the target plane. Metallography of sputter deposited Ni is presented.
DOE

N82-15177# Oak Ridge National Lab., Tenn.

RECENT RESULTS ON THE GETTERING OF TRITIUM FROM MOLTEN LITHIUM

J. B. Talbot, P. W. Fisher, and S. D. Clinton 1981 7 p refs
Presented at the 2nd Topical Meeting on Fusion Reactor Mater., Seattle, 9-12 Aug. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-028214; CONF-810831-20) Avail: NTIS
HC A02/MF A01

Recent sorption experiments confirm that the mass transfer resistance in the yttrium solid phase controls the rate of tritium uptake from liquid lithium. Physical and chemical characteristics of different yttrium sorbers were measured to identify those properties that have the greatest effect on the tritium recovery rate. The BET surface areas of the five samples tested ranged from 0.005 to 0.4 m(2)g; concentrations of carbon, hydrogen, nitrogen, and oxygen impurities in the sample lots increased with increasing surface area. The sample showing the highest effective sorption rate had the largest surface area but also contained the highest concentration of impurities.
DOE

N82-15178# Brookhaven National Lab., Upton, N. Y. Div. of Metallurgy and Materials Science.

INTERACTION OF STRESS WITH THE MARTENSITIC PHASE TRANSITION IN A15 COMPOUNDS

David O. Welch 1981 10 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030527; BNL-30016; CONF-810835-26) Avail: NTIS
HC A02/MF A01

The effect of the martensitic phase transition which occurs in many A15 compounds on superconductivity and on elastic and anelastic behavior is examined. Since in many practical applications, A15 compounds are subject to considerable stress and strain, it is of interest to examine the interaction of stress with the martensitic transition. An examination of the effects of stress predicted by a simple Landau model which successfully describes many features of the transition and the related temperature dependence of the elastic modulus (c11-c12)/2 was made. The effect of stress on the temperature ranges of stability and metastability of various types of martensitic domain and the nonlinearity of the stress-strain relation in a polycrystalline A15 are discussed.
DOE

N82-15179# Northwestern Univ., Evanston, Ill. Dept. of Materials Science and Engineering.

SLIP SYSTEMS AND SOLID SOLUTION SOFTENING/HARDENING IN BCC METALS

M. Meshii 1981 9 p refs Presented at the US NSF and Japan Soc. for the Promotion of Sci. Seminar, Honolulu, Hawaii, Mar. 1981
(Contract DE-AS02-76ER-01367)
(DE81-028883; CONF-810391-1; COO-1367-121) Avail: NTIS HC A02/MF A01

The solid solution softening phenomenon is re-examined with special attention to intrinsic/extrinsic mechanism controversy. It appears that the existence of intrinsic solid solution softening is gaining support in many bcc metals. The existence however, is still questioned in Nb and Ta. In this report the recent observations supporting the intrinsic mechanism in Nb are reviewed. Solid solution hardening is observed in cases where the solvent metal deforms extensively by the coplanar double slip mode and softening in those which deform primarily by the single slip mode.
DOE

N82-15180# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

PREIRRADIATION MICROSTRUCTURAL DEVELOPMENT DESIGNED TO MINIMIZE PROPERTIES DEGRADATION DURING IRRADIATION IN AUSTENITIC ALLOYS

P. J. Maziasz and T. K. Roche 1981 5 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028612; CONF-810831-11) Avail: NTIS HC A02/MF A01

The first generation Prime Candidate Alloy (PCA) for the austenitic stainless steel class of alloys for application as a magnet fusion energy first wall material is a 14 Cr-16 Ni-0.25 Ti modification of Type 316 stainless steel. A key parameter for material performance is wall lifetime. The ability of the material to resist swelling and resist embrittlement during irradiation is important to longer wall lifetimes. The microstructure that evolves during irradiation is primarily responsible for both the swelling and embrittlement responses, and helium plays a central role in this microstructural evolution. This paper indicated how preirradiation microstructures that employ control of MC precipitation and dislocation density are designed and produced for fusion application of PCA. DOE

N82-15181# Hanford Engineering Development Lab., Richland, Wash.

NOTCH TENSILE BEHAVIOR OF IRRADIATED 20 PERCENT COLD-WORKED TYPE 316 STAINLESS STEEL

F. F. Huang and R. L. Fish Dec. 1980 22 p Presented at the Am. Nucl. Soc. Ann. Meeting, Miami Beach, 7-12 Jun. 1981
(Contract DE-AC14-76FF-02170)
(DE81-028170; HEDL-SA-2317; CONF-810606-95) Avail: NTIS HC A02/MF A01

Test results show that the notch sensitivity of 20% cold worked Type 316 stainless steel is dependent on irradiation temperature as well as test temperature. The temperature dependence becomes evident as the test temperature increases to 600C. At 232C, significant irradiation effects on the strength of 20% cold worked Type 316 stainless steel were observed. Irradiation hardening results from the introduction of various microstructural components which impede moving dislocations. For irradiation temperature < or = 500C, the strength of irradiated 20% cold worked Type 316 stainless steel increases with increasing fluence up to a fluence of about 4 x 10 cm sq. Little additional hardening occurs beyond this fluence. The notch sensitivity changes from a notch strengthening at lower fluences to a notch weakening at a fluence of 7.8 x 10 to the 22nd power n/cm sq. because of the inability of the material to relieve stress concentration around a notch. DOE

N82-15182# Ames Lab., Iowa. Dept. of Materials, Science and Engineering.

EFFECT OF APPLIED STRESS ON THE TRANSFORMATION BEHAVIOR OF Ni-Ti

C. H. Hsu and M. S. Wechsler 1981 5 p refs Presented at the ASM Intern. Conf. on Solid-Solid Phase Transformations, Pittsburgh, 10-14 Aug. 1981
(Contract W-7405-eng-82)
(DE81-029838; IS-M-338; CONF-810860-1) Avail: NTIS HC A02/MF A01

Measurements of axial strain, circumferential strain, and electrical resistivity were made on Ni-Ti tubes of approximate composition 55 wt percent nickel as a function of temperature cycling through the austenite-martensite transformation range. The tests were performed under various constant deadweight tensile loads. It was observed that the magnitudes of the transformation strain increased with increasing applied tensile stress. The results are interpreted in terms of crystallographic multiplicity of the martensite plates and the alteration of the martensite plate substructure in response to the applied stress. DOE

N82-15183# Pacific Northwest Lab., Richland, Wash.

RELATIVE EFFECTS OF S, Sb AND P ON THE INTERGRANULAR FRACTURE OF IRON AND NICKEL TESTED AT CATHODIC POTENTIALS

R. H. Jones, S. M. Bruemmer, M. T. Thomas, and D. R. Baer May 1981 5 p Presented at the NATO Advanced Study Inst. on Atomistics of France, Corsica, France, 22 May 1981
(Contract DE-AC06-76RL-01830)
(DE81-030076; PNL-SA-9446; CONF-810584-3) Avail: NTIS HC A02/MF A01

Evidence that S, Sb, and P participate in the embrittlement of iron and nickel tested at cathodic potentials by decreasing the critical intergranular fracture stress or by enhancing hydrogen permeation was examined. It is concluded that some elements may affect one or the other or possibly both processes. DOE

N82-15184# Union Carbide Corp., Oak Ridge, Tenn. Nuclear Div.

EFFECTS OF TENSILE DEFORMATION ON THE STRAIN MEMORY BEHAVIOR OF URANIUM-NIOBIUM ALPHA DOUBLE PRIME MARTENSITE

R. A. Vandermeer, D. A. Carpenter, W. G. Northcutt, Jr., and J. C. Ogle Aug. 1981 9 p refs Presented at the ASM Intern. Conf. on Solid-Solid Phase Transformations, Pittsburgh, 10-14 Aug. 1981
(Contract W-7405-eng-26)
(DE81-030285; Y/DV-134; CONF-810860-2) Avail: NTIS HC A02/MF A01

Tensile testing, dilatometry and X-ray diffraction techniques were used to characterize the effects of deformation on the strain memory behavior of alpha double prime martensite in a U + 14.63 at percent (6.25 wt percent) Nb alloy. The reversible strain limit in tension was determined to be 7 percent. The reversible deformation was accompanied by a reorientation of martensite. Certain favored orientations increased in volume fraction at the expense of less favored ones, suggesting that deformation occurred by the movement of intervariant interfaces and/or twin boundaries. When plastic deformation prevailed, a reversal in the reorientation mechanism resulted and the ensuring strain recovery was diminished in extent. The heat-activated strain reversal attained a maximum value of 4.2 percent and was associated with martensite reversion. Increasing amounts of deformation caused the strain recovery kinetics to be inhibited, resulting in a broader temperature range over which strain reversal was detected. DOE

N82-15185# California Univ., Berkeley. Lawrence Berkeley Lab.

ACTINIDES 1981

Sep. 1981 322 p refs Conf. held in Pacific Grove, Calif., 10-15 Sep. 1981
(Contract W-7405-eng-48)
(DE81-030350; LBL-12441; CONF-810948) Avail: NTIS HC A14/MF A01

Abstracts of 134 papers which were presented at the Actinides-1981 conference are presented. Approximately half of these papers deal with electronic structure of the actinides. Others deal with solid state chemistry, nuclear physics, thermodynamic properties, solution chemistry, and applied chemistry. DOE

N82-15186# California Univ., Livermore. Lawrence Livermore Lab.

PREDICTIVE CALCULATIONS OF VOLATILITIES OF METALS AND OXIDES IN STEAM CONTAINING ENVIRONMENTS

Oscar H. Krikorian 10 Aug. 1981 28 p refs Presented at the Conf. on Chem. of Mater. at High Temp., Harwell, Oxfordshire, 7-10 Sep. 1981
(Contract W-7405-eng-48)
(DE81-029638; UCRL-85553; CONF-810943-1) Avail: NTIS HC A03/MF A01

Predictive methods are developed for estimating the bond energies and free energy functions of volatile species having the general formula MO sub x (OH) sub y, in order to shed some light on the mechanisms and extent of steam accelerated volatilization processes. A specific example of applying the data is illustrated for the case of a proposed underground radioactive waste disposal process, where oxides of radionuclides are allowed to equilibrate with 100 atm steam and .01 atm oxygen at 1000 to 2000 K. Vapor species found to have high volatilities include C2(OH)2, CaOH, AmO2(OH)2, AmO(OH)3, UO2(OH)2, NbO(OH)3, PuO2(OH)2, CeO(OH)2, Ba(OH)2, and Eu(OH)3.

Thermodynamic data are tabulated for all possible monomeric species for this specific example. DOE

N82-15187# Pacific Northwest Lab., Richland, Wash.
PULSED-IRRADIATION CREEP IN NICKEL
E. P. Simonen and C. H. Henager, Jr. Jul. 1981 5 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9-12 Aug. 1981
(Contract DE-AC06-76RL-01830)
(DE81-030078; PNL-SA-9266; CONF-810831-53) Avail: NTIS HC A02/MF A01

Results from a series of pulsed irradiation creep tests have indicated a significant effect of beam heating on pulsed irradiation creep behavior. A pulsing effect due to intermittent atomic displacement damage was not observed. Sheet metal specimens were irradiated at 473 K using 15 MeV deuterons and a stress of 200 MPa. The pulse cycle consisted of 1000 seconds of irradiation followed by 100 seconds of annealing. Pulsed irradiation creep behavior was compared with steady irradiation creep behavior. The experimental results were interpreted using models of intermittent displacement damage and theories of temperature history effects. DOE

N82-15188# Los Alamos Scientific Lab., N. Mex.
EFFECT OF CYCLIC PULSED TEMPERATURE ON VOID GROWTH IN METALS DURING IRRADIATION
L. N. Kmetyk, W. F. Sommer, and J. Weertman 1981 7 p refs Presented at the 2nd Fusion Reactor Mater. Meeting, Seattle, 9-12 Aug. 1981
(Contract W-7405-eng-36)
(DE81-030112; LA-UR-81-2437; CONF-810831-55) Avail: NTIS HC A02/MF A01

Analysis on radiation-produced point defect transport to lattice sinks and analysis of pulsed radiation have been extended to include the effects of radiation-induced temperature oscillations. These temperature pulses enhance void growth if the ambient temperature is below the peak swelling temperature and, conversely, decrease void growth when the ambient temperature is above the peak swelling temperature. When the temperature pulses were supposed, no difference was seen between void growth under steady and pulsed irradiation. The same effects on void growth can be obtained by superposing externally-produced temperature pulses on material under steady irradiation. Calculations were done for aluminum and molybdenum for sinusoidal temperature pulses of many amplitudes and frequencies. DOE

N82-15189# Hanford Engineering Development Lab., Richland, Wash.
DAMAGE DEVELOPMENT AND HARDENING IN 14 MeV NEUTRON IRRADIATION OF COPPER ALLOYS AT 25 DEG C
H. R. Brager, F. A. Garner, and N. F. Panayotou Jul. 1981 6 p refs Presented at Second Topical Meeting Fusion Reactors Mater., Seattle, 9-12 Aug. 1981
(Contract DE-AC14-76FF-02170)
(DE81-029780; HEDL-SA-2357; CONF-810831-44) Avail: NTIS HC A02/MF A01

Copper and copper alloyed with five atom percent of either aluminum, nickel or manganese were irradiated at 25 C with 14 MeV neutrons to fluences up to 7.5 x 10 to the 17th power n/sq cm (0.003 dpa). The radiation-induced microstructure of these materials was characterized by the coupled use of electron microscopy and microhardness. The irradiation-induced microhardness changes were found to be independent of alloy identity and the magnitude of the solute-induced hardening. It appears that at least 70 percent of the defect clusters are smaller than resolvable by microscopy (approximately 1 nm). The point defects at 25 C which survive recombination and aggregate in either visible or invisible clusters constitute at least 8 percent of those produced in the cascades. DOE

N82-15190# Hanford Engineering Development Lab., Richland, Wash.
EFFECTS OF TRANSMUTATION PRODUCTS ON SWELLING IN 316 STAINLESS STEEL
J. F. Bates, F. A. Garner, and F. M. Mann 1981 5 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9-12 Aug. 1981
(Contract DE-AC14-76FF-02170)
(DE81-029805; HEDL-SA-2342-FP; CONF-810831-47) Avail: NTIS HC A02/MF A01

Application of the extensive data base developed in fission reactors to the design of fusion reactors requires an understanding of the differences in the characteristics of the two neutron spectra. Results of a study in which the isotopic evolution of AISI 316 was calculated for two breeder reactors, two fusion devices, and the High Flux Isotope Reactor (HFIR) are presented. The largest changes in composition arise in HFIR, where the manganese is strongly depleted and substantial vanadium is generated. Both of these elements increase in fusion reactors but much more slowly. Data on the swellings of AISI 316 is presented to show that depletion of manganese in HFIR will lead to changes in the swelling behavior. Swelling behavior may be altered by vanadium in a manner typical of other strong MC-carbide forming elements such as titanium. DOE

N82-15191# Hanford Engineering Development Lab., Richland, Wash.
SWELLING OF SEVERAL COMMERCIAL ALLOYS FOLLOWING HIGH FLUENCE NEUTRON IRRADIATION
R. W. Powell, D. T. Peterson, M. K. Zimmerschied, and J. F. Bates Jan. 1981 6 p refs Presented at the 2nd Topical Meeting on Fusion Reactor Mater., Seattle, 9-12 Aug. 1981
(Contract DE-AC14-76FF-02170)
(DE81-029804; HEDL-SA-2341; CONF-810831-48) Avail: NTIS HC A02/MF A01

Swelling values for a set of commercial alloys irradiated over the temperature range of 400 to 650 C. The alloys studied fall into three classes: the ferritic alloys AISI 430 F, AISI 416, EM-12, H-11 and 2 1/4 Cr-1 Mo; the superalloys Inconel 718 and Inconel X-750; and the refractory alloys TZM and Nb-1 Zr. After irradiation to a peak fluence approaching goal exposures envisioned for advanced fusion reactor first walls, all of the alloys display swelling resistance far superior to cold worked AISI 316. Of the three alloy classes examined the swelling resistance of the ferritics is the least sensitive to composition. DOE

N82-15192# Hanford Engineering Development Lab., Richland, Wash.
MICROSTRUCTURAL EXAMINATION OF SEVERAL COMMERCIAL FERRITIC ALLOYS IRRADIATED TO HIGH FLUENCE
D. S. Gelles 1981 6 p refs Presented at the 2nd Topical Meeting on Fusion Reactor Mater., Seattle, 9-12 Aug. 1981
(Contract DE-AC14-76FF-02170)
(DE81-029800; HEDL-SA-2338-FP; CONF-810831-45) Avail: NTIS HC A02/MF A01

Microstructural observations are reported for a series of five commercial ferritic alloys, 2 1/4 Cr-1 Mo, H-11, EM-12, 416, and 430F, covering the composition range 2.25 to 17% chromium, following EBR-II irradiation over the temperature range 400C to 650C and to a maximum fluence of 17.6 x 10 to the 22nd power n/sq cm E > 0.1 MeV). These materials were confirmed to be low void swelling with maximum swelling of 0.63% measured in EM-12 following irradiation at 400C to 14.0 x 10 to the 22nd power n/sq cm. A wide range of precipitation response was found both as a function of alloy and irradiation temperature. Precipitates observed included M6C, Mo2C, Chi, Laves, M23C6, Alpha and a low temperature phase as yet unidentified. It is predicted, based on these results, that the major impact of irradiation on the ferritic alloy class will be changes in postirradiation mechanical properties due to precipitation. DOE

N82-15193# Kraftwerk Union A.G., Mulheim (West Germany). Arbeitsgemeinschaft Waermebehandlung und Werkstofftechnik.
REQUIREMENTS FOR HEAT RESISTANT AND HIGHLY HEAT RESISTANT MATERIALS IN THE CONSTRUCTION OF STATIONARY TURBINES [ANFORDERUNGEN AN WARMFESTE UND HOCHWARMFESTE WERKSTOFFE IM STATIONAEREN TURBINENBAU]
B. Deblon 1980 28 p refs In GERMAN Presented at Status-Sem. on Waermebehandlung warmfester u. hochwarmfester Werkstoffe, Schloss Dachau, West Germany, 12-13 Jun. 1980

Avail: NTIS HC A03/MF A01

The requirements for the characteristics of construction materials for turbines are discussed as regards design and cost estimates in order to cope with the demand for higher power and efficiency in the field of electric energy production. This demand entails larger dimensions and higher pressure and temperature at the turbine entrance. The material requirements for blades, rotor parts, housing, and components in contact with hot vapor and hot gas are deduced. It is impossible to fulfill all requirements at the same time. Optimization stresses the important material characteristics, bearing in mind that results on small workpieces are not necessarily transferable to larger ones. Author (ESA)

N82-15194# SEP Gesellschaft fuer Technische Studien, Entwicklung, Planung m.b.H., Munich (West Germany).
DEVELOPMENT AND TESTING OF A LOW WASTE NICKEL PLATING PROCESS Final Report, Jun. 1980
Rainer Huss Bonn Bundesministerium fuer Forschung und Technology Feb. 1981 90 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-046; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,90

The economic feasibility of a nickel electroplating process was investigated. This supplementary unit was connected to an existing automatic nickel-chrome plating line. Test results prove the functioning of the process and show comprehensive reductions in waste (sludge disposal, waste water) as well as savings in nickel (recovery), chemicals, and water. According to a profit calculation investment system is recovered in two to three years. Author (ESA)

N82-15195# Kernforschungsanlage, Juelich (West Germany). Inst. fuer Reaktorwerkstoffe.
QUANTITATIVE STRUCTURAL ANALYSIS OF CHROMATICALLY CONTRASTED REFRACTORY ALLOYS
H. J. Blumenkamp, E. Wallura, H. Hoven, K. Koizlik, and H. Nickel Aug. 1980 80 p refs In GERMAN; ENGLISH summary Original contains color illustrations
(Juel-1673; ISSN-0366-0885) Avail: NTIS HC A05/MF A01

A chromatic contrasting technique, using gas ion etching, was introduced for metallography of refractory alloys to improve quantitative metallography. Refractory alloys, such as iron and nickel alloys were subjected to long-term creep tests and corrosion experiments. Phase discrimation in the chromatically contrasted alloys is increased by using monochromatic light for visual examination and the application of quantitative image analysis to these materials is made possible. Author (ESA)

N82-15764# Joint Publications Research Service, Arlington, Va.
MICROBIOLOGIC ASPECTS OF METAL CORROSION
Ye. I. Andreyuk and I. A. Kozlova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 13 (JPRS-79639) 10 Dec. 1981 p 1-9 refs Transl. into ENGLISH from Mikrobiol. Zh. (Kiev), v. 43, no. 2, Mar. - Apr. 1981 p 139-145 (For primary document see N82-15763 06-51)
Avail: Issuing Activity

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-15196*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Materials Engineering.
ION BEAM SURFACE MODIFICATION
David W. Dwight [1982] 5 p
(Grant NsG-3204)
(NASA-CR-165062) Avail: NTIS HC A02/MF A01 CSCL 07C

The essential details of a study on the practical applications and mechanisms of polymer sputtering via Argon ion impact are summarized. The potential to modify the properties of polymer surfaces to improve their adherence, durability, biocompatibility, or other desirable properties by ion beam sputtering was emphasized. Ion beam milling can be of benefit as an analytical tool to obtain composition versus depth information. Ion impact from a directed ion gun source specifically etches polymer structures according to their morphologies, therefore this technique may be useful to study unknown or new morphological features. Factors addressed were related to: (1) the texture that arises on a polymer target after ion impact; (2) the chemistry of the top surface after ion impact; (3) the chemistry of sputtered films of polymeric material deposited on substrates placed adjacent to targets during ion impact; and (4) practical properties of textured polymer targets, specifically the wettability and adhesive bonding properties. M.D.K.

N82-15197*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NITRIDATION OF SILICON M.S. Thesis Case Western Reserve Univ.
Nancy J. Shaw Oct. 1981 113 p refs
(NASA-TM-82722; E-921) Avail: NTIS HC A06/MF A01 CSCL 11G

Silicon powders with three levels of impurities, principally Fe, were sintered in He or H2. Non-densifying mechanisms of material transport were dominant in all cases. High purity Si showed coarsening in He while particle growth was suppressed in H2. Lower purity powder coarsened in both He and H2. The same three Si powders and Si /111/ single crystal wafers were nitrided in both N2 and N2/H2 atmospheres. Hydrogen increased the degree of nitridation of all three powders and the alpha/beta ratio of the lower purity powder. Some Si3N4 whiskers and open channels through the surface nitride layer were observed in the presence of Fe, correlating with the nitridation-enhancing effects of Fe. Thermodynamic calculations showed that when SiO2 is present on the Si, addition of H2 to the nitriding atmosphere decreases the amount of SiO2 and increases the partial pressure of Si-containing vapor species, that is, Si and SiO. Large amounts of NH3 and SiH4 were also predicted to form. R.J.F.

N82-15198*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
GEOMETRICAL ASPECTS OF THE TRIBOLOGICAL PROPERTIES OF GRAPHITE FIBER REINFORCED POLYMIDE COMPOSITES
Robert L. Fusaro 1982 36 p refs Presented at the Ann. Meeting of the Am. Soc. of Lubrication Engrs., Cincinnati, 10-13 May 1982
(NASA-TM-82757; E-1076) Avail: NTIS HC A03/MF A01 CSCL 11D

A latin square statistical experimental test design was used to evaluate the effect of temperature, load and sliding speed on the tribological properties of graphite fiber reinforced polymide (GFRPI) composite specimens. Hemispherically tipped composite riders were slid against 440 C HT stainless steel disks, comparisons were made to previous studies in which hemispherically tipped 440 C HT stainless steel riders were slid against GFRPI composite disks and to studies in which GFRPI was used as a liner in plain spherical bearings. The results indicate that sliding surface geometry is especially important, in that different geometries can give completely different friction and wear results. Load, temperature, and sliding distance were found to influence the friction and wear results but sliding speed was found to have little effect. Experiments on GFRPI riders with 10 weight percent additions of graphite fluoride showed that this addition has no effect on friction and wear. Author

N82-15199*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ELUCIDATION OF WEAR MECHANISMS BY FERROGRAPHIC ANALYSIS
William R. Jones, Jr. 1981 18 p refs Presented at the Tech. Symp. on Water Glycol Hydraulic Fluids at BASF Wyandotte Corp., Wyandotte, Mich., 8 Oct. 1981
(NASA-TM-82737; E-1050) Avail: NTIS HC A02/MF A01 CSCL 20K

The use of ferrographic analysis in conjunction with light and scanning electron microscopy is described for the elucidation

of wear mechanisms taking place in operating equipment. Example of adhesive wear, abrasive wear, corrosive wear, rolling element fatigue, lubricant breakdown, and other wear modes are illustrated. In addition, the use of magnetic solutions to precipitate nonmagnetic debris from aqueous and nonaqueous fluids is described.
Author

N82-15200# Siemens A.G., Neustadt b. Coburg (West Germany). Bereich Starkstromkabel und -Leitungen.
CROSSLINKING OF POLYOLEFIN INSULATION OF CABLES AND INSULATED WIRES BY THE USE OF ENERGY-RICH RADIATION. PART 1: MATERIAL OF IRRADIATION Final Report, Mar. 1980
Detlef Pieper and Arnold Schillmoeller Bonn Bundesminesterium fuer Forschung und Technologie Jul. 1981 173 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-122-Vol-1; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 31.80

Polyolefins were selected that are crosslinkable by radiation including the copolymers of ethylene and polyolefin elastomer blends. Effective stabilizing systems against thermo-oxidative ageing and copper-catalized oxidation were developed. The influence of crosslink-reforcing, coagents fillers, and pigments was studied. For the materials XLPE, EPR and EVA the optimization of compounds in a scope of production trials resulted in useful proposals for solutions for 1kV insulating compounds.
T.M.

N82-15201# Siemens A.G., Erlangen (West Germany).
CROSSLINKING OF POLYOLEFIN INSULATIONS OF CABLES AND INSULATED WIRES BY THE USE OF ENERGY-RICH RADIATION. PART 2: PHYSICS OF ELECTRON BEAM IRRADIATION OF CABLES AND WIRES Final Report, Mar. 1980
Rudolf Baeuerlein Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 94 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-123-Vol-2; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19.70

Physical quantities having an important effect on the electron beam radiation of plastic are dealt with and in some cases measurements are given. Major criteria for the setting up of an electron beam irradiation device, e.g. beam voltage, beam power and method of imparting the radiation, are presented and discussed with reference to the radiation crosslinking of IkV cable insulation core. These irradiation parameters were calculated with the aid of a computer program and compared with the test results. For programming purposes, experiments were conducted to ascertain the necessary current density distribution at the wire handling level. To check the computer results, the radiation dose was ascertained with the aid of the Young's modulus of a crosslinked high polymer in a rubber-elastic state.
T.M.

N82-15202# Siemens A.G., Neustadt b. Coburg (West Germany). Bereich Starkstromkabel und -Leitungen.
CROSSLINKING OF POLYOLEFIN INSULATIONS OF CABLES AND INSULATED WIRES BY THE USE OF ENERGY-RICH RADIATION. PART 3: PRODUCTION ENGINEERING Final Report, Mar. 1980
Hans-Dieter Bickel, Hans Heublein, and Dietmar Weber Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 224 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-124-Vol-3; ISSN-0340-7608) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 38.90

Crosslinking of the PE insulations of electrical conductors by means of electron beams represents a perfect alternative to existing thermic and chemical procedures. From projecting-up to running-in of the plant there were no difficulties of general nature. For an essential range of products the most important production parameters could be determined. Some problems occuring during the radiation of products, such as straightening of the conductor, non-performance of the exactly specified adhesion power of the insulation to the conductor and non-uniform thickness of insulation could be eliminated by an optimization of the concerned parts of the plant. With the exception of three greater repairs within 4 years, up to now no defects were to be observed in the radiation plant. Heavy corrosion in the radiation part by ozone and nitrogen oxides in the beginning was reduced to an acceptable degree by suitable measures.
A.R.H.

N82-15203# Schaefer (Fritz) G.m.b.H., Neunkirchen (West Germany).
RECYCLING PLANT FOR PAINT SLUDGES Final Report, Dec. 1980
Karl-Heinz Berewinkel Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 85 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-125; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17.85

The efficiency of paint spraying is, according to present technology, not satisfactory because the percentage of overspraying is too big. A pilot plant demonstrated that the amount of overspray can be reduced and the paint sludge can be recycled, resulting in considerable savings.
L.F.M.

N82-15204# Sandia Labs., Albuquerque, N. Mex.
LOW PRESSURE HUGONIOT CUSP IN POLYMERIC MATERIALS
S. A. Sheffield and D. D. Bloomquist 1981 5 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-028267; SAND-81-0052C; CONF-810684-46) Avail: NTIS HC A02/MF A01

Polymethyl methacrylate (PMMA) exhibits a cusp in the shock Hugoniot at about 2.0 GPa which corresponds with the beginning of shock induced polarization and the begining of an exothermic studies. Other polymers have similar behavior at about the same pressure. Quartz guage impact experiments were performed using polypyromellitimide (Vespel) and polysulfone impactors to obtain Hugoniot information and the stress history at the impact plane. In the case of Vespel a slight Hugoniot cusp was observed at about 1.8 GPa which coincides with the start of shock induced polarization. Polysulfone does not appear to have a cusp but does show stress relaxation at the impact plant beginning at about 1.8 GPa, again coinciding with the start of shock induced polarization. The abnormal behavior in PMMA is the result of a shock induced chemical reaction. A stress of about 2 GPa is a threshold for shock induced chemical reaction in several polymers.
DOE

N82-15205# Oak Ridge National Lab., Tenn. Solid State Div.
MECHANICAL STRENGTH OF LOW-TEMPERATURE-IRRADIATED POLYIMIDES: A FIVE-TO-TENFOLD IMPROVEMENT IN DOSE RESISTANCE OVER EPOXIES
R. R. Coltman, Jr. and C. E. Klabunde Jun. 1981 6 p refs Presented at the 2nd Topical Meeting on Fusion Reactor Mater., Seattle, 9-12 Aug. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-026469; CONF-810831-15) Avail: NTIS HC A02/MF A01

Neutronics calculations by Engholm show that without additional shielding even the first-fusion test reactors such as the Fusion Engineering Device will produce lifetime doses at magnet insulator locations that exceed the radiation tolerance of glass-fabric-filled (gff) epoxies now used. To explore the possible use of an alternative insulator, the mechanical strength of pure and recently available gff polyimides was studied as a function of gamma-ray irradiation at 4.9 K to 100 MGy 10 to the 10th power. After a postirradiation anneal at 307 K the flexure and compressive strengths of the gff materials measured at 77K were reduced by up to 40 percent for 100 MGy while the pure material changed little. Testing done at 300 K gave similar results, but all stress values were about 40 percent less. Compared to earlier epoxy studies we find that, overall, the gff polyimides are 5 to 10 times more radiation resistant than comparably prepared gff epoxies.
DOE

N82-15206# Sandia Labs., Albuquerque, N. Mex. Surface Metallurgy Div.
THIN FILM ADHESION AND DEADHESION
D. M. Mattox 1981 8 p refs Presented at the Intern. Soc. for Hybrid Microelectron. Meeting, Chicago, 12 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE81-028415; SAND-81-0590C; CONF-811029-1) Avail: NTIS HC A02/MF A01

Adhesion is a microscopic property of a system and the failure of adhesion or deadhesion involves failure of large areas of material the surfaces of which rarely separate at a sharp boundary between two materials. Good adhesion is prompted by: (1) strong bonding in the interfacial region; (2) absence of high stresses; (3) absence of easy fracture modes; and (4) no long-term degradation modes. Each of these factors may be influenced by the materials involved, the deposition method used, the deposition parameters and the services/test conditions. A number of these factors which determine the adhesion of film-substrate systems are reviewed and attempts to outline some methods for resolving adhesion problems are outlined. DOE

N82-15207# Sandia Labs., Albuquerque, N. Mex.
TOUGHENING IN GLASS CERAMICS THROUGH MICROSTRUCTURAL DESIGN
J. J. Mecholsky 1981 16 p refs Presented at the Intern. Symp. on the Fracture Mech. of Ceramics, University Park, Pa., 15 Jul. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030209; SAND-81-0064C; CONF-810746-2) Avail: NTIS HC A02/MF A01

Pertinent literature was reviewed to establish the effect of several material parameters on fracture toughness, K sub IC, of glass ceramics. Important parameters considered included phase separation in glass, size, shape and quantity of the crystalline phase, and internal stress. By applying toughening mechanisms established for ceramic materials to glass ceramic systems, techniques for toughening glass ceramics are developed. Phase separation, internal stress, morphological interaction, stress induced phase transformation, and combinations of these techniques were considered. DOE

N82-15208# Sandia Labs., Albuquerque, N. Mex.
ELECTRICAL CONDUCTIVITY AND THERMAL DECOMPOSITION OF HIGH TEMPERATURE PHENOLIC- AND SILICONE-BASED MATERIALS
R. T. Johnson, Jr. and R. M. Biefeld 1981 22 p refs Presented at the Conf. on Elec. Insulation and Dielec. Phenomena, Whitehaven, Pa., 25 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023177; SAND-81-0786C; CONF-811016-1) Avail: NTIS HC A02/MF A01

The temperature dependence of the electrical conductivity and thermal decomposition characteristics of several phenolic and silicone resins reinforced with glass chopped fabric or cloth were measured to 600C to 700C in a nitrogen atmosphere. The electrical results were correlated with mass loss and thermal decomposition product data obtained using mass spectroscopy and thermal gravimetric analysis. Peaks in the conductivity temperature dependence and deviations from ohmic behavior were found to be associated with material decomposition and/or outgassing. Results show a direct correlation between thermal stability and temperature dependent electrical characteristics. DOE

N82-15209# Sandia Labs., Albuquerque, N. Mex.
EFFECTS OF ION IMPLANTATION ON THE PHOTOFERROELECTRIC PROPERTIES OF LEAD LANTHANUM ZIRCONATE TITANATE CERAMICS
C. E. Land and P. S. Peercy 1981 4 p refs Presented at the 5th Intern. Meeting on Ferroelectricity, University Park, Pa., 17 Aug. 1981 and at the 4th Symp. on Ferroelectric Semiconductors, Rostov-on-Don, USSR, 4 Jun. 1981 Sponsored in part by Army
(Contract DE-AC04-76DP-00789)
(DE81-028386; SAND-81-1834C; CONF-810863-1) Avail: NTIS HC A02/MF A01

Investigations of the implantation of chemically active ions, e.g., Al and Cr, in ferroelectric phase lead lanthanum zirconate titanate (PLZT) ceramics indicate that the absorption spectrum of the implanted region can be extended from the near ultraviolet to the visible, and that the extrinsic (visible light) photoferroelectric sensitivity can be improved substantially with respect to that of PLZT implanted with inert ions. The results of these studies are reviewed and photographic sensitivities of Ar-, Ar + Ne-, Ar + Ne + He-, Al-, Cr-, Fe-, and Fe + Ne- implanted PLZT at both near-uv and visible light wavelengths are compared with the sensitivities of other image storage media DOE

N82-15210# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
US CERAMIC HEAT EXCHANGER TECHNOLOGY: STATUS AND OPPORTUNITIES
V. J. Tennery 1981 5 p Presented at the Conf. on Advancement in Heat Exchangers, Dubrovnik, Yugoslavia, 7 Sep. 1981
(Contract W-7405-eng-26)
(DE81-029686; CONF-810946-1) Avail: NTIS HC A02/MF A01

The status of ceramic heat exchanger technology in the United States is reviewed including the basis for interest in designing, building, and demonstrating these components for application in energy systems. Ceramic heat exchangers for waste heat recovery and for advanced energy systems are discussed. DOE

N82-15211# Technische Hochschule, Aachen (West Germany). Inst. fuer Kunststoffverarbeitung.
CROSSLINKING OF POLYETHYLENE IN VIEW OF AN APPLICATION IN WIRE COATING Final Report, Dec. 1979
Bernd Franzkoch and Karl Beiss Bonn Bundesministerium fuer Forschung und Technologie Apr. 1981 261 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-058; ISSN-0340-7608) Avail: NTIS HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 42,60

Different polyethylene crosslinking methods to improve the characteristics of the material as wire coating were tested. It was determined that polyethylene curing by UV radiation is not suitable for application in wire coating. At higher insulation thickness, too much radiation is absorbed to cure deeper layers of the insulation. Using a shear gap die, melt temperatures can be raised within a very short time to a level high enough to initiate peroxide decay, thus starting the crosslinking reaction. Application of microwaves and use of special microwave-sensitive peroxides is recommended. These peroxides have to be polar to absorb energy from the alternating field. The energy splits the peroxy group of the molecule, thus generating radicals, and the crosslinking reaction takes place. Author (ESA)

N82-15212# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
THERMOMECHANICAL DYNAMIC ANALYSIS OF A PREPREG: APPLICATIONS TO INDUSTRIAL BAKING [ANALYSE THERMOMECANIQUE DYNAMIQUE D'UN PREIMPREGNE APPLICATIONS AUX CUISSONS INDUSTRIELLES]
J. Hognat 8 Sep. 1980 13 p In FRENCH Presented at 4th Natl. and 1st Intern. Meeting on Composite Mater., Milan, 19-21 Nov. 1980
(SNIAS-812-551-105; C.41-629) Avail: NTIS HC A02/MF A01

The rheological characteristics of the resin used in the fabrication of a polymer matrix composite were studied. The fabrication of an organic matrix composite supposes both a thermal cycle for the polymerization of the resin and compacting pressure on the stack of prepregs at a point in the thermal cycle where the viscosity of the resin is adequate for good fiber/resin contact, obtaining a composite without porosity that has high mechanical strength. Composite sheets were produced, applying compacting pressure at different characteristic stages in the resin gelation process. Structural porosity is assessed and optimal temperature and baking time are determined. Author (ESA)

N82-15213# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
CHARACTERIZATION OF THE POLYMERIZATION OF AN

IMPREGNATION RESIN: APPLICATION TO INDUSTRIAL BAKING [AUTOPSIE DE LA POLYMERISATION D'UNE RESINE D'IMPREGNATION. APPLICATIONS AUX CUISSONS INDUSTRIELLES]
Jacques Hognet and A. Dartus 28 Apr. 1980 12 p In FRENCH Presented at 3rd Intern. Conf. on Materiaux Composites et 2nd Journees Natl. sur les Composites, Paris, 26-29 Aug. 1980
(SNIAS-812-551-107; C.41247) Avail: NTIS HC A02/MF A01

Thermomechanical, physicochemical, and electrical tests were conducted to study their adequacy, with a given thermal cycle, to follow matrix polymerization and to determine the zone of gelation initiation favorable as a pressure point on a prepreg stack to obtain the best composite possible. Composite sheets were fabricated with pressure applied at varying stages in the thermal cycle and structural porosity was assessed. It is concluded that the thermomechanical technique is prefered for industrial purposes because of its greater simplicity in application.
Author (ESA)

N82-15214# Bureau of Mines, Tuscaloosa, Ala.
EFFECT OF ADDITIVES ON SINTERING OF SILICON NITRIDE-ALUMINA-ALUMINUM NITRIDE COMPOSITIONS
B. W. Jong (Bureau of Mines, Boulder City, Nevada) and H. Heystek Jun. 1981 20 p refs
(PB81-231086; BM-RI-8546) Avail: NTIS HC A02/MF A01 CSCL 11B

The effect of additives and starting materials on the sintering and strength properties of sialon (silicon-aluminium-oxynitride) compositions fabricated by conventional pressing and sintering techniques are evaluated. Sintering and modulus of rupture (MOR) data were developed for sialon compositions produced from three components, Si_3N_4, Al_2O_3, and AlN. When doped with Y_2O_3 to aid in sintering, the highest MOR values were obtained with compositions containing between 20 and 30 mole pct (Al_2O_3 + AlN).
GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-15215# Staatliches Forschungsinstitut fuer Geochemie, Bamberg (West Germany).
TRACER INVESTIGATIONS OF THE LAWS GOVERNING THE MIGRATION OF PHLEGMATIZERS IN GUN PROPELLANTS [TRACERUNTERSUCHUNGEN UEBER GESETZMAESSIGKEITEN DER PHLEGMATISATORM[illegible]TION IN TREIBLADUNGSPULVERN]
H. Meier, D. Boesche, G. Zeitler, E. Zimmerhackl, W. Hecker, and U. Tschirwitz Bonn Bundesministerium der Vertetdigung 1981 89 p refs In GERMAN; ENGLISH summary
(BMVg-FBWT-81-7) Avail: NTIS HC A05/MF A01; DOKZENTBw, Bonn DM 30

The penetration behavior of various phlegmatizer/solvent systems in nitrocellulose propellant grains was measured by applying the radiotracer technique. The tracer methods used for these measurements of the distribution of phlegmatizers such as di-iso-octylphthalate, di-n-nonylphthalate and di-iso-nonylphthalate labelled with carbon-14 are based on the profile sectioning technique in conjuction with liquid scintillation counting and autoradiography. The measurements yield the values for diffusion coefficients, activation energies and frequency factors.
T.M.

N82-15216# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
ACCELERATED AGING OF HTPB-BASED COMPOSITE PROPELLANTS AND LINERS
Bengt Nilsson and Roland Sanden Apr. 1981 21 p refs In SWEDISH; ENGLISH summary
(FOA-C-20405-D1) Avail: NTIS HC A02/MF A01

Samples of rocket propellants based on HTPB of the type R-45HT were stored in closed pots at temperatures of 20, 40, 60 and 80 C for two to three years. Two types of antioxidants, PBN and BKF, were tested. One of the propellants contained 1 percent Fe_2O_3. Tensile and hardness tests were performed at different times. All the propellants show excellent aging properties. Some HTPB-based liner materials were tested. Samples were stored for long times at room temperature and at 70 C and were tested in respect to mechanical properties and adhesion to steel plates. The results indicate excellent aging properties also for these materials.
T.M.

N82-15217# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
DEVELOPMENT OF A SOLID PROPELLANT WITH A HIGH LEVEL FUEL CONTENT FOR VOLVO ROCKET ENGINE AB(VFA) [UTVECKLING AV EN KRUTLADDNING MED ETT BRAENSLERIKT KRUT AAT VOLVO FLYGMOTOR]
Torsten Liljegren and Bert Anderson Sep. 1981 23 p ref In SWEDISH; ENGLISH summary
(FOA-C-20421-D3) Avail: NTIS HC A02/MF A01

The propellant contains 40% ammonium perchlorate and 1.5% iron oxide (Fe_2O_3) as the burning catalyst. The fuel is a mixture of hydroxy terminated polybutadiene and polystyrene in the ratio 1:1. The charge, which is tubular, is case-bonded and the ends are not inhibited. The charge configuration gives a nearly constant pressure-time curve and the desired performance: mass flow 0.130 kg/s and burning time 12 s.
T.M.

N82-15218# Battelle Pacific Northwest Labs., Richland, Wash.
FUEL-PERFORMANCE-IMPROVEMENT PROGRAM Semi-annual Progress Report, Oct. 1980 - Mar. 1981
C. E. Crouthamel Apr. 1981 75 p refs Prepared in cooperation with Exxon Nuclear Co., Inc., Richland, Wash. and Consumers Power Co., Covert, Mich.
(Contracts DE-AC02-76ET-34215; DE-AC06-76RL-01830)
(DE81-029817; DOE/ET-34215/21) Avail: NTIS HC A04/MF A01

Progress on the Fuel Performance Improvement Program's fuel test and demonstration irradiations is reported for the period of October 1980-March 1981. The purpose of the program is to test and demonstrate improved light water reactor fuel concepts that are more resistant to failure from pellet-cladding interaction during power increases than standard pellet fuel. This would also offer extended burnup potential and, hence, improved uranium utilization.
DOE

N82-15219# Wisconsin Univ., Madison. Dept. of Mechanical Engineering.
SURVEY OF PROPOSED METHODS OF BURNING ALCOHOL IN DIESEL ENGINES
D. E. Foster 1980 10 p refs Presented at the Canadian Natl. Power Alcohol Conf., Winnipeg, Manitoba, 20 Jun. 1980
(Contract DE-AC02-79CS-50025)
(DE81-025834; CONF-8006185-1) Avail: NTIS HC A02/MF A01

Different methods of burning alcohol in diesel engines are discussed. The primary difficulty in using alcohol as a diesel fuel is initiation of the flame. The methods are categorized by the ignition technique used; spark or hot surface; pilot injection which includes twin injection and fumigation, cetane improvement and diesel/alcohol mixtures. Each method is analyzed on the basis of the maximum amount of alcohol that can be substituted for diesel fuel and the likelihood for retrofitting on current engines. It is concluded that emulsification and fumigation are currently the two most feasible methods for adapting diesel engines to burn alcohol.
DOE

N82-15220# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
SYSTEMS ANALYSIS OF HYDROGEN/NATURAL GAS SUPPLEMENTATION AND SEPARATION
M. Beller, J. DAcierno, and A. Hermelee Apr. 1981 6 p refs Presented at the 2nd World Congr. of Chem. Eng., Montreal, Oct. 1981
(Contract DE-AC02-76CH-00016)
(DE81-021383; BNL-29520; CONF-811007-5) Avail: NTIS HC A02/MF A01

Specific potential markets for hydrogen are investigated and then examines the mix of customers comprising these markets. The pipeline infrastructure, its capability for use to store and transmit hydrogen, and the incentives and drawbacks in this area are studied. There is sufficient use of both hydrogen and natural gas in potential hydrogen-consuming industries to overcome the problem of reinjection of natural gas into the pipeline after separation. DOE

N82-15221# Oak Ridge National Lab., Tenn. Engineering Technology Div.

FAILURE MODES AND EFFECTS ANALYSIS OF A COAL-SLURRY PREHEATER

H. A. Mitchell, L. F. Parsly, and A. N. Smith Sep. 1981 33 p refs
(Contract W-7405-eng-26)
(DE81-030425; ORNL/TM-7664) Avail: NTIS HC A03/MF A01

Some 55 potential failure modes were identified in a coal slurry preheater, a critical component in a typical coal direct liquefaction plant. Fourteen of these events, if they should occur, would result in losses of sufficient magnitude to require special consideration in the design or operating phase to assure control of risk at an acceptable level. It is concluded that the failure modes and effects analysis technique (FMEA) could be a valuable tool in the identification of critical components for coal conversion systems. For maximum effect, FMEA needs to be used during the initial design phase. Its principal value is to determine high-risk failure modes, which could have unacceptable impacts on system safety and reliability/availability. The usefulness of FMEA can be improved if it is supplemented by the development of a failure data base; this data base could also be of value in selected cases as input to a more detailed technique such as a fault-free analysis. DOE

N82-15222# Oak Ridge National Lab., Tenn. Engineering Technology Div.

COAL AND LIMESTONE FEED TESTING FOR ATMOSPHERIC FLUIDIZED BED COMBUSTION

C. S. Dew, J. F. Thomas, and M. E Lackey Sep. 1981 78 p
(Contract W-7405-eng-36)
(DE81-030629; ORNL/TM-7724) Avail: NTIS HC A05/MF A01

Pneumatic conveying tests of coal and coal limestone mixtures were performed on a conveying system designed to represent the branch feed lines in the TVA 20 MW(e) atmospheric fluidized bed combustor pilot plant. Test conditions were chosen to cover the operating ranges anticipated for the pilot plant. These tests led to a basic understanding of the design and operating problems associated with coal surface moisture, air velocity, fines content, solids loading, and limestone to coal ratio. Coal surface moisture was found to be the most important parameter affecting handling properties. Above a critical level of about six %, surface moisture caused severe compaction problems in the feed hopper and impact plugging in the conveyor line. When surface moisture was less than six %, conveyor line plugging resulted only from saltation and filling. DOE

N82-15223# Department of Energy, Bartlesville, Okla. Energy Technology Center.

HEATING OILS, 1981

Ella Mae Shelton Aug. 1981 44 p refs
(DE81-030833; DOE/BETC/PPS-81/4) Avail: NTIS HC A03/MF A01

The properties of 249 heating oils manufactured by 28 petroleum refining companies in 92 domestic refineries and marketed in the United States were studied and compiled. The data are tabulated according to six grades of fuel and subdivided into five geographic regions in which the fuels are marketed. The six grades of fuels are defined by ASTM Specification D396. The five regions containing a total of 16 marketing districts are shown on a map. Trend charts are included showing average properties of the six grades of fuel for the past several years. Summaries of the results of the tests by grade and by region for 1981 are compared with data for 1980. Analyses of grade 6 foreign import oils are also tabulated. DOE

N82-15224# Department of Energy, Bartlesville, Okla.

MOTOR GASOLINES, WINTER 1980-81

E. M. Shelton Jul. 1981 67 p refs
(DE81-030845; DOE/BETC/PPS-81/3) Avail: NTIS HC A04/MF A01

A compilation of analytical data for 546 samples of motor gasoline produced by 23 manufacturers is presented. The data are tabulated by groups according to brands (unlabeled) and grades for 17 marketing districts into which the country is divided. A map showing marketing areas, districts, and sampling locations is induced. Trends of selected properties of motor fuels since 1959 are charted. Octane distribution percent charts for areas 1, 2, 3, and 4 for unleaded antiknock index (R + M)/2 below 90.0, unleaded antiknock index (R + M)/2 below 93.0, and leaded antiknock index (R + M)/2 93.0 and above grades of gasoline are presented. The antiknock (octane) index (R + M)/2 averages of gasoline sold in this country were 87.6 unleaded below 90.0, 91.4 unleaded 90.0 and above, 89.1 leaded below 93.0, and 93.3 leaded 93.0 and above grades of gasoline. DOE

N82-15225# Texas Univ., Austin. Bureau of Economic Geology.

ASSESSMENT OF IN-PLACE SOLUTION METHANE IN TERTIARY SANDSTONES: TEXAS GULF COAST

A. R. Gregory, M. M. Dodge, J. S. Posey, and R. A. Morton 1981 8 p refs Presented at the 5th Geopressured-geothermal Energy Conf., Baton Rouge, La., 13 Oct. 1981
(Contract DE-AC08-78ET-11397)
(DE81-029772; CONF-811026-5) Avail: NTIS HC A02/MF A01

The total volume of in place methane dissolved in formation waters of deep sandstone reservoirs of the onshore Texas Gulf Coast within the stratigraphic section extending from the base of significant hydrocarbon production (8000 ft) to the deepest significant sandstone occurrence is appraised. Reservoir bulk volume, porosity, and methane solubility were evaluated. The latter is controlled by the temperature, pressure, and salinity of formation waters. Regional assessment of the volume and distribution of potential sandstone reservoirs was made from a data base of 880 electrical well logs, from which a grid of 24 structural dip cross sections and 4 strike cross sections was constructed. These cross sections extend from near the Wilcox outcrop to the coastline. The structural and stratigraphic framework of Tertiary sandstone units was mapped. Structual and stratigraphic frame-boundaries were used to divide the Texas Gulf Coast into 24 subdivisions. Methane content in each of nine formations or divisions of formations was determined for each subdivision. The total in place methane for Tertiary sandstones below 8000 ft in the Texas Gulf Coast was found to be 690 TCF. The total in place methane for effective Tertiary sandstones (sandstone units greater than 30 ft thick) below 8000 ft was 325 TCF. DOE

N82-15226# Battelle Pacific Northwest Labs., Richland, Wash.

THERMOCHEMICAL PRODUCTION OF LIQUIDS FROM BIOMASS

D. C. Elliott 1981 8 p refs Presented at Solar World Forum, Brighton, England, 23 Aug. 1981
(Contract DE-AC06-76RL-01830)
(DE81-030085; PNL-SA-9246; CONF-810865-1) Avail: NTIS HC A02/MF A01

The chemistry of this process is essentially that of the CO-steam process wherein carbon monoxide and water, catalyzed by sodium carbonate, are the reducing agents for the biomass. A water slurry process involving a prehydrolysis step for wood chips has been used to produce the first biomass-derived oil on a large scale. A second variation which requires recycle of a portion of the product for use as the carrier vehicle for wood flour has also been developed to the point of producing multi-barrel quantities of product. An extensive amount of product analysis has been completed on both types of product. They are similar, being highly phenolic and approximately 10% by weight of oxygen. Utilization of the product as a boiler fuel has been tested and other uses of the product are now being investigated. Analytical results and product application tests are discussed. DOE

N82-15227# California Univ., Livermore. Lawrence Livermore Lab.

HIGH-PRESSURE SOLVENT EXTRACTION OF METHANE FROM GEOPRESSURED FLUIDS

R. Quong, H. H. Otuski, F. E. Locke, and R. Netherton Aug. 1981 6 p refs Presented at the 5th Geopressured-Geothermal Energy Conf., Baton Rouge, La., 13-15 Oct. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-027713; UCRL-86515; CONF-811026-2) Avail: NTIS HC A02/MF A01

Technical and economic aspects of solvent extraction as a means of recovering dissolved methane from geopressured-geothermal brines at high pressures are considered. Economic assessment shows that additional investment in a high pressure solvent extraction plant preceding direct injection disposal of brines into isolated aquifers can be profitable. Solvent extraction is compared with other injection methods. The contributions of hydraulic (pressure) energy recovery and geothermal power production are also assessed. The solubilities of a promising solvent, n-hexadecane, and a potential low cost solvent, No. 2 Diesel fuel, were measured in 15 wt percent NaCl solutions at temperatures up to 150 C. Preliminary results of initial extraction tests at 150 C and 1000 psi in sub-pilot scale equipment are also presented.
DOE

N82-15228# California Univ., Livermore. Lawrence Livermore Lab.

HIGH-EXPLOSIVE DETONATIONS IN VARYING-OXYGEN ATMOSPHERES

F. R. Kovar, K. R. Trigger, L. G. Guymon, and J. R. Harvey 13 Aug. 1981 6 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23-25 Jun. 1981
(Contract W-7405-eng-48)
(DE81-028179; UCRL-86563; CONF-810684-48) Avail: NTIS HC A02/MF A01

Small spheres of PBX9404 AND TNT were detonated in atmospheres of varying oxygen content to study the magnitude of the effects of oxygen on afterburn of high explosive (HE) detonation products (DPs). Each of the fireballs (FBs) formed by the HEDPs was observed by high-speed cameras and radiometers in the visible and near infrared. It was found that afterburn dominates the FB radiation, while having much less influence on FB size than do instabilities and turbulence. One-dimensional nonreactive fluid flow calculations of the FB radius-time (R-T) history and shock characteristics within the FB were performed. The R-T results are in good agreement with the experiment at early times, while the internal shock agreement extends over a much longer period.
DOE

N82-15229# Los Alamos Scientific Lab., N. Mex.

GLOBAL KINETICS FOR THE SHOCK-INDUCED DECOMPOSITION OF HETEROGENEOUS EXPLOSIVES

Jerry Wackerle and Allan B. Anderson 1981 13 p refs Presented at the Symp. on Kinetics of Chem. and Phys. Processes, 10th North Am. Thermal Analysis Soc. Conf., New Orleans, 19 Oct. 1981 Submitted for publication
(Contract W-7405-eng-36)
(DE81-025252; LA-UR-81-1835; CONF-811014-3) Avail: NTIS HC A02/MF A01

Methods were developed to determine empirical rate laws for the shock-induced decomposition of condensed explosives. Pressure-field histories are measured with embedded gauges in planewave shock-initiation experiments. A Lagrangian analysis is used to integrate the fluid-dynamic conservation relations, giving the histories of density and energy fields in the reactive flow. A reactant-product equation of state is assumed and a global reaction progress variable and the associated reaction rate are calculated. Correlations of the rate to other state variables provide empirical rate laws, which prove successful in the numerical modeling of numerous initiation and detonation phenomena. Heterogeneous explosive rate laws combining three factors - shock-strength, depletion, and heating - are consistent with many shock-initiation observations and the favored nucleation and growth concept of shock-induced decomposition.
DOE

N82-15230# Los Alamos Scientific Lab., N. Mex.

REACTION RATES FROM PRESSURE-GAUGE MEASUREMENTS IN REACTING EXPLOSIVES

M. J. Ginsberg, Allan B. Anderson, and Jerry Wackerl 1981 15 p refs Presented at the 1st Symp. on Gauges and Piezoresistive Mater., Archchon, France, 29-30 Sep. - 1 Oct. 1981
(Contract W-7405-eng-36)
(DE81-030252; LA-UR-81-2482; CONF-810931-3) Avail: NTIS HC A02/MF A01

Hydrodynamic data and an equation of state describing the reaction rates of the explosives PETN, PBX 9404, TATB, and TNT during the shock-to-detontion transition are presented. The data were provided by Manganin pressure gauges embedded in the reacting explosive. Once a pressure-field history was assembled from individual pressure histories at different depths in the explosive, the conservation equations were applied in a Lagrangian analysis of the data. A reactant-product equation of state is combined with this analysis and the extent of reaction and reaction rate are calculated. Successful correlation of the calculated reaction rate values with other thermodynamic variables, such as pressure or temperature, allows formulation of a rate law and the prediction of initiation behavior under circumstances quite different from the experiments that led to the rate law. The relatively thick insulation required on the pressure gage perturbs the flow to some extent. Pressure measurements in reactive flow can now be made routinely with gages that successfully produce data leading to a description of the flow and a powerful predictive capability.
DOE

N82-15231# Futures Group, Glastonbury, Conn.

AN ASSESSMENT OF NONFOSSIL HYDROGEN Final Report

E. Fein and T. Munson Dec. 1980 221 p refs Prepared for Gas Research Inst.
(GRI Proj. 50 14-310-0274)
(PB81-246522; GRI-79/0108) Avail: NTIS HC A10/MF A01 CSCL 21D

The potential for hydrogen produced from nonfossil energy sources as an energy carrier is examined. Water electrolysis, thermochemical systems, and various solar radiation processes are evaluated as hydrogen production methods. Long-term and short-term hydrogen storage technologies were also considered. Various possible hydrogen end-uses were appraised, including its role as an industrial chemical, a heating fuel for stationary applications, a vehicular fuel, and an aircraft fuel. The role of coal in future hydrogen production was seen as providing the major competitive technology to nonfossil hydrogen production. Conditions (constraints placed on the use of natural fossil fuels or synthetic fossil fuels) under which hydrogen might be produced primarily from nonfossil energy sources are analyzed. A possible scenario was suggested for the transition to a nonfossil energy era, and areas where hydrogen could be expected contribute to domestic energy needs were indicated.
GRA

N82-15232# Massachusetts Inst. of Tech., Cambridge. LNG Research Center.

LIQUID NATURAL GAS RAPID PHASE TRANSITIONS Topical Report, Sep. 1979 - Sep. 1980

George A. Corbin and Robert C. Reid Jan. 1981 99 p refs Prepared for Gas Research Inst.
(PB81-244774; GRI-80/0031) Avail: NTIS HC A05/MF A01 CSCL 21D

An apparatus was constructed to test the concept of initiating a rapid phase transition (RPT) in methane-rich LNG on water by collapsing the vapor film with a shock wave. Helium overpressures were achieved by breaking a diaphragm in a high-pressure helium chamber. Pressure transducers recorded subsequent events. NORPT were noted for liquid nitrogen, liquid ethane, liquid methane or methane-rich LNG even with helium driver pressures up to 62 bar. The helium did, however, greatly enhance the boiling rate of the cryogen on water. On the basis of analytical modelling, it was concluded that a RPT would be very improbable for a methane-rich LNG contacting ambient water in a mode where the surface pressures were high. In the course of the project, a new thermodynamic model was developed as a possible explanation for a RPT in cases where the hot liquid temperature would exceed the critical temperature of the cryogen. GRA

N82-15233# Southwest Research Inst., San Antonio, Tex.
CHARACTERIZATION OF DIESEL EMISSIONS AS A FUNCTION OF FUEL VARIABLES Final Report, Sep. 1979 - Mar. 1981
Bruce B. Bykowski Mar. 1981 288 p refs
(Contract EPA-68-03-2707)
(PB81-244048; EPA/460-3-81-015) Avail: NTIS
HC A11/MF A01 CSCL 21D

Several properties of a refinery 'straight run kerosene', which have a narrow boiling range approximating the middle of a No. 1 diesel fuel, were altered to study their effects on regulated and unregulated exhaust emissions. Eleven fuel blends, representing changes in nitrogen content, aromatic level, boiling point distribution, olefin content, and cetane number, were evaluated. Statistical analysis, including regression, was performed using selected fuel properties as independent variables. Higher aromatic levels are generally associated with increased emissions, while increased olefin levels are generally associated with decrease emissions. GRA

N82-15234# Miami Univ., Fla. Div. of Biology and Living Resources.
PHOTOPRODUCTION OF HYDROGEN BY MARINE BLUE-GREEN ALGAE Progress Report, 15 Aug. 1980 - 14 Feb. 1981
Akira Mitsui 14 Feb. 1981 37 p
(Grant NSF PFR-80-18142)
(PB81-241424; NSF/CPE-81007) Avail: NTIS
HC A03/MF A01 CSCL 06A

The growth of Miami BG 7 (Oscillatoria sp.) in seawater was studied using 2.8 liters of Fernbach batch cultures, 14 liters of Carboy batch cultures, and 7 liters of a controlled environment system. In the batch culture tests, both 'instant ocean' and natural seawater from the local environment were used. The effects of adding supplemental nitrate and ammonia to the seawater bases were also examined. The 7-liter controlled environment culture system provides for the control and monitoring of physical and chemical parameters, and can be used for continuous culture experiments. Work on the comparative study of Anabaena cylindrica and Miami BG 7 indicates that their hydrogen metabolism is quite different having a direct bearing on their applied potential. Author

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-15235 Laboratoire Central des Ponts et Chaussees, Paris (France). Section des Nouvelles Physiques.
PRESENT POSSIBILITIES FOR THE USE OF MICROWAVES IN CIVIL ENGINEERING: BIBLIOGRAPHICAL STUDY
G. Baillot Jun. 1980 69 p refs In GERMAN; ENGLISH summary
(LBC-95; ISSN-0222-8394) Copyright. Avail: Issuing Activity

The physics which govern the use of microwaves are reviewed. The laws of propagation in different media, the properties of microwaves and resulting possible applications in civil engineering are presented. Concepts are set forth concerning the directional propagation of electromagnetic waves and the generation and amplification of microwaves. Present applications are classed in two categories, according to the physical properties of which use is made. The first deals with applications connected with properties of propagation. These properties provide solutions to various problems, such as the detection of structural defects, the measurement of thicknesses, and the geometric characterization of surfaces. The second class of applications are connected with phenomena of interaction between radiation and matter. Possibilities exist for the measurement of the humidity and temperature of materials. Numerous applications of microwaves as energy sources are cited in fields such as the fusion of hydrocarbon compounds and the drying or the embrittlement of materials. Problems posed by the use of microwaves (electromagnetic pollution, protection against radiation hazards) and legislation in this field are also covered. Author (ESA)

N82-15236 National Physical Lab., Teddington (England). Div. of Mechanical and Optical Metrology.
A BIBLIOGRAPHY OF MICRO-HARDNESS TESTING
I. C. Leigh Sep. 1981 68 p refs
(NPL-MOM-56; ISSN-0309-3069) Copyright. Avail: Issuing Activity

Arranged chronologically by year of publication, this bibliography cites about 900 articles and books which appeared between 1937 and 1980. In addition to hardness measurement and test procedures, ductility, machineability, wear resistance, and tensile strength are considered. An author index is provided. A.R.H.

N82-15237# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
SYSTEM ANALYSIS OF ALTERNATIVE PROCEDURES FOR DEEP DRILLING TECHNIQUE FOR DEPTH BETWEEN 6,000 AND 10,000 METERS Final Report, Nov. 1979
Manfred Herbricht, Hans Ostermann, Armin Sowa, Karlheinz Arens (Tech. Univ. Clausthal-Zellerfield, West Germany), Waldhorst Gutsche (Tech. Univ. Clausthal-Zellerfield, West Germany), Claus Marx (Tech. Univ. Clausthal-Zellerfield, West Germany), Thor Noevig (Tech. Univ. Clausthal-Zellerfield, West Germany), Udo Meier (Preussag AG, Hanover), Gerd Schaumberg (Deutsche Schachtbau- und Tiefbohrgesellschaft mbH), and William C. Maurer (Maurer Engineering) Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 258 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-067; ISSN-0340-7608) Avail: NTIS
HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 43,40

Worldwide research activities were carried out in the field of rock destruction. Approximately 30 different techniques are concerned. These techniques were tested for applicability to the deep drilling technique as an alternative drilling method within the range of 6000 to 10,000 m. Approximately 3 to 5 of the drilling techniques can be rated functionally practicable but inferior to the rotary drilling systems. The potential of the drilling speed cannot be utilized due to the limitation of the secondary systems. The rotary drilling system is superior to other systems in economy, efficiency, and reliability. Improvement in the present rotary drilling system can be obtained by intensive research and development. N.W.

N82-15238# Leybold-Heraeus G.m.b.H., Cologne (West Germany).
DEVELOPMENT OF CRYOREFRIGERATORS Final Report, Sep. 1980
Hans-Hermann Klein Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 63 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-107; ISSN-0340-7608) Avail: NTIS
HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,25

Two types of two-stage Gifford-McMahon- (GM) Refrigerators were developed with different cooling capacities. The GM Refrigerator consists of two components: the coldhead, which produces the cooling capacity, and the compressor unit, which delivers the high pressure helium for the GM-cycle. The design of the coldhead and the compressor unit are described and a short theory of the GM-cycle is presented. Details of the most critical parts such as regenerators, seals at low temperature, dynamic seals, and oil separators are given. Author

N82-15239# Wohlenberg (H.) K.G. G.m.b.H. und Cie., Hanover (West Germany).
MICRO-PROCESSOR-CONTROL FOR CUTTING MACHINES Final Report, Dec. 1980
Ulrich Butter and Walter Glindeman Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 52 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-142; ISSN-0340-7608) Avail: NTIS
HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West

Germany DM 10.95

The CPU controls the keyboard computer and gives guided and controlled user programming along with logical tests of auxiliary function combinations. The machine logic is controlled by the microprocessor and permanently checked. Program administration and total coordination of the systems are taken over by the microprocessor as master.
T.M.

N82-15240# Navy Experimental Diving Unit, Panama City, Fla.
SALVAGE OF A USAF F-106 DELTA DART Final Report
Colin A. Kidman and R. A. Bornholdt Jul. 1981 22 p
(AD-A105610; NEDU-5-81) Avail: NTIS HC A03/MF A01 CSCL 13/10

The underwater search, location, and recovery of an F-106 DELTA DART in the Gulf of Mexico is described. The operation covered a span of 20 days.
Author

N82-15241# Computers/Structures International, Oakland, Calif.
USER'S GUIDE: COMPUTER PROGRAM FOR THREE-DIMENSIONAL ANALYSIS OF BUILDING SYSTEMS (CTABS80) Final Report
Edward L. Wilson, H. H. Dovey, and Ashraf Habibullah Aug. 1981 113 p Sponsored by Army
(AD-A105513; WES-IR-K-81-9) Avail: NTIS HC A06/MF A01 CSCL 13/3

This report is a user's guide for CTABS80, a computer program for the linear three dimensional structural analysis of multistory frame and shear wall buildings subjected to static or dynamic loadings. In CTABS80, the building is idealized as an assemblage of vertical independent frame and shear wall systems interconnected by horizontal floor diaphragms which are rigid in their own plane. The frame and shear wall systems must basically be of rectangular geometry (in elevation) with vertical columns (or piers) and horizontal beams (or spandrels). However, with special modeling techniques, very complex situations may be considered. A special shear panel element is developed to enable modeling of discontinuous shear walls and shear walls with arbitrary openings. A diagonal bracing element to model braced frames (X-braced, K-braced, or eccentrically-braced systems) is also presented. The column, shear panel, and diagonal formulations include the effects of bending, axial, and shear deformations. Bending and shear deformations are also included in the beam formulation; however, the effects of axial deformations are neglected. The effects of the finite dimensions of the beams and columns on the stiffness of a frame or shear wall system are automatically included.
GRA

N82-15242# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
THEORETICAL BASIS OF THE DOE-2 BUILDING ENERGY USE ANALYSIS PROGRAM
Richard B. Curtis Apr. 1981 15 p refs Presented at the Intern. Energy Agency Conf., West Berlin, 6-10 Apr. 1981
(Contract W-7405-eng-48)
(DE81-028896; LBL-12300) Avail: NTIS HC A02/MF A01

A user-oriented, public domain, computer program was developed that will enable architects and engineers to perform design and retrofit studies of the energy-use of buildings under realistic weather conditions. The DOE-2.1A has been named by the US DOE as the standard evaluation technique for the Congressionally mandated building energy performance standards (BEPS). A number of program design decisions were made that determine the breadth of applicability of DOE-2.1. Such design decisions are intrinsic to all building energy use analysis computer programs and determine the types of buildings or the kind of HVAC systems that can be modeled. In particular, the weighting factor method used in DOE-2 has both advantages and disadvantages relative to other computer programs.
DOE

N82-15243# Texas Univ., Austin. School of Architecture.
CONTINUING DEVELOPMENT OF THE DEROB SYSTEM Quarterly Report, 1 Apr. - 30 Jun. 1981
Arumi-Noe Francisco Jun. 1981 100 p
(Contract DE-AC02-80CS-30254)
(DE81-027971; DOE/CS-30254/4) Avail: NTIS HC A05/MF A01

The daylighting sky factors were calculated for an arbitrary point. The point represents a light meter that can be located anywhere in the simulated structure, and it can be oriented in any direction desired. It reads the sky factor and it can disaggregate the first incidence component from the contributions due to reflections from surfaces, and transmissions from other spaces. The reflected and transmitted components show a marked spatial dependence. The results are compared with standard calculation methods. These standard calculation methods are not capable of discerning the spatial dependence, and they have no capability to account for transmissions from other spaces. The fact that the dynamic energy response of buildings (DEROB) program can describe in detail multispatial interactions allows it to calculate the effect of light-wells, courtyards, solariums on the illumination pattern of simulated spaces. A description of the results of the first set of comparisons, as well as the mathematical theory for multispace coupling is included.
DOE

N82-15244# California Univ., Livermore. Lawrence Livermore Lab.
PERSPECTIVE ON PRECISION MACHINING, POLISHING, AND OPTICAL REQUIREMENTS
G. M. Sanger 18 Aug. 1981 15 p refs Presented at the 25th SPIE Intern. Symp., San Diego, Calif., 24 Aug. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-028008; UCRL-86579; CONF-810810-22) Avail: NTIS HC A02/MF A01

Simplistic examples of how optical components are specified with respect to form and finish are given. A comparison between optical polishing and precision machining is made, and some thoughts on which technique should be selected for a specific application are presented. A short discussion of future trends related to accuracy, materials, and tools is included.
DOE

N82-15245# California Univ., Berkeley. Lawrence Berkeley Lab.
MOBILE INFILTRATION TEST UNIT: ITS DESIGN AND CAPABILITIES, PRELIMINARY EXPERIMENTAL RESULTS
A. K. Blomsterberg, M. P. Modera, and D. T. Grimsrud Jan. 1981 21 p refs
(Contract W-7405-eng-48)
(DE81-031927; LBL-12259) Avail: NTIS HC A02/MF A01

The mobile infiltration test unit (MITU), a 12 sq m construction-site office trailer modified to provide long-term field data for air infiltration studies, is described. The trailer and its instrumentation, including some preliminary tests of the individual measurement systems, are discussed. It has a completely automated data acquisition system that records air infiltration rates, surfaces pressures, and weather as half-hour averages. The shell of the trailer is well sealed, and the quantity, type, and distribution of leakage area are controlled using removable leakage panels in 16 window openings. Using the trailer's fan pressurization system, the background leakage area of the shell was measured to be 12 sq cm while the two types of leakage panels have leakage areas of 13 sq cm and 17 sq cm. The infiltration measurement system was tested by inducing a known flow rate with the fan pressurization system, and predicted the flow rates to within 10% in all cases.
DOE

N82-15246# Brookhaven National Lab., Upton, N. Y. Accelerator Dept.
CRYOPUMPING OF HYDROGEN AND HELIUM
H. J. Halama, H. C. Hseuh, and T. S. Chou 1981 6 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030553; BNL-30012; CONF-810835-29) Avail: NTIS HC A02/MF A01

Results obtained in numerous tests on small and large cryopumps cooled to 4.2 K by LHe or between 10 to 20 K by closed-cycle helium refrigerator are summarized. Then, measurements of the compound cryopump, designed to work on Tokamaks to handle the exhaust gases from the Torus are presented. DOE

N82-15247# Argonne National Lab., Ill.
PERFORMANCE PREDICTIONS OF PASSIVE SOLAR COMMERCIAL BUILDINGS
T. L. Kurbowski 1981 5 p refs Presented at 2nd Natl. Tech. Conf. on Earth Sheltered Buildings, Tulsa, Okla., 16 Oct. 1981

(Contract W-31-109-eng-38)
(DE81-027979; CONF-811034-1) Avail: NTIS HC A02/MF A01

Many Earth bermed and high mass commercial structures tending to require cooling and lighting rather than heating were designed, built, and instrumented to record segregated or partitioned energy usage. Design solutions, preliminary performance, and cost information are addressed for the earth integrated projects. DOE

N82-15248# Los Alamos Scientific Lab., N. Mex.
HEATING REMOTE ROOMS IN PASSIVE SOLAR BUILDINGS
J. Douglas Balcomb 1981 6 p refs Presented at the Solar World Forum, Brighton, Eng., 23-28 Aug. 1981
(Contract W-7405-eng-36)
(DE81-030247; LA-UR-81-2518; CONF-810865-2) Avail: NTIS HC A02/MF A01

The heating of remote rooms by convection through a connecting doorway is investigated. A simple steady-state equation is developed for design purposes. Validation of a dynamic model was achieved using data obtained over a 13-day period. Dynamic effects were investigated using a simulation analysis for three different cases of driving temperature; the effect is to reduce the temperature difference between the driving room and the remote room compared to the steady-state model. For large temperature swings in the driving room a strategy which uses the intervening door in a diode mode is effective. The importance of heat-storing mass in the remote room is also investigated. DOE

N82-15249# Brookhaven National Lab., Upton, N.Y. Accelerator Dept.
CYCLE DESIGN FOR THE ISABELLE HELIUM REFRIGERATOR
D. P. Brown, A. P. Schlafke, K. C. Wu, and R. W. Moore (Koch Process Systems) 1981 8 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030651; BNL-30006; CONF-810835-21) Avail: NTIS HC A02/MF A01

The superconducting magnets for the ISABELLE storage ring/accelerator are designed to be operated at 3.8 K using a forced-flow supercritical helium cooling system. The ISABELLE refrigerator has been designed subject to these special requirements. The design output is 13.65 KW of refrigeration below 4.2 K (for cooling the magnet and distribution system), 55 KW at 55 K (to cool heat shields for the whole system) and 100 g/s of liquefaction (for magnets power leads cooling). The system incorporates a sub-cooler section that produces liquid helium at 5.3 atm and 2.6 K and circulates it through the loads, and a Claude-type main refrigerator section. The main refrigerator section has five stages of cooling, with four of them below liquid nitrogen temperature. Liquid nitrogen precooling is not used. With 60% isothermal compressors the efficiency of the refrigerator system will be about 26% of Carnot. DOE

N82-15250# Brookhaven National Lab., Upton, N.Y. Accelerator Dept.
ANALYSIS OF COOLDOWN PERFORMANCE FOR ISABELLE HELIUM REFRIGERATOR
K. C. Wu, D. P. Brown, and R. W. Moore (Koch Process Systems) 1981 7 p refs Presented at the 1981 Cyrog. Eng. Conf., San Diego, Calif, 10 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030548; BNL-30009; CONF-810835-22) Avail: NTIS HC A02/MF A01

The ISABELLE refrigerator was designed to provide cooling for 1000 superconducting magnets. It has the dual duty of providing cooling at steady-state operating conditions and to cooldowm massive magnets from ambient temperature. During the cooldown, tremendous quantities of heat must be removed from the magnets and 75,000 liters of cold helium must be supplied to fill the system. In the planning for ISABELLE, this procedure has been estimated to require approximately two weeks. Because of this long cooldown time and the fact that during cooldown the refrigerator will be operated quite differently from its steady-state design configuration, it is important to maximize the cooling capacity and identify the cooldown procedure. DOE

N82-15251# Lehigh Univ., Bethlehem, Pa. Dept. of Metallurgy and Materials
COMPARISON OF HYDROSTATIC EXTRUSION VERSUS WIRE DRAWING AS A METHOD OF PRODUCING NbSUB3Sn SUPERCONDUCTING WIRE
V. Thadani, B. Avitzur, Y. T. Chou, and T. S. Luhman 1981 5 p refs Presented at the 9th North Am. Manuf. Research Conf., University Park, Penn., 19-22 May 1981
(Contract DE-AC02-76CH-00016)
(DE81-030275; BNL-29941; CONF-8105111-1) Avail: NTIS HC A02/MF A01

The conventional manufacturing process for Nb3Sn multifilamentary superconducting wire is a combination of hot extrusion and wire drawing. An alternative process, cold hydrostatic extrusion, was developed. All experimental data pertaining to the hydrostatic extrusion process are presented, and a comparison is made between the two manufacturing methods. The results show that monofilamentary Nb3Sn wire produced by hydrostatic extrusion not only has good superconducting properties, but also that larger reductions are achieved per pass, and fewer and shorter intermediate anneals are required in its manufacture. DOE

N82-15252# Kernforschungszentrum, Karlsruhe (West Germany).
AUTOMATION OF A 5 M ROLLING MILL FOR THERMOMECHANICAL ROLLING OF HEAVY PLATE
F. Agte (Mannesmannroehren-Werke AG), G. Fuesers (Mannesmannroehren-Werke AG), K.-U. Jannsen (Mannesmannroehren-Werke AG), P. Schiefer (Mannesmannroehren-Werke AG), and K. Stallmann (Mannesmannroehren-Werke AG) Aug. 1979 46 p refs In GERMAN; ENGLISH summary
(KfK-PDV-168) Avail: NTIS HC A03/MF A01

The rolling processes applied for the manufacture of heavy plate, the so-called normal rolling and thermomechanical rolling, are illustrated. The thermomechanical rolling method is dealt with in consideration of the strategy used in the combination of rolling and cooling rates. Scope of duties and aims of automation as well as setup and mode of operation of the process control system are described. In addition, the project flow is discussed; some of the problems encountered while putting the installation into operation are mentioned. M.G.

N82-15253# Naval Surface Weapons Center, White Oak, Md.
LIGHT DEPOLARIZATION AS A MEASURE OF PAVEMENT SURFACE TEXTURE Final Report, May 1974 - Mar. 1981
W. C. Spring, III and W. L. King, Jr. Aug. 1981 75 p refs
(PB81-241507; NSWC/WOL-E-24; FHWA/RD-81/108) Avail: NTIS HC A04/MF A01 CSCL 13B

The feasibility of using light depolarization to measure pavement surface textures was determined. A prototype vehicle-mounted depolarization measuring instrument was used. The wavelength that produces the highest correlation between the depolarization values and the conventional measurements was determined. It is indicated that improved correlations occur in the near infrared region. it is concluded that a vehicle mounted depolarization instrument can be constructed that will correlate satisfactorily with skid numbers or other textural measurements. GRA

N82-15254# Marquette Univ., Milwaukee, Wis. Dept. of Civil Engineering.
VERTICAL MOTION OF HIGHWAY BRIDGE STRUCTURE DUE TO AN EARTHQUAKE
Chai Hong Yoo, Samir V. Acra, and Jao-Shiun Kao Jan. 1981 142 p refs
(Grant NSF PFR-78-22845)
(PB81-235319; MUCE-81-1; NSF/CEE-81021) Avail: NTIS HC A07/MF A01 CSCL 13B

The dynamic response of continuous highway bridge superstructures due to pulsating support settlements induced by an earthquake is investigated. A governing differential equation for the dynamic behavior of bridge superstructures under pulsating support settlements was formulated and a Fourier series type solution method is presented. The results are compared to those obtained by a dynamic three moment equation. Four separate

computer programs were developed to facilitate the analysis and comparisons. The concept of dynamic amplification factors as the ratios of dynamic responses to static responses was developed and subsequent charts were plotted. Unusually high dynamic amplifications were observed, particularly in shearing forces.
GRA

N82-15255# Monsanto Research Corp., Dayton, Ohio.
WASTE PLASTIC RECYCLING INFORMATION EXCHANGE. VOLUME 1: SUMMARY REPORT
1981 66 p Sponsored in part by EPA, Washington, D. C.
(PB81-242273; NATO/CCMS-123-Vol-1) Avail: NTIS
HC A04/MF A01 CSCL 13B

Study determined status of plastic scrap and waste recycling in the participating NATO countries. The analysis provides general conclusions and make specific recommendations. GRA

N82-15256# Hampton (Delon) and Associates, Silver Spring, Md.
REPRESENTATIVE GROUND PARAMETERS FOR STRUCTURAL ANALYSIS OF TUNNELS. VOLUME 1: RATIONAL APPROACH TO SITE INVESTIGATION Final Report, Mar. 1981
R. B. Peck, T. L. Brekke, and Delon Hampton Mar. 1981 30 p refs
(Contract DOT-FH-11-9150)
(PB81-236432; FHWA-RD-80/012-Vol-1) Avail: NTIS
HC A03/MF A01 CSCL 13B

The planning and implementation of programs for tunnel design and construction are considered. Geotechnical problems peculiar to tunneling, settings for specific tunneling problems, approaches to exploration for identifying problems and specific procedures for site investigations and their evaluation. It is intended that this document will provide guidance to those engineers responsible for the planning and implementation of site investigation programs related to tunnel design and construction. GRA

N82-15257# Hampton (Delon) and Associates, Silver Spring, Md.
REPRESENTATIVE GROUND PARAMETERS FOR STRUCTURAL ANALYSIS OF TUNNELS. VOLUME 3: TUNNEL DESIGN AND CONSTRUCTION Final Report, 23 Sep. 1976 - 31 Dec. 1980
D. Hampton, J. S. Jin, and J. P. Black Mar. 1981 205 p refs
(Contract DOT-FH-11-9150)
(PB81-236440; FHWA/RD-80/014-Vol-3) Avail: NTIS
HC A10/MF A01 CSCL 13B

Currently used analytical design procedures are summarized. The geotechnical parameters required as input into these design procedures and their significance are determined. GRA

N82-15258# Southwest Research Inst., San Antonio, Tex.
DETECTION OF FLAWS IN REINFORCING STEEL IN PRESTRESSED CONCRETE BRIDGE MEMBERS Final Report, Apr. 1976 - Feb. 1979
F. N. Kusenberger and J. R. Barton Apr. 1981 197 p refs
(Contract DOT-FH-11-8999)
(PB81-241630; FHWA/RD-81/087) Avail: NTIS
HC A09/MF A01 CSCL 13C

Development of a practical nondestructive method for detecting deterioration in the reinforcement of prestressed concrete bridge structural members in situ is discussed. A preliminary magnetic inspection equipment is described. Records from laboratory evaluations using a 20 ft (6m) section of Texas Type 'C' beam and from field evaluations are presented. Similarities between laboratory and field inspection signatures are indicated. Prominent anomalous signatures are shown which correlated with steel elements. Other field signatures which indicated stirrup configuration in the post-tension girders was not in accordance with the plans. Correlation investigations are described which illustrate promising electronic signature enhancement and recognition methods for discriminating between steel artifacts and deterioration.
GRA

N82-15259# SRI International Corp., Menlo Park, Calif.
THE EFFECT OF FIRE RETARDANTS ON THE HEAT-RELEASE RATE OF BUILDING MATERIALS Interim Report, 1 Oct. 1978 - 30 Jun. 1980
Stanley B. Martin and Larwrence B. Inman Jul. 1981 40 p refs
(Contract NBS-EO-A01-78-3559)
(PB81-238487; NBS-GCR-81-329) Avail: NTIS
HC A03/MF A01 CSCL 13M

A method was developed for making up thick cellulosic specimens with thermocouples implanted at various depths to determine the time dependent temperature profiles when exposed to external radiant fluxes. Specimens of alpha cellulose, both untreated and treated with 2 percent by weight of $Na_2B_4O_7$, were exposed to an applied radiant flux of 3.7 W/sq cm in the heat release rate calorimeter in order to examine the effect of the fire retardants on the heat release rate. The results on a limited number of tests suggest that the char enhancement, produced by the presence of $Na_2B_4O_7$, reduces the heat release rate mainly by the reduction of the caloric value of the volatile products rather than by the insulating effect of the increased char layer thickness.
GRA

N82-15260# Purdue Univ., Lafayette, Ind. School of Civil Engineering.
HYSTERESIS IDENTIFICATION OF MULTI-STORY BUILDINGS
Sassan Toussi and James T. P. Yao May 1981 96 p refs
(Grant NSF PFR-79-06296)
(PB81-235921; CE-STR-81-15) Avail: NTIS
HC A05/MF A01 CSCL 13M

Results of the estimation of the behavior of multi-degree-of-freedom (MDOF) structural systems are reported. First, the hysteresis identification method and the corresponding error criterion are presented. The error criterion is a least-squares estimation procedure which is applied to both a constrained and an unconstrained problem. Then, a lumped-mass model used to form 'M' different independent responses from the response of an 'M' degrees of freedom structure is described. The model allows each one of the 'M' responses to be considered as the output of a single-degree-of-freedom (SDOF) structural system. Finally, the identification technique is applied to estimate the inter-story behavior of a laboratory tested, reinforced concrete frame. In addition, the effect of damping in the response of high-rise buildings was examined.
GRA

N82-15261# Purdue Univ., Lafayette, Ind. School of Civil Engineering.
INEXACT INFERENCE FOR RULE-BASED DAMAGE ASSESSMENT OF EXISING STRUCTURES
Mitsuru Ishizuka, King-Su Fu, and James T. P. Yao Feb. 1981 23 p refs
(Grant NSF PFR-79-06296)
(PB81-235913; CE-STR-81-5) Avail: NTIS HC A02/MF A01 CSCL 13M

A rule-based damage assessment system of existing structures (SPERIL) subjected to earthquake excitation is described. The principal of inexact inference is applied to obtain a rational solution. Both the fuzzy set theory and a production system, with a certainty factor, are used jointly in the inexact inference to deal with the continuous nature of the damage state and to attain the modularity of uncertainty. An inference network diagram for the damage assessment of existing structures is included. GRA

N82-15262# Bureau of Mines, Boulder City, Nev. Metallurgy Research Lab.
STATE-OF-THE ART GUIDELINE MANUAL FOR DESIGN, QUALITY CONTROL AND CONSTRUCTION OF SULFUR-EXTENDED-ASPHALT (SEA) PAVEMENTS Final Implementation Package
W. C. McBee, T. A. Sullivan, and J. O. Izatt Aug. 1980 61 p refs Prepared in cooperation with Sulphur Inst.
(PB81-242547; FHWA/IP-80/14) Avail: NTIS
HC A04/MF A01 CSCL 13C

Sulfur-Extended-Asphalt (SEA) binders save asphalt, a potential energy source, by replacing some asphalt in conventional flexible pavement mixes with sulfur. These new binders appear to possess properties comparable to asphalt. The guideline manual discussed provides the highway community in both public and private organizations with the most definitive state-of-the-art guidelines extant for using these binders. Information on design,

construction, quality control, equipment, mixing plants, specifications, and safety is included. Administrators and professionals in pavement construction, design, maintenance, and materials testing will be the personnel who are most interested in the manual.
GRA

N82-15263# Northeastern Univ., Boston, Mass. Dept. of Civil Engineering.
PROBABILISTIC ANALYSIS FOR LIQUEFACTION
M. K. Yegien and B. M. Vitelli Mar. 1981 109 p refs
(Grant NSF PFR-78-23082)
(PB81-249724; NSF/CEE-81029) Avail: NTIS HC A06/MF A01 CSCL 08M

A comprehensive review of liquefaction case histories was made and an expanded data set was prepared. The newly compiled field data are presented together with a criterion for liquefaction based on the field observations of liquefaction and nonliquefaction. A simple model for calculating the probability of liquefaction conditional to the occurrence of a particular seismic event is given. Applications of the proposed criterion and the probability model are discussed and comparisons are made between the results of this research and those previously published. Specific applications of the proposed method include an evaluation of overall liquefaction risk at a site and estimation of earthquake-generated excess pore pressures. It is concluded that liquefaction analysis procedures, which are invariably based on field observations, include significant uncertainties because of the imperfect nature of the data used. Use of the probability model presented herein permits proper evaluations of these uncertainties.
Author

N82-15264# Purdue Univ., Lafayette, Ind. Joint Highway Research Project.
PREDICTION AND CONTROL OF FIELD SWELL PRESSURES OF COMPACTED MEDIUM PLASTIC CLAY Interim Report
Gregory M. Terdich 17 Mar. 1981 188 p refs Sponsored in part by Indiana State Highway Commission and Federal Highway Administration
(PB81-242471; JHRP-81-4; FHWA/IN/JHRP-81/4) Avail: NTIS HC A05/MF A01 CSCL 08M

The swelling pressure response of a medium plastic clay (AASHTO A-6) compacted both in the field and in the laboratory was investigated. Correlation was attempted to provide a prediction process for the field result. Swelling pressure was controlled by water content deviation from optimum, compactive effort, dry density, and various interactions among these terms. Regression models for laboratory and field results are different. Variability in dry density and swelling pressure was sizeable but predictable, with the field variability being larger. Prediction models were developed for expected average and maximum swelling pressure. Charts enable the engineer to select the compaction variables that will control the swelling pressure to desired maximum value. A computer program was created to predict maximum swelling pressure.
GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-15265 Forschungsinstitut fuer Funk und Mathematik, Werthoven (West Germany).
IMPROVEMENT OF RADAR TARGET SEARCHES BY A RANGE DEPENDENT DETECTION THRESHOLD OR SIGNAL AMPLIFICATION [VERBESSERUNG DER RADARZIELSUCHE DURCH EINE ENTFERNUNGSABHAENGIGE ENTDECKUNGSSCHWELLE ODER SIGNALVERSTARKUNG]
E. Hanle Oct. 1980 22 p refs In GERMAN; ENGLISH summary
(FFM-301) Copyright. Avail: Issuing Activity

The impact of signal amplification on the search for targets with different radar cross sections was studied. A clear presentation of the whole range dependence with minimum computing expense was obtained by restriction to single pulse operation. Through a suitable range controlled threshold with half the transmitting energy, the same detection probability at maximum range is obtained as with a fixed threshold. The detection probability at short ranges is reduced, resulting in a reduced detection range for targets with small cross sections or under strong electronic countermeasures conditions.
Author (ESA)

N82-15266 Fernmeldetechnisches Zentralamt, Darmstadt (West Germany). Forschungsinst.
AN MS43 BLOCK CODE HAVING AN ERROR MULTIPLICATION SMALLER THAN THAT OF THE MMS43 CODE AND A REDUCED PORTION OF THE POWER DENSITY SPECTRUM NEAR THE FREQUENCY ZERO
Guenter Morgenstern May 1981 18 p refs In GERMAN; ENGLISH summary
(FTZ-FI-044-TBr-88) Avail: Issuing Activity

Analysis of the code tables show that both in the case of MMS43 and of V-MS43, the error multiplication occuring in block-by-block decoding can be reduced by permutations without changes in the signal spectrum by about 15%. Since the V-MS43 block code in addition decreases the portion of the power density spectrum of the signal near the frequency zero the signal interference with neighboring blocks is reduced.
Author (ESA)

N82-15267 Fernmeldetechnisches Zentralamt, Darmstadt (West Germany). Forschungsinst.
COST FUNCTIONS OF THE LONG-TERM PLANNING OF DIGITAL TRANSMISSION SYSTEMS USING COAXIAL CABLES [KOSTENFUNKTIONEN FUER DIE LANGFRISTIGE PLANNUNG VON DIGITALSIGNAL-UEBERTRAGUNGSSYSTEME AUF KOAXIALKABELN]
Ruth Kleinewillinghoefer Mar. 1981 22 p refs In GERMAN; ENGLISH summary
(FTZ-FI-03-TBr-14) Avail: Issuing Activity

The cost mainly depends on the number of channels, i.e., the demand at the end of the planning term, the length of the transmission link, and the level of multiplexing at the transfer nodes. Cost functions were derived for specific transmission systems and bit rates which are all shown to be continuous and, depending on the demand, either linear or concave.
Author (ESA)

N82-15268 Fernmeldetechnisches Zentralamt, Darmstadt (West Germany). Forschungsinst.
ATTENUATION OF COAXIAL PAIRS IN THE LOWER FREQUENCY RANGE
Hans-Werner Wellhausen May 1981 24 p refs In GERMAN; ENGLISH summary
(FTZ-FI-21-TBR-51) Avail: Issuing Activity

The design of digital transmission systems for coaxial cables using redundancy-free line signals and for systems which are to occupy non-utilized frequency bands below the carrier frequencies requires exact knowledge of the attenuation behavior of the frequency range coming into question. Starting from the determination of the load per unit length, the effective attenuation and its components (attenuation constant, reflection loss, interaction loss) are calculated and discussed for the lengths of coaxial pairs existing in the German Bundespost network. Author

N82-15269 Fernmeldetechnisches Zentralamt, Darmstadt (West Germany). Forschungsinst.
A 16 QAM MODEM FOR A 140 Mbit/SEC RADIO RELAY SYSTEM [EIN 16 QAM-MODEM FUER 140 Mbit/SEC-RICHTFUNKSYSTEME]
Werner Lorek May 1981 34 p refs In GERMAN; ENGLISH summary
(FTZ-FI-21-TBR-20) Avail: Issuing Activity

Various frequency-economical modulation procedures for the planned change-over of the 4 GHz radio-relay band to 140 Mbit/s digital signals are compared. The structure of a 16 QAM modem, and the circuit design are described. The functions of the individual components are illustrated by measurement results or circuit diagrams. For the carrier recovery, the received 16 QAM signal is converted into a 4 PSK signal, from which a fixed reference phase for the phase control of the carrier can be derived with the aid of frequency quadruplication. First measurements of the

error rate by means of an analog radio-relay channel show an acceptable approximation to the theoretical expectation. It is demonstrated that, with the aid of 16 QAM, 140 Mbit/s signals will probably fit in with the analog 80 MHz channel bandwidth of the radio-relay system.
Author

N82-15270*# Operations Research, Inc., Silver Spring, Md. Space Engineering and Communication Systems Div.
PROPAGATION EFFECTS HANDBOOK FOR SATELLITE SYSTEMS DESIGN: A SUMMARY OF PROPAGATION IMPAIRMENTS ON 10 TO 100 GHz SATELLITE LINKS WITH TECHNIQUES FOR SYSTEM DESIGN
R. D. Kaul and R. G. Wallace Dec. 1981 423 p refs
(Contract NASw-3431)
(NASA-RP-1082; ORI-TR-1905) Avail: NTIS HC A18/MF A01 CSCL 14N

The major propagation effects experienced on Earth-space communications paths in the 10 to 100 GHz frequency range. Attenuation due to rain is dealt with in detail. For individual titles, see N82-15271 through N82-15276.

N82-15271*# Operations Research, Inc., Silver Spring, Md. Space Engineering and Communication Systems Div.
CHARACTERISTICS OF RAIN AND RAIN SYSTEMS
In its Propagation Effects Handbook for Satellite Systems Design Dec. 1981 p 5-39 refs (For primary document see N82-15270 06-32)
Avail: NTIS HC A18/MF A01 CSCL 14N

The description and measurement of the macroscopic and microscopic characteristics of rain and rain systems are discussed. The statistical relationships of these characteristics and their effect on polarization and attenuation are considered. Macroscopic characteristics include the size, distribution, and movements of rain cells, the height of melting layers, and the presence of ice crystals. Microscopic characteristics include the size distribution, density, and oblateness of rain drops and ice crystals. The estimation of a major propagation effect, specific attenuation, is described.
J.D.H.

N82-15272*# Operations Research, Inc., Silver Spring, Md. Space Engineering and Communication Systems Div.
AN OVERVIEW OF SEVERAL RAIN AND ATTENUATION MODELS
In its Propagation Effects Handbook for Satellite Systems Design Dec. 1981 p 41-101 refs (For primary document see N82-15270 06-32)
Avail: NTIS HC A18/MF A01 CSCL 14N

The key features of the Rice-Holmberg, Dutton-Dougherty, Global, Lin, and Piecewise Uniform Rain Rate models for estimation of cumulative attenuation statistics on Earth-space millimeter paths are summarized. The models provide either rain rate statistics or attenuation statistics, which can be related by use of the specific attenuation and the effective path length relation. The effective path length is defined. The advantages and disadvantages of each model for specific applications are discussed. The Global model is recommended as the design tool for predicting propagation effects in Earth-space communication systems.
J.D.H.

N82-15273*# Operations Research, Inc., Silver Spring, Md. Space Engineering and Communication Systems Div.
DEPOLARIZATION ON EARTH-SPACE PATHS
In its Propagation Effects Handbook for Satellite Systems Design Dec. 1981 p 103-154 refs (For primary document see N82-15270 06-32)
Avail: NTIS HC A18/MF A01 CSCL 14N

Sources of depolarization effects on the propagation paths of orthogonally-polarized information channels are considered. The main sources of depolarization at millimeter wave frequencies are hydrometeor absorption and scattering in the troposphere. Terms are defined. Mathematical formulations for the effects of the propagation medium characteristics and antenna performance on signals in dual polarization Earth-space links are presented. Techniques for modeling rain and ice depolarization are discussed.
J.D.H.

N82-15274*# Operations Research, Inc., Silver Spring, Md. Space Engineering and Communication Systems Div.
PROPAGATION DATA BASES
In its Propagation Effects Handbook for Satellite Systems Design Dec. 1981 p 155-194 refs (For primary document see N82-15270 06-32)
Avail: NTIS HC A18/MF A01 CSCL 14N

Existing data bases accumulated as the result of experiments to gather propagation data on millimeter wave Earth-space links are described. The satellites used are described and results of the significant experiments conducted in the United States are summarized. The data bases consist primarily of cumulative attenuation statistics, though some depolarization measurements are included. Additional summaries of propagation data are cited.
J.D.H.

N82-15275*# Operations Research, Inc., Silver Spring, Md. Space Engineering and Communication Systems Div.
PREDICTION TECHNIQUES
In its Propagation Effects Handbook for Satellite Systems Design Dec. 1981 p 195-348 refs (For primary document see N82-15270 06-32)
Avail: NTIS HC A18/MF A01 CSCL 14N

Prediction methods and related propagation results for the evaluation of Earth-space communication paths operating above 10 GHz are presented. Gaseous attenuation, rain, cloud, fog, sand, and dust attenuation, path diversity, signal fluctuations and low angle fading, depolarization effects, bandwidth coherence, and sky noise are considered.
J.D.H.

N82-15276*# Operations Research, Inc., Silver Spring, Md. Space Engineering and Communication Systems Div.
APPLICATION OF PROPAGATION PREDICTIONS TO EARTH/SPACE TELECOMMUNICATIONS SYSTEM DESIGN
In its Propagation Effects Handbook for Satellite Systems Design Dec. 1981 p 349-404 refs (For primary document see N82-15270 06-32)
Avail: NTIS HC A18/MF A01 CSCL 14N

The corresponding between a given propagation phenomenon and system performance is considered. Propagation data are related to system performance parameters, allowing the systems engineer to perform the analyses determining how well requirements are met by a given system design, and enabling the systems engineer to modify that design if necessary. The various ways of specifying performance criteria for different kinds of systems are discussed, and a general procedure for system design is presented and demonstrated.
J.D.H.

N82-15277*# Old Dominion Univ., Norfolk, Va. Dept. of Electrical Engineering.
AIRBORNE ANTENNA PATTERN CALCULATIONS Final Report, 1 Nov. 1980 - 31 Oct. 1981
Timothy J. Knerr, Teri M. Owens, and Roland R. Mielke Dec. 1981 322 p refs
(Grant NsG-1655)
(NASA-CR-165059) Avail: NTIS HC A14/MF A01 CSCL 20N

Calculated principal-and off-principal plane patterns are presented for the following aircraft: de Havilland DHC-7, Rockwell Sabreliner 75A, Piper PA-31T Cheyenne, Lockheed Jet Star II, Piper PA-31-350 Navajo Chieftain, Beechcraft Duke B60, Rockwell Commander 700, Cessna Citation 3, Piper PA-31P Pressurized Navajo, Lear Jet, and Twin Otter DHC-6. Author

N82-15278*# Virginia Univ., Charlottesville. Semiconductor Device Lab.
INVESTIGATION OF SEMICONDUCTOR CLAD OPTICAL WAVEGUIDES Semiannual Status Report,
T. E. Batchman and G. M. McWright Dec. 1981 25 p refs
(Grant NAG1-177)
(NASA-CR-165074; UVA/528207/EE81/101) Avail: NTIS HC A02/MF A01 CSCL 14N

The properties of semiconductor-clad optical waveguides based on glass substrates were investigated. Computer modeling studies on four-layer silicon-clad planar dielectric waveguides indicated that the attenuation and mode index should behave as exponentially damped sinusoids as the silicon thickness is decreased below one micrometer. This effect can be explained as a periodic coupling between the guided modes of the lossless structure and the lossy modes supported by the high refractive index silicon. The computer studies also show that both the attenuation and mode index of the propagating mode are significantly altered by conductivity charges in the silicon. Silicon claddings were RF sputtered onto AgNO3-NaNO3 ion exchanged waveguides and preliminary measurements of attenuation were made. An expression was developed which predicts the attenuation of the silicon clad waveguide from the attenuation and phase characteristics of a silicon waveguide. Several applications of these clad waveguides are suggested and methods for increasing the photo response of the RF sputtered silicon films are described. M.G.

N82-15279# Siemens A.G., Munich (West Germany). Werk fuer Integrierte Schaltungen.

INTEGRATED CIRCUITS FOR TV AND RADIO APPLICATIONS Final Report, Dec. 1979

Helmut Bichler, Helmut Deppe, Josef Fenk, Gerhard Gehring, Guenter vonHaefen, Walter Haberl, Walter Kellner, Hans Kriedt, Dietmar Mallon, Gerald Muendel et al Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 117 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-088; ISSN-0340-7608) Avail: NTIS HC A06/MF A01

This was achieved by: improving the electrical properties of existing IC's and simultaneously reducing the peripheral circuitry and the manufacturing costs; combining several circuits in a single complex IC; and replacing of circuitry previously made from discrete components by new integrated circuits. The newly developed IC's are described. All problems and their solutions connected with the development, the manufacture and the testing of the circuits are reported. The circuits described are mainly for use in the RF-, IF- and AF-sections, the power supply and the display and control sections of radio and TV-receivers. The development of two new process lines for the manufacture of RF-circuits and circuits operating at supply voltages of up to 45 volts is also reported. T.M.

N82-15280# Eckardt A.G., Stuttgart (West Germany).

STUDY OF THE STRUCTURE OF A PROCESS CONTROL SYSTEM CONSISTING OF UNITS FOR SIGNAL PROCESSING, OPERATOR STATIONS AND PROCESS COMPUTER Final Report, May 1980

Hans Unkel Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 52 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-135; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10.95

Large scale integrated circuits were used to develop a system for optimizing process control in automatically controlled plants. The system designed consists of units for signal processing which are linked by a data bus with color CRT stations for display and operation. A.R.H.

N82-15281# AEG-Telefunken, Backnang (West Germany). Fachbereich Weitverkehr und Kabeltechnik.

SYSTEM CONCEPTS AND BASIC TECHNOLOGIES FOR RECEIVER COMPONENTS OF DIGITAL RADIO LINK SYSTEMS AT 20 GHz Final Report, Jan. 1979

Juergen Marquardt, Wolfgang Ehrlinger, Martin Glauner, Gerhard Groebner, Wolfgang Hauth, and Nikolaos Rigos Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 274 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-166; ISSN-0340-7608) Avail: NTIS HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 43.90

As starting point for the system development of digital broadband-transmission at 20 GHz, the optimum modulation code is found considering various boundary conditions. Based on this result the design of the RF-filters for a system was demonstrated. After a refinement of the necessary basic technology design procedures was worked out for planar integrated microwave circuits at 20 GHz, design rules for housing dimensions and minimized length transitions between rectangular and planar waveguides are presented. T.M.

N82-15282# Institut fuer Zukunftsforschung G.m.b.H., Berlin (West Germany).

DATA PROTECTION OF COMPUTER AIDED TELECOMMUNICATION SYSTEMS Final Report, Oct. 1980

Peter Berger, Gunnar Grugelke, Guenter Jensen, Johanna Kratzsch, Rolf Kreibich, Helgomar Pichlmayer, and Jochen Peter Spohn Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 448 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FR-DV-81-006; ISSN-0170-9011) Avail: NTIS HC A19/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 61-20

The aim of the investigation of computer aided telecommunication systems. Existing and/or planned data protection problems that accompany emergency alert systems in the transportation sector, in interactive videotex, in two-way-cable TV, and in integrated office communication systems were examined. The services offered by the telecommunication systems imply the processing of user (participants) data and of data originated by the telecommunication process itself. It is concluded that data protection problems of computer aided telecommunication systems can not be reduced to the fact of simple misuse. T.M.

N82-15283# North Carolina Univ. at Chapel Hill. Dept. of Statistics.

INFORMATION CAPACITY OF GAUSSIAN CHANNELS

Charles R. Baker Sep. 1981 19 p refs
(Contract N00014-75-C-0491)
(AD-A105659) Avail: NTIS HC A02/MF A01 CSCL 09/4

A communication channel without feedback, with transmitted signal A(X), and with additive Gaussian noise N is considered. The information capacity C of this channel is obtained by stochastic process subject to certain constraints. The class of admissible processes W includes all Gaussian processes having induced measure equivalent to the measure induced by M. J.D.H.

N82-15284# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

APPLICATION OF SYMBOLIC PROCESSING TO COMMAND AND CONTROL: AN ADVANCED INFORMATION PRESENTATION SYSTEM. VOLUME 1: OVERVIEW Annual Technical Report, 1980 - 1981

Frank Zdybel, Jeff Gibbons, Norton Greenfeld, and Martin Yonke Aug. 1981 41 p refs
(Contract N00039-79-C-0316; ARPA Order 3740)
(AD-A106102; BBN-4752-Vol-1; ATR-2) Avail: NTIS HC A03/MF A01 CSCL 17/2

This report describes the work performed in the second year of the three-year contract to explore the application of symbolic processing to command and control (C2); specifically, the graphics interface between the C2 user and a complex C2 decision support system. In Volume 1, the goals and approaches used in the design of the prototype system, AIPS (Advanced Information Presentation System), are discussed, as well as the year's efforts to extend the prototype. An overview of the current AIPS system is also provided. GRA

N82-15285# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

APPLICATION OF SYMBOLIC PROCESSING TO COMMAND AND CONTROL: AN ADVANCED INFORMATION PRESENTATION SYSTEM. VOLUME 2: KNOWLEDGE BASE Annual Technical Report, 1980 - 1981

Frank Zdybel, Jeff Gibbons, Norton Greenfeld, and Martin Yonke Aug. 1981 181 p
(Contract N00039-79-C-0316; ARPA Order 3740)
(AD-A106103; BBN-4752-Vol-2; ATR-2) Avail: NTIS HC A09/MF A01 CSCL 17/2

This report describes the work performed in the second year of the three-year contract to explore the application of symbolic processing to command and control (C2); specifically, the graphics interface between the C2 user and a complex C2 decision support system. Volume 2 contains the complete AIPS knowledge base. This document provides the fully-inherited structure that the system sees during operation. GRA

N82-15286# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
APPLICATION OF SYMBOLIC PROCESSING TO COMMAND AND CONTROL: AN ADVANCED INFORMATION PRESENTATION SYSTEM. VOLUME 3: PROGRAM SOURCE FILES Annual Technical Report, 1980 - 1981
Frank Zdybel, Jeff Gibbons, Norton Greenfeld, and Martin Yonke
Aug. 1981 206 p
(N00039-79-C-0316; ARPA Order 3740)
(AD-A106104; BBN-4752-Vol-3; ATR-2) Avail: NTIS
HC A10/MF A01 CSCL 17/2

This report describes the work performed in the second year of the three-year contract to explore the application of symbolic processing to command and control (C2); specifically, the graphics interface between the C2 user and a complex C2 decision support system. Volume 3 contains the programs that manipulate the knowledge base and provide the active behavioral component of the system.
GRA

N82-15287# California Univ., Livermore. Lawrence Livermore Lab.
ELECTROMAGNETIC LAUNCHER: A NEW WEAPON
A. L. Brooks and R. S. Hawke 10 Aug. 1981 10 p refs
Presented at the 6th Intern. Symp. on Ballistics, Orlando, Fla., 22-24 Oct. 1981
(Contract W-7405-eng-48)
(DE81-029979; UCRL-85877; CONF-811033-1) Avail: NTIS
HC A02/MF A01

There are several perceived advantages to using Electromagnetic (EM) launching for weapons applications. Higher muzzle velocities than can be achieved with conventional ordnance will minimize the projectile time-of-flight to the target; this is of particular interest for air-defense applications against maneuvering targets and for penetrator launching. The potential for precise current (hence acceleration) control promises lower peak accelerations that the projectile must withstand, and much more precise muzzle velocity control, permitting the use of smart projectiles and continuous zoning for artillery applications. The principles behind EM accelerators, particularly dc accelerators (railguns), the recent history of their development, their advantages for weapons applications, the general requirements, potential problem areas that must be faced by designers, and the work that has been done by researchers at Livermore and Los Alamos National Laboratories in accelerating 3-g projectiles to 10 km/s, and larger masses to lower velocities are discussed.
DOE

N82-15288# Standard Elektrik Lorenz A.G., Stuttgart (West Germany). Fachbereich Nachrichtentechnik.
DIGITAL SPEECH TRANSMISSION AT LOW BITRATES Final Report
Manfred Immendoerfer, Dieter Kopp, and Sylvia Noigt Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 98 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-112; ISSN-0340-7608) Avail: NTIS
HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20,60

The performance of a linear prediction vocoder was tested by computer simulations and the selected algorithm was optimized concerning intelligibility and naturalness of the speech. For the purpose of realtime simulations of digital speech transmission systems a fast digital signal processor was developed using commercial available LSI components. The major components of the processor are a microprogram control unit, a 24 bit word length arithmetic - logic unit based on the AMD 2900 family - and a fast hardware multiplier unit capable of 5 million multiplications per second. The signal processor is interfaced to a host computer PDP 11, on which comfortable software development aids are available. A powerful operating system was developed for the signal processor itself to support and debug user software.
Author

N82-15289# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Electronique et Physique.
FAULT DETECTION AND SURVEILLANCE FOR A LINK IN A DATA TRANSMISSION NETWORK Final Report [DETECTION DES PANNES ET SURVEILLANCE AU NIVEAU D'UN NOEUD D'UN RESEAU DE TRANSMISSION DE DONNEES]
Louis-Francois Pau 1 Nov. 1980 55 p refs In FRENCH
(Contract ATP-A-651-37-38)
(ENST-D-80010) Avail: NTIS HC A04/MF A01

Functional reliability of data communications networks, based on packet switching, at the level of the network links was studied. Fault diagnostic theory for systems in a nonbinary state was applied, necessitating adaptations due to the characteristics of protocols and link architectures. Results indicate that the packets can be considered as random test signals, intended to verify on line the proper functioning of the network links, channels, and protocols. It is indispensable to generate priority service packet series (test and surveillance packets) which gather at each link, and along the selected route, information on the state of the links and channels. Functional reliability is increased by local suboptimal control of traffic transitions. Author (ESA)

N82-15290# Universite Catholique de Louvain (Belgium). Lab. de Telecommunications et d'Hyperfrequences.
STUDY OF THE INFLUENCE OF PRECIPITATIONS AND CLOUDS ON THE PERFORMANCE OF SYNTHETIC APERTURE RADARS
A. Guissard and M. DeCoster Paris ESA Mar. 1981 199 p refs
(Contract ESTEC-4153/79/NL-PP(SC))
(ESA-CR(P)-1465) Avail: NTIS HC A09/MF A01

The principles of synthetic aperture radar (ASAR) are introduced, and the parameters (spatial resolution, image contrast, radiometric accuracy and resolution, and reduction in reflectivity dynamics) which describe SAR image quality are discussed in relation with ground reflectivity models. Attenuation depolarization and backscattering due to rain and clouds investigated through mathematical models. For incidence angles > 20 deg, copolarized reflectivity is lower than -5 db. Cross polarized reflectivity is always lower than copolarized. The difference > 5 db. Instrument threshold = -18 db. Image quality is best at the lowest frequency tested (53 GHz) and lowest incidence angle (20 deg from vertical). Ground reflectivity intensifies with frequency increase.
Author (ESA)

N82-15291# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abt. Nachrichtentechnik.
ESTIMATION OF THE PARAMETERS OF AN UNMODULATED CARRIER SIGNAL DISTURBED BY COMPLEX-MULTIPLICATIVE AND ADDITIVE GAUSSIAN NOISE Ph.D. Thesis - Technischen Univ.
Franz Edbauer Jun. 1981 144 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-737)
(DFVLR-FB-81-23) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 29,70

Estimation of the channel state and the parameters of a noisy unmodulated receiver input signal (pilot tone) is investigated for fast Rayleigh and Rician fading channels. The channel state is estimated by Kalman-filtering. Estimation of parameters, namely the frequency offset, the phase and the amplitude of the direct component at the time origin, the ratio of the power of the direct and the scattered component, and the fading bandwidth, is performed by maximum-likelihood-identification. This is applied to the design of a suboptimum phase locked loop, which makes use of the properties of the fading channel. Results are achieved analytically and by means of computer simulations. Author

N82-15292# Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
ELEMENTS FOR THE NUMERICAL ANALYSIS OF WAVE MOTION IN LAYERED MEDIA
John Lambros Tassoulas and Eduardo Kausel Feb. 1981 225 p refs
(Grant NSF ENG-79-08080)
(PB81-245268; MIT-CE-R81-2; NSF/CEE-81019) Avail: NTIS
HC A10/MF A01 CSCL 08M

A technique for the numerical analysis of wave motion in layered media is developed. Semidiscrete particular solutions satisfying inhomogeneous boundary conditions are calculated by the finite element method. These solutions are combined with semidiscrete modes of an appropriate eigenvalue problem also obtained by the finite element method. The boundary conditions corresponding to rigid and rough footings on a layered stratum are treated in detail. Applications are considered which illustrate the use of the technique developed. GRA

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *75 Solid-State Physics*.

N82-15293 Fernmeldetechnisches Zentralamt, Darmstadt (West Germany). Forschungsinst.

DERIVATIVE MEASUREMENT SYSTEM FOR CURRENT-VOLTAGE AND LIGHT-CURRENT-VOLTAGE CHARACTERISTICS [MESSUNG VON STROM-SPANNUNGS- UND LICHT-STROM-KENNLINIEN MIT HILFE DER ABLEITUNGSTECHNIK]

H. Burkhard Nov. 1980 35 p refs In GERMAN; ENGLISH summary

(FTZ-FI-512-TBr-6) Copyright. Avail: Issuing Activity

A modulation apparatus, based on derivative measurements of current voltage characteristics to investigate double heterostructure lasers was examined. Modulation at constant modulation index yields a direct measurement of I. dV/dI and in the same apparatus at the fundamental and first harmonic of the modulation frequency. The method makes pulsed measurements. Thermal influence due to ohmic losses in laser diodes are largely eliminated. Diodes are tested before mounting on a heat sink to make a preselection. The diode series resistance is measured including contact resistance, and a possible current dependence is shown. Author (ESA)

N82-15294 Technische Univ., Berlin (West Germany). Inst. fuer Mechanik.

INTRODUCTION TO THE CALCULATION OF PARAMETRICALLY EXCITED OSCILLATIONS [EINFUEHRUNG IN DIE BERECHNUNG PARAMETERERREGTER SCHWINGUNGEN]

Norbert Eicher 1981 427 p refs In GERMAN

(ISBN-3-7983-5150-3) Copyright. Avail: Issuing Activity

Linear and nonlinear oscillations are treated, including the general characteristics (linear homogeneous differential equations with periodic coefficients, Hill differential equation, homogeneous Mathieu differential equations, Mathieu functions). A successive approximation method for integrodifferential equations was used. Examples of oscillation differential equations and the stability of parametrically excited oscillations are shown. For clearness, the different influences are treated separately. Author (ESA)

N82-15295*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.

TOWARD THE ASSESSMENT OF THE SUSCEPTIBILITY OF A DIGITAL SYSTEM TO LIGHTNING UPSET Final Report

Joseph G. Tront, Werner Graf, Clyde F. Martin, Gerald M. Masson, John M. Myers, and James J. Whalen Dec. 1981 42 p refs

(Grant NAG1-132)

Avail: NTIS HC A03/MF A01 CSCL 09C

Accomplishments and directions for further research aimed at developing methods for assessing a candidate design of an avionic computer with respect to susceptability to lightning upset are reported. Emphasis is on fault tolerant computers. Both lightning stress and shielding are covered in a review of the electromagnetic environment. Stress characterization, system characterization, upset detection, and positive and negative design features are considered. A first cut theory of comparing candidate designs is presented including tests of comparative susceptability as well as its analysis and simulation. An approach to lightning induced transient fault effects is included. A.R.H.

N82-15296*# Aerojet Electrosystems Co., Azusa, Calif.

GERMANIUM ACCUMULATION-MODE CHARGE-INJECTION-DEVICE PROCESS Final Report, Sep. 1980 - Jun. 1981

T. G. Moore Jun. 1981 40 p refs

(Contract NAS5-26318)

(NASA-CR-166754; Rept-7356) Avail: NTIS HC A03/MF A01 CSCL 09C

Gallium doped germanium is suitable for applications in the detection of far infrared radiation. Measurements were made on experimental photoconductors (PCs), accumulation mode charge injection devices (AMCIDs), and the SSPC (a switched, sampled PC alternative to the AMCID). The results indicate that the SSPC, which had a responsivity near 1.5 amp/watt, is desirable for use in two dimensional detector arrays. S.L.

N82-15297*# ITT Electro-Optical Products Div., Fort Wayne, Ind.

RUGGEDIZED ELECTRONOGRAPHIC TUBE DEVELOPMENT Final Project Report, Oct. 1979 - Oct. 1980

Scott Nevin Jan. 1981 23 p refs

(Contract NAS5-25877)

(NASA-CR-166762) Avail: NTIS HC A02/MF A01 CSCL 09A

Because of their glass components and lack of far ultraviolet sensitivity, currently available Spectracons are not suited for rocket launch. Technology developed for second generation image tubes and for magnetically focused image tubes can be applied to improve the optical and mechanical properties of these magnetically focused electronographic tubes whose 40 kilovolt signal electrons exit a 4-micrometer thick mica window and penetrate a photographic recording emulsion. A.R.H.

N82-15298# AEG-Telefunken, Frankfurt am Main (West Germany). Forschungsinst.

OPTICAL TRIGGERING OF POWER THYRISTORS (3) Final Report, Dec. 1979

Dieter Silber, Marius Fuellmann, Wolfgang Winter, Helmut Maeder, Werner Lukanz, and Franz Wilhelm Bonn Bundesministerium fuer Forschung und Technologie Apr. 1981 88 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-071; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,50

Light activated high voltage auxiliary thyristors were developed for blocking voltages until to 4 kV, and additionally suitable packages and optical coupling components. Turn-off times can be reduced without considerable deterioration of the trigger sensitivity. The integration of potential limiting diodes, Al-diffusion, compact device technology, and the problem of trigger delay times were also investigated. Author

N82-15299# Kieninger und Obergfell, St. Georgen (West Germany).

OPTIMIZING DEVELOPMENT OF A BIPOLAR STEPPING MOTOR WITH ELECTRONIC CIRCUIT FOR QUARTZ ANALOGUE CLOCKS Final Report, Oct. 1979

Erich Scheer Bonn Bundesministerium fuer Forschung und Technologie May 1981 31 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-077; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,50

Alternatives concerning stator assembly, stator material and rotor material in conjunction with drive are shown in accordance with the objective. The specifications for an integrated circuit are defined with regard to motor drive, also buzzer systems including drive were investigated for the optimum cost-performance ratio. Possibilities for a larger integration depth (hybrid assembly system) of IC and quartz crystal are discussed in view of automatic oscillator frequency alignment. T.M.

N82-15300# Siemens A.G., Munich (West Germany). Unternehmensbereich Bauelemente.

INTEGRATED FILTER FOR VIDEO COLOR PROCESSING Final Report, Nov. 1980

Horst Grobecker, Wolfgang Hausamann, Heinz-Peter Heller, and Rainer Lueder Bonn Bundesministerium fuer Forschung und Technologie May 1981 85 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-085; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,85

Besides some analog integrated circuits, the PAL-color decoder of a color TV set consists of various filters. Some of them can be integrated with modern semiconductor technologies. The advantages are a reduction in costs and adjustment and an increased reliability and performance. A concept was developed which uses CCD filters for the PAL-comb-filter, the luminance-delay-line and the color trap. These filters were fabricated and their performance was proved by measurement and by simulation with video signals. A PAL-video-IC, which includes the demodulation, amplifying, matrix and controlling was designed. It is matched to the CCD-filters.
Author

N82-15301# Institut fuer Festkoerpertechnologie, Munich (West Germany).
TOPOGRAPHY OF THE ELECTRICAL PROPERTIES OF THE SILICON/OXIDE INTERFACE AND THE INFLUENCE OF TECHNOLOGIC TREATMENTS Final Report, Sep. 1980
Helmut Bernt and Christoph Werner Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 123 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-066; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 25,85

Using the experience in automatic measurements of the parameters, turning point voltage, density of surface states and relaxation time of a MOS-capacitor the following methods were developed or improved by: simultaneous measurement of relaxation time and bulk lifetime at the same spot of a wafer; separation of the contributions to the relaxation time from bulk and surface generation; and automatic measurement of break down voltage and behavior under high voltage stress at room temperature. To explain the behavior of SiO2 layers under voltage-stress at normal and elevated temperature, additional measurements of fluctuations of the surface potential (caused by fixed oxide-charge) are presented.
T.M.

N82-15302# Kernforschungszentrum, Karlsruhe (West Germany).
EDDY: A PROGRAM FOR CALCULATING THE BEHAVIOR OF ELECTROMAGNETS
B. Aldefeld (Philips Zentrallab. GmbH, Hamburg) and D. Steimer (Philips Zentrallab. GmbH, Hamburg) Sep. 1980 97 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(KfK-CAD-168; HH-PHI/103) Avail: NTIS HC A05/MF A01

The program EDDY can be used for calculating the static and dynamic behavior of electromagnets having rotationally symmetrical geometry. It is particularly suited for applications where the electromagnets are operated under pulse exitation and where the motion of an armature and its mechanical energy are of interest. Special attention is also given to the nonlinearity of magnetization curves of ferromagnetic materials and to the effects of eddy currents. The underlying numerical procedure is based on the diffusion equation for the electromagnetic field. The mathematical methods, the structure of the program, and practical applications are described.
Author

N82-15303# Technische Hogeschool, Delft (Netherlands). Lab. voor Fiznmechanische Techniek.
ON THE EFFICIENCY OF SMALL AIR COIL MOTORS [OVER HET RENDEMENT VAN KLEINE LUCHTSPOELMOTOREN]
Paul Horowitz May 1981 134 p refs In DUTCH; ENGLISH summary
(WTHD-131) Avail: NTIS HC A07/MF A01

The efficiency of two types of small ironless motors in the output range of 5 to 500 mW was investigated for use in driving a miniature roller pump for a portable infusion system. One motor has a continuous rotating coil (commutator motor) and one has an oscillating coil. In this case a ratchet and ratchet wheel is needed to generate a rotating motion (ratchet wheel motor). The electromechanical transducer and a mechanical transformation and support system are discussed as well as frictional losses. The influence of the size of the motor is discussed. An expression for the total efficiency is obtained which enables the calculation of the speed of rotation of a certain motor at maximum efficiency for a certain required output. This optimal speed of rotation is hardly influenced by the required speed of rotation at the output shaft of the driving. The transmission, if required, has only a small effect on the optimum speed of rotation of the motor.
A.R.H.

N82-15304# Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).
SEMICONDUCTOR TECHNOLOGY FOR VLSI: PLASMA ETCHING AND HIGH PRESSURE OXIDATION Final Report, Mar. 1980
Konrad Eisele Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 100 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-115; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20,80

The large scale integration of electronic circuits on silicon requires etching of structures in the range of 1 micrometer or smaller. This cannot be achieved by wet chemical means. Dry etching processes, however, do produce an exact replica of the desired structure in those materials which are common in silicon planar technology. These procedures depend on the RF-energy, on how this is coupled to the substrate to be etched, and on the pressure. They are, accordingly, called plasma etching or reactive ion etching. Their etch rate and selectivity of the relevant materials for various gases was examined. MOS properties can be restored to their original level by annealing. The design of a practical etch reactor is outlined.
T.M.

N82-15305# Siemens A.G., Munich (West Germany). Grundlagenentwicklung Material Physik.
ELECTRICAL SCREENING OF INTEGRATED CIRCUITS BY SEMI-INSULATING SILICON LAYERS Final Report, Nov. 1980
Heinz Mitlehner Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 83 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-134; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,50

Insulating layers of high quality like SiO2 are a non-neglectable risk for the reliability of high voltage integrated circuits because these layers cannot completely screen the chip against external charges, especially in case of high resistive epitaxial layers surface charges. Deposition of semi-insulating amorphous silicon layers directly onto the crystal surface makes it possible to fully screen the chip with reproducible performance, and because of the high density of localized states in the amorphous silicon, external charges influence their countercharge in the layer itself. The properties of the various deposition methods (evaporation, glow-discharge, CVD) are compared and the decision for the evaporation is proved by the better interface properties.
T.M.

N82-15306# Siemens A.G., Erlangen (West Germany). Fertigungstechnische Entwicklung.
ELECTROCHROMIC DISPLAYS Final Report, Jan. 1981
Helmut Freller, Hans Peter Lorenz, and Konrad Mund Bonn Bundesministerium fuer Foschung und Technologie Aug. 1981 37 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-141; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,80

Prototypes of large size displays with number sizes up to 190 mm were developed. To achieve this goal the evaporation technique for the electrochromic tungsten trioxide films, the display electrode pattern and the backwall electrode were adapted to the requirements. A sealing technique based on the use of silicon rubber was developed which allows use of the display-cells in a temperature region of -20 C to +80 C with leakage. By adding

1 - 3 percent water to the aprotic propylenecarbonate LiClO4 electrolyte, display performance was enhanced. For coloring and bleaching of the displays two driving circuits were developed which allow sequential counting. T.M.

N82-15307# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Bereich Neue Technologien.
DEVELOPMENT OF A THIN FILM PREPARATION TECHNIQUE FOR ZrO2(Y2O3) ELECTROLYTES ON POROUS SUPPORT STRUCTURES Final Report, Jun. 1980
Guenter Dietrich, Wolfgang Doenitz, Hajo Hermeking, Guenter Oehme, and Jochen Wahl Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 84 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-143; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,65

An experimental study demonstrated that it is technologically feasible to deposit thin electrolyte layers of yttria-stabilized zirconia on porous substrates. Such structures were developed for application in high-temperature water vapor electrolysis. Thin film electrolytes were prepared by the electrochemical vapor deposition (EVD) technique. With this method, homogeneous, gas-tight layers of yttria-stabilized zirconia were prepared with a thickness of 20-50 micrometers. The thin film electrolytes show specific resistivities that are comparable to electrolyte sinters as applied in high-temperature water vapor electrolysis. T.M.

N82-15308# Stephan-Werke G.m.b.H. und Cie., Hameln (West Germany).
DESIGN OF A RELUCTANCE MOTOR WITH INCREASED EFFICIENCY AND POWER FACTOR FOR WIDESPREAD INDUSTRIAL APPLICATION Final Report, Jun. 1980
Peter Hansen-Goos and Walter Pieper Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 60 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-157; ISSN-0340-7608) Avail: NTIS HC A04/MF A01

The motors were designed in the range of 0.6-4 kW with 4-pole windings. An increase of nominal power by approximately 100%, and an increase of quality factor by approximately 50% are reported. The efficiency is equal to asynchronous motors of the same IEC size. T.M.

N82-15309# AEG-Telefunken, Berlin (West Germany). Fachbereich Sender.
IMPROVEMENT OF TETRODE POWER AMPLIFIER EFFICIENCY BY ADDING HARMONICS TO THE CARRIER OSCILLATION AND ENERGY SAVINGS RESULTING FROM VOLUME-DEPENDENT PULSE-DURATION MODULATION (PDM) CONTROL Final Report, Nov. 1980
Helmut Krebs, Dietmar Kroll, Manfred Lodahl, and Bodo Wysocki Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 94 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FT-T-81-163; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,80

The method of improving efficiency by adding the 3rd harmonic to the carrier oscillation is common in triode power amplifiers. For a transfer of this technical method to modern high-power tetrodes, the circuitry for the generation of 3f current was fundamentally changed. A qualitative as well as quantitative description of the functioning is given with the aid of diagrams. The introduction of pulse-duration modulation into transmitter technology makes possible an economical application of a volume-dependent carrier control method. The method is distinguished for a special carrier control characteristic in relation to the saving of energy and for improved transmission performance achieved by use of a controlled clipper. T.M.

N82-15310# State Univ. of New York at Buffalo. Dept. of Chemistry.
DETERMINATION OF DIFFUSION COEFFICIENTS OF ANIONS AT A ROTATING SILVER DISC ELECTRODE
Kunio Shimizu and Robert A. Osteryoung 1 Sep. 1981 18 p refs
(Contract N00014-79-C-0682; NR Proj. 051-715)
(AD-A106828; TR-8) Avail: NTIS HC A02/MF A01 CSCL 09/1

A silver rotating disc electrode has been employed to obtain diffusion coefficients for a number of anions which form insoluble films at the electrode surface (sulfide, selenide, thiocyanate, selenocyanate, iodide and bromide) and one which does not (cyanide). It is found that the Levich equation is obeyed even though a film is continuously forming on the silver surface. Except for cyanide, the electrode reactions appear irreversible, based on the shape of the anodic voltammograms and the cathodic stripping peaks. GRA

N82-15311*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PROCEEDINGS OF THE CONFERENCE ON HIGH-TEMPERATURE ELECTRONICS
1981 134 p refs Conf. held in Tucson, Ariz., 25-27 Mar. 1981 Sponsored by IEEE Industrial Electronics and Control Instrumentation Group, IEEE Solid State Circuits Council, DOE, NRC, NSF, LASL, and Arizona Univ.
(NASA-TM-84069; DE81-025058; CONF-810316) Avail: NTIS HC A07/MF A01 CSCL 09C

The development of electronic devices for use in high temperature environments is addressed. The instrumentational needs of planetary exploration, fossil and nuclear power reactors, turbine engine monitoring, and well logging are defined. Emphasis is place on the fabrication and performance of materials and semiconductor devices, circuits and systems and packaging. For individual titles, see N82-15312 through N82-15337.

N82-15312*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
HIGH TEMPERATURE ELECTRONICS APPLICATIONS IN SPACE EXPLORATION
R. F. Jurgens *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 3-7 refs (For primary document see N82-15311 06-33)
(Contract NAS7-100)
Avail: NTIS HC A07/MF A01 CSCL 09C

The extension of the range of operating temperatures of electronic components and systems for planetary exploration is examined. In particular, missions which utilize balloon-borne instruments to study the Venusian and Jovian atmospheres are discussed. Semiconductor development and devices including power sources, ultrastable oscillators, transmitters, antennas, electromechanical devices, and deployment systems are addressed. M.G.

N82-15313*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
HIGH TEMPERATURE ELECTRONIC REQUIREMENTS IN AEROPROPULSION SYSTEMS
William C. Nieberding and J. Anthony Powell *In its* Proc. of The Conf. on High-Temp. Electron. 1981 p 13-16 refs (For primary document see N82-15311 06-33)
(E-708) Avail: NTIS HC A07/MF A01 CSCL 09C

The needs for high temperature electronic and electro-optic devices as they would be used on aircraft engines in either research and development applications, or operational applications are discussed. The conclusion reached is that the temperature at which the devices must be able to function is in the neighborhood of 500 to 600 C either for R&D or for operational applications. In R&D applications the devices must function in this temperature range when in the engine but only for a moderate period of time. On an operational engine, the reliability requirements dictate that the devices be able to be burned-in at temperatures significantly higher than those at which they will function on the engine. The major point made is that semiconductor technology must be pushed well beyond the level at which silicon will be able to function. M.G.

N82-15314*# Arizona Univ., Tucson. Dept. of Electrical Engineering.
PASSIVE COMPONENTS FOR HIGH TEMPERATURE OPERATION
L. S. Raymond, D. R. Clark, D. O. Black, D. J. Hamilton, and

W. Kerwin *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 21-23 Sponsored by DOE (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

The development of resistors, capacitors, and interconnect metalizations utilizing a low pressure chemical vapor deposition (LPCVD) process is described. The LPCVD process allows the passive components to be fabricated at temperatures higher than their highest operating temperatures. The deposition of thin films by LPCVD is accomplished by reacting one or more gases on the surface of a heated substrate. The substrates to be coated are placed on a graphite susceptor and then loaded into the center of a quartz reaction tube. The RF power is applied to the coil on the outside of the reaction tube which in turn is coupled into the graphite susceptor causing it to heat. Pressures of several torr or less are typical, with carrier flow rates of 0.1 to 2.0 liters/min. Nitrogen, hydrogen, and helium are typical carrier gases. These are controlled with mass flow controllers and the pressure is continuously monitored with a capacitive manometer. Materials selection and device testing are also discussed. M.G.

N82-15315*# Panelvision Corp., Pittsburgh, Pa.
DEVELOPMENT OF AN 1100 DEG F CAPACITOR
Robert E. Stapleton *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 25-28 ref Prepared in cooperation with Westinghouse Electric Corp., Pittsburgh, Pa. (For primary document see N82-15311 06-33) (Contracts NAS3-6465; NAS3-10941)
Avail: NTIS HC A07/MF A01 CSCL 09C

The feasibility of developing a high temperature capacitor for 1100 F operation which is as small and light as conventional capacitors for normal operating temperatures is discussed. Pyrolyic boron nitride (PBN) was selected for the dielectric. The PBN capacitors were made by slicing and lapping material from thick blocks and then sputtering thin film electrodes. These capacitors had breakdown strengths of 7,000 volts per mil and a dissipation factor of less than 0.001 at 1100 F. Additional processing improvements were made after testing a multi-layer or stacked PBN capacitor for 1,000 hours at 1100 F. Sputter etching the wafers before depositing electrodes resulted in a reduction in dissipation factor. A sputtered boron nitride film applied to the outer electrode surfaces produced a more stable capacitor. A design for a 0.1 mu F capacitor and a summary of PBN wafer fabrication costs are given. M.G.

N82-15316*# Sandia Labs., Albuquerque, N. Mex.
HIGH-TEMPERATURE MEASUREMENTS OF Q-FACTOR IN ROTATED X-CUT QUARTZ RESONATORS
I. J. Fritz *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 29-31 refs (For primary document see N82-15311 06-33)
(Contract DE-AC04-76DP-00789)
Avail: NTIS HC A07/MF A01 CSCL 09C

The Q-factors of piezoelectric resonators fabricated from natural and synthetic quartz with a 34 deg rotated X-cut orientation were measured at temperatures up to 325 C. The synthetic material, which was purified by electrolysis, retains a higher enough Q to be suitable for high temperature pressure-transducer applications, whereas the natural quartz is excessively lossy above 200 C for this application. The results are compared to results obtained previously at AT-cut resonators. M.G.

N82-15317*# Naval Research Lab., Washington, D. C.
ASSESSMENT OF HIGH TEMPERATURE METALLIZATIONS FOR I(2)L AND CMOS TECHNOLOGIES
A. Christou and B. R. Wilkins *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 33-34 refs (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

High temperature barrier metallizations were assessed and tested for I(2)L and CMOS applications. Life tests were accelerated to 375 C in view of the -55 C to +300 C temperature range established for engine-located electronics without fuel cooling. The gold-refractory metallizations evaluated were Au-TiW-PtSi, Au-TiW/TiO2/TiW-PtSi and Au-TiW(N)-PtSi. These metallization systems were thermally annealed to at least 375 C for up to 250 hours. The critical requirement for stable diffusion barrier is the TiW grain size. Small grain (250A-500A) films were observed to be stable up to 375 C. Deposition to TiW diffusion barrier in the presence of oxygen and nitrogen also results in an effective diffusion barrier. Auger electron spectroscopy profiles of the PtSi indicates some penetration by the TiW. In the case of PtSi/TiW interface, the redistribution of oxygen further passivates the system by forming a TiO2 layer at the interface, M.G.

N82-15318*# Wisconsin Univ. - Madison. Dept. of ECE.
AMORPHOUS METALLIZATIONS FOR HIGH-TEMPERATURE SEMICONDUCTOR DEVICE APPLICATIONS
J. D. Wiley, J. H. Perepezko, J. E. Nordman, and Guo Kang-Jin (Chinese Academy of Sciences, Shanghai) *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 35-37 refs (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

The initial results of work on a class of semiconductor metallizations which appear to hold promise as primary metallizations and diffusion barriers for high temperature device applications are presented. These metallizations consist of sputter-deposited films of high T sub g amorphous-metal alloys which (primarily because of the absence of grain bounderies) exhibit exceptionally good corrosion-resistance and low diffusion coefficients. Amorphous films of the alloys Ni-Nb, Ni-Mo, W-Si, and Mo-Si were deposited on Si, GaAs, GaP, and various insulating substrates. The films adhere extremely well to the substrates and remain amorphous during thermal cycling to at least 500 C. Rutherford backscattering and Auger electron spectroscopy measurements indicate atomic diffussivities in the 10 to the -19th power sq cm/S range at 450 C. M.G.

N82-15319*# Naval Research Lab., Washington, D. C.
OHMIC CONTACTS TO GaAs FOR HIGH-TEMPERATURE DEVICE APPLICATIONS
W. T. Anderson, Jr., A. Christou, J. F. Giuliani, and H. B. Dietrich *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 39-42 refs (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

Ohmic contacts to n-type GaAs were developed for high temperature device applications up to 300 C. Refractory metallizations were used with epitaxial Ge layers to form the contacts: TiW/Ge/GaAs, Ta/Ge/GaAs, Mo/Ge/GaAs, and Ni/Ge/GaAs. Contacts with high dose Si or Se ion implantation of the Ge/GaAs interface were also investigated. The contacts were fabricated on epitaxial GaAs layer grown on N+ or semi-insulating GaAs substrates. Ohmic contact was formed by both thermal annealing (at temperatures up to 700 C) and laser annealing (pulsed Ruby). Examination of the Ge/GaAs interface revealed Ge migration into GaAs to form an N+ doping layer. The specific contact resistances of specimens annealed by both methods are given. M.G.

N82-15320*# Texas Instruments, Inc., Dallas.
FABRICATION AND HIGH TEMPERATURE CHARACTERISTICS OF ION-IMPLANTED GaAs BIPOLAR TRANSISTORS AND RING-OSCILLATORS
F. H. Doerbeck, H. T. Yuan, and W. V. McLevige *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 45-48 refs (For primary document see N82-15311 06-33)
(Contract N00014-80-C-0936)
Avail: NTIS HC A07/MF A01 CSCL 09C

Ion implantation techniques that permit the reproducible fabrication of bipolar GaAs integrated circuits are studied. A 15 stage ring oscillator and discrete transistor were characterized between 25 and 400 C. The current gain of the transistor was found to increase slightly with temperature. The diode leakage currents increase with an activation energy of approximately 1 eV and dominate the transistor leakage current 1 sub CEO above 200 C. Present devices fail catastrophically at about 400 C because of Au-metallization. R.J.F.

N82-15321*# Los Alamos Scientific Lab., N. Mex.
DEVELOPMENT OF INTEGRATED THERMIONIC CIRCUITS FOR HIGH-TEMPERATURE APPLICATIONS

J. Byron McCormick, Dale Wilde, Stephen Depp (IBM Research, San Jose, Calif.), Douglas J. Hamilton (Arizona Univ., Tucson), William Kerwin (Arizona Univ., Tucson), Charles Derouin, Lorenzo Roybal, and Richard Wooley *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 49-53 Sponsored by DOE (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

Integrated thermionic circuits (ITC) capable of extended operation in ambient temperatures up to 500 C are studied. A set of practical design and performance equations is demonstrated. Experimental results are discussed in which both devices and simple circuits were successfully operated in 5000 C environments for extended periods. It is suggested that ITC's may become an important technology for high temperature instrumentation and control systems in geothermal and other high temperature environments. R.J.F.

N82-15322*# Sandia Labs., Albuquerque, N. Mex.

GALLIUM PHOSPHIDE HIGH TEMPERATURE DIODES

R. J. Chaffin and L. R. Dawson *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 55-57 refs (For primary document see N82-15311 06-33)
(Contract DE-AC04-76DP-00789)
Avail: NTIS HC A07/MF A01 CSCL 09C

High temperature (300 C) diodes for geothermal and other energy applications were developed. A comparison of reverse leakage currents of Si, GaAs, and GaP was made. Diodes made from GaP should be usable to 500 C. A Liquid Phase Epitaxy (LPE) process for producing high quality, grown junction GaP diodes is described. This process uses low vapor pressure Mg as a dopant which allows multiple boat growth in the same LPE run. These LPE wafers were cut into die and metallized to make the diodes. These diodes produce leakage currents below ten to the -9th power A/sq cm at 400 C while exhibiting good high temperature rectification characteristics. High temperature life test data is presented which shows exceptional stability of the V-I characteristics. R.J.F.

N82-15323*# Sandia Labs., Albuquerque, N. Mex.

A GALLIUM PHOSPHIDE HIGH-TEMPERATURE BIPOLAR JUNCTION TRANSISTOR

T. E. Zipperian, L. R. Dawson, and R. J. Chaffin *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 59-61 refs (For primary document see N82-15311 06-33)
(Contract DE-AC04-76DP-00789)
Avail: NTIS HC A07/MF A01 CSCL 09C

Preliminary results are reported on the development of a high temperature (350 C) gallium phosphide bipolar junction transistor (BJT) for geothermal and other energy applications. This four-layer p(+)n(-)pp(+) structure was formed by liquid phase epitaxy using a supercooling technique to insure uniform nucleation of the thin layers. Magnesium was used as the p-type dopant to avoid excessive out-diffusion into the lightly doped base. By appropriate choice of electrodes, the device may also be driven as an n-channel junction field-effect transistor. The initial design suffers from a series resistance problem which limits the transistor's usefulness at high temperatures. R.J.F.

N82-15324*# Texas Technological Univ., Lubbock. Dept. of Electrical Engineering.

RELIABILITY STUDY OF REFRACTORY GATE GALLIUM ARSENIDE MESFETS

John C. W. Yin and William M. Portnoy *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 63-66 refs (For primary document see N82-15311 06-33)
(Contract N00014-78-C-0738)
Avail: NTIS HC A07/MF A01 CSCL 09C

Refractory gate MESFET's were fabricated as an alternative to aluminum gate devices, which have been found to be unreliable as RF power amplifiers. In order to determine the reliability of the new structures, statistics of failure and information about mechanisms of failure in refractory gate MESFET's are given. Test transistors were stressed under conditions of high temperature and forward gate current to enhance failure. Results of work at 150 C and 275 C are reported. R.J.F.

N82-15325*# RCA Research Labs., Tokyo (Japan).

ELECTRICAL SWITCHING IN CADMIUM BORACITE SINGLE CRYSTALS

Tatsuo Takahashi and Osamu Yamada *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 67-70 refs (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

Cadmium boracite single crystals at high temperatures (> 300 C) were found to exhibit a reversible electric field-induced transition between a highly insulative and a conductive state. The switching threshold is smaller than a few volts for an electrode spacing of a few tenth of a millimeter corresponding to an electric field of 100 to 1000 V/cm. This is much smaller than the dielectric break-down field for an insulator such as boracite. The insulative state reappears after voltage removal. A pulse technique revealed two different types of switching. Unstable switching occurs when the pulse voltage slightly exceeds the switching threshold and is characterized by a pre-switching delay and also a residual current after voltage pulse removal. A stable type of switching occurs when the voltage becomes sufficiently high. Possible device applications of this switching phenomenon are discussed. R.J.F.

N82-15326*# Westinghouse Electric Corp., Pittsburgh, Pa.

WHATEVER HAPPENED TO SILICON CARBIDE

R. B. Campbell *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 71-75 refs (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

The progress made in silicon carbide semiconductor devices in the 1955 to 1975 time frame is examined and reasons are given for the present lack of interest in the material. Its physical and chemical properties and methods of preparation are discussed. Fabrication techniques and the characteristics of silicon carbide devices are reviewed. It is concluded that a combination of economic factors and the lack of progress in fabrication techniques leaves no viable market for SiC devices in the near future. R.J.F.

N82-15327*# Burr-Brown Research Corp., Tucson, Ariz.

MINUS 55 TO PLUS 200 DEG C 12 BIT ANALOG-TO-DIGITAL CONVERTER

Lewis R. Smith and Paul R. Prazak *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 77-79 refs (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

A 12 bit successive approximation analog to digital converter that offers moderately high speed precision data conversion at a reasonable level of cost and complexity is studied. The ADCH10HT extends this capability over a temperature range of -55 to +200 C. No missing-code performance is maintained over the entire temperature range. The converter is completely self-contained with internal clock and +10 volt reference. The CMOS devices offer low power dissipation, so that the internal temperature of the hybrid circuit does not rise as much from self heating. In CMOS circuits, pn junction leakage currents are returned to the supplies so that the logic keeps working at temperatures up to 250 C. R.J.F.

N82-15328*# Harris Semiconductor, Melbourne, Fla.

PROCESS CHARACTERISTICS AND DESIGN METHODS FOR A 300 DEG QUAD OP AMP

J. D. Beasom and R. B. Patterson, III *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 81-84 ref Sponsored by Sandia National Lab., Albuquerque, N. Mex. (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

The results of process characterization, circuit design, and reliability studies for the development of a quad OP amplifier intended for use up to 300 C are presented. A dielectrically isolated complementary vertical bipolar process was chosen to fabricate the amplifier in order to eliminate isolation leakage and the possibility of latch up. Characterization of NPN and PNP junctions showed them to be suitable for use up to 300 C. Interconnect reliability was predicted to be greater than four years mean time between failure. Parasitic MOS formation was eliminated by isolation of each device. R.J.F.

N82-15329*# Micro Networks Corp., Worcester, Mass.
HYBRID A/D CONVERTER FOR 200 DEG C OPERATION
Mark R. Sullivan and Jeffrey B. Toth *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 85-88 refs (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

A 12 bit A/D converter was designed and developed which will operate at 200 C with .06 linearity, 1/accuracy, 350 WSec conversion time, and only 455 mW power consumption. This product also necessitated the development of a unique three metal system in which aluminum wire bonding is done utilizing aluminum bonding pads, gold wire bonding to all gold areas, and employment of a nickel interface between gold and aluminum connections. This system totally eliminates the formation of a intermetallics at the bonding interface which can lead to bond failure. This product represents an advancement in electronics as it proved the operation of integrated circuits at high temperature, as well as providing information about both the electrical and mechanical reliability of hybrid circuits at 200 C. B.W.

N82-15330*# Oak Ridge National Lab., Tenn.
WIRELESS, IN-VESSEL NEUTRON MONITOR FOR INITIAL CORE-LOADING OF ADVANCED BREEDER REACTORS
J. T. DeLorenzo, E. J. Kennedy (Tennessee Univ., Knoxville), T. V. Blalock (Tennessee Univ., Knoxville), J. M. Rochelle, M. M. Chiles, and K. H. Valentine *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 89-92 refs (For primary document see N82-15311 06-33)
(Contract W-7405-eng-26)
Avail: NTIS HC A07/MF A01 CSCL 09C

An experimental wireless, in-vessel neutron monitor was developed to measure the reactivity of an advanced breeder reactor as the core is loaded for the first time to preclude an accidental critically incident. The environment is liquid sodium at a temperature of approx. 220 C, with negligible gamma or neutron radiation. With ultrasonic transmission of neutron data, no fundamental limitation was observed after tests at 230 C for > 2000 h. The neutron sensitivity was approx. 1 count/s-nv, and the potential data transmission rate was approx. 10,000 counts/s. B.W.

N82-15331*# Sandia Labs., Albuquerque, N. Mex.
SOLID STATE MICROELECTRONICS TOLERANT TO RADIATION AND HIGH TEMPERATURE
Bruce L. Draper and David W. Palmer *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 93-96 refs (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

The 300 C electronics technology based on JFET thick film hybrids was tested up to 10 to the 9th power rad gamma (Si) and 10 to the 15th power neutrons/sq cm. Circuits and individual components from this technology all survived this total dose although some devices required 1 hour of annealing at 200 or 300 C to regain functionality. This technology used with real time annealing should function to levels greater than 10 to the 10th power rad gamma and 10 to the 16th power n/sq cm. B.W.

N82-15332*# General Electric Co., Syracuse, N.Y. Electronics Lab.
HIGH TEMPERATURE LSI
D. C. Dening, L. J. Ragonese, and C. Y. Lee *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1982 p 97-100 refs (For primary document see N82-15311 06-33)
(Contract N00173-79-C-0010)
Avail: NTIS HC A07/MF A01 CSCL 09C

Integrated injection logic (1,2) technology for reliable operation under a -55 C to +300 C, temperature range is discussed. Experimental measurements indicate that an 80 mv signal swing is available at 300 C with 100 micro A injection current per gate. In addition, modeling results predict how large gate fan-ins can decrease the maximum thermal operational limits. These operational limits and the longterm reliability factors associated with device metallization are evaluated via specialized test mask. B.W.

N82-15333*# Sandia Labs., Albuquerque, N. Mex.
HIGH-TEMPERATURE COMPLEMENTARY METAL OXIDE SEMICONDUCTORS (CMOS)
John D. McBrayer *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron 1981 p 101-104 refs (For primary document see N82-15311 06-33)
(SAND-81-0345C) Avail: NTIS HC A07/MF A01 CSCL 09C

The results of an investigation into the possibility of using complementary metal oxide semiconductor (CMOS) technology for high temperature electronics are presented. A CMOS test chip was specifically developed as the test bed. This test chip incorporates CMOS transistors that have no gate protection diodes; these diodes are the major cause of leakage in commercial devices. B.W.

N82-15334*# Laboratoires de Marcoussis (France). Electrochemistry Dept.
A PRESENTLY AVAILABLE ENERGY SUPPLY FOR HIGH TEMPERATURE ENVIRONMENT (550-1000 DEG F)
J. Jacquelin and R. L. Vic *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 107-109 (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

Sodium-sulfur cells attractive electric energy storage device for long service, are discussed. The state of art is given. More than 200 Wh/kg cells were tested. The known range of working temperature is 550 to 750 F. Self-discharge is quite nonexistent for months in operation. The technical basis for expecting an operating range up to 1,000 F under a high pressure atmosphere is given. Possibilities to adapt size and characteristics to particular interplanetary missions are discussed. B.W.

N82-15335*# General Electric Co., Syracuse, N.Y.
STUFFED Mo LAYER AS A DIFFUSION BARRIER IN METALLIZATIONS FOR HIGH TEMPERATURE ELECTRONICS
John K. Boah, Virginia Russell, and David P. Smith *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 111-114 refs (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

Auger electron spectroscopy was employed to characterize the diffusion barrier properties of molybdenum in the CrSi2/Mo/Au metallization system. The barrier action of Mo was demonstrated to persist even after 2000 hours annealing time at 300 C in a nitrogen ambient. At 340 C annealing temperature, however, rapid interdiffusion was observed to have occurred between the various metal layers after only 261 hours. The presence of controlled amounts of oxygen in the Mo layer is believed to be responsible for suppressing the short circuit interdiffusion between the thin film layers. Above 340 C, its is believed that the increase in the oxygen mobility led to deterioration of its stuffing action, resulting in the rapid interdiffusion of the thin film layers along grain boundaries. B.W.

N82-15336*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PACKAGING TECHNIQUES FOR LOW-ALTITUDE VENUS BALLOONS BEACON
Thomas J. Borden and John W. Winslow *In* NASA. Lewis Research Center Proc. of the Conf. on High Temp. Electron. 1981 p 117-121 (For primary document see N82-15311 06-33)
(Contract NAS7-100)
Avail: NTIS HC A07/MF A01 CSCL 09C

The results of a specific design project for the Venus balloon beacon, in which a microwave beacon is required to operate for a limited time at high temperature (350 C) and at high pressure, (10 bars). In a chemically hostile environment after surviving large mechanical shock forces (up to 280 gs) are discussed. It was found that many existing, commerically-available component can be used in such a design with only minor modifications. A further result is that a crude (and consequently low-cost) test program can be designed to identify and select promising commercial components. B.W.

N82-15337*# Permaluster, Inc., Burbank, Calif.
HIGH TEMPERATURE (Al2O3) INSULATION AND LIGHT WEIGHT CONDUCTORS

Henry Walker *In* NASA. Lewis Research Center Proc. of the Conf. on High-Temp. Electron. 1981 p 123-219 (For primary document see N82-15311 06-33)
Avail: NTIS HC A07/MF A01 CSCL 09C

The of an aluminum conductor with an aluminum oxide insulation film was investigated. Aluminum oxide insulated wire or strip (with a melting point of 2050 C) is unique for applications in the electronic, missile, atomic reactor, aerospace, and aircraft industries. The oxide film is highly flexible, suitable for all windings of any size and shape of coil (magnetic). Briefly touched upon are the ultraviolet, proton gamma radiation uses, as well as high vacuum and cryogenic applications. Since the film is inorganic and chemically inert, it does not age or deteriorate in storage and has good dielectric properties (1000 volts per mil). B.W.

N82-15338# Brookhaven National Lab., Upton, N. Y.
IMPROVED TECHNIQUE TO MEASURE ELECTRONICALLY AC LOSSES IN SUPERCONDUCTING CABLES
F. Schauer and M. Meth 1981 8 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-029323; BNL-29932; CONF-810835-15) Avail: NTIS HC A02/MF A01

An improved electronic method for measuring ac losses in superconducting cables of lengths from 1m to 10m was developed. This method compensates for phase shifts in the measuring circuit elements and for imbalance of the difference amplifier due to changes in the common mode voltage. This measuring method is being further improved and adapted to the loss measurements of a 138V, 4 kA, 100 m long superconducting cable under construction. DOE

N82-15339# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Systems Technology Div.
COMPONENT OUTAGE DATA ANALYSIS METHODS. VOLUME 1: OVERVIEW AND SPECIAL APPLICATIONS Final Report
J. A. Marshall, M. Mazumdar, and D. A. McCutchan Aug. 1981 219 p refs Sponsored by Electric Power Research Institute 2 Vol.
(EPRI Proj. 1468-1)
(DE81-904214; EPRI-EL-1980-Vol-1) Avail: NTIS HC A10/MF A01

Methods for improving the quality of outage statistics for power equipment are addressed. Statistical techniques were evaluated and applied to utility outage data to illustrate their use. Fitting distributions is discussed for interval estimation and verifying models of equipment failure and repair. Precision is gained by pooling data across similar experience/equipment categories; methods are demonstrated for testing data samples to be pooled. Similarly, use of regression analysis to uncover relationships and integrate information from dissimilar samples is illustrated. Errors in modeling equipment performance, e.g., neglecting dependences, are discussed and model verification by simulation is shown to be a powerful tool. Emphasis is given to infrequent events and small data samples; Bayesian analysis and model simplification (reducing the number of parameters estimated) are examined as remedies to data sparsity. DOE

N82-15340# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Systems Technology Div.
COMPONENT OUTAGE DATA ANALYSIS METHODS. VOLUME 2: BASIC STATISTICAL METHODS Final Report
J. A. Marshall, M. Mazumdar, and D. A. McCutchan Aug. 1981 130 p refs Sponsored by Electric Power Reseach Inst. 2 Vol.
(EPRI Proj. 1468-1)
(DE81-904197; EPRI-EL-1980-Vol-2) Avail: NTIS HC A07/MF A01

Statistical methods for analyzing outage data on major power system components such as generating units, transmission lines, and transformers are identified. The analysis methods produce outage statistics from component failure and repair data that help in understanding the failure causes and failure modes of various types of components. Methods for forecasting outage statistics for those components used in the evaluation of system reliability are emphasized. DOE

N82-15341# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
SUPERCONDUCTING CRITICAL CURRENT DENSITY AS A PROBE OF DEFECTS IN METALLIC GLASSES
C. C. Koch, J. O. Scarbrough, and D. M. Kroeger 1981 4 p refs Presented at the 4th Intern. Conf. on Rapidly Quenched Metals, Sendai, Japan, 24 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028138; CONF-810851-1) Avail: NTIS HC A02/MF A01

The influence of cold rolling on the critical current density in amorphous (Mo sub o sub 6 RU sub o sub 4)sub 82 B sub 18 is reported. Furthermore, more extensive characterization of the samples by transmission electron microscopy, scanning electron microscopy, and small angle X-ray scattering is presented. DOE

N82-15342# California Univ., Livermore. Lawrence Livermore Lab.
PERFORMANCE AND COST ANALYSIS OF LARGE CAPACITOR BANKS USING WEIBULL STATISTICS AND MTBF
B. T. Merritt and K. Whitham 1 Jun. 1981 6 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf. Albuquerque, N. Mex., 1-3 Jun. 1981
(Contract W-7405-eng-48)
(DE81-024364; UCRL-85723; CONF-810659-21) Avail: NTIS HC A02/MF A01

Inertial confinement fusion projects have required increasingly larger capacitor banks. As bank size has increased, the need for high energy density capacitors has become apparent. Higher energy densities are achieved by increasing the dielectric stress while reducing life. Acceptable capacitor life is based on system mean time between failure (MTBF) for Nova, a 100 shot MTBF was deemed to be minimum. For a large population of capacitors, as in Nova, statistical analysis is required to evaluate system performance. The tradeoff between capacitor life and energy density can be characterized via Weibull statistics. A method of calculating capacitor bank reliability and capacitor bank costs based on Weibull statistics is given herein. DOE

N82-15343# Oak Ridge National Lab., Tenn.
DEVELOPMENT OF FORCE-COOLED SUPERCONDUCTORS FOR USE IN LARGE MAGNETS
J. R. Miller 1981 12 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028067; CONF-810835-8) Avail: NTIS HC A02/MF A01

Force-cooled conductors of ICSs offer an attractive option for designers of large magnets. Knowledge of the performance of this type of conductor has advanced sufficiently in recent years for reliable designs to be made. Preliminary designs can be made with the help of relatively simple formulae and a rather extensive data base from small conductor tests. DOE

N82-15344# Brookhaven National Lab., Upton, N. Y. Div. of Metallurgy and Mater. Sci.
SUPERCONDUCTING CURRENT DENSITIES IN BRONZE-PROCESSED Nb_3Sn MULTIFILAMENTARY WIRES
S. Okuda (Sumitomo Electric Industry, Osaka), M. Suenaga, and T. S. Luhman 1981 11 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030566; BNL-30018; CONF-810835-26) Avail: NTIS HC A02/MF A01

The superconducting current densities of five multifilamentary wires with diameters of 0.41 mm and different ratios of bronze to Nb (R = 2 to 3.7) were measured. The superconducting critical currents were measured at 4.2 K in magnetic fields of 8 to 19 T. Effects of heat treatments were investigated. DOE

N82-15345# Minnesota Power and Light Co., Duluth.
INVESTIGATION OF GEOMAGNETICALLY INDUCED CURRENTS IN THE PROPOSED WINNIPEG-DULUTH-TWIN CITIES 500-kV TRANSMISSION LINE Final Report
J. G. Kappenman, V. D. Albertson (Minnesota Univ., Minneapolis), and N. Mohan (Minnesota Univ., Minneapolis) Jul. 1981

169 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1205-1)
(DE81-904233; EPRI-EL-1949) Avail: NTIS HC A08/MF A01

The effects of geomagnetically induced currents (GIC) on a new 749 km (466 mile) 500 kV ac transmission line from the vicinities of Winnipeg, Manitoba to Duluth, Minnesota to Minneapolis-St. Paul, Minnesota are investigated. The effects on the operation of the 500 kV line, equipment connected directly to the line, and effects on the power systems connected to the line are studied. The study covers the instrumentation to measure and record geomagnetic field fluctuations, Earth surface potential, and GIC; the analytical determination of GIC throughout the system; the determination of increased transformer reactive power requirements under conditions of half cycle saturations; interconnected power system load-flow studies in the presence of GIC; switching transients on the 500 kV line and harmonic studies of the 500 kV autotransformers in the presence of GIC; the effects of GIC on current transformers and relays; and, effects of harmonics due to GIC on high voltage dc converter station operation. DOE

N82-15346# California Univ., Berkeley. Lawrence Berkeley Lab. Physics, Computer Science and Mathematics Div.

GAS COOLED ELECTRICAL LEADS FOR USE ON FORCED COOLED SUPERCONDUCTING MAGNETS

R. G. Smits, P. L. Andrews, W. A. Burns, C. T. Day, J. W. Gary, G. H. Gibson, M. A. Green, M. Pripstein, R. R. Ross, and J. D. Taylor Aug. 1981 9 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981
(Contract W-7405-eng-48)
(DE81-029855; LBL-12783; CONF-810836-18) Avail: NTIS HC A02/MF A01

The fabrication and testing of a pair of single tube leads which carry one fifth of the time projection chamber (TPC) magnet current is described. Since one of the TPC magnet leads is horizontal within the vacuum chamber, the test leads were tested in a near horizontal position. The performance of the composite TPC magnet lead or the performance of other leads built with multiple tube bundles can be predicted. DOE

N82-15347# Sandia Labs., Albuquerque, N. Mex.

HIGH VOLTAGE, MAGNETICALLY SWITCHED PULSED POWER SYSTEMS

J. P. VanDevender and R. A. Reber 1981 12 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N.Mex., 1 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-026290; SAND-81-0754C; CONF-810659-28) Avail: NTIS HC A02/MF A01

The principles of magnetic switching are briefly described. Experiments on material properties and their relation to switch performance, risetime limitations, and core insulation are described. Magnetic switching is evaluated from a system perspective. An idealized pulse power system with 200 kJ or stored energy and a 40 ns output pulse is examined. The multi-megavolt electrical insulation requirements impose limitations on the switches. The cost of the magnetically switched system exceeds the cost of the conventional superpower generator system by up to 75%. The potential for reliability, reproducibility, and repetitive pulse capability must be evaluated for each application to offset the increased cost. DOE

N82-15348# Siemens A.G., Munich (West Germany). Werk fuer Integrierte Schaltungen.

COMPUTER AIDS FOR CIRCUITS DESIGNS Final Report, Apr. 1980

Adolf Pascher, Istvan Madas, and Michael Mirbeth Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 72 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-185; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15.15

Suitable simple and reliable computer aided circuit design methods for measuring data and processing model parameters were developed for integrated circuit design engineers. Test chips were modified in order to register the relevant measured data for different technologies. The measuring methods were improved in order to obtain more accurate and more reproducible data for the measuring programs and the computer. Device and process simulation programs were developed for models for bipolar and metal oxide semiconductor (MOS) transistors in order to determine model parameters. Author (ESA)

N82-15349# AEG-Telefunken, Frankfurt am Main (West Germany). Fachbereich Leistungshalbleiter.

CONTROL OF THE MINORITY CARRIER LIFETIME OF SILICON DEVICES USING ELECTRON IRRADIATION Final Report, Jul. 1980

Edgar Sorchet, Joachim Dziewior, Dieter Silber, and Alois Sonntag Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 94 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-037; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19.80

The turn off time (tq) of thyristors was lowered approximately 50% by electron irradiation of local sites on the devices. The on state voltage (VT) and the blocking characteristics (VR, VD) are not degraded whereas the turn-on power loss increases. Decreasing the lifetime in silicon power devices by high energy electron irradiation (12 and 15 MeV) of the total device area gives better data trade-off (VT - tq - VR, VD) as compared with gold diffusion. The thermal stability of the radiation induced recombination centers is, however, relatively low when the devices are annealed at 200 C for periods of 100 to 1000 hr. Author (ESA)

N82-15350# Semikron Gesellschaft fuer Gleichrichterbau und Elektronik m.b.H., Nuremberg (West Germany).

ELECTRON IRRADIATION OF SEMICONDUCTOR DEVICES Final Report, Dec. 1979

Hansjuergen Fuchs, Reinhard Grube, Werner Tursky, and Joachim Knopp Bonn Bundesministerium fuer Froschung und Technologie Feb. 1981 76 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-045; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16

Electron beam irradiation technology, applied for modeling of electrical semiconductor device parameters, was investigated, especially for producing fast switching devices with high blocking capability. Applicability of this method to local carrier lifetime adjustment was also studied. For adjusting the switching times of semiconductor devices, electron beam irradiation surpasses gold diffusion considerably as far as expenditure, accuracy and reproducibility are concerned. The ratio of on-state voltage to turn-off time which is inferior in comparison to gold diffusion be improved by adapting the device dimensions carrier lifetime was proved. Equipment and methods for series production were developed and tested with pilot production quantities. The basis for introducing this technology into production is now available. Author (ESA)

N82-15351# Leitz (Ernst) G.m.b.H., Wetzlar (West Germany). Ressort Entwicklung.

COMPONENTS FOR MASK TECHNOLOGY Final Report, Oct. 1979

Hans-Dieter Jacoby Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 40 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-055; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8.40

The production of photomasks is considered in three areas: (1) development of a wide angle projection lens, 10 : 1; (2) development of a comparator based on laser interferometry and capable of automatic measurement of masks; and (3) creation of software systems for meteorology applications in two of three dimensions as well as in polar coordinates, with automated measuring equipment adapted to different computer systems. Examples illustrate the capabilities of software aided meteorology. Author (ESA)

N82-15352# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Electronique et Physique.
CHARACTERIZATION OF GaAs SUPERHIGH FREQUENCY FIELD EFFECT POWER TRANSISTORS IN THE NONLINEAR MODE Ph.D. Thesis [CARACTERISATION DES TRANSISTORS A EFFET DE CHAMP GAAS HYPERFREQUENCE DE PUISSANCE EN REGIME NON LINEAIRE]
Michel Goudelis May 1981 234 p refs In FRENCH
(ENST-E-81001) Avail: NTIS HC A11/MF A01

Different characterization methods for FET's are examined. Taking the variation of large signal parameters and a small signal model, equivalent circuit elements which have nonlinear behavior are sought while the variation in these elements is linked with voltage variations at their terminals. This modeling is independent of the test frequency and the impedances of the component. The mechanism of nonlinearity in FET's is explained. Simulation results show the utility of this model in broadband amplifier design. Author (ESA)

N82-15353# Westinghouse Electric Corp., Baltimore, Md. Advanced Technology Labs.
ADVANCED PLANAR SILICON TEST STRUCTURES Final Report, 1 Jan. 1978 - 31 Oct. 1979
D. McCarthy, J. Acevedo, and D. Herman Jul. 1981 94 p refs
(Contract NBS-6-35766; ARPA Order 2397)
(PB81-229155; NBS-GCR-81-327) Avail: NTIS HC A05/MF A01 CSCL 09E

An integrated structure that is used to measure pn junction reverse bias leakage current was implemented in modular test chips to investigate the effects of certain design parameters on the leakage measurements. The test structure is composed of a gated diode, a reset switch, and an integrally connected source follower MOSFET which functions as an electrometer. The automated measurement procedure is discussed, and data obtained using the test structure are analyzed to determine the bulk generation life-time and the surface recombination velocity in processed silicon wafers. GRA

N82-15354# National Bureau of Standards, Washington, D.C. National Engineering Lab.
DEVELOPMENT OF TEST STRUCTURES FOR CHARACTERIZATION OF THE FABRICATION AND PERFORMANCE OF RADIATION-HARDENED CHARGE-COUPLED DEVICE (CCD) IMAGERS Annual Report, 15 May 1980 - 14 May 1981
G. P. Carver Aug. 1981 27 p refs Sponsored in part by Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
(PB81-244071; NBSIR-2319) Avail: NTIS HC A03/MF A01 CSCL 09A

Test structures and test methods for the characterization of radiation-hardened charge coupled devices (CCD) imagers were evaluated. The results of measurements on CCD imager wafers using the surface-channel and buried-channel, integrated gated-diode electrometers, before and after exposure to Co60 radiation, and using the cross bridge/electrical alignment test structures are reported. Examples of cross sections of the CCDs made by beveling and staining are also presented. Author

N82-15355# National Bureau of Standards, Washington, D.C. Center for Electronics and Electrical Engineering.
DEVELOPMENT OF POWER SYSTEM MEASUREMENTS Quarterly Report, 1 Apr. - 30 Jun. 1981
R. E. Hebner, ed. Jun. 1981 21 p refs
(Contract DOE-EA-77-A-01-6010)
(PB81-246860; NBSIR-81-2334) Avail: NTIS HC A02/MF A01 CSCL 09A

Measurements of ion density in air, the use of signals above 1 GHz to detect incipient faults in cables, the measurement of the by-products which develop during partial discharge activity in SF sub 6, and the determination of the breakdown behavior of an oil-paper interface are discussed. DOE

N82-15356# National Bureau of Standards, Washington, D.C. National Engineering Lab.
USING A TEM (TRANSVERSE ELECTROMAGNETIC) CELL FOR EMC MEASUREMENTS OF ELECTRONIC EQUIPMENT
M. L. Crawford and J. L. Workman Jul. 1981 71 p refs
(PB81-244857; NBS-TN-1013) Avail: NTIS HC A04/MF A01 CSCL 09C

The physical design and electrical evaluation of pertinent parameters which influence the use and operation of a transverse electromagnetic (TEM) cell are described. Detailed, step-by-step procedures are given for using a TEM cell for performing either radiated EM susceptibility testing or for measuring radiated EM emissions from electronic/electro-mechanical equipment. GRA

N82-15357# National Bureau of Standards, Washington, D.C. Electron Devices Div.
SOME CONSIDERATIONS REGARDING FILM THICKNESS STANDARDS FOR THE SEMICONDUCTOR INDUSTRY
James R. Ehrstein Nov. 1980 15 p refs
(PB81-239535; NBSIR-80-2158) Avail: NTIS HC A02/MF A01 CSCL 09E

Some of the requisite properties of Standard Reference Materials (SRMs) for effective use in improving the uniformity of measurements are presented. Some of the limitations imposed by real world thin film specimens and our state of understanding of their properties as well as by the different types of measurements available are then considered. Finally, the need for improved measurement control will be related to the SRM program in light of these limitations. GRA

N82-15358# National Bureau of Standards, Washington, D.C.
PLANE-WAVE SCATTERING-MATRIX THEORY OF ANTENNAS AND ANTENNA-ANTENNA INTERACTIONS
David M. Kerns Jun. 1981 182 p
(PB81-245243; NBS-MONO-162; LC-81-600015) Avail: NTIS HC A09/MF A01 CSCL 09E

The use of plane wave spectra for the representation of fields in space and the consideration of antenna-antenna (and antenna-scatterer) interactions at arbitrary separation distances are discussed. The plane wave representation is eminently suitable for this purpose as well as for the expression of conventional asymptotic quantities of antenna theory, such as power gain, effective area, and polarization. The primary objective is to facilitate the critical acceptance and proper application of antenna and field measurements techniques deriving more or less directly from the plane wave scattering matrix theory of antennas and antenna interactions. A secondary objective is to present some recent and some new theoretical results based on this theory. GRA

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N82-15359*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RELATIONS FOR THE THERMODYNAMIC AND TRANSPORT PROPERTIES IN THE TESTING ENVIRONMENT OF THE LANGLEY HYPERSONIC CF4 TUNNEL
Kenneth Sutton Oct. 1981 40 p refs
(NASA-TM-83220) Avail: NTIS HC A03/MF A01 CSCL 20D

Thermodynamic and transport properties of gaseous CF4 that can be used in flow field computer codes and theoretical analyses for comparison of results with experimental data from the Langley Hypersonic CF4 Tunnel are presented. The thermodynamic relations which are based on thermally perfect but calorifically imperfect gas are adequate for the testing environment of the CF4 tunnel and are simpler to use than the imperfect gas relations required to define the complete expansion from the tunnel reservoir. Relations for the transport properties are based on the kinetic theory of gases in which published experimental data are used in the derivation of the relations. Extensive experimental data were located for viscosity and the derived relation should provide values for viscosity with errors of less than 1 percent. The experimental data for thermal conductivity were limited with significant disagreement between the various sources. The derived relation will probably provide values for the thermal conductivity with errors of no more than 5 percent which is within the accuracy of the experimental data. M.D.K.

N82-15360*# Oklahoma State Univ., Stillwater. School of Mechanical and Aerospace Engineering.

INVESTIGATIONS OF FLOWFIELDS FOUND IN TYPICAL COMBUSTOR GEOMETRIES Semiannual Status Report, 1 Jan. - 31 Jul. 1981

D. G. Lilley and D. K. McLaughlin (Dynamics Technology, Inc., Torrance, Calif.) 31 Jul. 1981 243 p refs
(Grant NAG3-74)
(NASA-CR-165061; SASR-2) Avail: NTIS HC A11/MF A01 CSCL 20D

The flowfields of gas turbine combustion chambers were investigated. Six flowfield configurations with sidewall angles alpha = 90 and 45 deg. and swirl vane angles phi = 0, 45 and 70 deg. are characterized. Photography of neutrally-buoyant helium-filled soap bubbles, tufts, and injected smoke helps to characterize the time-mean streamlines, recirculation zones and regions of highly turbulent flow. Five-hole pitot probe pressure measurements allow the determination of time-mean velocities u, v and w. An advanced computer code equipped with a standard two-equation kappa-epsilon turbulence model was used to predict corresponding flow situations and to compare results with the experimental data. J.D.H.

N82-15361*# Old Dominion Univ., Norfolk, Va. Research Foundation.

INFLUENCE OF PRECURSOR HEATING ON VISCOUS FLOW AROUND A JOVIAN ENTRY BODY Final Report, 1 Jan. - 31 Dec. 1977

S. N. Tiwari and K. Y. Szema Washington, D.C. NASA Oct. 1979 145 p refs
(Contract NAS1-14193-27)
(NASA-CR-3174) Avail: NTIS HC A07/MF A01 CSCL 20D

The influence of changes in precursor region flow properties (resulting from the absorption of radiation from the shock layer) on the entire shock layer flow phenomena was investigated. The axially symmetric case is considered for both the preheating zone (precursor region) and shock layer. The flow in the shock layer is assumed to be viscous with chemical equilibrium but radiative nonequilibrium. Realistic thermophysical and spectral models are employed, and results are obtained by implicit finite difference and iterative procedures. The results indicate that precursor heating increases the radiative heating of the body by a maximum of 7.5 percent for 116 km entry conditions. Author

N82-15362# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ACTA MECHANICA SINICA (SELECTED ARTICLES)

29 Oct. 1981 59 p refs Transl. into ENGLISH from Acta Mechanica Sinica (China), no. 4, 1979 p 303-322, 344-352
(AD-A108123; FTD-ID(RS)T-0707-81) Avail: NTIS HC A04/MF A01 CSCL 20/4

Applications of computational fluid dynamics are addressed. Cascade flow in tub turbomachine blades, traveling shock wave in shock tubes, and unstarted choked regime are among the topics discussed. For individual titles, see N82-15363 through N82-15365.

N82-15363# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

GENERALIZED VARIATIONAL PRINCIPLES, VARIATIONAL PRINCIPLES AND DUAL EXTREMUM PRINCIPLES OF GASDYNAMICS FOR THE DIRECT PROBLEM OF TURBOMACHINE AIRFOIL CASCADES ON AN ARBITRARY STREAM SHEET OF REVOLUTION

Liu Gao-Lian *In its* Acta Mechanica Sinica (Selected Articles), No. 4, 1980 (FTDID(RS)T07078-81) 29 Oct. 1981 p 1-22 refs Transl. into ENGLISH from Acta Mechanica Sinica (China), no. 4, 1979 Presented at the Natl. Experience Exchange Meeting in the Thermodyn. Calculation, Design and Expt. of the Aerodyn. of Turbomachines (For primary document see N82-15362 06-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

Variational principles are derived for the direct aerodynamic problem of channels and airfoil cascades (with prescribed distributed mass injection and/or suction along the profile contours for blade cooling or boundary layer control) on an arbitrary stream sheet of revolution in order to provide a rigorous and sound theoretical basis for introducing and applying the finite element method to computational aerodynamics of turbomachine airfoils. Three generalized variational principles are developed and from them three families of variational principles are derived by means of successive transformations. A pair of dual extremum principles are shown to exist for homoentropic subsonic flows. In order to simplify the numerical treatment of various boundary conditions characterizing the complexity of the cascade problem all boundary conditions are converted to natural ones. J.M.S.

N82-15364# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

CALCULATION OF UNSTARTED-CHOKED REGIME OF SUPERSONIC AND TRANSONIC COMPRESSOR CASCADES

Cheng Jia-gang *In its* Acta Mechanica Sinica (Selected Articles), No. 4, 1980 (FTD-ID(RS)T-0707-81) 29 Oct. 1981 p 23-39 refs Transl. into ENGLISH from Acta Mechanica Sinica (China), no. 4, 1979 (For primary document see N82-15362 06-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

Unstarted-choked regime of supersonic and transonic cascade, is studied. A semiempirical method is given which allows for calculating operating incidence of this regime. This method also gives useful results under the condition of downstream throttle, or at various axial velocity density ratio. Other performance parameters such as total pressure loss, pressure ratio and low deviation angle may be obtained simultaneously. The calculating results obtained show this method is reliable. Because this method is simple and convenient, it may be adopted to analyze the aerodynamic performance of cascades and the influence of geometric parameters and dynamic parameters on cascade performance. J.M.S.

N82-15365# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE NUMERICAL COMPUTATION FOR DIFFRACTION AND REFLECTION OF A TRAVELING SHOCK WAVE FROM AN OPEN END OF A SHOCK-TUBE

Du Xun, Wei Zhong-lei, Li Wen-xuan, and Wang Jia-jun *In its* Acta Mechanica Sinica (Selected Articles), No. 4, 1980 (FTD-ID(RS)T0707-81) 29 Oct. 1981 p 40-56 refs Transl. into ENGLISH from Acta Mechanica Sinica (China), no. 4, 1979 (For primary document see N82-15362 06-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

When a shock wave travels from an open end of shock-tubes an over-pressure field is induced and wave diagrams of shock diffraction and reflection form immediately. In general the outflow problem can be computed by solving the unsteady two dimensional gasdynamic equations. This problem is computed numerically, using Eulerian coordinates, fictitious viscosity, and finite difference method. In order to decide the boundary conditions for computation at the end of tube, analytical solution for the unsteady one dimensional flow in a shock-tube, and then the variations of the velocity, pressure and density of the flow at the open end of the tube with time. The present numerical results are in agreement with the experiments. J.M.S.

N82-15366*# Astro Research Corp., Carpinteria, Calif.

LIGHTWEIGHT MOVING RADIATORS FOR HEAT REJECTION IN SPACE Final Report

Karl Knapp 10 Nov. 1981 50 p refs
(Contract NAS8-34191)
(NASA-CR-161943; ARC-TN-1107) Avail: NTIS HC A03/MF A01 CSCL 20D

Low temperature droplet stream radiators, using nonmetallic fluids, can be used to radiate large amounts of waste heat from large space facilities. Moving belt radiators are suitable for use on a smaller scale, radiating as few as 10 kW from shuttle related operations. If appropriate seal technology can be developed, moving belt radiators may prove to be important for high temperature systems as well. Droplet stream radiators suitable for operation at peak temperatures near 300 K and 1000 K were studied using both freezing and nonfreezing droplets. Moving belt radiators were also investigated for operation in both temperature ranges. The potential mass and performance characteristics of both concepts were estimated on the basis of parametric variations of analytical point designs. These analyses included all consideration of the equipment required to operate the moving radiator system and take into account the mass of fluid lost by evaporation during mission lifetimes. Preliminary results indicate that low temperature droplet stream radiator appears to offer the greatest potential for improvement over conventional flat plate radiators. A.R.H.

N82-15367# Technische Universitaet, Hanover (West Germany). Abt. Kaeltetechnik.
ROTATING REGENERATIVE HEAT EXCHANGER FOR ENERGY RECOVERY IN CHEMICAL PLANTS Final Report, Jul. 1979
Reinhard Vauth Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 198 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-099; ISSN-0340-7608) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 36,30

The behavior of a rotary heat exchanger was analyzed with special regard to heat and mass transfer. Parallel to measurements at such a rotary heat exchanger with non-absorbant matrix a mathematic model was developed to simulate the heat and mass transfer. The correlation of experimental and theoretical results shows that the experimental data can be calculated by the mathematical model within an accuracy which is usual for calculating heat and mass transfer. Within a variation of several parameters for the working medium (humid air) the influences of operating conditions on the exchange characteristic of regenerative heat exchangers with rotating matrix were examined. A study of parameters with the working medium flue-gas, which was thought as a possible application of the mathematic model, confirms the results which were found with the working medium humid air. Author

N82-15368# Orlando Technology, Inc., Shalimar, Fla.
HULL/EPIC3 LINKED EULERIAN/LAGRANGIAN CALCULATION IN THREE DIMENSION Contract Report, Jul. 1979 - Oct. 1980
Daniel A. Matuska and John J. Osborn Sep. 1981 102 p
(Contract DAAK11-79-C-0106)
(AD-A106033; ARBRL-CR-00467; AFATL-TR-81-71) Avail: NTIS HC A06/MF A01 CSCL 19/4

This report documents a demonstration calculation performed to evaluate the three dimensional Eulerian/Lagrangian linked hydrocode developed under this contract. The calculation consists of a staballoy rod impacting an armor plate at obliquity 65 degrees and velocity 1 km/sec. Calculational results compared favorably with experimental data. The linked calculation was completed with the use of about nine total CDC 7600 computer hours as compared to the estimated 25 hours if the calculation had been run with only the Eulerian code.
Author (GRA)

N82-15369# Oak Ridge National Lab., Tenn. Engineering Technology Div.
DEVELOPMENT AND ADAPTATION OF CONDUCTION AND RADIATION HEAT-TRANSFER COMPUTER CODES FOR THE CFTL
J. C. Conklin Aug. 1981 39 p refs
(Contract W-7405-eng-26)
(DE81-028033; ORNL/TM-7854) Avail: NTIS HC A03/MF A01

RODCON and HOTTEL are two computational methods used to calculate thermal and radiation heat transfer for the Core Flow Test Loop (CFTL) analysis efforts. RODCON was developed at ORNL to calculate the internal temperature distribution of the fuel rod simulator (FRS) for the CFTL. RODCON solves the time-dependent heat transfer equation in two dimensional (R angle) cylindrical coordinates at an axial plane with user-specified radial material zones and time- and position-variant surface conditions at the FRS periphery. HOTTEL is a revision of an algorithm developed by C.B. Baxi at the General Atomic Company to be used in calculating radiation heat transfer in a rod bundle enclosed in a hexagonal duct. HOTTEL uses geometric view factors, surface emissivities, and surface areas to calculate the gray-body or composite view factors in an enclosure having multiple reflections in a nonparticipating medium. DOE

N82-15370# Sandia Labs., Livermore, Calif. Dept. of Combustion Sciences.
RAMAN-SCATTERING GAS TEMPERATURE MEASUREMENTS IN PARTICLE-LADEN FLOWS
W. L. Flower Jul. 1981 21 p refs Presented at the Symp. on Instrumentation and Control for Fossil Energy Processes, San Francisco, 8 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-029621; SAND-81-8608; CONF-810607-13) Avail: NTIS HC A02/MF A01

The feasibility of making time-averaged Raman-scattering temperature measurements in highly luminous flows was investigated in tests on the Sandia Atmospheric Combustor Exhaust Simulator facility. The diluted exhaust stream from a methane-burning combustor was seeded with 5 micrometer diameter fly ash particles. Test temperatures ranged from 900 K to 1450 K at particle densities up to 6000 particles/cc. A pulsed argon-ion probe laser and a gated detection system for enhancement of signal-to-background ratio were used. Scans of the Stokes Q-branch vibrational Raman spectrum of nitrogen were fit by calculated spectra to determine temperature. The Raman-scattered signal was small but measurable in all cases. There was no apparent laser-induced interference from either fluorescence or particle incandescence. Good agreement between Raman-scattering temperature measurements and radiation corrected thermocouple measurements was obtained. DOE

N82-15371# Oak Ridge National Lab., Tenn.
STEADY-STATE HEAT TRANSFER TO BOILING LIQUID HELIUM IN SIMULATED COIL WINDINGS
P. L. Walstrom 1981 20 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028561; CONF-810835-3) Avail: NTIS HC A02/MF A01

The present data show that the worst case steady-state stability in the GE/LCT magnet windings is at a horizontal conductor orientation. The heat transfer improves with inclination of the conductor from horizontal. Calculations show that for these small regions normal zones will recover by cold-end conduction from the inclined conductor on either end. DOE

N82-15372# Los Alamos Scientific Lab., N. Mex.
SHOCK-COMPRESSION MEASUREMENTS AT PRESSURES GREATER THAN 1 TPa
C. E. Ragan 1981 5 p refs Presented at the 8th AIRAPT Conf. and the 19th EHPRG Conf., Uppsala, 17 Aug. 1981
(Contract W-7405-eng-36)
(DE81-030113; LA-UR-81-2426; CONF-810827-10) Avail: NTIS HC A02/MF A01

Precise Hugoniot data were obtained for samples of aluminum, quartz, iron, molybdenum, and low density molybdenum using the impedance matching technique. An underground nuclear explosion drove a nearly planar, 5-TPa shock into a molybdenum standard. Shock velocities were measured with 1.5% to 2.5% accuracies. DOE

N82-15373# Sandia Labs., Albuquerque, N. Mex.
TIME-RESOLVED WAVE PROFILE MEASUREMENTS IN COPPER TO MEGABAR PRESSURES
L. C. Chhabildas and J. R. Asay 1981 7 p refs Presented at the 8th AIRAPT Conf. and 19th EHPRG Conf., Uppsala, 17 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-026109; SAND-81-1358C) Avail: NTIS HC A02/MF A01

Time-resolved measurements of copper at shock induced high pressures and temperatures are used to illustrate the capability of using such techniques to investigate high pressure strength. Continuous shock loading and release wave profiles were made to 93 GPa using veocity interferometric techniques. Fine structure in the release wave profiles from the shocked state indicates an increase in shear strength of copper to 1.5 GPa at 93 GPa from its ambient value of 0.08 GPa. DOE

N82-15374# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
NUMERICAL SIMULATION OF THE COUNTERCURRENT FLOW IN A GAS CENTRIFUGE
Lawrence D. Cloutman and Richard A. Gentry 1981 29 p refs Presented at the 4th Workshop on Gases in Strong Rotation, Oxford, 24-27 Aug. 1981
(Contract W-7405-eng-36)
(DE81-030283; LA-UR-81-1821; CONF-810845-2) Avail: NTIS HC A03/MF A01

A finite difference method is presented for the numerical simulation of the axisymmetric countercurrent flows in gas centrifuge. A time marching technique is used to relax an arbitrary initial condition to the desired steady state solution. All boundary layers may be resolved. It is concluded that this technique is capable of accurately predicting the performance of a wide variety of machines under all operating conditions of interest. DOE

N82-15375# Battelle Pacific Northwest Labs., Richland, Wash.
ANALYSIS OF COLUMN TRACER EXPERIMENTS BY A STOCHASTIC-CONVECTIVE TRANSPORT METHOD
C. S. Simmons Apr. 1981 30 p Presented at the AGU Chapman Conf. on Spatial Variability in Hydrologic Modeling, Fort Collins, Colo., 21-23 Jul. 1981
(Contract DE-AC06-76RL-01830)
(DE81-030088; PNL-SA-9478; CONF-810761-1) Avail: NTIS HC A03/MF A01

A stochastic-convective transport formulation for describing solute transport in porous media, and based upon solute travel time probability is presented. It is shown to include Fickian transport as a special subcase. It is further demonstrated that a travel time probability associated with a log-normal distribution of hydraulic conductivity will yield concentration breakthrough curves nearly equivalent to Fickian transport when the coefficient of variation in travel time is < or = 1. Laboratory measured hydrodynamic dispersion may be ascribed to local variations in hydraulic conductivity. The travel time formulation is shown to provide a direct link between measured dispersivity and the autocovariance of local flow velocity variation. Dispersivity is shown to manifest a scale effect by increasing in proportion to the length of a system when the velocity correlation range is greater than the length. Chemical absorption effects are described by simply scaling the travel time probability with a retardation factor. DOE

N82-15376# Stuttgart Univ. (West Germany). Inst. fuer Kernenergetik und Energiesysteme.
HEAT TRANSPORT AND CONDUCTION LAYERS IN GRAVITY-ASSISTED HEAT PIPES Ph.D. Thesis [WAERMEUEBERTRAGUNG UND LEISTUNGSGRENZEN IN SCHWERKRAFTUNTERSTUETZTEN WAERMEROHREN]
Hung Nguyen-Chi Feb. 1980 141 p refs In GERMAN; ENGLISH summary
(IKE-5-212; ISSN-0173-6892) Avail: NTIS HC A07/MF A01

The steady state performance and the limiting heat transport capability of gravity-assisted screen-wicked heat pipes with a liquid overfill are discussed in the present work. A semi-empirical correlation between the maximum heat flux density, or maximum heat transport rate, and various influence parameters, viz. tilt angle, fill charge, number of screen mesh layers, screen mesh size, operating temperature, heat pipe diameter and evaporator length, is derived. Moreover, the heat transfer phenomenon within the heat pipe as well as the effect of the screen structure on the bubble growth process is thoroughly investigated. Finally, the work confirms the complexity of the influence of screen mesh size and of the multiple-layer screen mesh configuration on the wall superheat required for the nucleation of the first bubbles, on the capillary force and on the wick porosity. Author

N82-15377# Imperial Coll. of Science and Technology, London (England). Dept. of Aeronautics.
CALCULATION OF THREE-DIMENSIONAL INSTABILITY MODES IN A BLASIUS BOUNDARY LAYER
Chen Mao-Zhang (Peking Inst. of Aeronautics and Astronautics) and P. Bradshaw May 1981 33 p refs Sponsored in part by Government of the People's Republic of China
(IC-Aero-81-01; ISSN-0308-7247) Avail: NTIS HC A03/MF A01

Transition from laminar to turbulent flow was investigated computationally for downstream flow. Wortmann's qualitative model which is a three dimensional structure composed of the basic flow and longitudinal counterrotating, overlapping vortex sheets inclined downstream was tested. The relation between eigenvalues for two dimensional and three dimensional disturbances was established. Numerical calculations of the spanwise component of the fluctuating velocity agree fairly well with Wortmann's measurements and substantiate the model. Author (ESA)

N82-15378# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Berlin (West Germany). Abt. Turbulen Berlin
EXPERIMENTAL INVESTIGATION OF THE INFLUENCE OF THE CASING GEOMETRY UPON THE FLOW CONDITIONS AND THE NOISE OF A CENTRIFUGAL FAN Ph.D. Thesis - Technischen Univ.,
Teofani Gikadi Feb. 1981 137 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-736)
(DFVLR-FB-81-20; ESA-TT-736) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 23.30

Beginning with a casingless impeller with six backward curved blades, the influence of a small logarithmic volute casing with a cut-off clearance of delta r/R = 0.014 (R = impeller radius) upon the flow through the rotating impeller ducts was studied. It is found that there is a blockage of the flow in each impeller duct when passing the cut-off due to the small cut-off clearance. An optimization of the casing geometry regarding low noise and high fan efficiency lead to a logarithmic spiral with a large cut-off clearance of delta r/R = 0.3. The noise was reduced by 22 dB without loss in fan efficiency. T.M.

N82-15379# Research Inst. of National Defence, Umea (Sweden). Huvudavdelning 3.
FORMATION AND SPREADING OF EXPLOSIVE AND TOXIC GAS CLOUDS. A STUDY OF THE LITERATURE
Kenneth Nyren, Stellan Winter, Ola Hertzberg, and Edvard Karlsson Oct. 1981 98 p refs In SWEDISH; ENGLISH summary
(FOA-C-40141-C1) Avail: NTIS HC A05/MF A01

The outflow and aerosol formation at a leakage of pressurized condensed gas, gravity dispersion and the influence of the terrain on heavy gas, are emphasized. It is shown that gas escape, aerosol formation and dispersion of heavy gas on a plane surface are treated considerably more in international literature than the influence of the terrain on the behavior of a heavy gas. Models for calculating discharge and dispersion of heavy gas exist in several countries. Those models demand considerable background knowledge to be applied and recommendations are given how to plan the model work. T.M.

N82-15380# Texas A&M Univ., College Station. Coastal, Hydraulic, and Ocean Engineering Group.
SIMULATANEOUS WAVE AND CURRENT FORCES ON CYLINDER NEAR THE BOTTOM BOUNDARY
David A. Knoll and John B. Herbich May 1981 99 p refs
(Grant NOAA-04-7-158-44105)
(PB81-243990; TAMU-SG-81-203; NOAA-81070807) Avail: NTIS HC A05/MF A01 CSCL 13B

The interaction of waves and currents and their relationship to the forces on submerged pipelines was investigated. A model pipeline in a wave current test facility was used to obtain experimental force values which were compared to values predicted by various theoretical methods of representing wave propagation in a current. The parameters for fluid force are affected by the interaction of waves and currents, and the variations of these parameters are presented. GRA

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-15381* National Aeronautics and Space Administration. Pasadena Office, Calif.
FARADAY ROTATION MEASUREMENT METHOD AND APPARATUS Patent
Milton H. Brockman, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 13 Oct. 1981 10 p Filed 21 Dec. 1979 Supersedes N80-16313 (18 - 07, p 0857) Sponsored by NASA
(NASA-Case-NPO-14839-1; US-Patent-4,295,140;
US-Patent-Appl-SN-106119; US-Patent-Class-343-100PE;
US-Patent-Class-455-60; US-Patent-Class-455-137;
US-Patent-Class-455-139) Avail: US Patent and Trademark Office CSCL 14B

A method and device for measuring Faraday rotation of a received RF signal is described. A simultaneous orthogonal polarization receiver compensates for a 3 db loss due to splitting of a received signal into left circular and right circular polarization channels. The compensation is achieved by RF and modulation arraying utilizing a specific receiver array which also detects and measures Faraday rotation in the presence or absence of spin stabilization effects on a linear polarization vector. Either up-link or down-link measurement of Faraday rotation is possible. Specifically, the Faraday measurement apparatus utilized in conjunction with the specific receiver array provides a means for comparing the phase of a reference signal in the receiver array to the phase of a tracking loop signal related to the incoming signal, and comparing the phase of the reference signal to the phase of the tracking signal shifted in phase by 90 degrees. The averaged and unaveraged signals, are compared, the phase changes between the two signals being related to Faraday rotation.

Official Gazette of the U.S. Patent and Trademark Office

N82-15382 Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).
EMPIRICAL-STATISTICAL INVESTIGATIONS OF THE ACCURACY STRUCTURE OF PHOTOGRAMMETRIC AERIAL PHOTOGRAPHS Ph.D. Thesis - Stuttgart Univ. [EMPIRISCH-STATISTICHE UNTERSUCHUNGEN ZUR GENAUIGKEITSSTRUKTUR DES PHOTOGRAMMETRISCHEN LUFTBILDES]
Matthaeus Schilcher Verlag der Bayerischen Akademie der Wissenschaften 1980 190 p refs In GERMAN
(Ser-C-262; ISSN-0065-5325; ISBN-3-7696-9314-0)
Copyright. Avail: Issuing Activity

Single aerial photographs were empirically-statistically investigated, with emphasis on the stochastic aspects of the picture, for basic research into photogrammetric point determination. By making use of two series of wide angle and superwide angle shots and empirical-statistical analyses, the variance and covariance characteristics of the picture coordinates inside the picture and between different pictures were investigated for a sample of 5000 points. The results lead to answers for existing questions about the functional, and especially the stochastic, photogrammetric point determination model, and also to a better foundation for aerotriangulation. Author (ESA)

N82-15383*# Desert Research Inst., Reno, Nev.
THE THIRD INTERNATIONAL CLOUD CONDENSATION NUCLEI WORKSHOP Final Report
W. C. Kocmond, C. R. Rogers, ed., and S. W. Rea, ed. Nov. 1981 287 p refs Workshop held in Reno, Nev., 6-17 Oct. 1980; sponsored in part by NSF
(Contract NAS8-33820)
(NASA-CP-2212) Avail: NTIS HC A13/MF A01 CSCL 14B

Twenty-five instruments were tested, including size characterization devices and two Aitken counters. The test aerosols were supplied to the instruments by an on-line generation system, thereby eliminating the need for storage bags. Cloud condensation chambers and haze chambers are highlighted. For individual titles, see N82-15384 through N82-15407.

N82-15384*# Wyoming Univ., Laramie.
CONTRIBUTION TO CCN WORKSHOP REPORT FROM UNIVERSITY OF WYOMING GROUP
David C. Rogers and Marcia K. Politovich *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 11-13 refs (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

The group's CCN counter is described. It is a static, horizontal, parallel plate thermal gradient diffusion chamber. Examples of the application of the CCN are presented and include the CCN spectra measured during the winter of 1978-79 near Elk Mountain, Wyoming. Comparisons of droplet concentrations derived from upwind CCN spectra are covered. T.M.

N82-15385*# Naval Research Lab., Washington, D. C.
DESCRIPTION AND DISCUSSION OF THE NRL TGDCC
W. A. Hoppel and T. A. Wojciechowki *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 14-16 refs (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

The NRL thermal gradient diffusion cloud chamber (TGDCC) consists of two plates 7.5 cm in diameter separated by 1.25 cm and covered with saturated filter paper. The cylindrical wall separating the plates is glass. The top plate is at room temperature and the bottom plate is cooled with a thermoelectric cooler. The temperature difference is measured with several sets of thermocouples. The CCN concentration was determined from the video recording. This procedure of averaging the maximum count obtained on several successive recordings at the same supersaturation results in concentrations which are somewhat higher than concentrations calculated from an average across the plateau. T.M.

N82-15386*# Clermont-Ferrand Univ. (France).
THE CCN COUNTER OF THE IOPG OF PUY DE DOME: MAIN CHARACTERISICS AND RESULTS OF MEASUREMENTS
Roger Serpolay *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 17-19 (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

In performing the data analysis of the measurements achieved during the Workshop with the device, a global approach was preferred rather than an individual analysis, in order to illustrate some main characteristics in the behavior of the device with respect to a mean behavior resulting from a general survey of all the equipments involved in each experiment. The device tends generally to overestimate the CCN concentrations measured near the high supersaturations and sometimes underestimates the concentrations close to 0.1% or 0.2% of supersaturation. Despite the fact that it belongs to a type of static diffusion chamber, it shows, however, similar spectra to those obtained with other types of chambers (continuous flow diffusion chamber and haze chamber). Author

N82-15387*# Missouri Univ. -Rolla. Center for Cloud Physics Research.
UMR DUAL MODE CCN COUNTER (MODES: CFD PLUS HAZE)
D. J. Alofs and M. B. Trueblood *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 20-22 refs (For primary document see N82-15383 06-35)
(Grant NSF ATM-79-24326)
Avail: NTIS HC A13/MF A01 CSCL 14B

The chamber consists of two vertical plates 100 cm long in the vertical direction and 13 cm wide, with a 0.8 cm spacing between the plates. The haze mode is used for the nuclei active at supersaturations (S) from 0.0133 to 0.173%. In this mode the two plates are kept at the same temperature (25 C). In the CFD mode the supersaturation is determined by the temperature difference between the two plates. About 40 minutes is required to obtain a spectrum (5 values of S in the CFD mode, plus 7 values of S in the haze mode). About half of this time is used to adjust the temperatures and flows; the rest is used in actual counting of the nuclei. Comparisons of the counter to other types of counters are reported. T.M.

N82-15388*# Washington Univ., Seattle. Cloud and Aerosol Research Group.
A CLOUD CONDENSATION NUCLEUS SPECTROMETER DESIGNED FOR AIRBORNE MEASUREMENTS
Lawrence F. Radke, Stephen K. Domonkos, and Peter V. Hobbs *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 23-25 refs (For primary document see N82-15383 06-35)
(Contract NAS8-33148)
Avail: NTIS HC A13/MF A01 CSCL 14B

The spectrometer is a simple extension of the continuous flow diffusion chamber (CFDC) operated in the vertical mode. The principal new design features of the instrument are its rapid time response and ability to rapidly measure the CCN activity spectrum. The activity spectrum of CCN in an air sample is measured by simultaneously operating the spectrometer at four supersaturations. The CCN spectrometer consists of four essentially independent CFDC's in a parallel array. Each CFDC is 61 cm long, 10 cm wide, and consists of two vertical parallel plates 1 cm apart, maintained at different temperatures. Each CFDC has a single particle optical counter located at the center of its base. T.M.

N82-15389*# Commonwealth Scientific and Industrial Research Organization, Sydney (Australia).
STATIC DIFFUSION CLOUD CHAMBERS
Greg Ayers *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 26-27 refs (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

The chamber geometry and optical arrangement are described. The supersaturation range is given and consists of readings taken at five fixed points: 0.25%, 0.5%, 0.75%, 1.0%, and 1.25%. The detection system is described including light source, cameras, and photocell detectors. The temperature control and the calibration of the chamber are discussed. T.M.

N82-15390*# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
AN AIRBORNE ISOTHERMAL HAZE CHAMBER
Edward E. Hindman *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 28-32 refs (For primary document see N82-15383 06-35)
(Contract N00014-79-C-0793)
Avail: NTIS HC A13/MF A01 CSCL 14B

Thermal gradient diffusion cloud chambers (TGDCC) are used to determine the concentrations of cloud condensation nuclei (CCN) with critical supersaturations greater than or equal to about 0.2%. The CCN concentrations measured with the airborne IHC were lower than theoretically predicted by factors ranging between 7.9 and 9.0. The CCN concentrations measured with the airborne IHC were lower than the concentrations measured with the larger laboratory IHC's by factors ranging between 3.9 and 7.5. The bounds of the supersaturation ranges of the airborne IHC and the CSU-Mee TGDCC do not overlap. Nevertheless, the slopes of the interpolated data between the bounds agree favorably with the theoretical slopes. T.M.

N82-15391*# Meteorological Office, Bracknell (England).
A DESCRIPTION OF THE UK METEOROLOGICAL OFFICE CCN COUNTER
M. Kitchen and E. Stirland *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 33-34 (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

The chamber is a thermal gradient diffusion type with the upper plate at room temperature and the lower plate thermoelectrically cooled. The light from a 25W projector bulb is focused in a beam of approximations 1x3 mm in the central part of the chamber. The light scattered by drops is viewed in the forward direction (40 deg) by a microscope and a sensitive photodetector. Experiments were performed to relate the peak output from the photocell with the maximum number of drops in the beam recorded photographically. The microscope is used to check the calibration at low concentrations of CCN. The results of the experiments and the performance of the counter are reported. T.M.

N82-15392*# Alaska Univ., Fairbanks. Geophysical Inst.
CLOUD CONDENSATION NUCLEUS COUNTER BY IMPACTOR SAMPLING TECHNIQUE
Takeshi Ohtake *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 35-36 ref (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

Unlike typical CCN counters, this device counts the numbers of water droplets condensed on aerosol particles sampled on a microcover glass at various different relative humidities. The relative humidities ranged from 75 percent to a calculated value of 110 percent. A schematic of the apparatus is shown. The individual CCN can be identified in an optical micrograph and scanning electron micrograph and may be inspected for their chemical composition later. T.M.

N82-15393*# York Univ., Downsview (Ontario).
DIFFUSION TUBE
R. Leaitch and W. J. Megaw *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 37-39 (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

The diffusion tube was designed to operate below about 0.25 percent of water supersaturation. It is simply a long tube lined on the inside with a damp chamois cloth, and heated isothermally to a few degrees centigrade above the incoming air. The diffusion coefficient for water vapor is slightly larger than that for heat, making it possible to supersaturate the airflow. This is the same principle by which transient supersaturations may occur in parallel plate cloud chambers. Only the diffusion of vapor and heat from the walls into the moving air are considered. T.M.

N82-15394*# State Univ. of New York, Albany. Automated Sciences Research Center.
AN AUTOMATIC LIGHT SCATTERING CCN COUNTER
G. Garland Lala *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 40-41 ref (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

The counter is a static thermal diffusion chamber which has been modified to include an optical system for the determination of droplet concentration by the measurement of scattered light. The determination of concentration is made by measurement of the peak scattered light signal from the cloud of growing droplets which is a function of both the droplet concentration and chamber supersaturation. Because the formation of the peak is related to the rate of growth of the droplets and sedimentation, both of which are determined by supersaturation, the system calibration can be uniquely determined by comparison with an absolute counter such as a static diffusion chamber with a photographic recording system. T.M.

N82-15395*# Naval Research Lab., Washington, D. C.
DESCRIPTION OF THE NRL ISOTHERMAL HAZE CHAMBER
William A. Hoppel *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 42-43 ref Sponsored in part by the Naval Air Systems Command (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

In the IHC the critical supersaturation is inferred from the measurement of the size of particles which have grown to their equilibrium size at exactly 100 percent RH. The largest size channel corresponds to a critical supersaturation of 0.014 percent. The growth time required for particles of this size to reach their equilibrium size exceeds the 110 second residence time in the IHC. Since the supersaturation spectrum is always very steep in this region, the contribution of these larger particles which have not yet attained their equilibrium size to smaller size channels is negligible. However, failure of these particles to reach their equilibrium size could result in a significant lowering of the count in the size channel corresponding to the smaller critical supersaturation. T.M.

N82-15396*# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.

MODIFIED MEE INDUSTRIES STATIC THERMAL GRADIENT DIFFUSION CLOUD CHAMBER

Randolph D. Borys *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 44-45 (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

The experiments performed at the Workshop were undertaken to confirm the calculated sample volume, determine the usable range of supersaturation, and minimum detectable size. Comparison of absolute CCN concentrations with other state-of-the-art continuous flow diffusion chambers at supersaturations near 1 percent indicated that the volume used produced CCN concentrations well within the range of CCN concentrations determined at the workshop. This agreement is interpreted to mean the sample volume was correct. Direct measurements of the beam geometry done in the laboratory indicated a factor of 4-5 error. This error is apparently due to the larger apparent visible beam diameter versus the actual usable beam diameter given the droplet illumination, chamber optical geometry, microscope optics and film characteristics. T.M.

N82-15397*# Desert Research Inst., Reno, Nev.

SIMULTANEOUS OPERATION OF THREE CCN COUNTERS AND AN ISOTHERMAL HAZE CHAMBER AT THE 1980 INTERNATIONAL CCN WORKSHOP

James G. Hudson, C. F. Rogers, and G. Keyser *In its* The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 46-53 refs (For primary document see N82-15383 06-35)
(Contract NAS8-33820; Grant NSF ATM-79-21558)
Avail: NTIS HC A13/MF A01 CSCL 14B

Four devices were operated for the detection and characterization of cloud condensation nuclei (CCN) and fog condensation nuclei (FCN). In chronological order of development, the CCN devices are the conventional continuous-flow diffusion chamber (CFD), the rapid-cycle CCN spectrometer, and the instantaneous CCN spectrometer. The FCN detection device is an isothermal haze chamber (IHC). These four instruments are discussed and general comments on their performance at the workshop are given. T.M.

N82-15398*# Desert Research Inst., Reno, Nev.

STEADY GENERATION OF AEROSOLS WITH AN IMPROVED CONSTANT OUTPUT ATOMIZER

Jack Y. Dea and Ulrich Katz *In its* The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 54-56 ref (For primary document see N82-15383 06-35)
(Contract NAS8-33820; Grant NSF ATM-79-21558)
Avail: NTIS HC A13/MF A01 CSCL 14B

It is common practice to generate laboratory aerosols of soluble materials with pneumatic atomizers. In a typical device, a solution of the substance to be aerosolized is injected into a jet of air and the liquid is broken up into very small droplets. After forced evaporation, a dry aerosol of the solute is produced. A number of commercially available devices were tested, and despite differences in design, all the atomizers tested suffered from short- and/or long-term fluctuations of their output particle number concentrations. The mechanisms responsible for atomizer instabilities are discussed and methods for alleviating these problems are considered. T.M.

N82-15399*# State Univ. of New York, Albany. Atmospheric Sciences Research Center.

CCN COMPARISONS OF STATIC DIFFUSION CHAMBERS

James E. Jiusto, R. E. Ruskin (Naval Research Lab.), and A. Gagin (Hebrew Univ.) *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 57-63 refs (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

Nine CCN counters of the static diffusion (SDC) type were compared with one another and with continuous flow diffusion (CFD) chambers. The nine SDCs showed a considerable amount of variation, largely attributable to newness and/or lack of prior calibration of some units. The five more consistent instruments agreed quite well, to within at least 20 percent of the NRL mobility analyzer and to within 10 percent at 1 percent supersaturation. There was satisfactory agreement between the more reliable SDC and CFD chambers. Author

N82-15400*# State Univ. of New York, Albany. Atmospheric Sciences Research Center.

CCN-SUPERSATURATION SPECTRA SLOPES (K)

James E. Jiusto and G. Garland Lala *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 64-68 refs (For primary document see N82-15383 06-35)
(Contract DAAG29-81-K-0019; Grant NSF ATM-76-24048-02)
Avail: NTIS HC A13/MF A01 CSCL 14B

Theoretically the slope k of a CCN-supersaturation spectrum should equal two thirds of the slope of the total (soluble) aerosol size distribution. Workshop results tended to verify this relation. The k values are markedly different depending on whether one is measuring ambient CCN concentrations at supersaturations S above or below approximately 0.1-0.2%. The larger k values for S approximately < 0.1% is consistent with the greater decrease in large particle concentration with increasing size. It is concluded that over the S range of 0.02% to 2%, two power fits (and k values) may sometimes suffice for a reasonable approximation of the CCN distribution. At other times, and with laboratory generated aecosols, such an approach is inadequate and requires refinement. T.M.

N82-15401*# Naval Research Lab., Washington, D. C.

MEASUREMENT OF THE AEROSOL SIZE DISTRIBUTION WITH NRL'S MOBILITY ANALYZER

William A. Hoppel *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 69-78 refs Sponsored in part by the Naval Air Systems Command (For primary document see N82-15383 06-35)
Avail: NTIS HC A15/MF A01 CSCL 14B

The size distribution was measured in the size range between 0.0057 and 0.57 micrometer radius. A description of the instrumentation and data analysis is given, together with the measured size distributions calculated for 23 experiments. T.M.

N82-15402*# Desert Research Inst., Reno, Nev.

PERFORMANCE OF THE CONTINUOUS FLOW DIFFUSION CHAMBERS

James G. Hudson and Darryl J. Alofs (Missouri Univ., Rolla) *In its* The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1982 p 79-84 ref (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

A brief comparative description is made of the chambers. Overall, comparisons for the various types of experiments - monodisperse, polydisperse and ambient aerosol - showed agreement among these chambers to within 15% in most cases. A careful analysis of the results indicated that a proper accounting of certain parameters would bring about much closer agreement among four of these instruments. T.M.

N82-15403*# Naval Research Lab., Washington, D. C.

REVIEW OF ISOTHERMAL HAZE CHAMBER PERFORMANCE

J. W. Fitzgerald, C. F. Rogers (Desert Research Inst.), and J. G. Hudson (Desert Research Inst.) *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 85-92 refs (For primary document see N82-15383 06-35)
(Contract NAS8-33820; Grant NSF ATM-79-21558)
Avail: NTIS HC A13/MF A01 CSCL 14B

The theory of this method of characterizing cloud condensation nuclei (CCN) over the critical supersaturation range of about 0.01% to 0.2% was reviewed, and guidelines for the design and operation of IHC's are given. IHC data are presented and critically analyzed. Two of the four IHC's agree to about 40% over the entire range of critical. a third chamber shows similar agreement with the first two over the lower part of the critical supersaturation range but only a factor of two agreement at higher supersaturation. Some reasons for the discrepancies are given. T.M.

N82-15404*# Desert Research Inst., Reno, Nev.
AEROSOL GENERATION AND DISTRIBUTION SYSTEM FOR THE THIRD INTERNATIONAL CLOUD CONDENSATION NUCLEI WORKSHOP
Ulrich Katz and Jack Y. Dee *In its* Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 93-96 refs (For primary document see N82-15383 06-35)
(Contract NAS8-33820; Grant NSF ATM-79-21558)
Avail: NTIS HC A13/MF A01 CSCL 14B

In order to obtain identical samples participating CCN instruments and aerosol characterizing equipment were located along and connected to a 8.2 cm diameter aluminum tube through which the test aerosols were pumped directly from the source at very slight overpressure. Of the total of 29 experiments, 18 were carried out with artificial NaCl or (NH4)2SO4 aerosols. These were generated from salt solutions by pneumatic atomizers of special design to ensure high constancy of the aerosol output concentration. In three experiments with insoluble CCN (AgI, paraffin wax) the aerosols were generated thermally. In some of the tests, an electrostatic classifier was used for narrowing the particle size distributions. T.M.

N82-15405*# Florida State Univ., Tallahassee. Dept. of Meteorology.
ELEMENTAL COMPOSITION OF AEROSOLS IN FOURTEEN EXPERIMENTS OF THE CLOUD CONDENSATION NUCLEI WORKSHOP
William H. Mach and Richard R. Hucek *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 97-98 refs (For primary document see N82-15383 06-35)
(Contract NAS8-33820; Grant NSF ATM-79-21558)
Avail: NTIS HC A13/MF A01 CSCL 14B

Aerosols were collected with two Ci impactors and analyzed with proton induced X-ray emission (PIXE) for chemical composition and to detect if contamination was present. One of the impactors sampled the generated aerosols; the other impactor sampled droplets from a diffusion cloud chamber. The purpose of the experiments was to test the feasibility of a study of the transfer of chemical elements from the fine particle sizes to the coarse particle sizes, after CCN are activated and cloud droplets are formed. The data indicated that sulfur-containing aerosols did exhibit the expected transfer. T.M.

N82-15406*# Desert Research Inst., Reno, Nev.
COMPARISON BETWEEN TWO AITKEN COUNTERS AND WITH CLOUD CONDENSATION NUCLEI COUNTERS AT THE 1980 INTERNATIONAL CCN WORKSHOP
C. F. Rogers and R. L. McKenzie (NBS, Washington, D.C.) *In its* The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 99-107 refs (For primary document see N82-15383 06-35)
(Contract NAS8-33820; Grant NSF ATM-79-21558)
Avail: NTIS HC A13/MF A01 CSCL 14B

The Pollak and the TSI 3020 counters agreed to within about 10% at concentrations below 1000 cu cm, whereas above that concentration, substantial systematic differences were observed. When the test aerosol was monodisperse and the CCN counters were operated at supersaturations that should nucleate all the aerosol, the Pollak counter read about 6% to 20% lower than the CCN counter in the concentration range from 250/cu cm to 1800/cu cm. The TSI 3020 read about 20% lower than the CCN counter at concentrations less than 1000/cu cm, and a factor of about two higher at concentrations above 1000/cu cm. T.M.

N82-15407*# Wyoming Univ., Laramie.
COMPARING DRY AEROSOL SIZE MEASUREMENTS
David C. Rogers *In* Desert Research Inst. The Third Intern. Cloud Condensation Nuclei Workshop Nov. 1981 p 106-107 refs (For primary document see N82-15383 06-35)
Avail: NTIS HC A13/MF A01 CSCL 14B

Two instruments were used to size dry aerosols for the CCN experiments: the Naval Research Laboratory (NRL) instrument which uses an electrical mobility analyzer to separate the aerosol size fractions and a diffusion chamber to grow and count the particles and the University of Wyoming (WYO) aerosol monitoring system. Measurements from these two systems were usually found to be in agreement during the CCN Workshop. Two examples are presented to compare aerosol size distribution measurements of the two instruments: experiment 8 (monodisperse NaCl) and experiment 27 (polydisperse AgI). Differential (dN/dR) and cumulative plots are shown for both instruments for experiment 8 and experiment 27; also shown are Aitken particle measurements for comparison. T.M.

N82-15408*# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
ADVANCED MICROWAVE MOISTURE SOUNDER (AMMS) FOR WB-57F CCOPE MISSION Final Technical Report, 3 Apr. - 31 Oct. 1981
J. A. Gagliano and J. J. McSheehy Oct. 1981 48 p refs
(Contract NAS5-26528)
(NASA-CR-166752; A-2904) Avail: NTIS HC A03/MF A01 CSCL 14B

The AMMS, flown on the WB-57F Cooperative Convective Precipitation Experiment (CCOPE), collected data at three bands on either side of the 183.3 GHz water vapor line at + or - 2.25, + or - 5.00, and + or - 8.75 GHz. Data were also collected simultaneously at a single low-loss atmospheric window channel near 94 GHz. The AMMS scanner imaged the scene below the WB-57F over an angular range of + or - 45 degree about nadir with beam-widths of 2 degree and 1 degree for the 94 GHz and 183 GHz sensors, respectively. The radiometer system operated under control of the onboard microcomputer used to: store radiometric data on the AMMS flight recorder, operate the stepper motor driven scanner, and collect pertinent housekeeping data for the system. A portable ground support system was used following each CCOPE flight to provide quick-look data analysis. The CCOPE flight logs and tape of the AMMS data were delivered to NASA. A.R.H.

N82-15409# NETZSCH-Geraetebau G.m.b.H., Selb (West Germany).
DEVELOPMENT OF A PROTOTYPE OF A TEST APPARATUS FOR THE DETERMINATION OF THE THERMAL CONDUCTIVITY IN SOLIDS, ON POWDERS AND FOAMS Final Report
Karl Bayreuther Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 49 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-052; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,30

The measuring methods required for the determination of thermal conductivity cross wire and parallel, are applied in the laboratories already for a long time, the cross wire method mainly for insulating materials, the parallel method for good heat conductors. The measuring principle of both methods is the same. From the temperature distribution of a sample heated constantly from the interior, the thermal conductivity is calculated, in the instationary methods in dependence of defined times. For tests to 1500 C the measuring arrangement is put into a furnace. The aim of the development intent should be the commercialization, automation and combination of the measuring methods. The constructed apparatus fulfills the required conditions. To generate the necessary test temperature a special chamber furnace is used, where measurements according to both methods can be carried out. The measuring run-off is controlled by a computer, data acquisition and data processing take place automatically. The measuring results are registered by a plotter in a data print out and shown in graphs. In several examples the function capacity of the apparatus has been approved. Author

N82-15410# Erlangen-Nuremberg Univ. (West Germany). Lehrstuhl und Lab. fuer Technische Elektronik.
DIGITAL RECORDING OF VIDEO SIGNALS ON MAGNETIC TAPE AT 40 M BIT/SEC Final Report, Dec. 1979
Norbert Bauer Bonn Bundesministerium fuer Forschung und Technologie May 1981 16 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-084; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 3,40

Video signals can be recorded at a data rate of 40 Mbit/sec on a modified helical recorder (GPR, GRUNDIG). The approach realized runs at a data rate of 30 Mbit/sec. The video signal is sampled at a rate of 10 MHz and quantized into 64 amplitude levels. A data compression ratio of 2 is achieved by a special DPCM system which causes little error propagation. Simple track is replaced by a double track, requiring the same space on the magnetic tape. A.R.H.

N82-15411# Siemens A.G., Munich (West Germany). Work fuer Integrierte Schaltungen.
IMPROVEMENTS OF PROXIMITY EXPOSURE TECHNIQUE FOR SMALLER LARGE-SCALE INTEGRATION PATTERN Final Report, Jun. 1980
Guenter Doemens, Bodo Dreisbach, Erich Rosshaupter, Dusan Sofronijevic, Hans Udo Sygulla, and Guenter Winterhalter Bonn Bundesministerium fuer Forschung und Technologie Apr. 1981 91 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-072; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19.16

The technique was improved from 5 micrometers to 3-3.5 micrometers resist pattern in the manufacturing process. The technological limits of this technique for light were estimated at 2 micrometers in the laboratory and 2.5 micrometers in production. Because of the lack of a suitable photo resist for wavelength approximately = 200 nm, these limits cannot be used in manufacturing. A prototype development for automatic wafer alignment reached its goals. The wafer distortion is found to be relatively small, nearly linear, isotropic, and it can be compensated. T.M.

N82-15412# Tuebingen Univ. (West Germany). Inst. fuer Angewandte Physik.
ELECTRON OPTICAL MASK PROJECTOR WITH A PHOTOCATHODE FOR MINIATURIZATION Final Report, Dec. 1980
Gottfried Moellenstedt, Rumold Speidel, Michael Dostmann, Fritz Martin, and Max Mayr Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 107 p refs In GERMAN; ENGLISH Summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-089; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22.50

The projector was developed with an image converter consisting of a masked photocathode and a plane anode grid. The mask structure to be demagnified is on a quartz glass plate in a thin layer of TiO2 strongly absorbing ultraviolet light. A photoemissive layer is deposited by evaporation on the whole front side of the plate. For the demagnification of the electron image of the mask, a system is used consisting of two geometrically similar magnetic lenses in a telescopic arrangement. T.M.

N82-15413# Siemens A.G., Berlin (West Germany). Research Labs.
ELECTRON RADIATION SYSTEMS FOR STRUCTURE PRODUCTION. PART 1: PHYSICAL FOUNDATIONS AND EXPERIMENTAL RESULTS Final Report, Mar. 1980
Klaus Anger, Juergen Frosien, Burkhard Lischke, and Hans Schuster-Woldan Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 102 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie 2 Vol.
(BMFT-FB-T-81-090-Vol-1; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21.40

Microlithograph processes are required to manufacture VLSI semiconductors which are capable of producing extremely fine structures. Reducing electron projection systems were examined for this purpose. On the basis of theoretical considerations concerning the resolution and number of image elements, a reducing electron projector with a scale of 1:4 was developed. The imaging system with corrected compound optics has an optical capability of 37,000 resolvable lines per image field, and a distortion of 0.4 %. The exposure time required for electron lithographic production of 1 micron structures on 8 mm by 8 mm fields is around 2.5 s/sq cm. A highly accurate method of adjustment was developed for the illumination and imaging system. This is essential to reproducible generation of structures by an electron projection system. A new alignment method which yields a registration accuracy of 0.1 micron for multilayer exposures was demonstrated. N.W.

N82-15414# Siemens A.G., Berlin (West Germany). Forschungslab.
ELECTRON RADIATION SYSTEM FOR STRUCTURE PRODUCTION. PART 2: EQUIPMENT SYSTEMS AND DESIGN Final Report, Mar. 1980
Guenter Friedrich, Guenther Gorges, Burkhard Lischke, Reinhold Schmitt, and Mathias Sturm Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 198 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie 2 Vol.
(BMFT-FB-T-81-091-Vol-2; ISSN-0340-7608) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 36.30

The physical foundation for the development of a microprojector is presented and the results achieved with this equipment are described. The basic considerations concerning the design of the mechanical and electronic equipment are discussed. New types of electron-optical lenses for wide beam diameters, precision systems for positioning the mask with respect to the wafer, and electronic measuring systems for highly accurate adjustment of the beam were developed. Structures with minimum sizes of 0.3 micrometers can by produced over image fields of 8 by 8 sq mm. The registration accuracy in the case of multi-layer exposures is 0.1 micrometers. T.M.

N82-15415# Optische Werke G. Rodenstock, Munich (West Germany).
DEVELOPMENT OF A PROCESS CAMERA LENS WITH VARIABLE FOCAL LENGTH Final Report
Hans Grumpelt, Peter Hanke, Ernst Rothe, Manfred Schuck, Walter Smilga, and Hermann Walter Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 93 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-155; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19.40

Process cameras of today are equipped exclusively with fixed focal length lenses. The development of a process lens with variable focal length is described. The design principles of its optical, mechanical, and electronic groups of components are explained. The prototype of the new lens reaches the image quality of fixed focal length lenses. Author

N82-15416# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
DATA EVALUATION AND DATA PROCESSING OF THE LOW-ENERGY PARTICLE SPECTROMETER E8 ON BOARD THE HELIOS PROBES Final Report, Dec. 1980
Klaus Richter, Gerhard Umlauft, and Erhard Keppler Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 77 p refs In GERMAN; ENGLISH summary Sponsored in cooperation with Max-Planck-Gesellschaft
(Contracts BMFT-RS-10/7; BMFT-01-QC-076A-ZA-WRS-0108)
(BMFT-FB-W-81-035; ISSN-0170-1339) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16.20

The production of the HELIOS-E8-data is described along with their handling on ground. Software routines necessary to evaluate the data are described. Numerous examples are given. Author

N82-15417# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Kreiselgeraete und Traegheitsortung.
RESEARCH ON MAGNETO-OPTICAL BIAS ELEMENTS FOR LASER GYROS Final Report
Rolf Gauert Apr. 1981 58 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-81-21) Avail: NTIS HC A04/MF A01; DFVLR,

Cologne DM 15,60

Different magnetooptical bias techniques for laser gyros are discussed. The magnetic mirror in the configuration of the transverse Kerr-effect and the Faraday cell with ferromagnetic garnets in an external resonator are examined theoretically and experimentally. The magnetic mirror delivers acceptable results at the wavelength of 1.153 microns and the Faraday cell in the external resonator delivers good results at the wavelength of 0.633 microns. The calculations for the Faraday-mirror (which in principle is a Faraday cell) are promising. Other magnetooptical methods are discussed briefly. M.G.

N82-15418# Sydney Univ. (Australia). Coastal Studies Unit.
CALIBRATION AND DATA CORRECTION PROCEDURES FOR FLOW METERS AND PRESSURE TRANSDUCERS COMMONLY USED BY THE COASTAL STUDIES UNIT
P. Nielsen and P. J. Cowell Jul. 1981 39 p refs
(Grant N00014-80-G-0001; NR Proj. 388-157)
(AD-A105594; CSU-TR-81/1) Avail: NTIS HC A03/MF A01 CSCL 14/2

This report describes calibration procedures and results for two types of instruments commonly used by the Coastal Studies Unit: a bidirectional ducted flow meter and a strain gage pressure transducer. These instruments each constitute a system comprising a sensor head which issues a pulsating signal and a control box which electronically integrates the pulses into an analogue voltage which is then recorded. It is the response characteristics of these systems as a whole that are examined herein. GRA

N82-15419# Brookhaven National Lab., Upton, N. Y. National Synchrotron Light Source.
ULTRA-HIGH-VACUUM DOUBLE-AXIS GONIOMETER FOR USE WITH AN ELECTRON SPECTROMETER
Mark Shleifer and Gwyn P. Williams 1981 8 p Presented at the 2d Natl. Conf. on Synchrotron Radiation Instr., Ithaca, N.Y., 15-17 Jul. 1981
(Contract DE-AC02-76CH-00016)
(DE81-028470; BNL-29850; CONF-810750-2) Avail: NTIS HC A02/MF A01

A double-axis goniometer designed for moving and indexing an electron spectrometer for angle-resolved photoemission studies is described. A feature of the design is that the two rotations operate independently and either can be carried out with the analyzer at any position. The goniometer is designed to be installed in a 14 in spool piece which makes it possible to add it to an existing 14 in uhv system. DOE

N82-15420# Oak Ridge National Lab., Tenn.
SYSTEMS BACKGROUND IN X-RAY MICROANALYSIS
James Bentley 1981 11 p refs Presented at the 3rd Analytical Electron Microscopy Workshop, Vail, Colo., 13 Jul. 1981
(Contract W-7405-eng-26)
(DE81-027285; CONF-810740-2) Avail: NTIS HC A02/MF A01

X-ray systems background in analytical electron microscopes are discussed. Methods of reducing or eliminating these sources are presented. DOE

N82-15421# Los Alamos Scientific Lab., N. Mex.
INSTRUMENT FOR LIQUIDS, AMORPHOUS AND POWER DIFFRACTION
Alan K. Soper 1981 13 p refs Presented at a Symp. on Neutron Scattering, Argonne, Ill., 12-14 Aug. 1981
(Contract W-7405-eng-36)
(DE81-030135; LA-UR-81-2531; CONF-810840-4) Avail: NTIS HC A02/MF A01

A time-of-flight diffractometer, which has been built at the Los Alamos pulsed neutron source, is described. The concept of resolution focusing is discussed and the application of the instrument to liquid structure over a broad range of momentum transfers is presented. DOE

N82-15422# Stanford Linear Accelerator Center, Calif.
DESIGN AND PERFORMANCE OF THE NEW CATHODE READOUT PROPORTIONAL CHAMBERS IN LASS
G. Aiken, D. Aston, W. Dunwoodie, W. B. Johnson, A. Kilert, D. W. G. S. Leith, D. McShurley, B. Ratcliff, R. Richter, S. Suzuki et al Oct. 1980 28 p refs Presented at the IEEE Nucl. Sci. Symp., Orlando, Fla., 5 Nov. 1980 Prepared in cooperation with Carleton Univ. and Nagoya Univ.
(Contract DE-AC03-76SF-00515)
(DE81-028087; SLAC-PUB-2642; CONF-801103-63) Avail: NTIS HC A03/MF A01

The design and construction of a new proportional chamber system for the LASS spectrometer are discussed. This system consists of planar and cylindrical chambers employing anode wire and cathode strip readout techniques. The good timing characteristics of anode readout combine with the excellent spatial resolution of cathode readout to provide powerful and compact detectors. Preliminary resolution data are presented along with operating characteristics of the various devices. DOE

N82-15423# Brookhaven National Lab., Upton, N. Y.
MULTIPARTICLE MAGNETIC SPECTROMETER WITH dE/dx AND TRD PARTICLE IDENTIFICATION
S. J. Lindenbaum (City College of New York) and R. S. Longacre 1981 11 p refs Presented at the Phys. Opportunities at ISABELLE Summer Workshop, Upton, N.Y., 20 Jul. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030567; BNL-29980; CONF-81075) Avail: NTIS HC A02/MF A01

Fast high resolution magnetic multiparticle spectrometers with excellent particle tracking, momentum measurement, and identification capability are described. These techniques are applied here primarily for design of spectrometers for low p sub t and other physics (at moderate and even high p sub t) in the ISABELLE small angle hall. DOE

N82-15424# Brookhaven National Lab., Upton, N. Y. Accelerator Dept.
PRODUCTION AND USE OF HIGH-GRADE SILICON-DIODE TEMPERATURE SENSORS
J. Sondericker 1981 8 p Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030547; BNL-30005; CONF-810835-25) Avail: NTIS HC A02/MF A01

The development and application of silicon diode temperature sensors for cryogenic applications in ISABELLE is described. Selection of a stable silicon diode showing minimal junction voltage drop is discussed. A calibration cryostat consisting of an evacuated pot suspended in a liquid helium filled Dewar was constructed, and used to calibrate the sensors. The performance of 600 commercial and in house sensors used in ISA projects shows a failure rate of less than 1 per cent. Problems associated with cryogenic thermometry falling short of catastrophic failure are discussed. DOE

N82-15425# California Univ., Livermore. Lawrence Livermore Lab.
HYPER-FILTER-FLUORESCER SPECTROMETER FOR FUSION X-RAY DIAGNOSTICS
C. L. Wang 16 Jun. 1981 6 p refs Presented at the 10th European Conf. on Controlled Fusion and Plasma Phys., 14-19 Sep. 1981
(Contract W-7405-eng-48)
(DE81-029867; UCRL-86163; CONF-810906-7) Avail: NTIS HC A02/MF A01

The filter fluorescer spectrometer is a powerful tool for measuring X-ray spectrum from high fluence X-ray sources. However, this technique is limited to energies less than 120 keV, because there are no practical absorption edges available above this energy. A new method of utilizing the filter fluorescer system for X-ray spectral measurement above 120 keV is presented. The new apparatus is called hyper-filter-fluorescer spectrometer. DOE

N82-15426# California Univ., Livermore. Lawrence Livermore Lab.
DESIGN OF NEUTRON STREAK CAMERA FOR FUSION DIAGNOSTICS
C. L. Wang, R. Kaligjian, and M. S. Singh 16 Jun. 1981 5 p refs Presented at the 10th European Conf. on Controlled Fusion and Plasma Phys., Moscow, 14-19 Sep. 1981
(Contract W-7405-eng-48)
(DE81-029866; UCRL-86162; CONF-810906-6) Avail: NTIS

HC A02/MF A01

The design of a neutron detector of 20 ps resolving time is described. It is used to study the history of fusion burn. DOE

N82-15427# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
HIGH-SPEED PHOTOGRAPHIC OBSERVATION OF PLASMA-LIMITER INTERACTIONS IN ISX-B
R. E. Clausing, L. C. Emerson, and L. Heatherly 1981 5 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9-12 Aug. 1981
(Contract W-7405-eng-26)
(DE81-029669; CONF-810831-52) Avail: NTIS HC A02/MF A01

High speed motion pictures confirm that arcing occurs in the ISX-B limiter during periods of plasma instability. Various types of plasma/limiter interactions are described and illustrated. Arcing and other visible phenomena are correlated to plasma parameters. DOE

N82-15428# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
LABORATORY AND FIELD PORTABLE SYSTEM FOR CALIBRATING AIRBORNE MULTISPECTRAL SCANNERS
W. W. Kuhlow 1981 5 p Presented at the SPIE Intern. Symp., San Diego, Calif., 24 Aug. 1981
(Contract DE-AC08-76NV-01183)
(DE81-029740; EGG-1183-1777; CONF-810810-23) Avail: NTIS HC A02/MF A01

A calibration and alignment system for airborne multispectral scanners which permit the procedures to be carried out in about two to three hours is described. This equipment can be quickly disassembled, transported with the scanner in all but the smallest single engine aircraft, and reassembled in a few hours. The subsystems of this equipment are commonly available from manufacturers of optical and electronic equipment. The other components are easily purchased, or fabricated. The scanner discussed is the Model DS-1260 digital line scanner. It is a dual-sensor system which is operated in one of two combinations of sensors: one spectrometer head (which provides simultaneous coverage in ten visible channels) and one thermal infrared detector, or simply two thermal infrared detectors. DOE

N82-15429# Technische Hochschule, Aachen (West Germany). Inst. fuer Strahlantriebe und Turboarbeitsmaschinen.
OPTIMIZATION OF MEASUREMENT SIGNAL PROCESSING AND DATA ACQUISITION FOR THE LASER TWIN FOCUS VELOCIMETER [OPTIMIERUNG DER MESSIGNALAUFBEREITUNG UND DER DATENSAMMLUNG FUER DAS LASER-ZWEI-FOKUS-GESCHWINDIGKEITSMESSVERFAHREN]
U. Schricker Jul. 1979 57 p refs In GERMAN
(Mitt-79-04) Avail: NTIS HC A04/MF A01

A laser twin-focus velocimeter was developed and automated for turbomachine applications. The required measuring time is substantially reduced. Optimization of signal processing speeds up measuring by a factor of 10. A special buffer storage system improves data recording. The adjustment and waiting periods are considerably shortened by automation. In rotating systems the measuring time is reduced by a factor of 20 using the velocimeter continuously instead of stroboscopically. Author (ESA)

N82-15430# Valvo G.m.b.H., Hamburg (West Germany). Roehren- und Halbleiterwerke.
PHOTOLITHOGRAPHIC PROCESSES FOR SMALL STRUCTURES: INTRODUCTION AND TRIAL OF ELECTRON BEAM LITHOGRAPHY Final Report, Nov. 1979
Wolfgang Doemer, Andreas Hupe, Juergen Kasker, Ralf Kastmann, and Gerd Leschke Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 140 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-199; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 29,40

Electron beam lithography was introduced for mask making in very large scale integration circuits. The vector-scan electron beam pattern generator Philips EBPG3 is described. The appropriate process line and the test patterns were followed by an extensive representation of mask processes for several electron-sensitive resists. Two programs that convert pattern data from the computer aided design format into the EBPG format as well as exposure experiments on silicon slices are described. Advantages as compared to light optics are more flexibility in producing circuits, shorter mask making time, and lower mask defect density. Author (ESA)

N82-15431# Centre National de la Recherche Scientifique, Marseilles (France). Lab. d'Astronomie Spatiale.
THE FAINT OBJECT CAMERA (FOC): EUROPEAN INSTRUMENT ASSOCIATED WITH THE SPACE TELESCOPE [LA FAINT OBJECT CAMERA (FOC.) INSTRUMENT EUROPEEN ASSOCIE AU SPACE TELESCOPE]
Michel Saisse 1981 21 p In FRENCH Presented at Reunion Franco-Sovietique, Moscow 16-22 Mar. 1981
Avail: NTIS HC A02/MF A01

The FOC instrument characteristics which are designed to be installed in orbit at the back of the space telescope after rendezvous with a space shuttle are discussed. The FOC consists of two cameras that operate respectively with apertures of F/96 and F/48; each camera has its own photodetector. The detectors are two dimensional and are linked with an optical system whose resolution is limited by diffraction. The five observational modes of the FOC are described. Besides the F/96 and F/48 optical modes, a high resolution (F/288, supplementing the F/96 mode with a Cassegrain system) mode, a coronagraphic mode, and a spectrographic mode are available. Author (ESA)

N82-15432# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
FIELD TESTS OF A THORN EMI ACOUSTIC CAMERA USED IN AN UNDERWATER ACOUSTIC TELEVISION SYSTEM [AKUSTISK BILDSENSOR FOER UNDERVATTENSBRUK. LAEGESRAPPORT 1981-04-30. FAELTFOERSOEK MED AKUSTISK KAMERA, TYP THORN-EMI]
Ludvig Mossberg Aug. 1981 106 p refs In SWEDISH; ENGLISH summary
(FOA-C-30225-E1) Avail: NTIS HC A06/MF A01

A very large number of pictures were registered on videotape. The subjective impression of an acoustic image was judged to be as important as quantitative analysis of such features as: target detectability, range of the system, resolution, detectable target contrasts as seen by the camera, etc. Although laboratory conditions did not exist at the test site a number of interesting conclusions were derived from the picture tapes and are discussed. The Thorn-EMI Technical Specification for the system is fulfilled. T.M.

N82-15433# Radian Corp., Austin, Tex.
RESPONSE FACTORS OF VOC ANALYZERS AT A METER READING OF 10,000 ppmV FOR SELECTED ORGANIC COMPOUNDS Final Report, Dec. 1980 - Feb. 1981
D. A. DuBose Mar. 1981 30 p refs
(Contract EPA-68-02-3171)
(PB81-234817; EPA-600/2-81-051) Avail: NTIS HC A03/MF A01 CSCL 13B

A reinterpretation of data generated in a laboratory study of the sensitivity of two types of portable hydrocarbon detectors to a variety of organic chemicals is summarized. Detector sensitivity is quantified by a response factor for each chemical where the response factor equals the actual concentration of the chemical divided by the observed concentration from the detector. Response factors estimated for a 10,000 ppmv detector reading are presented. The instruments were calibrated to 7993 ppmv methane gas. GRA

N82-15434# Dudley Observatory, Albany, N.Y.
THE TAPERED ELEMENT OSCILLATING MICROBALANCE: A MONITOR FOR SHORT-TERM MEASUREMENT OF FINE AEROSOL MASS CONCENTRATION Final Report, Oct. 1977 - Dec. 1980
Harvey Patashnick and Georg Rupprecht Aug. 1981 41 p refs
(Grant EPA-R-805222)
(PB81-245219; EPA-600/2-81-146) Avail: NTIS

HC A03/MF A01 CSCL 14B

An instrument for short-term monitoring of ambient aerosol fine mass concentration was developed based on a device called a tapered element oscillating microbalance (TEOM). The detector consists of a tapered hollow tube fixed at the wide end and holding an exchangeable filter cartridge at the narrow end. Air is drawn through the filter cartridge down the hollow tube. Particulates deposit on the filter cartridge. The tapered tube is maintained in continuous oscillation in a clamped-free mode whose frequency is accurately monitored. As particulates load on the filter cartridge, the frequency changes in relation to the mass added. A microprocessor-based electronics system collects and processes the data. Output is printed in a format consisting of time and aerosol concentration level in microgram/cu m. GRA

N82-15435# North Carolina State Univ. at Raleigh.
PHOTOACOUSTIC DETECTION OF PARTICULATE CARBON
Charles A. Bennett and Richard R. Patty Aug. 1981 52 p refs
(Contract EPA-R-805332)
(PB81-245425; EPA-600/7-81-129) Avail: NTIS HC A04/MF A01 CSCL 14B

A photoacoustic technique for the mass monitoring of carbonaceous aerosols deposited on filter substrates was developed. The technique involves the use of a specially designed photoacoustic cell. Photoacoustic response is calibrated as a function of elemental carbon loading using laboratory-generated elemental carbon standards. The nature of the photoacoustic response is examined at several chopping frequencies using these calibration standards, and the physical principles necessary for an adequate interpretation of the experimental results is presented in detail. Practical considerations concerning ambient carbon monitoring are outlined; in particular, the perturbation due to the presence of scattering particulates is examined and limited experimental quantification of this perturbation is reported. GRA

N82-15436# National Bureau of Standards, Washington, D.C.
DIMENSIONS, VOLUME 65, NUMBER 3
Apr. 1981 29 p refs
(PB81-235053; NBS-DIM-65-3) Avail: NTIS HC A03/MF A01 CSCL 14B

This monthly magazine features short summaries of major technical developments, highlights of work in progress, major speeches and statements by Bureau management, and a listing of NBS publications. Topics discussed are issue swinging to the Earth's tilt, testing for technical competence, physics at the measurement limits, new parameter proposed for fracture toughness, evaluation of solar collector cover plates, and improved modeling of cement and concrete, fire development in basement rooms, and generation and measurement of DC electric field with space charges. Author

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-15437# Siemens A.G., Munich (West Germany). Forschungslab.
OPTICAL PUMPED NEODYMIUM MINIATURE LASER TRANSMITTER Final Report, Oct. 1978
Siegfried Geckeler, Wolfgang Kruehler, Hans F. Mahlein, Rolf Plaettner, Gerhard Schiffner, Lutz Vite, and Gerhard Winzer Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 173 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-095; ISSN-0340-7608) Avail: NTIS HC A08/MF A01

The preparation and the properties of the most important stoichiometric Nd laser materials and miniature lasers made from them are considered as well as calculations for pumping these lasers with LEDs and for coupling them to the modulator. Both optical communication systems and the rival merits of neodym solid-state lasers and semiconductor lasers are considered. The following results are of particular interest: miniature lasers for 1.06 micrometer and in some cases for 1.32 micrometer fabricated from NdP5O14, NdAl3(BO3)4 and LiNd(PO3)4 with mirrors directly applied to their endfaces allowing CW operation at room temperature. The LNP laser with 1 mW threshold, 6% differential efficiency and a threshold pump power density of 4 kW/cu cm offers the best performance. The electrooptical coefficient expected for NdAl3(BO3)4 on the basis of lattice symmetry was found to be < 0.6 x 10 to the -12 power m/V. The Nd laser transmitter can be expected to cost considerably more than the future INGAP semiconductor laser transmitter. Author

N82-15438# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 1: Physics.
THE SIGNAL TO NOISE RATIO OF A HETERODYNE LASER DETECTION SYSTEM
K. W. Getreuner Mar. 1980 90 p refs In DUTCH; ENGLISH summary
(Contract A77/KL/052)
(PHL-1980-11; TDCK-73843) Avail: NTIS HC A05/MF A01

The analysis of expected signal and noise powers as features of a continuous CO2 laser heterodyne detection system is described. Quantative calculations were performed for systems which are presently under construction. Only additive noise was considered. The impact on the system of detector characteristics is highlighted. In order to determine the equivalent electronic networks for two available detectors, impedance measurements were carried out. An analysis was made about the expected accuracy of range measurements based on amplitude modulation of the laser beam. Both sinus wave as well as binary pseudo noise code modulation techniques are considered. Expressions were derived for the minimum measuring time as a function of, e.g., the standard deviation of the range accuracy. A detailed analysis is given of the signal to noise aspects of the quadratic demodulation technique. T.M.

N82-15439# Siemens A.G., Munich (West Germany). Forschungslab.
LASER DIODE Final Report, May 1980
Klaus Mettler, Karl-Heinz Zschauer, Hans-Dietrich Wolf, and Wolfgang Endler Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 78 p refs In GERMAN; ENGLISH summary
(BMFT-FB-T-81-151; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16,40

Stable, profitable, narrow proton and oxide stripe lasers were fabricated from multiple layers of (Ga,Al)As by the dimensioning of the structure based on a two dimensional mathematical model. They operated satisfactorily in the experimental system at data rates of 560 Mbit/s. Accelerated degradation tests gave extrapolated life times for room temperature operation in excess of 100,000 hours. Furthermore, three index guided laser structures (BH, CSP and RIG) were tested (In,Ga)(As,P)/InP multilayers were fabricated and tested by using broad mesa lasers. T.M.

N82-15440# California Univ., Livermore. Lawrence Livermore Lab.
COMPACT 36 kJ ELECTRON BEAM SYSTEM FOR LASER PUMPING
L. G. Schlitt 31 May 1981 16 p Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N.Mex., 1-3 Jun. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-024375; UCRL-85665; CONF-810659) Avail: NTIS A02/MF A01

An electron beam machine consisting of six modules is being constructed for the B amplifier of a KrF laser system. Each module consists of a diode, a 5 omega positive charged water dielectric Blumlein pulse forming line, and a five stage Marx generator. Separate 25 cm by 41 cm electron beams are formed in magnetically isolated diodes which when arranged in groups of three produce two nearly continuous 25 cm by 125 cm beams that enter the laser cell from opposite sides. The pulse forming lines operate at 450 keV and Produce 150 ns long pulses. The lines employ electrically triggered annular SF6 output switches. The two concentric transmission lines of each pulse forming line are charged in 1 microsec through symmetric circuits to reduce diode prepulse voltage. The six modules together with the laser cell occupy less than 15 sq m of floor space. DOE

N82-15441# Los Alamos Scientific Lab., N. Mex.
STATUS OF THE FREE-ELECTRON LASER EXPERIMENT AT LOS ALAMOS
Roger W. Warren (Westinghouse Research Lab.), Charles A. Brau, Brian E. Newman, William E. Stein, John G. Winston, and Lloyd M. Young 1981 19 p refs Presented at the Workshop on Free Elect. Lasers, Sun Valley, Idaho 22-25 Jun. 1981 Sponsored in part by ARPA, AFOSR, and Navy Air Systems Command
(Contract W-7405-eng-36)
(DE81-030132; LA-UR-81-2568; CONF-8106145-2) Avail: NTIS HC A02/MF A01

Main design parameters are presented for the accelerator, the laser, and the wiggler. Features of the design, construction, alignment, and diagnostic parts of the experiment are discussed. Performance characteristics of the components are described. DOE

N82-15442# California Univ., Livermore. Lawrence Livermore Lab.
ABERRATIONS AND FOCUSABILITY IN LARGE SOLID-STATE-LASER SYSTEMS
W. W. Simmons 1981 25 p refs Presented at the SPIE Intern. Symp., San Diego, Calif., 24-28 Aug. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-029914; UCRL-85645; CONF-810810-26) Avail: NTIS HC A02/MF A01

Solid state lasers for fusion experiments must reliably deliver maximum power to small (approximately .5 mm) targets from stand-off focal distances of 1 m or more. This requirement places stringent limits upon the optical quality of the several major components - amplifiers, Faraday isolators, spatial filters - in each amplifier train. Residual static aberrations in optical components are transferred to the beam as it traverses the optical amplifier chain. Although individual components are typically less than lambda/20 for components less than 10 cm clear aperture; and less than lambda/10 for components less than 20 cm clear aperture; the large number of such components in optical series results in a wavefront error that may exceed one wave for modern solid state lasers. Specific examples of the performance of large aperture components are presented. Design requirements upon the larger aperture Nova laser components, up to 74 cm in clear aperture are also discussed. T.M.

N82-15443# Los Alamos Scientific Lab., N. Mex.
USE OF ZERNIKE POLYNOMIALS AND INTERFEROMETRY IN THE OPTICAL DESIGN AND ASSEMBLY OF LARGE CARBON-DIOXIDE LASER SYSTEMS
V. K. Viswanathan 1981 10 p refs Presented at the Spie 25th Anniv. Celebration, San Diego, Calif., 24-28 Aug. 1981
(Contract W-7405-eng-36)
(DE81-030138; LA-UR-81-2524; CONF-81810-24) Avail: NTIS HC A02/MF A01

The need for non-raytracing schemes in the optical design and analysis of large carbon-dioxide lasers like the Gigawatt, Gemini, and Helios lasers currently operational at Los Alamos, and the Antares laser fusion system under construction is described. The scheme currently used at Los Alamos involves characterizing the various optical components with a Zernike polynomial set obtained by the digitization of experimentally produced interferograms of the components. A Fast Fourier Transform code then propagates the complex amplitude and phase of the beam through the whole system and computes the optical parameters of interest. The analysis scheme is illustrated through examples of the Gigawatt, Gemini, and Helios systems. A possible way of using the Zernike polynomials in optical design problems of this type is discussed. Comparisons between the computed values and experimentally obtained results are made and it is concluded that this appears to be a valid approach. DOE

N82-15444# Los Alamos Scientific Lab., N. Mex.
OPTICAL TOOLING FOR ANTARES
Walter Bauke, Albert C. Saxman, and Noel OKay 1981 9 p Presented at the Conf. on Optics '81, Los Alamos, N. Mex., 6 Apr. 1981
(Contract W-7405-eng-36)
(DE81-030256; LA-UR-81-2469; CONF-810429-39) Avail: NTIS HC A02/MF A01

The Antares laser system is a large (40 kJ) CO2 pulse laser system. High energy pulses are transmitted between buildings over path lengths exceeding 90 m. The optical elements are contained within large steel assemblies (power amplifiers, turning chambers, and target chamber) which must be positioned with tolerances of 0.75 mm. The subassemblies of optical components must be prepositioned to a precision of 0.25 mm. This precision can easily be obtained by first order surveying techniques and instrumentation. The use of a combination of traditional surveying techniques and modern optical tooling methods throughout the integration of building reference planes and the erection of major steel assemblies are described. The design and measured assembly tolerances are compared. DOE

N82-15445# Los Alamos Scientific Lab., N. Mex.
PHASE ABERRATIONS AND BEAM CLEANUP TECHNIQUES IN CARBON-DIOXIDE LASER FUSION SYSTEMS
V. K. Viswanathan 1981 6 p refs Presented at the SPIE 25th Anniv. Celebration, San Diego, Calif., 24-28 Aug. 1981
(Contract W-7405-eng-36)
(DE81-030139; LA-UR-2523; CONF-810810-25) Avail: NTIS HC A02/MF A01

The various carbon dioxide laser fusion systems at Los Alamos are described from the point of view of an optical designer. The types of phase aberrations present in these systems, as well as the beam cleanup techniques that can be used to improve the beam optical quality, are discussed. T.M.

N82-15446# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
NOBLE GAS HALOGEN LASER INDUCED FLUORESCENCE OF BENZENE: SOME OF ITS DERIVATIVES, DIFLUOROMETHYL RADICALS; AND CARBON MONOXIDE Thesis - Georg-August-Univ. [MIT EINEM EDELGAS-HALOGEN-LASER INDUZIERTE FLUORESZENZ VON BENZOL, EINIGEN SEINER FLUORDERIVATE, DEM DIFLUORMETHYLENRADIKAL UND KOHLENSTOFFMONOXID]
Walter Langel Dec. 1980 124 p refs In GERMAN
(MPIS-22/1980; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21

The dynamics of molecules excited by laser absorption into well defined vibrational states were investigated. An apparatus was built in order to study laser induced fluorescence. A noble gas halogen excimer laser (pulse energy 10 mJ for KrF) was also constructed. Fluorescence of gaseous or liquid substances was examined by a high resolution monochromator, a transient recorder and a computer. Through absorption of the KrF line (248.4 nm) of the excimer laser by benzene and its fluor derivatives, vibrationally excited levels in the first electronically excited singulet state were populated and the concomitant fluorescence was observed and resolved in spectrum and time. Author (ESA)

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-15447# Technische Hochschule, Darmstadt (West Germany). Fachgebeit Mechanische Technologie und Werkzeugmaschinen.
TECHNICAL AND SCIENTIFIC RESEARCH ACCOMPANYING THE PROJECTS ON 'NEEDLE MILLING', INCLUDING THE DETERMINATION OF SPECIFIC PROCESS PARAMETERS Final Report
Hans-Peter Wolf Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 72 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-HA-81-005; ISSN-0171-7618) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West

Germany DM 15,10

The new manufacturing process 'needle milling' was studied The first application is the discharge of surfaces on rolled products, such as sheet metal, pipes, sheet bars, and so on. This machining is to prepare final rolling operations. The methods used today do not meet the demands of humane working conditions (noise, dust, refinish by hand, pickling, pollution). The application of needle milling seems to be an effective alternative. On testing the applications in cooperation with industrial enterprises, the fundamentals of needle milling were defined and further possibilities of application were found. Author

N82-15448# Technical Research Centre of Finland, Espoo. Metallilab.

ON THE EFFECTS OF THE POST-FABRICATION TREATMENT METHODS FOR WELDED STAINLESS STEELS

Juho Hakala and Tuula Purra Jan. 1981 40 p refs In FINNISH; ENGLISH summary Original contains color illustrations

(VTT-83; ISBN-951-38-1178-6; ISSN-0355-6395) Avail: NTIS HC A03/MF A01

Different chemical and mechanical cleaning techniques were applied to manual and MIG welded joints of stainless steels. The materials used were AISI 304, 316 and 321. The efficiency of the different cleaning techniques and the appearance of the surface were determined. The corrosivity of the methods in microscale was characterized. The corrosion behavior of the treated welds were tested by measuring the corrosion potential and the potential where an increase in the corrosion current can be seen on the anodic polarization curve. T.M.

N82-15449# California Univ., Livermore. Lawrence Livermore Lab.

EVALUATION OF SHIELDED METAL ARC AND FLUX CORED METAL ARC WELDING CONSUMABLES FOR FABRICATION OF STAINLESS STEEL MAGNET CASES FOR 4K SERVICE

E. N. C. Dalder, O. W. Seth (Chicago Bridge and Iron Co.), and T. A. Whipple (NBS, Boulder, Colo.) 30 Jul. 1981 15 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981

(Contract W-7405-eng-48)

(DE81-028851; UCRL-85564; CONF-810835-5) Avail: NTIS HC A02/MF A01

Of three highly restrained shielded metal arc (SMA) welds made in the flat position with large diameter Type E316L-15 welding electrodes supplied by different vendors, two welds showed adequate combinations of 4K tensile and K sub IC properties to be considered for use in manufacture of mirror fusion test facility (MFTF-B) superconducting magnet-cases. The poor performance of the third SMA weld is explainable, in part, by a combination of higher ferrite level and N2 concentration than in the other two SMA welds. Despite presence of undissolved metallic flux-constituents and porosity in a Type 316L flux cored metal arc weld, its 4K K sub Ic would be adequate for use on (MFTF-B). However, its 4K sigma y was slightly below MFTF-B requirements. DOE

N82-15450# Maschinenfabrik K. Walter, Munich (West Germany).

DEVELOPMENT OF A MEASURING, CONTROL, AND REGULATION UNIT FOR A CYLINDER TURNING MACHINE Final Report

Ernst Ettl Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 20 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-106; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4,20

A control unit for high-precision lathes for turning rotogravure cylinders is described. A measuring system for determining cylinder diameter, a bearing control system connecting cross feed and measuring system, controlled magnetic bearings, and a control system for longitudinal traverse and cross feed were developed. Free programmable control is employed. J.D.H.

N82-15451# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.

SAFETY, RELIABILITY, COST REDUCTION: PERMANENT OBJECTIVES OF THE MODERN AEROSPACE INDUSTRY AND HOW STUDIES IN TRIBOLOGY CONTRIBUTE TO THE FORMULATION OF FUTURE SOLUTIONS [SECURITE, FIABILITE, REDUCTION DES COUTS: OBJECTIFS CONSTANTS DE L'INDUSTRIE AEROSPATIALES MODERNE. COMMENT LES ETUDES DE TRIBOLOGIE PARTICIPENT A L'ELABORATION DES SOLUTIONS DE DEMAIN]

M. Armbruster 4 Feb. 1981 22 p In FRENCH Presented at Journees ISF Conf. on the Lutte contre le Frottement et l'Usure, ses Objectifs pour Demain, 6 Nov. 1980

(SNIAS-812-551-111; C.42-031) Avail: NTIS HC A02/MF A01

Advances in aircraft R and D are discussed. Tribology is of special importance in the following areas: aircraft brakes, contact corrosion, rotor hubs, the functioning of transmissions after lubricant breakdown, and diagnostic methods. Applications for different fields of aeronautics are: problems with missiles and launch vehicles, problems with satellites, problems with aircraft, and problems with helicopters. Friction and wear are of constant concern and special attention is paid to self lubricating bearings and in-service wear detection (ferrography). Author (ESA)

N82-15452# Ricardo & Co., Engineers (1927) Ltd., Shoreham-by-Sea (England).

THE UTILISATION OF ALCOHOL IN LIGHT DUTY DIESEL ENGINES Final Report

28 May 1981 41 p refs Sponsored by EPA

(PB81-244469; EPA-460/3-81-010; DP-81/935) Avail: NTIS HC A03/MF A01 CSCL 21G

Various approaches employed to facilitate the utilization of alcohols, methanol and ethanol, in light duty diesel engines were reviewed. The choice of which system to employ is most heavily influenced by the proportion of alcohol substitution which is required and the resulting engine first cost penalty which is deemed to be acceptable. Alcohol utilization by more or less conventional spark ignited engines appears to be far less problematical than conversion of diesel engines. GRA

N82-15453# Department of Energy, Bartlesville, Okla. Energy Technology Center.

AUTOMOTIVE FUEL ECONOMY: POTENTIAL IMPROVEMENT THROUGH SELECTED ENGINE AND DIFFERENTIAL GEAR LUBRICANTS Final Report

Ted M. Naman Jul. 1981 50 p refs

(Contract DO-SC-RA-78-19)

(PB81-240467; DOT-TSC-NHTSA-81-8; DOT-HS-805895) Avail: NTIS HC A03/MF A01 CSCL 21G

The effects of four engine lubricants and three differential gear lubricants on the fuel economy of two 1978 automobiles operated at 20F, 70F, and 100F ambient temperatures are evaluated. The engine lubricants were evaluated using the 1978 Federal Test procedure and steady state tests from a cold start. The gear lubricants were evaluated in steady state operation from a cold start. GRA

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-15454# Los Alamos Scientific Lab., N. Mex.

FAILURE MODE ANALYSIS USING STATE VARIABLES DERIVED FROM FAULT TREES WITH APPLICATION

Robert J. Bartholomew 1981 11 p refs Presented at the ANS/ENS Topical Meeting on Probabilistic Risk Assessment, Port Chester, N.Y., 20-24 Sep. 1981

(Contract W-7405-eng-36)

(DE81-030239; LA-UR-81-2595; CONF-810905-3) Avail: NTIS HC A02/MF A01

Fault Tree Analysis (FTA) is used extensively to assess both the qualitative and quantitative reliability of engineered nuclear power systems employing many subsystems and components. FTA is very useful, but the method is limited by its inability to account for failure mode rate of change interdependencies (coupling) of statistically independent failure modes. The state variable approach (using FTA derived failure modes as states) overcomes these difficulties and is applied to the determination of the lifetime distribution function for a heat pipe thermoelectric nuclear power subsystem. Analyses are made using both Monte Carlo and deterministic methods and compared with a Markov model of the same subsystem. DOE

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N82-15455*# National Aeronautics and Space Administration, Washington, D. C.

CHARACTERISTICS FOR CALCULATING PARTS MADE OF REINFORCED PLASTICS

Yu. M. Tarnopolskiy and A. V. Roze Aug. 1981 392 p refs Transl. into ENGLISH of the book "Osobennosti Rascheta Detaley iz Armirovanykh Plastikov" Riga, Zinatne, 1969 p 1-272 Translation was announced as N75-77572 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-75915) HC A17/MF A01 CSCL 20K

The construction, properties and regulation of the anisotropy of reinforced plastics is discussed. Weak displacement resistance and expansion compression perpendicular to the direction of reinforcement are emphasized. Traditional problems of the resistance of materials and applied theory of elasticity (rods, plates, thick walled rings) are examined. Experimental material obtained during the testing of referenced fiberglass plastic material with a fibrous, laminated, and spatially joined structure is included. S.L.

N82-15456*# Computer Sciences Corp., Hampton, Va. System Sciences Div.

NASTRAN USER'S GUIDE (LEVEL 17.5)

E. I. Field, D. N. Herting, and M. J. Morgan Washington NASA Jun. 1979 552 p ref Prepared for Universal Analytics, Inc.
(Contract NAS1-12969)
(NASA-CR-3146) Avail: NTIS HC A24/MF A01 CSCL 20K

The user's guide is a handbook for engineers and analysts who use the NASTRAN finite element computer program supplements the NASTRAN Theoretical Manual (NASA SP-221), the NASTRAN User's Manual (NASA SP-222), the NASTRAN Programmer's Manual (NASA SP-223), and the NASTRAN Demonstration Program Manual (NASA SP-224). It provides modeling hints, attributes of the program, and references to the four manuals listed. A.R.H.

N82-15457# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).

INFLUENCE OF THROAT AND PLATE THICKNESS ON THE FATIGUE STRENGTH OF FILLET WELDS

E. Haibach, R. Olivier, and W. Ritter 1981 69 p refs In GERMAN; ENGLISH summary
(LBF-FB-131) Avail: NTIS HC A04/MF A01

An investigation was carried out aiming at the influence of throat and plate thickness on fatigue strength of fillet welds with fatigue critical toe. The statistical test program refers to angular fillet welds made from steel MRSt 37-2 and includes twelve fabrication variants. The fillets were welded in the horizontal or flat position under a mixed gas atmosphere by means of the M.A.G. welding process: in the case of 10 mm plate thickness as single pass with 4 mm throat thickness and with case of 50 mm plate thickness as flat faced fillets by multiple pass with 20 mm or 35 mm throat thickness. At all considered variants, the fatigue strength decreased with increasing plate and throat thickness. Hot spot strain measurements made at the toe of the welds indicated that this was largely due to a geometric size effect which for fillet welds with a throat thickness of 4 mm, 20 mm and 35 mm implied a reduction of tolerable nominal stress with a ratio of 1 : 0.75 : 0.67. T.M.

N82-15458# Technische Universitaet, Hanover (West Germany). Inst. fuer Konstruktion und Statik der Schiffe.

CATALOG OF EFFECTIVE WIDTH AND ULTIMATE LOADS OF LONGITUDINALLY STIFFENED PLATES [KATALOG MITTRAGENDER BREITEN UND TRAGLASTENLAENGSGEDRUECKTER, VERSTEIFTER PLATTENFELDER (BERECHNUNGSKONZEPT)]

K. Hutschenreiter Bonn Bundesministerium der Verteidigung 1981 109 p refs In GERMAN; ENGLISH summary
(BMVG-FBWT-81-9) HC A06/MF A01

Diagrams were used to determine the effective width and ultimate loads for eccentrically stiffened plates. The influence of plates and stiffeners were separated for numerical calculations. The effective widths were plotted dependent upon residual stresses, predeformations and lateral loads for the axially loaded plates with the aspect ratios 1/b = 2, 3 and 4. Simplified formulas (Perry-Robertson) are presented for the effective width and collapse of longitudinally stiffened plates. The effects of strain and bend of eccentric stiffeners, predeformations and plate buckling were considered. The reduced section modulus and ultimate moment of a ship's hull was calculated. For gamma/gamma * < or less than 1, the permissible loads of the linear theory are greater than the ultimate loads of the imperfect structure. As a result, it is unsafe to calulate with gamma/gamma * = 1. Gamma/gamma * should be 4 or 5. A.R.H.

N82-15459# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abteilung Betriebsnahe Ermuedungsfestigkeit.

EVALUATION OF THE CRACK INITIATION LIFE BEHAVIOR OF FATIGUE LOADED AUTOMOTIVE COMPONENTS MADE FROM HIGH STRENGTH ALUMINUM ALLOYS Ph.D. Thesis - Technischen Hochschule

Dieter Hanschmann Mar. 1981 189 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-733)
(DFVLR-FB-81-10) Avail: NTIS HC A09/MF A01; DFVLR, Cologne DM 51.50

Since the fatigue process occurs mainly at stress raisers, the local stresses and strains are explicitely determined. Based on the local stresses and strains a cumulative damage analysis was performed. Since the cumulation damage under variable amplitude loading is significantly non-linear, a new damage evaluation concept is proposed which especially accounts for the load sequence effects. The analytical prediction method was applied together with several automotive companies. T.M.

N82-15460# Northwestern Univ., Evanston, Ill.

FINITE-ELEMENT PROGRAM FOR CREEP ANALYSIS OF CONCRETE STRUCTURES

Zdenek P. Bazant, Edwin C. Rossow, and Geir Horrigmoe (Pavlo Multiconsult A.S.) 1981 8 p refs Presented at 6th Intern. Conf. on Struct. Mech. in Reactor Technol., Paris, 17 Aug. 1981 Prepared for Oak Ridge National Lab.
(Contract W-7405-eng-26)
(DE81-028071; CONF-810801-57) Avail: NTIS HC A02/MF A01

A new finite element program for the analysis of creep effects in concrete structures, is described. The program represents an extension of the general purpose finite element code NONSAP. The program uses a rate type creep law based on expanding the relaxation function in Dirichlet series. The creep law is linear, the aging is accounted for, and the temperature effects on creep rate as well as the rate of aging are considered. Material properties can be input either as empirical creep test data or as the double power law for creep. The program can automatically set up the creep parameter from partial empirical information. The program uses a step by step integration in time. DOE

N82-15461# Brown Univ., Providence, R. I. Div. of Engineering.

ESTIMATE OF THE CONTRIBUTION OF LOAD TRANSFER TO THE YIELD STRENGTH AND HARDNESS OF A DUAL-PHASE STEEL

J. Gurland Jun. 1981 14 p refs Presented at the Conf. on Effects of Interfaces on Deformation and Fracture, Louisville, Ky., 11 Oct. 1981
(Contract DE-AC02-80ER-10556)
(DE81-025545; COO-3084-83; CONF-811022-1) Avail: NTIS HC A02/MF A01

The ratio of the average stresses in ferrite and martensite at yield of a dual phase steel was calculated from a shear lag model of load transfer, based on a shape parameter of the martensite particles. A stress ratio of 2.2 is determined for a specific steel. This value is compared to the stress ratio obtained from hardness and microhardness determinations. The results qualitatively and tentatively support the strengthening role of load transfer in dual phase steels. DOE

N82-15462# Sandia Labs., Albuquerque, N. Mex.

PRESSURE-SHEAR LOADING OF MATERIALS

L. C. Chhabildas and J. W. Swegle 1981 4 p refs Presented at the 8th AIRAPT Conf. and the 19th EHPRG Conf., Uppsala, 17 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-028250; SAND-81-0378C; CONF-810827-7) Avail: NTIS HC A02/MF A01

A novel technique involving the use of Y-cut quartz crystals for simultaneous dynamic longitudinal and shear loading of materials is described. The coupled longitudinal and shear motion generated within the Y-cut crystal (upon impact) is transmitted into a sample bonded to its rear surface and is monitored using velocity interferometer techniques. Experimental results on pressure shear loading of aluminum and alumina-filled epoxy are given. DOE

N82-15463# Sandia Labs., Albuquerque, N. Mex.

THERMAL-FATIGUE PROPERTIES OF COATED MATERIALS FOR FUSION-DEVICE APPLICATIONS

A. W. Mullendore, J. B. Whitley, and D. M. Mattox 1981 10 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-028367; SAND-81-0230C; CONF-810831-21) Avail: NTIS HC A02/MF A01

The adherence of plasma sprayed coatings on substrates was evaluated in a pulsed electron beam, thermal fatigue environment. The materials are candidates for application as limiter and armor components of Tokamak fusion devices. Materials were tested both in the as-sprayed condition and after hot isostatic pressing (HIP) to increase coating density. Some showed good survivability in both the as-sprayed and HIP densified conditions. DOE

N82-15464# California Univ., Livermore. Lawrence Livermore Lab.

AXISYMMETRIC FINITE DEFORMATION MEMBRANE PROBLEMS

William W. Feng 12 Dec. 1980 4 p ref Presented at the Symp. on Fluid Mech. of Combust. Systems, Boulder, Colo., 22-24 Jun. 1981
(Contract W-7405-eng-48)
(DE81-030070; UCRL-85278; CONF-810621-6) Avail: NTIS HC A02/MF A01

The general formulations for solving a class of axisymmetric membrane problems are presented. The material nonlinearity, as well as the geometric nonlinearity, is considered. One method solves a set of differential equilibrium equations. The governing equations are reduced to three first order ordinary differential equations with explicit derivatives. The Ritz method, where a general potential energy functional valid for all axisymmetric deformed positions is presented. The geometric admissible functions that govern the deformed configuration are written in terms of a series with unknown coefficients. These unknown coefficients are determined by the minimum potential energy principle that of all geometric admissible deformed configurations, the equilibrium configuration minimizes the potential energy. DOE

N82-15465# URS/Blume (John A.) and Associates, San Francisco, Calif.

EXPERIMENTAL AND THEORETICAL STUDY OF A TALL BUILDING SUBJECTED TO WIND LOADING

R. S. Mills 1981 9 p refs Presented at the 4th Natl. Conf on Wind Eng. Res., Seattle, 26 Jul. 1981
(Contract DE-AC08-81NV-10145)
(DE81-029478; CONF-810742-2) Avail: NTIS HC A02/MF A01

Full-scale experimental observations of the wind-induced response of a building of moderate height show that dynamic considerations may be negligible for stress analysis of alongwind response. For analysis of a cosswind response and human perception, however, dynamic relatonships must be accurately modeled. The contribution of torsional response is also significant and may be produced by aerodynamic properties even when the building system appears to be structurally symmetric. Predictions of alongwind response of the building obtained from a developed analytical procedure show reasonable agreement with observed response. DOE

N82-15466# California Univ., Livermore. Lawrence Livermore Lab.

FREE-SURFACE VELOCITY MEASUREMENTS OF PLATES DRIVEN BY REACTING AND DETONATING RX-03-BB AND PBX-0404

L. M. Erickson, H. G. Palmer, N. L. Parker, and H. C. Vantine 13 Jul. 1981 6 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23-25 Jun. 1981
(Contract W-7405-eng-48)
(DE81-026776; UCRL-86372; CONF-810684-50) Avail: NTIS HC A02/MF A01

Copper plates 90 mm in diameter, of thickness 0.25 mm and 0.5 mm, were accelerated by an adjacent 17 mm thick cylinder of RX-03-BB or PBX-9404-03. The explosvie was initiated by impact of a thick flyer from the LLNL 102 mm gun, providing either a reactive or fully detonating wave, by appropriate choice of flyer velocities up to 1.30 mm/micros. The free surface velocity of the plates were measured with a Fabry-Perot velocimeter. Excellent experimental free-surface velocity histories were obtained. Calculations of this history employing beta-burn and nucleation and growth high explosives models are in good agreement with fully detonating experiments. For reacting RX-03-BB, adjustments in the parameter are needed. The experimental technique gives records whose agreement with calculation is sensitive of the model and is therfore a good way of testing new high explosive models. Also, this method allows one to infer information about the reaction zone length. DOE

N82-15467# Sandia Labs., Albuquerque, N. Mex.

DYNAMIC SHEAR-WAVE VELOCITY MEASUREMENTS USING INTERFEROMETRIC TECHNIQUES

L. C. Chhabildas 1981 14 p refs Presented at the Intern. Congr. on Instrumentation in Aerospace Simulation Facilities, Dayton, Ohio, 30 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DE81-026973; SAND-81-1135C; CONF-810939-1) Avail: NTIS HC A02/MF A01

An optical technique using velocity interferometers to determine the particle velocity changes associated with plane shear wave propagation is described. Two velocity interferometers are used to monitor different diffracted laser beams from a surface which undergoes both longitudinal and shear motion. Fringes produced in the interferometer are proportional to a linear combination of both the longitudinal and shear components of the free surface velocity. By obtaining two different recordings of the motion, the two components can be separated. Examples of shear wave interferometry applications are reported. DOE

N82-15468# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).

CALCULATION OF THE STRESS-STRAIN EVOLUTION OF A PRESSURE-LOADED TRAPEZOID ALUMINUM BEAM BEFORE AND AFTER REACHING ELASTIC LIMIT [DIE RECHNERISCHE BESTIMMUNG DES KRAFT-VERSCHIEBUNGS-VERLAUFES EINES DRUCKBELASTETEN TRAPEZFOERMIGEN ALU-TRAEGERS NACH ERREICHEN DER TRAGLAST]

Ekkehard Schneider 28 Oct. 1980 64 p refs In GERMAN
(Ek47-059-80) Avail: NTIS HC A04/MF A01

The stress/strain diagram for a statically compression loaded trapezoidal aluminum beam was calculated to predict load bearing capacity. The calculation was carried out by a dynamic SLOW RAMP method using the finite element program MARC. It is shown that a particular damping behavior has to be chosen, and that the applied deformation velocities have a clear influence on the value of the loading capacity (elastic limit). The calculated values and test data are compared and the suitability of the SLOW-RAMP method is shown. Author (ESA)

N82-15469# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).

EFFECT OF GAS PORES FROM SHOP-PRIMED PLATE MATERIAL ON THE FATIGUE STRENGTH OF LONGITUDINAL FILLET WELDS

R. Olivier and W. Ritter 1981 49 p refs In GERMAN; ENGLISH summary

(LBF-FB-160(1981)) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 40

Welding of shop-primed plate-materials usually leads to the formation of porosity defects by arising gas bubbles penetrating through the weld metal. These gas pores especially occur in fillet welds and may even reach the weld surface. The effect of gas pores of different size and density on the fatigue strength of fillet welds loaded in the longitudinal direction was examined. In contrast to fillet welds lying transversely to the loading direction, the portion of areas of gas pores or clustered pores to the whole load-carrying cross section remains largely irrelevant for fillet welds lying in the loading direction. The parameters in welding and finishing techniques are included under statistical aspects thus allowing generalized conclusions to be drawn on the fatigue behavior of longitudinal fillet welds with gas pores. The fatigue strength of longitudinal fillet welds with or without gas pores does not differ remarkably, although the pores prove to be the fatigue critical detail independently from their size. Author

N82-15470# Kernforschungszentrum, Karlsruhe (West Germany).

LOCALIZED LOADS APPLIED TO SHELLS OF REVOLUTION

L. Depmeier (Erlangen-Nuernberg Univ., West Germany), D. Lambrecht (Erlangen-Nuernberg Univ., West Germany), and W. Nevermann (Erlangen-Nuernberg Univ., West Germany) Sep. 1980 164 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(KfK-CAD-155) Avail: NTIS HC A08/MF A01

The most important papers concerning thin shell theory, attempts of solution, and experimental investigations are summarized and evaluated. The development and testing of computer programs which are convenient for the calculation of stresses from local loadings in cylindrical, spherical and conical shells is discussed. The results achieved with these programs are demonstrated. A parametric study was conducted for the loading of a cylinder by a longitudinal moment acting on a rectangular area. The results are shown in diagrams which allow a fast evaluation of the occurring stresses. Author

N82-15471# Kernforschungszentrum, Karlsruhe (West Germany).

CALCULATION OF THE STRESSES AND THE FINITE DEFLECTIONS OF A PERFECT CIRCULAR CYLINDER SUBJECTED TO NON-AXISYMMETRIC LOADS

M. Esslinger (DFVLR, Brunswick), K. Kretschel (DFVLR, Brunswick), and H. W. Melzer (DFVLR, Brunswick) Aug. 1980 48 p refs In GERMAN; ENGLISH summary

(KfK-CAD-165; GL-DFL/100) Avail: NTIS HC A03/MF A01

A computation procedure for solving nonlinear shell equations in the case of nonaxisymmetric loading is presented. In the circumferential direction the state variables are expanded into Fourier series. In the direction of the meridian a segmentation method is applied. The transfer matrices are established by means of collocation. The application of the procedure is demonstrated by presenting several examples. Author

N82-15472# Southampton Univ. (England). Inst. of Sound and Vibration Research.

USING THE ENVELOPE OF RESONANCE PEAKS TO ESTIMATE POWER ABSORBED BY A FINITE STRUCTURE

R. J. Pinnington Mar. 1981 40 p refs Sponsored by Admiralty Marine Technology Establishment

(ISVR-TR-115) Avail: NTIS HC A03/MF A01

An absorbed vibration power measuring method applicable when a structure is sufficiently lightly damped for the vibrations to be governed by modal behavior is presented. Power input to the structure is found by measuring the power absorbed by each vibrational mode which is calculated from the resonance peak value of the point, or transfer inertance at selected points and the acceleration spectra at these points, measured under normal operating conditions. Cubic spline curves fitted through the resonance peak inertance values estimate power levels between resonances. It is found that the method is accurate in resonance regions, but not in the troughs between resonances. Author (ESA)

N82-15473# Illinois Univ. at Urbana-Champaign. Structural Research Lab.

RESPONSE OF REINFORCED CONCRETE PLATE-COLUMN CONNECTIONS TO DYNAMIC AND STATIC HORIZONTAL LOADS

Denby G. Morrison and Mete A. Sozen Apr. 1981 266 p refs

(Grant NSF PFR-78-16318)

(PB81-237380; Structural-Research-Ser-490; UILU-ENG-81-2004; NSF/CEE-81024) Avail: NTIS HC A12/MF A01 CSCL 13M

The response of interior reinforced concrete plate column connections was investigated. Eight specimens were tested statically and dynamically. Other experimental variables were reinforcement ratio and the amount of superimposed vertical load. The statically tested specimens provided information on the influence of the change in reinforcement ratio and the amount of superimposed vertical load on the response to horizontal loading. An analysis model was developed to interpret the results from the statically tested specimens. The dynamically tested specimens were used to obtain data on the response of the specimens, the observed hysteresis, and calculated damping. GRA

42 GEOSCIENCES (GENERAL)

N82-15474# Water Research Centre, Stevenage (England).

RESEARCH PROGRAMME 1981/82 Progress Report

1981 32 p

Avail: NTIS HC A03/MF A01

Water management projects are outlined. The following propertis are investigated: surface water quality (toxicity, biodegradability, aquatic biology); drinking water quality; water treatment (inorganic, organic compounds, disinfection, instrumentation); distribution systems; sewerage systems; waste water treatment (economic aspects, pollution, pathogens, odor control); sludge utilization; groundwater and river pollution; tidal waters; instrumentation and computing. Author (ESA)

N82-15475# Water Research Centre, Stevenage (England).

[ACTIVITIES AND ACCOUNTS REPORT] Annual Report, 1980-1981

1981 40 p refs

Avail: NTIS HC A03/MF A01

Research projects in water science are reported. The following subjects were investigated: sewers (inspection, rehabilitation, renovation, hydraulic performance, structural capabilities); water mains (joints, pipes, leakage control, quality problems); water quality; health factors (pollution, swimming pool disinfection, nitrates); wastewater treatment and sludge pumping. Author (ESA)

N82-15476# Joint Publications Research Service, Arlington, Va.

USSR REPORT: EARTH SCIENCES, NO. 18

10 Dec. 1981 72 p refs Transl. into ENGLISH from various Russian articles

(JPRS-79631) Copyright. Avail: Issuing Activity

The development of climate and global ecology models and the predicted effects of a long term warming trend on the climate of the earth are discussed. For individual titles, see N82-15477 through N82-15479.

N82-15477# Joint Publications Research Service, Arlington, Va.
MODEL OF CLIMATE AND GLOBAL ECOLOGY c47
Vladimir Valentinovich Aleksandrov and Nikita Nikolayevich Moiseyev *In its* USSR Rept.: Earth Sci., No. 18 (JPRS-79631) 10 Dec. 1981 p 1-13 refs Transl. into ENGLISH from Priroda (Moscow), no. 9, Sep. 1981 p 68-71 (For primary document see N82-15476 06-42)
Copyright. Avail: Issuing Activity

Requirements for the development of climate and global ecology models are described. The activities of the Club of Rome are reviewed. Global ecological models based on the relationship between human civilization and the dynamic processes taking place in the environment, and requiring the determination of admissable loads on the biosphere, are discussed. Numerical modeling of the cycling of matter in nature, of human activity (based on economic and demographic processes), and climate models is described. J.D.H.

N82-15478# Joint Publications Research Service, Arlington, Va.
POTENTIAL CHANGE IN CLIMATE BY YEAR 2000 c47
O. A. Drozdov *In its* USSR Rept.: Earth Sci., No. 18 (JPRS-79613) 10 Dec. 1981 p 14-15 Transl. into ENGLISH from Novoye, V Zhizni, Nauke, Tekhn., Ser. Nauka o Zemle (Moscow), No. 8, Aug. 1981 p 32-34 (For primary document see N82-15476 06-42)
Avail: Issuing Activity

A warming trend in the climate by the beginning of the next century is postulated. An increase in precipitation in the north and in the subtropics, with an intensification of wind, is predicted. A slight reduction of precipitation in the temperature regions, with an increase in its annual variability, is predicted. J.D.H.

N82-15479# Joint Publications Research Service, Arlington, Va.
CLIMATES OF PAST AS A MODEL OF FUTURE CLIMATE c47
D. D. Kvasov *In its* USSR Rept.: Earth Sci., No. 18 (JPRS-79631) 10 Dec. 1981 p 16-17 Transl. into ENGLISH from Novoye V Zhizni, Nauke Tekhn. Ser. Nauka o Zemle (Moscow), no. 8, Aug. 1981 p 30-32 (For primary document see N82-15476 06-42)
Avail: Issuing Activity

Reasons for assuming an increase in precipitation when there is a climatological warming trend are presented. The effect of a warming trend is predicted to lead to a decrease in the number of icebergs without an increase in ocean level. J.D.H.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N82-15480*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.
DEVELOPMENT AND EVALUATION OF AN AUTOMATIC LABELING TECHNIQUE FOR SPRING SMALL GRAINS Technical Report, 15 Nov. 1979 - 31 Dec. 1980
Eric P. Crist and William A. Malila, Principal Investigators Aug. 1981 67 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS
(Contract NAS9-15476; Proj. AgRISTARS)
(E82-10001; NASA-CR-161080; SR-EL-04065; ERIM-152400-3-T) Avail: NTIS HC A04/MF A01 CSCL 05A

A labeling technique is described which seeks to associate a sampling entity with a particular crop or crop group based on similarity of growing season and temporal-spectral patterns of development. Human analyst provide contextual information, after which labeling decisions are made automatically. Results of a test of the technique on a large, multi-year data set are reported. Grain labeling accuracies are similar to those achieved by human analysis techniques, while non-grain accuracies are lower. Recommendations for improvments and implications of the test results are discussed. Author

N82-15481*# South Dakota State Univ., Brookings. Remote Sensing Inst.
REMOTE SENSING APPLICATIONS TO RESOURCE PROBLEMS IN SOUTH DAKOTA Annual Progress Report, 1 Jul. 19[illegible]0 - 30 Jun. 1981
Victor I. Myers, Principal Investigator 30 Jun. 1981 154 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Grant NGL-42-003-007)
(E82-10002; NASA-CR-164892; SDSU-RSI-81-11) Avail: NTIS HC A08/MF A01 CSCL 05A

The procedures used as well as the results obtained and conclusions derived are described for the following applications of remote sensing in South Dakota: (1) sage grouse management; (2) censusing Canada geese; (3) monitoring grasshopper infestation in rangeland; (4) detecting Dutch elm disease in an urban environment; (5) determining water usage from the Belle Fourche River; (6) resource management of the Lower James River; and (7) the National Model Implantation Program: Lake Herman watershed. A.R.H.

N82-15482*# California Univ., Berkeley. Space Sciences Lab.
APPLICATION OF REMOTE SENSING TO SELECTED PROBLEMS WITHIN THE STATE OF CALIFORNIA Annual Report
Robert N. Colwell, Principal Investigator, Andrew S. Benson, John E. Estes, and Claude Johnson 1 May 1981 258 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS
(Grant NsG-7220)
(E82-10004; NASA-CR-164893; SSL-Ser-22-Issue-18) Avail: NTIS HC A12/MF A01 CSCL 05A

Specific case studies undertaken to demonstrate the usefulness of remote sensing technology to resource managers in California are highlighted. Applications discussed include the mapping and quantization of wildland fire fuels in Mendocino and Shasta Counties as well as in the Central Valley; the development of a digital spectral/terrain data set for Colusa County; the Forsythe Planning Experiment to maximize the usefulness of inputs from LANDSAT and geographic information systems to county planning in Mendocino County; the development of a digital data bank for Big Basin State Park in Santa Cruz County; the detection of salinity related cotton canopy reflectance differences in the Central Valley; and the surveying of avocado acreage and that of other fruits and nut crops in Southern California. Special studies include the interpretability of high altitude, large format photography of forested areas for coordinated resource planning using U-2 photographs of the NASA Bucks Lake Forestry test site in the Plumas National Forest in the Sierra Nevada Mountains. A.R.H.

N82-15483*# General Electric Co., Philadelphia, Pa. Space Div.
LANDSAT-2 AND LANDSAT-3 FLIGHT EVALUATION REPORT, 23 APRIL TO 23 JULY 1979
1 Aug. 1979 258 p ERTS
(Contract NAS5-21808)
(E82-10005; NASA-CR-163348; Doc-79SDS4242) Avail: NTIS HC A12/MF A01 CSCL 05B

The performance of satellite subsystems and the response of in-orbit payload systems are summarized. Graphs and tables show the values of the various parameters of these systems. A spacecraft orbit reference table is included. A.R.H.

N82-15484*# Energy Information Administration, Washington, D.C. Geomagnetic Service.
THE REDUCTION, VERIFICATION AND INTERPRETATION

OF MAGSAT MAGNETIC DATA OVER CANADA Progress Report
R. L. Coles, Principal Investigator, E Dawson, G. V. Haines, G. Jansen vanBeek, J. K Walker, and L. R. Newitt Jul. 1981 3 p Sponsored by NASA ERTS
(E82-10006; NASA-CR-164904; PR-3) Avail: NTIS HC A02/MF A01 CSCL 05B

Magnetic anomalies of lithospheric origin are weak at Magsat altitudes (20 to 30 nT at most), and are easily masked by much larger effects caused by field-aligned and other currents at high latitudes. Most of Canada lies under the influence of ionospheric currents in the auroral zone and polar cap. A more refined selection of quiet Magsat data allowed a revised scalar magnetic anomaly map of the whole region north of about 40 deg N latitude. Very preliminary vector anomaly maps and absolute vector component maps were derived. The scalar magnitudes show great promise for mapping the total force and anomaly fields. The Z vector data also appear to be good. The horizontal X and Y vector data are seriously contaminated with external fields and maybe other effects. A.R.H.

N82-15485*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
WHEAT CULTIVATION: IDENTIFICATION AND ESTIMATION OF AREAS USING LANDSAT DATA [CULTURA DO TRIGO IDENTIFICACAO E AVALIACAO DE AREAS ATRAVES DE DADOS DO LANDSAT]
Nelson deJesusParada, Principal Investigator, Francisco Jose Mendonca, Dall Arthur Cottrell, Antonio Tebaldi Tardin, David Chung Liang Lee, Yosio Edemir Shimabukuro, Mauricio Alves Moreira, and Angela Maria deLimaeFernandoCelsoSoaresMaia May 1981 5 p refs In PORTUGUESE Sponsored by NASA ERTS
(E82-10007; NASA-CR-164905; INPE-2054-RPE/300) Avail: NTIS HC A02/MF A01 CSCL 02C

The feasibility of using automatically processed multispectral data obtained from LANDSAT to identify wheat and estimate the areas planted with this grain was investigated. Three 20 km by 40 km segments in a wheat growing region of Rio Grande do Sul were aerially photographed using type 2443 Aerochrome film. Three maps corresponding to each segment were obtained from the analysis of the photographs which identified wheat, barley, fallow land, prepared soil, forests, and reforested land. Using basic information about the fields and maps made from the photographed areas, an automatic classification of wheat was made using MSS data from two different periods: July to September and July to October 1979. Results show that orbital data is not only useful in characterizing the growth of wheat, but also provides information of the intensity and extent of adverse climate which affects cultivation. The temporal and spatial characteristics of LANDSAT data are also demonstrated. Transl. by A.R.H.

N82-15486*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
QUANTITATIVE ANALYSIS OF DRAINAGE OBTAINED FROM AERIAL PHOTOGRAPHS AND RBV/LANDSAT IMAGES [ANALISE QUANTITATIVA DA DRENAGEM OBTIDA ATRAVES DE FOTOGRAFIAS AEREAS E IMAGENS DO RBV/LANDSAT]
Nelson deJesusParada, Principal Investigator, Antonio Roberto Formaggio, Jose Carlos Neves Epiphanio, and Mario Valerio Filho May 1981 29 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Reuniao Anual de SBPC Sponsored by NASA ERTS
(E82-10008; NASA-CR-164906) Avail: NTIS HC A03/MF A01 CSCL 08H

Data obtained from aerial photographs (1:60,000) and LANDSAT return beam vidicon imagery (1:100,000) concerning drainage density, drainage texture, hydrography density, and the average length of channels were compared. Statistical analysis shows that significant differences exist in data from the two sources. The highly drained area lost more information than the less drained area. In addition, it was observed that the loss of information about the number of rivers was higher than that about the length of the channels. Author

N82-15487*# Massachusetts Univ., Amherst. Dept. of Geology.
THE MINERALOGY OF GLOBAL MAGNETIC ANOMALIES Progress Report, Jan. - Sep. 1981
Stephen E. Haggerty, Principal Investigator 19 Sep. 1981 27 p ERTS
(Contract NAS5-26414)
(E82-10009; NASA-CR-164907) Avail: NTIS HC A03/MF A01 CSCL 08G

Progress is reported in developing predictive abilities to evaluate the potential stabilities of magnetic minerals in the Earth crust and mantle by: (1) computing oxidation state profiling as a function of temperature and pressure; (2) compiling data on basalts to establish validity of the oxidation state profiles; (3) determining Fe-Ni alloys in association with magnetitie as a function of temperature and oxidation state; and (4) acquiring large chemical data banks on the mineral ilmenite which decomposes to mineral spinel in the presence of high sulfur or carbonate environments in the lower crust upper mantle. In addition to acquiring these data which are related to constraining Curie isotherm depths, an excellent correlation was found between MAGSAT anomaly data and the geology of West Africa. A.R.H.

N82-15488*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
INVESTIGATION OF THE APPLICATION OF REMOTE SENSING TECHNOLOGY TO ENVIRONMENTAL MONITORING
M. L. Rader, Principal Investigator Aug. 1980 76 p ERTS
(Contract NAS9-15800)
(E82-10010; NASA-CR-161071; JSC-16759; LEMSCO-15175) Avail: NTIS HC A05/MF A01 CSCL 13B

Activities and results are reported of a project to investigate the application of remote sensing technology developed for the LACIE, AgRISTARS, Forestry and other NASA remote sensing projects for the environmental monitoring of strip mining, industrial pollution, and acid rain. Following a remote sensing workshop for EPA personnel, the EOD clustering algorithm CLASSY was selected for evaluation by EPA as a possible candidate technology. LANDSAT data acquired for a North Dakota test sight was clustered in order to compare CLASSY with other algorithms. A.R.H.

N82-15489*# Geological Survey, Denver, Colo.
GEOLOGIC APPLICATIONS OF THERMAL-INERTIA MAPPING FROM SATELLITE Final Report
Terry W. Offield, Principal Investigator, Kenneth Watson, and Susanne Hummer-Miller Jul. 1981 109 p refs Original contains imagery. Original imagery may be purchased from NASA Goddard Space Flight Center, (Code 601), Greenbelt, Md. 20771. Domestic users send orders to 'Attn: National Space Science Data Center'; non-domestic users send orders to 'Attn: World Data Center A for Rockets and Satellites'. HCMM
(NASA Order S-40256-B)
(E82-10011; NASA-CR-164818) Avail: NTIS HC A06/MF A01 CSCL 08B

In the Powder River Basin, Wyo., narrow geologic units having thermal inertias which contrast with their surroundings can be discriminated in optimal images. A few subtle thermal inertia anomalies coincide with areas of helium leakage believed to be associated with deep oil and gas concentrations. The most important results involved delineation of tectonic framework elements some of which were not previously recognized. Thermal and thermal inertia images also permit mapping of geomorphic textural domains. A thermal lineament appears to reveal a basement discontinuity which involves the Homestake Mine in the Black Hill, a zone of Tertiary igneous activity and facies control in oil producing horizons. Applications of these data to the Cabeza Prieta, Ariz., area illustrate their potential for igneous rock type discrimination. Extension to Yellowstone National Park resulted in the detection of additional structural information but surface hydrothermal features could not be distinguished with any confidence. A thermal inertia mapping algorithm, a fast and accurate image registration technique, and an efficient topographic slope and elevation correction method were developed. Author

N82-15490*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

REMOTE SENSING IN FORESTRY: APPLICATION TO THE AMAZON REGION
Nelson deJesusParada, Principal Investigator, Antonio T. Tardin, Armando dosSantos, Pedro Hernandez Filho, and Yosio E. Shimabukuro Apr. 1981 72 p refs Sponsored by NASA ERTS
(E82-10012; NASA-CR-164755; INPE-2035-RPE/292) Avail: NTIS HC A04/MF A01 CSCL 02F

The utilization of satellite remote sensing in forestry is reviewed with emphasis on studies performed for the Brazilian Amazon Region. Timber identification, deforestation, and pasture degradation after deforestation are discussed. A.R.H.

N82-15491*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
FISCAL YEAR 1980-81 IMPLEMENTATION PLAN IN SUPPORT OF TECHNICAL DEVELOPMENT AND INTEGRATION OF SAMPLING AND AGGREGATION PROCEDURES
Mar. 1981 88 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10013; NASA-CR-161030; FC-LO-00612; LEMSCO-15168; JSC-16819) Avail: NTIS HC A05/MF A01 CSCL 02C

The specific objectives of the FY 1980-81 tasks are: (1) further refinements to the weighted aggregation procedure; (2) improved approaches for estimating within-stratum variance; (3) more intensive investigation of alternative sampling strategies such as full-frame sampling strategy, and (4) further developments in regard to a simulated approach for assessing the performance of the overall designed sampling and aggregation system. Author

N82-15492*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
WINTERKILL INDICATOR MODEL, CROP CONDITION ASSESSMENT DIVISION (CCAD) DATA BASE INTERFACE DRIVER, USER'S MANUAL
R. F. Hansen, Principal Investigator Mar. 1981 13 p ref Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10014; NASA-CR-161031; EW-L1-00713; LEMSCO-16033; JSC-17117) Avail: NTIS HC A02/MF A01 CSCL 02C

Instructions are given for using the Winterkill indicator model CCAD data base interface driver. The purpose of the system is to interface the Winterkill Indicator Model with the CCAD operational data base. The interface driver routine decides what meteorological stations should be processed and calls the proper subroutines to process the stations. Author

N82-15493*# IBM Federal Systems Div., Houston, Texas.
ERSYS-SPP ACCESS METHOD SUBSYSTEM DESIGN SPECIFICATION
R. C. Weise, Principal Investigator Sep. 1980 74 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS
(Contract NAS9-14350; Proj. AgRISTARS)
(E82-10015; NASA-CR-161039; MU-11-00300; JSC-16918) Avail: NTIS HC A04/MF A01 CSCL 02C

The STARAN special purpose processor (SPP) is a machine allowing the same operation to be performed on up to 512 different data elements simultaneously. In the ERSYS system, it is to be attached to a 4341 plug compatible machine (PCM) to do certain existing algorithms and, at a later date, to perform other to be specified algorithms. That part of the interface between the 4341 PCM and the SPP located in the 4341 PCM is known as the SPP access method (SPPAM). Access to the SPPAM will be obtained by use of the NQUEUE and DQUEUE commands. The subsystem design specification is to incorporate all applicable design considerations from the ERSYS system design specification and the Level B requirements documents relating to the SPPAM. It is intended as a basis for the preliminary design review and will expand into the subsystem detailed design specification. Author

N82-15494*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
US/CANADA WHEAT AND BARLEY CROP CALENDER EXPLORATORY EXPERIMENT IMPLEMENTATION PLAN
Sep. 1980 23 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E82-10016; NASA-TM-84034; FC-JO-00611; JSC-16812) Avail: NTIS HC A02/MF A01 CSCL 02C

A plan is detailed for a supplemental experiment to evaluate several crop growth stage models and crop starter models. The objective of this experiment is to provide timely information to aid in understanding crop calendars and to provide data that will allow a selection between current crop calendar models. Author

N82-15495*# General Electric Co., Philadelphia, Pa. Space Div.
LANDSAT-2 AND LANDSAT-3 FLIGHT EVALUATION REPORT, 23 OCTOBER 1978 TO 23 JANUARY 1979
1 Feb. 1979 236 p ERTS
(Contract NAS5-21808)
(E82-10017; NASA-CR-166640; Doc-79SDS4201) Avail: NTIS HC A11/MF A01 CSCL 05B

Orbital parameters and adjustments are discussed and tabulated. The performance of the various subsystems and payloads on the two satellites is documented in tables. A.R.H.

N82-15496*# Mississippi State Univ., Mississippi State. Remote Sensing Center.
A PROPOSAL FOR CONTINUATION OF SUPPORT FOR THE APPLICATION OF REMOTELY SENSED DATA TO STATE AND REGIONAL PROBLEMS. PART 1: TECHNICAL PROPOSAL
Jun. 1981 114 p ERTS
(Grant NGL-25-001-054)
(E82-10018; NASA-CR-164817) Avail: NTIS HC A06/MF A01 CSCL 05A

The objectives, procedures, accomplishments, plans, and ultimate uses of information from current projects at the Mississippi Remote Sensing Center are discussed for the following applications: (1) land use planning; (2) strip mine inventory and reclamation; (3) biological management for white tailed deer; (4) forest habitats in potential lignite areas; (5) change discrimination in gravel operations; (6) discrimination of freshwater wetlands for inventory and monitoring; and (7) remote sensing data analysis support systems. The initiation of a conceptual design for a LANDSAT based, state wide information system is proposed. A.R.H.

N82-15497# Committee on Science and Technology (U. S. House).
CIVIL LAND REMOTE SENSING SYSTEMS
Washington GPO 1981 370 p Joint hearings before the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol. and the Subcomm. on Sci., Technol., and Space of the Comm. on Com., Sci., and Transportation, 97th Congr., 1st Sess., No. 40, 22-23 Jul. 1981
(GPO-35-265) Avail: Subcommittee on Space Science and Applications

Steps taken to facilitate NOAA assumption of responsibility for operating LANDSAT D and LANDSAT D prime are reviewed and institutional alternatives for transferring operational responsibility for the program to the private sector are examined. These include: (1) an existing private corporation; (2) a legislatively established for profit private corporation; (3) a government corporation; and (4) Federal agency ownership with private sector operation. The advantages and disadvantages of each of these options are considered as well as user participation. A.R.H.

N82-15498*# EG and G Washington Analytical Services Center, Inc., Pocomoke City, Md.
A GLOBAL ATLAS OF GEOS-3 SIGNIFICANT WAVEHEIGHT DATA AND COMPARISON OF THE DATA WITH NATIONAL BUOY DATA
J. D. McMillan Wallops Island, Va. NASA. Wallops Flight Center Nov. 1981 163 p refs

(Contract NAS6-2639)
(NASA-CR-156882) Avail: NTIS HC A08/MF A01 CSCL 08C

The accuracy of the GEOS-3 significant waveheight estimates compared with buoy measurements of significant waveheight were determined. A global atlas of the GEOS-3 significant waveheight estimates gathered is presented. The GEOS-3 significant waveheight estimation algorithm is derived by analyzing the return waveform characteristics of the altimeter. Convergence considerations are examined, the rationale for a smoothing technique is presented and the convergence characteristics of the smoothed estimate are discussed. The GEOS-3 data are selected for comparison with buoy measurements. The GEOS-3 significant waveheight estimates are assembled in the form of a global atlas of contour maps. Both high and low sea state contour maps are presented, and the data are displayed both by seasons and for the entire duration of the GEOS-3 mission. E.A.K.

N82-15499# Cologne Univ. (West Germany). Inst. fuer Geophysik und Meteorologie.
ANALYSIS OF SATELLITE OBSERVATIONS: THEORETICAL STUDIES ON THE SAMPLING PROBLEM [ANALYSE VON SATELLITENBEOBACHTUNGEN - THEORETISCHE UNTERSUCHUNGEN ZUM SAMPLING PROBLEM]
Hans Joachim Preuss 1981 68 p refs In GERMAN; ENGLISH summary
(Mitt-31; ISSN-0069-5882) Avail: NTIS HC A04/MF A01

In a general mission analysis, some orbital and measuring charcteristics are simulated and their influence on the sampling investigated. The important role of a satellite with a moderate inclination (approximately 60 deg) is shown: with the drifting orbit homogeneous sampling of diurnal variations and of radiance distributions is possible in a global scale within about 15 days. More complex scan modes (off track, rotary or conical) may improve the angular sampling, especially in case of Sun synchronous satellites, but for studies in small temporal and spatial scales a system with at least three satellites is necessary. The general results are applied on the determination of the radiation balance. By means of models for the diurnal variations and anisotropic behavior, measurements are created and sampling errors demonstrated. Author

N82-15500# Marconi Co. Ltd., Chelmsford (England). Communications Research Div.
ADDITIONAL STUDIES OF EARTH RESOURCES SYNTHETIC APERTURE RADAR PAYLOADS Final Report
A. P. Luscombe Paris ESA Oct. 1980 105 p refs
(Contract ESA-6225/80-F-CG(SC))
(MTR-80/90; ESA-CR(P)-1469) Avail: NTIS HC A06/MF A01

Results of design studies on the synthetic aperture radar payload are discussed. A new baseline system for an incidence angle of about 45 deg was specified, and its performance at smaller angles is assessed. A feasibility study of a squinted SAR system is described. For individual titles, see N82-15501 through N82-15502.

N82-15501# Marconi Co. Ltd., Chelmsford (England). Communications Research Div.
NEW BASELINE SYSTEM Final Report
In its Additional Studies of Earth Resources Syn. Aperture Radar Payload Oct 1980 46 p refs (For primary document see N82-15500 06-43)
Avail: NTIS HC A06/MF A01

A baseline system with an incidence angle of around 45 deg was specified for the Earth resources SAR payload and its operation at smaller angles was investigated. The basic system design and method of analysis are described. The choices of pulse repetition frequency (PRF) for different incidence angles, the problem of ambiguities and their evaluation and the antenna beam patterns are covered along with the selection of major system parameters (beam pattern, PRF's and incidence angles). The detail and the baseline system suggested is analyzed in terms of the image quality specifications. Two more aspects of the SAR system, the transmitter power requirements and the variation in ground range resolution with incidence angle, are discussed. A listing of the basic results for four different incidence angles is given. J.M.S.

N82-15502# Marconi Co. Ltd., Chelmsford (England). Communications Research Div.
SQUINTED SAR SYSTEM Final Report
In its Additional Studies of Earth Resources Syn. Aperture Radar Payload Oct. 1980 32 p refs (For primary document see N82-15500 06-43)
Avail: NTIS HC A06/MF A01

It is found that for conventional SAR systems pointing broadside to the satellite track it is impossible to obtain the required swarth width at several incidence angles with the same antenna design. It is suggested that the swath width might be increased by 'squinting' the beam forwards or backwards. A feasibility study of such a system is discussed. J.M.S.

N82-15503# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Hochfrequenztechnik.
VISUAL EVALUATION OF E-SLAR IMAGERY
Juergen Nithack Feb. 1981 52 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-734)
(DFVLR-FB-81-11) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 13,10

Flights were conducted E-SLAR (side looking airborne radar) for remote sensing experiments with active microwave techniques (X-band). The analog recorded data were mainly evaluated by visual methods to judge the system and its usefulness to solve Earth scientific questions. J.M.S.

N82-15504# Naval Postgraduate School, Monterey, Calif. Dept. of Oceanography.
BIOLOGICAL PATCHINESS IN RELATION TO SATELLITE THERMAL IMAGERY AND ASSOCIATED CHEMICAL MESOSCALE FEATURES M.S. Thesis
Ronald Wayne Phoebus Jun. 1981 63 p refs
(AD-A105757) Avail: NTIS HC A04/MF A01 CSCL 08/1

The presence of biological patches, or communities, can have a direct effect on Naval operations, scientific research, and fisheries. It is shown that remote infrared satellite sensing may be used as a real-time tool to accurately locate thermally and biologically significant features. Several physical, chemical, and biological variables were sampled in the surface layer of mesoscale thermal features which were located using satellite imagery. The bio-chemical sampling produced replicate results from which the distribution of biomass could be inferred. Possible explanations are advanced for patch forming mechanisms and biomass distribution. Author (GRA)

N82-15505# Texas Univ., Austin. Bureau of Economic Geology.
STRUCTURAL EVOLUTION OF THREE GEOPRESSURED-GEOTHERMAL AREAS IN THE TEXAS GULF COAST
Charles D. Winker, Robert A. Morton, and Deborah D. Garcia 1981 13 p refs Presented at the 5th Geopressured-Geothermal Energy Conf., Baton Rouge, La., 13 Oct. 1981
(Contract DE-AC08-79ET-27111)
(DE81-029798; CONF-811026-9) Avail: NTIS HC A02/MF A01

Detailed analysis of geological and seismic data from several geopressured geothermal areas (Cuero, Blessing, Pleasant Bayou) reveals similarities in structural-stratigraphic relationships that form geopressured aquifers as well as differences in structural complexity and evolution that characterize the different areas. In these examples, geopressured sandstones are isolated on the updip side by downfaulting against shelf-slope shales, and on the downdip side by unfaulting against transgressive marine shales. Moreover, they are isolated above and below by thick sequences of transgressive shale or interbedded sandstone and shale. Prospective reservoirs are found where delatic and associated sandstones (distributary channel, delta front, barrie-strandplain) were deposited seaward of major growth faults and near the shelf margin. DOE

N82-15506# Geological Survey, Denver, Colo.
PRELIMINARY ANALYSIS OF GRAVITY AND AEROMAGNETIC SURVEYS OF THE TIMBER MOUNTAIN AREA, SOUTHERN NEVADA
M. F. Kane, M. W. Webring, and B. K. Bhattacharyya 1981

143 p refs
(Contract DE-AI08-78ET-44802)
(DE81-029462; DOE/ET-44802/T2; USGS-Open-File-81-189)
Avail: NTIS HC A07/MF A01

Gravity and aeromagnetic surveys revealed details of subsurface structure and lithology. Information caused by volcanic events accommodated along straight line faults combining to give a curvilinear appearance to regional structure is suggested. The magnetic data suggest that rock units may have been altered, perhaps thermally, from their original state. The gravity data indicate that the south part of Timber Mountain is underlain by relatively dense and possibly intrusive rock, like that which crops out along its southeast side. The gravity data also suggest that the Silent Canyon caldera may extend considerably south of its presently indicated southern limit and may underlie much of the area of Timber Mountain. The moat areas appear to be more rectangular or triangular than annular in shape. The southern part of Timber Mountain caldera is seperated from the Yucca Mountain area to the south by a triangular horst. The structural relations of the rock units making up the horst are complex. Several linear terrain features in the southern part of the caldera area are closely alined with geophysical features, implying that the terrain features are fault controlled. DOE

N82-15507# Academy of Natural Sciences, Avondale, Pa. Water Research Center.
GEOGRAPHIC ANALYSIS OF THERMAL EQUILIBRIA: A BIOENERGETIC MODEL FOR PREDICTING THERMAL RESPONSE OF AQUATIC INSECT COMMUNITIES Technical Progress Report, 1 Jul. 1980 - 31 Dec. 1981
R. L. Vannote and B. W. Sweeney 28 Aug. 1981 65 p refs
(Contract DE-AC02-79EV-10259)
(DE81-029680; DOE/EV-10259/2) Avail: NTIS HC A04/MF A01

A conceptual model describing the effects of natural and altered temperature regimes on laval growth and adult size and fecundity of hemimetaboloyus aquatic insects is tested and modified. The central hypothesis is that the stability of a given population (i.e., the ability to recover from serious reduction in numbers by environmental perturbations or fluctuations) within the geographic range of a species reflects mainly a dynamic equilibrium between temperature and individual growth, metabolism, reproductive potential, and generation time. In this context, a thermal regime is viewed as optimum for a species when individual body weight and fecundity is maximized. The model predicts that geographic range extension away from a location with an optimum thermal regime would be associated with temperature induced changes in the rate and efficiency of energy use, developmental processes, and generation time. DOE

N82-15508# Gulf Universities Research Consortium, Bellaire, Tex.
RELATIONAL METHODOLOGY FOR INTEGRATING AND ANALYZING FIELD TEST AND RESEARCH DATA DESCRIBING ENHANCED OIL RECOVERY
Bill A. Bavinger, Scott Callaway, Donna Tice Goodbread, and James L. Gumnick Oct. 1981 154 p refs
(Contract DE-AC01-76ET-10145)
(DE81-030441; DOE/ET-10145/72) Avail: NTIS HC A08/MF A01

The application of concepts of relational analysis for the integration of two experimental data bases was demonstrated. The following data bases are created: the enhanced oil recovery field test data base; and the enhanced oil recovery research data base. DOE

N82-15509# University of Southern Mississippi, Hattiesburg. Dept. of Polymer Science.
IMPROVED POLYMERS FOR ENHANCED OIL RECOVERY SYNTHESIS AND RHEOLOGY Annual Report, Oct. 1979 - Sep. 1980
C. L. McCormick, R. D. Hester, H. H. Neidinger, and G. C. Wildman Apr. 1981 300 p refs
(Contracts DE-AS05-77ET-12038; EF-77-S-05-5603)
(DE81-030194; DOE/ET-12038/T3; AR-3) Avail: NTIS HC A13/MF A01

The synthesis, characterization, and rheological studies of random and graft copolymers which are used as models for mobility control agents in enhanced oil recovery are reported. The following procedures are studied: macromolecular syntheses of model polymers, dilute solution viscosity, aqueous size exclusion chromatography, and laser light scattering. DOE

N82-15510# Battelle Pacific Northwest Labs., Richland, Wash.
RESERVOIR STABILITY STUDIES
T. J. Doherty Jul. 1981 9 p refs Presented at Mech. Magnetic and Energy 1981 Ann. Contractors Review Meeting, Washington, D.C., 24 Aug. 1981
(Contract DE-AC06-76RL-01830)
(DE81-030099; PNL-SA-9782; CONF-810833-9) Avail: NTIS HC A02/MF A01

Stability criteria for large underground reservoirs in salt domes, hard rock caverns, and porous rock structures for air storage in utility applications were studied. Reservoir stability commercialization of compressed air energy storage (CAES) systems was emphasized. A state-of-the-art assessment, numerical model development and experimental studies culminating in field research, was formulated. Site specific geotechnical design evaluations using methodologies to assess hard rock carvern stabilty, implementation of in-mine research on the response of domal salt, integrated laboratory and field study facilities to assess developed predictive methods and determine in situ response of a porous media reservoir to air injection are completed. DOE

N82-15511# Purdue Univ., Lafayette, Ind. Water Resources Research Center.
OPTIMAL MIX OF ADJUSTMENTS TO FLOODS
T. L. Morin, W. L. Meier, Jr., and K. S. Nagaraj Jun. 1981 106 p refs Sponsored by Office of Water Research and Technology
(PB81-240533; TR-139) Avail: NTIS HC A06/MF A01 CSCL 13B

Developing a general methodology for the solution of the optimal mix of adjustment problems is addressed. It is recognized that the overall problem has an underlying sequencing nature which can be exploited in order to use a dynamic programming solution approach which bears distinct similarities to the sequencing approaches used in electric generation planning problems. Algorithmic details and computational refinements are also discussed. Data requirements and implementation details are also discussed and details of an application to a real world problem are given. GRA

N82-15512# Florida Univ., Gainesville. Dept. of Coastal and Oceanographic Engineering.
PORT CANAVERAL ENTRANCE GLOSSARY OF INLETS REPORT NO. 9
S. D. Hunt and H. Kojima Dec. 1980 56 p refs Sponsored by NOAA
(PB81-238149; FSG-R-39; NOAA-81062914) Avail: NTIS HC A04/MF A01 CSCL 08F

Information available on Port Canaveral is summarized in order to aid in the evaluation of the effect of the Port on the economics, recreation, water quality, and shoreline stability of the surrounding area. Specifically, the geologic setting is described and the climate and storm history of the Port is examined. Morphological changes, hydraulics, and sedimentary processes are also peculiar to the Port addressed. J.M.S.

N82-15513# Florida Univ., Gainesville. Coastal and Oceanographic Engineering Lab.
FORT GEORGE INLET GLOSSARY OF INLETS, REPORT NO. 10
H. Kojima and S. D. Hunt Nov. 1980 56 p refs Sponsored by NOAA
(PB81-238925; FSG-R-38; NOAA-81062801) Avail: NTIS HC A04/MF A01 CSCL 08F

Information available on Fort George Inlet is summarized in order to aid in the evaluation of the effect of the inlet on the economics, recreation, water quality, and shoreline stability of the surrounding area. Specifically, the geologic setting is described and the climate and storm history of the inlet is examined. Morphological changes, hydraulics, and sedimentary processes peculiar to the inlet are also addressed. J.M.S.

N82-15514# Teknekron, Inc., McLean, Va.
COAL RESOURCES AND SULPHUR EMISSION REGULATIONS: A SUMMARY OF 8 EASTERN AND MIDWESTERN STATES Final Report, Apr. 1979 - Mar. 1981
Richard A. Chapman and Marcella A. Wells May 1981 112 p refs Prepared for Versar, Inc., Springfield, Va.
(Contract EPA-68-02-3136)
(PB81-240319; EPA-600/7-81-086) Avail: NTIS HC A06/MF A01 CSCL 13B

Coal resources, current coal use, and the effectiveness of SO2 control strategies for use by coal users, regulators, and administrators in future coal related decisions were analyzed. The eight major eastern and midwestern coal producing states are discussed and each state's analysis includes a general overview of the coal industry, an overview of coal properties, a description of major coal seams, an analysis of the quantity of coal available to meet various SO2 emission regulations, and information regarding the sulfur content of coals used by utilities in 1979. Physical coal cleaning and the use of low sulfur coal as viable emission control strategies are emphasized. The coal assessment processor model was developed to determine the quantity of coal that would be available in each state to meet various SO2 emission regulations using one or a combination of alternative SO2 control technologies. GRA

N82-15515# Geological Survey, Hartford, Conn. Water Resources Div.
WATER RESOURCES DATA FOR CONNECTICUT, WATER YEAR 1980 Annual Water-data Report, 1 Oct. 1979 - 30 Sep. 1980
Apr. 1981 414 p refs
(PB81-245292; USGS/WRD/HD-81/035; USGS-WRD-CT-80-1) Avail: NTIS HC A18/MF A01 CSCL 08H

Water Resources Data for the 1980 water year for Connecticut were recorded. Data consist of records of stage, discharge, and water quality of streams, stage, contents and water quality of lakes and reservoirs; and water levels and water quality of ground-water wells. Records for water discharge at gaging stations; storm discharge at gaging stations; tidal volume at a gaging station; contents at lakes and reservoirs; water quality at gaging stations, lakes and reservoirs, harbors, wells, and springs; and water levels at observation wells. Crest-stage partial-record stations are also included. GRA

N82-15516# Geological Survey, Madison, Wis. Water Resources Div.
WATER RESOURCES DATA FOR WISCONSIN, WATER YEAR 1980 Annual Water-data Report, 1 Oct. 1979 - 30 Sep. 1980
May 1981 519 p refs
(PB81-235186; USGS/WRD/HD-81/045; USGS-WRD-WI-80-1) Avail: NTIS HC A22/MF A01 CSCL 08H

Water resources data for the 1980 water year for Wisconsin are reported. The data includes: records of streamflow at gaging stations, partial record stations, and miscellaneous sites; records of reservoir storage, records of chemical, physical, and biological characteristics of surface water, ground water, and precipitation, and records of water level in observation wells. GRA

N82-15517# Geological Survey, Boise, Idaho.
WATER RESOURCES DATA FOR IDAHO, WATER YEAR 1980. VOLUME 1: GREAT BASIN AND SNAKE RIVER BASIN ABOVE KING HILL Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Jun. 1981 384 p
(PB81-244188; USGS/WRD/HD-80/052; USGS-WRD-ID-80-1) Avail: NTIS HC A17/MF A01 CSCL 08H

Water resources data for the 1980 water year for Idaho are given including records of stage, discharge, and water quality of streams, stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. GRA

N82-15518# Geological Survey, Boise, Idaho. Water Resources Div.
WATER RESOURCES DATA FOR IDAHO, WATER YEAR 1980. VOLUME 2: UPPER COLUMBIA RIVER BASIN AND SNAKE RIVER BASIN BELOW KING HILL Annual Water-data Report, 1 Oct. 1979 - 30 Sep. 1980
Jun. 1981 393 p refs
(PB81-244196; USGS/WRD/HD-80/053; USGS-WRD-ID-80-2) Avail: NTIS HC A17/MF A01 CSCL 08H

Water resources data for the 1980 water year for Idaho consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. Discharge records for 192 gaging stations are reported. GRA

N82-15519# Guam Univ., Agana. Water Resources Research Center.
ESTIMATE OF RECHARGE TO THE FRESHWATER LENS OF NORTHERN GUAM
Jerry F. Ayers Mar. 1981 28 p refs
(Contract DI-14-34-0001-0112)
(PB81-233595; W81-04366; OWRT-A-017-GUAM(1)) Avail: NTIS HC A03/MF A01 CSCL 08H

The groundwater hydrology of Guam was studied over several decades. The chloride-ion concentration in the rainwater was examined. The chloride ion is used as a tracer which is concentrated evapotranspiration. GRA

N82-15520# National Ocean Survey, Rockville, Md.
A HISTORY OF FLYING AND PHOTOGRAPHY: IN THE PHOTOGRAMMETRY DIVISION OF THE NATIONAL OCEAN SURVEY 1919 - 1979
John T. Smith, Jr. 1980 493 p refs
(PB81-246738; NOAA-81071405) Avail: NTIS HC A21/MF A01 CSCL 14E

A history of aerial photography and its impact on photogrammetric geodesy is presented. The work of pilots, navigators, and photographers as teams is narrated. Early mapping activities are reported. Development of the nine lens camera is described. Other topics include pilot training, testing of color and infrared photography, the B-17 photographic aircraft, beginning the Liberian survey, adaptation to new equipment, Saudi Arabia mapping, the Buffalo aircraft, and the RC-10 camera. GRA

N82-15521# Colorado Cooperative Fishery Unit, Fort Collins.
STUDIES OF THE EFFECTS OF OPERATING THE MT. ELBERT PUMPED-STORAGE POWERPLANT ON TWIN LAKES, COLORADO: 1979 REPORT OF FINDINGS
James F. LaBounty, James J. Sartoris, Sharon G. Campbell, John R. Boehmke, and Richard A. Roline Dec. 1980 73 p refs
(PB81-240483; REC-ERC-80-7) Avail: NTIS HC A04/MF A01 CSCL 08H

The studies were performed to qualify and quantify the changes that occur to the limnological features of Twin Lakes because of the powerplant. Twin Lakes are a pair of dimictic, connected, montane, drainage lakes of glacial origin. T.M.

N82-15522# West Virginia Univ., Morgantown. Engineering Experiment Station.
DEVELOPMENT OF TESTS AND CRITERIA TO EVALUATE GROUNDING SYSTEMS Open File Report, 1 Jul. 1979 - 31 Oct. 1980
Wils L. Cooley and Robert L. McConnell Nov. 1980 177 p refs
(Contract DI-BM-J0-199116)
(PB81-238354; BM-OFR-103-81) Avail: NTIS HC A09/MF A01 CSCL 08I

Aspects of mine safety ground systems, primarily for underground coal mines are reported. The design of a combined ground fault ground check monitoring system is presented. Grounding systems for dc shuttle cars are analyzed. Resistance data and results of physical inspections of self salting ground rods are presented. A resistance and economic analysis for the use of composite materials for building inexpensive and effective ground beds in high resistivity areas is examined. The desirability of penetrating the coal seam with a borehole safety ground is investigated. GRA

N82-15523# Geological Survey, Helena, Mont. Water Resources Div.
STEAMFLOW CHARACTERISTICS OF THE HUDSON BAY AND UPPER MISSOURI RIVER BASINS, MONTANA, THROUGH 1979 Final Report
Ronald R. Shields and Melvin K. White Aug. 1981 150 p ref Prepared in cooperation with the Montana Dept. of Natural Resources and Conservation
(PB81-247199; USGS/WRD/WRI/81-075; USGS/WRI-81-32) Avail: NTIS HC A07/MF A01 CSCL 08H

Statistical summaries of streamflow data for selected stream gaging sites to aid in appraising the hydrology of the Hudson Bay and upper Missouri River basins are measured. Streamflow record collection in the Hudson Bay and upper Missouri River basins began in 1890. A brief description is given for station location, drainage area, period of record, revisions of previously published records, type and history of gages, regulation and diversions, and extremes of discharge. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-15524*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SATELLITE POWER SYSTEM: CONCEPT DEVELOPMENT AND EVALUATION PROGRAM. VOLUME 7: SPACE TRANSPORTATION
Nov. 1981 258 p refs Prepared in cooperation with NASA. Johnson Space Center, Houston, Tex.
(NASA-TM-58238) Avail: NTIS HC A12/MF A01 CSCL 10A

During the several phases of the satellite power system (SPS) concept definition study, various transportation system elements were synthesized and evaluated on the basis of their potential to satisfy overall SPS transportation requirements and their sensitivities, interfaces, and impact on the SPS. Additional analyses and investigations were conducted to further define transportation system concepts that will be needed for the developmental and operational phases of an SPS program. To accomplish these objectives, transportation systems such as the shuttle and its derivatives were identified; new heavy-lift launch vehicle (HLLV) concepts, cargo and personnel orbital transfer vehicles (COTV and POTV), and intra-orbit transfer vehicle (IOTV) concepts were evaluated; and, to a limited degree, the program implications of their operations and costs were assessed. The results of these analyses were integrated into other elements of the overall SPS concept definition studies. Author

N82-15525*# Naval Weapons Support Center, Crane, Ind. Weapons Quality Engineering Center.
EVALUATION PROGRAM FOR SECONDARY SPACECRAFT CELLS: SEVENTEENTH ANNUAL REPORT OF CYCLE LIFE TEST Annual Report
J. D. Harkness 1 Feb. 1981 308 p refs
(NASA Order C-13105D)
(NASA-CR-165071; WQEC/C-81-1; AR-17) Avail: NTIS HC A14/MF A01 CSCL 10C

Acceptance tests were conducted on nickel cadmium, silver cadmium, and silver zinc cells to insure that all cells put into the life cycle program meet the specifications outlined in the respective purchase contracts. Statistical information is presented on cell performance characteristics and limitations. Weaknesses discovered in cell design are reported and aid in research and development efforts toward improving the reliability of space batteries. Battery weaknesses encountered in satellite programs such as IMP, NIMBUS, OGO, OAO, SAS, and TETR were studied and remedied through special tests. A.R.H.

N82-15526*# Vanderbilt Univ., Nashville, Tenn. Dept. of Physics and Astronomy.
ADVANCED SOLAR ENERGY CONVERSION Annual Progress Report, 1 Sep. 1980 - 31 Aug. 1981
Ja H. Lee 31 Aug. 1981 22 p refs
(Contract NCC1-8)
(NASA-CR-165060) Avail: NTIS HC A02/MF A01 CSCL 10A

An atomic iodine laser, a candidate for the direct solar pumped lasers, was successfully excited with a 4 kW beam from a xenon arc solar simulator, thus proving the feasibility of the concept. The experimental set up and the laser output as functions of operating conditions are presented. The preliminary results of the iodine laser amplifier pumped with the HCP array to which a Q switch for giant pulse production was coupled are included. Two invention disclosures - a laser driven magnetohydrodynamic generator for conversion of laser energy to electricity and solar pumped gas lasers - are also included. S.L.

N82-15527*# Burns and Roe, Inc., Woodbury, N. Y.
MHD OXIDANT INTERMEDIATE TEMPERATURE CERAMIC HEATER STUDY Final Report
A. W. Carlson, I. L. Chait, D. P. Saari, and C. L. Marksberry Sep. 1981 199 p refs Prepared in cooperation with Fluidyne Engineering Corp.
(Contract DEN3-107; DE-AI01-77ET-10769)
(NASA-CR-165453; DOE/NASA-0107/3) Avail: NTIS HC A09/MF A01 CSCL 10A

The use of three types of directly fired ceramic heaters for preheating oxygen enriched air to an intermediate temperature of 1144K was investigated. The three types of ceramic heaters are: (1) a fixed bed, periodic flow ceramic brick regenerative heater; (2) a ceramic pebble regenerative heater. The heater design, performance and operating characteristics under conditions in which the particulate matter is not solidified are evaluated. A comparison and overall evaluation of the three types of ceramic heaters and temperature range determination at which the particulate matter in the MHD exhaust gas is estimated to be a dry powder are presented. E.A.K.

N82-15528# Leybold-Heraeus G.m.b.H., Hanau/Main (West Germany). Werksgruppe M.
PROCESS DEVELOPMENT FOR LARGE-SCALE PRODUCTION OF CdS THIN FILM SOLAR CELLS SPUTTERED COPPER SULFIDE LAYERS AND CADMIUM SULFIDE-COPPER SULFIDE HETEROJUNCTIONS. APPLICATION OF HIGH RATE SPUTTERING USING HOT-PRESSED TARGETS Final Report
Werner Mueller, Wolf-Dieter Muenz, Karl Radler, and Karl-Heinz Schuller Bonn Bundesministerium fuer Forschung und Technologie Apr. 1981 158 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-069; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 32.30

A method was developed for the manufacturing of stoichiometrically composed copper sulphide-layers and of polycrystalline CdS-layers using a diode sputtering process. Heterojunctions were produced with a Cds-layer-thickness of 6 micrometers and on solarelectric efficiency of 1%. High rate sputtering cathodes were developed and their suitfulness, when sputtering CdS, was tested. Using high rate sputtering the sputtering rate of targets with 200 mm diameter could be increased by the factor 5 to 9 nm/sec. T.M.

N82-15529# Varta Batterie A.G., Kelkheim (West Germany). Forschungs- und Entwicklungszentrum.
ENERGY STORAGE SYSTEMS FOR TERRESTRIAL SOLAR GENERATORS Final Report, Dec. 1980
Margarete Jung Bonn Bundesministerium fuer Forschung und Technologie May 1981 76 p refs In GERMANY; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-082; ISSN-0340-7608) Avail: NTIS

HC A05/MF A01; Fachinformationszentrum, Karlruhe, West Germany DM 16

Mercury can react with Raney nickel to form the alloy $NiHg_4$. This intermetallic compound is the basis of an excellently rechargeable positive electrode material. In combination with cadmium it forms a rechargeable cadmium/mercury oxide cell which can be operated under hermetically sealed conditions. Since both electrodes are thermodynamically stable in aqueous alkaline electrolytes, the self discharge rate of the cell is very low and hence the Coulomb efficiency even at very low charge rates in the order of 1000 - 2000 hrs. is higher than 95%. The cadmium/mercury oxide cells can be cycled more than a hundred times. These cells are particularly qualified to serve as an energy storage in combination with photovoltaic cells. Author

N82-15530# Internationale Atomreaktorbau Gesellschaft, Bensberg (West Germany). Abt. Anlagenbau.

GAS COOLED SOLAR POWER PLANT FOR GENERATING ELECTRICAL ENERGY IN THE 20MWe OPERATING RANGE (GAST): PRELIMINARY DESIGN PHASE Final Report, Nov. 1980

Siegfried Kostrzewa and Peter Wehowsky Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 33 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-097; ISSN-0340-7608; IAT-BS-100000-010) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7

R&D work required for the erection of a pilot plant was defined. Since the location of the site is not yet determined, the project work was based on preliminary basic data. Significant results of the preliminary design phase include both the choice of a combined gas/steam thermal energy conversion process for the reference concept and basic concepts for heliostat, heliostat field arrangement, receiver, tower and master control/process computer system. A.R.H.

N82-15531# Varta Batterie A.G., Kelkheim (West Germany). Forschungs- und Entwicklungszentrum.

NICKEL-IRON BATTERY OF HIGH ENERGY DENSITY Final Report, Jul. 1980

Guenter Kraemer, V. Antony Oliapuram, Karl-Wilhelm Lexow, and Karl-Georg Horn Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 163 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-100; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 32.80

The energy and power densities of conventional Nickel-Iron accumulators at about 26 wh/kg (5 h) and 18 w/kg (1 h) respectively are rather low. By using active materials of high utilization, electrode construction with low-weight support, light cell containers, and less electrolyte with gas recombination specific values of 45 wh/kg (5 h) and 35 w/kg (1 h) can be obtained as well as short-time load peaks of about 100 w/kg. An elastic casing is an essential feature of the new battery. The reversible pressure-volume changes can be used as a state-of-charge indicator. Production procedures, experimental results and recommendations for use are given. A 1 kwh batter has been completed. Author

N82-15532# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). New Energy Technology.

DEVELOPMENT OF A PROTOTYPE OF A 10 kW SMALL SOLAR POWER PLANT Final Report, Sep. 1979

Franz Maier and Josef Haenfling Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 170 p ref In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-101; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 33.50

Activities performed in the design and construction of a solar driven 10 kW turbogenerator for local TV-educational systems, irrigation pumps and other applications in developing countries include: (1) System design and thermodynamic calculation; (2) Design of the collector array and construction; (3) Fixing of components and auxiliary units; (4) Turbine design, construction, manufacture and test run; (5) Generator design, construction, manufacture and test run; (6) Turbogenerator integration and test; (7) Electrical supply, plant control and regulation; and (8) Test assembly, performance and analysis. Component tests are being run and are being evaluated by a data acquisition unit installed on site. A.R.H.

N82-15533# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Hauptabt. Neue Technologie Energietechnik.

DEVELOPMENT OF A SIMPLE WATER PUMP DRIVEN WITH SOLAR ENERGY Final Report

Dieter Schneller and Klaus Speidel Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 48 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-119; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10.10

A piston engine, a solar collector with direct evaporation, and a processing plant were developed and constructed. The water pump worked satisfactorily under three months of European weather conditions. A total efficiency of 2.5% was reached (efficiency being defined as hydraulic output/solar energy input on installed collector field). The pump is intended to meet the water requirements of small village communities. T.M.

N82-15534# Prins Maurits Lab. TNO, Rijswijk (Netherlands). Inst. voor Chemische en Technologische Research.

SOLAR POWER SYSTEMS SMALLER THAN 500 W FOR MILITARY USE

P. P. M. M. Wittgen Nov. 1979 27 p refs In DUTCH; ENGLISH summary
(Contract A78/KL/125)
(PML-1980-06; TDCK-73397) Avail: NTIS HC A03/MF A01

A literature search of the feasibility of using photovoltaic cells for the energy supply of low power-consuming military equipment is presented. Progress in the technology of solar cells in the coming years offers good prospects for the use of photovoltaic systems. A hybrid system consisting of an array of solar cells combined with secondary batteries in a sunny climate is capable of supplying equipment with energy. Climatic conditions in the Netherlands and the northern part of Germany are too bad for a fully self-supporting year round system. Especially in winter the intensity and quantity of the radiation is too low. In these northern regions the hybrid solar system can only be used when additional primary or secondary batteries are accepted in the winter period. J.D.H.

N82-15535# Battelle Inst., Frankfurt am Main (West Germany).

DEVELOPMENT OF A CADMIUM SELENIDE THIN FILM SOLAR CELL Final Report, Mar. 1980

Edmund Rickus Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 85 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-109; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17.85

Examinations of the physical and chemical structure of thin CdSe films and their surfaces show that not only the electronic structure, but also the orientation and morphology of the semiconductor layer have a strong influence on the photovoltaic properties of the cells. The MIS structures with a chromium back contact, a 2 nm thick undoped CdSe layer, a 4 to 5 nm thick ZnSe layer, and a 20 nm thick gold layer show efficiencies of more than 6% related to a radiation f 100 mW/sq cm reaching the CdSe layer. At the present stage of development, efficiencies of more than 4% can be realized with very simple, not yet optimized ZnS antireflection coatings. As the analysis of current-voltage characteristics shows, the open circuit voltage and the presently relatively low fill factor can be enhanced by improved doping. This gives a realistic goal of about 10% efficiency for further work. Author

N82-15536# Institut fuer Kemtechnik und Energiewandlung e.V., Stuttgart (West Germany). Abteilung Energiewandlung und Waermetechnik.

INVESTIGATION OF MEDIUM AND HIGH TEMPERATURE PHASE CHANGE MATERIALS FOR THERMAL ENERGY STORAGE Final Report, Apr. 1980
Dietmar Heine, Friedrich Hess, and Dieter Steiner Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 110 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-149; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,10

Investigations in the temperature ranges 200 to 450 C and 700 to 900 C, are reported. These investigations comprise the corrosion of structural materials together with promising storage materials and the thermal stability and the melting and freezing behavior of the storage materials. The mass losses of sheet metal samples were measured from the corrosion tests, and thickness reduction and corrosion rate were calculated. The corrosion type was determined using microscopes. Furthermore, melting and freezing curves were continually measured during cycling tests. The thermal stability of the storage materials was thereby determined as a function of the melting and freezing properties. The combinations mild steel with NaNO3, boiler steel with KCl-ZnCl2, NaNO3 and MgCl2-NaCl, and NiCu30Fe with KCl-ZnCl2 were found to be compatible in the temperature range 200 to 450 C. T.M.

N82-15537# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
ORGANIC FLUIDS FOR THE PRACTICAL USE IN ENERGY CONVERSION SYSTEMS OF SOLAR POWER PLANTS Final Report, Jun. 1980
Guenther Schmidt, Dietmar Wolf, and Eberhard Raasch Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 76 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-154; ISSN-0340-7608) Avail: NTIS HC A05/MF A01

With respect to their specific performance, the most promising organic fluids were determined for their practical use in Rankine cycles operating in the temperature range between 150 and 400 C. For these fluids, the process cycle efficiencies were compared for different temperature levels. Laboratory experiments with a great number of fluids and lubricants results in the estimation of the operation limit in Rankine Cycles. A test facility consisting of a heating system, an organic Rankine cycle and a control and measurement system was designed, built, and put into operation for testing various working fluids. Author

N82-15538# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
HIGH EFFICIENT COLLECTOR FOR SMALL SOLAR-POWERED FACILITIES Final Report
Eugen Obermayr, Wolfgang Molt, Dieter Schneller, and Klaus Speidel Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 100 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-156; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21

A series of preliminary investigations and laboratory tests were performed as a basis for developing a new type of solar collector. The vacuum flat plate collectors are actually evaporators, where the working medium is evaporated within the collector itself. Prototypes of direct evaporation collectors were constructed and tested. In the temperature range seen for this application (130 - 150 C), the collector efficiency is about 40 - 50 percent. L.F.M.

N82-15539# Heraeus (W. C.) G.m.b.H., Hanau (West Germany). Produktbereich Vakumtechnik.
DEVELOPMENT OF A PROCESS FOR AN INEXPENSIVE PRODUCTION OF THIN FILM SOLAR CELLS ON AN INDUSTRIAL SCALE Final Report, Jul. 1980
Norbert Ruecker Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 32 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-159; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,70

A process was developed for an inexpensive production of CdS/Cu(x)S solar cells on an industrial scale. Using a pre-covering evaporated thickness of 3 micron Cd-films exhibit a grain size of more than 3 micron. Cadmium can be converted to alpha-CdS by a thermal treatment in a H2S-containing atmosphere. It is expected that the time of conversion can be reduced by optimizing the process. The CdS grain size is some tenths of a micron on the surface; below the surface it increases. The resistivity of converted CdS-layers can be enhanced in a definite manner by exposure to a glow discharge containing H2S. Using this technique the connection of the CdS-layer to the substrate by means of Cd-metal is guaranteed. Further investigations should be extended to thicker layers. The Cu(x)S-film should be formed by thermal evaporation. J.M.S.

N82-15540# Kraftanlagen A.G., Heidelberg (West Germany).
THE MIT ABU EL KOM SOLAR DEMONSTRATION PROJECT IN EGYPT. PHASE A: SOLAR THERMAL INSTALLATIONS Final Report, Mar. 1980
Friedrich Reinmuth Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 71 p refs In GERMAN; ENGLSH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-164; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,90

Maintenance-free solar installations were tested under unfavorable operating conditions in a village in Egypt. Thirty-five simple domestic hot water installations, designed as natural circulation systems of a collector surface of 2 sqm each and a 120 liter boiler mounted on the roof were examined. These installations were completely mounted and commissioned. The performance and efficiency of the systems were satisfactory. T.M.

N82-15541# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
COMPARISON OF CONCEPTS FOR SOLAR-HEATED OR SOLAR-DRIVEN ABSORPTION AND COMPRESSION COOLING MACHINES FOR AIR CONDITIONING AND FOOD PRESERVATION PURPOSES, PHASE 1 Final Report, Nov. 1978
Herbert Grallert, Manfred Herbricht, and Martin Margulies Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 91 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-165; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,10

For the cooling power range of about 10 to 500 kW and for cooling temperatures of +20, 0, and -20 C, a comparison was made between solar heated absorption machines and compression machines, which are driven by a solar heated Rankine cycle. Comparison criteria are C.O.P., energy prices, and application risks. All partial efficiencies and costs were determined by component analyses. For several cooling loads an annual system simulation was performed using MBB computer programs. Furthermore, the electric energy demand for absorption cooling systems was estimated and initial application recommendations are given. Author

N82-15542# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany). Inst. fuer Technische Physik.
HYDROGEN AS CARRIER OF SECONDARY ENERGY: PROPOSAL FOR A RESEARCH AND DEVELOPMENT PROGRAM
H. Buhl, C. Carpetis, J. Nitsch, W. Peschka, T. Schott, W. Seeger, W. Schnurnberger, H. Steeb, and H. J. Sternfeld Jun. 1981 94 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-732)
(DFVLR-Mitt-81-10) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 14,20

The nuclear or solar production of hydrogen may become economically attractive in the future. The technological problems of the production and the introduction of hydrogen into the energy system are shown. Suitable research development efforts are recommended to achieve a complete ensured scope of knowledge concerning hydrogen systems. A.R.H.

N82-15543# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
ROLE OF LARGE SCALE ENERGY SYSTEMS MODELS IN R&D PLANNING
J. Lamontagne Nov. 1980 13 p refs Presented at the ORSA/TIMS Conf., Colorado Springs, 9 Nov. 1980
(Contract DE-AC02-76CH-00016)
(DE81-026058; BNL-29751; CONF-801126-3) Avail: NTIS HC A02/MF A01

The development of alternative technologies to provide new sources of energy and extend the lives of current ones is discussed. The influence of model results on energy policy makers who are not knowledgable about flaws or uncertainties in the models, errors in assumptions in model inputs which can result in faulty forecasts, the overall usefulness of energy system models, and model limitations are discussed. It is concluded that energy models should be clearly related to specific issues and methodologies should be clearly related to specific decisions, and allow adjustments to be easily made for alternative assumptions and for additional knowledge gained during the evolution of the energy system. DOE

N82-15544# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
LOW-COST PASSIVE-SOLAR RETROFITS FOR NEW AND EXISTING MOBILE HOMES
Steve Brent and Michael Holtz Jul. 1981 6 p refs Presented at the 6th AS/ISES Natl. Passive Conf., Portland, Oreg., 8-12 Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-028356; SERI/TP-721-1138R; CONF-810925-17) Avail: NTIS HC A02/MF A01

Passive solar heating and cooling retrofit options can significantly reduce the energy consumption of new and existing mobile homes. The initial efforts of the Solar Energy Research Institute to explore the solar potential for the existing stock of mobile homes and those in the production stage are described. DOE

N82-15545# Midwest Research Inst., Golden, Colo.
INDUSTRIAL PROCESS HEAT APPLICATIONS FOR SOLAR THERMAL TECHNOLOGIES
David Feasby and David W. Kearney Jun. 1981 9 p refs Presented at the 3rd Intern. Conf. on Energy Use Management, West Berlin, 26 Oct. 1981
(Contract DE-AC02-77CH-00178)
(DE81-025934; SERI/TP-733-1278; CONF-811006-2) Avail: NTIS HC A02/MF A01

Selected solar industrial process heat (IPH) activities under development in the US are reviewed. Included are: a summary of the IPH field test program, status of solar thermal technologies, and results of specific technology/application matching and market studies. The near term viability of solar technologies in the industrial sector is dependent upon both the economic and technical issues which vary depending on the application, plant site, and system selected. DOE

N82-15546# Sandia Labs., Albuquerque, N. Mex.
SANDIA PROGRAM IN GEOTHERMAL TECHNOLOGY DEVELOPMENT
J. R. Kelsey and B. C. Caskey 1981 4 p refs Presented at the Geothermal Resources Council Ann. Meeting, Houston, Tex., 25 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025394; SAND-81-1490C; CONF-811015-4) Avail: NTIS HC A02/MF A01

The accomplishments of the geothermal research program, the status of current projects, and plans for future activities are presented. The program includes R and D in high temperature rock penetration mechanics, drilling fluids borehole mechanics, and diagnostics technology. DOE

N82-15547# Coury and Associates, Inc., Denver, Colo.
FEASIBILITY ANALYSIS OF GEOTHERMAL DISTRICT HEATING FOR LAKEVIEW, OREGON Final Report
23 Dec. 1980 93 p refs Prepared for Northwest Geothermal Corp., Portland Oregon
(Contract DE-AC51-79ET-27229)
(DOE/ET-27229/T1) Avail: NTIS HC A05/MF A01

A substantial resource capable of supporting extensive residential, commercial and industrial heat loads is indicated. Good resource productivity is expected with water temperatures of 200 F at depths of 600 to 3000 feet in the immediate vicinity of the town. Preliminary district heating system designs were developed for a Base Case serving 1170 homes, 119 commercial and municipal buildings, and a new alcohol fuel production facility; a second design was prepared for a downtown Mini-district case with 50 commercial users and the alcohol plant. Capital and operating costs were determined for both cases. Initial development of the Lakeview system has involved conducting user surveys, well tests, determinations of institutional requirements, system designs, and project feasibility analyses. DOE

N82-15548# Battelle Pacific Northwest Labs., Richland, Wash.
COMPRESSED-AIR ENERGY-STORAGE TECHNOLOGY: PROGRAM OVERVIEW
L. D. Kannberg Jul. 1981 7 p Presented at the Mech., Magnetic and Underground Energy Storage Ann. Contractor's Rev. Meeting, Washington, D.C., 24 Aug. 1981
(Contract DE-AC06-76RL-01830)
(DE81-030103; PNL-SA-9780; CONF-810833-8) Avail: NTIS HC A02/MF A01

A new technology designed to reduce the consumption of oil in the generation of electric power was developed. The program has two major elements: reservoir stability studies and second generation concepts studies. The reservoir stability studies are aimed at developing stability criteria for long term operation of large underground reservoirs used for compressed air storage. The second generation concepts studies are aimed at developing new concepts that will require little or no petroleum fuels for operation. The program efforts are outlined and major accomplishments towards the objectives of the program are identified. DOE

N82-15549# Mound Lab., Miamisburg, Ohio.
CHARACTERIZATION OF RADIATION-CROSSLINKED, HIGH-DENSITY POLYETHYLENE FOR THERMAL ENERGY STORGE APPLICATIONS
Ruth B. Whitaker, Stephen M. Craven, Donald E. Etter, and Eugene F. Jendrek 1981 8 p refs Presented at the 11th North Am. Thermal Anal. Soc. Conf., New Orleans, 19 Oct. 1981
(Contract DE-AC04-76DP-00053)
(DE81-024915; MLM-2836-OP; CONF-811014-1) Avail: NTIS HC A02/MF A01

Characterization of the crosslinked, form stable high density polyethylene (HDPE) pellets produced by electron beam radiation crosslinking, and the effects of crosslinking on crystallinity and heat of fusion were studied. Methods used include differential scanning calorimetry, Fourier Transform Infrared Spectroscopy (FTIR), and X-ray diffraction measurements. It is indicated that the crosslinking occurs primarily in the amorphous regions of the polyethylene. The FTIR spectroscopy was used to estimate the relative amounts of crosslinking occurring with the varying radiation dosages, and the uniformity of crosslinking throughout the pellets. It is found that the amount of crosslinking from the outside to the center of the pellets is uniform, which assists in maintaining long term form stability in the pellets. DOE

N82-15550# Oak Ridge Associated Universities, Tenn.
INDIVIDUAL BIOMASS FACILITY REPORTS. SUPPLEMENT TO SOME EMPLOYMENT AND EARNINGS IMPLICATIONS OF REGIONAL BIOMASS ENERGY UTILIZATION: NEW ENGLAND AND THE CORNBELT STATES
Joanna R. Little, Sharon E. Bell, Larry M. Blair, Ruth M. Gove, Wayne Stevenson, and Robert F. Tamura Aug. 1981 155 p
(Contract DE-AC05-76OR-00033)
(DE81-028523; ORAU-181B) Avail: NTIS HC A08/MF A01

Research was conducted to determine the direct employment and earnings implications of regional biomass energy utilization. Details of the primary data collected during the course of the investigation are provided. A case studies approach was used to observe and analyze various biomass energy systems. Visits were made to existing biomass facilities and data on their operation and employment requirements were collected. Information on planned or potential future facilities was also obtained. When this information was analyzed, a fairly accurate picture of the current situation as well as the rate and direction of future development in biomass was attained. Separate descriptions are included for each facility visited or for each interview obtained. The facility reports are organized according to fuel cycle (wood-fuel, alcohol-fuel, municipal solid waste facilities, others). DOE

N82-15551# Monsanto Research Corp., Dayton, Ohio.
LOW-COST MIRROR CONCENTRATOR BASED ON INFLATED, DOUBLE-WALLED, METALLIZED, TUBULAR FILMS Final Report
J. L. Schwendeman, G. L. Ball, III, J. W. Leffingwell, and C. E. McClung Jul. 1981 121 p refs
(Contract DE-AC04-78AL-04227)
(DE81-027813; MRC-DA-944; ALO-4227-6) Avail: NTIS HC A06/MF A01

A potentially low cost, inflatable plastic solar mirror concentrator based on segments of a cylinder joined along the length of the collector on a plane passing through the axis of the absorber tube was designed and built. This design results in a savings of approximately 40% in the amount of window and mirror material and in a savings of about 20% of the land area occupied by a single collector when compared to a fully cylindrical one. The type of construction permits the assembling of the mirror/window envelope to the collector without disturbing the collector frame, absorber tube, or the associated plumbing. Aluminum foil plastic laminates were used as an alternative to aluminized polyester films, because of their potential low cost and durability. Specially ultraviolet stabilized and polyester scrim reinforced flexible polyvinyl chloride film was developed for use as the outer cover material. DOE

N82-15552# SRI International Corp., Menlo Park, Calif.
EXPLORATORY STUDY OF COAL-CONVERSION CHEMISTRY Quarterly Report, 20 Jun. 1980 - 19 Sep. 1981
4 Mar. 1981 35 p refs
(DE81-016136; DOE/ET-14855/12) Avail: NTIS HC A03/MF A01

The mechanism of cleavage of key bond types present in coals, and catalysis of conversion in CO-H2O systems are described. Catalytic carbon-carbon and carbon-oxygen bond cleavage in coal related diphenylmethane and diphenyl ether structures were measured. The homogeneous scission of carbon-oxygen bonds in diphenyl ether structure was also studied. The CO-H2O conversion level is obtained with aqueous solutions either at a starting pH above 12.6 or in neutral solutions with water soluble catalysts present. Catalysts, including the potassium or sodium salts of molybdate, chromate, manganate, and tungstate was studied and it is found that all are effective in the 3000 to 6000 ppM range. The nitrate was converted to ammonium ion and formate was detected in the product aqueous phase. It is found that catalytic quantities of sodium formate in CO/H2O at pH 7 are effective in the conversion. DOE

N82-15553# Stoller (S. M.) Associates, New York.
POTENTIAL CONTRIBUTION OF CURRENTLY OPERATING NUCLEAR-FUELED ELECTRIC-GENERATING UNITS TO REDUCING US OIL CONSUMPTION
R. H. Koppe, Eric A. J. Olson, and Kenneth R. VanHowe 30 Sep. 1980 56 p Prepared for ORNL
(Contract W-7405-eng-26)
(DE81-030497; ORNL/Sub-80/40416/1) Avail: NTIS HC A04/MF A01

The prospect for performance improvement in the 62 operating light water reactors was examined. It is found that in the short term, capacity factor improvement of about 16 percent can be achieved, in response to a short term energy crisis. In the long term a gain of 18 percent can be achieved. Such gains represent a decrease in equivalent oil consumption of approximately 350,000 barrels a day. Potential increases in the operating power level of these units, are evaluated. This total short term power level increase would be equivalent to 138,000 barrels of oil per day. DOE

N82-15554# Department of Energy, Washington, D. C. Office of Energy Management and Extension.
ANNUAL REPORT TO THE PRESIDENT AND THE CONGRESS ON THE STATE ENERGY CONSERVATION PROGRAM FOR CALENDAR YEAR 1980
Jul. 1981 40 p
(DE81-025862; DOE/CE-0016) Avail: NTIS HC A03/MF A01

The activities of the fifth year's operation (December 1979 through December 1980) of the state energy conservation program are reported. The program requires states to develop and implement plans that will reduce projected energy consumption by 5% or more in 1980. Five program measures required to be eligible for financial assistance under the plan and three program measures under a supplemental plan are described and outlined. The details of program operation and results to date are reported. Program management in a description of selected innovative state Program measures are described. The President's Program for economic recovery is evaluated. DOE

N82-15555# Pacific Northwest Lab., Richland, Wash.
TECHNOLOGY CHANGE AND ENERGY CONSUMPTION: A COMPARISON OF RESIDENTIAL SUBDIVISIONS
L. A. Nieves and A. L. Nieves 1981 38 p Presented at the 56th Ann. Conf. of the Western Econ. Assoc., San Francisco, 2-6 Jul. 1981
(Contract DE-AC06-76RL-01830)
(DE81-030075; PNL-SA-9049; CONF-810757-2) Avail: NTIS HC A03/MF A01

The energy savings in residential buildings likely to result from implementation of the building energy performance standards (BEPS) were assessed. The goals were to: compare energy use in new homes designed to meet or exceed BEPS levels of energy efficiency with that in similar but older homes designed to meet conventional building codes, and to survey the home owners regarding their energy conservation attitudes and behaviors and to ascertain the degree to which conservation attitudes and behaviors are related to residential energy use. The consumer demand theory which provides the framework for the empirical analysis is presented. The sample residences are described and the data collection method discussed. The definition and measurement of major variables are presented. DOE

N82-15556# Minnesota Geological Survey, St. Paul.
MOORHEAD DISTRICT HEATING, PHASE 2 Final Report
R. E. Sundberg Jan. 1981 429 p refs
(Contract DE-AC02-78CS-20074)
(DE81-029689; DOE/CS-20074/1) Avail: NTIS HC A19/MF A01

The feasibility of developing a demonstration cogeneration hot water district heating system was studied. The district heating system would use coal and cogenerated heat from the Moorhead power plant to heat the water that would be distributed through underground pipes to customers or their space and domestic water heating needs, serving a substantial portion of the commercial and institutional loads as well as single and multiple family residences near the distribution lines. The technical feasibility effort considered the distribution network, retrofit of the power plant, and conversion of heating systems in customers' buildings to use hot water from the system. The system would be developed over six years. The economic analysis consisted of a market assessment and development of business plans for construction and operation of the system. Rate design methodology, institutional issues, development risk, and the proposal for implementation are discussed. DOE

N82-15557# Ames Lab., Iowa. Dept. of Materials Science and Engineering.
SOME THERMOELECTRIC PROPERTIES OF THE LIGHT RARE EARTH SESQUISELENIDES (R2Se/SUB3-X/)
T. Takeshita, B. J. Beaudry, and K. A. Gschneidner, Jr. 1981 5 p refs Presented at the IECEC Conf., Atlanta, 9-14 Aug. 1981
(Contracts W-7405-eng-82; WPAS-AE-15-25)
(DE81-025526; IS-M-329; CONF-810812-29) Avail: NTIS HC A02/MF A01

Rare earth sesquiselenides of the Th3P4 structure which show variable electric properties over their homogeneity range.

i.e., ranging from metallic to semimetallic to semiconducting were analyzed. The composition change is due to the formation of metal vacancies in the Th3P4 structure with no vacancies at R3Se4 and 4.75 at. % vacancies at R2Se3. The rare earth sesquiselenides are refractory materials and of interest for high temperature thermoelectric applications. Preliminary results of thermoelectric power and electrical resistivity measurements on the light lanthanide sesquiselenides are presented. DOE

N82-15558# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
DESIGN AND ECONOMICS OF DIRECT-CONTACT SALT HYDRATE STORAGE SYSTEMS
John D. Wright May 1981 9 p refs Presented at the 2nd World Congr. of Chem. Eng., Montreal, 4-9 October 1981
(Contract EG-77-C-01-4042)
(SERI/TP-631-1163; CONF-811007-3) Avail: NTIS HC A02/MF A01

A salt hydrate latent heat storage system in which oil is injected at the bottom of the container and exhanges heat as it floats to the top where it is pumped back to the heat source is described. Two experiments are described: (1) to reliably inject the oil into the salt phase; and (2) to minimize the carryover of salt hydrate into the oil, which can be done using two stage coalescer filters. Three systems are described and compared: a standard liquid based sensible heat storage system, a latent heat storage design where oil is the heat transfer fluid throughout the system, and a latent heat storage system where ethylene glycol/water is used in the collectors and oil in the storage tank. DOE

N82-15559# Los Alamos Scientific Lab., N. Mex.
HOT DRY ROCK GEOTHERMAL PROSPECTS, 1981
F. Goff, A. W. Laughlin, J. Aldrich, M. E. Ander, B. H. Arney, E. Decker, J. Gardner, G. Heiken, A. J. Kron, C. M. LaDelfe et al 1981 5 p refs Presented at the Geothermal Resources Council Ann. Meeting, Houston, Tex. 25-29 Oct. 1981
(Contract W-7405-eng-36)
(DE81-025305; LA-UR-81-1807; CONF-811015-8) Avail: NTIS HC A02/MF A01

Sites within the USA as candidates for development of a second hot dry rock (HDR) geothermal system were assessed. Potential sites examined fall broadly into three categories according to the nature of their thermal anomalies: (1) quaternary magmahydrothermal (volcanic or igneous) systems; (2) regional thermal anomalies of tectonic origin; and (3) prequaternary plutonic and metamorphic complexes. Sites with both electrical generation and direct use potential were considered however, efforts were concentrated on electrical sites. DOE

N82-15560# Pacific Northwest Lab., Richland, Wash.
WIND SPEED SIMULATION FOR ECONOMIC EVALUATION OF WIND ENERGY CONVERSION SYSTEMS
J. V. Ramsdell, G. F. Athey, and M. Y. Ballinger Jul. 1981 14 p refs Presented at the 4th U.S. Natl. Conf. of Wind Eng. Res., Seattle, 26-29 Jul. 1981 Submitted for publication
(Contract DE-AC06-76RL-01830)
(DE81-030077; PNL-SA-9149; CONF-810742-3) Avail: NTIS HC A02/MF A01

A time series model was developed for the simulation of wind speeds. The model provides for the incorporation of systematic seasonal variation of the mean speed, standard deviation, and correlation of speeds. It also provides for incorporation of the systematic diurnal variation of the mean speed and the standard deviation. As a demonstration of the model capabilities, a number of simulations were using model parameters derived from data previously collected. The results of analyses of both sets of data, the simulated set and the real data, were compared. In general the major features found in the analyses of the real data are identifiable in the corresponding analyses of the simulated data. The primary difference between the two data sets is in the frequency of high wind speeds. The frequencies of hourly and daily average wind speeds greater than two standard deviations above the mean are underestimated slightly by the model. DOE

N82-15561# Sandia Labs., Albuquerque, N. Mex.
PROJECT DEEP STEAM: FOURTH MEETING OF THE TECHNICAL ADVISORY PANEL
R. L. Fox, A. B. Donaldson, S. W. Eisenhawer, C. M. Hart, D. R. Johnson, A. J. Mulac, J. R. Wayland, and L. J. Weirick Jul. 1981 104 p Proceedings of Meeting held at Albuquerque, N.Mex., 4-5 Nov. 1980
(Contract DE-AC04-76DP-00789)
(DE81-029457; SAND-81-0043) Avail: NTIS HC A06/MF A01

The status of project DEEP STEAM was reviewed. Proceedings, are divided into five main sections: (1) the injection string modification program; (2) the downhole steam generator program; (3) supporting activities; (4) field testing; and (5) recommendations and discussion. DOE

N82-15562# Oak Ridge National Lab., Tenn. Computer Sciences Div.
PREPARATION OF MAGNETIC ANOMALY PROFILE AND CONTOUR MAPS FROM DOE-NURE AERIAL SURVEY DATA. VOLUME 1: PROCESSING PROCEDURES
Eddie P. Tennel and William J. Hinze (Purdue Univ.) Sep. 1981 139 p refs
(Contract W-7405-eng-26)
(DE81-030700; ORNL/CSD/TM-155-Vol-1) Avail: NTIS HC A07/MF A01

Total intensity magnetic anomaly data acquired as a supplement to radiometric data in preparing regional profile and contour maps are discussed. Survey contractor supplied magnetic anomaly data are subjected to a multiprocess, computer based procedure. This procedure is used to produce the following machine plotted maps: (1) profile map of contractor supplied magnetic anomaly data; (2) profile map of high cut filtered data with contour levels of each profile marked and annotated on the associated flight track; (3) profile map of critical point data with contour levels indicated; and (4) contour map of filtered and selected data. DOE

N82-15563# Mid-American Solar Energy Complex, Minneapolis, Minn.
SOLAR ENERGY TRAINING PROGRAM FOR CODE ENFORCEMENT PERSONNEL
Jun. 1981 17 p
(Contract DE-AC02-79CS-30150)
(DE81-030053; MASEC-CF-81-023; P-101-12/A-101-4) Avail: NTIS HC A02/MF A01

A training program for building code officials is discussed. The development of a new model building code for solar was coordinated and course materials was developed. A manual to inform code officials about the basics of passive and active solar energy and the model code is developed Michigan was selected as the target state. DOE

N82-15564# Mid-American Solar Energy Complex, Minneapolis, Minn.
SUMMARY OF PASSIVE SOLAR MULTI-FAMILY DESIGN WORKSHOPS
Jun. 1981 14 p
(Contract DE-AC02-79CS-30150)
(DE81-030353; MASEC-CF-81-035; P-103-4) Avail: NTIS HC A02/MF A01

Instructional materials on the design, construction, and marketing of passive solar multi-family residential buildings were developed. An outline of the workbook used for the workshops is presented, along with a list of the workshops. Promotional activities are described briefly. DOE

N82-15565# Mid-American Solar Energy Complex, Minneapolis, Minn.
EVALUATION OF THE PASSIVE SOLAR FOR AGRICULTURE PROGRAM
Sep. 1981 5 p refs
(Contract DE-AC02-79CS-30150)
(DE81-030056; MASEC-R-81-045; P-107-1) Avail: NTIS HC A02/MF A01

The stimulation of the use of passive and hybrid solar energy for farm homes is discussed. Redirection of DOE emphasis limits the FY '81 program to information transfer on the topic to requesting groups and individuals. DOE

N82-15566# Los Alamos Scientific Lab., N. Mex.

OXIDATION OF METAL SULFITES BY IODINE FOR USE IN THERMOCHEMICAL HYDROGEN CYCLES

C. F. V. Mason and M. G. Bowman 1981 6 p refs Presented at the 4th Intern. Energy Agency Annex 1 Workshop on Thermochem. Hydrogen, Julich, West Germany, 23-25 Sep. 1981 Submitted for publication
(Contract W-7405-eng-36)
(DE81-030253; LA-UR-81-2477; CONF-810942-5) Avail: NTIS HC A02/MF A01

It is noted that thermochemical hydrogen cycles involving metal sulfates offer an alternative to sulfuric acid which is corrosive and has high energy requirements for drying prior to its thermal decomposition. The formation of such metal sulfates in conjunction with a low temperature hydrogen formation step is discussed. The following reaction was studied: MgSO3(c) + MgO(c) + I2(g) yields MgSO4(c) + MgI2(c). Although magnesium sulfite appears promising for this oxidation, a search was conducted for alternative metal sulfites which fit the following criteria for use: (1) sulfate must decompose in the temperature range available (< 1400 K); (2) iodide must hydrolyze easily; and (3) salts must not be rare, toxic, or expencive. Lanthanum and titanium fit these criteria.
DOE

N82-15567# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

MICRO-HYDROPOWER IN THE UNITED STATES

R. O. Haroldsen and F. B. Simpson 1981 9 p refs Presented at WATERPOWER 1981 Conf., Washington, D.C., 22 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-028271; EGG-M-02781; CONF-8106137-5) Avail: NTIS HC A02/MF A01

The interest and problems relating to the development of micro-hydropower, i.e., capacities of less than 100 kW, was assessed. A total of 62 individuals from 10 states and 4 groups, i.e., developers, A/E firms, equipment manufacturers, and state and federal agencies, were polled to determine their perceptions of the advantages and disadvantages of micro-hydro developments and the needs for such developments. Financing, technical assistance, and help with the economic analysis and regulatory aspects of micro-hydro development appeared to be the paramount needs. Whether or not a specific site can be successfully developed depends on site conditions. A micro-hydro plant discussed as an example is shown to be a poor investment, e.g., maximum $200 per month return on $60,000 investment.
DOE

N82-15568# Pacific Northwest Lab., Richland, Wash.

SPECTRAL RESPONSE MEASUREMENTS FOR SOLAR CELLS

J. S. Hartman and M. A. Lind 1981 20 p refs From Com. Photovoltaics Meas. Workshop, Vail, Colo., 27-29 Jul. 1981
(Contract DE-AC06-76RL-01830)
(DE81-030097; PNL-SA-9751; CONF-810748-2) Avail: NTIS HC A02/MF A01

An overview of spectral response measurements, measurement systems, and potential measurement problems are described relative to the characterization of solar cells. Measurement systems are outlined for determining the spectral response, external quantum efficiency, and internal quantum efficiency of solar cells. Practical system components and measurement systems are presented along with their potential advantages and weaknesses. Finally, several solar cell properties (linearity, spatial uniformity, etc.) are discussed which must be considered before a measurement system can be designed to evaluate a specific type of solar cell.
DOE

N82-15569# Midwest Research Inst., Golden, Colo. Photoconversion Research Branch.

PHOTOELECTROCHEMICAL SOLAR CELLS: STABILIZATION OF SMALL-BAND-GAP SEMICONDUCTOR IN AQUEOUS SOLUTION BY SURFACE-ATTACHED ORGANIC CONDUCTING POLYMER

Arthur J. Frank Sep. 1981 13 p refs Presented at the Intern. Conf. on Low-Dimensional Conductors, Boulder, Colo., 10-14 Aug. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-030312; SERI/TP-233-1388; CONF-810864-1) Avail: NTIS HC A02/MF A01

Surface-attached polypyrrole films are shown to produce a marked improvement in the stability of n-type single-crystal and polycrystalline Si against oxidation in an aqueous electrolyte. The current production of n-type polycrystalline Si coated with polypyrrole deteriorates less than 30% during 122 hr of irradiation whereas the unprotected bare electrode stops producing photocurrent within 30 s. The polymer protection of the n-type single-crystal Si is significantly less than that of the polycrystalline material because of differences in the adhesion of the polymer film to the electrode surfaces. The adhesion strength is shown to depend on various surface properties of Si and other electrode materials. Moreover, the surface morphology of the electrode affects the topography of the growing surface of the polypyrrole film. Requirements are discussed for the applications of organic conducting polymers to photoelectrochemical devices utilized for solar energy conversion.
DOE

N82-15570# California Univ., Berkeley. Lawrence Berkeley Lab.

ENVIRONMENTAL PROGRAMS FOR OCEAN THERMAL ENERGY CONVERSION (OTEC)

P. Wilde Jul. 1981 10 p refs Presented at the Oceans 1981 Conf., Boston, 16 Sep. 1981
(Contract W-7405-eng-48)
(DE81-028876; LBL-12977; CONF-810911-2) Avail: NTIS HC A02/MF A01

The ocean thermal energy conversion (OTEC) which provides documented information on the effect of proposed operations on the ocean and the effect of oceanic conditions on the plant is discussed. The associated environment program consists of archival studies in potential areas serial oceanographic cruises to sites or regions of interest, studies from various fixed platforms at sites, and compilation of such information for appropriate legal compliance and permit requirements and for use in progressive design of OTEC plants. Four classes of environmental concerns are identified: (1) redistribution of oceanic properties; (2) chemical pollution; (3) structural effects and (4) socio-legal economic.
DOE

N82-15571# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.

COMPARATIVE THERMAL PERFORMANCE OF DIRECT GAIN, TROMBE, AND SUNSPACE WALLS

H. T. Ghaffari and R. F. Jones 1981 8 p refs Presented at the 6th Natl. Passive Conf., Portland, Ore., 8-12 Sep. 1981 sap
(Contract DE-AC02-76CH-00016)
(DE81-030546; BNL-29970; CONF-810925-21) Avail: NTIS HC A02/MF A01

The natural thermal storage features of the Brookhaven superinsulated house were analyzed and verified. These include the Trombe and sunspace passive-solar-collection walls and the superinsulated south-facing wall. The thermal contributions of each system were demonstrated. Several thermal characteristic factors, in relation to each design for the hourly and daily period, were assessed. Further, the interior temperature fluctuations and the reductions in the required auxiliary energy with regard to incorporated passive designs were evaluated.
T.M.

N82-15572# Department of Energy, Washington, D. C. Office of the Assistant Secretary for Conservation and Renewable Energy.

ANNUAL DOE ACTIVE SOLAR HEATING AND COOLING CONTRACTORS REVIEW MEETING

Sep. 1981 286 p refs Proc. of Conf. held in Washington, D.C., Sep. 1981
(DE81-028052; CONF-810912) Avail: NTIS HC A13/MF A01

Ninety three project summaries dicussing the following aspects of active solar heating and cooling are presented: Rankine solar cooling systems; absorption solar cooling systems; desiccant solar cooling systems; solar heat pump systems; solar hot water systems; special projects (such as the National Solar Data Network, hybrid solar thermal/photovoltaic applications, and heat transfer and water migration in soils); administrative/management support; and solar collector, storage, controls, analysis, and materials technology.
DOE

N82-15573# Eureka Labs., Inc., Sacramento, Calif.

HEATING AND COOLING APPLICATIONS OF ATRIUMS AND ATTACHED GREENHOUSES: A STATE-OF-THE-ART REPORT

Dec. 1980 113 p refs
(Contract DE-AC03-80SF-11511)
(DE81-022181; DOE/SF-11511/T1) Avail: NTIS HC A06/MF A01

The current state-of-the-art in atrium designs is described and its deployment status throughout the US is reported. Individual and computer subject searches of atriums and greenhouse were completed. An annotated bibliography of each reference reviewed was prepared and are listed in three categories: system characteristics; existing attached greenhouses and atriums, and current greenhouse design criteria. Atriums are defined; a classification scheme was developed; and operating modes are discussed. Atrium locations are identified by region. Simplified approaches to sizing atrium elements, emphasizing greenhouse materials, are discussed. DOE

N82-15574# Los Alamos Scientific Lab., N. Mex.

PASSIVE-SOLAR RETROFIT STUDY FOR THE UNITED STATES NAVY

William O. Wray and Charles R. Miles (Naval Civil Engineering Lab., Port Hueneme) 1981 6 p ref Presented at the Solar World Forum, Brighton, U.K., 23-28 Aug. 1981
(Contract W-7405-eng-36)
(DE81-030250; LA-UR-81-2500; CONF-810865-3) Avail: NTIS HC A02/MF A01

The purpose of the study was to determine the energy savings obtainable in concrete block buildings from several passive solar heating strategies. A procedure involving the use of test cell data and computer simulation was employed to assess the merits of six retrofit options. The six strategies selected were chosen on the basis of providing a series of options that will deliver increasing energy savings at the cost of correspondingly increased levels of commitment. DOE

N82-15575# California Univ., Berkeley. Lawrence Berkeley Lab.

INCREMENTAL COOLING LOAD DETERMINATION FOR PASSIVE DIRECT GAIN HEATING SYSTEMS

Paul W. Sullivan, Douglas Mahone, Winslow Fuller, James Gruber, Ron Kammerud, Wayne Place, and Brandt Anderson May 1981 5 p refs Presented at the Am. Sect. of the Intern. Solar Energy Soc., Philadelphia, 27-30 May 1981
(Contract W-7405-eng-48)
(DE81-029882; LBL-12048; CONF-810509-40) Avail: NTIS HC A02/MF A01

The applicability of the National Association of Home Builders (NAHB) full load compressor hour method for predicting the cooling load increase in a residence attributable to direct gain passive heating systems is examined. The NAHB method predictions are compared with the results of 200 hour-by-hour simulations using BLAST, and the two methods show reasonable agreement. The degree of agreement and the limitations of the NAHB method are discussed. DOE

N82-15576# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

SERI SOLAR-ENERGY-STORAGE PROGRAM

Charles E. Wyman Aug. 1981 3 p refs Presented at the Ann. DOE Active Solar Heating and Cooling Contractors Rev. Meeting, Washington, D.C., 14-16 Sep. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-029476; SERI/TP-620-1344; CONF-810912-11) Avail: NTIS HC A02/MF A01

The program provides research, system analysis, and assessments of thermal energy storage and transport in support of the Thermal Energy Storage Program of the DOE Division of Energy Storage Technology; emphasis is on thermal energy storage for solar thermal power and process heat applications and on thermal energy transport. Currently, research is in progress on direct-contact thermal energy storage and thermochemical energy storage and transport. In addition, SERI is directing the definition of new concepts for thermal energy storage and supporting research on thermal energy transport by sensible and latent heat media. SERI is performing systems analyses of thermal energy storage for solar thermal application and coordinating thermal energy storage activities for solar applications. DOE

N82-15577# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.

OVERVIEW OF ACTIVE SOLAR ABSORPTION/RANKINE COOLING PROGRAM

Michael Wahlig, Al Heitz, Harry Angerman, Ron Glas, and Mashuri Warren Jul. 1981 7 p Presented at the Active solar Contractors' Review Meeting, Washington, D.C. 9-12 Sep. 1981; sponsored by DOE
(Contract W-7405-eng-48)
(DE81-028041; LBL-13054-Rev; CONF-810912-13) Avail: NTIS HC A02/MF A01

The individual absorption and Rankine projects along with the main features and accomplishments/status of each and future plans were identified. The absorption program, was three active component development projects, four systems field test projects, one advanced fluid study project and one advanced cycle study project. Rankine program, includes five active component development projects, two system field test projects, and one advanced study project. DOE

N82-15578# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.

VERIFICATION OF BLAST BY COMPARISON WITH MEASUREMENTS OF A SOLAR-DOMINATED TEST CELL AND A THERMALLY MASSIVE BUILDING

Brandt Andersson, Fred Bauman, William Carroll, Ronald Kammerud, and Nina Friedman Apr. 1981 12 p refs Presented at the 3rd Ann. Systems Simulation and Econ. Anal. Operational Results Conf., Solar Energy Div., Reno, Nev., 27 Apr. - 1 May 1981; sponsored by ASME
(Contract W-7405-eng-48)
(DE81-029883; LBL-11387; CONF-810405-16) Avail: NTIS HC A02/MF A01

Temperatures were compared in a direct solar gain test cell and temperatures were predicted. The comparisons were performed for two distinct climate period. The test cell configuration and weather data manipulations, quantitative evaluations of the comparisons between measured and predicted interior temperatures, limitations of the comparisons, and sensitivities of the simulation results to uncertainties in the measured parameters are examined. In the second study, comparisons of BLAST predictions to temperatures and loads measured in a massive structure were carried out. The tests verifying the program's ability to: (1) calculate full scale building loads; and (2) accurately model hybrid cooling using forced ventilation. DOE

N82-15579# Ames Lab., Iowa.

TRANSWALL: A MODULAR VISUALLY TRANSMITTING THERMAL STORAGE WALL Status Report

J. F. McClelland, R. W. Mercer, L. Hodges, R. F. Szydlowski, P. H. Sidles, R. G. Struss, J. R. Hull (Argonne National Lab., Ill.), and D. A. Block 1980 8 p refs Presented at the Intern. Solar Energy Soc. Conf., Brighton, England, 24-27 Aug. 1980
(Contract W-7405-eng-82)
(DE81-029821; IS-M-345; CONF-8008123-1) Avail: NTIS HC A02/MF A01

The Transwall a semitransparent thermal storage wall system that offers a number of advantages over conventional direct gain and Trombe wall approaches is examined. Progress is reported in the design, fabrication, installation, and operation of a glass and aluminum prototype system. A facility for year round performance testing of the system is described and preliminary summer season thermal test data are presented. Thermal performance modeing results that predict heat loss reduction with a heat mirror coating on Transwall to be comparable to that obtained with R6 night insulation are reported. DOE

N82-15580# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

OVERVIEW AND FY 1981 PROGRESS ON OPEN-CYCLE OTEC POWER SYSTEMS

T. R. Penney and B. Shelpuk Aug. 1981 7 p refs Presented at the Oceans Conf., Boston, 19-21 Sep. 1981
(Contract EG-77-C-01-4042)
(DE81-029277; SERI/TP-634-1282; CONF-810911-3) Avail:

NTIS HC A02/MF A01

Progress in an advanced research and development program studying viable alternatives to closed cycle OTEC is reported. Work on a 100 MWe steam turbine, heat exchangers, and deaeration for Claude or open cycle OTEC systems are reported. Capsule descriptions of ocean energy conversion techniques are given, including wave energy conversion, ocean current energy conversion, and salinity gradient energy conversion as well as varieties of ocean thermal energy conversion. DOE

N82-15581# Los Alamos Scientific Lab., N. Mex.
USE OF OXIDE DECOMPOSITIONS IN ADVANCED THERMOCHEMICAL HYDROGEN CYCLES FOR SOLAR HEAT SOURCES. APPLICATION OF THE TRICOBALT TETRAOXIDE-COBALT MONOXIDE PAIR
W. M. Jones and M. G. Bowman 1981 9 p refs Presented at Intern. Energy Agency Annex 1 Workshop on Thermochem. Hydrogen, Julich, West Germany, 23 Sep. 1981
(DE81-030235; LA-UR-81-2628; CONF-810942-6) Avail: NTIS HC A02/MF A01

The concept of utilizing oxide decompositions in advanced thermochemical hydrogen cycles for solar heat sources is introduced. It allows direct transmission of energy to the process through an air window. Reaction (2) gives a high concentration of MgI2 that would be favorable for (3). The solutions contain iodine dissolved as polyiodide, partly offsetting this advantage. It is indicated that reaction (2) is slow at 150 C. It is surmised that the mechaniam of (2) consists of the iodine disproportionation reaction (6), followed by reaction (7). It was found that (6) was relatively fast and with a good yield at 150 C. Reaction (7) is sufficiently slow at 150 C to account for the slowness of (2). The yield of (7) is proportional to the square root of the time, suggesting that iodate must diffuse through an adherent, accumulating C0304 layer. DOE

N82-15582# Texas Univ., Austin. Fusion Research Center.
KINETIC THEORY OF ALFVEN WAVE HEATING
David W. Ross, G. L. Chen, and S. M. Mahajan Feb. 1981 7 p refs Presented at the 4th Topical Conf. on Radio Freq. Plasma Heating, Austin, Tex., 9-11 Feb. 1981
(Contract DE-AC05-76ET-53036)
(DE81-029777; DOE/ET-53036/25; CONF-810214-10) Avail: NTIS HC A02/MF A01

The heating of Tokamak plasmas by Alfven waves in cylindrical geometry using linearized kinetic equations was studied. The energy deposition and density fluctuations as functions of the plasma radius, as well as the total impedance for the experiments on the PRETEXT Tokamak are computed. Optimum conditions for heating are investigated. DOE

N82-15583# Vereinigte Elektrizitaetswerke Westfalen A.G., Dortmund (West Germany). Bereich Marketing.
ENERGY CONSUMPTION ANALYSIS AND COMPARATIVE STUDY OF THE OPERATIONAL RESULTS FROM HEAT PUMP PLANTS Final Report, Oct. 1979
Peter Mueller, Bernd Bewer, Heinz Klaus, Walter Sander, and Hans-Joachim Guenther Wirthwein Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 240 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-109; ISSN-0340-7608) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 40,50

Electric energy consumption with inclusion of the electricity consumption of the supplementary and auxiliary equipment is considered. Costs are divided into plant costs for heat pumps, heating systems and auxiliary equipment, installation costs for heat pumps, heating systems and auxiliary equipment, operating costs and maintenance costs. Specific energy consumption and cost statements were determined. Operational experiences were reviewed and the energetic operational behavior, including supplementary and auxiliary equipment for a random test of plants, is discussed. Author (ESA)

N82-15584# Institut fuer Kerntechnik und Energiewandlung e.V., Stuttgart (West Germany).
DEVELOPMENT OF A MODULAR HEAT EXCHANGER WITH INTEGRATED LATENT HEAT ENERGY STORE Final Report, Dec. 1979
Ashok Abhat, Dietmar Heine, Manfred Heinisch, Nikolaus A. Malatidis, and Guenther Neuer Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 247 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(Contract BMFT-PLE-ET-4060-A)
(BMFT-FB-T-81-050; ISSN-0340-7608) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 41,10

Latent heat storage materials and appropriate heat exchangers for solar heating applications, such as house heating and domestic hot water production were investigated. The melting and freezing characteristics and the effects of thermal cycling on a total of 12 substances, including paraffins, fatty acids and salt hydrates, were investigated and their corrosive interaction with five conventional construction materials was determined. The poor thermal conductivity of the heat storage materials requires the development of a modular finned heat pipe heat exchanger with increased heat transfer characteristics. A cost analysis is provided and comparisons with hot water storage indicate that latent heat storage has the potential of becoming economically more attractive than the former for domestic hot water production. Author (ESA)

N82-15585# Deutsche Automobilgesellschaft m.b.H., Esslingen (West Germany).
DEVELOPMENT OF GAS PHASE METALLIZED PLAQUES FOR ELECTRODES OF STORAGE BATTERIES, IN PARTICULAR FOR NICKEL OXIDE ELECTRODES Final Report, Jul. 1979
Rolf Linkohr and Herman Schladitz (Physikalisch-Chemisch Forchungslab.) Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 87 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-053; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,30

Nickel oxide electrode plaques for alkaline batteries were developed by nickel carbonyl vapor deposition plating on large fiber plaque substrates made of carbon. The most promising technique is the one in which carbonyl gas flows continuously through the carbon felt, allowing continuous processing as well as improved uniformity of the nickel distribution. Structural strength, electrical resistance, heat conduction, and gas permeation of the plaques were approximated by simple models which are borne out by experimental comparison it is indicated that electrochemical measurements in half cell arrangements are reached for nickel savings, capacity per unit area, and current capability. Author (ESA)

N82-15586# Varta Batterie A.G., Kelkheim (West Germany). Forschungs- und Entwicklungszentrum.
EXPERIMENTAL STUDY FOR RECHARGEABLE SEALED Ni/Cd WATCH BATTERIES Final Report
Helmut Haelbig Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 87 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-129; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,30

The potential feasibility of using Ni/Cd cells as energy storage devices in electronic wrist watches powered by solar cells was evaluated. It is shown that the necessary special requirements can only be met, if the following conditions are fulfilled: a minimal capacity of 35 mAh in a cell of the dimensions 11,4 mm in diameter and 5,1 mm in height; and a hermetic seal to prevent leakage. Long periods of overcharge with currents higher than 50 microns must be avoided in order to achieve a service life of 10 years. The minimal charge current must be 350 mA to provide an autonomy of 6 months, with a discharge current of 5 micro A. J.M.S.

N82-15587# Intermountain Forest and Range Experiment Station, Ogden, Utah.
DOWNED DEAD WOODY FUEL AND BIOMASS IN THE

NORTHERN ROCKY MOUNTAINS
James K. Brown and Thomas E. See Jul. 1981 52 p refs
(PB81-240517; FSGTR/INT-117) Avail: NTIS
HC A04/MF A01 CSCL 02F

Weights and volumes of downed woody material in diameter classes of one-fourth to 1, 1 to 3, and greater than 3 inches and forest floor duff depths were summarized from extensive inventories in nothern Idaho and Montana. Biomass loadings are shown by cover types and habitat types within National Forests. Total downed woody biomass ranged from 5 tons per acre in ponderosa pine to 33 tons per acre in cedar-hemlock. Loadings generally increased with increased productivity, but varied greatly with stand age. Fuels tended to become predictably high in overmature stands but unpredictable in young, immature, and mature stands. Forest fuel succession is discussed in relation to tree mortality, fuel buildup, and depletion. GRA

N82-15588# Iowa State Univ. of Science and Technology, Ames. Engineering Research Inst.
THE CONVERSION OF AGRICULTURAL BY-PRODUCTS TO SUGARS Final Report
Peter J. Reilly Mar. 1981 200 p refs
(Contract NSF PFR-77-00198)
(PB81-241432; ISU-ERI-AMES-81188; NSF/CPE-81008) Avail: NTIS HC A09/MF A01 CSCL 02A

The following objectives were attained: optimizing the immobilization of beta-xylosidase; determining the effects of temperature and pH on the activity and stability of immobilized beta-xylosidase and comparing the results with those from soluble beta-xylosidase; and preparing model substrates of known composition. A summary of what is known about the xylanase family is given. A comprehensive literature search of the catalytic properties of the glycoside glycohydrolase family, of which beta-xylosidase is a member, is presented. Results on the purification, immobilization, and characterization of beta-xylosidase are given. An overview of the purification of various xylanases is supplied. The purification and characterization of the five homogeneous xylanases purified in this study are detailed. GRA

N82-15589# Mitre Corp., McLean, Va. Metrek Div.
ENERGY AND DEVELOPMENT IN CENTRAL AMERICA. VOLUME 1: REGIONAL ASSESSMENT Final Report, Oct. 1979 - Feb. 1980
Wayne Park, Wayne Park, Carole Neves, Ranvir Trehan, William Gallagher, Phillip Palmedo, Andres Doernberg, Keith Oberg, and Steven Kyle Feb. 1980 128 p refs Prepared in cooperation with Energy/Development International 2 Vol.
(Contract AID/SOD/PDC-C-0146)
(PB81-231540; MTR-80W601-Vol-1) Avail: NTIS
HC A07/MF A01 CSCL 10A

A regional energy assessment of six Central American countries is presented. The purpose is to assist these countries in defining, planning, and meeting energy requirements implicit in their economic and social development goals. The following topics are treated: Central America Regional energy assessment; energy issues; geographical, social, and economic aspects; energy resources; current energy use and future energy use; energy strategies. GRA

N82-15590# Mitre Corp., McLean, Va. METREK Div.
ENERGY AND DEVELOPMENT IN CENTRAL AMERICA. VOLUME 2: COUNTRY ASSESSMENTS Final Report, Oct. 1979 - Feb. 1980
Wayne Park, Carole Neves, Ranvir Trehan, William Gallagher, Phillip Palmedo, Andres Doenberg, Keith Oberg, and Steven Kyle Mar. 1980 350 p refs Prepared in cooperation with Energy/Development International 2 Vol.
(Contract AID/SOD/PDC-C-0146)
(PB81-231557; MTR-80W602-Vol-2) Avail: NTIS
HC A15/MF A01 CSCL 10A

An energy assessment for each of six Central American countries - Guatemala, El Savador, Honduras, Nicaragua, Costa Rica, and Panama is presented. The program assists the U.S. Agency for International Development and other development organizations in defining energy programs in Central America. The following issues are treated separately for each individual country: geographic, social and economic aspects; energy resources; current and future energy use; energy strategies. GRA

N82-15591# Tata Inst. of Fundamental Research, Bombay (India). Documentation Centre.
INDIAN ENERGY ABSTRACTS
Mar. 1981 46 p
(PB81-232316) Avail: NTIS HC A03/MF A01 CSCL 10A

The document provides abstracting coverage of scientific and technical energy literature originating from Indian Government Departments, Universities, National Laboratories, and other research institutions including industries. The scope encompasses all forms of renewable sources of energy and more efficient and less polluting use of fossil and fissile fuels. DOE

N82-15592# National Academy of Sciences - National Research Council, Washington, D. C. Advisory Committee on Technology Innovation.
SUPPLEMENT TO ENERGY FOR RURAL DEVELOPMENT: RENEWABLE RESOURCES AND ALTERNATIVE TECHNOLOGIES FOR DEVELOPING COUNTRIES Final Report
1981 248 p refs
(Contract AID/TA-C-1433)
(PB81-231011; CIR/BOSTID/38) Avail: NTIS
HC A11/MF A01 CSCL 10A

The publication energy for rural development: renewable resources and alternative technologies for developing countries, which presented information on a variety of subjects, including direct uses of solar energy (heating, cooling, distillation, crop drying, photovoltaics), indirect uses of solar energy (wind power, hydropower, photosynthesis, biomass), geothermal energy, and energy storage is reviewed. New technologies developed and advances made in technologies are discussed. GRA

N82-15593# TRW Energy Systems, Redondo Beach, Calif.
SAMPLING AND ANALYSIS OF POTENTIAL GEOTHERMAL SITES Final Report, Apr. 1978 - Apr. 1979
R. Sung, G. Houser, D. Strehler, and K. Scheyer Aug. 1981 205 p refs
(Contract EPA-68-03-2560)
(PB81-240061; EPA-600/7-81-138) Avail: NTIS
HC A10/MF A01 CSCL 08I

Information on the physical, chemical and radiochemical data of geothermal manifestations (wells and springs) in areas with the most probable potential for development was documented. The information can be used to evaluate control technologies and to ultimately establish emission/discharge standards for the emerging geothermal industry. GRA

N82-15594# Bureau of the Census, Washington, D. C.
FUELS AND ELECTRIC ENERGY CONSUMED
Feb. 1981 25 p
(PB81-240442; MIC-77-SR-5) Avail: NTIS HC A02/MF A01
CSCL 08I

The following topics on energy consumption are reported: general summary, type of operation, size of establishment, type of organization, assets and capital expenditures, fuels and electric energy consumed, and water use. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-15595 Deutscher Wetterdienst, Offenbach am Main (West Germany).
REPORTS FROM THE GERMAN METEOROLOGICAL SERVICE, NUMBER 154: STATISTICS OF THE MAXIMUM MIXING HEIGHT ACCORDING TO RADIOSONDE MEASUREMENTS FOR THE AEROLOGICAL STATIONS OF THE GERMAN METEOROLOGICAL SERVICE FOR THE PERIOD 1957-1973 [BERICHTE DES DEUTSCHEN WETTERDIENSTES, NR 154: STATISTIK DER MAXIMALEN MISCHUNGSSCHICHTHOEHE NACH RADIOSONDENMESSUNGEN AN DEN AEROLOGISCHEN STATIONEN DES DEUTSCHEN WETTEDIENSTES IM ZEITRAUM 1957-1973]
Anneliese Gutsche and Christiana Lefebvre 1981 56 p refs
In GERMAN; ENGLISH summary
(ISSN-0072-4130; ISBN-3-88148-186-9) Avail: Issuing Activity

As MMH is the upper limit of the atmospheric layer in which vertical mixing through convection occurs, it is a measure of the atmospheric dispersion and dilution capability of air pollution. As air pollution is more critical on dry days, days with precipitation and/or temperature decrease at the surface after the radiosonde ascent were treated separately and in less detail. The daily values of MMH were divided in 200 and 500 m classes and mean numbers of occurrences of each class were computed for months, seasons and the year as well as monthly averages. The results are represented in tables and diagrams and discussed. Seasonal and regional effects on the formation of the mixing height are identified. Selected weather situations are discussed and the correlation between mixing height and pollution level is established. Author (ESA)

N82-15596# Prins Maurits Lab. TNO, Rijswijk (Netherlands). Inst. voor Chemische en Technologische Research.
POLLUTION OF THE SOIL BY AVIATION GASOLINE
A. Verweij Aug. 1979 26 p ref In DUTCH; ENGLISH summary
(Contract A78/KL4/146)
(PML-1979-41; TDCK-73390) Avail: NTIS HC A03/MF A01

A literature search was conducted to determine the effects of aviation gasoline spills and more general oil spills on the environment and on the condition of oil storage tanks. Remedial measures are presented. Attention is given to natural restoration processes as well as to actions to speed up these processes. Author

N82-15597# Mainz Univ. (West Germany). Inst. fuer Arbeits- und Sozialmedizin.
RESULTS OF THE THIRD INTERNATIONAL CONGRESS ON NOISE EFFECTS: AS A PUBLIC HEALTH PROBLEM; BIOLOGICAL DISTURBANCES; EFFECTS ON BEHAVIOR Final Report, Feb. 1979
Sieglinde Rehm, Gerd Jansen, Eckhard Gros, and Barbara Griefahn Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 44 p In GERMAN; ENGLISH summary Presented at Freiburg, West Germany, 25-29 Sep. 1978 Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-HA-81-013; ISSN-0171-7618) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9.30

The essentials of the German governmental program on humanization at work-places as well as noise effects research since the Dubrovnik-Congress 5 years ago were presented by about 100 scientists from different countries all over the world. Topics cover: (1) noise induced hearing loss; (2) noise and communication; (3) noise induced extraaural physiological effects; (4) influence of noise on efficiency and behavior; (5) noise induced disturbances of sleep; (6) noise induced community reactions; (7) noise and animals; and (8) noise and other physical and/or chemical agents affecting man. Proposals for near future research requirements and priorities of noise effects research are developed. Author

N82-15598# Battelle Pacific Northwest Labs., Richland, Wash.
ECOLOGICAL EFFECTS ASSESSMENT: REQUIREMENTS VS STATE-OF-THE-ART
D. H. McKenzie, J. M. Thomas, and L. L. Eberhardt May 1981 31 p refs Presented at the 3rd Conf. on Waste Heat Management and Utilization, Miami, Florida, 12 May 1981
(Contract DE-AC06-76RL-01830)
(DE81-028092; PNL-SA-9292; CONF-810545-5) Avail: NTIS HC A03/MF A01

Current requirements and the state-of-the-art in ecological effects assessments in regard to nuclear power plants are studied. The current cooling system approaches, data collection programs, and ecological effects assessments are discussed. A timely review and evaluation of current practice is called for. The magnitude of economic and environmental resources being committed to cooling system alternatives mandates that the decision-making process result in as many optimal choices as possible. In addition, the resources being devoted to environmental data collection and integration provide considerable motivation for providing meaningful input to the decision-making process. It is maintained that the input should be as quantitative and as free from subjective content as is reasonably possible. An alternative viewpoint suggests that the past several decades of experience be considered but a first step, and the current task to be one of designing a second step. DOE

N82-15599# Battelle Pacific Northwest Labs., Richland, Wash.
EVALUATION OF THE USEFULNESS OF ECOLOGICAL SIMULATION MODELS IN POWER PLANT IMPACT ASSESSMENT
G. L. Swartzman, R. T. Hsar, and D. H. McKenzie May 1981 12 p refs Presented at the Intern. Symp. on Energy and Ecological Modelling, Louisville, Ky., 20 Apr. 1981
(Contract DE-AC06-76RL-01830)
(PNL-SA-9098; CONF-810488-2) Avail: NTIS HC A02/MF A01

Comparisons were made of the equations, rationale, data sources, and parameter values of 26 simulation models of fish and zooplankton population dynamics and energetics and results were compared in standard notation and units, process by process. The major process categories considered were composition, predation, metabolic processes, assimilation, growth, fecundity, recruitment, and mortality. A model simulation language was built to compare model equations process by process allowing convenient interchange of model equations for any process module. This simulator was parameterized to a test site, Lake Keowee, South Carolina, on which resides the Oconee nuclear power station. Model parameter estimation and comparison of these models with biological monitoring data allows evaluation of ecosystem models from the standpoint of prediction of behavior under normal and perturbed conditions, organization of data into an ecosystem framework, and evaluation of data to address impact questions. DOE

N82-15600# Battelle Pacific Northwest Labs., Richland, Wash.
SPECIATION OF AQUEOUS CONTAMINANTS - ROLE OF THE GEOCHEMICAL MODEL
Everett A. Jenne Jul. 1981 15 p refs Presented at the NBS Workshop on Aqueous Speciation of Dissolved Contaminants, Gaithersburg, Md., 18-20 May 1981
(Contract DE-AC06-79RL-01830)
(DE81-029976; PNL-SA-9584; CONF-810588-4) Avail: NTIS HC A02/MF A01

It is noted that a combination of accurate, selected analytical determinations and a competent geochemical model constitutes a means of achieving a thorough and reliable aqueous speciation of waters for the evaluation of societal risks resulting from anthropogenic inputs from energy related technologies. A reliable calculation of the distribution of species requires analytical determination of: (1) the quantity of each element in true solution; and (2) the amount of quantitatively and/or environmentally important aqueous species which are in disequilibrium. Due to the: (1) very numerous organic compounds which may be present; (2) the absence of Gibbs free energy and enthalpy data defining the association of these organic compounds with trace and major elements; and (3) the lack of competence of speciation-solubility models for organic ligands, the quantity of organic, trace-element complexes must, at the moment, be addressed analytically. DOE

N82-15601# Notre Dame Univ., Ind. Dept. of Civil Engineering.
HYDRODYNAMIC AND CHEMICAL MODELING OF HEAVY METALS IN ASH POND LEACHATES Progress Report, 1 Jul. 1980 - 31 Aug. 1981
Thomas L. Theis, David J. Kirkner, and Aaron A. Jennings Aug. 1981 55 p refs
(Contract DE-AC02-79EV-10253)
(DE81-028510; DOE/EV-10253/2) Avail: NTIS HC A04/MF A01

Models which are capable of describing both the physical and chemical factors which affect the transport of solutes through a porous media were developed. Complex solution and soil chemical interactions which are known to be of importance in the leachates and soils associated with wastes produced from energy production are emphasized. One dimensional saturated flow multi-solute finite element models for flow in a homogeneous medium were developed. The derivation of the governing equations is summarized and the numerical techniques and algorithms used to achieve a solution are described. DOE

N82-15602# California Univ., Livermore. Lawrence Livermore Lab.

THREE-DIMENSIONAL, FINITE ELEMENTAL MODEL FOR SIMULATING HEAVIER-THAN-AIR GASEOUS RELEASES OVER VARIABLE TERRAIN

Robert L. Lee, Philip M. Gresho, Stevens T. Chan, and Craig D. Upson Aug. 1981 17 p refs Presented at the NATO/CCMS 12th Intern. Tech. Meeting on Air Pollution Modeling and its Applications, Menlo Park, Calif., 25-28 Aug. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-028689; UCRL-85520; CONF-810841-1) Avail: NTIS HC A02/MF A01

A 3 dimensional finite element model was developed to predict the dispersion processes associated with heavier than air gaseous releases in the atmosphere. Both 2 dimensional and 3 dimensional examples presented to demonstrate the flexibility of the model in simulating the motion of the vapor cloud generated after a liquid natural gas spill over flat or variable terrain. Also presented are results to justify the slightly more complex generalized anelastic model rather than one employing the Boussinesq and/or hydrostatic approximation, which are routinely used for planetary boundary layer flows but can be inappropriate for this application. DOE

N82-15603# California Univ., Berkeley. Lawrence Berkeley Lab.

X-RAY METHODS FOR THE CHEMICAL CHARACTERIZATION OF ATMOSPHERIC AEROSOLS

J. M. Jaklevic and A. C. Thompson May 1981 20 p refs Presented at the Conf. on X- and Gamma-Ray Sources and Appl., Ann Arbor, Mich., 10 Jun. 1981 Sponsored in part by EPA
(Contract W-7405-eng-48)
(DE81-028874; LBL-12493; CONF-810647-10) Avail: NTIS HC A02/MF A01

The use of X-ray methods for the chemical characterization of atmospherical aerosol particulate samples are described. The methods are based on the emission, absorption, and scattering of X-ray photons emphasizing optimization for the nondestructive analysis of dilute specimens. Techniques include: photon induced energy dispersive X-ray fluorescence, extended X-ray absorption fine structure spectrocopy using synchrotron radiation and high rate X-ray powder diffractometry using a position sensitive gas proportional counter. The chemical compositions of size segregated aerosol particulate samples obtained with dichotomous samples were measured by one X-ray analysis method. The multiple elemental analyses obtained from X-ray fluorescence can be used as a cross check on the major compounds observed by powder diffraction. DOE

N82-15604# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.

REAL-TIME COARSE-PARTICLE MASS MEASUREMENTS IN A HIGH-TEMPERATURE/PRESSURE COAL-GASIFIER PROCESS TREATMENT

J. Wegrzyn, J. Saunders, and W. Marlow 1981 7 p Presented at the Conf. on High Temp., High Pressure Particulate and Alkali Control in Coal Combust. Process Streams, Morgantown, W. Va., 3-5 Feb. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030039; BNL-29953; CONF-810261-1) Avail: NTIS HC A02/MF A01

A sampling system that employs a probe appropriate for direct extracted sampling of erosive range particulate matter from a coal gasifier outlet or a high pressure fluidized bed combustor was constructed. The sampling system consists of four modules: (1) a null balance extractive probe with injection through a porous lined tube to minimize wall loss; (2) a stem type virtual impactor to separate coarse from fine particles; (3) a filter tape collector; and (4) a beta gauge total mass detector. A stem type virtual impactor separates at ambient gas stream conditions the coarse particles from the sampling stream so that at filtration no condensible vapors, fine particles or reactive gases pass through the filter tape. This system provides coarse particle mass flux data with a time resolution of 30 seconds or better. Sampling requirements for high temperature, high pressure aerosols are defined and discussed. DOE

N82-15605# Data Resources, Inc., Lexington, Mass.

REGIONAL LOAD-CURVE MODELS: SCENARIO AND FORECAST USING THE DRI MODEL Final Report

H. D. Platt Aug. 1981 283 p Sponsored by Electric Power Research Inst.
(EPRI Proj. 1008)
(DE81-904192; EPRI-EA-1672-Vol-3) Avail: NTIS HC A13/MF A01

Regional load curve models were constructed for 32 regions that were created by aggregating hourly load data from 146 electric utilities. The forecast scenario is described and the forecast resulting from the use of this scenario is presented. The highlights of this forecast are two observations: first, peak demands will once again become winter phenomena. In the heating season, the model is reponsive to the number of heating degree hours, the penetration rate of electric heating equipment, and the rate at which this space conditioning equipment is utilized. Winter season demands grow more rapidly than demands in other seasons and peaks begin to appear in winter months. Secondly load factors begin to increase in the forecast, reversing the trend which began in the early 1960s. Nationally, load factors do not leap upwards, instead they increase gradually. DOE

N82-15606# Brookhaven National Lab., Upton, N. Y. National Center for Analysis of Energy Systems.

ASSESSMENT METHODOLOGY FOR THE AIR QUALITY IMPACT OF RESIDENTIAL WOOD BURNING

Frederick W. Lipfert 1981 20 p refs Presented at the Intern. Conf. on Residential Solid Fuels, Portland, Oreg., 1 Jun. 1981
(Contract DE-AC02-76CH-00016)
(DE81-029373; BNL-29763; CONF-810674-4) Avail: NTIS HC A02/MF A01

Firewood usage varies inversely with population density, resulting in an implied limit to the density of usage. Tests of wood stoves indicate that emissions of particulates vary inversely with heat demand, such that nighttime emissions at low combustion rates may be worse than those during maximum heat demand conditions. Finally, atmospheric dispersion rates are coupled to the driving forces of space heating so that nighttime emissions tend to have a disproportionately large impact on ambient air quality. The air quality impacts of increased residential wood fuel used were assessed. It is indicated that in flat terrain primary ambient standards are not threatened by residential wood combustion. DOE

N82-15607# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.

KINETICS OF REACTIONS IN A WET FLUE GAS SIMULTANEOUS DESULFURIZATION AND DENITRIFICATION SYSTEM

S. G. Chang, D. Littlejohn, and N. H. Lin Jul. 1981 36 p refs Presented at the ACS Symp. on Advan. in Flue Gas Desulfurization, Atlanta, 30 Mar. - 3 Apr. 1981
(Contract W-7405-eng-48)
(DE81-029853; LBL-13063; CONF-810394-1) Avail: NTIS HC A03/MF A01

A number of processes for simultaneous removal of SO2 and NO sub x are discussed. They are based on either the oxidation of relatively insoluble NO to more soluble NO2 or the employment of a water soluble ferrous chelating compound as a catalyst to aid in the absorption of the insoluble NO. These ferrous compounds have the ability to form complexes with the NO and thus promote the absorption of the NO. Once in solution NO sub x can be reduced by the absorbed SO2 to form molecular N2, N2O or reduced nitrogen compounds such as NOH(SO3)2(-2), NH(SO3)2(-2), NH2SO(-) and NH4(+); while SO2 is oxidized to sulfate. The kinetics and mechanisms of reactions involved in this system are discussed. DOE

N82-15608# University of Western Michigan, Kalamazoo. Dept. of Chemistry.

FUNDAMENTALS OF NITRIC OXIDE FORMATION IN FOSSIL-FUEL COMBUSTION Progress Report, 29 Sep. - 28 Dec. 1980

Thomas Houser and Michael E. McCarville Aug. 1981 19 p refs
(Contracts DE-AC21-76ET-10592; EX-76-C-01-2018)

(DE81-030329; DOE/ET-10593/T2; FE-2018-19) Avail: NTIS HC A02/MF A01

The rate and products of oxidation of HCN and the influence of additives, benzene, cyclohexane, toluene, acetylene and CO, on the rate and products were studied. The only significant oxidation products in the absence of additives were CO2, H2O and N2. The complex order indicates that a complex chain mechanism is operating, however, the activation energy appears too large for a chain or surface mechanism. HCN consumption dropped drastically and benzene consumption was reduced a small amount even at higher oxygen concentrations in the reactor. No change in products was observed. It suggested that CO and acetylene produce an intermediate during oxidation that does not form when benzene oxidizes. DOE

N82-15609# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.

REAL TIME COARSE PARTICLE MASS MEASUREMENTS IN A HIGH TEMPERATURE AND PRESSURE COAL GASIFIER PROCESS TREATMENT

J. Wegrzyn, J. Saunders, and W. Marlow Mar. 1981 9 p refs Presented at the 3rd Symp. on the Transfer and Utilization of Particulate Control Technol., Denver, 10-12 Mar. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030036; BNL-22952; CONF-810319-3) Avail: NTIS HC A02/MF A01

A probe appropriate for direct extracted sampling of erosive range particulate matter from a coal gasifier outlet or a high pressure fluidized bed combustor. The system consists of four modules: (1) a null balance extraction probe with injection through a porous lined tube to minimize wall loss; (2) a stem type virtual impactor to separate coarse from fine particles; (3) a filter tape collector; and (4) a beta gauge total mass detector. A stem type virtual impactor separates at ambient gas stream conditions the coarse particles from the sampling stream so that at upon filtration no condensible vapors, fine particles or reactive gases pass through the filter tape. DOE

N82-15610# California Univ., Livermore. Lawrence Livermore Lab. Environmental Sciences Div.

ELEMENTAL COMPOSITION OF ATMOSPHERIC FINE-PARTICLES EMITTED FROM COAL BURNED IN A MODERN ELECTRIC POWER PLANT EQUIPPED WITH A FLUE-GAS DESULFURIZATION SYSTEM

J. M. Ondov Jul. 1981 19 p refs Presented at the Am. Chem. Soc. Meeting, Las Vegas, Nev., 1 Dec. 1980
(Contract W-7405-eng-48)
(DE81-030073; UCRL-85035; CONF-801266) Avail: NTIS HC A02/MF A01

Mechanisms of fine particle formation and chemical enrichment in the flue-gas desulfurization system are dicussed. Improved control devices drastically affect the quantity, chemical composition, and physical characteristics of fine particles emitted to the atmosphere from these sources. Fly ash aerosols were sampled upstream and downstream from a modern lime slurry, spray tower system installed on a 430 Mw(e) coal utility boiler. The concentrations of up to 35 elements and estimates of the size distributions of particles in each the fly ash fractions were determined by instrumental neutron activation analysis and by electron microscopy. DOE

N82-15611# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.

INDOOR AIR QUALITY

C. D. Hollowell Jun. 1981 13 p refs Presented at the Inst. of Gas Res. Conf., Los Angeles, 28 Sep. - 1 Oct. 1981
(Contract W-7405-eng-48)
(DE81-029857; LBL-12887; CONF-810909-4; EEB-Vent-81-17) Avail: NTIS HC A02/MF A01

Common sources of indoor air pollution in buildings, the specific pollutants emitted by each source, the potential health effects, and possible control techniques are discussed. Rising energy prices, have generated an incentive to reduce ventilation rates and thereby reduce the cost of heating and cooling buildings. Reduced ventilation in buildings increases exposure to indoor air pollution. It is suggested that reduced ventilation adversely affects indoor air quality unless appropriate control strategies are undertaken. The strategies used to control indoor air pollution depend on the specific pollutant or class of pollutants encountered, and differ depending on whether the application is to an existing building or a new building under design and construction. The first course of action is prevention or reduction of pollutant emissions at the source. DOE

N82-15612# Department of Energy, Washington, D. C. Office of Conservation and Renewable Energy.

WORKSHOP ON INDOOR AIR QUALITY RESEARCH NEEDS

1980 350 p refs Proceedings of Conf. in Leesburg, Va., 3-5 Dec. 1980
(DE81-026488; CONF-801259; EPA-600/7-81-118) Avail: NTIS HC A15/MF A01

Indoor air quality research needs including the monitoring of indoor air quality, report of the instrumentation subgroup of indoor air quality, health effects, and the report of the control technology session are reported. Risk analysis studies addressing indoor environments are summarized. DOE

N82-15613# Pacific Northwest Lab., Richland, Wash.

ASSESSMENT OF THE LONG-RANGE TRANSPORT OF RESIDENTIAL WOODSTOVE FINE-PARTICULATE EMISSIONS FOR TWO FUTURE UNITED STATES ENERGY SCENARIOS

K. J. Allwine, Jr. May 1981 17 p refs Presented at the Intern. Conf. on Residential Solid Fuels, Portland, Oreg., 1-4 Jun. 1981
(Contract DE-AC06-76RL-01830)
(DE81-030096; PNL-SA-9606; CONF-810674-5) Avail: NTIS HC A02/MF A01

The impact of solar energy technologies (especially woodstoves) on regional scale fine particulate air quality resulting from direct-energy-use sources was analyzed. It is shown that significant interregional transport of fine particulates occurs especially into the three northeastern regions of the US. It is indicated that concentrations are low relative to any current particulate standards. Both maximums occurred in the Middle Atlantic region. It is predicted that the concentrations in the eastern five regions will decrease from 1975 to 2000 (both scenarios) whereas the opposite is true for the five western regions. The contributions from woodstoves are projected to increase in all regions. The majority of this increase is due to woodstoves. For the three northeastern regions more than 50% of the impact of each region is from outside the respective region. DOE

N82-15614# Battelle Pacific Northwest Labs., Richland, Wash.

TECHNIQUE FOR PLANNING AND MANAGING INDUSTRIAL GROWTH FROM THE AIR-QUALITY STANDPOINT

K. Jerry Allwine 23 Mar. 1981 10 p ref Presented at the Spring Point Source Modeling and Ambient Air Quality Monitoring Speciality Meeting, Renton, Wash., 2 Apr. 1981
(Contract DE-AC06-76RL-01830)
(DE81-028342; PNL-SA-9419; CONF-810393-1) Avail: NTIS HC A02/MF A01

A technique was developed for summing modeled air quality impacts from many sources onto a common grid. The computed concentration fields can come from any air quality model provided the same period of meteorology is used. At present the computed concentration fields from EPA models CRSTER and ISC can be overlayed onto the grid. The current area of application is for a 100 km by 100 km area but could be expanded to any management unit. Current application of the technique and potential uses in planning and managing industrial growth are discussed. T.M.

N82-15615# Steinmueller (L. und C.) G.m.b.H., Gummersbach (West Germany). Versuchsanstalt fuer Verfahrenstechnik.

INVESTIGATIONS IN A LABORATORY PLANT FOR REHEATING SCRUBBED FLUE GASES BY MEANS OF HEAT EXCHANGERS Final Report, Oct. 1980

Mohammad Yoqub Chughtai Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 96 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-005; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West

Germany DM 20

Reheating used to reduce SO2 emission from coal or oil fired power plants is discussed. Tube and plate heat exchangers were tested under scrubbed clean gas conditions. Extensive removal of the droplets contained in the clean gas, evaporation by means of recirculation, and cleaning of the heat exchanger with steam are adequate in avoiding or removing scale, either individually or combined. Laboratory as well as power plant investigations of flue gas show that Inconel 625 test specimens have the highest corrosion resistance as compared with other coated and noncoated materials. Author (ESA)

N82-15616# Research Triangle Inst., Research Triangle Park, N. C.

PROCEEDINGS: SYMPOSIUM ON IRON AND STEEL POLLUTION ABATEMENT TECHNOLOGY FOR 1980

Franklin A. Ayer, comp. Mar. 1981 628 p refs 2nd Symp. held at Philadelphia, 18-20 Nov. 1980
(Contract EPA-68-02-3152)
(PB81-244808; EPA-600/9-81-017; IERL-RTP-1161) Avail: NTIS HC A99/MF A01 CSCL 13B

Information on technology problems related to air, water, and solid waste pollution control in the iron and steel industry, environmental aspects of a proposed formcoke demonstration plant and the future of steel technology and the environment were exchanged. The following topics were examined: (1) air pollution abatement, covering coke plant emission control, fugitive emission control, innovative air pollution control technology, iron and steelmaking emission control, and inhalable particulates; (2) water pollution abatement, covering recycle/reuse of water, coke plant wastewater treatment, and coke plant wastewater new developments; and (3) solid waste pollution abatement. GRA

N82-15617# Michigan Univ., Ann Arbor. Dept. of Atmospheric and Oceanic Science.

ENVIRONMENTAL CONTROLS ON THE COMPOSITION OF THE SURFACE MICROLAYER IN LAKE MICHIGAN

James E. Mackin, Robert M. Owen, and Philip A. Meyers Sep. 1980 48 p refs
(PB81-239006; UMICH-SG-80-203; ; NOAA-81062915) Avail: NTIS HC A03/MF A01 CSCL 08G

Surface microlayer and subsurface (1 m) water samples were collected at ten stations along the major axis of Lake Michigan and in the ten major rivers which flow into the lake to determine the processes which influence the composition of the surface microlayer. Dissolved and particulate phase concentrations of the elements Ca, Cu, Fe, K and Mn were determined. Associations revealed by these analyses indicate that the composition of fluvial microlayers is controlled by localized factors, related to the geology of individual drainage basins, while open lake microlayers are influenced by broad scale physio-chemical interactions. Author

N82-15618# Battelle Columbus Labs., Ohio.

USE OF COAL CLEANING FOR COMPLIANCE WITH SO2 EMISSION REGULATIONS Final Report, Jun. 1977 - Jun. 1981

E. H. Hall, A. W. Lemmon, Jr., G. L. Robinson, F. K. Goodman, J. H. McCreery, R. E. Thomas, and P. A. Smith Sep. 1981 438 p refs
(Contract EPA-68-02-2163)
(PB81-247520; EPA-600/7-81-146; IERL-RTP-1244) Avail: NTIS HC A19/MF A01 CSCL 13B

Results of an evaluation of coal cleaning as a means of controlling SO2 emissions from coal fired stationary sources are presented. Coal cleaning was examined in the light of various existing and proposed SO2 emissions regulations to determine applications in which the technology would be most useful. Barriers were identified that prevent wider application of coal cleaning. Actions are described which should be taken to overcome these barriers. Much information about coal is compiled as resource data on the coal reserve base, present and projected coal production, coal cleanability, current and projected coal use by utilities and industry, size and age distribution of coal fired facilities, and the nature of coal contracts. Environmental impacts of coal cleaning are compared with those of other sulfur removal strategies such as flue gas desulfurization and the use of low sulfur coal. Similarly, costs of the various SO2 control alternatives are compared. GRA

N82-15619# Little (Arthur D.), Inc., Cambridge, Mass.

MONITORING TECHNIQUES FOR CARBON FIBER EMISSIONS: EVALUATION B Final Report

Edward T. Peters, Kenneth T. Menzies, Edward J. Cook, and Michael Rossetti Aug. 1981 81 p refs
(Contract EPA-68-02-3275)
(PB81-247413; EPA-600/2-81-145) Avail: NTIS HC A05/MF A01 CSCL 13B

An evaluation of available measurement methods for continuously monitoring the number and mass of carbon fibers emitted from source operations was conducted. A total of eleven candidate monitoring methods were identified based on contact (electrical), locally sensing (optical, microwave) and remote sensing (microwave, radar). Each method was rated on the basis of measurement (sampling), detection and instrumental parameters, and their useful concentration and length range were compared to three emission scenarios representing textile weaving machining and waste incineration. Five methods have merit for certain conditions and are recommended for further study. GRA

N82-15620# Environmental Protection Agency, Ann Arbor, Mich. Office of Mobile Source Air Pollution Control.

AIR QUALITY ANALYSIS FOR THE 1984 HIGH ALTITUDE REPORT TO CONGRESS: SUMMARY OF RESULTS

Mark Wolcott Apr. 1981 71 p refs
(PB81-247702; EPA-AA-TEB-81-17) Avail: NTIS HC A04/MF A01 CSCL 13B

Four types of control strategies were considered. These strategies are examined first without an inspection and maintenance program for light duty vehicles alone and in combination with similar trucks. Next, these strategies are assumed to include an inspection and maintenance program. Changes in each of the three major mobile source pollutants, carbon monoxide, nonmethane hydrocarbons, and oxides of nitrogen, are examined for their ambient air quality effects in Denver, Colorado Springs, Albuquerque, and Salt Lake City. Other factors include the modified linear rollback model, the National Emission Data System, a source contribution factor, design values, background pollution, stationary sources, growth and retirement rates, emission rations, and air quality projections. GRA

N82-15621# Environmental Protection Agency, Ann Arbor, Mich. Standards Development and Support Branch.

HEAVY-DUTY ENGINE BASELINE PROGRAM AND NO SUB X EMISSION STANDARD DEVELOPMENT (1972-73)

Timothy Cox, Zachary Diatchun, Thomas Nugent, Glenn Passavant, and Larry Ragsdale Mar. 1981 69 p refs
(PB81-244030; EPA-AA-SDSB-81-01) Avail: NTIS HC A04/MF A01 CSCL 13B

The statutory NOx emission standard for 1985 heavy duty engines was determined. The standard is based on a 75% reduction from the average measured emissions for uncontrolled (1972-73 model year) gasoline fueled heavy duty engines program established the amount of NOx emissions from the uncontrolled heavy duty gasoline-fueled engines. A baseline testing this program consists of four sectons: (1) engine procurement; (2) restorative maintenance; (3) testing the engine emission levels by transient test procedure; and (4) determination of the average measured emissions. GRA

N82-15622# Research Triangle Inst., Research Triangle Park, N. C.

PROCEEDINGS OF THE CONFERENCE ON WOOD COMBUSTION ENVIRONMENTAL ASSESSMENT Progress Report, Oct. 1980 - Jun. 1981

Franklin A. Ayer, comp. 1981 330 p refs Proceedings of conf. held at New Orleans, 21-24 Feb. 1981
(Contract EPA-68-02-3170)
(PB81-248155; EPA-600/9-81-029; IERL-RTP-1235) Avail: NTIS HC A15/MF A01 CSCL 13B

Residential wood combustion information is presented. An overview of environmental assessment activities, specific emissions and heating efficiency assessments, emissions control techniques and residential wood combustion issues and their resolution are discussed. High concentrations of polycyclic organic matter (POM) in residential wood stove emissions were verified. High POM concentrations in the indoor environment of homes with wood stoves were reported. High ambiemt values were not attributed to residential wood combustion. Emission control techniques which were considered for controlling organic emissions included secondary combustion and the introduction of a combustion catalyst. GRA

N82-15623# Research Triangle Inst., Research Triangle Park, N. C.

SYMPOSIUM PROCEEDINGS: ENVIRONMENTAL ASPECTS OF FUEL CONVERSION TECHNOLOGY, 5TH Progress Report, Feb. - Aug. 1980

F. A. Ayer, comp. and N. S. Jones, comp. Jan. 1981 665 p refs Proceedings of symp. held in St. Louis, 16-19 Sep. 1980
(Contract EPA-68-02-3170)
(PB81-245045; EPA-600/9-81-006) Avail: NTIS HC A99/MF A01 CSCL 13B

Environmental aspects of fuel conversion technology are presented. Environmental information related to coal gasification, indirect liquefaction, direct liquefaction, program approach, environmental assessment, environmental control, and the development of pollution control guidance documents is included. GRA

N82-15624# Geological Survey, Indianapolis, Ind. Water Resources Div.

EFFECTS OF COAL FLY-ASH DISPOSAL ON WATER QUALITY IN AND AROUND THE INDIANA DUNES NATIONAL LAKESHORE, INDIANA Final Water-resources Investigation Report

Mark A. Hardy Apr. 1981 73 p refs
(PB81-238479; USGS/WRD/WRI-81-073; USGS/WRI-81-16)
Avail: NTIS HC A04/MF A01 CSCL 13B

Dissolved constituents in seepage from fly ash settling ponds bordering part increased trace elements, and gross alpha and gross beta radioactivity in ground water and surface water downgradient from the settling ponds. It is suggested that concentrations of some dissolved trace element are greater beneath interdunal pond 2 than in the pond. It is found that calcium concentrations are greater in ground water downgradient from the settling ponds than in the ponds. Where organic material is present downgradient from the settling ponds, concentrations of arsenic, fluoride, molybdenum, potassium, sulfate, and strontium were greater in the ground water than in the ponds. In contrast, the concentrations of cadmium, cooper, nickel, aluminum, cobalt, lead, and zinc are less. GRA

N82-15625# PEDCo-Environmental, Inc., Cincinnati, Ohio.

EVALUATION OF SOLVENT LOSS FROM VAPOR DEGREASER SYSTEMS. PHASE 2 AND 3: EFFECT OF CROSSCURRENT AIR VELOCITY ON CONTROL SYSTEM PERFORMANCE Final Report, Jul. 1970 - Nov. 1980

R. W. Gerstle and E. S. Schindler May 1981 99 p
(Contracts EPA-68-02-2535; EPA-68-02-2907)
(PB81-246308; EPA-600/2-81-072; PN-3280-C; PN-3481-1)
Avail: NTIS HC A05/MF A01 CSCL 13B

Pollution reduction capabilities of vapor degreasers fitted with add-on control systems were evaluated. Solvent loss from degreasing systems of various design was assessed, and the test conditions, procedures, results, and conclusions are reported. Tests were performed to evaluate the effects of different variables on the rate of solvent loss from degreasers. The variables tested include the following degreaser control options and operating conditions: freeboard ratio, load cross sectional area, refrigerated freeboard chiller, hoist speed, lip exhaust, crosscurrent air velocity, degreaser size, solvent type, an automatic cover. The factor most likely to ensure long periods of operation with minimum solvent loss, regardless of the mix of control options are ensured by installation in an area where crosscurrent velocity is minimized. GRA

N82-15626# TRW, Inc., Research Triangle Park, N.C. Progress Center.

DEMONSTRATION OF WELLMAN-LORD/ALLIED CHEMICAL FGD TECHNOLOGY: DEMONTRATION TEST SECOND YEAR RESULTS Final Report, Feb. 1973 - Oct. 1979

R. C. Adams, S. W. Mulligan, and R. R. Swanson Aug. 1981 410 p refs
(Contract EPA-68-02-3174)
(PB81-246316; EPA-600/7-81-140) Avail: NTIS HC A18/MF A01 CSCL 13B

The performance over a 2 year period of a full scale flue gas desulfurization (FGD) is reported. The process is regenerable, employing sodium sulfite wet scrubbing, thermal regeneration of the spent scrubber solution, and reduction to elemental sulfur of the recovered SO2. Process energy requirements, primarily for thermal regeneration of the scrubber solution and subsequent recovery of SO2, were quite large, amounting to 12 percent of the boiler heat input derived from fuel. Operation and performance occurred after some modification to the boiler to increase inlet flue gas temperature and after implementing FGD plant improvements identified during initial operation. GRA

N82-15627# National Enforcement Investigations Center, Denver, Colo.

THE USE OF LIDAR FOR EMISSIONS SOURCE OPACITY DETERMINATIONS: SECOND EDITION

Arthur W. Dybdahl Jul. 1981 399 p refs Sponsored by EPA
(PB81-246662; EPA-330/1-79-003-R) Avail: NTIS HC A17/MF A01 CSCL 13B

Lidar can be used to measure the opacity of particulate emissions from stationary sources. Extensive test results support the promulgation of the lidar technique as an alternative to trained visible emissions observers (VEO). Three tests demonstrate lidar precision and accuracy: one using an aerosol chamber to generate a controlled particulate plume, the second using an optical generator to simulate lidar return signals, the third using fabricated screen targets of constant fixed opacity. Advantages of lidar over VEOs are the ability to measure opacity during darkness and independently of background contrast conditions, and also the lidar is not subject to time and endurance constraints. Requirements and procedures needed to facilitate routine use of lidar were developed. GRA

N82-15628# National Water Well Association, Worthington, Ohio.

DISEQUILIBRIUM OF HYDROGEN SULFIDE IN GROUND WATER BY AERATION Final Report

Joseph Dwight Ritchey 24 Apr. 1981 119 p refs
(Grant NSF ISP-80-16077)
(PB81-244717; NSF/ISP-81011) Avail: NTIS HC A06/MF A01 CSCL 13B

Removal of hydrogen sulfide gas by aeration as a result of bubbling air through water in the well before it is pumped out of the ground was examined. Evaluation of water analyses indicated three processes that caused reduction in the concentration of hydrogen sulfide gas: (1) hydrogen sulfide gas was released from water to air by gas transfer indicated by a strong 'rotten egg odor', characteristic of hydrogen sulfide gas that was emitted from the wellhead; (2) hydrogen sulfide gas was oxidized to elemental sulfur evidenced by an increase in dissolved oxygen measured in water samples and by clouding of pumped water; and (3) hydrogen sulfide gas was partially ionized indicated by an increase in the pH and the redox potential of water samples. This field study demonstrates that in-well areation is an effective method of hydrogen sulfide gas removal in domestic wells with potential application in larger installations. GRA

N82-15629# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).

AIR POLLUTION PILOT STUDY: ASSESSMENT METHODOLOGY AND MODELING, 1975 - 1979 (FIRST FOLLOW-UP REPORT)

31 Aug. 1980 139 p refs
(PB81-242257; NATO/CCMS-114) Avail: NTIS HC A07/MF A01 CSCL 13B

The recommendations made by the air pollution pilot study assessment methodology and modeling (1975-1978) for the Federal Republic of Germany are reported. Exchange of information on application of the air quality management systems (AQMS) methods and techniques as described in the technical documents of the study are reviewed. GRA

N82-15630# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
PRACTICAL DEMONSTRATION OF URBAN AIR QUALITY SIMULATION MODELS. PART 1: A REPORT OF THE NATO/CCMS PILOT STUDY ON AIR POLLUTION ASSESSMENT METHODOLOGY AND MODELING
Aug. 1980 114 p refs
(PB81-242240; NATO/CCMS-106-Pt-1) Avail: NTIS HC A06/MF A01 CSCL 13B

Cooperation of NATO member nations in developing standardized methods for emissions data storage and retrieval to support requirements in conduct of national air quality management programs are reported. Cooperation in developing standardized techniques for projecting emissions and predicting future ambient air quality is discussed. GRA

N82-15631# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
AIR POLLUTION EMISSIONS INVENTORY SYSTEMS. APPENDIX C: EMISSIONS INVENTORY IN THE FEDERAL REPUBLIC OF GERMANY
Aug. 1980 175 p refs
(PB81-242232; NATO/CCMS-104-App-C) Avail: NTIS HC A08/MF A01 CSCL 13B

Emissions inventory systems and methods used in the Federal Republic of Germany are reviewed. GRA

N82-15632# New York Sea Grant Inst., Albany.
GREAT LAKES COASTAL GEOLOGY. EFFECTS OF JETTIES, SODUS BAY, NEW YORK
William R. Brownlie (Calif. Inst. of Tech., Pasadena) and Parker E. Calkin (State Univ. of New York, Buffalo) Jan. 1981 30 p refs Sponsored by NOAA
(PB81-238982; NOAA-81062917) Avail: NTIS HC A03/MF A01 CSCL 08M

Erosion of the Lake Ontario coastline around Great Sodus Bay (near Rochester, N.Y.), may be due to a federal navigation project which involved construction of piers and breakwaters and dredging the channel at the entrance to Sodus Bay. Possible links between coastline erosion and jetties are studied. GRA

N82-15633# Los Angeles County Sanitation District, Whittier, Calif.
PARALLEL EVALUATION OF AIR-AND OXYGEN-ACTIVATED SLUDGE Final Report, Feb. 1975 - Dec. 1976
Scott Austin, Fred Yunt, Donald Wuerdeman, and Walter E. Garrison Aug. 1981 53 p
(Contract DI-14-12-150)
(PB81-246712; EPA-600/2-81-155) Avail: NTIS HC A04/MF A01 CSCL 13B

The merits of air and oxygen in the activated sludge process, two 1900-cu m/day activated sludge pilot plant, one air and one oxygen system, were operated. Both of the pilot plants met the applicable discharge limitations for everything but three trace metals, but the oxygen system provided a more stable operation. Primary differences in performance concerned ammonia nitrogen removals and energy consumption. GRA

N82-15634# Wyle Labs., Inc., El Segundo, Calif.
MANUAL FOR DEVELOPMENT OF FORMAT FOR THE PRESENTATION OF COMMUNITY NOISE ASSESSMENT DATA
Marilyn Auerbach and Katharina R. Geissler Jul. 1981 105 p refs
(Contract EPA-68-01-4909)
(PB81-243008) Avail: NTIS HC A06/MF A01 CSCL 13B

A comprehensive and computerized system assesses the noise problems of a community and then planning a noise control strategy for its abatement. A guide to various presentation techniques for all the data generated by the Community Noise Assessment Manual is presented which will facilitate. GRA

N82-15635# Wyle Labs., Inc., El Segundo, Calif.
COMMUNITY NOISE ASSESSMENT MANUAL: SOCIAL SURVEY WORKBOOK
Jul. 1981 566 p Prepared in cooperation with California Univ., Los Angeles
(Contract EPA-68-01-4694)
(PB81-244360) Avail: NTIS HC A24/MF A01 CSCL 13B

Workbook for the design and administration of a social survey of community attitudes toward noise is presented. Instructions for survey design and management and appendices providing forms and special handbooks for administering the survey is reviewed. The major areas are: an attitudinal questionnaire, sample selection procedures, data processing procedures and techniques for data analysis. GRA

N82-15636# Monsanto Research Corp., Dayton, Ohio.
ENGINEERING HANDBOOK FOR HAZARDOUS WASTE INCINERATION Final Report, Mar. - Sep. 1981
T. A. Bonner, C. L. Cornett, B. O. Desai, J. M. Fullenkamp, T. W. Hughes, M. I. Johnson, E. D. Kennedy, R. J. McCormick, J. A. Peters, and D. L. Zanders Sep. 1981 487 p refs
(Contract EPA-68-03-3025)
(PB81-248163; MRC-DA-1090; EPA/SW-889) Avail: NTIS HC A21/MF A01 CSCL 13B

Technical advisory information on hazardous waste incineration is presented. Generic incineration processes involving gaseous and solid wastes are reviewed. Foreign and domestic incinerator technology is discussed along with air pollution control devices. Waste sampling and analysis methods are given as well as techniques for evaluating incineration and air pollution control systems designs. Overall facility design, operation, and monitoring is discussed. GRA

N82-15637# Energy Resources Co., Inc., Cambridge, Mass.
POTENTIAL ENVIRONMENTAL PROBLEMS OF ENHANCED OIL AND GAS RECOVERY TECHNIQUES Final Report
Ron Beck, Robert Shore, Terry Ann Scriven, and Melinda Lindquist Aug. 1981 287 p refs
(Contract EPA-68-03-2648)
(PB81-240186; EPA-600/2-81-149) Avail: NTIS HC A13/MF A01 CSCL 13B

This report provides: (a) an identification of and analysis of available data regarding EOR/EGR related pollutants; (b) an assessment of potential environmental impacts and an identification of possible controls; and (c) recommendations as to research needs. The following processes were studied: steam injection, in situ combustion, carbon dioxide miscible flooding, micellar/polymer flooding, alkaline flooding, improved waterflooding, advanced hydraulic fracturing, chemical explosive fracturing, and directional drilling. The existing EOR/EGR environmental impact information (published and unpublished) is critically reviewed and summarized. The effect of EOR/EGR processes on air quality, groundwater quality, water quantity, noise levels, and secondary impacts is the main area of analysis. GRA

N82-15638# Environmental Protection Agency, Ann Arbor, Mich. Test and Evaluation Branch.
COMPILATION OF AIR POLLUTANT EMISSION FACTORS: HIGHWAY MOBILE SOURCES Final Report
Mar. 1981 406 p
(PB81-238305; EPA-460/3-81-005) Avail: NTIS HC A18/MF A01 CSCL 13B

The emission factors and calculation methodology is used in the MOBILE2 computer program are summarized. The emission factors are presented for eight individual vehicle types in three regions of the country. This document describes the basic test procedures used to collect the hydrocarbon (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) emissions and the generalized emission factors calculation equations. The emissions presented in this document are the basic exhaust emissions, the crankcase and evaporate HC emissions, January 1 basic exhaust emission levels, and idle exhaust emissions. Further, nonmethane HC fractions and particulates are presented to adjust the emissions for various ambient and vehicle usage conditions such as speed, temperature, and humidity for NOx. GRA

N82-15639# Engineering-Science, Inc., McLean, Va.
REVIEW AND UPDATE OF MODELING ANALYSIS OF CARBON MONOXIDE EMISSIONS IN MECKLENBURG COUNTY, NORTH CAROLINA Final Report
Jul. 1981 115 p
(Contract EPA-68-02-3509)
(PB81-248841; EPA-904/9-81-080) Avail: NTIS HC A06/MF A01 CSCL 13B

The carbon monoxide emissions were analyzed by state-of-the-art modeling techniques. The techniques were used to forecast ambient CO concentrations at three existing monitoring sites as well as at other anticipated hotspots where high concentrations might occur. Locations where ambient violations may occur at the end of 1987 are indicated. The results will be used to compile a control plan for the scheduled state implementation plan revision in 1982 which will show these hotspots in compliance with the ambient standard by the end of 1987. GRA

N82-15640# Delamer, Inc., Cupertino, Calif.
RESEARCH OUTLOOK, 1981 Annual Report
Elissa Feldman, ed. Dec. 1980 195 p
(Contract EPA-68-02-3644)
(PB81-243495; EPA-600/9-80-061) Avail: NTIS
HC A09/MF A01 CSCL 13B

Research Outlook 1981 is the sixth in a series of EPA annual reports mandated by Congress. It describes the research currently performed and the program that is expected to be implemented over the next five years. Topics include environmental research and planning, air pollution, nonionizing radiation, pesticides, water quality and waste water. The structure of the EPA Office of Research and Development is described. The priorities for research center around finding cost effective ways of controlling and monitoring toxic hazards are included. GRA

N82-15641# Wyle Labs., Inc., El Segundo, Calif.
COMMUNITY NOISE ASSESSMENT MANUAL: COMPUTER PROGRAMS FOR THE STRATEGY GUIDELINES FOR DEVELOPING A COMMUNITY NOISE CONTROL PROGRAM
Patrick K. Glenn Jul. 1981 263 p 2 Vol.
(Contract EPA-68-01-3921)
(PB81-243024) Avail: NTIS HC A12/MF A01 CSCL 13B

Computer programs required for running a community noise control program are given. The programs were written for a UNIVAC 1108. The source language used is FORTRAN 4. A listing of the source programs are included. GRA

N82-15642# Wyle Labs., Inc., El Segundo, Calif.
COMMUNITY NOISE ASSESSMENT MANUAL: STRATEGY GUIDELINES FOR DEVELOPING A COMMUNITY NOISE CONTROL PROGRAM
Jul. 1981 232 p 2 Vol.
(Contract EPA-68-01-3921)
(PB81-244352) Avail: NTIS HC A11/MF A01 CSCL 13B

Communities are assisted in determining, in an objective manner, the efficient application of funds for reducing the adverse effects of noise in their community. Since the number of possible combinations of noise sources and corresponding countermeasures to reduce their impact can be quite large, a computer based approach is therefore used to develop optimum scenarios for noise control expenditures. This manual utilizes an optimization computer model, which selects the most cost effective noise abatement measures and the amount of money which should be spent on each. The primary criterion for optimization is based on economic and acoustical data gathered in the community. GRA

N82-15643# Environmental Protection Agency, Seattle, Wash. Analytic Center.
QUANTIFYING ENVIRONMENTAL IMPACTS
C. A. Shenk and William Riley May 1981 46 p refs
(PB81-244915; EPA-910/9-81-086) Avail: NTIS
HC A03/MF A01 CSCL 13B

The inclusion of environmental impacts in cost effectiveness determinations is examined. Methodologies and research used for quantifying those impacts were reported. A methodology to assess the cost effectiveness of proposed electric power projects was developed. Difficulties in physically measuring environmental impacts and in subsequently placing dollar values on them are discussed. Impact mitigation costs and expert judgement techniques are reviewed to determine the appropriateness for this process. Property structuring of the decision making process to avoid the need for comparing completely unlike alternatives is suggested. GRA

N82-15644# Mason and Hanger-Silas Mason Co., Inc., Leonardo, N. J.
PERFORMANCE TESTING OF THE SOVIET OIL/DEBRIS SKIMMER Final Report
H. W. Lichte Aug. 1981 42 p
(Contract EPA-68-03-2642)
(PB81-244790; EPA-600/2-81-154) Avail: NTIS
HC A03/MF A01 CSCL 13B

Performance evaluation of a Soviet oil skimmer was conducted. The oil skimming capability of a specially modified Soviet skimmer, Model 2550/4 was valuated. The vessel is capable of five knots forward speed and skims effectively at speeds from zero to two knots. It is suggested that the unique combination of various weir designs into one system, vessel mobility, the efficient use of energy, a series type oil/water gravity separator, and the propulsion techniques makes it an effective harbor skimmer. GRA

N82-15645# State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
UTILIZATION OF EARTHWORMS AND MICROORGANISMS IN STABILIZATION, DECONTAMINATION AND DETOXIFICATION OF RESIDUAL SLUDGES FROM TREATMENT OF WASTEWATER Final Report
Roy Hartenstein 16 Feb. 1981 19 p
(Grant NSF PFR-78-09331)
(PB81-236481; NSF/CEE-81009) Avail: NTIS
HC A02/MF A01 CSCL 13B

The feasibility of using earthworms in managemant of municipal sludges was examined. Results of tests on two earthworm species, Eudrilus euganiae and Eisenia foetida, are reported. The following observations were made. (1) toxicity of worm casts to the earthworms signifies the need to retain E. foetida in its source of food (activated sludge) as long as, or slightly longer than, the time required to convert the sludge into castings; (2) knowledge of the quantity of material passing through the earthworm gut per unit of time, for a particular ingestible sludge, permits prediction of sludge quantity manageable per unit time; and (3) E. foetida fails to gain weight rapidly, if at all, on unlimited supplies of certain organic materials. GRA

N82-15646# Environmental Protection Agency, Research Triangle Park, N.C. Quality Assurance Div.
NATIONAL PERFORMANCE AUDIT PROGRAM: 1979 PROFICIENCY SURVEYS FOR SULFUR DIOXIDE, NITROGEN DIOXIDE, CARBON MONOXIDE, SULFATE, NITRATE, LEAD AND HIGH VOLUME FLOW
Berne I. Bennett, Robert L. Lampe, and John C. Puzak Apr. 1981 64 p refs
(PB81-239402; EPA-600/4-81-025) Avail: NTIS
HC A04/MF A01 CSCL 07D

Sample material, simulating ambient air pollution samples as closely as possible, are furnished to participating laboratories. Surveys of hi-vol sample flow are conducted annually using a modified orifice. The various sample materials are monitored by the Quality Assurance Division to assure that samples are stable, of uniform composition and are representative of pollutant concentration levels encountered under field sampling conditions and that all materials conform to prescribed standards of accuracy. Sample materials are required to be similar enough to true air pollution matrices not to introduce unrealistic conditions of sample preparation or impose handling techniques that are not a part of the normal monitoring and analytical activity. A major survey objectiye is the assessment of routine analytical performance. GRA

N82-15647# Environmental Protection Agency, Research Triangle Park, N.C. Data Management and Analysis Div.
AIR QUALITY DATA FOR NONMETALLIC INORGANIC IONS: NITRATE AND SULFATE FOR 1977 AND 1978 FROM THE NATIONAL AIR SURVEILLANCE NETWORKS Final Report
Gary F. Evans, John C. Puzak, John E. Frazer, and Allan Riley Sep. 1981 146 p refs
(PB81-248148; EPA-600/4-81-074) Avail: NTIS
HC A07/MF A01 CSCL 13B

Concentration values are presented in the form of cumulative frequency distributions. Arithmetic and geometric sample statistics are also reported, as are measures of the precision and bias associated with the analytical methods employed. GRA

N82-15648# HydroQual, Inc., Mahwah, N.J.
ULTRAVIOLET DISINFECTION OF A SECONDARY WASTEWATER TREATMENT PLANT EFFLUENT Progress Report, Nov. 1977 - Feb. 1980
G. Karl Scheible and Carlene D. Bassell Aug. 1981 167 p refs Prepared in cooperation with Northwest Bergen County Sewer Authority, Waldwick, N.J.
(Grant EPA-R-804880)
(PB81-242125; EPA-600/2-81-152) Avail: NTIS HC A08/MF A01 CSCL 13B

Ultraviolet disinfection of a full-scale secondary effluent was investigated during a 13 month field study. The experimental program was designed to demonstrate the feasibility of achieving a fecal coliform density of 200 MPN/100 ml by ultraviolet irradiation; to determine the efficiency of ultraviolet disinfection relative to dosage, power consumption, and effluent water quality; and to assess the utility of the full-scale unit relative to O&M requirements. The impact of photoreactivation was investigated during the field program. Uniform procedures for the calculation of dose and the sizing of ultraviolet systems were also developed. Second order dose-response relationships were developed and were found to provide a rational expression of the microbial response to ultraviolet dose. GRA

N82-15649# T. S. Associates, Inc., Columbia, Md.
LABORATORY DEMONSTRATION OF THE FEASIBILITY OF USING COMMERCIALLY-AVAILABLE, IN-DEPTH FILTERS FOR SUSPENDED SOLIDS REMOVAL BY CROSS-FLOW FILTRATION
T. R. Sundaram and Abbas M. Sinnarwalla Feb. 1981 157 p refs
(Grant NSF DAR-80-10543)
(PB81-243719; J8005-P80012-1; NSF/CPE-81005) Avail: NTIS HC A08/MF A01 CSCL 13B

Correlations of filtration performance with various relevant filter, wastewater, and operating parameters are given. Further pilot-scale confirmation of the concept demonstrated in the laboratory offers applications to a technology for suspended solids separation which is efficient, relatively inexpensive, and has low energy requirements. Experimental procedures are described and the test results and their implications are presented. Potential commercial applications are in the food-processing, metal-finishing, and laundry industries, as well as in the treatment of wastewater. T.M.

N82-15650# National Oceanic and Atmospheric Administration, Boulder, Colo. Ocean Dumping Program.
ASSESSMENT REPORT ON THE EFFECTS OF WASTE DUMPING IN 106-MILE OCEAN WASTE DISPOSAL SITE: DUMPSITE EVALUATION REPORT
May 1981 325 p refs
(PB81-241572; DER-81-1; NOAA-81070802) Avail: NTIS HC A14/MF A01 CSCL 08J

Individual investigations carried out under NOAA funding by various Federal and university scientists are summarized. Field and laboratory studies of the heavy and transition metals in the major wastes dumped at 106-Mile Site are emphasized. Field and laboratory studies of the effects of the wastes on bacteria, plankton, fish eggs, and fish are considered. T.M.

N82-15651# Research Triangle Inst., Research Triangle Park, N. C.
PROCEEDINGS: SYMPOSIUM ON FLUE GAS DESULFURIZATION, VOLUME 1
Franklin A. Ayer Apr. 1981 548 p refs Symp. held at Houston, Tex., 28-31 Oct. 1980
(Contract EPA-68-02-3170)
(PB81-243156; EPA-600/9-81-019A-Vol-1) Avail: NTIS HC A23/MF A01 CSCL 13B

Presentations of the flue gas desulfurization (FGD) conference are presented. They cover such subjects as approaches for control of acid rain, the Nation's energy future, economics of FGD, legislative/regulatory developments, FGD research/development trends, FGD system operating experience, FGD byproduct disposal/utilization, developments in dry FGD, and industrial boiler applications. GRA

N82-15652# Research Triangle Inst., Research Triangle Park, N. C.
PROCEEDINGS: SYMPOSIUM ON FLUE GAS DESULFURIZATION, VOLUME 2
Franklin A. Ayer, comp. Apr. 1981 551 p refs 6th Symp. held at Houston, Tex., 28-31 Oct. 1980
(Contract EPA-68-02-3170)
(PB81-243164; EPA-600/9-81-019B) Avail: NTIS HC A24/MF A01 CSCL 13B

Proceedings on flue gas desulfurization are documented. Presentations covered the following subjects: approaches for control of acid rain, the nation's energy future, economics of FGD, legislative/regulatory developments, FGD research/development trends, FGD system operating experience, FGD byproduct disposal/utilization, developments in dry FGD, and industrial boiler applications. GRA

N82-15729*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ENVIRONMENTAL EFFECTS OF SHUTTLE LAUNCH AND LANDING
Andrew E. Potter *In its* STS-1 Med. Rept. Dec. 1981 p 81-91
(For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 13B

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N82-15653 Atomic Weapons Research Establishment, Aldermaston (England).
COMPLEXITY OF SHORT PERIOD P SEISMOGRAMS: WHAT DOES SCATTERING CONTRIBUTE?
A. Douglas, J. A. Hudson (Cambridge Univ., England), and B. J. Barley Jul. 1981 57 p refs
(AWRE-O-3/81; BR79646) Copyright. Avail: Issuing Activity

The complexity of the P-coda is reviewed. The coda of short period P seismograms, including the precursors to PP, are waves scattered in the crust and uppermost mantle. Scattering effects are separated from those of simple reverberation in plane parallel layered models and observed seismograms and models computed using simple Earth and source models are compared. Broadband seismograms were used since they display ground displacement over a wider frequency range than SP seismograms. It is shown that although the arrivals between P and PP appear to have a wide energy spectrum, they consist mainly of scatter waves at short periods, and reflected and converted waves at long periods. Author (ESA)

N82-15654# Prins Maurits Lab. TNO, Rijswijk (Netherlands). Inst. voor Chemische en Technologische Research.
SIMPLE METHODS FOR THE CALCULATION OF THE DISPERSION OF GASES IN THE ATMOSPHERE
C. J. P. vanBuijtenen Apr. 1979 59 p refs In DUTCH; ENGLISH summary
(PML-1979-29; TDCK-72219) Avail: NTIS HC A04/MF A01

The Gaussian plume model and Pasquill's recommendations for the use of stability classes and corresponding dispersion coefficients are considered in this revised version of Report 1976-15 of the Chemical Laboratory TNO. Author

N82-15655# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 1: Physics.
TRANSMISSION AND EMISSION OF THE ATMOSPHERE; CONTINUED MEASUREMENTS AND ANALYSIS OF THE DATA
W. A. P. Denissen Nov. 1979 33 p refs In DUTCH; ENGLISH summary
(PHL-1979-50; TDCK-73427) Avail: NTIS HC A03/MF A01

Measurements are presented of the transmission and the emissions of the atmosphere in the infrared spectral region, carried out with the teleradiancemeter. Special attention is given to the measurements performed in autumn of 1978, under different meteorological conditions. A great part of the measurements were done at low values of the visual range. The experimental accuracy is pointed out in relation to the source and ambient temperature. The measured results are compared with transmission calculations, done by means of a computer program, incorporating the LOWTRAN 3B program. M.G.

N82-15656# Goettingen Univ. (West Germany). Inst. fuer Geophysik.

GEOMAGNETIC AND MAGNETOTELLURIC SOUNDINGS IN THE AREA OF THE CENTRAL EUROPEAN RIFT SYSTEM Final Report, Jun. 1980

Michael Lee Richards, Urich Schmucker, Erich Steveling, and Juergen Waterman Bonn Bundesministerum fuer Forschung und Technologie Aug. 1981 76 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie and EEC
(BMFT-FB-T-81-111; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16

The conductivity structure connected with the Central European rift system was investigated with regard to geothermal energy sources using methods of geomagnetic depth sounding and magnetotelluric sounding. Sensors, a data acquisition system, and a software package for data handling and data analysis were developed. During a test campaign in the Leinegraben area and two field campaigns in the Rheingraben area, geoelectric and geomagnetic variations in the period range from 6 seconds to 24 hours were registrated. At base sites in the Rheingraben and the Black Forest, models of the vertical profile of the electrical conductivity were determined, while at sites in between the lateral conductivity variations were investigated. The perturbation of magnetic field in the region of the Rheingraben is strong and frequency dependent. The higher frequencies (low penetration depths) show the influence of the graben sedimentary structure, filling only the narrow graben area, and strong currents along the center of the graben. The lower frequencies (deeper penetration depths) reflect the deeper, probably broader conductivity structure. Author

N82-15657# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).

THE MASS SPECTROMETER EXPERIMENT IN THE PROGRAM AEROS Final Report, Mar. 1981

Dieter Krankowsky and Peter Laemmerzahl Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 59 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-030; ISSN-0170-1339) Avail: NTIS HC A04/MF A01

The neutral and ion mass spectrometer measured the composition of gases (He, N, O, N2, and Ar) and the ion composition. The instrument, calibration, and data analysis are described. Some results as e.g., the detection of atomic nitrogen, measurement of gravity waves, and an empirical model for the seasonal variaton of gas composition are presented. Author

N82-15658# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).

DATA PROCESSING AND DATA EVALUATION OF THE ISEE-PARTICLE SPECTROMETER Final Report, Feb. 1981

Patrick W. Daly, Erhard Keppler, and Horst Specht Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 101 p refs In GERMAN; ENGLISH summary Sponsored in cooperation with Max-Planck Gesellschaft
(Contracts BMFT-01-OI-016; BMFT-ZA-WF-WRK-0275:4)
(BMFT-FB-W-81-032; ISSN-0170-1339) Avail: NTIS HC A06/MF A01

The processing and the evaluation of the data provided by our charged particles spectrometers, which were flown on the ISEE-A and -B spacecraft, are described. Results are demonstrated by several examples. Author

N82-15659# Kaman Tempo, Santa Barbara, Calif.

THE ROSCOE MANUAL. VOLUME 28-1: MOLECULAR BAND MODEL PARAMETERS FOR THERMAL EMISSIONS: EXPANDED WAVELENGTH COVERAGE Final Report, 9 Nov. 1979 - 31 Jan. 1981

Timothy L. Stephens and Alice L. Klein 31 Jan. 1981 51 p refs
(Contract DNA001-80-C-0030)
(AD-A106077; KT-81-002(R)-Vol-28-1) Avail: NTIS HC A04/MF A01 CSCL 04/1

The spectral range of band model parameters for the ROSCOE thermal emission has been extended to cover the 2- to 100-micron region. Sources for the new parameteir compilation are documented, and graphical representations of the parameters at selected temperatures are presented. Author (GRA)

N82-15660# Teledyne Geotechnical, Alexandria, Va. Seismic Data Lab.

AN INVESTIGATION OF ATTENUATION, SCATTERING AND SITE EFFECTS ON REGIONAL PHASES

Zoltan A. Der, Anne Donnell, and Pamela J. Kloude VELA Seismological Center 23 Mar. 1981 100 p refs
(Contract F08606-79-C-0007; DARPA Order 2551)
(AD-A105995; SDAC-TR-81-4; VSC-TR-81-11) Avail: NTIS HC A05/MF A01 CSCL 17/10

Investigation of regional phase amplitudes at a large number of LRSM sites showed a pronouncad increase of Pn, Pg, and Lg amplitudes at sedimentary structures relative to hard rock. In the early part of the coda and the main part of the wavetrain for Lg, lower order modes generated by mode conversion at local inhomogeneities must be present to explain the site variations and the coherence structure of Lg. A modification of Aki's scattering theory is presented to explain such observations. Analysis of the late coda of Lg showed high crustal Q values at RKON and much lower values of OB2NV. At OB2NV the crustal Q appears to be frequency dependent, increasing from 200 to about 600 in the 1 to 10 Hz band. Author (GRA)

N82-15661# Los Alamos Scientific Lab., N. Mex.

SCHLUMBERGER RESISTIVITY STUDY OF THE JEMEZ SPRINGS REGION OF NORTHWESTERN NEW MEXICO

Chris Pearson and Fraser Goff 1981 5 p refs Presented at the Geothermal Resources Council Ann. Meeting, Houston, Tex., 25-29 Oct. 1981
(Contract W-7405-eng-36)
(DE81-025302; LA-UR-81-1806; CONF-811015-10) Avail: NTIS HC A02/MF A01

Schlumberger resistivity soundings made in the Jemez Mountains of northwestern New Mexico, near the village of Jemez Springs, are presented. Three areas that have potential as low temperature geothermal reservoirs were identified. The areas are characterized by a localized zone of very low resistivity which represents the extent of geothermal water and correlates with the location of hot springs or recent volcanic rocks. Resistivities increase rapidly toward the margins of the anomalies, suggesting either variable porosities or variable temperatures and salinities in the reservoirs. DOE

N82-15662# Enertech Engineering and Research Co., Houston, Tex.

TEMPERATURE HISTORIES IN GEOTHERMAL WELLS: SURVEY OF ROCK THERMOMECHANICAL PROPERTIES AND DRILLING, PRODUCTION, AND INJECTION CASE STUDIES

Malcolm A. Goodman Albuquerque Sandia National Labs. Jul. 1981 86 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029957; SAND-81-7128) Avail: NTIS HC A05/MF A01

Thermal and mechanical properties for geothermal formations are tabulated for a range of temperatures and stress conditions. Data were obtained from the technical literature and direct contacts with industry. Heat capacity, conductivity, diffusivity and undisturbed geothermal profiles are presented. Mechanical properties include Youngs' modulus and Poisson ratio. Two GEOTEMP thermal simulations of drilling, production and injection are reported. Actual drilling, production, and injection histories were simulated. Results are documented in the form of printed GEOTEMP output and plots of temperatures versus depth, radius, and time. Wellbore temperatures during drilling as a function of depth; bit temperatures over the drilling history; cement temperatures from setting to the end of drilling; and casing and formation temperatures during drilling, production, and injection are discussed. DOE

N82-15663# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Chemistry.
SURFACE SCIENCE OF HETEROGENEOUS CATALYSIS: POSSIBLE APPLICATIONS IN ATMOSPHERIC SCIENCES
G. A. Somorjai Jun. 1981 15 p refs Presented at the Atmospheric Chem. Soc. Conf. on Atmospheric Sci., Albany, N.Y., 23 Jun. 1981
(Contract W-7405-eng-48)
(DE81-028135; LBL-12986; CONF-8106147-1) Avail: NTIS HC A02/MF A01

The catalyzed reactions of carbonaceous deposits and water vapor and the possible importance of trace metals and high surface area alumina silicates in atmospheric chemistry are discussed. The molecular details of heterogeneous catalytic processes and techniques were developed to determine the atomic surface structure, the composition, and oxidation states in the surface monolayer. The structure of the calaytic surface influences the surface chemical bonds of adsorbed molecules. Additives which are often electron donors (alkali metals) or electron acceptors (halogens) change the oxidation state of surface atoms, block sites, or change the surface structure and influence the surface reactivity. DOE

N82-15664# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
TERRESTRIAL SOLAR SPECTRAL MODELING
Richard E. Bird Jul. 1981 12 p refs Presented at the Com. Photovoltaics Measurement Workshop, Vail, Colo., 27-29 Jul. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-029067; SERI/TP-642-1343; CONF-810748-1) Avail: NTIS HC A02/MF A01

Two rigorous radiative transfer codes called SOLTRAN and BRITE are described. SOLTRAN was constructed from an atmospheric transmission code which uses a layered atmosphere model between sea level and 100-km altitude. This code includes no scattered radiation in its output. The BRITE code uses a Monte Carlo method and a layered atmosphere model, and accounts for both scattering and absorption. Spectra produced using the BRITE code are illustrated, and the use of SOLTRAN and BRITE for photovoltaic applications was demonstrated. Spectral comparisons between SOLTRAN, BRITE, and a spherical harmonics code are presented. Recommendations are made for improving the codes. DOE

N82-15665# Fraunhofer Inst., Freiburg (West Germany).
AURORAL SPECTROMETER AF6 FOR THE POLAR HIGH ATMOSPHERE ROCKET CAMPAIGN Final Report, Aug. 1980
Fritz Fischer, Manfred Knothe, and Gerhard Schmidtke Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 49 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-006; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,30

An extreme ultraviolet (EUV) spectrometer for the polar high atmosphere experiment and the results of two flights are presented. The optical concept is based on Rowland grating geometry using the blaze effect and providing a high efficiency spectrometer. Height, profiles of important spectral emissions such as O2 and O1 are obtained and strong differences in the spatial distribution of emissions with different optical depths are shown in the spectral region. Author (ESA)

N82-15666# Fraunhofer Inst., Freiburg (West Germany).
THE AEROS RETARDING POTENTIAL ANALYZER Final Report, Nov. 1980
Karl Spenner Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 114 p refs IN GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-007; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,90

Analyzer was developed for in situ measurements of the most important thermal plasma parameters. An experiment was successfully flown on the two research satellites AEROS A and B. Plasma density, the electron and ion temperature, the most dominant ion constituents, and the superthermal electron fluxes were determined. A comparison with other independent measurements demonstrated the high reliability of the AEROS results and the improvement over other probe measurements. The achieved know-how was used for a number of other projects, e.g., in the NASA Pioneer Venus Program. Author (ESA)

N82-15667# Bonn Univ. (West Germany). Inst. fuer Astrophysik and Extraterrestrische Forschung.
THERMOSPHERIC STUDIES USING SATELLITES AEROS A AND B Final Report, Dec. 1979
Max Roemer, Werner Framke, Hans Joachim Beese (Siemens AG, Munich), Michael Jung (Brown, Boverie und Cie AG, Mannheim, West Germany), Egbert Richter (MBB, Munich), and Olaf Senzlober (Kraftwerke Union AG) Bundesministerium fuer Forschung und Technologie Feb. 1981 144 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-012; ISSN-0170-1339) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 30,20

Atmospheric drag was analyzed in order to determine the atmospheric total density at perigee by the orbital drag technique. The principle of this technique, reduction of radio interferometer and radar observations, and the results of an orbit improvement procedure are presented. The aerodynamic drag coefficient of a cylindrical spin stabilized satellite was determined for all angles of attack. Measured values of the total atmospheric density and mass spectrometer data agree. The inverse orbital drag method was developed for full orbit comparisons. The COSPAR international reference atmosphere was adapted, using AEROS A mass spectrometer data. Experiences gained with a mass spectrometer and incoherent scatter data atmospheric model, based on all neutral gas measurements, are summarized. Negative ionospheric storms and the morphology of the thermospheric response to geomagnetic disturbances were studied. Author (ESA)

N82-15668# Cologne Univ. (West Germany). Inst. fuer Geophysik und Meteorologie.
ONE AND TWO DIMENSIONAL MODELING OF THE PLANETARY BOUNDARY LAYER [EIN- UND ZWEIDIMENSIONALE MODELLIERUNG DER PLANETARISCHEN GRENZSCHICT]
Wolfgang Behnke Dec. 1980 65 p refs In GERMAN
(Mitt-29) Avail: NTIS HC A04/MF A01

One and two dimensional models of the planetary boundary layer were developed. The models are based on the shallow water equations with the turbulent kinetic energy equation as closure law. The one dimensional model is only slightly affected by initial values, but strongly by boundary conditions. The effect of closure laws on the results of the model in case of horizontal homogeneity as well as for highly inhomogeneous surfaces was studied. Two difference methods were compared for the two dimensional model. Temperature profiles obtained by the two dimensional model are extremely well corroborated by the measured values. The importance of orography in the investigation of the boundary layer jet flow is shown. Author (ESA)

N82-15669# Cologne Univ. (West Germany). Inst. fuer Geophysik und Meteorologie.
RADIATION CHARACTERISTICS OF CLOUD FIELDS [STRAHLUNGSEIGENSCHAFTEN VON WOLKENFELDERN]
Johannes Schmetz Jan. 1981 76 p refs In GERMAN
(Mitt-30) Avail: NTIS HC A05/MF A01

The influence of the micro and macrostructure of clouds on radiation characteristics was investigated, starting from radiation measurements on clouds and simultaneous measurements of microphysical characteristics. One dimensional radiation transport models were verified and the three dimensional model was qualitatively corroborated. The importance of the macrostructure as compared to the microstructure is clarified with a simple parameterization of the clouds macrostructure. The macrostructure dominates the integral radiation characteristics of a pierced cloud layer. Aircraft measurements under a pierced cloud cover show

the nonlinear dependence of solar transmission on the covering degree. the three dimensional model show qualitatively different behavior with respect to the zenith dependence of albedo and transmission of a cube shaped single cloud as compared to a cloud field.
Author (ESA)

N82-15670# Fraunhofer Inst., Freiburg (West Germany).
IMPEDANCE PROBE: THE ELECTRON DENSITY EXPERIMENT ONBOARD THE AERONOMY SATELLITES AEROS Final Report, Nov. 1980
Eugen Neske and Rainer Kist Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 101 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-006; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21,20

The AEROS-B electron density impedance probe (IP) with its main theoretical aspects, technical solution and data acquisition and data reduction are described. The IP subsystems which includes the IP sensor and electronic groups, such as resonance frequency and phase measurement, sensor potential control, measuring program control, and inflight calibration are discussed. Absolute electron densities with high accuracy and spatial resolution in the altitude range 220 to 900 km are measured. Comparisons with accompanying AEROS-B experiments as well as synoptic measurements from ground stations and other satellites are presented. Geophysical phenomena, such as the midlatitude electron density trough, the South Atlantic anomaly, and polar density fluctuations are investigated. Author (ESA)

N82-15671# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).
SOUNDING ROCKET PROGRAM AERONOMY PROJECT: 'POLAR HIGH ATMOSPHERE' MASS SPECTROMETER EXPERIMENT Final Report, Feb. 1981
Dieter Krankowsky, Peter Laemmerzahl, and Werner Loos Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 50 p refs In GERMAN; ENGLISH summary
(Contract BMFT-WRK-RV-14-B101/74)
(BMFT-FB-W-81-027; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,50

The response of the thermosphere during a magnetic substorm was studied in a sounding rocket mass spectrometer experiment. The instrument, laboratory calibration procedure, data analysis, and geophysical conditions during the launch are described. It is shown that the ion concentrations are greatly enhanced by the storm activity. Primary ionization rates are derived from the measured altitude profiles of singly ionized O, NO and O_2 ions by a one dimensional model, ion chemistry and transport. The rates are compared with the rates calculated from the energetic electron fluxes measured with an auroral particle spectrometer.
Author (ESA)

N82-15672# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Quality Div.
THE CHON PHOTOCHEMISTRY OF THE TROPOSPHERE: GRASSLANDS PROJECT (SUMMER COLLOQUIUM 1980) Final Report
Anthony Delany 1980 182 p refs Proceedings of Colloquium held at Boulder, Colo., 1980
(Grant NSF ATM-77-23757)
(PB81-233140; NCAR/CQ-7) Avail: NTIS HC A09/MF A01 CSCL 04A

A comprehensive set of photochemically action carbon, hydrogen, oxygen, and nitrogen compounds together with a modelling effect aimed at reproducing the interaction of these species were determined. Species and parameters measured included paraffinic, olefinic and aromatic hydrocarbons, CH_4, H_2, CO, NO, NOX, HNO_3, (HCHO), O_3, H_2O_2, H_2O, OH, J(NO_2), J(O_3) and T. The experimental techniques in the measurements and an intercomparison between measurements and model results are discussed. Ozone fluxes are measured by both an aircraft mounted correlation technique and a tower gradient method. Destruction flux measurements are also made for NOX and HNO_3.
GRA

N82-15673# California Univ., Santa Barbara. Computer Systems Lab.
USE OF ENVIRONMENTAL SATELLITE DATA FOR INPUT TO ENERGY BALANCE SNOWMELT MODELS Final Report
Jeff Dozier Dec. 1980 125 p refs
(Grant NOAA-04-8-MO)
(PB81-227795; TR-CSL-8001; NOAA-81050501) Avail: NTIS HC A06/MF A01 CSCL 04A

The development of solar and longwave radiation models for alpine snow covered terrain, techniques for atmospheric correction of satellite radiometric data and for snow albedo determination from satellite, a very fast solution to the terrain horizon problem, investigations of the use of NOAA satellite data for snow surface temperature, mapping, and work on canopy cover measurements from satellite for use in solar and longwave radiation models are described.
GRA

N82-15674# University of Southern California, Los Angeles. Dept. of Civil Engineering.
WATER WAVES GENERATED BY THREE DIMENSIONAL BED MOTION: ABSTRACT
J. J. Chang and J. J. Lee 1980 7 p refs Abstract of paper to be presented at the Intern. Tsunami Symp., Japan, 25-29 May -1981
(Grants NSF ENV-77-01599; NOAA-NA-80-AA-D-00100)
(PB81-238172; NSF/RA-800553) Avail: NTIS HC A02/MF A01 CSCL 08K

Dipole dislocation of the sea floor with a finitie aspect ratio (length/width of the bottom dislocation) is reported. The method for three dimensional bed motion in the case of rectangular bed upthrust of finite aspect ratio was applied. A potential flow is assumed; thus the velocity potential satisfies Laplace's equation and linearized boundary conditions. Fourier transform for the spatial variables and the Laplace transform for the time variable are applied. Results on water surface profiles for different lengths/widths of bottom dislocation were obtained and features of generated wave patterns were found. Programs for obtaining wave profiles along any arbitrarily chosen coordinates by a mathematical plantom are developed.
GRA

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-15675 Deutscher Wetterdienst, Offenbach am Main (West Germany).
REPORTS FROM THE GERMAN METEOROLOGICAL SERVICE. NUMBER 155: TWO HUNDRED YEARS OF METEOROLOGICAL OBSERVATIONS AT HOHENPEISSENBERG (1781-1980) [BERICHTE DES DEUTSCHEN WETTERDIENSTS, NR 155: 200 JAHRE METEOROLOGISCHE BEOBACHTUNGEN AUF DEM HOHENPEISSENBERG (1781-1980)]
Walter Attmannspacher 1981 230 p refs In GERMAN Original contains color illustrations
(ISSN-0072-4130; ISBN-3-88148-184-2) Avail: Issuing Activity

Research into the free atmosphere, e.g., ozone studies and concomitant radiosondes, is outlined. Rainfall measurements are described: point measurements, using the ombrometer HP, and measurements on a surface, using a weather radar system.
Author (ESA)

N82-15676 Freie Univ., Berlin (West Germany). Inst. fuer Meteorologie.
METEOROLOGICAL DATA, VOLUME 134, NUMBER 3: THE EVOLUTION OF THE CIRCULATION PATTERN AT THE 100 mbar LEVEL FOR THE YEARS 1973 AND 1974 ILLUSTRATED BY MAPS OF MONTHLY MEAN VALUES [METEOROLOGISCHE ABHANDLUNGEN, BAND 134, HEFT 3: DER ZIRKULATIONSVERLAUF IN DER 100-MBAR-FLAECHE IN DEN JAHREN 1973 UND 1974 AN HAND MONATLICHER MITTELKARTEN]

Ingrid Buschner 1980 171 p refs In GERMAN; ENGLISH summary Original contains color illustrations
(ISSN-0342-4332) Avail: Issuing Activity

A compilation of monthly averaged maps during 1973 and 1974 of height and temperature at the 100 mbar level, monthly changes, deviations from the long-term mean 1951 to 1970, and their latitude anomalies over the Northern Hemisphere is presented. The maps are evaluated, relationships to the troposphere and the middle stratosphere are shown, and comparisons are made with climatological series. The monthly mean values of height and temperature are given in table form. Author (ESA)

N82-15677*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CLOUD-ENCOUNTER AND PARTICLE-CONCENTRATION VARIABILITIES FROM GASP DATA
Gregory D. Nastrom (Control Data Corp., Minneapolis), James D. Holdeman (NASA. Lewis Research Center, Cleveland), and Richard E. Davis Dec. 1981 245 p refs
(NASA-TP-1886; L-14483) Avail: NTIS HC A11/MF A01 CSCL 04B

Summary statistics, tabulations, and variability studies are presented for cloud encounter and particle concentration data taken as part of the NASA global atmospheric sampling program. Cloud encounter was experienced in about 15 percent of the data samples; however, the percentage varies with season, latitude, and altitude (particularly distance from the tropopause). In agreement with classical storm models, the data show more clouds in the upper troposphere in anticyclones than in cyclones. The concentration of particles with a diameter greater than 3 micron also varies with time and location, depending primarily on the horizontal extent of cloudiness. Some examples of the application of the statistical data to the estimation of the frequency of cloud encounter and laminar flow loss to be expected on long range airline routes are also presented. Author

N82-15678*# Computer Sciences Corp., Pocomoke City, Md.
AN AUTOMATED TECHNIQUE FOR ESTIMATING DAILY PRECIPITATION OVER THE STATE OF VIRGINIA Final Report
Walton A. Follansbee and Lloyd W. Chamberlain, III Sep. 1981 95 p refs
(Contract NAS6-2947)
(NASA-CR-156883) Avail: NTIS HC A05/MF A01 CSCL 04B

Digital IR and visible imagery obtained from a geostationary satellite located over the equator at 75 deg west latitude were provided by NASA and used to obtain a linear relationship between cloud top temperature and hourly precipitation. Two computer programs written in FORTRAN were used. The first program computes the satellite estimate field from the hourly digital IR imagery. The second program computes the final estimate for the entire state area by comparing five preliminary estimates of 24 hour precipitation with control raingage readings and determining which of the five methods gives the best estimate for the day. The final estimate is then produced by incorporating control gage readings into the winning method. In presenting reliable precipitation estimates for every cell in Virginia in near real time on a daily on going basis, the techniques require on the order of 125 to 150 daily gage readings by dependable, highly motivated observers distributed as uniformly as feasible across the state. A.R.H.

N82-15679*# Operations Research, Inc., Silver Spring, Md.
ANALYSIS OF METEOROLOGICAL SATELLITE LOCATION AND DATA COLLECTION SYSTEM CONCEPTS Final Report, 3 Jun. - 3 Dec. 1981
R. G. Wallace and D. L. Reed Dec. 1981 96 p refs
(Contract NAS5-26604)
(NASA-CR-166763; TR-1989) Avail: NTIS HC A05/MF A01 CSCL 04B

A satellite system that employs a spaceborne RF interferometer to determine the location and velocity of data collection platforms attached to meteorological balloons is proposed. This meteorological advanced location and data collection system (MALDCS) is intended to fly aboard a low polar orbiting satellite. The flight instrument configuration includes antennas supported on long deployable booms. The platform location and velocity estimation errors introduced by the dynamic and thermal behavior of the antenna booms and the effects of the presence of the booms on the performance of the spacecraft's attitude control system, and the control system design considerations critical to stable operations are examined. The physical parameters of the Astromast type of deployable boom were used in the dynamic and thermal boom analysis, and the TIROS N system was assumed for the attitude control analysis. Velocity estimation error versus boom length was determined. There was an optimum, minimum error, antenna separation distance. A description of the proposed MALDCS system and a discussion of ambiguity resolution are included. S.L.

N82-15680*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
NOSS-SCAT WIND DIRECTION ALIAS REMOVAL Final Report
K. Sam Shanmugan, V. Narayanan, and J. Stiles Jan. 1982 44 p
(Grant NAG1-117)
(NASA-CR-165069; RSL-TR-515-1) Avail: NTIS HC A03/MF A01 CSCL 04B

The use of automated algorithms for removing aliases in NOSS-SCAT data is reported. The algorithms used for alias removal consist of histogram analysis, local averaging and curve fitting. The histogram analysis is used to determine the degree of homogeneity of the wind field defined by the largest probability alias vector at each grid point. The alias directions are compared with the preferred direction at each grid location and one of the multiple aliases is chosen as the true direction. E.A.K.

N82-15681# Royal Netherlands Meteorological Inst., De Bilt.
NETWORK FOR THE MEASUREMENT OF THE CHEMICAL COMPOSITION OF PRECIPITATION IN THE NETHERLANDS Annual Report, 1980 [MEETNET VOOR BEPALING VAN DE CHEMISCHE SAMENSTELLING VAN DE NEERSLAG IN NEEDERLAND]
1981 60 p refs Prepared in cooperation with Rijksinst. voor de Volksgezondheid
(KNMI-156-3; RIV-217810-003) Avail: NTIS HC A04/MF A01

From January 1978 at 12 stations and from January 1979 at 13 stations monthly samples were taken for the determination of the chemical composition of precipitation. A practical problem remains the droppings of birds in the raingauge. A description is given of the analytical procedures used. The unit of concentration used in umol/1. Multi-annual average values (1978 to 1989) and annual and semiannual averages of the year 1980 of 14 components are presented in the form of maps showing some isolines. T.M.

N82-15682# Royal Netherlands Meteorological Inst., De Bilt.
YEARBOOK A METEOROLOGY VOLUME 132 Annual Report
1981 76 p In ENGLISH and DUTCH
(KNMI-97-132) Avail: NTIS HC A04/MF A01; KNMI, De Bilt, Netherlands FL 17.50

All data are based on the 24-hour period 0-24 U.T.C. The normals recorded are averages computed from measurements made during the period 1931-1960. The observations were made at 49 meteorological stations. Details on the stations and the position of instruments are given. T.M.

N82-15683# Royal Netherlands Meteorological Inst., De Bilt.
PRECIPITATION Annual Report, 1980
1981 146 p In ENGLISH and DUTCH
(KNMI-117-1981) Avail: NTIS HC A07/MF A01; KNMI, De Bilt, Netherlands FL 10

The precipitation stations of the Royal Netherlands Meteorological Institute, spread over fifteen areas, are indicated by their codenumber. Details on the stations are given. The measurements are made at 7.55 h U.T.C. (= 8.55 h C.E.T) and recorded on the day of measuring in mm. Author (ESA)

N82-15684# Royal Netherlands Meteorological Inst., De Bilt. Oceanographic Research Div.
METEOROLOGICAL AND OCEANOGRAPHIC OBSERVATIONS ON BOARD NETHERLANDS LIGHTVESSELS AND

THE LIGHTPLATFORM 'GOEREE' IN THE NORTH SEA Annual Report, 1976
1981 143 p In ENGLISH and DUTCH
(KNMI-141-28) Avail: NTIS HC A02/MF A01; KNMI, De Bilt, Netherlands FL 17,50

Three-hourly meteorological and wave observations as well as hourly current and salinity measurements were compiled. Tables show: (1) meteorological results; (2) oceanographic results; (3) general air circulation, air pressure, precipitation, and fog; (4) visibility and cloud amount; (5) air temperature; (6) sea surface temperature; (7) air-sea temperature differences; and (8) wind and wave frequencies.
A.R.H.

N82-15686# Royal Netherlands Meteorological Inst., De Bilt.
SYNOPTIC AND UPPER AIR OBSERVATIONS IN THE NETHERLANDS, VOLUME 24 Annual Report, 1979
1980 398 p In ENGLISH and DUTCH
(KNMI-142-24) Avail: NTIS HC A17/MF A01; KNMI, De Bilt, Netherlands FL 25

Tables show (1) surface observations of the weather situation from Netherlands land stations, the lightvessel and from the automatic reporting station on the fixed platform; (2) upper air observations of pressure, temperature, relative humidity, wind direction, wind speed at De Bilt; (3) upper air observations of wind direction and wind speed at De Bilt; and (4) mean values for each month and for the year computed from the data of temperature, relative humidity, wind direction and wind speed.
A.R.H.

N82-15686# Royal Netherlands Meteorological Inst., De Bilt.
SYNOPTIC AND UPPER AIR OBSERVATIONS IN THE NETHERLANDS, VOLUME 25 Annual Report, 1980
1981 400 p In ENGLISH and DUTCH
(KNMI-142-25) Avail: NTIS HC A17/MF A01; KNMI, De Bilt Netherlands FL 25

Weather reports are given in code according to: (1) surface observations of the weather situation from Netherlands land stations, the lightvessel and from the automatic reporting station on the fixed platform at 00, 06, 12 and 18 hours G.M.T.; (2) upper air observations of pressure, temperature, relative humidity, wind direction, wind speed at De Bilt at 00 and 12 hours G.M.T.; and (3) upper air observations of wind direction and wind speed at 06 and 18 hours G.M.T.. Mean values for each month and for the year were computed from the data of temperature, relative humidity, wind direction and wind speed and are presented in tables.
A.R.H.

N82-15687# Virginia Univ., Charlottesville. Dept. of Environmental Sciences.
THE BEHAVIOR OF SURFACE WIND AND THERMODYNAMIC FIELDS IN THE PRESENCE OF DEEP CONVECTION
Henry J. Cooper and Michael Garstang May 1981 257 p refs
(Contract DAAG29-80-K-0053; Grant NSF ATM-78-08865)
(AD-A105895; TR-5; ARO-16816.2-GS) Avail: NTIS HC A12/MF A01 CSCL 04/2

Surface wind measurements, in fine mesh networks to calculate surface divergence on the convective scale are presented. After the initiation of a convective scale feedback mechanism by the peninsular scale forcing, downdraft induced convergence maintains and intencifies the convective scale activity long after the peninsular scale forcing has passed its peak. A feedback mechanism between the larger and convective scale is established. It is suggested that decline in the efficiency of the convective scale feedback mechanism is related to the rate of change in the peninsular scale forcing. The evolution of the convective activity from a condition of weak convection to a condition of deep convection depends upon the amount of moisture mixed up into the lower cloud layer by the shallower convection. It is shown that diurnal convective process is a very efficient mechanism in the vertical mixing of water vapor, and a relatively inefficient mechanism in production of rainfall.
E.A.K.

N82-15688# Maryland Univ., College Park. Dept. of Meteorology.
SATELLITE OBSERVED PLANTETARY ALBEDO AND ITS PARAMETERIZATION Final Report
Alan Robock and Robert Lutz Apr. 1981 42 p refs
(Contract NA79AA-D-00094)
(PB81-238974; NOAA-81062918) Avail: NTIS HC A03/MF A01 CSCL 04B

Planetary albedo data derived from satellites were compared. The variability of the albedo were calculated using the continuous data set of Winston et al. The data were also compared to a parameterization of Thompson. Because of the different observation methods and the variability of the data, it is impossible to say whether any of the data collections of the parameterization gives the best values for planetary albedo. The parameterization was inverted to use the data to calculate cloudiness, but this did not give consistent results.
GRA

N82-15689# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
STATUS REPORT ON DOE-SPONSORED METEOROLOGICAL MODEL VALIDATION PROGRAM
C. E. Bailey and D. W. Pepper 1981 7 p refs Presented at the Symp. on Intermediate Range Atmospheric Transport Process and Technol. Assessment, Gatlinburg, Tenn., 1 Oct. 1981 Submitted for publication
(Contract DE-AC09-76SR-00001)
(DP-MS-81-20; CONF-811005-1) Avail: NTIS HC A02/MF A01

Mesoscale meteorological models are evaluated. Extensive Kr-85 integrated air concentration measurements and meteorology data obtained in the vicinity of the Savannah River Plant were used for all calculations.
DOE

N82-15690# Los Alamos Scientific Lab., N. Mex.
EXPERIMENTAL DESIGN AND DATA OF THE AUGUST 1980 CORRAL GULCH NOCTURNAL WIND EXPERIMENT, PICEANCE BASIN, NORTHWESTERN COLORADO
William E. Clements, Sue Goff, John A. Archuleta, and Sumner Barr Jul. 1981 200 p refs
(Contract W-7405-eng-36)
(DE81-028665; LA-8895-MS) Avail: NTIS HC A09/MF A01

The characteristics of the nocturnal drainage and upper level winds were investigated. Intensive meteorological measurements were made on four experimental nights using a network of surface stations, free and captive balloon vertical profilers, an acoustic sounder, and the release and sampling of sulfur hexafluoride tracer. The experimental design and the data collected during this study are summarized.
DOE

N82-15691# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Experimentelle Atmosphaerenphysik 1.
CLOUD DROPLET MEASUREMENT METHODS: A BIBLIOGRAPHY
Klaus-Peter Schickel Feb. 1981 120 p refs In GERMAN; ENGLISH summary
(DFVLR-MITT-81-04) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 23,30

All important techniques to measure cloud and fog droplets are mentioned in this compendium. Measurement methods for cloud droplets and cloud droplet size distributions are emphasized.
J.M.S.

N82-15692# Research Inst. of National Defence, Umea (Sweden). Huvudavdelning 4.
A MODEL FOR CALCULATING THE ABSORBED DOSE TO POPULATIONS TAKING LOCAL WEATHER STATISTICS INTO CONSIDERATION
Leif Svensson Oct. 1981 17 p refs
(FOA-C-40140-A3) Avail: NTIS HC A02/MF A01

A mathematical model of the parameters needed to assess radiation absorbed by populations exposed to radiation released in nuclear reactor accidents is presented. The model is based on the Gaussian model for atmospherical dispersion of radionuclides. Probability of giving the number of individuals receiving absorbed doses greater then specified dose limits are calculated. The probability of an accidental release is not taken into account. A core meltdown accident at a 1700 MWth boiling water reactor was simulated. It is found that the highest irradiation occurs for Pasquill class D weather, windspeed 15 m/sec and no precipitation.
Author (ESA)

N82-15693# Illinois State Water Survey, Urbana.
CLIMATOLOGY OF HIGH DAMAGING WIND IN ILLINOIS
Stanley A. Changnon, Jr. 1980 50 p refs
(PB81-234767; ISWS/RI-95/80) Avail: NTIS
HC A03/MF A01 CSCL 04B

Although there is a lack of definitive data, historical data from 43 cooperative substations and 6 first order stations, plus recent wind sensor data from two (short-period) dense networks and a 10-year sample of recorded wind speed data at one location, were used to develop basic climatological information on high winds in Illinois. Spatial and temporal variations in both averages and extremes were treated to dimensionalize the incidence of days with high winds. Among the conclusions are that damaging straight line winds peak in the spring and are least frequent in early fall. Summer thunderstorms are the major producers of high winds, but in all other seasons deep low center passages are the major cause. GRA

N82-15694# Environmental Research and Technology, Inc., Concord, Mass.
ON-SITE METEOROLOGICAL INSTRUMENTATION REQUIREMENTS TO CHARACTERIZE DIFFUSION FROM POINT SOURCES: WORKSHOP REPORT Final Report, Sep. 1979 - Sep. 1980
David Strimaitis, Gale Hoffnagle, and Arthur Bass Apr. 1981 124 p refs
(Contract EPA-68-02-3282)
(PB81-247223; EPA-600/9-81-020) Avail: NTIS
HC A06/MF A01 CSCL 04B

Specific measurement technique and accuracies are recommended. Recommendations to the National Weather Service (NWS) about collecting and archiving meteorological data that would best support air quality dispersion modeling objectives are presented. Recommendations on standardization of meteorological data reporting and quality assurance programs are discussed. T.M.

N82-15695# Meteorology Research, Inc., Altadena, Calif.
MRI AIRBORNE RESEARCH STUDIES IN SUPPORT OF HIPLEX Final Report, May 1975 - Dec. 1980
D. M. Takeuchi Dec. 1980 203 p refs
(Contract DI-14-06-D-7699)
(PB81-243750; MRI-81-FR-1799) Avail: NTIS
HC A10/MF A01 CSCL 04B

Work performed in support of HIPLEX for the period May 1975 to December 1980 is summarized. Subjects covered include: descriptions of the measurement and data systems of the cloud physics research aircraft, the field operations, the results, and conclusions. The cloud base and supercooled cloud regions and intensive case studies of individual storms are analyzed. GRA

N82-15696# National Oceanic and Atmospheric Administration, Rockville, Md. Library and Information Services Div.
IMPACT OF WEATHER AND CLIMATE ON AGRICULTURE: A SELECTED BIBLIOGRAPHY
Gary H. Adams, comp., Robert R. Walter, comp., and Douglas A. McManus, comp. May 1981 132 p
(PB81-245003; NOAA-81063001) Avail: NTIS
HC A07/MF A01 CSCL 04B

This bibliography covers the impact of weather and climate on various socioeconomic and political sectors of modern society relating to agriculture. The references were retrieved by computer searching of about 30 bibliographic databases covering scientific, technical and social science topics. Time coverage is limited to 1970-1979. GRA

N82-15697# National Oceanic and Atmospheric Administration, Washington, D. C. Office of Federal Coordinator for Meteorological Services and Supporting Research.
NATIONAL HURRICANE OPERATIONS PLAN
May 1981 81 p
(PB81-247231; NOAA-FCM-P12-1981; NOAA-81071411)
Avail: NTIS HC A05/MF A01 CSCL 04B

The hurricane warning service is an interdepartmental effort to provide the nation and designated international recipients with environmental data, forecasts, and assessments concerning tropical and subtropical weather systems. GRA

N82-15698# National Oceanic and Atmospheric Administration, Washington, D. C.
ENVIRONMENTAL SATELLITE IMAGERY, MARCH 1981
May 1981 69 p refs
(PB81-248049; KMRD-5.4-8103) Avail: NTIS
HC A04/MF A01 CSCL 04B

Current cloud data obtained by operational environmental satellites was documented. Daily global satellite imagery is recorded in condensed form as a guide to data stored in the NOAA archives and is designed to help users select data for research and climatological use. The polar hemispheric mosaics reproduced in this catalog are derived from the advanced very high resolution radiometer (AVHRR (GSC)) data, and prepared daily by high speed computers. Visible and infrared swaths obtained while the satellite is northbound are used in the 15L mosaics from TIROS-N and the infrared channel only in the 17L mosaics from NOAA-6. NOAA-7 will include both the infrared and visible mosaics from the 14L pass. Infrared data swaths obtained during southbound passage of TIROS-N are labeled 03L. NOAA-6 are labeled 07L and NOAA-7 will be labeled 02L. GRA

N82-15477# Joint Publications Research Service, Arlington, Va.
MODEL OF CLIMATE AND GLOBAL ECOLOGY
Vladimir Valentinovich Aleksandrov and Nikita Nikolayevich Moiseyev *In its* USSR Rept.: Earth Sci., No. 18 (JPRS-79631) 10 Dec. 1981 p 1-13 refs Transl. into ENGLISH from Priroda (Moscow), no. 9, Sep. 1981 p 68-71 (For primary document see N82-15476 06-42)
Copyright. Avail: Issuing Activity

N82-15478# Joint Publications Research Service, Arlington, Va.
POTENTIAL CHANGE IN CLIMATE BY YEAR 2000
O. A. Drozdov *In its* USSR Rept.: Earth Sci., No. 18 (JPRS-79613) 10 Dec. 1981 p 14-15 Transl. into ENGLISH from Novoye, V Zhizni, Nauke, Tekhn., Ser. Nauka o Zemle (Moscow), No. 8, Aug. 1981 p 32-34 (For primary document see N82-15476 06-42)
Avail: Issuing Activity

N82-15479# Joint Publications Research Service, Arlington, Va.
CLIMATES OF PAST AS A MODEL OF FUTURE CLIMATE
D. D. Kvasov *In its* USSR Rept.: Earth Sci., No. 18 (JPRS-79631) 10 Dec. 1981 p 16-17 Transl. into ENGLISH from Novoye V Zhizni, Nauke Tekhn. Ser. Nauka o Zemle (Moscow), no. 8, Aug. 1981 p 30-32 (For primary document see N82-15476 06-42)
Avail: Issuing Activity

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-15699*# Oregon State Univ., Corvallis. Climatic Research Inst.
ANALYSIS OF THE SURFACE HEAT BALANCE OVER THE WORLD OCEAN Final Technical Report, 1 Dec. 1978 - 30 Sep. 1981
Steven K. Esbensen Dec. 1981 242 p
(Grant NsG-5308)
(NASA-CR-165072) Avail: NTIS HC A11/MF A01 CSCL 08C

It is possible to estimate long term monthly mean latent and sensible heat fluxes over the ocean to within > or approximately 20% relative accuracy of the bulk aerodynamic formulas, by using observations of the monthly mean surface wind speed and the monthly mean sea air temperature and humidity differences. It is possible to make an estimate of the fluxes on a month to month basis from monthly averaged surface data. S.L.

N82-15700# Naval Surface Weapons Center, Dahlgren, Va. Strategic Systems Dept.

GLOBAL OCEAN TIDES. PART 7: THE DIURNAL PRINCIPAL SOLAR TIDE (P1), ATLAS OF TIDAL CHARTS AND MAPS Final Report

E. W. Schwiderski May 1981 88 p refs Sponsored in part by the National Geodetic Survey
(AD-A105612; NSWC/TR-81-220) Avail: NTIS HC A05/MF A01 CSCL 08/3

In Part 1 (Schwiderski, 1978a) of this report, a unique hydrodynamical interpolation technique was introduced, extensively tested, and evaluated in order to compute partial global ocean tides in great detail and with a high degree of accuracy. This novel method has been applied to construct the diurnal principal solar (P1) ocean tide with a relative accuracy of better than 5 cm anywhere in the open oceans. The resulting tidal amplitudes and phases are tabulated on a 1 deg X 1 deg grid system in an atlas of 42 deg X 71 deg overlapping charts covering the whole oceanic globe. A corresponding atlas of global corange and cotidal maps is included to provide the reader with a quick general overview of the major tidal phenomena. The specifying hydrodynamical parameters of the model are listed along with quoted sources of empirical tide data, and significant tidal features are explained and discussed. As expected, since the periods of the diurnal tides P1 (24.07h) and K1 (23.93 h) differ by only 0.14 h, these two tides resemble very closely each other (compare Part 4). Significant differences occur only in regions of rapid tidal variations. Of course, P1 resembles also the diurnal 01 tide but to a visibly lesser degree (see Part 5). Author (GRA)

N82-15701# Texas Univ. at Austin. Bureau of Economic Geology.

SALINITY OF DEEP FORMATION WATERS, TEXAS GULF COAST: PRELIMINARY RESULTS

R. A. Morton, J. S. Posey, and C. M. Garrett, Jr. 1981 10 p refs Presented at the 5th Geopressured-Geothermal Energy Conf., Baton Rouge, La., 13 Oct. 1981
(Contracts DE-AC08-79ET-27111; DE-AC08-79ET-27112)
(DE81-029773; CONF-811026-6) Avail: NTIS HC A02/MF A01

The vertical variation in salinity was studied. Salinities are lowest in the transition zone, but in many areas, salinities of geopressured reservoirs tend to gradually increase with depth. High salinities at depth explained by hyperfiltration and proximity to salt domes are discussed. Both mechanisms are responsible for high salinities in the Frio Formation; however, concentrated brines are not necessarily indicative of salt dissolution as shown by water analyses from south Texas. This area is far removed from any known salt accumulations and yet salinities of formation water from some fields are greater than 200,000 ppM. Reservoirs that are stratigraphically equivalent but separated by minor faults produce waters with similar salinities. The greatest differences in salinity are found in stratigraphically separated reservoirs. DOE

N82-15702# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

LASER DEPTH SOUNDING IN THE BALTIC SEA

Haakan Klevebrant, Joergen Lexander, Ove Steinvall, and Anders Widen May 1981 45 p refs
(FOA-C-30219-E1) Avail: NTIS HC A03/MF A01

Tests were made over areas with different water clarities. Simultaneous sea truth measurements were done from boats. Maximum depth penetration of more than 30 m is obtained, in good agreement with theoretical estimation. Mapping of an area close to a large ship route shows good agreement between sonar and laser profiles down to 20 m depth. The experiment demonstrates the great potential of a laser bathymeter for remote monitoring of depth and turbidity in Swedish coastal water. A scanning system gives a significant reduction of cost and increases the speed of data collection for hydrographic charting. Author (ESA)

N82-15703# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Environmental Lab.

ANALYSIS OF METHODOLOGIES USED FOR THE ASSESSMENT OF WETLAND VALUES Final Technical Report

Robert I. Lonard, Ellis Clairain, Jr., Robert T. Huffman, J. W. Hardy, Linda D. Brown, Paul E. Ballard, and Janet W. Watts Sep. 1981 81 p refs Sponsored in part by Water Resources Council
(PB81-245664) Avail: NTIS HC A05/MF A01 CSCL 08J

Methodologies that assess inland and coastal wetlands functions are identified and evaluated. GRA

N82-15704# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.

PROCEEDINGS OF A SYMPOSIUM ON PRELIMINARY RESULTS FROM THE SEPTEMBER 1979 RESEARCHER/PIERCE IXTOC-1 CRUISE

Donald K. Atwood Dec. 1980 533 p refs Symp. held at Key Biscayne, Fla., 9-10 Jun. 1980
(PB81-246068; NOAA-81071401) Avail: NTIS HC A23/MF A01 CSCL 08J

A complete listing of the types and numbers of samples collected is given. Compounds resulting from photooxidation experiments conducted on IXTOC-1 crude oil were the same as those found in situ in the area of the spill plume. These same compounds were formed by microbial action in microcosm experiments conducted in the dark on board the Researcher, but in differing amounts and ratios. It is concluded that the entire microbial community responds to the spilled oil and that a population of petroleum degrading bacteria can grow rapidly enough to consume the oil at relatively rapid rates. T.M.

N82-15705# Texas A&M Univ., College Station. Research Foundation.

OVERPRESSURED MARINE SEDIMENTS. VOLUME 3: THERMAL CONDUCTIVITY, ELECTRICAL RESISTIVITY, AND PERMEABILITY OF SATURATED SEDIMENT AT VARIOUS POROSITIES Final Report

James Keith Enderby and Louis J. Thompson 14 Jul. 1981 120 p refs
(Grant DI-14-08-C001-17289)
(PB81-243578) Avail: NTIS HC A06/MF A01 CSCL 08J

The thermal conductivity of sea water saturated clays, kaolinite, illite and bentonite, and sea water saturated Ottawa sand was determined in both the horizontal and vertical direction. All clays showed anisotropic thermal conductivity. The horizontal thermal conductivity of illite and bentonite was independent of porosity. The horizontal thermal conductivity of kaolinite increases as porosity decreased. It is found that the saturated clay electrical resistivity substantially decreases as either the applied voltage or duration of test increased. The same trend was observed in both the horizontal and vertical direction using either alternating current or direct current. GRA

N82-15706# Hawaii Univ., Honolulu. Lab. of Oceanographic Engineering.

WAVE ATTENUATION AND WAVE SET UP ON A COASTAL REEF

Franciscus Gerritsen Mar. 1981 440 p refs
(Grants NOAA-04-6-158-4402; NOAA-04-6-158-44114)
(PB81-246159; UNIHI-SG-CR-81-05; LOOK-LAB-81-48; NOAA-81071403) Avail: NTIS HC A19/MF A01 CSCL 08C

The breaking of waves on coastal reefs, with special emphasis on energy dissipation (wave height attenuation), wave spectrum modification and characteristics of wave set up is examined. The hydrodynamic processes associated with waves breaking on a reef and the goals are described. The following topics are discusssed: aspects of nonlinear waves, significance bottom friction in wave dissipation over a shallow reef, various aspects of wave set up, effects of a modulating wave train on the wave set up on the reef, and the spectrum for various water depths. GRA

N82-15707# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.

HF RADAR MEASUREMENTS OF SURFACE CURRENTS IN THE GERMAN BIGHT DURING MARSEN PHASE 2

M. M. Janopaul, A. S. Frisch, and R. S. Lyons May 1981 59 p refs
(PB81-244410; NOAA-TM-ERL-WPL-71; NOAA-81063011) Avail: NTIS HC A04/MF A01 CSCL 08C

Surface currents were measured by HF radar (called CODAR) situated in the German Bight. Hourly maps of instantaneous surface currents, tidal current ellipses, and direct current averages are presented. Analysis of the surface flow identified the principal focal feature as cyclonic semidiurnal tidal currents. It is shown that the surface flow is a relatively weak cyclic pattern. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-15708*# National Aeronautics and Space Administration, Washington, D. C.
USSR SPACE LIFE SCIENCES DIGEST Annual Summary
Courtland S. Lewis, ed. and Kristy L. Donnelly, ed. 1980 72 p refs Prepared jointly with BioTechnology, Inc., Arlington, Va.
(Contract NASw-3469)
(NASA-TM-84080) Avail: NTIS HC A04/MF A01 CSCL 06C

Research in exobiology, life sciences technology, space biology, and space medicine and physiology, primarily using data gathered on the Salyut 6 orbital space station, is reported. Methods for predicting, diagnosing, and preventing the effects of weightlessness are discussed. Psychological factors are discussed. The effects of space flight on plants and animals are reported. Bioinstrumentation advances are noted. R.J.F.

N82-15709*# George Washington Univ., Washington, D.C. Dept. of Medical and Public Affairs.
A COMPENDIUM OF HYPOKINETIC AND HYPODYNAMIC ANIMAL STUDIES Contractor Report, Dec. 1981
Linda G. Pleasant and Phyllis T. Axelrod Washington NASA Dec. 1981 734 p
(Contract NASw-3165)
(NASA-CR-3485) Avail: NTIS HC A99/MF A01 CSCL 06C

This compendium organizes and summarizes the scientific literature dealing with the study of hypokinetic and hypodynamic animal studies. It includes both American and foreign research papers. Author

N82-15710*# Research Triangle Inst., Research Triangle Park, N. C.
NASA BIOMEDICAL APPLICATIONS TEAM. APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE Quarterly Report, Apr. - Jun. 1979
D. J. Rouse, R. Beadles, H. C. Beall, J. N. Brown, Jr., W. H. Clingman, M. W. Courtney, M. McCartney, R. W. Scearce, and B. Wilson Jun. 1979 60 p refs
(Contract NAS1-14708)
(NASA-CR-152663; RTI/1411/00-07Q) Avail: NTIS HC A04/MF A01 CSCL 06C

The use of a bipolar donor-recipient model of medical technology transfer is presented. That methodology is designed to: (1) identify medical problems and aerospace technology that in combination constitute opportunities for successful medical products; (2) obtain the early participation of industry in the transfer process; and (3) obtain acceptance by the medical community of new medical products based on aerospace technology. Problem descriptions and activity reports and the results of a market study on the tissue freezing device are presented. E.A.K.

N82-15711*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
STS-1 MEDICAL REPORT
Sam L. Pool, ed., Philip C. Johnson, Jr., ed., and John A. Mason, ed. Dec. 1981 114 p
(NASA-TM-58240; S-509) Avail: NTIS HC A06/MF A01 CSCL 06P

The report includes a review of the health of the crew before, during and immediately after the first Shuttle orbital flight (April 12-14, 1981). Areas reviewed include: health evaluation, medical debriefing of crewmembers, health stabilization program, medical training, medical kit carried inflight; tests and countermeasures for space motion sickness, cardiovascular profile, biochemistry and endocrinology results; hematology and immunology analyses; medical microbiology; food and nutrition; potable water; shuttle toxicology; radiological health; cabin acoustical noise. Also included is information on: environmental effects of Shuttle launch and landing, medical information management; and management, planning and implementation of the medical program. For individual titles, see N82-15712 through N82-15731.

N82-15712*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
EVALUATION OF CREW HEALTH c52
Craig L. Fischer and Joseph Degioanni *In its* STS-1 Med. Rept. Dec. 1981 p 5-6 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

The STS-1 pre- and postflight medical evaluations are presented. Exams included: audiometry; dental examination; laboratory microbiology; physical examination; cardiovascular stress tests, including 80% treadmill; stand test weight; tonometry; and visual examination. No significant clinical problem was identified postflight. Of interest medically was the expected hyperreflexia and dependent venous stasis exhibited by both crewmen. T.M.

N82-15713*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
INFLIGHT OBSERVATIONS c52
Michael A. Berry *In its* STS-1 Med. Rept. Dec. 1981 p 7-9 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

The monitoring was carried out by recording electrocardiogram (ECG) during prelaunch, launch, early orbit time, entry, and landing; monitoring crew voice transmission throughout the mission; and conducting a daily private crew medical communication. Crew performance is outlined. No medical problems of any kind were experienced by the crew. No medical treatment inflight was required except for the prophylactic use of an antimotion sickness medication that had been planned preflight. T.M.

N82-15714*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CREW MEDICAL DEBRIEFING c52
Joseph Degioanni and Craig L. Fischer *In its* STS-1 Med. Rept. Dec. 1981 p 11-17 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

The postflight debriefings of the STS-1 astronauts are presented. The debriefings are presented as dialogues taken from the tape recording of the sessions. T.M.

N82-15715*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
HEALTH STABILIZATION PROGRAM c52
James K. Ferguson *In its* STS-1 Med. Rept. Dec. 1981 p 19-21 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

The objective of the HSP is to provide an environment surrounding the prime and backup crewmen which will reduce or eliminate the exposure of the crew to infectious agents. The program limited the access of large numbers of newspersons to the crew and enabled the identification and medical examination of all VIP's who visited the crew. Although several primary contacts were observed not wearing masks at required times, the great majority of primary contacts did wear masks. The STS-1 program effectively kept 38 known ill persons out of crew work areas and thereby prevented crew exposure and possible illness. T.M.

N82-15716*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
EMERGENCY MEDICAL SERVICES SYSTEM (EMSS) c54
Sam E. Pool *In its* STS-1 Med. Rept. Dec. 1981 p 23-27 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

The objective of the EMSS was to provide the ill or injured crewman with rapid access to the appropriate level of medical care. In order to meet the objective, the following factors were carefully considered in developing the EMSS for STS-1: accessibility to health care centers, personnel, training, experience, transportation, response times, communications, medical records, and special environmental hazards. The system is described along with flight surgeon staffing and deployment. T.M.

N82-15717*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CREW MEDICAL TRAINING c52
James M. Vanderploeg *In its* STS-1 Med. Rept. Dec. 1981 p 29-30 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

Each astronaut's initial training in the medical disciplines occurred during the first year following selection. The medical curriculum encompassed approximately 16 hours of instruction during the year. The principal areas covered include: the central and peripheral nervous systems; the auditory and vestibular systems; the visual system; dental health; the cardiovascular system; the pulmonary system, gastrointestinal system, and genitourinary system; and the musculoskeletal system. For each of these areas the astronauts were taught the basics of anatomy and physiology. In addition, they were introduced to physical examination techniques, diagnosis, and treatment of the more common ailments of the different organ systems. T.M.

N82-15718*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SHUTTLE ORBITAL MEDICAL SYSTEM c52
James M. Vanderploeg *In its* STS-1 Med. Rept. Dec. 1981 p 31-35 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

The system was designed to provide treatment for life threatening emergencies and to permit diagnosis and treatment of all less severe injuries and illnesses. It is intended to sustain the medical needs of a two man crew for up to 7 days. The system is described and a detailed list of the equipment in the emergency medical kit is presented. The prescribed medical training in the performance of emergency procedures, the use of diagnostic equipment, the performance of therapeutic modalities, and the knowledge of the medical kits contents is discussed. T.M.

N82-15719*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
VALIDATION OF PREDICTIVE TESTS AND COUNTERMEASURES FOR SPACE MOTION SICKNESS c52
Jerry L. Homick *In* the STS-1 Med. Rept. Dec. 1981 p 37-38 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

Inflight observations, supported by a series of pre and postflight data collection procedures, on STS-1 crewmembers in an effort to validate ground based tests which may be predictive of susceptibility to the space motion sickness syndrome are presented. Crew procedures were implemented which enabled acquisition of data to be used in validating motion sickness countermeasures. T.M.

N82-15720*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CREW CARDIOVASCULAR PROFILE c52
Michael W. Bungo *In its* STS-1 Med. Rept. Dec. 1981 p 39-45 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

Cardiovascular data was acquired in the operational mode of the flight. Heart rate and blood pressure responses are presented for each crewman. There were definable points in the mission which produce cardiovascular stress as measured by heart rate response. The stand test in both the PLT and CDR show evidence for a relative hypovolemia and perhaps a resetting of arterial regulation. The anti-G suit and G sub z acceleration effects are discussed. The anti-G suit proved to be a rather simple yet relatively effective device for increasing tolerance to +G sub z acceleration. The STS-1 flight profile produced no operationally significant alterations in G tolerance. T.M.

N82-15721*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
BIOCHEMISTRY AND ENDOCRINOLOGY RESULTS c52
Carolyn S. Leach *In its* STS-1 Med. Rept. Dec. 1981 p 47-49 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

Blood (plasma or serum) biochemistry findings show postflight decreases below preflight findings for uric acid triglycerides, and AST. Postflight increases above preflight values were observed in glucose, cholesterol, BUN, calcium phosphate, angiotensin I, aldosterone, insulin, T3, T4, HGH, ACTH and GGTP. It is suggested that special attention should be given to the fluid and electrolyte intake in the astronauts so that homeostatic perturbations are not consequential. T.M.

N82-15722*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
HEMATOLOGICAL AND IMMUNOLOGICAL ANALYSES c52
Gerald R. Taylor *In its* STS-1 Med. Rept. Dec. 1981 p 51-52 refs (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

The analyses conducted on the cellular blood components of the primary and backup crewmembers indicated that for the one month period preceding the flight, there were no unusual variations in the cellular blood components of the crewmembers. However, there were alterations in both of the primary crewmembers after the flight. The explanation is that there was a phase decrease in fluid volume. Concomitant with this fluid imbalance there is also evidence to support an absolute decrease in mean erythrocyte volume, a peripherial lymphopenia, and a marked decrease in blastogenic response of lymphocytes to in vitro mitogenic challenge. T.M.

N82-15723*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
MEDICAL MICROBIOLOGY OF CREWMEMBERS c52
Duane L. Pierson *In its* STS-1 Med. Rept. Dec. 1981 p 53-58 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

A surveillance program consisting of microbial monitoring of the flight crews (prime and backup) and the spacecraft (including surfaces, food, air and water) is described. Samples were obtained from the crews and the Orbiter at specified times and were evaluated by quantitating the number of microorganisms and identifying the pathogenic and potentially pathogenic microbes. Quantitative values for total microorganisms per sample site were relatively low both pre- and postlaunch except for three sites which exhibited some microbial buildup during the flight. The circulating air in the Orbiter displayed a sharp increase in the number of airborne bacteria and fungi immediately prior to launch. T.M.

N82-15724*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
FOOD AND NUTRITION c54
Richard L. Sauer and Rita M. Rapp *In its* STS-1 Med. Rept. Dec. 1981 p 59-62 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06H

The menu used during STS-1 is shown in terms of food items and food forms (irradiated, freeze-dried, or beverage). The estimated mean daily inflight nutrient consumption per crewman is presented. Recommended quantities of specific nutrients are reported. T.M.

N82-15725*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE POTABLE WATER c54
Richard L. Sauer *In its* STS-1 Med. Rept. Dec. 1981 p 63-66 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06K

Periodic samples of the potable water were obtained preflight and a series of samples were taken postflight to determine the continuing microbiological and chemical quality of the water. Those parameters of nonmedical concern which were exceeded included total organics and color. Other parameters included nickel concentration, total bacteria count, and chromium concentration levels. T.M.

N82-15726*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SHUTTLE TOXICOLOGY c52
Wayland J. Rippstein *In its* STS-1 Med. Rept. Dec. 1981 p 67-75 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06T

Space flight toxicity standards and methods for control and evaluation of candidate spacecraft materials selection and/or use are described. The development of methods and hardware for removal of spacecraft contaminants is discussed. The analytical chemical data obtained from the two Orbiter vehicles (OV-101 and OV-102) were reviewed. The Enterprise (OV-101) is shown to be an extremely clean vehicle, whereas the Columbia (OV-102) outgassed a significant number and quantity of contaminant gases. T.M.

N82-15727*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
RADIOLOGICAL HEALTH c52
Charles M. Barnes *In its* STS-1 Med. Rept. Dec. 1981 p 77-78
(For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06R

Dosimeters were provided for development within the crew compartment and on the astronauts flight garments to detect radiation encountered by the space crew during the mission. The STS-1 mission encountered geomagnetically trapped electrons and protons on 13 low altitude passes through the South Atlantic anomaly. The orbital inclination was such that encounters with the outer belt horn was negligible. Radiation dose to the crew from the above events was estimated to be 5 millirad. Total PDL measured dose to the crew from all sources during the STS-1 mission was 20 millirad. T.M.

N82-15728*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CABIN ACOUSTICAL NOISE c71
Jerry L. Homick *In its* STS-1 Med. Rept. Dec. 1981 p 79-80
(For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 20A

Using a hand-held sound pressure level meter the crew made one octave band and A-weight sound level measurements at four locations in the Orbiter on Mission Day 1. The data were voice recorded and transmitted to the ground prior to the first inflight sleep period. The data obtained are summarized. From a physiological point of view the noise levels measured on STS-1 were not hazardous to the crewmens' hearing. T.M.

N82-15729*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ENVIRONMENTAL EFFECTS OF SHUTTLE LAUNCH AND LANDING c45
Andrew E. Potter *In its* STS-1 Med. Rept. Dec. 1981 p 81-91
(For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 13B

The areas of concern were the toxic exhaust cloud produced by Shuttle launch, the effect of launch operations on the local ecology, and the sonic boom produced by Orbiter re-entry. Wet acidic dust fell from the exhaust cloud for about ten minutes after launch. The fallout was not entirely unexpected, but the intensity and duration was larger than anticipated. The fallout material is not considered a significant health hazard. T.M.

N82-15730*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
MEDICAL INFORMATION MANAGEMENT c82
Edward C. Moseley *In its* STS-1 Med. Rept. Dec. 1981 p 93-98
(For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 05B

Input forms were established for all areas of crew health assessment except microbiology. Microprocessor systems and remote terminals were functional for all medical laboratories and are described. The major objectives of being able to collect, store, and retrieve primary medical information from local and remote locations were accomplished. T.M.

N82-15731*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
MANAGEMENT, PLANNING, AND IMPLEMENTATION OF MEDICAL OPERATIONS c81
Norman Belasco *In its* STS-1 Med. Rept. Dec. 1981 p 99-110
(For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 05A

The roles of the primary team member organization participating in and supporting STS-1 medical operations activities are summarized. The medical operations panel and supporting structure are outlined. The medical operations assignments are presented for JSC along with communications requirements for STS-1. T.M.

N82-15732# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
FEASIBILITY STUDY (PHASE A) FOR A LIFE SCIENCE DOUBLE RACK ENVISAGED FOR THE SPACELAB MISSION D1 Final Report, Oct. 1980
Rolf Baur, Karl-Ludwig Bitzer, Helmut Preiss, and Peter Schiller Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 83 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-037; ISSN-0170-1339) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,40

The lifescience double rack which is envisaged for a flight in the Spacelab mission D1 enables the performance of biomedical and botanical experiments. Besides experiment specific boxes, the double rack contains multi-user facilities like a standard botanical equipment, an oscilloscope and two centrifuges, furthermore stowage containers for auxiliary equipment. For late access and early retrieval equipment, stowage lockers in the middeck are available and in addition middeck freezers can be used during flight. A concept for the life science double rack was worked out including the flight and ground operations and the ground support equipment. Author

N82-15733# Erno Raumfahrttechnik G.m.b.H., Bremen (West Germany).
CONCEPT STUDY OF A LIFE SCIENCES PAYLOAD ELEMENT (PLE) FOR THE SL-D1 MISSION Final Report, Nov. 1980
Peter Junk, Heinrich Stegen, Wolfgang Haebel, and Manfred Ott Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 184 p refs Partly in GERMAN and ENGLISH Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-038; ISSN-0170-1339) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 34,70

Twelve life sciences experiments were selected as candidates for the Spacelab (SL)-D1 mission. They are combined to form a payload element (PLE). Experiment requirements were analyzed and completed, and technical concepts for the PLE were proposed. Interfaces were defined and missions assurance, operational, testing, and ground support aspects were considered. Most of the experiment requirements are within the capability which is supplied by the Space Transportation System, except the total stowage volume required for sample stowage in the orbiter mid deck. Also crew time is a critical parameter. The technical design concepts of the experiments are based on first Spacelab payload hardware or on existing commercial equipment, which has to be modified for SL. For realizing the SL-PLE, 32 months were estimated, starting from a definition phase. M.G.

N82-15734# Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radizioni.
SPECTROPHOTOMETRIC STUDIES ON THE RNA STRUCTURE IN E.COLI RIBOSOMES. PART 1: FUNDAMENTALS OF ULTRAVIOLET SPECTROPHOTOMETRY OF NUCLEI ACIDS
M. Belli, F. Mazzei, and G. Onori (Perugia Univ., Italy) 20 Mar. 1980 35 p refs In ITALIAN; ENGLISH summary 2 Vol.
(ISS-R-80/2-Pt-1; ISSN-0390-6477) Avail: NTIS HC A03/MF A01

The fundamentals of UV absorption spectroscopy of nucleic acids are reviewed. The relationship between the absorption of a polymer (DNA, RNA) with the absorption properties of the bases, is described. The association between spectral changes and structural modifications in nucleic acids, is also evidentiated. M.G.

N82-15735# Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazioni.
SPECTROPHOTOMETRIC STUDIES OF THE RNA STRUCTURE IN E.COLI RIBOSOMES. PART 2: INFLUENCE OF IONS AND PROTEINS ON THE RNA SECONDARY STRUCTURE

A. Arsco, M. Belli, F. Mazzni (Perugia Univ.), and G. Onori 27 Mar. 1980 31 p refs In ITALIAN; ENGLISH summary 2 Vol. (ISS-R-80/3-Pt-2; ISSN-0390-6477) Avail: NTIS HC A03/MF A01

The main results obtained on E.coli ribosomes and rRNA conformation are reviewed. It is shown in particular that the rRNA structure within the ribosome subunits can be affected by the interaction with proteins and with magnesium. M.G.

N82-15736# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

FUNDAMENTALS OF AERONAUTICAL AND AEROSPACE MEDICAL SCIENCE

Cai Qiao, Feng Gengquan, and Yan Yuanfu 17 Jul. 1981 956 p Transl. into ENGLISH of the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 344 p (AD-A102298; FTD-ID(RS)T-1802-80) Avail: NTIS HC A99/MF A01 CSCL 06/5

The biological and physiological effects of flight environments were examined along with the types of environments themselves. The environments discussed are of three major types: the external environment, the cabin environment, and the internal environment of the body. Emphasis is placed on acceleration stresses and high gravity environments, flight safety and health, and the human body's reaction to the particular stresses discussed. For individual titles, see N82-15737 through N82-15762.

N82-15737# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE DEVELOPMENTAL HISTORY OF AERONAUTICAL AND AEROSPACE MEDICAL SCIENCE c52

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 4-8 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

Early research is emphasized. Several experiments in balloon flight and pressurized cabins are discussed. Problems arising from aeronautical development in World War 1 such as frostbite, hypoxia, decompression sickness, and flight fatigue are discussed. The influences of space navigational development on aerospace medicine are also discussed. The relationship between aircraft flight environment and spacecraft environment is considered. T.M.

N82-15738# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ENVIRONMENTAL CONDITIONS OF AVIATION AND SPACE NAVIGATION c54

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 9-24 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-52)

Avail: NTIS HC A99/MF A01 CSCL 06/5

Three types of environments are discussed: the space environment, the inner cabin environment, and the environment in the human body. Atmospheric conditions encountered in aviation and space flight were reviewed. Medically related aircraft and spacecraft environmental conditions are summarized and include low pressure, lack of oxygen, decompression, explosive decompression, and oxygen poisoning. T.M.

N82-15739# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

GENERAL LAWS OF AVIATION AND SPACE NAVIGATION ENVIRONMENTAL EFFECTS ON THE HUMAN BODY c52

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 25-34 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

The effects of environmental conditions on the human body are brought about within various complex relations. The so-called action of a single condition is only the most outstanding manifestation in a certain dynamic process. The physiological changes and pathological process of the human body in space navigation as well as their reasons and reaction mechanisms were analyzed. The following factors are discussed: the qualities and composition of the environmental factors; the functioning state of the organism at the time; and man's subjective dynamic role. T.M.

N82-15740# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

MEDICAL PROBLEMS OF GRAVITATIONAL CHANGES AND POWERED FLIGHT c52

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 35-37 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

Three types of gravitational change are discussed: overweightness, angular acceleration, and noise produced by air vibration. Overweightness is considered as a large increase in the gravitational force such as impact. The vestibule-autonomic nervous system reactions and motion sickness caused by angular acceleration are covered. Aerodynamic noise tolerances are discussed. T.M.

N82-15741# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

INJURY AND PROTECTION OF OVERWEIGHTNESS c54

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 38-129 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

Physiological acceleration and acceleration stresses are summarized. Acceleration protection in high gravity environments is emphasized. The physics of angular acceleration and impact acceleration were reviewed. The physiological effects of high gravity are presented in detail along with pilot performance results due to such stresses. T.M.

N82-15742# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

HARMFULNESS OF VIOLENT IMPACT AND AIRFLOW SHOCKS c52

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 131-162 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

Various types of impact on the human body resulting from aircraft accidents or sudden deceleration are discussed. Special emphasis is given to parachuting or ejection from the aircraft and protective measures to be taken. L.F.M.

N82-15743# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

HUMAN BODY REACTION TO VIBRATION c52

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-08) 17 Jul. 1981 p 163 223 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

Low frequency whole body vibrations sustained in aircraft and spacecraft are discussed. The physiological effects of such vibrations and protective measures to be taken are presented. L.F.M.

N82-15744# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE EFFECTS OF ROTATION AND OSCILLATION: AERIAL SICKNESS c52
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 195-223 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

Acrial sickness caused by aircraft and spacecraft motion is discussed. Various motion sickness drugs and other measures for combating this sickness are presented. L.F.M.

N82-15745# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
FLIGHT ILLUSIONS c54
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 224-295 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

Flight illusions encountered by aircraft pilots are discussed. Pilot selection and training techniques as well as other measures for preventing and overcoming these illusions are presented. L.F.M.

N82-15746# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
MAN'S ADAPTATION TO WEIGHTLESSNESS AND LOW WEIGHT c54
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ED(RS)T-1802-80) 17 Jul. 1981 p 244-295 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

Weightlessness and its effect on astronauts after long exposure to it are discussed. Its causes and various means to combat it are presented. L.F.M.

N82-15747# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NOISE AND SENSE OF HEARING c52
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 296-335 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

Aircraft noise and its effect on pilots and others of the crew are discussed. Noise reduction techniques and steps to be taken to allow pilot efficiency in a noisy environment are presented. L.F.M.

N82-15748# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE PHYSIOLOGICAL EFFECT OF LOW-AIR-PRESSURE ANOXIA c52
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 337-398 Transl. into ENGLISH from the book "Funcamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

Anoxia, a problem of the atmospheric environment in aerospace medicine, is discussed extensively. Discussion is limited to the physiological effects of anoxia caused by low air pressure. More specifically, the effects on the human respiratory, circulatory, nervous, and metabolic systems are detailed. M.D.K.

N82-15749# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CAISSON DISEASE c52
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 399-426 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

The causal factors of Caisson Disease, a problem of the atmospheric environment in aerospace medicine, are discussed. Physiological effects of the disease on the human respiratory, circulatory, digestive, and skeletal systems are considered. Effects on body organs and tissues and attendant shock and fainting are also discussed. The physiological effects (mechanical and biochemical) of the formation of bubbles inside body tissues, the main cause of Caisson Disease, are detailed. Pressurization treatment and suggested procedures for adaptation and training as preventative measures are also discussed. M.D.K.

N82-15750# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DANGERS OF EXPLOSIVE DECOMPRESSION c52
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 427-439 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

Explosive decompression, drastic decompression at an ascent rate of over 1.5 km/sec, in space ships is either caused by structural damage or collision with a large meteor. The physiological effects of explosive decompression, a problem of the atmospheric environment in aerospace medicine, are discussed. Specific effects on the physiological tolerances of the human respiratory (bubble formation), digestive, nervous, and circulatory systems and attendant effects on body organs are considered. Suggestions for developing adaptation, training, and preventative methodology to handle explosive decompression are given. M.D.K.

N82-15751# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
OXYGEN TOXICATION c52
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) p 440-456 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

Oxygen poisoning, oxygen toxication, will be induced if the oxygen partial pressure is over 176 mm Hg and the duration is too long. The physiological effects of oxygen poisoning, a problem of the atmospheric environment in aerospace medicine, is discussed. Effects on the human respiratory and circulatory systems, hearing and vision, and body tissues are considered. Suggestions for fire prevention, safety measures, and protective equipment for use in pure oxygen environments are given. M.D.K.

N82-15752# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE RELATIONSHIP OF BODY TEMPERATURE TO ENVIRONMENTAL TEMPERATURE c52
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 457-476 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

The unresolved problem of fluctuations in environmental temperature in aeronautics and space travel and the attendant physiological effects on the human body are considered. Environmental temperature requirements, namely optimal and tolerable temperatures, the damage done to the human body by cold and heat, and its prevention are discussed. The human body's inherent mechanisms and their responses in regulating normal body temperature are also reviewed. M.D.K.

N82-15753# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

COMFORTABLE TEMPERATURE AND TOLERABLE TEMPERATURE c54

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 477-506 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

The range of temperature during flight which makes people feel comfortable was examined. During passenger flights or space travel, the cabin temperature is kept in a range comfortable for the crew and passengers. However, this comfortable temperature range cannot always be maintained. Flighters always have to sacrifice comfort for speed, any complicated temperature regulation facilities adds extra weight and volume to the plane, and slow it down. The comfortable temperature range required to maintain flying ability and operational efficiency is the acceptable temperature. The comfortable, tolerable and acceptable temperatures are discussed. E.A.K.

N82-15754# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE PHYSIOLOGICAL EFFECT OF HEAT AND ITS PREVENTION c52

In its Fundamentals of Aeron. and Aerospace Med Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 507-534 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

The actual physiological effects of heat and preventive measures are discussed. The following issues are examined: (1) change of skin temperature and internal body temperature; (2) perspiration rate; (3) change of cardiovascular systems, respiration, and metabolism; (4) effects of heat; (5) sensitivity to temperature; (6) heat stroke; (7) heat adaptation; (8) heat damage prevention. E.A.K.

N82-15755# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE EFFECT OF COLD AND THE COLD PREVENTION c52

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 535-554 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

The effects of cold, and cold prevention are described. Physiological responses to low temperatures are outlined: (1) physiological effects and damaged of cold; (2) local frostbites and injuries caused by cold; (3) effects of cold on flying ability; (4) factors affecting physiological responses to cold; (5) adaptation to cold; (6) clothing. E.A.K.

N82-15756# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

IONIZING RADIATION AND ITS BIOLOGICAL EFFECTS c52

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 555-630 Transl. into ENGLISH from "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

The biological effects of ionizing radiation are outlined. The following issues are discussed: (1) units of ionizing radiation; (2) radiation environments in space travel (solar cosmic radiation, terrestrial radiation zones); (3) radiation intensity during air and space travel (cosmic radiation in supersonic jets); (4) mechanism of radiation biological effects; (5) biological target theory; (6) radiation damage; (7) limitations of radiation safety. E.A.K.

N82-15757# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

OTHER BIOLOGICAL EFFECTS OF RADIATION c52

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 631-707 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

The application of lasers in aerospace technology, its biological effects, and protective measures are discussed. The light simulated radiation has special characteristics of collimation and coherency, and its light pressure and destructive power is much greater than common light. Various types of lasers are solid gas, chemical, semiconductor and their light waves which have several thousand different wavelengths from ultraviolet to infrared. The use of laser technology in industrial health, and scientific research, and its use in military affairs and national defense is outlined. In the military, lasers have not only become effective measures in communications, aiming, reconnaissance, observations, night vision and navigation, but they can also be used directly as deadly weapons. E.A.K.

N82-15758# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

VISUAL PROBLEMS IN AVIATION AND SPACE NAVIGATION c52

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) p 708-739 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

Visual problems encountered on aerospace navigation are discussed. Vision depends on the stimulation of visible light for realization and visible light is a type of electromagnetic radiation. The wavelength of visible light is 3,800-7,500 angstrom and photon energy lies in the range of 3.1-16.5 electron volts. After entering a high altitude or outer space, many differences occur between the visual environment and the Earth's surface, presenting aerospace medical science with many special problems concerning vision. E.A.K.

N82-15759# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SPACE NAVIGATION LIFE QUARANTEES c52

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 740-822 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)

Avail: NTIS HC A99/MF A01 CSCL 06/5

Requirements for and the provision of a normal living environment and the necessary supplies of food, water, gases, and hygenic and medical safequards during space flight are discussed. The human metabolism is reviewed. Food supply and preparation methods, oxygen supply and methods of handling waste gases, the water supply and water regeneration, closed life support systems and subsystems and environmental sanitation are described. Space suit and helmet design are considered. Medical treatment and first aid, the medical experiences of the Apollo astronauts, and emergency requirements for forced landing on Earth in desert, ocean, and polar regions and the basic survival kit are discussed. The biological clock and diurnal rhythm are considered. J.D.H.

N82-15760# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

CABIN POLLUTION c54

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 822-873 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense

Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

Possible pollutants existing in closed aircraft and spacecraft cabins and methods for the handling and disposal of these pollutants are described. Pollutants from fuel, waste gases, and rubber articles are considered. Excretions from the human body including gases, perspiration, feces, urine, and gastrointestinal tract gases are also sources of pollution. Pollutants originating from high altitudes and outer space, such as high altitude ozone and cosmic space radiation, are considered. J.D.H.

N82-15761# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AVIATION MEDICAL GUARANTEES c52
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 874-889 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

The medical requirements for pilots and air crew and how to guarantee their safety, work capabilities, and physical health in the air are discussed. The various characteristics of flight work are described. Psychological and physical preparation of air crews for flight stress are considered. J.D.H.

N82-15762# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SPACE NAVIGATION MEDICAL GUARANTEES AND MEDICAL SUPERVISION c52
In its Fundamental of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 890-919 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

The medical requirements for astronauts and how to quarantee their safety, work capabilities, and physical health during space flight are discussed. The characteristics of flight work are described. Psychological and physical preparation of astronauts for flight stress are considered. Special consideration is given to the medical selection of astronauts and the medical guarantees and supervision required during training, and prior to, during, and after space flight. J.D.H.

N82-15763# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 13
10 Dec. 1981 89 p refs Transl. into ENGLISH from various Russian articles
(JPRS-79639) Copyright. Avail: Issuing Activity

The fouling of metals and petroleum products by anaerobes, the production of synthetic proteins from biomass, the development of virus-resistant varieties of plants, and general epidemiology and prophylaxis for infectious diseases are among the topics covered in this review of progress studied in the areas of biochemistry, medical science, radiation biology, and ecosystems. For individual titles, see N82-15764 through N82-15767.

N82-15764# Joint Publications Research Service, Arlington, Va.
MICROBIOLOGIC ASPECTS OF METAL CORROSION c26
Ye. I. Andreyuk and I. A. Kozlova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 13 (JPRS-79639) 10 Dec. 1981 p 1-9 refs Transl. into ENGLISH from Mikrobiol. Zh. (Kiev), v. 43, no. 2, Mar. - Apr. 1981 p 139-145 (For primary document see N82-15763 06-51)
Avail: Issuing Activity

Data are presented on the role of microorganisms in the corrosion of metals and metallic structures which are used in different ecological conditions. Mechanisms of anaerobic and aerobic corrosion caused by bacteria in the sulfur cycle are examined. Author

N82-15765# Joint Publications Research Service, Arlington, Va.
ALL-UNION CONFERENCE ON NEW SOURCES OF FOOD PROTEIN AND THEIR APPLICATION c54
L. A. Zakordonets *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 13 (JPRS-79639) 10 Dec. 1981 p 10-12 Transl. into ENGLISH from Mikrobiol. Zh. (Kiev), v. 43, no. 2, Mar. - Apr. 1981 p 266-267 Conf. held in Tbilisi, USSR, Nov. 1980 (For primary document see N82-15763 06-51)
Avail: Issuing Activity

Highlights are given of reports presented on general questions concerning the processing of protein, obtaining protein from animal and plant sources, using protein from new sources derived from meat products, dairy products, bread-making and the canning industry. A.R.H.

N82-15766# Joint Publications Research Service, Arlington, Va.
ECOLOGICAL AND TECHNOLOGICAL PROBLEM OF BIODAMAGES
I. A. Kozlova and E. Z. Koval *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 13 (JPRS-79639) 10 Dec. 1981 p 13-15 Transl. into ENGLISH from Mikrobiol. Zh. (Kiev), v. 43, no. 2, Mar. - Apr. 1981 p 267-268 (For primary document see N82-15763 06-51)
Avail: Issuing Activity

The problem of biodamages is the ecological-technical problem of modern times, encompassing a wide circle of questions related to the study of organism-destruction from microorganisms, rodents and birds which cause damage to an enormous number of materials, resources, products and equipment and the need to develop means for protection from bioovergrowth, biodamage and biocorrosion. Topics discussed in 15 scientific reports on new directions in research on this global problem are summarized. A.R.H.

N82-15767# Joint Publications Research Service, Arlington, Va.
CONFERENCE ON PLANT VIROLOGY
V. G. Krayev *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 13 (JPRS-79639) 10 Dec. 1981 p 16-18 Transl. into ENGLISH from Mikrobiol. Zh. (Kiev), v. 43, no. 2, Mar. - Apr. 1981 p 269-270 (For primary document see N82-15763 06-51)
Avail: Issuing Activity

The basic diseases affecting agricultural ornamental plants in Poland and efforts to identify new viruses and produce resistant varieties of farm crops were reviewed in a conference attended by 70 scientists from 7 countries. Other topics discussed include: (1) the influence of viral diseases of plants and animals on food products and the productivity of livestock; (2) methods for diagnosing viral diseases and their comparative effectiveness; (3) characteristics of new viruses, strains, and isolates of plant viruses in various countries and their distribution in the seeding of cultured plants such as alfalfa, potatoes, peanuts, tomatoes, cucumbers, tabacco, and raspberries; (4) the epidemiology of viral diseases and practical means of combatting them; and (5) advances in photovirology. A.R.H.

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-15768* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY. A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 225)
Nov. 1981 59 p
(NASA-SP-7011(225)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 140 reports, articles, and other documents introduced into the NASA scientific and technical information system in October 1981. E.A.K.

N82-15769*# Research Triangle Inst., Research Triangle Park, N. C.

APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE
H. C. Beall, R. L. Beadles, J. N. Brown, Jr., W. H. Clingman, M. W. Courtney, D. J. Rouse, and R. W. Scearce, Jr. Hampton, Va. NASA Jul. 1979 128 p refs
(Contract NAS1-14708)
(NASA-CR-159106; RTI/1411/00-05F) Avail: NTIS HC A07/MF A01 CSCL 03B

Medical products utilizing and incorporating aerospace technology were studied. A bipolar donor-recipient model for medical transfer is presented. The model is designed to: (1) identify medical problems and aerospace technology which constitute opportunities for successful medical products; (2) obtain early participation of industry in the transfer process; and (3) obtain acceptance by medical community of new medical products based on aerospace technology. E.A.K.

N82-15770*# Wisconsin Univ. - Madison.
NASA BIOMEDICAL APPLICATIONS TEAM ADVISORY CENTER FOR MEDICAL TECHNOLOGY AND SYSTEMS Final Report
Melvin P. Siedband 28 May 1981 29 p refs
(Contract NAS5-26454)
(NASA-CR-166755) Avail: NTIS HC A03/MF A01 CSCL 06B

Projects carried out by the UW-BATeam are reported. The following subjects were investigated: clinical opthalmic ultrasound improvements, magnetic cell sorters, hyperthermia treatment for cancer, joystick driving control for the handicapped, qualitative coronary artery imaging (MIPS), and speech autocuers. E.A.K.

N82-15771# Naval Ocean Systems Center, San Diego, Calif. Bioengineering Branch.
REMOTE MEDICAL DIAGNOSIS SYSTEM (RMDS) UTILIZATION STUDY Technical Progress Report, Dec. 1980 - May 1981
I. Stevens and C. Zakan (WESTEC Services, Inc.) 18 Aug. 1981 44 p refs
(Contract N00123-81-D-0353)
(AD-A105559; NOSC-TR-700) Avail: NTIS HC A03/MF A01 CSCL 06/5

Remote medical diagnosis systems are being successfully utilized for consultation in rural health care programs and private radiology practices. Consultation over RMDS-type systems reduces medical referrals and evaluations and assists in making triage decisions with a greater degree of confidence. RMDS-type systems can be used effectively for teleradiology consultations. The utilization of RMDS on ships and at remote shore sites has the potential for improved diagnoses. Nonphysician health care providers are more inclined to use telemedicine than physicians. GRA

N82-15772# Brookhaven National Lab., Upton, N. Y. Medical Research Center.
APPLICATIONS OF NUCLEAR TECHNIQUES FOR IN VIVO BODY COMPOSITION STUDIES AT BROOKHAVEN NATIONAL LABORATORY
S. H. Cohn, K. J. Ellis, D. Vartsky, A. N. Vaswani, and L. Wielopolski 1981 42 p refs Presented at the IAEA Conf. on Nucl. Based Tech. for In Vivo Study of Human Body Composition, Upton, N.Y., 22 Jun. 1981
(Contract DE-AC02-76CH-00016)
(DE81-029922; BNL-29959; CONF-8106151-1) Avail: NTIS HC A03/MF A01

A series of technical developments and their clinical application in various nuclear technologies is described. These include the development of a portable neutron activation facility for measuring cadmium in vivo in kidney and liver, a technique for the measurement of body iron utilizing nuclear resonant scattering of gamma rays, a noninvasive measure of the skeletal levels of lead by an X-ray fluorescence technique, and the development of a pulsed Van de Graaff generator as a source of pulsed neutrons for the measurement of lung silicon. DOE

N82-15773# Massachusetts Inst. of Tech., Cambridge.
MYOCARDIAL PERFUSION SCINTIGRAPHY USING A NEW TECHNIQUE, THE MESH CHAMBER Progress Report, 1 Sep. 1978 - 1 May 1981
Louis S. Osborne and B. Leonard Holman Aug. 1981 16 p Prepared in cooperation with Harvard Medical School
(Contract DE-AS02-78EV-04969)
(DE81-027995; DOE/EV-04969/3) Avail: NTIS HC A02/MF A01

Myocardial perfusion scintigraphy performed after the injection of a potassium analogue during exercise to detect transiently ischemic myocardium due to coronary artery disease was examined. The limitation in the implementation of the technique for the screening of patients with coronary artery disease is the lack of a high resolution, positron detecting system. The positron multiwire proportional counter solves this problem. The dispersion of the absorbing material is achieved by stringing wires of high Z material, such as tungsten, in a cross pattern. The wire layers are at graded voltages, the ionization from the photoelectrons is drifted through the stack and picked up by sense wires operating in the proportional mode. Positron annihilation detectors are self collimating. The acquisition of events over a multiplicity of angles allows 3 dimensional reconstruction. The combination of large solid angle, high efficiency and a short source half life minimizes radiation dose to the patient. DOE

N82-15774# Pacific Northwest Lab., Richland, Wash.
PROBLEMS IN EVALUATING HEALTH EFFECTS OF OCCUPATIONAL AND ENVIRONMENTAL EXPOSURES
Ethel S. Gilbert 1981 23 p refs Presented at the Conf. on Statistical and Epidemiological Methods in Ionizing Radiation, Berkeley Springs, W. Va., 6-10 Jul. 1981
(Contract DE-AC06-76RL-01830)
(DE81-028440; PNL-SA-9632; CONF-810755-1) Avail: NTIS HC A02/MF A01

The problems involved in analyzing and interpreting radiation exposure data are addressed. Existing standards for exposure are based primarily on estimates of health effects obtained by extrapolation from effects of high level exposures. Occupational and environmental exposures provide one source of data. Populations exposed in this manner were studied. Because of the size of most of the groups and the magnitude of the exposures received the amount that can be learned from such populations is severely limited. Many of these problems are illustrated by study of the effects on mortality of occupational exposure to radiation at the Hanford plant. DOE

N82-15775# Bureau of Radiological Health, Rockville, Md. Div. of Electronic Products.
AIRBORNE ULTRASOUND: MEASUREMENT AND POSSIBLE ADVERSE EFFECTS
Bruce A. Herman and David Powell May 1981 19 p refs Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, N.Y.
(PB81-240459; DHHS/PUB/FDA-81-8163) Avail: NTIS MF A01; SOD HC CSCL 06R

Ultrasound energy in the range of 16 kHz to 100 kHz which is used in a variety of consumer and industrial applications is discussed. For consumer devices the intended transmitting medium is usually air while industrial processes usually use liquid or solid materials as propagating media. In the latter situation attendant acoustic energy is radiated into the surrounding atmosphere. GRA

N82-15776# Colorado Univ., Denver. Health Sciences Center.
NON-INVASIVE PULMONARY ARTERIAL PRESSURE MEASUREMENT Final Report, 1 Jun. 1976 - 30 Nov. 1980
John T. Reeves 8 Jun. 1981 124 p
(Contract NO1-HR-6-2920)
(PB81-239410; NIH-NO1-HR-62920-1F) Avail: NTIS HC A06/MF A01 CSCL 06P

Pulmonary arterial pressure by noninvasive means based on measurement of hemodynamic variables, particularly pulse wave velocity, instantaneous blood flow and pulmonary arterial diameter was measured. An esophageal approach showed good pulmonary arterial flow patterns from the esophagus. A dual range gated Doppler from the front obtained Doppler flow pulses in the main pulmonary artery. A body plethysmographic technique recorded flow at the most distal part of the pulmonary vascular bed, the microcirculation. In humans undergoing right heart catheterization, pulse wave velocity was an excellent correlation of pressure in the low range. It is suggested that the scator at higher pressures is due to variations in artery diameter and wall stiffness. It is concluded that a hemodynamic approach is feasible using known techniques if the problem of measuring pulse wave velocity can be solved. GRA

N82-15777# National Bureau of Standards, Washington, D.C. National Engineering Lab.
A HEAT TRANSFER ANALYSIS OF SCALD INJURY Final Report
Robert L. Palla, Jr. Jul. 1981 69 p refs
(PB81-238503; NBSIR-81-2320) Avail: NTIS HC A04/MF A01 CSCL 06E

Numerical solutions for skin tissues temperature during scald injury events are obtained and utilized in conjunction with a thermal injury criterion, to predict critical exposure levels for various heated fluids. A one dimensional tissue model of the type used by Love is employed to determine the initial tissue temperature distribution. The bio-heat equation for tissue heat transfer is then solved via an implicit finite difference technique, subject to convective heating and cooling at the surface. The sensitivity of the critical exposure level to variation in tissue properties and convective heating coefficients is investigated. Thermal injury thresholds are presented for various fluids along with bounds to reflect uncertainty in assumed tissue properties. The results obtained are in good agreement with existing experimental scald injury data. GRA

N82-15778# National Inst. on Drug Abuse, Rockville, Md. Div. of Research.
NEW APPROACHES TO TREATMENT OF CHRONIC PAIN: A REVIEW OF MULTIDISCIPLINARY PAIN CLINICS AND PAIN CENTERS
Lorenz K. Y. Ng, ed. May 1981 212 p refs Presented at a Conf. held at Bethesda, Md., 20-21 Jun. 1980
(Contract NIDA-271-79-3607)
(PB81-240913; DHHS/PUB/ADM-81-1089; NIDA/DR081-03; LC-81-600060; NIDA/RM-36) Avail: NTIS HC A10/MF A01 CSCL 06E

Chronic pain treatment is discussed including multidisciplinary pain clinics and centers and their staffing and organization, the problems for which patients are treated, drugs taken by entering patients, therapeutic approaches used, costs of treatment, and methods for long-term evaluation of treatment effectiveness. Goals for future research and professional and public education are also presented. GRA

N82-15712*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
EVALUATION OF CREW HEALTH
Craig L. Fischer and Joseph Degioanni *In its* STS-1 Med. Rept. Dec. 1981 p 5-6 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

N82-15713*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
INFLIGHT OBSERVATIONS
Michael A. Berry *In its* STS-1 Med. Rept. Dec. 1981 p 7-9 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

N82-15714*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CREW MEDICAL DEBRIEFING
Joseph Degioanni and Craig L. Fischer *In its* STS-1 Med. Rept. Dec. 1981 p 11-17 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

N82-15715*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
HEALTH STABILIZATION PROGRAM
James K. Ferguson *In its* STS-1 Med. Rept. Dec. 1981 p 19-21 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

N82-15717*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CREW MEDICAL TRAINING
James M. Vanderploeg *In its* STS-1 Med. Rept. Dec. 1981 p 29-30 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

N82-15718*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SHUTTLE ORBITAL MEDICAL SYSTEM
James M. Vanderploeg *In its* STS-1 Med. Rept. Dec. 1981 p 31-35 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

N82-15719*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
VALIDATION OF PREDICTIVE TESTS AND COUNTERMEASURES FOR SPACE MOTION SICKNESS
Jerry L. Homick *In* the STS-1 Med. Rept. Dec. 1981 p 37-38 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

N82-15720*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CREW CARDIOVASCULAR PROFILE
Michael W. Bungo *In its* STS-1 Med. Rept. Dec. 1981 p 39-45 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

N82-15721*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
BIOCHEMISTRY AND ENDOCRINOLOGY RESULTS
Carolyn S. Leach *In its* STS-1 Med. Rept. Dec. 1981 p 47-49 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

N82-15722*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
HEMATOLOGICAL AND IMMUNOLOGICAL ANALYSES
Gerald R. Taylor *In its* STS-1 Med. Rept. Dec. 1981 p 51-52 refs (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06P

N82-15723*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
MEDICAL MICROBIOLOGY OF CREWMEMBERS
Duane L. Pierson *In its* STS-1 Med. Rept. Dec. 1981 p 53-58 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

N82-15726*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SHUTTLE TOXICOLOGY
Wayland J. Rippstein *In its* STS-1 Med. Rept. Dec. 1981 p 67-75 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06T

N82-15727*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
RADIOLOGICAL HEALTH
Charles M. Barnes *In its* STS-1 Med. Rept. Dec. 1981 p 77-78 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06R

N82-15737# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE DEVELOPMENTAL HISTORY OF AERONAUTICAL AND AEROSPACE MEDICAL SCIENCE
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 4-8 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15739# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
GENERAL LAWS OF AVIATION AND SPACE NAVIGATION ENVIRONMENTAL EFFECTS ON THE HUMAN BODY

In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 25-34 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15740# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
MEDICAL PROBLEMS OF GRAVITATIONAL CHANGES AND POWERED FLIGHT
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 35-37 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15742# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
HARMFULNESS OF VIOLENT IMPACT AND AIRFLOW SHOCKS
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 131-162 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15743# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
HUMAN BODY REACTION TO VIBRATION
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-08) 17 Jul. 1981 p 163 223 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15744# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE EFFECTS OF ROTATION AND OSCILLATION: AERIAL SICKNESS
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 195-223 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15747# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NOISE AND SENSE OF HEARING
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 296-335 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15748# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE PHYSIOLOGICAL EFFECT OF LOW-AIR-PRESSURE ANOXIA
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 337-398 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15749# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CAISSON DISEASE
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 398-426 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15750# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DANGERS OF EXPLOSIVE DECOMPRESSION
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 427-439 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15751# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
OXYGEN TOXICATION
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) p 440-456 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15752# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE RELATIONSHIP OF BODY TEMPERATURE TO ENVIRONMENTAL TEMPERATURE
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 457-476 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15754# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE PHYSIOLOGICAL EFFECT OF HEAT AND ITS PREVENTION
In its Fundamentals of Aeron. and Aerospace Med Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 507-534 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15755# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE EFFECT OF COLD AND THE COLD PREVENTION
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 535-554 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15756# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
IONIZING RADIATION AND ITS BIOLOGICAL EFFECTS
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 555-630 Transl. into ENGLISH from "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15757# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

OTHER BIOLOGICAL EFFECTS OF RADIATION
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 631-707 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15758# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
VISUAL PROBLEMS IN AVIATION AND SPACE NAVIGATION
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) p 708-739 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15759# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SPACE NAVIGATION LIFE QUARANTEES
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 740-822 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15761# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AVIATION MEDICAL GUARANTEES
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 874-889 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15762# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SPACE NAVIGATION MEDICAL GUARANTEES AND MEDICAL SUPERVISION
In its Fundamental of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 890-919 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-15779# Assessment Systems Corp., St. Paul, Minn.
METHODS FOR LINKING ITEM PARAMETERS Final Report
C. David Vale, Vincent A. Maurelli, Kathleen A. Gialluca, David J. Weiss, and Malcolm James Ree Brooks AFB, Tex. AFHRL Aug. 1981 190 p refs
(Contract F33615-80-C-0008)
(AD-A105509; AFHRL-TR-81-10) Avail: NTIS HC A09/MF A01 CSCL 05/9

A simulation study to determine appropriate linking methods for adaptive testing items was designed. Responses of examinees of three group sizes for four test lengths were simulated. Three basic data sets were created: (a) randomly sampled data set, (b) systematically sampled data set, and (c) selected data set. Three categories of evaluative criteria were used: fidelity of parameter estimation, asymptotic ability estimates, root-mean-square error of estimates, and the correlation between true and estimated ability. Test length appeared to be relatively more important to calibration effectiveness than was sample size. efficiency analyses suggested that increases in test length were at least three to four times as effective in improving calibration efficiency as proportionate increases in calibration sample sizes. The asymptotic ability analyses suggested that the linking procedures based on Bayesian ability estimation (an equivalent-groups procedure) were somewhat more effective than the others and that the equivalent-tests method was typically no better than not linking at all. Analyses using the relative efficiency criteria suggested that the equivalent-groups procedures were superior to the equivalent-tests procedures and that those using Bayesian scoring procedures were slightly superior to the others tested. Efficiency loss due to linking error was always less than that due to item calibration error and although test length and sample size had a definite effect on calibration efficiency, no strong effects appear with respect to linking efficiency. For the systematically sampled data set, the anchor-test and anchor-group methods were considered along with the equivalence methods.
GRA

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-15780*# Life Systems, Inc., Cleveland, Ohio.
PREPROTOTYPE NITROGEN SUPPLY SUBSYSTEM DEVELOPMENT Interim Report, Jun. 1981
D. B. Heppner, T. M. Hallick, and F. H. Schubert Jun. 1981 50 p refs
(Contract NAS2-10673)
(NASA-CR-166192; LSI-TR-410-4) Avail: NTIS HC A03/MF A01 CSCL 06K

A nitrogen supply subsystem based on the dissociation of hydrazine into a mixture of hydrogen and nitrogen is developed. The latter is separated to provide makeup nitrogen to control the composition of spacecraft atmospheres. Specific hardware developments resulted in the design and fabrication of a nominal 3.6 kg/d nitrogen generation module. The design integrates a hydrazine catalytic dissociator, three ammonia dissociation stages and four hydrogen separation stages into a 33 kg, 14 cu dm module. A technique was devised to alternate the ammonia dissociation and hydrogen separation stages to give high nitrogen purity in the end product stream. Tests show the product stream to contain less than 0.5 percent hydrogen and 10 parts per million ammonia. The design and development of a test stand for the nitrogen generation module and a series of tests which verified its operation and performance capability are described.
S.L.

N82-15781# Luitpoldhuette A.G., Amberg (West Germany).
HUMANIZATION OF WORKING PLACES IN THE FOUNDRY BY USE OF AN AUTOMATIC FETTLING EQUIPMENT Final Report
Hanns Helge Bolle Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 64 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-HA-81-004; ISSN-0171-7618) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,40

Operation of a pilot plant using an industrial robot in the fettling shop of a foundry is described. A continuous path 5 axis robot was employed to steer the pneumatic grinding equipment while the castings remained in a fixed position. Satisfactory removal of edges from the castings was achieved. Ergonomic analysis revealed a reduction of stress for human workers in the foundry. Problems encountered require an automatic change of tools and investigation of the wear of abrasives. J.D.H.

N82-15782# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

A CRITERION FOR THE DISPOSAL OF M58 SLEEPING BAGS

W. A. Lotens and E. J. M. Smienk 1979 23 p refs In DUTCH; ENGLISH summary
(Contract A77/KL/156)
(IZF-1979-15; TDCK-73398) Avail: NTIS HC A02/MF A01

In order to seperate sufficiently insulating from non-sufficiently insulating sleeping bags, a convenient criterion was developed. Physical measurements showed that the thickness of the material under a pressure of 15 N/sq m gives a good correlation with insulating power. By means of a heat conduction model of a man in a bag (based on experiments with subjects) a relation between minimum tolerable outside temperature and thickness of the bag was established. It turns out that with optimal use of all personal equipment a new sleeping bag (26 mm thickness) will fail to keep a man warm in 3% of the man-nights and an old one (12 mm thickness) in 6%. It is recommended to dispose of bags with a thickness less than 20 mm. This result, however, is highly dependent on the insulative suit that is worn. M.G.

N82-15783# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

HEARING PROTECTION

G. F. Smoorenburg, A. M. Mimpen, and H. A. vanLeeuwen 1980 17 p refs In DUTCH; ENGLISH summary
(Contract A76/K/104)
(IZF-1980-2; TDCK-73415) Avail: NTIS HC A02/MF A01

The acoustic attenuation of 20 types of ear plugs and 20 types of ear muffs was surveyed. Important design aspects, the maximum attenuation possible closing the ear canal, the attenuation of plug plus muff, and measuring methods are discussed. To determine the attenuation for practical purposes, differences in hearing protector fitting, temporary removal of protectors, and the noise spectrum must be considered. The effect of wearing hearing protectors on speech intelligibility is discussed. Speech intelligibility does not decrease for people with normal hearing exposed to steady state noise but it may decrease in relatively silent periods of fluctuating or intermittent noise and for all noises if one has a perceptive hearing loss. Author

N82-15784# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

EVALUATION OF CHEMICAL PROTECTIVE FACELETS AND COMPARISON OF FOUR PROTOTPYES

W. A. Lotens 1980 21 p In DUTCH; ENGLISH summary
(Contract A79/KL/111)
(IZF-1980-15; TDCK-75013) Avail: NTIS HC A02/MF A01

In a controlled field experiment four prototypes of chemical protective facelets were tested to determine the effect on physical and mental performance, and the chemical protection and ergonomic properties. Wearing facelets decreases the physical performance on running 400 m resp. 3 km by 3.5 resp. 7.5 percent. When worn during 24 hr. physical performace is variable and mental performance decreases by ca. 10 percent. There is no indication for adaptation within a one-week period. Chemical protection is sufficient for all four types after a while of wearing, however, one of four is highly sensitive for rain. Ergonomic tests show only slight differences between the facelets but there is a marked difference in comfort. Because of this the subjects preferred two types above the other two. Protection during sleep is far from optimal. Author

N82-15785# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

THE LINK-MILES DRIVER TRAINING SIMULATOR FOR TRACKED VEHICLES: INFLUENCE OF CABIN MOTION ON GEAR-CHANGE LEARNING

K. J. Poll 1980 15 p refs In DUTCH; ENGLISH summary
(Contract A76/KL/148)
(IZF-1980-24; TDCK-75017) Avail: NTIS HC A02/MF A01

The influence of the moving base from the Leopard driving simulator on gear-change learning was studied. Twelve trainees were trained with motion and twelve others without motion. All trainees were constantly accompanied by the instructor and after the training on the simulator, all trained on the tank. No differences between both groups were found in learning time on the simulator and in learning time on the tank. This means that the information, given by the motion, can be replaced by good instruction. Author

N82-15786# Sandia Labs., Albuquerque, N. Mex.

SIMULATOR DATA ON HUMAN ERROR PROBABILITIES

E. J. Kozinsky (General Physics Corp.) and H. E. Guttmann 1981 7 p refs Presented at the ANS/ENS Topical Meeting on Probabilistic Risk Assessment, Port Chester, N.Y., 20 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DE81-026094; SAND-81-1707C; CONF-810905-4) Avail: NTIS HC A02/MF A01

Analysis of operator errors on NPP simulators was used to determine human error probabilities (HEP). Simulator data tapes are analyzed for operator error rates. The tapes collected, using performance measurement system software, contain a history of all operator manipulations during simulated casualties. Analysis yields a time history or operational sequence diagram and a manipulation summary, both stored in computer data files. Data searches yield information on operator errors of omission and commission. This work experimentally determined HEP's for probabilistic risk assessment calculations. DOE

N82-15787# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bonn (West Germany). Inst. fuer Flugmedizin.

USE OF A TELEVISION MULTIPOINT x-y TRACKER FOR DETERMINING THE TRANSMISSION OF VIBRATIONS ON HUMAN BEINGS [UEBER DIE ANWENDUNG EINES 'TV-MULTIPOINT x-y TRACKERS' ZUR BESTIMMUNG DER SCHWINGUNGSUEBERTRAGUNG AUF DEN MENSCHEN]

L. Vogt and E. Schwartz 1980 10 p In GERMAN
Avail: NTIS HC A02/MF A01

A television multipoint x-y tracker was used to study the influence of mechanical vibrations on the human body, in a project on human factors in man machine systems. A mechanical model of a human being seated on a shaker was employed on which the mechanical impedance and the vibration transmission (transmissibility) were investigated as a function of vibration frequency. The multipoint x-y tracker provides contactless registration of the motions of the head. The system is based on a television camera, and allows the simultaneous and continuous registration of the x and y coordinates of three points of a moving object. Author (ESA)

N82-15788# Rexnord, Inc., Milwaukee, Wis. Environmental Research Center.

EVALUATION OF AIR CLEANING AND MONITORING EQUIPMENT USED IN RECIRCULATION SYSTEMS

Mark L. Holcomb and Robert C. Scholz Apr. 1981 200 p refs
(Contract PHS-NIOSH-210-78-0011)
(PB81-242695; DHHS/PUB/NIOSH-81-113) Avail: NTIS HC A01; SOD HC CSCL 06J

Several pilot scale air cleaners and monitors were evaluated to determine their performance characteristics, maintenance requirements, and reliability for use in a recirculating exhaust system. A set of evaluation criteria for recirculation system components were developed. Then, selected system components (including an electrostatically augmented fabric filter, electrostatic precipitator, aspirated cartridge filter, four different extractive type particulate air monitors, three different extractive ozone monitors and a safety monitoring filter were installed and tested on a welding process exhaust. The results indicate that many factors must be evaluated before a decision can be reached concerning the use of a particular device. Additionally, components of a complete recirculation monitoring system were identified and the need for the development of commercial devices incorporating all of these components was evidenced by the fact that each of the commercially available devices tested lacked one or more of these components. GRA

N82-15789# National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Div. of Physical Sciences and Engineering.

AN EVALUATION OF ENGINEERING CONTROL TECHNOLOGY FOR SPRAY PAINTING

Dennis M. OBrien and Donald E. Hurley Jun. 1981 185 p refs
(PB81-243123; DHHS/PUB/NIOSH-81-121) Avail: NTIS

MF A01; HC SOD CSCL 06J

Field surveys of 11 finishing operations provided information for an evaluation of control technology for spray painting and coating processes. Studies were conducted in the automobile refinishing, wood and metal furniture, transportation equipment (nonautomotive), heavy machinery, and appliance finishing industries. Processes selected provide representative coverage of spray finishing operations relative to the number of exposed workers, different control techniques, physical size of the workpiece, and the coating systems that are typically used. Control of selected health hazards is discussed; available control options evaluated. Case study summaries include analysis of: hazards, engineering controls and work practices, ventilation measurements, air sampling data and personal protective equipment. Results should be usable as a reference source. GRA

N82-15716*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
EMERGENCY MEDICAL SERVICES SYSTEM (EMSS)
Sam E. Pool *In its* STS-1 Med. Rept. Dec. 1981 p 23-27 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06E

N82-15724*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
FOOD AND NUTRITION
Richard L. Sauer and Rita M. Rapp *In its* STS-1 Med. Rept. Dec. 1981 p 59-62 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06H

N82-15725*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE POTABLE WATER
Richard L. Sauer *In its* STS-1 Med. Rept. Dec. 1981 p 63-66 (For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 06K

N82-15738# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ENVIRONMENTAL CONDITIONS OF AVIATION AND SPACE NAVIGATION
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 9-24 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-52)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15741# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INJURY AND PROTECTION OF OVERWEIGHTNESS
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 38-129 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15745# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
FLIGHT ILLUSIONS
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 224-295 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15746# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
MAN'S ADAPTATION TO WEIGHTLESSNESS AND LOW WEIGHT
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ED(RS)T-1802-80) 17 Jul. 1981 p 244-295 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15753# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COMFORTABLE TEMPERATURE AND TOLERABLE TEMPERATURE
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 477-506 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15760# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CABIN POLLUTION
In its Fundamentals of Aeron. and Aerospace Med. Sci. (FTD-ID(RS)T-1802-80) 17 Jul. 1981 p 822-873 Transl. into ENGLISH from the book "Fundamentals of Aeronautical and Aerospace Medical Science" Peking, National Defense Industry Publishers, Jun. 1979 (For primary document see N82-15736 06-51)
Avail: NTIS HC A99/MF A01 CSCL 06/5

N82-15765# Joint Publications Research Service, Arlington, Va.
ALL-UNION CONFERENCE ON NEW SOURCES OF FOOD PROTEIN AND THEIR APPLICATION
L. A. Zakordonets *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 13 (JPRS-79639) 10 Dec. 1981 p 10-12 Transl. into ENGLISH from Mikrobiol. Zh. (Kiev), v. 43, no. 2, Mar. - Apr. 1981 p 266-267 Conf. held in Tbilisi, USSR, Nov. 1980 (For primary document see N82-15763 06-51)
Avail: Issuing Activity

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N82-15790# Forschungsinstitut fuer Funk und Mathematik, Werthoven (West Germany).
COMPUTING TIME MEASUREMENTS ON THE FFM MULTICOMPUTER SYSTEM [RECHENZEITMESSUNGEN AM FFM-MULTICOMPERSYSTEM]

G. Neumann, R. Ackermann, and W. Gruenwald Oct. 1980 49 p refs In GERMAN
(FFM-300) Copyright. Avail: Issuing Activity

The computing performance at which the multiminicomputer is capable of delivering was investigated in relation to the operational system price payed for the gain in parallelism. This gain depends on utilization and configuration of the computer network. A software controllable measuring module was developed for measuring computing times. Bus storage behavior of a multiprocessor node of the network and the most important communication tasks of the unloaded system were investigated. A pipeline of tasks,' as an example of utilization, was applied. Simultaneously, the influence of high communication rate and high degree of parallel work was studied. These pipeline measurements were compared with the time required for the same task by a single processor. Results show a need for improvement of the system. Author (ESA)

N82-15791# Siemens A.G., Munich (West Germany). Unternehmensbereich Bauelemente.

TECHNOLOGY RELATED INVESTIGATIONS OF HARDWARE VARIATIONS DEPENDING ON SYSTEM PROPOSALS AND NEW APPROACHES TO DECODERS FOR VIDEOTEXT-BILDSCHIRMTEXT Final Report

Peter Preller and Robert Reiner Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 27 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-024; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5.70

The expenditure for internal components for the integrated circuits of videotext were calculated and compared with the UK-teletext standard (asynchronous transmission associated with the composition method; synchronous transmission with additional data flow; individual improvements). The integration of external components of the data slicer into a MOS-circuit was investigated, especially the function of the adjustable resonance circuit for the data clock. T.M.

N82-15792# Siemens A.G., Munich (West Germany). Werk fuer Integrierte Schaltungen.

MICROCOMPUTER LARGE-SCALE INTEGRATION CHIPS Final Report

Guenter Sandner, Bernd Huber, Irmfried Bromme, Johannes Gruenert, Heinrich Kessler, Hans-Eberhard Longo, Willi Mosch, Adolf Pascher, Gerhard Weil, Klaus Ziebert et al Bonn Bundesministerium fuer Forschung und Technologie Apr. 1981 94 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-068; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19.75

It was the goal of this development project to extend development know how in order to close the gap to the microprocessor market leaders in the USA. In the field of single-chip-microcomputers the development of our nanocomputer was finished successfully. Also the development of two application-oriented single-chip-microcomputers for use in entertainment electronic systems was completed. The CPU 8085, a standard 8 bit microcomputer was developed with license and volume production was started. Beyond that peripheral components, for instance a multifunction asynchronous receiver-transmitter-chip were developed. With respect to the 16 bit microprocessors, the CPU 2016 was developed with success. During the development of the CPU 3016C the original goals with respect to system concept were reached completely and partly with respect to system development. This task will be continued in a following project. Author

N82-15793# Siemens A.G., Munich (West Germany). MOS-Leistungshalbleiter.

MICROCOMPUTER AND LSI COMPATIBLE POWER SWITCH Final Report, Sep. 1980

Jenoe Tihanyi Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 40 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-093; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8.40

The SIPMOS (Siemens Power MOS) technology was developed for the fabrication of power MOS transistors. SIPMOS transistors with reverse voltages between 50 and 1000 V were assessed and experimentally tested. The feasibility of a MOS driven thyristor and an optically driven triac was demonstrated. Since they are capable of operating on an input voltage as low as 5 V, all the developed SIPMOS devices are directly compatible with microcomputers and LSI circuits. T.M.

N82-15794# Leicher G.m.b.H. und Cie., Unterfoehring (West Germany). Abteilung Elektronik.

DEVELOPMENT ON A NEW KIND OF MICROPROCESSOR-BASED LOCK Final Report, Nov. 1980

Peter Leicher, Christian Kreppel, and Fritz Mueller Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 26 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-128; ISSN-0340-7608) Avail: NTIS HC A03/MF A01

In common unlocking a lock is caused on the knowledge of two coincident informations. Here the lock is built up electronically and the information to be compared is stored in electrically alterable read only memories, of which one is located in the lock and in the key. The information belonging together is altered with every locking cycle. One pair of storage cells is reserved for every lock-key combination. Further, a programming key will be detected, capable of programming and deprogramming the lock function for a key. This aim was reached by building up a single-chip microprocessor based circuit with interface circuits to the electrically alterable read only memories, the random generator and the sequence control units in lock and key. New lines on usage and possibilities on building up and assembling locking systems are given with these kind of locks. So unlocking a car, private building, factory door etc. would be possible without preplanning and replacing locks. Author

N82-15795# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 3: Telecommunications.

EDITEX: A TELEX TEXT-EDITOR BASED ON AN 8085 MICROPROCESSOR

N. W. Kaan, P. Feenstra, W. J. M. Geerdink, and N. A. Noz Feb. 1980 29 p refs In DUTCH; ENGLISH summary
(PHL-1980-06; TDCK-73837) Avail: NTIS HC A03/MF A01

A microprocessor-based text editor specially developed to add text editing capabilities to currently used telex machines without any necessary technical changes is described. An overview is given of the hardware and software which were developed to realize the text editor. The User Manual is included. Author

N82-15796# Karlsruhe Univ. (West Germany). Informatik-Rechnerabt.

DEVELOPMENT OF AN X.25 PROTOCOL CONVERTER Final Report

Christopher Chlap and Hans Peter Dittler Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 256 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-DV-81-002; ISSN-0170-1911) Avail: NTIS HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 42.10

The objective of the project was the development of a cheap X.25-adaption box with universal applicability and good changeability, so that it can easily be adapted to different interface requirements, where especially BASIC MODE protocols were assumed on the primary side. The requirement of low costs was fulfilled by using a common microprocessor type (INTEL 8080). The developed software consists of the modules of the operating system, the X.25 packet level, th X.25 frame level, and of the primary protocol, where the latter can easily be exchanged. The project proved that complex data communication protocols can be implemented on microprocessors, showing a good efficiency. The box supports on the primary side a great variety of single and multidrop lines. T.M.

N82-15797# Battelle Inst., Frankfurt am Main (West Germany).
IMPLEMENTATION AND APPLICATION OF A SET THEORETICAL DATA BASE SYSTEM Final Report
Anton Braig, Siegmar Gweissner, Renate Mandrella, Ursula Matheis, and Juergen Welter Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 194 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-DV-81-004; ISSN-0170-9011) Avail: NTIS HC A09/MF A01

The particular system or model-oriented concepts for data declaration and manipulation restrict the ways in which information can be handled within the currently available conventional and relational-oriented data base systems. A vital extension of a data base systems performance range can be achieved by applying mathematical methods for the implementation of complex logical models for information handling. This was demonstrated by an experimental modular implementation of the essential functions of a data base system applied to a data base problem in the area of document retrieval. An example of automatic handling of descriptor relations of any kind is given by using the hierarchical relations of a technical thesaurus for a suitable variation of the retrieval area. T.M.

N82-15798# Philips Zentrallaboratorium G.m.b.H., Hamburg (West Germany). Forschungsabt. Technische Systeme.
ELECTRONIC PICTURE BASE Final Report
Hans-Dieter Boehring, Hubertus Busch, Jens Christiansen, Jacobus Coumans, Ruediger Grewer, Hans-Dieter Hinz, Herbert Loebl, Dietrich Meyer-Ebrecht, Rainer Pape, Ulf Rothgordt et al Bonn Bundesministerium fuer Forschung und Technologie Sep. 1981 192 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-DV-81-005; ISSN-0170-9011) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 35,70

The electronic processing and filing of large quantities of pictures was studied. An approach to the architecture of decentralized picture-processing/picture-base systems is described. The signal processing tasks, control tasks, and management task are to be performed in separated system levels. For the signal level a concept was developed for a fast and flexible picture processor, and methods for the implementation of picture operation, in particular picture coding processes, were elaborated. A state-of-technology review of peripheral devices was performed. Extensive investigations were carried out concerning electrostatic grey-tone printing. Promising results were achieved with the electrophoretic process and an experimental system was assembled to study architectural problems as well as to test peripheral devices. T.M.

N82-15799# Sandia Labs., Albuquerque, N. Mex.
DEPTH/BREADTH TRADOFF IN HIERARCHICAL COMPUTER MENUS
Dwight P. Miller 1981 13 p refs Presented at the Human Factors Soc. Meeting, Rochester, N.Y., 12 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE81-028392; SAND-81-1860C; CONF-81132-1) Avail: NTIS HC A02/MF A01

Goal acquisition speed and accuracy were compared for subjects using four different menu configurations of a semantic hierarchy on an interactive computer terminal. Depth (the number of menu levels) varied from one to six, while breadth (the number of choices per menu) varied from two to 64. Goal acquisition time for the four experimental groups produced a U shaped function with a minimum at the configuration of two levels with eight choices per level. Error data corroborated the acquisition times demonstrating that the fastest conditions also produced the least errors. Optimization of the depth/breadth tradeoff is an important design consideration in goal acquisition tasks requiring speed and accuracy. DOE

N82-15800# Oak Ridge Y-12 Plant, Tenn.
MINICOMPUTER AND COMPUTER NUMERICAL CONTROL MAINTENANCE
G. R. Bright 1981 23 p refs Presented at 1981 Joint Elec. Engr. Seminar Div. of Union Carbide, Nashville, 17-18 Sep. 1981
(Contract W-7405-eng-26)
(DE81-030645; Y/IA-152; CONF-810952-1) Avail: NTIS HC A02/MF A01

Difficult requirements placed upon the electrical and electronics maintenance department by the acquisition of large numbers of computers and precision computer numerical controlled machines, combined with a rapidly changing technology are discussed. The equipment to be maintained, the personnel who perform the maintenance activities, the techniques utilized, the support requirements, and future trends in equipment and maintenance techniques are discussed. Cost reductions and the reduction of downtime are emphasized. DOE

N82-15801# Department of Energy, Washington, D. C. Office of Health and Environmental Research.
DEFINITIONS OF CAMAC TERMS
Jul. 1981 20 p
(DE81-028247; DOE/ER-0104) Avail: NTIS HC A02/MF A01

Definitions and concise explanations of terms used in documents concerning the Computer Automated Measurement and Control (CAMAC) modular instrumentation and digital interface system are presented. DOE

N82-15802# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. d'Informatique.
THE ARCHITECTURE OF SIRENE: A DISTRIBUTED COMPUTER SYSTEM FOR TEACHING [ARCHITECTURE DE SIRENE: UN SYSTEME D'INFORMATIQUE REPARTIE POUR L'ENSEIGNEMENT]
Jean-Alain Hernandez, Eric Horlait, and Guy Pujolle Jul. 1981 16 p refs In FRENCH Presented at Cong. AFCET-TTI, Nov. 1981
(ENST-C-81004; TTI-6) Avail: NTIS HC A02/MF A01

A system composed of heterogeneous equipment, e.g., graphics consoles and Videotex terminals, linked through a local network is described. Calculation workload is distributed among microcomputers (type Apple 2) and minicomputers. The user can address one (or several) of the communal resources of the system from any terminal. The equipment intercommunication protocols are characterized. The dependence of network efficiency on these protocols is stressed. A layered hierarchy is used and programming language problems are discussed. Author (ESA)

N82-15803# Federal Compiler Testing Center, Washington, D.C.
DECSYSTEM-20, MODEL 2060, COBOL-74, VERSION 12B
29 Jun. 1981 70 p
(PB81-233983; CCVS74-VSR771) Avail: NTIS HC A04/MF A01 CSCL 09B

The validation summary for the Decsystem-20 COBOL-74 compiler version 12B (TOPS-20 verision 4) is presented. An overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974 standards is included. A section relating the catagories of discrepancies to each of the Federal levels of the language, and a detailed listing of discrepancies together with the tests which were failed are given. GRA

N82-15804# Federal Compiler Testing Center, Washington, D.C. Automated Data and Telecommunications Service.
DECSYSTEM-10, MODEL 1090-SMP COBOL-74, VERSION 12B
29 Jun. 1981 70 p
(PB81-233975; CCVS74-VSR770) Avail: NTIS HC A04/MF A01 CSCL 09B

The validation summary for the Decsystem-10 COBOL-74 Compiler Version 12B (TOPS-10 Version 7.01) is presented. An overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974 standards is included. A section relating the categories of discrepancies to each of the Federal levels of the language is also provided along with a detailed listing of discrepancies together with the tests which were failed. GRA

N82-15805# Federal Compiler Testing Center, Falls Church, Va. Automated Data and Telecommunications Service.
NORTHERN TELECOM, INC., COBOL/3. INDEXED I-O MODULE
10 Jul. 1981 13 p refs

(PB81-233991; FCTC/TR-81/27) Avail: NTIS
HC A02/MF A01 CSCL 09B

The results obtained from the evaluation of the indexed I-O module of the Northern Telecom, Inc. COBOL compiler version COBOL/3 (NTIO OS Version 4.1) against the indexed I-O module of the 1974 COBOL standard are summarized. GRA

N82-15806# National Bureau of Standards, Washington, D.C. Building Equipment Div.
USING MICROCOMPUTERS TO MONITOR THE FIELD PERFORMANCE OF RESIDENTIAL HEAT PUMPS
Charles W. Hurley, George E. Kelly, and Paul A. Kopetka Jun. 1981 119 p refs Sponsored in part by DOE
(PB81-240608; NBSIR-81-2285) Avail: NTIS
HC A06/MF A01 CSCL 09B

The procedures, instrumentation, and microprocessor based data acquisition system (DAS) used for evaluating the field performance of three residential heat pumps are described. The instrumentation, signal conditioning unit, and DAS are described in detail. The on-line microcomputer was used to reduce and analyze raw data and record the calculated results. This reduced the amount of data collected and extended the time period between collections. Basic equations and software are described. GRA

N82-15807# Federal Compiler Testing Center, Falls Church, Va.
BASIC FOUR INFORMATION SYSTEMS DIVISION (MAI)/ 580 COBOL VERSION 1.00 INDEXED I-O MODULE
24 Aug. 1981 14 p refs
(PB81-248114; FCTC/TR-81/28) Avail: NTIS
HC A02/MF A01 CSCL 09B

A consolidated summary of the results obtained from the evaluation of the COBOL compiler version 1.00 against the indexed I-O module of the 1974 COBOL standard is presented. A summary of the I-O language elements together with any errors or discrepancies is given. GRA

N82-15808# Federal Compiler Testing Center, Falls Church, Va.
INTERNATIONAL BUSINESS MACHINES, INC., SYSTEM/34 COBOL, 5726-CB1 RELEASE 7 WITH PTF 07096
18 Aug. 1981 48 p
(PB81-249088; CCVS74-VSR835) Avail: NTIS
HC A03/MF A01 CSCL 09B

A consolidated summary of the results obtained from the validation of the COBOL compiler version 2 against the 1974 standard is presented. The compiler was validated at the low-intermediate level of FIBS PUB 21-1. An overview of the validation which lists all categories module within x3.23-1974 is given. A detailed listing is given. A detailed listing of discrepancies that were failed are given. GRA

N82-15809# Federal Compiler Testing Center, Falls Church, Va.
INTERNATIONAL BUSINESS MACHINES, INC., SYSTEM/38 COBOL, 5714-CB1 RELEASE 2
18 Aug. 1981 53 p
(PB81-249104; CCVS74-VSR836) Avail: NTIS
HC A04/MF A01 CSCL 09B

A consolidated summary of the results obtained from the validation of the COBOL compiler version 2 against the 1974 COBOL standard is presented. The compiler was validated at the low-intermediate level of FIBS PUB 21-1. An overview of the validation which lists all categories of discrepancies by level or module within x3.23-1974 is given. A detailed listing of discrepancies together with the tests that were failed are given. GRA

N82-15810# Federal Compiler Testing Center, Falls Church, Va.
INTERNATIONAL BUSINESS MACHINES, INC., 5714-CB1 RELEASE 2, INDEXED I-O MODULE
24 Aug. 1981 11 p
(PB81-249112; FCTC/TR-81/26) Avail: NTIS
HC A02/MF A01 CSCL 09B

A consolidated summary of the results obtained from the evaluation of the COBOL complier version 2 against the indexed I-O module of the 1974 COBOL standard is presented. A summary of the I-O language elements is given together with any errors or discrepancies. GRA

N82-15811# Federal Compiler Testing Center, Falls Church, Va.
INTERNATIONAL BUSINESS MACHINES, INC., 5726-CB1 RELEASE 7 WITH PTF-07096, INDEXED I-O MODULE
24 Aug. 1981 11 p
(PB81-249120; FCTC/TR-81/25) Avail: NTIS
HC A02/MF A01 CSCL 09B

A consolidated summary of the results obtained from the evaluation of the COBOL compiler version 7 against the indexed I-O module of the 1974 COBOL standard is presented. A summary of the I-O language elements is given together with any errors or discrepancies. GRA

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-15812 Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).
DESCRIPTION AND COMPARISON OF ALGORITHMS FOR SOLVING LARGE SETS OF SPARSE MATRIX NORMAL EQUATIONS IN GEODESY AND PHOTOGRAMMETRY Ph.D. Thesis - Technischen Univ., Munich [DARSTELLUNG UND VERGLEICHE VON LOESUNGSSTRATEGIEN FUER GROSSE SCHWACH BESETZTE NORMALGLEICHUNGSSYSTEME IN DER GEODAESIE UND IN DER PHOTOGRAMMETRIE]
Franz Steidler Verlag der Bayerischen Akademie der Wissenschaften 1980 117 p refs In GERMAN
(Ser-C-261; ISSN-0065-5325; ISBN-3-7696-9313-2) Avail: Issuing Activity

Algorithms were investigated in relation to calculation time and data storage capability. For geodetic networks, direct techniques for sparse matrices are very well suited. For photogrammetric bundle-block adjustments with self calibration the conventional use of band algorithms is the best choice. For generating a digital terrain model following the finite element method, the band algorithm solves the normal equations in the fastest way. Author (ESA)

N82-15813*# Boeing Computer Services, Inc., Seattle, Wash. Space and Military Applications Div.
INTEGRATED TESTING AND VERIFICATION SYSTEM FOR RESEARCH FLIGHT SOFTWARE DESIGN DOCUMENT Contractor Report
Richard N. Taylor, Randall L. Merilatt, and Leon J. Osterweil Hampton, Va. NASA 31 Jul. 1979 243 p refs
(Contract NAS1-15253)
(NASA-CR-159095) Avail: NTIS HC A11/MF A01 CSCL 09B

The NASA Langley Research Center is developing the MUST (Multipurpose User-oriented Software Technology) program to cut the cost of producing research flight software through a system of software support tools. The HAL/S language is the primary subject of the design. Boeing Computer Services Company (BCS) has designed an integrated verification and testing capability as part of MUST. Documentation, verification and test options are provided with special attention on real time, multiprocessing issues. The needs of the entire software production cycle have been considered, with effective management and reduced lifecycle costs as foremost goals. Capabilities have been included in the design for static detection of data flow anomalies involving communicating concurrent processes. Some types of ill formed process synchronization and deadlock also are detected statically. M.D.K.

N82-15814*# Virginia Univ., Charlottesville.
FUNCTIONAL DESCRIPTION OF THE ISIS SYSTEM
W. Joseph Berman Oct. 1979 28 p
(Contract NAS1-14862)

(NASA-CR-159152) Avail: NTIS HC A03/MF A01 CSCL 09B

Development of software for avionic and aerospace applications (flight software) is influenced by a unique combination of factors which includes: (1) length of the life cycle of each project; (2) necessity for cooperation between the aerospace industry and NASA; (3) the need for flight software that is highly reliable; (4) the increasing complexity and size of flight software; and (5) the high quality of the programmers and the tightening of project budgets. The interactive software invocation system (ISIS) which is described is designed to overcome the problems created by this combination of factors. M.D.K.

N82-15815# Laboratory for Electronic Development of the Armed Forces, Oegstgeest (Netherlands).

COMPUTER PROGRAM FOR COMPUTING AND PLOTTING BODE, PHASE, AND NYQUIST DIAGRAMS AND TIME RESPONSES OF GIVEN FREQUENCY TRANSFER FUNCTIONS [COMPUTERPRORAMMA VOOR HET BEREKENEN EN PLOTTEN VAN BOE-, FASE EN NYQUIST-DIGRAMMEN VAN TIJDRESPONSIES VAN GEGEVEN FREKWENTIE-OVERDRACHTSFNKTIES]

S. J. Vitterdijk 31 Oct. 1979 76 p In DUTCH; ENGLISH summary
(LEOK-TR-1979-13; TDCK-73396) Avail: NTIS HC A05/MF A01

The background and use of a computer program that calculates and plots the Bode-, phase- and Nyquist-diagram of a given frequency response function of arbitrary order are described. The frequency response function is allowed to be of a direct type function, for example in case of analyzing a filter, or of a feed forward together with a feedback type function, in case of analyzing a control system. The program offers also the possibility of calculating and plotting the time response function, related to a frequency response function, as a result of one of the several possible input signals as function of time. Author

N82-15816# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research.

ANALYSIS OF HEURISTICS FOR STOCHASTIC PROGRAMMING: RESULTS FOR HIERARCHICAL SCHEDULING PROBLEMS

M. A. H. Dempster (Oxford Univ.), M. L. Fisher (Pennsylvania Univ.), L. Jansen (Algemene Bank Nederland), B. J. Lageweg, J. K. Lenstra, and A. H. G. Rinnooykan (Erasmus Univ.) Jun. 1981 26 p refs Submitted for publication
(Grants NSF ENG-78-26500; NATO-9.2.02(SRG); NATO-1575)
(MC-BUT-142/81) Avail: NTIS HC A03/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3.15

Certain multi-stage decision problems that arise frequently in operations management planning and control allow a natural formulation as multi-stage stochastic programs. In job shop scheduling, for example, the first stage could correspond to the acquisition of resources subject to probabilistic information about the jobs to be processed, and the second stage to the actual allocation of the resources to the jobs given deterministic information about their processing requirements. For two simple versions of this hierarchical scheduling problem, heuristic solution methods are described and their performance is shown asymptotically optimal both in expectation and in probability. T.M.

N82-15817# Battelle Pacific Northwest Labs., Richland, Wash.

COMPARISON OF COMPUTER CODES (CE-THERM, FRAP-T5, GT3-FLECHT, AND TRUMP-FLECHT) WITH DATA FROM THE NRU-LOCA THERMAL HYDRAULIC TESTS

C. L. Mohr, W. N. Rausch, and G. M. Hesson Jul. 1981 8 p refs Presented at the 6th Intern. Conf. on Structural Mech. in Reactor Technol., Paris, 17 Aug. 1981
(Contract DE-AC06-76RL-01830)
(DE81-028136; PNL-SA-9328; CONF-810801-56) Avail: NTIS HC A02/MF A01

The LOCA Simulation Program in the NRU reactor is the first set of experiments to provide data on the behavior of full-length, nuclear-heated PWR fuel bundles during the heatup, reflood, and quench phases of a loss-of-coolant accident (LOCA). This paper compares the temperature time histories of 4 experimental test cases with 4 computer codes: CE-THERM, FRAP-T5, GT3-FLECHT, and TRUMP-FLECHT. The preliminary comparisons between prediction and experiment show that the state-of-the art fuel codes have large uncertainties and are not necessarily conservative in predicting peak temperatures, turn around times, and bundle quench times. DOE

N82-15818# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.

DESCRIPTION OF AN EXACT RECURSIVE METHOD TO SIMPLIFY SHADING CALCULATIONS

A. D. Nawrocki and Ronald Kammerud Apr. 1981 11 p refs Presented at the ASME Solar Energy Div., 3rd Ann. Systems Simulation and Econ. Anal./Heating and Cooling Operational Results Conf., Reno, Nev., 27 Apr. - 1 May 1981
(Contract W-7405-eng-48)
(DE81-027409; LBL-11390; CONF-810405-16) Avail: NTIS HC A02/MF A01

A method called SHADE for simplifying shading calculations as performed by a programmable calculator or microcomputer is described. Preliminary applications of SHADE using a Hewlett Packard HP-41C programmable calculation are outlined. For a given solar hour, SHADE is used to compute the following quantities: the percentage of the total area of the opening which is shaded; the shaded area itself; the cosine of the angle of incidence between Sun and glazing surface; the direct insolation at this surface, with and without shading; and the direct solar power at this surface, with and without shading. In its application, SHADE can be used in preliminary design and comparative analyses of shading devices on an hourly, daily, or seasonal basis, provided that the fins and overhangs are square or rectangular and lie in planes perpendicular to the plane of the opening, and that the opening itself is vertical and rectangular with arbitrary building azimuths. Design candidates include conventional overhangs and side fins, porches, and reveals. In principle, SHADE can be extended to awnings, slatted sun screens, and bevelled recesses and to calculations of direct solar gain through vertical and non-vertical glazings. DOE

N82-15819# Battelle Pacific Northwest Labs., Richland, Wash.

ADVANCED GAMMA SCAN SYSTEM SOFTWARE PACKAGE REFERENCE MANUAL

J. Schroeder Feb. 1981 53 p
(Contract DE-AC06-76RL-01830)
(DE81-028094; PNL-SA-9348) Avail: NTIS HC A04/MF A01

The manual for the Advanced Gamma Scan System (AGSS), used to collect and analyze gamma spectra from reactor fuel pins, is presented. The AGSS software package operates on a minicomputer and controls a precision examination stage, multi-channel analyzer and gamma radiation detector. In addition, the software package provides an operator interface to this system. DOE

N82-15820# Kontron Elektronik G.m.b.H., Eching (West Germany). Image Analysis Div.

DEVELOPMENT OF A COMPUTERIZED MEASURING SYSTEM FOR QUANTITATIVE DIGITAL IMAGE ANALYSIS INTERACTIVE IMAGE ANALYSIS SYSTEM (IBAS) Final Report, Jul. 1980

Gerd Hillje and Rudi Wieczorek Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 43 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-035; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9,10

The system has fast arithmetic routines and either a floppy or hard disk unit. It has a fast analog to digital converter as input unit and a fast digital image-refresh-memory with interactive input possibilities. The system allows direct storage and analysis of the total contents of an image which can be selected automatically or interactively. Processing of any external image input signal can also be done using the parallel mode of operation. The system is programmable in BASIC-FORTRAN. Author (ESA)

N82-15821# Kernforschungszentrum, Karlsruhe (West Germany). Project PDV

SHORT SYSTEM DESCRIPTIONS

B. Karl Aug. 1980 271 p refs In GERMAN; ENGLISH summary

(KfK-PDV-126) Avail: NTIS HC A12/MF A01

Information is given about software/hardware systems including fields of application, user cases, function and performance, data processing field (type of processing, components required, and periphery), publications and documentation as well as commercialization (purchase, renting, training, maintenance, servicing). The short system descriptions relate to tools and techniques of process automation by DP as well as to complete user systems. Author

N82-15822# Centre National de la Recherche Scientifique, Marseilles (France). Lab. d'Astronomie Spatiale.

AUTOMATIC CALCULATION OF SPHEROELLIPTICAL SYSTEMS, ESSENTIAL FACTS, AND ELEMENTARY TRACES (CASSETTE): UTILIZATION [CALCULS AUTOMATIQUES DE SYSTEMES SPHERO-ELLIPTIQUES. TESTS ESSENTIELS ET TRACES ELEMENTAIRES (CASSE-TETE). UTILISATION DU PROGRAMME]

J. Y. LeGall 1981 30 p refs In FRENCH

(LAS-OPT.INST-02-81) Avail: NTIS HC A03/MF A01

A computer program which parametrically characterizes optical systems, having aspherical diopters not of revolution and holographic of classic dispersion, was written. The program makes use of an HP 9825 A desk computer associated with the peripherals HP 2631 A and HP 9872 A. Spot diagrams can be traced, i.e. the section by whatever plane in space of the totality of the rays that issue from a point source and traverse the entire optical system is found. Input and data storage are explained. Operations include: evaluation of the system; calculation of aberrations; find the real ray path; and trace the spot diagram. A wide angle camera is taken as an example. Author (ESA)

N82-15823# Mitre Corp., McLean, Va.

PROCEEDINGS OF SOFTWARE VERIFICATION AND VALIDATION SYMPOSIUM Final Report

Siba N. Mohanty Jun. 1981 497 p refs Symp. held in McLean, Va., 9-10 Jun. 1981

(Contract F19628-81-C-0001)

(PB81-236465; MTR-81W00183) Avail: NTIS HC A21/MF A01 CSCL 09B

A state-of-the-art discussion on software engineering, and the verification and validation (V&V) of software life-cycle activities is presented. The potential application of V&V techniques to software during the system acquisition process is considered. GRA

62 COMPUTER SYSTEMS

Includes computer networks.

N82-15824# Sandia Labs., Albuquerque, N. Mex. Scientific Network Design Div.

SPECIFICATIONS OF SANDIA PROTOTYPE NETWORK COMMUNICATIONS INTERFACE BETWEEN APPLICATIONS SOFTWARE AND NSC A120 ADAPTERS

Rena A. Haynes and Ronald D. Halbgewachs Aug. 1981 30 p refs

(Contract DE-AC04-76DP-00789)

(DE81-028451; SAND-81-0960) Avail: NTIS HC A03/MF A01

A prototype network to provide a software development tool for various network nodes before they are connected to the production network is described. The software and function definitions that will be used in a CDC 7600 level computer for data communications interface between the prototype network input/output mechanism and the physical level of transmission are also described. DOE

N82-15825# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

ON DATA SECURITY IN A DISTRIBUTED OFFICE COMPUTER SYSTEM

Rolf Blom (Linkoeping Inst. of Technology), Jan-Olof Brueer (Linkoeping Inst. of Technology), Viiveke Faak (Linkoeping Inst. of Technology), and S. Ingvar Aakersten Aug. 1981 48 p refs

(FOA-C-30224-E1; Lith-ISY-I-0480) Avail: NTIS HC A03/MF A01

Trends analysis and a literature review were used to investigate high security data systems. An office with individual work stations having desktop computers is considered. These communicate among themselves and share a host computer of higher capacity including special purpose input/output equipment. Aspects covered include problems related to the protection of data bases; ease of selectively designating addresses and authorization to access data and messages; key distribution and protection; and general requirements for equipment needed in such a local net environment. The main source of overhead is key generation and distribution. Absolute unbreakability is not needed if several security measured are used concurrently. Author (ESA)

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

No abstracts in this category.

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-15826# Stichting Mathematisch Centrum, Amsterdam (Netherlands).

NUMERICAL SOLUTION OF A DIFFUSION PROBLEM WITH SEGREGATION AT A MOVING INTERFACE

M. Bakker and D. Hoonhout (FOM-Inst. voor Atoom- en Molecuulfysica) Dec. 1980 21 p refs Submitted for publication

(MC-NW-97/80) Avail: NTIS HC A02/MF A01

The transport of impurities implanted in silicon, which accompanies the annealing of implantation damage by means of pulsed-laser irradiation, is described by a one-dimensional diffusion equation whose solution is discontinuous at a moving interior point. This discontinuity is due to segregation of mass at the liquid/solid interface during (re)solidification. Problems in the numerical solution of the equation are examined. M.G.

N82-15827# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.

THE CONSTRUCTION OF AN ACCURATE LOWER BOUND FOR THE REAL PARTS OF THE EIGEN VALUES OF AN M-MATRIX

Pieter P. N. deGroen (Vrije Univ.) Apr. 1981 8 p refs Submitted for publication

(MC-NW-102/81) Avail: NTIS HC A02/MF A01; Sticthing Mathematisch Centrum, Amsterdam FL 3,15

Let A be an M-matrix, i.e., A is nonsingular, real, irreducible and weakly diagonally dominant and has positive diagonal and nonpositive off diagonal elements. Via the graph of A, a vector W is constructed such that AW is positive. This yields a lower bound of the spectrum, which is optimal in certain problems. Author

N82-15828# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.

ON THE REGULARITY OF THE PRINCIPLE VALUE OF THE DOUBLE LAYER POTENTIAL

H. Schippers Apr. 1981 26 p refs Submitted for publication

(MC-NW-104/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3,15

The regularity of the principal value of the potential due to a doublet distribution mu along the boundary S of a two-dimensional (2-D) open connected set is discussed. Assuming S to be a Lyapunov boundary and mu to be bounded and integrable it is proved that the principal value in 2-D is more regular than the one in 3-D. This result is applied to the aerodynamic problem of calculation of potential flows around 2-D bodies. M.G.

N82-15829# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.

ON THE CHOICE OF SUITABLE OPERATORS AND PARAMETERS IN MULTIGRID METHODS

W. J. A. Mol Jun. 1981 52 p refs
(MC-NW-107/81) Avail: NTIS HC A04/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 6.30

Multigrid methods for the solution of elliptic boundary value problems are discussed. These methods are described by a simple Algol-like program. By special choices of some operators and parameters, almost every multigrid strategy proposed in the literature for linear problems can be recovered. Several possibilities for the restriction, prolongation, coarse grid, and smoothing operators are considered. Furthermore, the number of smoothing steps and the number of coarse grid corrections are discussed. Some comparitive experiments are described with the Poisson, anisotropic diffusion, and the convection-diffusion equations. M.G.

N82-15830# Princeton Univ., N. J. Plasma Physics Lab.

STATISTICAL DESCRIPTION OF AN ATTRACTOR

A. B. Rechester (MIT, Cambridge, Mass.) and R. B. White Jul. 1981 14 p refs
(Contracts DE-AC02-76CH-03073; DE-AS02-78ET-53074)
(DE81-027708; PPPL-1821) Avail: NTIS HC A02/MF A01

Attracting solutions of one dimensional maps are described statistically by an invariant probability distribution. Expressions for the Fourier transform of this function and the Liapunov exponent are derived. Good agreement between the theory and numerical computations is found. DOE

N82-15831# California Univ., Livermore. Lawrence Livermore Lab. Mathematics and Statistics Div.

THEORY AND IMPLEMENTATION OF THE EOS FITTING CODE RATFIT

F. N. Fritsch Apr. 1981 40 p refs
(Contract W-7405-eng-48)
(DE81-029110; UCID-19098) Avail: NTIS HC A03/MF A01

The theory behind the equations of state fitting code RATFIT is detailed and the implementation of the code using existing mathematical software is described. DOE

N82-15832# California Univ., Livermore. Lawrence Livermore Lab.

THERMAL CONVECTION SIMULATION IN THREE DIMENSIONS BY A MODIFIED FINITE ELEMENT METHOD

C. D. Upson, P. M. Gresho, R. L. Sani, S. T. Chan, and R. L. Lee 21 Jul. 1981 24 p refs Presented at the 2nd Intern. Symp. on Numerical Methods and Heat Transfer, College Park, Md., 28-30 Sep. 1981
(DE81-028847; UCRL-85555; CONF-810935-1) Avail: NTIS HC A02/MF A01

In the effort to model the advection and dispersion of pollutants in the planetary boundary layer over complex terrain, a relatively simple computer code was developed for solving the three dimensional Navier-Stokes equations. The computer code was applied to the simulation of a Boussinesq fluid contained in a three dimensional rectangular box which is heated below and cooled above. Temperature difference between these two isothermal surfaces determines the spatial and temporal thermoconvection patterns. Their relevance to natural convection in solar energy collectors, crystal growth in liquids, radioactive waste storage, and more importantly in studying systems of this sort can provide insight into the onset of phase-chaotic induced turbulence. Numerical simulations of the two flow configuration observed experimentally, the three and two-roll cell patterns are presented. These results appear to be the first calculations to truly time-dependent three dimensional confined Benard convection of elevated Rayleigh numbers. DOE

N82-15833# California Univ., Livermore. Lawrence Livermore Lab.

METHODOLOGY AND BASIC ALGORITHMS OF THE LIVERMORE ECONOMIC MODELING SYSTEMS

Robert B. Bell 17 Mar. 1981 43 p refs
(Contract W-7405-eng-48)
(DE81-029430; UCRL-53131) Avail: NTIS HC A03/MF A01

The methodology and the basic pricing algorithms used in the Livermore economic modeling system (EMS) are described. Each algorithm's function is analyzed and a detailed derivation of the actual mathematical expressions used to implement the algorithm is presented. DOE

N82-15834# California Univ., Livermore. Lawrence Livermore Lab.

QUADRANTAL SYMMETRY CALCULATIONS FOR NON-SYMMETRIC HALF-PLANE FILTERS

Dennis M. Goodman 3 Dec. 1980 5 p refs Presented at the 14th Asilomar Conf. on Circuits, Systems and Computers, Pacific Grove, Calif., 17 Nov. 1980
(Contract W-7405-eng-48)
(DE81-030071; UCRL-85156-Rev-1; CONF-801170-2) Avail: NTIS HC A02/MF A01

The conditions under which an all-pole, stable, nonsymmetric half plane filter has a quadrantally symmetric magnitude response are investigated. It is shown that quadrantal symmetry is obtained if and only if the denominator of the transfer function can be written as the product of two functions; the inverse z transforms of these two functions have different regions of support and one of them must obey a symmetry condition. The usefulness of these conditions in filter design algorithms is discussed. DOE

N82-15835# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research.

SURROGATE DUALITY RELAXATION FOR JOB SHOP SCHEDULING

M. L. Fisher (Pennsylvania Univ.), B. J. Lageweg, J. K. Lenstra, and A. H. G. RinnooyKan (Erasmus Univ.) Aug. 1981 20 p refs Submitted for publication
(Grants NSF ENG-78-26500; NATO-9.2.02(SRG); NATO-1575)
(MC-BW-145/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3.15

Surrogate duality bounds for the job shop scheduling problem are obtained by replacing the capacity constraints on the machines and the precedence constraints determining the machine order for each job by their weighted sum and strengthening the aggregate constraint by iterating over all possible weights. A theoretical investigation of the resulting relaxations is presented. Results confirm the inherent intractability of the problem, although bounds superior to those obtained by Lagrangean relaxation are produced. Author (ESA)

N82-15836# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

A SIMPLE INVERSION METHOD FOR DETERMINING AEROSOL SIZE DISTRIBUTIONS

Thomas Kaijser Sep. 1981 32 p refs
(FOA-C-30231-E) Avail: NTIS HC A03/MF A01

The integral equation representing the extinction of light through an aerosol of spherical particles is used to determine aerosol size distributions from light measurements. The method provides a physically realistic solution to the integral equation. It assumes that the solution can be described as a linear combination of log-normal functions. The method is fast and the same parameter set works for all data. Dispersion coefficients > 0.4 are recommended. Author (ESA)

N82-15837# National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.

AN ALGORITHM WHICH DETERMINES THE GLOBAL LEAST SQUARES EQUIDISTANT SPLINE FIT

M. R. Best 12 Nov. 1979 27 p refs
(Contract NIVR-1816)
(NLR-TR-80008-U) Avail: NTIS HC A03/MF A01

The algorithm requires linear computation time and constant storage. The method is based on a Cholesky decomposition of the matrix of normal equations belonging to the minimization problem. The special structure of the matrix is heavily exploited. An error analysis is included. T.M.

N82-15838# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.

ON MARTINGALES AND RECURSIVE OPTIMAL STATE ESTIMATION

G. Moek 26 Jun. 1980 92 p refs

(Contract NIVR-1771)

(NLR-TR-80068-U) Avail: NTIS HC A05/MF A01

A number of theoretical results concerning martingales and linear as well as nonlinear estimation theory are summarized in an innovation and presentation theorem. Based upon this, a simple derivation of the Kalman and Kalman-Buoy filters is sketched. Reference is made to more general estimation problems (counting process observations, martingale noise) which can be solved along the same lines. A wide sense martingale approach to linear estimation is discussed. For a class of signals, comprising those studied in the Kalman and Kalman-Buoy problem, recursive estimation equations for the signal based on observations in either white or colored noise are described. A more general model for colored noise is given. By means of numerical simulation of some model problems the Kalman filter and the wide sense martingale approach are compared. T.M.

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-15839# Sheffield Univ. (England). Dept. of Control Engineering.

PROJECTED MARKOV PARAMETERS AND MULTIVARIABLE ROOT-LOCI

D. H. Owens Feb. 1981 14 p refs

(RR-146) Avail: NTIS HC A02/MF A01

An inductive proof of the relationship between the asymptotic behavior of multivariable root-loci and the projected Markov parameters introduced by Kouvaritakis and Edmunds is provided. Author

N82-15840# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Mathematical Statistics.

BERRY-ESSEEN THEOREMS FOR SIMPLE LINEAR RANK STATISTICS UNDER THE NULL-HYPOTHESIS

R. J. M. M. Does Apr. 1981 19 p refs Submitted for publication

(MC-SW-71/81) Avail: NTIS HC A02/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 3.15

Berry-Esseen bounds of order O(N(1/2)) are established for simple linear rank statistics under the null-hypothesis. The theorems are proved for a wide class of scores generating functions which includes the normal quantile function. M.G.

N82-15841# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Mathematical Statistics.

LINEAR NONPARAMETRIC TESTS FOR COMPARISON OF COUNTING PROCESSES, WITH APPLICATIONS TO CENSORED SURVIVAL DATA

Per Kragh Andersen (Danish Medical and Social Science Research Councils), Oernulf Borgan (Copenhagen Univ.), Richard Gill, and Niels Keiding (Danish Medical and Social Science Research Councils) Jul. 1981 41 p refs Submitted for publication Sponsored in part by Norwegian Research Council for Science and the Humanities and by Association of Norwegian Insurance Companies

(MC-SW-72/81) Avail: NTIS HC A03/MF A01; Stichting Mathematisch Centrum, Amsterdam FL 5.25

Linear nonparametric one- and k-sample tests for counting processes are surveyed. The necessary probabilistic background is outlined and a master theorem proved, which may be specialized to most known asymptotic results for linear rank tests for censored data as well as to asymptotic results for one- and k-sample tests in more general situations, an important feature being that very general censoring patterns are allowed. A survey is given of existing tests and their relation to the general theory, and examples of applications to Markov processes are provided. The relation of the approach to classical nonparametric hypothesis testing theory based on permutation distributions is also discussed. M.G.

N82-15842# University of Southern California, Los Angeles. Dept. of Management.

TABULAR AIDS FOR FITTING WEIBULL MOMENT ESTIMATES

Wallace R. Blischke, L. Guin, and Ernest M. Scheuer (California State Univ., Northridge) Aug. 1981 10 p refs Presented at the Ann. Meeting of the Am. Statist. Assoc.

(Contract N00014-75-C-0733)

(AD-A105965) Avail: NTIS HC A02/MF A01 CSCL 12/1

A table to facilitate fitting moment estimates for a Weibull distribution is given. An estimation procedure is described for use in cases where the sample size is large. M.G.

N82-15843# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

PROPERTIES OF STOCHASTIC LABELING PROCEDURES

Tommy Elfving and Jan-Olof Eklundh Jun. 1981 31 p refs

(FOA-C-30229-E1) Avail: NTIS HC A03/MF A01

An optimization model for stochastic labeling is formulated and the first order Kuhn-Tucker conditions of the model are derived. The nonzero fixed points of the relaxation scheme by Rosenfeld, Hummel and Zucker are characterized in terms of these conditions. A local convergence result is presented and proved. The use of the relaxation scheme for optimization is illustrated by the problem of classifying a triangle in three dimensional space given two dimensional observations. Results are close to predicted values. Author (ESA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-15844# California Univ., Livermore. Lawrence Livermore Lab.

IDENTIFIER PROTECTION IN A DISTRIBUTED OPERATING SYSTEM

D. M. Nessett 6 Jun. 1981 6 p refs Presented at the Nat Electron. Conf., Chicago, 26-28 Oct. 1981

(Contract W-7405-eng-48)

(DE81-025978; UCRL-86143; CONF-811020-1) Avail: NTIS HC A02/MF A01

A scheme was recently presented to protect capabilities in a distributed operating system. This scheme uses public-key encryption to ensure that capabilities cannot be stolen in a form useful to the thief nor forged by an unauthorized process or user. Unfortunately, security and efficiency considerations make currently available public-key encryption techniques unattractive. This report focuses on the characteristics an identifier protection scheme must possess and on the use of secret-key encryption to provide identifier protection. DO

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

No abstracts in this category.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physic*

N82-15845# California Univ., Livermore. Lawrence Livermore Lab.

TEMPERATURE MEASUREMENTS OF SHOCKED TRAN

LUCENT MATERIALS BY TIME-RESOLVED INFRARED RADIOMETRY
William G. VonHolle 4 Jun. 1981 6 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23-25 Jun. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-028426; UCRL-85381; CONF-810684-47) Avail: NTIS HC A02/MF A01

Infrared emission in the range 2 to 5.5 micrometers has been used to measure temperatures in shock-compressed states of nitromethane, cyclohexane and benzene and in polycrystalline KBr. Polymethylmethacrylate shows anomolous emission probably associated with some heterogeneity. DOE

N82-15846# Brookhaven National Lab., Upton, N. Y. Dept. of Physics.
NUMERICAL STUDIES OF GAUGE FIELD THEORIES
Michael Creutz Jun. 1981 28 p refs Presented at the 19th Intern. School of Subnucl. Phys., Erice, Italy, 31 Jul. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030526; BNL-29840; CONF-810762-1) Avail: NTIS HC A03/MF A01

The application of Monte Carlo simulation to quantized gauge field theories is described. Strong numerical evidence that the standard SU(3) non-Abelian gauge theory of the strong interaction is capable of simultaneously confining quarks into the physical hadrons and exhibiting asymptotic freedom is presented. In four dimensions, confinement is a nonperturbative phenomenon. Essentially all models of confinement the widely separated quarks together with strings of gauge field flux. This gives rise to a linear potential at long distances. A Monte Carlo program generates a sequence of field configuration by a series of random changes of the fields. The algorithm is so constructed that ultimately the probability density for finding any given configuration is proportional to the Boltzmann weighting. The lattices are brought into thermal equilibrium with a heat bath at a temperature specified by the coupling constant, performing computer experiments with four dimensional crystals stored in a computer memory. As the entire field configuration is stored, any correlation function desired is accessible. The kinds of experiments being done and the implications of these results for strong interaction physics are described. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-15847*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
APPLICATION OF STEADY STATE FINITE ELEMENT AND TRANSIENT FINITE DIFFERENCE THEORY TO SOUND PROPAGATION IN A VARIABLE AREA DUCT: A COMPARISON WITH EXPERIMENT
Kenneth J. Baumeister, W. Eversman (Missouri Univ., Rolla), R. J. Astley (Missouri, Univ., Rolla), and J. W. White (Tennessee Univ., Knoxville) 1981 14 p refs Presented at the 7th Aeroacoustics Conf., Palo Alto, Calif., 5-7 Oct. 1981; sponsored by AIAA
(NASA-TM-82678; E-960) Avail: NTIS HC A02/MF A01 CSCL 20A

Sound propagation without flow in a rectangular duct with a converging-diverging area variation was studied experimentally and theoretically. The area variation was of sufficient magnitude to produce large reflections and induce model scattering. The rms (root-mean-squared) pressure and phase angle on both the flat and curved surface were measured and tabulated. The steady state finite element theory and the transient finite difference theory are in good agreement with the data. It is concluded that numerical finite difference and finite element theories appear ideally suited for handling duct propagation problems which encounter large area variations. M.G.

N82-15848*# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
A STUDY OF METHODS OF PREDICTION AND MEASUREMENT OF THE TRANSMISSION SOUND THROUGH THE WALLS OF LIGHT AIRCRAFT Semiannual Report
B. Forssen, Y. S. Wang, and Malcolm J. Crocker Dec. 1981 24 p refs
(Grant NAG1-58)
(NASA-CR-165040; Rept-2; HL-81-34) Avail: NTIS HC A02/MF A01 CSCL 20A

Several aspects were studied. The SEA theory was used to develop a theoretical model to predict the transmission loss through an aircraft window. This work mainly consisted of the writing of two computer programs. One program predicts the sound transmission through a plexiglass window (the case of a single partition). The other program applies to the case of a plexiglass window window with a window shade added (the case of a double partition with an air gap). The sound transmission through a structure was measured in experimental studies using several different methods in order that the accuracy and complexity of all the methods could be compared. Also, the measurements were conducted on the simple model of a fuselage (a cylindrical shell), on a real aircraft fuselage, and on stiffened panels. B.W.

N82-15849# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
THE SOUND ATTENUATION OF THE WILLSON EARMUFF NUMBER 250 AND THE AMPLIVOX, TYPE H4016
A. M. Mimpen Apr. 1979 7 p In DUTCH; ENGLISH summary
(Contract A76/K/104)
(IZF-1979-9; TDCK-72155) Avail: NTIS HC A02/MF A01

By measuring the binaural threshold for pure tones with and without wearing an earmuff the sound attenuation as a function of frequency was determined with ten subjects for the Willson-earmuff, no. 250. In the same way the sound attenuation was determined for the Amplivox, type H4016 with built-in telephones. Both the Willson earmuff, no. 250 and the Amplivox, type H4016 have a good sound attenuation, also at low frequencies. Author

N82-15850# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Berlin (West Germany). Abteilung Turbulenzforschung.
SOUND MEASUREMENT IN FLOWS: DETERMINATION OF THE NOISE LEVEL DUE TO TURBULENT PRESSURE VARIATIONS BY COMPARING THE MEASUREMENTS WITH A NOSE CONE AND WITH A SLOTTED TUBE [SCHALLMESSUNGEN IN STROEMUNGEN - BESTIMMUNG DES STOERPEGELS INFOLGE TURBULENTER DRUCKSCHWANKUNGEN DURCH VERGLEICHSMESSUNG MIT NASENKONUS UND SCHLITZROHR]
W. Neise 1981 4 p refs In GERMAN
Avail: NTIS HC A02/MF A01

A method for the separation of sound and noise signals in flow channels is described. The two signals as a function of frequency are compared. It is assumed that sound and turbulent noise signals are statistically independent, and that the microphone noise levels are different when using a nose cone or a slotted tube. The use of comparative measurement is simple in the frequency domain of plane waves, the wave propagation being parallel to the channel axis and the sound pressure being constant in a cross section. The case of higher modes in the channel is considerably more problematic and requires laborious measurements and treatments. Author (ESA)

N82-15851# Technische Universitaet, Hanover (West Germany). Inst. fuer Messtechnik im Maschinenbau.
NOISE REDUCTION DURING THE PRODUCTION OF THICK WALLED STEEL CONSTRUCTIONS BY MEANS OF IMPACT PROCESSING TECHNIQUES Final Report, Jul. 1980
Bernard Dupuis Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 84 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-HA-81-008) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,60

A number of measures are described that can be taken to reduce the noise generated by techniques using impactors in the production of thick walled steel constructions. In most workshops, the noise usually exceeds by far the legal noise limit. Suggestions, based on laboratory tests, are made for noise reduction by modification of the manufacturing procedure, by adaptation of the tools, and by diminishing the excitation and emission characteristics of the body under construction. By means of specific examples of container and steelframe construction, it is demonstrated that noise generated by impact processes can indeed be reduced to a large extent. Author (ESA)

N82-15852# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

SOUND DAMPING IN A CONDENSATION LOADED GAS FLOW [SCHALLDAEMPFUNG IN EINER KONDENSATBELADENEN GASSTROEMUNG]

Martin Huettig Dec. 1980 98 p refs In GERMAN; ENGLISH sumary
(MPIS-24/1980; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,45

The sound absorption by suspended water droplets in an air flow with Mach-number 0.72 was investigated in a tube cm in length and 5 cm in diameter. The portion of the condensate is less than 10 g per kg air, the radius of the droplets is probably 2.5 x 10 to the -8 power < r sub tm < 10 to the -7 power m. At frequencies in the range from 2 kHz to 50 kHz, sound absorption from 5 dB/m to 140 dB/m is obtained. Author

N82-15728*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

CABIN ACOUSTICAL NOISE

Jerry L. Homick *In its* STS-1 Med. Rept. Dec. 1981 p 79-80
(For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 20A

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-15853*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ATLAS OF ABSORPTION LINES FROM 0 TO 17 900 cm(-1)

Jae H. Park, L. S. Rothman (AFGL), C. P. Rinsland (Coll. of William and Mary, Williamsburg, Va.), M. A. H. Smith, D. J. Richardson (Systems and Applied Sciences Corp., Hampton, Va.), and J. C. Larsen (Systems and Applied Sciences Corp., Hampton, Va.) Washington Dec. 1981 208 p refs
(NASA-RP-1084; L-14720) Avail: NTIS HC A10/MF A01 CSCL 07D

Plots of absorption line strength versus line position for wavenumbers from 0 to 17,900 cm(-1) are shown for 20 atmospheric gases (H2O, CO2, O3, N2O, CO, CH4, O2, NO, SO2, NO2, NH3, HNO3, OH, HF, HCl, HBr, HI, ClO, OCS, H2CO). Also shown are similar plots of lower-state energy values for adsorption lines for the strongly adsorbing atmospheric gases (H2O, CO2, O3, and CH4) for wavenumbers from 0 to 5000 cm(-1). M.G.

N82-15854# Ohio Univ., Athens.

STUDY OF STRUCTURE OF NUCLEI WITH NEUTRONS AND NUCLEAR DATA MEASUREMENTS FOR MFE Progress Report, 1 Sep. 1980 - 1 Jul. 1981

Raymond O. Lane 1981 73 p refs
(Contract DE-AS02-76ER-02490)
(DE81-028388; DOE/ER-02490/2) Avail: NTIS HC A04/MF A01

Measurements of neutron differential elastic and inelastic scattering cross sections were made for C-13 and O-18. For Li-7 + n, a multichannel R-matrix analysis was completed, providing much new structure information for the compound Li-8 system. These results are in very good agreement with recent theoretical model calculations, so that together the two provide considerable advancement in the state of our knowledge of Li-8. R-matrix analyses of B-11 + n, C-12 + n, C-13 + n and inelastic scattering data have also been completed. For all th
nuclei, comparisons of theoretical results with the R-matrix analy
are made. The triplet quadrupole spectrometer (TQS) is n
fully operational. Development of new detectors, techniques, d
analysis codes and theoretical model codes for use with t
TQS system is complete. Construction of the long-flight-p
tunnel for the swinger magnet facility is complete. D

N82-15855# Sandia Labs., Albuquerque, N. Mex.

LOW-ENERGY X-RAY EMISSION FROM LIGHT I TARGETS

L. P. Mix, E. J. T. Burns, D. L. Fehl, D. L. Hanson, and D.
Johnson 1981 15 p refs Presented at the Topical Conf.
Low-Energy X-ray Diagnostics, Livermore, Calif., 8 Jun. 1
(Contract DE-AC04-77DP-00789)
(DE81-028249; SAND-81-0842C; CONF-810651-5) Av
NTIS HC A02/MF A01

Dagnostics are described. Soft X-ray plasma measurem
made on targets on the 200 times smaller Proto I acceler
are presented. Plasma brightness temperatures of 20 eV h
been observed in the deposition region and 35 eV (100
electron temperature) in the stagnation region of implod
conical Al targets on Proto I. D

N82-15856# Maryland Univ., College Park. Dept. of Phy
and Astronomy.

DYNAMICS OF HADRON-NUCLEUS INTERACTIONS

Steven J. Wallace Jul. 1981 25 p refs Presented at
9th Intern. Conf. on High Energy Phys. and Nucl. Struct
(9-ICOHEPANS), Versailles, France, 6-10 Jul. 1981
(Contract DE-AS05-76ER-05126)
(DE81-026272; CONF-810747-3; ORO-5126-145) A
NTIS HC A02/MF A01

Recent progress in diffraction theory shows that pro
nucleus scattering at nonforward angles is dominated by
interference of waves from two or more bright spots. Ana
formulas based on asymptotic theories of diffraction have yie
valuable new insights into the scattering and these form
can be readily extended to illuminate the role of dynami
ingredients, i.e., the nucleon-nucleon amplitudes. The gover
parameters of the diffraction and some direct connections betw
the observed cross sections and the input dynamics are review
New information regarding the nucleon-nucleon parameters b
on recent phase shift analyses show some systematic di
ences from the effective NN amplitudes which produce fit
proton-nucleus diffraction data. Recent progress in understan
the role of delta isobars in proton-nucleus dynamics is
viewed. D

N82-15857# Temple Univ., Philadelphia, Pa. Dept.
Physics.

EXPERIMENTAL INVESTIGATIONS IN PARTICLE PHYS AT INTERMEDIATE ENERGIES Progress Report, 1 D 1980 - 30 Nov. 1981

L. B. Auerbach, V. L. Highland, and W. K. McFarlane
1981 12 p refs
(Contract DE-AC02-76ER-03539)
(DE81-027954; DOE/ER-03539/T1; COO-3539-16) A
NTIS HC A02/MF A01

Data-taking on the pion-beta-decay measurement
substantial progress in its analysis are reported. The low-en
anti pp annihilation cross section experiment is near comple
Planning for a new pi-zero-to-three-gamma experiment at LA
is complete. The proposal to use the LEAR facility at CERN
further anti pp work has been approved, and some contribut
to the preparation of a neutrino experiment proposal at LAM

N82-15858# Brookhaven National Lab., Upton, N. Y.

HYPERNUCLEI AND INTERACTIONS OF KAONS W NUCLEI

Carl B. Dover 1981 18 p refs Presented at the 9th In
Conf. on High Energy Phys. and Nucl. Structure, Versailles, Fra
6-10 Jul. 1981
(Contract DE-AC02-76CH-00015)
(DE81-028467; BNL-29774; CONF-810747-1) Avail:
HC A02/MF A01

Different models for hyperon-nucleus central and spin-potentials are compared: several models yield a very small spin-orbit strength for the lambda, as experimentally observed, but differ considerably in their predictions for the sigma. The new data on the C-13 hypernuclear spectrum, as obtained in the strangeness exchange reaction at 800 MeV/c, are discussed. It is shown how one extracts constraints on the lambda nucleus and effective lambda nucleon interactions from the data. The new BNL data on the (anti kaon, pion) reaction at 720 MeV/c, leading to sigma hypernuclear states, are examined. The case of Li-6(anti kaon, pion)H-6 reaction is discussed, and some speculations concerning the (anti kaon, pion) reaction on other targets are presented. The physical mechanisms which may lead to unusually narrow sigma excitations in some systems are examined. The physics motivations for several future hypernuclear experiments which are already under development, or under preliminary consideration are reviewed. DOE

N82-15859# California Univ., Livermore. Lawrence Livermore Lab. Dept. of Physics and Astronomy.

PARAMETERIZATION OF THE BREMSSTRAHLUNG SPECTRUM

I. J. Feng and R. H. Pratt 31 Aug. 1981 52 p
(Contract W-7405-eng-48)
(DE81-029739; UCRL-15384; PITT-266) Avail: NTIS
HC A04/MF A01

A parameterization is provided for the bremsstrahlung spectrum in the incident electron energy range 10 to 500 keV for all elements, with particular emphasis on the range 20 to 100 keV for Z = 41 to 92. A general accuracy of 20% is achieved, with 50% in the worst cases, in most ranges utilizing simple one variable functions. DOE

N82-15860# Battelle Pacific Northwest Labs., Richland, Wash.

CONTINUUM ELECTRON EMISSION IN HEAVY ION: ATOM COLLISONS

L. H. Toburen Feb. 1981 57 p refs Presented at the Seminar on High Energy Ion-Atom Collision Processes, Debrecen, Hungary, 17 Mar. 1981
(Contract DE-AC06-76RL-01830)
(DE81-028234; PNL-SA-9306; CONF-810392-1) Avail: NTIS
HC A04/MF A01

The measurement of energy losses of heavy ions in molecular targets is reviewed. Topics covered include ionization by protons, ionization by helium ions, and ionization by carbon impact. An appendix gives a data compilation of ejected energies and ejected electron energies and ejection angles for proton collision with H2, He, Ne, Ar, Kr, Xe, N2, O2, H2O, CH4, C2H2, C2H4, C2H6, C6H6, NH3, CH3NH2, C2H5NH2, SF6, and TeF6. Double differential cross sections are included for several ion molecular collisions. DOE

N82-15861# Brookhaven National Lab., Upton, N. Y.

COULOMB EXPLOSION OF LARGE PENETRATING MOLECULAR CLUSTERS

H. E. Wegner and P. Thieberger 1981 40 p refs Presented at the 5th NYU Workshop on Penetration Phenomena: Exotic Projectiles in Matter, New York, 8-10 Jan. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025866; BNL-29448; CONF-810152-1) Avail: NTIS
HC A03/MF A01

Coulomb explosion measurements are made to determine the structure of large penetrating molecular clusters and other complex molecules, and also to determine what other special phenomena comes into play as these complex molecules pass through matter. An image intensifier detector system, coupled with a microcomputer, is used. DOE

N82-15862# Oak Ridge National Lab., Tenn. Fusion Energy Div.

IMPROVEMENT OF GAS EFFICIENCY OF NEGATIVE ION SOURCES

J. H. Whealton Aug. 1981 15 p refs
(Contract W-7405-eng-26)
(DE81-028031; ORNL/TM-7885) Avail: NTIS
HC A02/MF A01

A modification of the currently operating Calutron, magnetron, and modified duoPIGatron negative ion source is proposed. The modification should improve gas efficiency by more than an order of magnitude in the Calutron, by a factor of five in the magnetron, and by a factor of two in the duoPIGatron. DOE

N82-15863# Illinois Univ., Urbana. Materials Research Lab.

ILLUSTRATIVE NUMERICAL COMPARISONS BETWEEN PHONON MEAN FREE PATHS AND PHONON THERMAL CONDUCTIVITY

W. M. MacDonald and A. C. Anderson 1981 9 p refs Presented at the Intern. Joint Conf. on Thermophys. Properties, Gaithersburg, Md., 15 Jun. 1981
(Contract DE-AC02-76ER-01198)
(DE81-028180; DOE/ER-01198/1361; CONF-810683-5) Avail. NTIS HC A02/MF A01

Measurements of thermal conductivity are often used as an interrogative technique to learn about phonon scattering processes in solids. In general the relationship between thermal conductivity lambda and a phonon mean free path 1 is complex and it is therefore necessary to make some simplifying assumptions in order to make this relationship tractable. These assumptions may lead to erroneous conclusions, many of which have appeared in the published literature. An intuitive insight is provided to the relationship between lambda and 1. DOE

N82-15864# Oak Ridge National Lab., Tenn.

SELECTED TOPICS IN THERMAL AND RESONANCE NEUTRON CAPTURE

S. Raman 1981 19 p refs Presented at the 4th Intern. Symp. on Neutron Capture Gamma-Ray Spectry. and Related Subjects, Grenoble, France, 7-11 Sep. 1981
(Contract W-7405-eng-26)
(DE81-029676; CONF-810920-13) Avail: NTIS
HC A02/MF A01

Energy and intensity standards direct thermal neutron capture and primary E2 transitions in (n, gamma) reactions are discussed. Nonstatistical effects in resonance neutron capture, transmission measurements of Sc employed in 2 keV facilities, and tests of Axe-Brink predictions of gamma ray strength functions via average resonance capture are also presented. DOE

N82-15865# Argonne National Lab., Ill.

DETERMINATION OF NUCLEAR-MATTER TEMPERATURE AND DENSITY

Kevin L. Wolf 1980 58 p refs Presented at the Workshop on Future Relativistic Heavy Ion Expt., Darmstadt, West Germany, 7-10 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023847; CONF-8010154-4) Avail: NTIS
HC A04/MF A01

Information learned about nuclear matter under extreme conditions during the past few years in relativistic heavy ion studies are reviewed. The completion of analyses and publication of results from the impact parameter-selected, single-particle inclusive experiments is discussed. Preliminary results from the new generation of two-particle correlation and particle-exclusive measurements, especially those using streamer chambers are considered. The measurement of more exotic ejectiles with long mean free paths in nuclear matter is discussed. Calculations offering guidance and providing explanations of high energy collisions, particularly the Monte Carlo and intranuclear cascade calculations, are evaluated. DOE

N82-15866# California Univ., Berkeley. Lawrence Berkeley Lab.

MID-RAPIDITY PION CROSS SECTIONS: NEW DATA CONFRONT THEORIES

K. A. Frankel, J. A. Bistirlich, R. Bossingham, H. R. Bowman, K. M. Crowe, C. J. Martoff, J. Miller, D. L. Murphy, J. O. Rasmussen, J. P. Sullivan et al Jul. 1981 6 p refs Presented at the 5th High Energy Heavy Ion Study, Berkeley, Calif. 18-22 May 1981
(Contract W-7405-eng-48)
(DE81-028014; LBL-12641; CONF-8105104-5) Avail: NTIS
HC A02/MF A01

Pion production by collisions of relativistic heavy ions has been studied recently. For the reaction 1.05 GeV/A Ar + Ca pion (+), they discovered a peak in the invariant cross section at mid-rapidity at P/sub perpendicular/approximately 0.5 m/sub pion/c. This peak is not apparent in the 730 MeV p(+)p and was attributed to possible hydrodynamic flow effects. Several authors have suggested that the pion(+) peak is a Coulomb effect. These models predict the pion(-) would be drawn in towards the fireball, leaving an essentially flat distribution in the mid-rapidity region. Mid-rapidity pion(+) and pion(-) cross sections were measured using at 1.05 GeV/A argon beam with a calcium target. The pions were measured with a magnetic spectrometer set at 15 degrees to the beam and were stopped in a scintillator range telescope. Results are presented and discussed. DOE

N82-15867# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.

THEORY OF COULOMB DISTORTION OF PION SPECTRA BY HEAVY-ION SPECTATOR FRAGMENTS

J. O. Rasmussen, H. M. A. Radi (Kuwait Univ.), J. P. Sullivan, K. A. Frankel, , and O. Hashimoto (Tokyo Univ., Japan) Jul. 1981 7 p refs Presented at the 5th High Energy Heavy Ion Study, Berkeley, Calif., 18-22 May 1981
(Contract W-7405-eng-48)
(DE81-028013; LBL-12623; CONF-8105104-7) Avail: NTIS HC A02/MF A01

It has been known for over two years now that the pion(-) spectrum from heavy ion collisions peaks near beam velocity and that the pion (+) spectrum has a corresponding depression. It has been guessed that these features are Coulomb effects of projectile fragments. A theoretical treatment of this phenomena is given, and results are compared with experimental data. DOE

N82-15868# Institut Max von Laue/Paul Langevin, Grenoble (France).

PHONONS IN GRAPHITE INTERCALATION COMPOUNDS MEASURED BY NEUTRON SCATTERING

A. Magerl and H. Zabel (Illinois Univ. at Urbana-Champaign) 1981 8 p refs Presented at the Conf. on Phys. of Intercalation Compounds, Trieste, Italy, 6 Jul. 1981
(Contract DE-AC02-76ER-01198)
(DE81-029681; DOE/ER-01198/1354; CONF-810758-1) Avail: NTIS HC A02/MF A01

The entire phonon dispersion of a solid can be measured by neutron scattering under favorable conditions. Triple axis spectroscopy allows the phonon energies to be determined for a chosen polarization at well defined wave vectors q throughout the Brillouin zone (BZ). In the case of graphite a complete measurement of the phonon dispersion is not possible because of the limited size of (natural) single crystals, and because of the high energy approximately 200 meV of some branches. Only a limited amount of neutron data have been collected with pyrolytic graphite (PG). The high energy branch of stage 3 K together with complete (001) L dispersions for stage 2 K, Rb and Cs and stage I K and Cs are presented for the first time. It is shown that a Born-vanKarman formalism is inappropriate, however, including an interaction with an electronic layer between alkali and bonding graphite planes results in a shell model, which can consistently describe the measurement for all compounds.
M.D.K.

N82-15869# Pacific Northwest Lab., Richland, Wash.

STRESS DEPENDENCE OF CREEP IN Ni BOMBARDED WITH 17-MeV DEUTERONS

C. H. Henager, Jr., E. P. Simonen (Washington Univ., Seattle), E. R. Bradley, and R. G. Stang Jul. 1981 6 p refs Presented at the 2nd Fusion Reactor Mater. Meeting, Seattle, 9-12 Aug. 1981
(Contract DE-AC06-76RL-01830)
(DE81-030080; PNL-SA-9728; CONF-810831-54) Avail: NTIS HC A02/MF A01

A linear stress dependence of irradiation creep was observed in pure, heavily cold-worked Ni and the creep behavior was modeled using a climb-glide creep mechanism. The Ni foils were bombarded with 17 MeV deuterons at 473 K with a damage rate of 0.0000006 dpa/s. The applied tensile stress ranged from 135 MPa to 250 MPa. Transmission electron microscopy revealed that up to 50% of the material had recrystallized during the pre-irradiation thermal creep test. A high number density of interstitial loops were observed throughout the material. Small voids were observed primarily in the recrystallized regions. The creep rate magnitude and stress dependence was rationalized using models of loop hardening of rate theory predictions of point defect annihilation at sinks. DOE

N82-15870# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.

TRITIUM AUTORADIOGRAPHY

George R. Caskey, Jr. 1981 28 p refs Presented at the TMS/AIME Fall Meeting on Advanced Tech. for the Characterization of Hydrogen in Metals, Louisville, Ky., 11-15 Oct. 1981
(Contract DE-AC09-76SR-00001)
(DE81-030521; DP-MS-81-12; CONF-811037-1) Avail: NTIS HC A03/MF A01

Hydrogen distribution and diffusion within many materials may be investigated by autoradiography if the radioactive isotope tritium is used in the study. Tritium is unstable and decays t helium-3 by emission of a low energy (18 keV) beta partic which may be detected photographically. The basic principles o tritium autoradiography were discussed. Limitations are imposed on the technique by: (1) the low energy of the beta particles; (2) the solubility and diffusivity of hydrogen in materials; and (3) the response of the photographic emulsion to beta particles. These factors control the possible range of application of tritium autoradiography. The technique was applied successfully to studies of hydrogen solubility and distribution in materials and to studies of hydrogen damage. DOE

N82-15871# California Univ., Berkeley. Lawrence Berkeley Lab.

COMPUTER SIMULATION OF ORGANIC AND BIOLOGICAL MOLECULES

Arthur J. Olson, ed. 1981 80 p refs Presented at the Workshop on Computer Simulation of Org. and Biol. Molecules, Pacific Grove, Calif., 5-8 Jan. 1981
(Contract W-7405-eng-48; Grant NSF CHE-7721305)
(DE81-029948; LBL-12979; CONF-810149; NRCC-PROC-11)
Avail: NTIS HC A05/MF A01

Molecular mechanics applied to smaller molecules, conformational studies of nucleotides, and dynamics and energetics o small peptides were discussed. Larger systems including protein and protein hydration also were discussed. Monte Carlo simulations of hydration were addressed. Two talks on drug desig represented a new community exhibiting great interest in th field. The desirability of writing a general software package fo calculating the properties of molecular systems from classica mechanics using an analytical representation of the energy wa considered. DO

N82-15872# California Univ., Livermore. Lawrence Livermor Lab.

RESULTS OF CALCULATIONS OF EXTERNAL GAMMA RADIATION EXPOSURE RATES FROM FALLOUT AND TH RELATED RADIONUCLIDE COMPOSITIONS. OPERATIO RANGER, 1951

Harry G. Hicks Jul. 1981 63 p refs
(Contract W-7405-eng-48)
(DE81-030467; UCRL-53152-Pt-1) Avail: NTI HC A04/MF A01

Radioactivity outside the Nevada Test Site complex i examined. Data on calculated gamma radiation exposure rate and ground deposition of related radionuclides are presented.
DO

N82-15873# Oak Ridge National Lab., Tenn.

ONE AND A HALF CENTERED EXPANSION FOR ION-ATO COLLISIONS

J. F. Reading, A. L. Ford, and R. L. Becker 1980 21 p re Presented at the Intern. Conf. on X-ray Processes and Inner-she Ionization, Stirling, UK, 25 Aug. 1980 Prepared in cooperatio with Texas A and M Univ.
(Contract W-7405-eng-26)
(DE81-028142; CONF-800859-8) Avail: NTI HC A02/MF A01

Fast ion-atom collisions in which charge transfer plays dominant role have been traditionally treated by a two cent expansion (TCE): the state wavefunction is approximated by truncated set of Hilbert states centered on the target and projecti This method is accurate but expensive in the use of comput time. A new method which allows charge transfer throug variational time independent amplitudes, and target excitatio and ionization through variation time dependent amplitudes presented. The method retains the efficiency of a single center expansion and yet reproduces the conventional TCE results situations where charge transfer is dominant. Comparison to experiment is made. DOE

N82-15874# Sandia Labs., Albuquerque, N. Mex.

SURVEY OF ATOMIC PHYSICS ISSUES IN EXPERIMENTAL INERTIAL CONFINEMENT RESEARCH

Allen Hauer (Los Alamos National Lab.) and E. J. T. Burns 1981 14 p refs Presented at the 12th IPEAC Intern. Conf. on the Phys. of Electron. and Atomic Collisions, Gatlinburg, Tenn., 15 Jul. 1981
(Contract DE-AC04-76DP-00789)
(DE81-028389; SAND-81-1864C; CONF-810754-2) Avail: NTIS HC A02/MF A01

Atomic processes impact many of the interactions important to inertial confinement fusion. For example, ionization of bound electrons represent one of the primary stopping mechanisms for both ions and electrons. Atomic processes are also important in predicting the behavior of the very dense plasmas which are central to the success of inertial fusion. Atomic spectroscopy is an important diagnostic of ICF plasmas. DOE

N82-15875# Los Alamos Scientific Lab., N. Mex.

NEUTRINO NUMBER OF THE UNIVERSE

Edward W. Kolb 10 Aug. 1981 11 p refs Presented at the Intern. Conf. on Neutrino Phys. and Astrophys., Maui, Hawaii, 30 Jun. - 9 Jul. 1981 Submitted for publication
(Contract W-7405-eng-36)
(DE81-030249; LA-UR-81-2505; CONF-8106156-1) Avail: NTIS HC A02/MF A01

The influence of grand unified theories on the lepton number of the universe is reviewed. A scenario is presented for the generation of a large (>>1) lepton number and a small (<<1) baryon number. DOE

N82-15876# Los Alamos Scientific Lab., N. Mex.

INTERMEDIATE ENERGY PROTON AND LIGHT-ION SCATTERING

J. M. Moss 1981 13 p refs Presented at the 9th Intern. Conf. on High Energy Phys. and Nucl. Structure, Versailles, France, 6-10 Jul. 1981
(Contract W-7405-36)
(DE81-030115; LA-UR-81-2410; CONF-810747-4) Avail: NTIS HC A02/MF A01

Recent (1979-81) developments in the field of intermediate-energy proton and light-ion scattering from nuclei are reviewed with emphasis on theoretical and calculational techniques of particular interest to experimentalists. Topics covered include: nucleon-nucleon interactions; DWIA description of inelastic scattering; data-to-data analysis, giant resonances; Delta-isobar-hole configurations; pion-condensation precursors; measurement of the Q parameter; and spin-flip measurements. DOE

N82-15877# Brookhaven National Lab., Upton, N. Y.

SEARCH FOR THE VIOLATION OF TIME-REVERSAL INVARIANCE IN K MU SUB MU 3 DECAYS

W. M. Morse, L. B. Leipuner, R. C. Larsen, S. R. Blatt, M. K. Campbell, R. K. Adair, J. K. Black, H. Kasha, and M. P. Schmidt Aug. 1981 5 p refs Presented at the Intern. Conf. on High Energy Phys., Lisbon, 9 Jul. 1981 Submitted for publication
(Contract DE-AC02-76CH-00016)
(DE81-030557; BNL-30026; CONF-810760-1) Avail: NTIS HC A02/MF A01

From international conference on high energy physics Lisbon, Portugal (9 Jul 1981). The polarization of the Mu(+) from the decays K sub L yields Pi(-) Mu(+) Nu and K(+) yields Pi(o) Mu(+) Nu was measured. The transverse polarization forbidden by time reversal invariance is .00185 + or -.0036 based on the final data sample of thirty-four million events. This null result places constraints on certain models of charge-parity violation through the exchange of Higgs bosons. DOE

N82-15878# Brookhaven National Lab., Upton, N. Y.

POLARIZING MULTILAYER SPECTROMETER FOR NEUTRONS

C. F. Majkrzak, L. Passell, and A. M. Saxena 1981 8 p refs Presented at the Symp. on Neutron Scattering, Argonne, Ill., 12 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-029546; BNL-29922; CONF-810840-2) Avail: NTIS HC A02/MF A01

Polarizing neutron monochromators were prepared by sputtering thin film multilayers with d-spacings from 40 to 85 A on large float glass substrates. Peak reflectivities as great as 90% and polarizing efficiencies of 98% were measured. Increased angular acceptances were obtained by fabricating multilayers with multiple d-spacings. A planned polarized beam spectrometer which incorporates the multilayers and which has a variable energy resolution independent of angular beam divergence is described. DOE

N82-15879# Rochester Univ., N. Y. Dept. of Chemistry.

STUDIES OF HEAVY-ION REACTIONS AND TRANSURANIC NUCLEI Progress Report, 1 Aug. 1980 - 31 Jul. 1981

J. R. Huizenga and W. U. Schroeder Jul. 1981 260 p refs
(Contract DE-AC02-76ER-03496)
(DE81-027980; DOE/ER-03496/T1) Avail: NTIS HC A12/MF A01

Mass and charge transport induced by nucleon exchange are examined. The parameters and dynamics for heavy ion collisions, heavy ion fusion and high energy reaction are also explored. For individual titles, see N82-15880 through N82-15886.

N82-15880# Rochester Univ., N. Y. Nuclear Structure Research Lab.

CORRELATED MASS AND CHARGE TRANSPORT INDUCED BY STATISTICAL NUCLEON EXCHANGE IN DAMPED NUCLEAR REACTIONS

W. U. Schroeder, J. R. Huizenga, and J. Randrup (Lawrence Berkeley Lab.) *In its* Studies of Heavy-Ion Reactions and Transuranic Nuclei Jul. 1981 p 6-18 refs (For primary document see N82-15879 06-72)
Avail: NTIS HC A12/MF A01

Experimental relations between mass, charge and energy loss of fragments from damped reactions in terms of an independent-particle transport model were analyzed. A quantitative description of data is achieved including the energy loss dependence of isobaric and isotopic fragment distributions. E.A.K.

N82-15881# Rochester Univ., N. Y. Nuclear Structure Research Lab.

DISSIPATIVE REACTION DYNAMICS OF HEAVY-ION COLLISIONS

W. U. Schroeder and J. R. Huizenga *In its* Studies of Heavy-Ion Reactions and Transuranic Nuclei Jul. 1981 p 20-46 refs (For primary document see N82-15879 06-72)
Avail: NTIS HC A12/MF A01

The transition from the very simple quasi-elastic to the vastly complex fusion type reactions involving up to several thousand nucleonic degrees of freedom was studied. Nuclear reactions induced by heavy ions at bombarding energies of a few MeV/u above the interaction barrier differ in several important ways from the more conventional processes observed with light projectiles such as protons, deuterons and alfa-particles. In light ion induced reactions two mechanisms are distinguished: (1) quasi-elastic pickup or stripping of one or a few nucleons and, (2) compound nucleus formation following the fusion of projectile and target nuclei. Heavy ion reactions constitute a reaction mechanism intermediate between quasi-elastic and fusion processes. These binary reactions, termed damped or deep inelastic collisions, arise because of the very strong repulsive Coulomb and centrifugal forces retarding or even inhibiting the fusion process. E.A.K.

N82-15882# Rochester Univ., N. Y. Nuclear Structure Research Lab.

A TWO DIMENSIONAL POSITION SENSITIVE DELTAE-E COUNTER FOR ENERGETIC LIGHT CHARGED PARTICLES

W. W. Wilcke, J. R. Birkelund, J. P. Kosky, H. J. Wollersheim, A. D. Hoover, J. R. Huizenga, W. U. Schroeder, L. E. Tubbs, and D. Hilscher (Hahn-Meitner Inst.) *In its* Studies of Heavy-Ion Reactions and Tranuranic Nuclei Jul. 1981 p 47-79 refs (For primary document see N82-15879 06-72)
Avail: NTIS HC A12/MF A01

A large area position sensitive deltaE-E detector for energetic light charged particles is described. A single wire gas proportional counter is used as the deltaE-E detector. Two dimensional position readout is obtained from the proportional counter by a combination of charge division and electron drift time measurements. The detector is suitable for alpha particles with energies between 6.5 and 180 MeV. The application of the detector to study charged particle emission in a heavy ion induced reaction is discussed. E.A.K.

N82-15883# Rochester Univ., N. Y. Nuclear Structure Research Lab.

REACTION PARAMETERS FOR HEAVY-ION COLLISIONS

W. W. Wilcke, J. R. Birkelund, H. J. Wollersheim, A. D. Hoover, J. R. Huizwega, W. U. Schroeder, and L. E. Tubbs *In its* Studies of Heavy-Ion Reactions and Transuranic Nuclei Jul. 1981 p 81-106 refs (For primary document see N82-15879 06-72)
Avail: NTIS HC A12/MF A01

Reaction parameters for all combinations of 27 projectile and 16 target nuclei in a laboratory bombarding energy range of 1-60 MeV/u are presented. The reaction parameters are derived from the Fresnel model of heavy ion scattering, the droplet model and the rotating liquid drop model or from systematics of experimental data. E.A.K.

N82-15884# Rochester Univ., N. Y. Nuclear Structure Research Lab.

HEAVY-ION FUSION REVISITED

J. R. Huizenga, J. R. Birkelund, W. U. Schroeder, W. W. Wilcke, and H. J. Wollersheim *In its* Studies of Heavy-Ion Reactions and Transuranic Nuclei Jul. 1981 p 108-133 refs (For primary document see N82-15879 06-72)
Avail: NTIS HC A12/MF A01

Heavy ion fusion cross sections for a selected number of reactions are presented. For the lighter systems emphasis is placed on the high energy part of the fusion evaporation excitation functions. For lighter systems and not too high energies, the fusion process is experimentally rather well distinguishable because of the dominance of compound nucleus formation. For intermediate systems, fusion-fission competition begins to dominate over fusion evaporation for angular moments of approximately 65K. The experimental fusion-fission cross sections of the very heavy systems indicate that the topology of the underlying potential energy surface of relevance for the fusion process is not well approximated by a barrier in a one dimensional picture. A simple model description of fusion inhibition induced by the dynamical evolution along a neck degree of freedom is applied to a variety of fusion-fission excitation functions. The dependence of dynamical fusion inhibition on pertinent features of the multidimensional potential energy surface are also studied. E.A.K.

N82-15885# Rochester Univ., N. Y. Nuclear Structure Research Lab.

THE 209BI + 136Xe REACTION AT E SUB LAB = 1422 MeV

H. J. Wollersheim, W. W. Wilcke, J. R. Birkelund, J. R. Huizenga, W. U. Schroeder, H. Freiesleben, and D. Hilscher *In its* Studies of Heavy-Ion Reactions and Transuranic Nuclei Jul. 1981 p 134-176 refs (For primary document see N82-15879 06-72)
Avail: NTIS HC A12/MF A01

Projectile like reaction products from the 209Bi + 136Xe reaction bombarding energy of 1422 MeV were studied. The fragments were identified by atomic number, and their kinetic energies and angular distributions were measured using three solid state deltaE-E telescopes. The angular distribution is peaked near the grazing angle. The minimum kinetic energy is bombarding energy independent and 150 MeV smaller than the Coulomb energy of touching spherical fragments which indicates a large deformation of these dinuclear systems. The measured element distributions for given Q-values are Gaussian and centered at the atomic number of the projectile. At large negative Q-values, the centeroids of the Gaussian distributions exhibit a small drift towards charge splits more asymmetric than the initial system.
E.A.K.

N82-15886# Rochester Univ., N. Y. Nuclear Structure Research Lab.

THE 165Ho + 56Fe REACTION AT E SUB LAB = 462 MeV

A. D. Hoover, J. R. Birkelund, D. Hilscher, W. U. Schroeder, W. W. Wilcke, J. R. Huizenga, H. Breuer (Maryland Univ., College Park), A. C. Mignerey (Maryland Univ., College Park), V. E. Viola, Jr. (Indiana Univ., Bloomington), and K. L. Wolf (Argonne National Lab., Ill.) *In its* Studies of Heavy-Ion Reactions and Transuranic Nuclei Jul. 1981 p 178-258 refs (For primary document see N82-15879 06-72)
Avail: NTIS HC A12/MF A01

The Z-distributions measured as a function of angle an energy are discussed. The integrated fragment Z-distribution o the light reaction fragment is fairly broad and centered close t the charge of the projectile. The kinetic energy distribution extends from the quasi-elastic region down to energies smaller than th Coulomb energy of touching spherical nuclei. The angular distribution is peaked forward of the quarter point angle an rises at small angles which are due to orbiting. Charge distributions show an average drift towards larger asymmetry and an increase in width with increasing energy damping. The Coulomb barrie is considered for two choices of the scission radius. E.A.K.

N82-15887# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

POTENTIAL DETERMINATION OF THE SYSTEM SODIUM (3 2P) PLUS MERCURY (6 1S) BY MEASURING AND ANALYZING THE RAINBOW SCATTERING IN THE SUPER-THERMAL ENERGY DOMAIN BETWEEN 0.3 AND 3.2eV Thesis - Georg-August-Univ. [POTENTIALBESTIMMUNG DES SYSTEMS Na (3 2P) + Hg (6 1S) DURCH MESSUNG UND ANSWERTUNG DER REGENBOGENSTREUUNG IM UEBERTHERMISCHEN ENERGIEBEREICH VON 0,7 BI 3,2eV]

Lutz Huewel Dec. 1980 122 p refs In GERMAN
(MPIS-23/1980; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, Wes Germany DM 20,65

The differential scattering cross section of the collisio system Na (3 2 P) + Hg (6 1S) was determined, using rainbo oscillations. Electronically laser excited Na atoms were scattere by Hg and fluorescence was observed. The experimental setu consists basically of two (Na and Hg) atomic beams and an ou of plane detection system. With a fast Na atomic beam, capabl of reaching velocities above 5000 m/sec and providing collisio energies of 3eV. Two well separated rainbow oscillatory system were demonstrated in the differential scattering cross sectio Both rainbow systems show strong amplitude dependence o the laser light polarization state. Author (ESA

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and react theory.

For space radiation see *93 Space Radiation*.

N82-15888# California Univ., Livermore. Lawrence Livermo Lab.

PROGRESS TOWARD FUSION ENERGY

Keith I. Thomassen 11 Mar. 1981 8 p Presented at th Energy in the Man-Built Environment: The Next Decade Special Conf., Vail, Colo., 3-5 Aug. 1981
(Contract W-7405-eng-48)
(UCRL-84974; CONF-810808-5) Avail: NT HC A02/MF A01

The basis for the present optimism in the magnetic fusi program is summarized. Some of the remaining tasks leading a demonstration power reactor and the primary technologi necessary for that endeavor are described. DO

N82-15889# Washington Univ., Seattle. Nuclear Physi Lab.

UNIVERSITY OF WASHINGTON NUCLEAR PHYSICS DAT COLLECTION SYSTEM

Kelly C. Green 1981 9 p Presented at the Topical Conf. Computerized Data Acquisition in Particle and Nucl. Phys., O

Ridge, Tenn., 28 May 1981
(Contract DE-AC06-76ER-01388)
(DE81-028321; DOE/ER-01388/486; CONF-810523-11) Avail: NTIS HC A02/MF A01

A data collection system was developed, replacing a previous system based on an SDS-930 computer. The system is constructed about a PDP 11/60 and an MBD-11 controlled CAMAC crate. The hardware configuration as well as a locally written singles data collection code are described. Multiparameter data is taken with an enhanced version of Fermilab Multi. Current capabilities and future plans are discussed. DOE

N82-15890# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.
POLYNOMIAL CHROMODYNAMICS
Herbert M. Ruck Jun. 1981 6 p refs Presented at the 5th High Energy Heavy Ion Study, Berkeley, Calif., 18-22 May 1981
(Contract W-7405-eng-48)
(DE81-028038; LBL-12872; CONF-8105104-6) Avail: NTIS HC A02/MF A01

A model of classical field theory with internal symmetry Z(3) is partially solved in 1 + 1 dimensions. The dynamical variables are two pairs of scalar and spinor fields phi sub 1, phi sub 2 and phi sub 1, phi sub 2. The phi and psi fields form composite finite-size particles. The mass spectrum and the interactions of these particles is studied. DOE

N82-15891# Battelle Pacific Northwest Labs., Richland, Wash.
FACTORS AFFECTING CRITICALITY FOR SPENT-FUEL MATERIALS IN A GEOLOGIC SETTING
B. F. Gore, U. P. Jenquin, and R. J. Serne Apr. 1981 210 p refs
(Contract DE-AC06-76RL-01830)
(DE81-029275; PNL-3791) Avail: NTIS HC A10/MF A01

The conditions required for the criticality of spent fuel constituents are determined. The calculational methods and computer codes used to determine critical conditions are described. Effects of the fissile content of spent fuel on criticality are examined. Pu quantities and concentrations are required for criticality without water were determined for various conditions of Pu separation, rock moderation and reflection, rock impurities, and isotopic content of the Pu. The possibility of geochemical processes separating Pu from other spent fuel constituents is addressed. Solubilities of U and Pu are calculated for groundwaters characteristic of basalt, tuff, granite, bedded and dome salt. Maximum concentrations which could be adsorbed on geologic media in contact with these groundwaters are then calculated. DOE

N82-15892# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Sciences Div.
NON-LINEAR VACUUM POLARIZATION IN STRONG FIELDS
M. Gyulassy Jul. 1981 17 p refs Presented at the NATO-Advanced Summer Inst. Summer School on QED of Strong Fields, Lahnstein, W. Germany, 14 Jul. 1981
(Contract W-7405-eng-48)
(DE81-028039; LBL-12972; CONF-8106148-1) Avail: NTIS HC A02/MF A01

The Wichmann-Kroll formalism for calculating the vacuum polarization density to first order in alpha but to all orders in zeta alpha is derived. The most essential quantity is shown to be the electrons Green's function in these calculations. The method of constructing that Green's function in the field of finite radius nuclei is then presented. DOE

N82-15893# Department of Energy, Washington, D. C. Office of Energy Research.
TECHNOLOGY OF CONTROLLED NUCLEAR FUSION
F. H. Tenney, ed. and C. C. Hopkins, ed. Jul. 1981 644 p refs Proceedings of the 4th ANS Topical Meeting held at King of Prussia, Pa., 14-17 Oct. 1980 Sponsored in part by DOE, Washington, D.C. and EPRI
(DE81-027361; CONF-801011-Vol-3) Avail: NTIS HC A99/MF A01

An assessment of magnetically confined fusion power reactors, their technological use and applications, is made. The key engineering areas studied relate to: thermomechanics, thermohydraulics, electromagnetics, nucleonics, systems engineering, assembly, maintenance, repair, instrumentation and control of reactors and reactor materials. The subjects of safety factors, laser applications, and wall design are also addressed. M.D.K.

74 OPTICS

Includes light phenomena.

N82-15894*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
OPTICAL INFORMATION PROCESSING FOR AEROSPACE APPLICATIONS
Dec. 1981 347 p refs Conf. held in Hampton, Va., 18-19 Aug. 1981
(NASA-CP-2207; L-15018) Avail: NTIS HC A15/MF A01 CSCL 20F

Current research in optical processing is reviewed. Its role in future aerospace systems is determined. The development of optical devices and components demonstrates that system concepts can be implemented in practical aerospace configurations. For individual titles, see N82-15895 through N82-15922.

N82-15895*# Air Force Office of Scientific Research, Bolling AFB, Washington, D.C.
AIR FORCE RESEARCH IN OPTICAL PROCESSING
John Neff *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 1-15 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Optical and optical electronic hybrid processing especially in the application area of image processing are emphasized. Real time pattern recognition processors for such airborne missions as target recognition, tracking, and terminal guidance are studied. S.L.

N82-15896*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EARTH FEATURE IDENTIFICATION FOR ONBOARD MULTISPECTRAL DATA EDITING: COMPUTATIONAL EXPERIMENTS
R. M. Aherron (Information and Control Systems, Inc., Hampton, Va.), R. F. Arduini (Computer Sciences Corp., Hampton, Va.), R. E. Davis, R. O. Huck, and S. K. Park *In its* Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 17-32 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

A computational model of the processes involved in multispectral remote sensing and data classification is developed as a tool for designing smart sensors which can process, edit, and classify the data that they acquire. An evaluation of sensor system performance and design tradeoffs involves classification rates and errors as a function of number and location of spectral channels, radiometric sensitivity and calibration accuracy, target discrimination assignments, and accuracy and frequency of compensation for imaging conditions. This model provides a link between the radiometric and statistical properties of the signals to be classified and the performance characteristics of electro-optical sensors and data processing devices. Preliminary computational results are presented which illustrate the editing performance of several remote sensing approaches. S.L.

N82-15897*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ROLE OF OPTICAL COMPUTERS IN AERONAUTICAL CONTROL APPLICATIONS
Robert J. Baumbick *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 33-43 (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 30F

The role that optical computers play in aircraft control is determined. The optical computer has the potential high speed capability required, especially for matrix/matrix operations. The optical computer also has the potential for handling nonlinear simulations in real time. They are also more compatible with fiber optic signal transmission. Optics also permit the use of passive sensors to measure process variables. No electrical energy need be supplied to the sensor. Complex interfacing between optical sensors and the optical computer is avoided if the optical sensor outputs can be directly processed by the optical computer. S.L.

N82-15896*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

HIGH SPEED TECHNIQUES FOR SYNTHETIC APERTURE RADAR IMAGE FORMATION

Demetri Psaltis (California Inst. of Tech., Pasadena), Armand R. Tanguay, Jr. (Univ. of Southern California, Los Angeles), and Thomas J. Bicknell *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 47-52 (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

One possible approach to high speed synthetic aperture radar signal reconstruction involves the utilization of two dimensional real time spatial light modulators as recyclable replacements for photographic film in the input transducer plane of a modified synthetic aperture radar (SAR) coherent optical processor. Leading candidate spatial light modulators include modified Pockels readout optical modulators (PROM), charge coupled devices (CCD) addressed liquid crystal light valves, and CCD addressed membrane light modulators. The fundamental physical limitations affecting SAR processor performance characteristics of such real time devices are under investigation. Current research on PROM is focused on the effects of device operational mode, device constitutive parameters, electro-optic crystal orientation, writing wavelength, frame rate/data overwrite/presuming, erasure completeness, and image retention on the overall quality of SAR image formation. Both modulated laser scanning and intensified CRT temporal to spatial input approaches are being examined. S.L.

N82-15899*# Georgia Inst. of Tech., Atlanta.

OPTICAL IMPLEMENTATION OF SYSTOLIC ARRAY PROCESSING

H. J. Caulfield (Innovative Optics, Inc., Concord, Mass.), W. T. Rhodes (Carnegie-Mellon Univ.), M. J. Foster, and Sam Horvitz (Naval Underwater Systems Center, New London, Conn.) *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 53-60 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Algorithms for matrix vector multiplication are implemented using acousto-optic cells for multiplication and input data transfer and using charge coupled devices detector arrays for accumulation and output of the results. No two dimensional matrix mask is required; matrix changes are implemented electronically. A system for multiplying a 50 component nonnegative real vector by a 50 by 50 nonnegative real matrix is described. Modifications for bipolar real and complex valued processing are possible, as are extensions to matrix-matrix multiplication and multiplication of a vector by multiple matrices. S.L.

N82-15900*# Lockheed Electronics Co., Plainfield, N. J.

MATRIX VECTOR MULTIPLIER WITH TIME VARYING SINGLE DIMENSIONAL SPATIAL LIGHT MODULATORS

A. Tarasevich, N. Zeplin, and W. T. Rhodes (Georgia Inst. of Tech.) *In* NASA. Langley Research Center Opt. Inform. Process for Aerospace Appl. Dec. 1981 p 61-70 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

The applicability of iterative optical processors in environments requiring a short transient response time is analyzed. An approach is proposed utilizing acousto-optic single dimension light modulators where the matrix is the outer product of two vectors. The problems associated with a nonnegative real representation are addressed. A solution is proposed at some cost of processor speed. S.L.

N82-15901*# Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.

INCOHERENT OPTICAL MATRIX-MATRIX MULTIPLIER

A. R. Dias *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 71-83 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Real time processing capabilities in the context of reconnaissance sensors, two dimensional beamforming, etc. are addressed. Matrix-matrix multiplier concepts using incoherent light are studied. S.L.

N82-15902*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

BULK AND INTEGRATED ACOUSTO-OPTIC SPECTROMETERS FOR RADIO ASTRONOMY

G. Chin, D. Buhl, and J. M. Florez *In* NASA. Langley Research Center Opt. Inform. Process for Aerospace Appl. Dec. 1981 p 85-91 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

The development of sensitive heterodyne receivers (front end) in the centimeter and millimeter range, and the construction of sensitive RF spectrometers (back end) enable the spectral lines of interstellar molecules to be detected and identified. A technique was developed which combines acoustic bending of a collimated coherent light beam by a Bragg cell followed by detection by a sensitive array of photodetectors (thus forming an RF acousto-optic spectrometer (AOS). An AOS has wide bandwidth, large number of channels, and high resolution, and is compact, lightweight, and energy efficient. The thrust of receiver development is towards high frequency heterodyne systems, particularly in the millimeter, submillimeter, far infrared, and 10 micron spectral ranges. S.L.

N82-15903*# Grumman Aerospace Corp., Bethpage, N.Y.

ENERGY NORMALIZATION OF TV VIEWED OPTICAL CORRELATION (AUTOMATED CORRELATION PLANE ANALYZER FOR AN OPTICAL PROCESSOR)

Alex Grumet *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 93-104 (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

An automatic correlation plane processor that can rapidly acquire, identify, and locate the autocorrelation outputs of a bank of multiple optical matched filters is described. The read-only memory (ROM) stored digital silhouette of each image associated with each matched filter allows TV video to be used to collect image energy to provide accurate normalization of autocorrelations. The resulting normalized autocorrelations are independent of the illumination of the matched input. Deviation from unity of a normalized correlation can be used as a confidence measure of correct image identification. Analog preprocessing circuits permit digital conversion and random access memory (RAM) storage of those video signals with the correct amplitude, pulse width, rising slope, and falling slope. TV synchronized addressing of 3 RAMs permits on-line storage of: (1) the maximum unnormalized amplitude, (2) the image x location, and (3) the image y location of the output of each of up to 99 matched filters. A fourth RAM stores all normalized correlations. A normalization approach, normalization for cross correlations, a system's description with block diagrams, and system's applications are discussed. M.D.K.

N82-15904*# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Electrical Engineering.

ITERATIVE OPTICAL VECTOR-MATRIX PROCESSORS (SURVEY OF SELECTED ACHIEVABLE OPERATIONS)

David Casasent and Charles Neuman *In* NASA. Langley Research Center Opt. Inform. Process for Aerospace Appl. Dec. 1981 p 105-118 refs Sponsored in part by AFOSR (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

An iterative optical vector-matrix multiplier with a microprocessor-controlled feedback loop capable of performing a wealth of diverse operations was described. A survey and description of many of its operations demonstrates the versatility and flexibility of this class of optical processor and its use in diverse applications. General operations described include: linear difference and differential equations, linear algebraic equations, matrix equations, matrix inversion, nonlinear matrix equations, deconvolution and eigenvalue and eigenvector computations. Engineering applications being addressed for these different operations and for the IOP are: adaptive phased-array radar, time-dependent system modeling, deconvolution and optimal control. M.D.K.

N82-15905*# Harry Diamond Labs., Adelphi, Md.
INTERFEROMETRIC SURFACE-WAVE ACOUSTO-OPTIC TIME-INTEGRATING CORRELATORS
Norman J. Berg, Irwin J. Abramovitz, and Michael W. Casseday *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 119-129 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

A structure for a coherent-interferometric acousto-optic (AO) time-integrating correlator was implemented by using a single surface acoustic wave (SAW) device with tilted transducers to reduce intermodulation terms. The SAW device was fabricated on Y-Z LiNbO3 with a center frequency of 175 MHz, a bandwidth of 80 MHz, and a time aperture of about 10 micros. The density of the photodetector array, with a potential of 120 MHz. Typical integration times are 30 to 40 ms, providing processing gains in excess of 10 to the 6th power. Such a device is useful in providing fast synchronization of communication links and in demodulating to base band and simultaneously acting as a synchronization lock monitor for moderate data rates. Where processing may be limited by Doppler shifts, a two dimensional architecture was implemented to allow full processing gain. Two one-dimensional, SAW AO time-integrating correlators and a two dimensional correlator are evaluated. M.D.K.

N82-15906*# Naval Research Lab., Washington, D. C.
THREE METHODS FOR PERFORMING HANKEL TRANSFORMS
R. A. Athale, H. H. Szu, and J. N. Lee *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 133-144 (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Three methods for performing Hankel transforms with optical or digital processors are described. The first method is applicable when the input data is available in Cartesian (x-y) format and uses the close connection between generalized Hankel transform and the two dimensional Fourier transform in Cartesian coordinates. The second method is useful when the input data is in polar (r - theta) format and uses change of variables to perform the nth order Hankel transform as a correlation integral. The third method utilizes the von Neumann addition theorem for Bessel functions to extract the Hankel coefficients from a correlation between the radial part of the input and a Bessel function. Initial experimental results obtained for optical implementation of the first two methods are presented. M.D.K.

N82-15907*# California Univ., San Diego. Dept. of Electrical Engineering and Computer Sciences.
OPTICAL RECOGNITION OF STATISTICAL PATTERNS
Sing H. Lee *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 145-166 refs Sponsored by NSF and AFOSR (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Optical implementation of the Fukunaga-Koontz transform (FKT) and the Least-Squares Linear Mapping Technique (LSLMT) is described. The FKT is a linear transformation which performs image feature extraction for a two-class image classification problem. The LSLMT performs a transform from large dimensional feature space to small dimensional decision space for separating multiple image classes by maximizing the interclass differences while minimizing the intraclass variations. The FKT and the LSLMT were optically implemented by utilizing a coded phase optical processor. The transform was used for classifying birds and fish. After the F-K basis functions were calculated, those most useful for classification were incorporated into a computer generated hologram. The output of the optical processor, consisting of the squared magnitude of the F-K coefficients, was detected by a T.V. camera, digitized, and fed into a micro-computer for classification. A simple linear classifier based on only two F-K coefficients was able to separate the images into two classes, indicating that the F-K transform had chosen good features. Two advantages of optically implementing the FKT and LSLMT are parallel and real time processing. M.D.K.

N82-15908*# Honeywell, Inc., Bloomington, Minn.
OPTICAL SPATIAL INTEGRATION METHODS FOR AMBIGUITY FUNCTION GENERATION
P. N. Tamura, J. J. Rebholz, O. T. Daehlin, and T. C. Lee *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 167-172 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

A coherent optical spatial integration approach to ambiguity function generation is described. It uses one dimensional acousto-optic Bragg cells as input tranducers in conjunction with a space variant linear phase shifter, a passive optical element, to generate the two dimensional ambiguity function in one exposure. Results of a real time implementation of this system are shown. M.D.K.

N82-15909*# Hughes Research Labs., Malibu, Calif.
THE INTEGRATED OPTIC RF SPECTRUM ANALYZER
M. E. Pedinoff, T. R. Ranganath, T. R. Joseph (Hughes Aircraft Co., Fullerton, Calif.), and J. Y. Lee (Hughes Aircraft Co., Carlsbad, Calif.) *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 173-208 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

The results of measurements made on a fully integrated optic RF spectrum analyzer (IOSA) are reported. The performance of the device acousto-optic bandwidth, single-tone RF resolution, two-tone RF resolution, single-tone dynamic range, two-tone dynamic range, and single-tone RF response are presented. The device parameters that control device performance are analyzed. These results demonstrate the viability of the IOSA for real time spectrum analysis of pulsed and CW RF signals. Improvements of RF bandwidth resolution can be obtained by the use of larger collimated optical beams which requires larger optical lens elements, and hence, larger crystals. Author

N82-15910*# Battelle Columbus Labs., Ohio.
APPLICATIONS OF ELECTRO-OPTIC GRATINGS IN INTEGRATED OPTICAL SIGNAL PROCESSING DEVICES
Carl M. Verber *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 209-215 refs Sponsored in part by AFOSR (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

A variety of applications of electro-optically induced Bragg gratings in integrated optical signal processing and computation devices are shown. The gratings are easy to fabricate, operate efficiently on relatively low voltages and have design principles which are well known and reliable. The component allows a rapid and efficient interaction with an optical wave in a planar electro-optic waveguide. The operation of such gratings and their use as intensity modulators, spatial light modulators, and components in correlators and in a variety of computational units is described. M.D.K.

N82-15911*# Virginia Univ., Charlottesville.
FOUR- AND FIVE-LAYER SILICON-CLAD DIELECTRIC WAVEGUIDES
Glen McWright and T. E. Batchman *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 217-230 refs (For primary document see N82-15894 06-74) (Grant NsG-1567)
Avail: NTIS HC A15/MF A01 CSCL 20F

Computer modeling studies conducted on four-layer silicon-clad dielectric waveguides indicate that the attenuation (alpha) and mode index (beta/K) behave as exponentially damped sinusoids as the silicon thickness is increased. The observed effect can be explained quite simply as a periodic coupling between the guided modes of the lossless structure and the lossy modes supported by the high-refractive index silicon. The attenuation and mode index are significantly altered by conductivity changes in the silicon; an amplitude modulator and an intensity modulator were proposed using these results. Predicted high attenuations in the device may be reduced significantly with a silicon dioxide buffer layer between the semiconductor and the polystyrene guide. Experimental confirmation of the predicted characteristics is still necessary. A number of thin-silicon film waveguides have been RF sputtered but attenuation measurements to verify the damped oscillatory behavior are forthcoming. Conductivity variations of the silicon should demonstrate the modulation capabilities. Author

N82-15912*# Army Armament Research and Development Command, Dover, N. J.
CO2 LASER WAVEGUIDING IN PROTON IMPLANTED GaAs
H. A. Jenkinson and D. C. Larson (Drexel Univ.) *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 231-240 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Surface layers capable of supporting optical modes at 10.6 microns have been produced in n-type GaAs wafers through 300 keV proton implantation. The dominant mechanism for this effect appears to be free carrier compensation. Characterization of the implanted layers by analysis of infrared reflectivity spectra and synchronous coupling at 10.6 microns produced results in good agreement with elementary models. These results of sample characterization by infrared reflectivity and by CO2 laser waveguiding as implanted are presented and evaluated. M.D.K.

N82-15913*# Honeywell, Inc., Bloomington, Minn.
AlGaAs/GaAs TRANSVERSE JUNCTION STRIPE LASERS WITH DISTRIBUTED FEEDBACK
M. J. Hafich, R. A. Skogman, P. E. Petersen, and H. Kawanishi (Kogakuin Univ.) *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 241-250 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Transverse junction stripe (TJS) lasers with periodic feedback were fabricated in two geometries. An interferometric and wet chemical etching technique was used to create a feedback grating across the entire pumping region for the distributed feedback (DFB) TJS laser and to create the separate distributed Bragg reflectors/DBR) for the TJS/DBR laser. The TJS/DFB laser was a double heterostructure device grown by liquid phase epitaxy (LPE) and had a third order grating etched in the top ALO. 2GaO. 8As layer. The grating was buried by growing an ALO.35GaO.65As layer on the grating by metal organic chemical vapor deposition (MO-CVD). The TJS/DBR laser was also fabricated in an LPE double heterostructure. The top AlGaAs layer was thinned to 0.1 micron over more than half of the laser so that the grating would be close to the GaAs active layer and optical field. Single mode operation in both configurations was obtained. The thermal shift of the laser wavelength in both cases was less than 1 Angstrom/deg K, compared to the 3 Angstrom/deg K shift of the spontaneous emission peak. N.W.

N82-15914*# Battelle Columbus Labs., Ohio.
EVAPORATED As2S3 LUNEBURG LENSES FOR LiNbO3:Ti OPTICAL WAVEGUIDES
James R. Busch, Van E. Wood, Richard P. Kenan, and Carl M. Verber *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 251-261 refs Sponsored in part by AFOSR (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Luneburg lenses of good quality were formed on high index optical waveguides by evaporation of arsenic trisulfide glass through simple masks. Using only two thin circular aperture masks, lenses with focal spots of a few times the diffraction limited width at f/4 were obtained. These lenses were designed for and tested at both visible (633 nm) and infrared wavelengths. Procedures for the design, fabrication, and testing of lenses of this type are described. N.W.

N82-15915*# Hazeltine Corp., Greenlawn, N. Y.
A BROADBAND RF CONTINUOUSLY VARIABLE TIME DELAY DEVICE
Frederick W. Freyre *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 265-274 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

A method for implementation of continuously variable time delay of broadband RF signals is described. The method uses Bragg Cell and optical heterodyne technology. The signal to be delayed is applied to the Bragg Cell acoustic transducer, and the delay time is the acoustic transit time from this transducer to the incident light beam. By translating the light beam, the delay is varied. Expressions describing the Bragg Cell diffraction, lens Fourier transformation, and the optical heterodyne processes are developed. Specifications for the variable delay including bandwidth, range of delay, and insertion loss are provided. Applications include radar signal processing, spread spectrum intercept, radar ECM, and adaptive array antenna processing. N.W.

N82-15916*# Cornell Univ., Ithaca, N. Y.
MONOLITHICALLY INTEGRATED ACTIVE OPTICAL DEVICES
J. Ballantyne, D. K. Wagner, B. Kushner, and S. Wojtczuk *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 275-289 refs Sponsored in part by NSF (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Considerations relevant to the monolithic integration of optical detectors, lasers, and modulators with high speed amplifiers are discussed. Some design considerations for representative subsystems in the GaAs-AlGaAs and GaInAs-InP materials systems are described. Results of a detailed numerical design of an electro-optical birefringent filter for monolithic integration with a laser diode is described, and early experimental results on monolithic integration of broadband MESFET amplifiers with photoconductive detectors are reported. N.W.

N82-15917*# Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Science.
MICROCHANNEL SPATIAL LIGHT MODULATOR
Cardinal Warde *In* NASA. Langley Research Center Opt. Inform. Process for Aerospace Appl. Dec. 1981 p 291-298 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

The Microchannel Spatial Light Modulator (MSLM), a versatile, highly sensitive, and optically addressed device being developed for real time optical information processing is discussed. The MSLM operates by converting an input optical image into a charge distribution at the surface of an electro-optic crystal. The charge distribution generates an electric field which modulates the refractive index of the crystal and thereby the phase or intensity of an image readout beam. Prototype devices employing 250 micron thick crystals exhibited a spatial resolution of 5 cycles/mm at 50% contrast, an exposure sensitivity of 2.2 nJ/cu cm and framing rates of 40 Hz with full modulation depth. The image processing operations that have been achieved using the internal processing mode of the MSLM include contrast reversal, contrast enhancement, edge enhancement, image addition and subtraction, analog and digital intensity thresholding, and binary level logic operations such as AND, OR, EXCLUSIVE OR, and NOR. N.W.

N82-15918*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
INFRARED FIBER OPTIC FOCAL PLANE DISPERSERS
John H. Goebel *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 301-308 refs (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Far infrared transmissive fiber optics as a component in the design of integrated far infrared focal plane array utilization is discussed. A tightly packed bundle of fibers is placed at the focal plane, where an array of infrared detectors would normally reside, and then fanned out in two or three dimensions to individual detectors. Subsequently, the detectors are multiplexed by cryogenic electronics for relay of the data. A second possible application is frequency up-conversion (v sub 1 + v sub 2 = v sub 3), which takes advantage of the nonlinear optical index of refraction of certain infrared transmissive materials in fiber form. Again, a fiber bundle is utilized as above, but now a laser of frequency v sub 1 is mixed with the incoming radiation of frequency v sub 1 within the nonlinear fiber material. The sum, v sub 2 is then detected by near infrared or visible detectors which are more sensitive than those available at v sub 2. Due to the geometrical size limitations of detectors such as photomultipliers, the focal plane dispersal technique is advantageous for imaging up-conversion. N.W.

N82-15919*# Honeywell, Inc., Bloomington, Minn.
E-BEAM GENERATED HOLOGRAPHIC MASKS FOR

OPTICAL VECTOR-MATRIX MULTIPLICATION

Steven M. Arnold and Steven K. Case (Minnesota Univ., Minneapolis) *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 309-317 (For primary document see N82-15894 06-74)
(Contract F49620-80-C-0029)
Avail: NTIS HC A15/MF A01 CSCL 20F

An optical vector matrix multiplication scheme that encodes the matrix elements as a holographic mask consisting of linear diffraction gratings is proposed. The binary, chrome on glass masks are fabricated by e-beam lithography. This approach results in a fairly simple optical system that promises both large numerical range and high accuracy. A partitioned computer generated hologram mask was fabricated and tested. This hologram was diagonally separated outputs, compact facets and symmetry about the axis. The resultant diffraction pattern at the output plane is shown. Since the grating fringes are written at 45 deg relative to the facet boundaries, the many on-axis sidelobes from each output are seen to be diagonally separated from the adjacent output signals. N.W.

N82-15920*# Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.

MULTIFACET HOLOGRAPHIC OPTICAL ELEMENTS

Steven K. Case and Paul R. Haugen *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 319-325 refs (For primary document see N82-15894 06-74)
(Grant DAA29-81-K-0033)
Avail: NTIS HC A15/MF A01 CSCL 20F

New types of holographic optical elements, combining the flexibility of computer generated holograms with the large space bandwidth product and high diffraction efficiency of interferometrically recorded volume phase holograms, are demonstrated. The optical elements are recorded by subdividing a volume hologram film surface into numerous small areas (facets), each of which is individually exposed under computer control. Each facet is used to produce a portion of the desired final wavefront. Three different optical elements are demonstrated. N.W.

N82-15921*# Syracuse Univ., N. Y. Dept. of Electical and Computer Engineering.

A LIQUID CRYSTAL ADAPTIVE LENS

Stephen T. Kowel and Dennis S. Cleverly (GE, Utica, N.Y.) *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 329-339 refs (For primary document see N82-15894 06-74)
(Contract DAAK70-80-0053)
Avail: NTIS HC A15/MF A01 CSCL 20F

Creation of an electronically controlled liquid crystal lens for use as a focusing mechanism in a multi-element lens system or as an adaptive optical element is analyzed. Varying the index of refraction is shown to be equivalent to the shaping of a solid refracting material. Basic characteristics of liquid crystals, essential for the creation of a lens, are reviewed. The required variation of index of refraction is provided by choosing appropriate electrode voltages. The configuration required for any incoming polarization is given and its theoretical performance in terms of modulation transfer function derived. N.W.

N82-15922*# Sperry Univac, St. Paul, Minn.

MANIPULATION OF LIGHT WITH MAGNETO-OPTIC STRIPE DOMAIN FIELDS

E. J. Torok, F. G. Hewitt, J. A. Drawczak, and G. L. Nelson *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 341-350 refs Sponsored in part by Army Research Office (For primary document see N82-15894 06-74)
Avail: NTIS HC A15/MF A01 CSCL 20F

Magnetic diffraction grating materials, being developed to provide a simple means of deflecting light in a two dimensional, solid state fashion are discussed. The most promising material, for several applications, appears to be bismuth substituted iron garnet films in epitaxial form. Calculations indicate that deflection efficiency greater than 60% is possible in the near infrared region of the spectrum. Within the field of view of the deflector, measurements predict that 105 resolvable spots can be expected. Applications include: (1) general purpose deflection of free laser light, (2) image processing of extended sources such as transparencies, (3) programmable lensing, and (4) fiber optic matrix switching. N.W.

N82-15923# Fraunhofer-Inst. fuer Productionstechnik und Automatisierung, Stuttgart (West Germany).

INVESTIGATION OF A COHERENT OPTICAL METHOD FOR ROUGHNESS MEASUREMENTS Final Report, Dec. 1979

Norbert Rau Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 58 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-065; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fahinformationszentrum, Karlruhe, West Germany DM 12.20

When a surface is illuminated with coherent or partial coherent light, the reflected light shows a structure in the intensity distribution. There are defined statistical quantities dependent on the surface roughness and surface properties. Computing models were constructed to describe the correlation between the speckle pattern and the roughness. The sum of the experimental examinations is to form a dependence of the statistical quantities in the speckle pattern on the surface so that a characteristic line for the determination of the roughness can be determined. Several light sources with different coherent properties were inserted and various technical surfaces were investigated. T.M.

N82-15924# Zeiss (Carl), Oberkochen (West Germany).

CONSTRUCTION OF A NUMERICALLY CONTROLLED DEVICE FOR ALIGNING OPTICAL AND MECHANICAL AXIS OF A MICROSCOPE LENS ON A LATHE Final Report

Hans-Joachim Juranek Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 12 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-033; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 2.50

In microscope manufacturing lenses are normally cemented in special mounts. The optical axis is aligned to the mechanical axis by a turning operation on a special lathe. Solutions to automate this process are presented. T.M.

N82-15925# Preussag A.G. Metall, Goslar (West Germany). Arbeitsgebiet Rohstoffe.

AN INVESTIGATION INTO THE APPLICABILITY OF THERMAL INFRARED SCANNING FOR EXPLORATION Final Report, Feb. 1981

Heribert Broicher Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 18 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-087; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 3.80

Pratt's theory of thermal inertia stripping lead to thermal inertia calculations for subsurface zones subjected to diurnal and annual temperature variations, as well as to temperatures at the zone limits. Thermal inertia mapping after separating these zones gains in importance for exploration since forebodies might cause detectable subsurface temperature anomalies. T.M.

N82-15926# AEG-Telefunken, Heilbronn (West Germany). Geschaeftsbereich Halbleiter.

OPTOELECTRONICS: MATERIALS QUALITY AND DEVICE DEVELOPMENT Final Report, Jun. 1980

Klaus Berchtold Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 46 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-093; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9.70

By using specific process modifications, different sources of degradation were separately investigated and analyzed. The investigations were carried out using GaP as a test vehicle and were later extended to other LED materials. A new degradation mechanism was discovered. Two procedures for an automatic mounting technique were developed. The simultaneous mounting technique allows a reduction of mounting time by a factor of 4. Using the one side mounting technique the wire bond processes can be omitted. A selective liquid phase epitaxy process for small area infrared emitters was developed, which makes it possible to grow GaAs layers on small isolated areas. Using a flip chip technique with the p-layer facing downwards, one side contacted monolithic 50 element arrays on transparent substrates (GaP) were developed in the colors green and orange. These arrays exhibit extremely low crosstalk. T.M.

N82-15927# Agfa-Gevaert A.G., Munich (West Germany). Phototechnik.
DEVELOPMENT OF OPTICAL PLASTICS Final Report, Oct. 1980
Helmut Duerr, Carl Heynemann, Guenter Kirchhof, and Hans Hespe (Bayer AG) Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 47 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-121; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9.90

A large range of thermoplastics with differing optical qualities is required for the calculation of new plastic lenses. Commonly-known general correlations between structure and refractive value, as well as pre-testing of over 300 compounds formed the basis for a selection of 3 product groups for optimisation. The iterative improvements made to these materials through experimental injection molding and by measuring further physical material ratings led to: a thermoplastic with n greater than 1.6; 4 thermoplastics with optical data between those of PMMA and PS or PC; and material which combines a low refractive value with relatively high optical dispersion. T.M.

N82-15928# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.
HIGH RESOLUTION X-RAY IMAGER Final Report
Hans Hartmann and Peter Predehl Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 82 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-042; ISSN-0170-1339) Avail: NTIS HC A05/MF A01

A laboratory model of a high resolution X-ray imaging detector was developed and constructed. The detector is suitable as a focal plane instrument for an X-ray telescope for astronomical observations. The detector will be used to test such telescopes in the laboratory. The X-ray photons are detected through photoconversion and secondary multiplication by two cascaded microchannel plates. Position determination is accomplished by means of a crossed grid charge collector. The operation of this detector as well as its development are described. The theory of charge division by a resistance-coupled wire grid is discu[illegible] in detail. A theory of the sensitivity of the detector for [illegible] X-rays is developed and is in good agreement with measurements. M.G.

N82-15929# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Wesseling (West Germany). Inst. fuer Physik der Atmosphaere.
THE OPTICAL RECOGNITION OF SURFACE TARGETS AS A FUNCTION OF SURROUNDING, TARGET AND OBSERVATION PARAMETERS IN AIR TO SURFACE OBSERVATIONS [DIE OPTISCHE ERFASSUNG VON LANDZIELEN IN ABHAENGIGKEIT VON UMGEBUNGS-, ZIEL- UND BEOBACHTUNGSPARAMETERN BEI BEOBACHTUNGEN LUFT-LAND]
Hans-Eberhard Hoffmann Bonn Bundesministerium der Verteidigung 1981 54 p refs In GERMAN; ENGLISH summary
(BMVG-FBWT-81-6) Avail: NTIS HC A04/MF A01; DOK-ZENTBW, Bonn DM 30

The visibility ranges 'maximum detection range' and 'maximum recognition range' were determined when observing air to ground. Both a 1.5 t truck and a Leopard 1 battle tank were used as land targets. The determination of observation values and the measurements of environmental parameters were carried out from helicopter Bell UH 1D. On the basis of the results obtained during these field tests, the influence of the following parameters on visibility ranges is shown: degree of turbidity of the atmosphere, background, illumination, direction of observation, flight altitude, environmental brightness (as environmental parameters); dimension of target, movement of target (as target parameters); and naked eye, field-glasses, light-intensifier, limitation of field of view (as observation parameters). Author

N82-15930# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Wesseling (West Germany). Inst. fuer Physik der Atmosphaere.
THE OPTICAL RECOGNITION OF SEA TARGETS AS A FUNCTION OF SURROUNDING AND OBSERVATION PARAMETERS IN AIR TO WATER OBSERVATIONS
Hans-Eberhard Hoffmann Bonn Bundesministerium der Verteidigung 1981 41 p refs In GERMAN; ENGLISH summary
(BMVG-FBWT-81-10) Avail: NTIS HC A03/MF A01; DOK-ZENTBW, Bonn DM 30

The influence of environmental and observation parameters on visibility ranges, maximum detection range, and maximum identification range were determined. The determination of the visibility ranges and the measurements of environmental parameters took place from helicopters. On the basis of the test results the influence of the following parameters on visibility ranges is shown: visual range, illumination, flight altitude, and environmental brightness as environmental parameters; and naked eye, light-intensifier, night goggles, limitation of field of view as observation parameters. T.M.

N82-15931# Photometrics, Inc., Woburn, Mass.
EVALUATION OF INFRARED SIMULATION DATA Final Report, 1 Dec. 1979 - 31 Oct. 1980
Irving L. Kofsky, Dennis P. Villanucci, and Randall B. Sluder 26 Nov. 1980 126 p refs
(Contract DNA001-80-C-0010)
(AD-A105872; PHM-04-80; DNA-5521F) Avail: NTIS HC A07/MF A01 CSCL 18/3

Sounding rocket and aircraft data on atmospheric IR/optical radiations resulting from natural and artificial inputs of energy that simulate high-altitude nuclear explosions are evaluated and interpreted. Data from the HIRIS 2 and EXCEDE spectral rockets and the 1979-80 auroral missions of AFGL's optical aircraft are addressed. Author

N82-15932# Brookhaven National Lab., Upton, N. Y. National Synchrotron Light Source.
NATIONAL SYNCHROTRON LIGHT SOURCE IN THE INFRARED REGION
Gwyn P. Williams 1981 14 p refs Presented at the 2nd Natl. Conf. on Synchrotron Radiation Instr., Ithaca, N.Y., 15-17 Jul. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030037; BNL-29884; CONF-810750-4) Avail: NTIS HC A02/MF A01

A discussion of the utilization of the national synchrotron light source (NSLS) in the 1 to 100 micron infrared spectral region is presented. A comparison is made of the respective brightness of the NSLS and of black body sources. The way in which each source may be utilized with a monochromator is discussed and comparative slit brightnesses are calculated for selected cases. DOE

N82-15933# California Univ., Livermore. Lawrence Livermore Lab.
X-RAY MICROSCOPY USING GRAZING INCIDENCE REFLECTION OPTICS
Robert H. Price 6 Aug. 1981 13 p refs Presented at the Topical Conf. on Low Energy X-ray Diagnostics, Livermore, Calif., 8-10 Jun. 1981
(Contract W-7405-eng-48)
(DE81-028160; UCRL-86046; CONF-810651) Avail: NTIS HC A02/MF A01

The Kirkpatrick-Baez microscopes are decribed along with their role as the workhorse of the X-ray imaging devices. This role is being extended with the development of a 22X magnification Kirkpatrick-Baez X-ray microscope with multilayer X-ray mirrors. These mirrors can operate at large angles, high X-ray energies, and have a narrow well defined X-ray energy bandpass. Where a large solid angle is needed, the Woelter microscope will still be necessary and the technology needed to build them will be useful for many other typs of X-ray optics. DOE

N82-15934# Sandia Labs., Albuquerque, N. Mex.
CONTINUOUSLY VARIABLE ELECTROOPTIC FILTER
J. B. Whitley, R. E. Cuthrell, and D. M. Mattox 1981 4 p refs Presented at the SPIE Intern. Symp., San Diego, Calif., 24 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025393; SAND-81-0580C; CONF-810810-7) Avail: NTIS HC A02/MF A01

A PLZT electrooptic filter being used to control the intensity of light transmitted to a video camera from samples undergoing pulsed electron beam thermal testing is discussed. This electron beam test system is part of a materials development program for fusion energy applications. During the testing, sample surface temperatures may reach 3000 C and the intense light from these pulses is potentially damaging to the camera. The use of a variable density electrooptic filter prevents this damage and provides improved image quality during rapid changes of surface temperature. DOE

N82-15935# Brookhaven National Lab., Upton, N. Y.
FINE-GRAINED HODOSCOPES BASED ON SCINTILLATING OPTICAL FIBERS
S. R. Borenstein (City College of City of New York) and R. C. Strand 1981 12 p refs Presented at CESRII Workshop, Ithaca, N.Y., 18 Jun. 1981
(Contract DE-AC02-76CH-00016)
(DE81-029316; BNL-29923; CONF-8106150-1) Avail: NTIS HC A02/MF A01

In order to exploit the high event rates at ISABELLE, it is necessary to have fast detection with fine spatial resolution. A prototype fine-grained hodoscope, the elements of which are scintillating optical fibers, is currently being constructed. The fibers were drawn from commercially available plastic scintillator which has been clad with a thin layer of silicone. It was demonstrated with one mm diameter fibers that with a photo-detector at each end, the fibers are more than 99% efficient for lengths of about 60 cm. The readout will be accomplished either with small diameter photomultiplier tubes or avalanche photodiodes (APD) used either in the linear or Geiger mode. The program of fiber development and evaluation is described. The status of the APD as a readout element is discussed, and an optical encoding readout scheme is described for events of low multiplicity. DOE

N82-15936# Brookhaven National Lab., Upton, N. Y.
APPLICATIONS OF BENT CYLINDRICAL MIRRORS TO X-RAY BEAMLINES
S. M. Heald Jul. 1981 11 p refs Presented at the 2nd Natl. Conf. on Synchrotron Radiation Instrumentation, Ithaca, N.Y., 15 Jul. 1981
(Contract DE-AC02-76CH-00016)
(DE81-029918; BNL-29940; CONF-810750-5) Avail: NTIS HC A02/MF A01

Bent cylindrical mirrors are considered as substitutes for paraboloidal and ellipsoidal mirrors in X-ray beamlines. Analytic and raytracing studies are used to compare their optical performance with the corresponding ideal elements. Particular emphasis is placed on obtaining the practical limitations in the application of bent cylinders to typical beamline configurations. DOE

N82-15937# Los Alamos Scientific Lab., N. Mex.
OPTICAL ANALYSIS AND ALIGNMENT APPLICATIONS USING THE INFRARED SMARTT INTERFEROMETER
V. K. Viswanathan, P. D. Bolen, I. Liberman (Westinghouse Research and Development Center), and B. D. Seery (TRW, Inc., Redondo Beach, Calif.) 1981 7 p refs Presented at the Conf. on Optics '81, Los Alamos, N. Mex., 6 Apr. 1981
(Contract W-7405-eng-36)
(DE81-030257; LA-UR-81-2468; CONF-810429-38) Avail: NTIS HC A02/MF A01

The possibility of using the infrared Smartt interferometer for optical analysis and alignment of infrared laser systems has been discussed previously. In this paper, optical analysis of the Gighwatt Test Facility at Los Alamos, as well as a deformable mirror manufactured by Rocketdyne, are discussed as examples of the technique. The possibility of optically characterizing, as well as aligning, pulsed high energy laser systems like Helios and Antares is discussed in some detail. DOE

N82-15938# Technische Universitaet, Munich (West Germany). Lehrstuhl fuer Allgemeine Elektrotechnik und Angewandte Elektronik.
TRANSPARENT GaAlAs LUMINESCENT DIODES FOR OPTICAL WAVELENGTH MULTIPLEXING [TRANSPARENTE GaAlAs-LUMINESZENZDIODEN FUER OPTISCHEN WELLENLAENGENMULTIPLEXBETRIEB]
W. Proebster Bonn Bundesministerium der Verteidigung 1979 69 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-79-18) Avail: NTIS HC A04/MF A01; DOKZENTBw, Bonn DM 30

Gallium aluminum arsenide light emitting diodes (LED) are evaluated. The emission wavelength is determined by the aluminum content of the active region. A multiplex transmitter unit was constructed, consisting of a GaInAs LED emitting at 1.06 microns and of a transparent GaAlAs LED. The long wavelength light signal of the GaINAs LED is coupled through the transparent GaAlAs LED into the transmission fiber by means of a short connection fiber. Since the transmission fiber is directly coupled to the GaAlAs LED, light signals of 0.8 microns and 1.06 microns are simultaneously transmitted. The light power in the transmission fiber and the modulation bandwiths of the LED's (200 Mhz for the GaInAs LED and 100 Mhz for the GaAlAs LED) allow for a high transmission capacity. Author (ESA)

N82-15939# Centre National de la Recherche Scientifique, Marseilles (France). Lab. d'Astronomie Spatiale.
THEORETICAL STUDY OF IMAGE SPOTS WITH THE WIDE FIELD CAMERA AND THE IMPLICATIONS FOR NEBULAR SPECTROGRAPHY [ETUDE THEORIQUE DES TACHES IMAGES DE LA CAMERA GRAND CHAMP ET DU SPECTROGRAPHE NEBULAIRE]
J. Y. LeGall Sep. 1981 46 p In FRENCH
(LAS-OPT.INST-03-81) Avail: NTIS HC A03/MF A01

A Schmidt camera onboard Spacelab is considered. The operating spectral domain (120 to 350 nm) necessitates an optical correction for differential aberrations in function of view angle. A computer program (CASSE-TETE) is adapted. Coefficients of asphericity for a deformed mirror are calculated. Test spectrographs were made for 66 deg field of view at various wavelengths. The program CASSE-TETE gives spot diagrams similar to mirror manufacturer ones. It is appropriate for determining the optimal position of the mirror where image spots are as small as possible. Author (ESA)

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-15940# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
SPACE-RESOLVED MEASUREMENTS OF NEUTRONS AND IONS EMITTED BY A PLASMA FOCUS [ORTSAUFGELOESTE MESSUNGEN ZUR NEUTRONEN- UND IONENEMISSION AM PLASMAFOKUS]
U. Jaeger May 1980 101 p refs In GERMAN
(IPF-80-8) Avail: NTIS HC A06/MF A01

Space-resolved measurements of neutrons and of accelerated charged particles emitted by a plasma focus device are presented. The neutron source was measured with one and two dimensional paraffin collimators. The spatial resolution is 5 mn along the axis and the radius, with a time resolution of 10 ns. In order to make quantitative statements about the neutron yield, neutron scattering, absorption, and nuclear reactions were taken into account. Part of the neutron measurement was carried out together with time and space resolved measurements of the electron density to study possible correlations between n sub e and y sub n. Author

N82-15941# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
LOWER HYBRID RF HEATING EXPERIMENTS IN THE MIT ALCATOR A, C AND VERSATOR II TOKAMAKS
M. Porkolab, J. Schuss, Y. Takase, K. I. Chen, S. Knowlton, S. Luckhardt, and S. McDermott 1980 12 p refs Presented at the 2nd Joint Varenna-Grenoble Intern. Symp. on Heating of Toroidal Plasmas, Como, Italy, 3-12 Sep. 1980
(Contract DE-AS02-78ET-53076)
(DE81-028193; CONF-800932-9) Avail: NTIS HC A02/MF A01

Experimental results on lower hybrid heating in the Alcator A and the Versator-2 Tokamaks with power levels up to 90 kW are presented. In Alcator A, a double waveguide grill, and in Versator 2, a 4 waveguide grill with arbitrary phasing are used. Also, a 6 waveguide grill experiment in Versator 2 is described which launches a traveling wave aimed at driving toroidal currents. The forthcoming lower hybrid heating experiment in Alcator C, utilizing four 4 x 4 waveguide arrays with power levels up to 4 MW, is also described. DOE

N82-15942*# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
CONSTANCE MIRROR PROGRAM: PROGRESS AND PLANS
Robert E. Klinkowstein, Michael E. Mauel, James H. Irby, Louis D. Smullin, and Steven H. Voldman 3 Mar. 1981 89 p refs
(Grant NsG-1323; Contracts DE-AC02-78ET-51013;
DE-AS02-78ET-53076; N00014-77-C-0641;
ET-78-C-02-4687; F49620-79-C-0200)
(NASA-CR-164804; DE81-029962; DOE/ET-51013/5;
PFC/RR-81-3) Avail: NTIS HC A05/MF A01 CSCL 20I

The current state of the mechanics of the Constance II experiment, the physics results gathered, the motivation background, and future plans for the Constance II experiment are reviewed. Several improvements have been made and several experimental investigations have been completed. These include the construction/installation/testing of: (1) liquid-nitrogen cooled, Ioffe bars installed, (2) a diverter coil (3) the 100 kW ICRF generator, (4) the data acquisition system, and (5) the optimum hot-iron operation of the machine with Titanium and pulsed-gas plasma guns. Measurements were made of the density, temperature, and radius of the plasma. Ion-cyclotron fluctuations were observed, their bandwidth measured, and data collected demonstrating resonance heating. New X-ray diagnostics were designed and purchased, and progress on the Thomson scattering was made. Finally, a new hot cathode gun was designed and constructed. M.D.K.

N82-15943# Wisconsin Univ., Madison. Nuclear Engineering Dept.
MAGNETIC CONFINEMENT FUSION PLASMA THEORY Annual Progress Report, 14 Ju. 1980 - 31 Dec. 1981
J. D. Callen Jul. 1981 17 p refs
(Contract DE-AC02-80ER-53104)
(DE81-029789; DOE/ET-53104/1) Avail: NTIS HC A02/MF A01

Research that concentrated on some key magnetic mirror confinement physics questions (pyrophase diffusion, alpha particle losses, and coil misalignment effects) and on a fairly comprehensive development of neoclassical transport in rippled Tokamaks and stellarators, including effects due to a boundary layer, energy smoothing, an electric field, direct particle loss and helical trapping is reported. Some minor projects on tandem mirror boundary layers, kinetic effects on rippling modes in the edge of a Tokamak, and ballooning modes in tandem mirrors, the large Octupole, and stellarators are also addressed. DOE

N82-15944# Wisconsin Univ., Madison. Plasma Physics Group.
EQUILIBRIUM AND STABILITY OF EXPERIMENTAL HIGH BETA TOROIDAL PLASMAS
S. C. Prager 1981 12 p Presented at the 23rd Ann. Meeting of the Div. of Plasma Phys. of the APS, New York, N.Y., 12-16 Oct. 1981
(Contract DE-AS02-76ET-53051)
(DE81-023610; DOE/ET-53051/24; CONF-811028) Avail: NTIS HC A02/MF A01

The beta limit to the stability of average minimum-beta plasmas remains unknown for all such confinement concepts. The strength of nonMHD effects was demonstrated in a study of the equilibrium and stability properties of high beta plasmas. A wide range of stable high beta plasmas were created from beta = approximately 8% to 35%, 2 to 9 times the single fluid ballooning instability beta limit of 4%. No beta related fluctuations were observed in magnetic field, density, or electrostatic potential. Since the critical parameter for instability onset is diamagnetic current density, not beta, the observed stability at beta = 35% may be understandable. Measurements are underway to detect the equilibrium Pfirsch-Schlueter current that flows parallel to the magnetic field. The injection of 3.8 MW of auxiliary heating (2 MW ion cyclotron heating and 1.8 MW neutral beam) to enlarge the high beta parameter space is in progress. DOE

N82-15945# Texas Univ., Austin. Dept. of Physics.
BREAKDOWN IN THE PRETEXT TOKAMAK Ph.D. Thesis
Jay F. Benesch Jun. 1981 83 p refs
(Contract DE-AS05-77ET-53042)
(DE81-029362; DOE/ET-53042/2; FRCR-226) Avail: NTIS HC A05/MF A01

Data are presented on the application of ion cyclotron resonance RF power to preionization in Tokamaks. A 0.3-3 kW at 12 MHz was applied to hydrogen and a visible discharge was obtained but no scaling of breakdown voltage was found with any parameter that was varied. A possible explanation for this, which implies that higher RF power would have been much more effective, is discussed. Finally, the investigation of the dV/dt dependence of breakdown voltage in PRETEXT, a phenomenon also seen in JFT-2 is presented. The breakdown is discussed in terms of the physics of Townsend discharges. DOE

N82-15946# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
NONLINEAR STEADY-STATE COUPLING OF LH WAVES
K. Ko and V. B. Krapchev Feb. 1981 8 p refs Presented at the 4th Topical Conf. on Radio Frequency Plasma Heating, Austin, Tex., 9 Feb. 1981
(Contract DE-AC02-78ET-51013)
(DE81-029435; DOE/ET-51013/11; PFC/RR-81-9;
CONF-810214-9) Avail: NTIS HC A02/MF A01

The coupling of lower hybrid waves at the plasma edge by a two waveguide array with self-consistent density modulation is solved numerically. For a linear density profile, the governing nonlinear Klein-Gordon equation for the electric field can be written as a system of nonlinearly modified Airy equations in Fourier k sub z space. Numerical solutions to the nonlinear system satisfying radiation condition are obtained. Spectra broadening and modifications to resonance cone trajectories are observed with increase of incident power. DOE

N82-15947# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
LH WAVE ABSORPTION BY MODE CONVERSION NEAR ION CYCLOTRON HARMONICS
K. Ko, A. Bers (REQ, Varennes, Quebec), and V. Fuchs Feb. 1981 8 p refs Presented at the 4th Topical Conf. on Radio Frequency Plasma Meeting, Austin, Tex., 9 Feb. 1981
(Contract DE-AC02-78ET-51013)
(DE81-029434; DOE/ET-51013/10; CONF-810214-8;
PFC/RR-81-8) Avail: NTIS HC A02/MF A01

Numerical studies of the dispersion relation near the lower hybrid frequency in an inhomogeneous plasma (delta n, delta T, delta B) show that portions of an incident lower hybrid wave spectrum undergo successive but partial mode conversions to warm plasma waves in the presence of ion cyclotron harmonics. Wave absorption beyond the first mode conversion occurs near an ion cyclotron harmonic where ion Landau damping is enhanced. A second order dispersion relation numerically in good agreement with the full dispersion relation in the mode conversion region is derived using the condition variation in D/variation in k = 0. The mode conversion efficiency at each confluence is evaluated by solving the corresponding differential equation. DOE

N82-15948# California Univ., Livermore. Lawrence Livermore Lab.

HYDROGEN PRODUCTION BASED ON MAGNETIC FUSION

Oscar H. Krikorian 17 Aug. 1981 7 p Presented at the Intern. Energy Agency Ann. 1 Workshop on Thermochem. Hydrogen, Julich, W. Germany, 23-25 Sep. 1981
(Contract W-7405-eng-48)
(DE81-029636; UCRL-86600; CONF-810942-1) Avail: NTIS HC A02/MF A01

A brief summary of the status of tandem mirror reactor blanket design studies as an energy source for thermochemical cycles is given. A joule-boosted decomposer concept for SO3 decomposition is discussed. Some of the details of the thermodynamics of boiling of the H2SO4 azeotrope and the enthalpy of the resulting vapor as a function of temperature are included. DOE

N82-15949# Brookhaven National Lab., Upton, N.Y. Accelerator Dept.

DESIGN OF 24.8-KW, 3.8 K CRYOGENIC SYSTEM FOR ISABELLE

D. P. Brown, M. Afrashteh, J. A. Bamberger, A. Fresco, A. P. Schlafke, W. J. Schneider, J. Sondericker, A. Werner, and K. C. Wu 1981 6 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030555; BNL-30013; CONF-810835-20) Avail: NTIS HC A02/MF A01

ISABELLE will consist of two proton accelerator/storage rings in a common tunnel. There will be 1084 superconducting magnets installed in the 3.8 km circumference tunnel. The protons will be accelerated to an energy of 400 GeV in each ring and stored for 24 hours. The two beams are counter-rotating and intersect at six places around the ring. The particles which emerge from proton interactions at these intersecting points are studied using various types of detectors. DOE

N82-15950# Brookhaven National Lab., Upton, N.Y. Accelerator Dept.

TRANSIENT RESPONSE OF A THERMAL BUFFER: A STUDY FOR ISABELLE

W. J. Schneider 1981 8 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981
(DE81-030549; BNL-30008; CONF-810835-23) Avail: NTIS HC A02/MF A01

The design and transient response of a buffer for use during cooldown of ISABELLE is discussed. Introduction of an insensitive thermal mass of the inlet of a sextant ahead of the first semiconducting magnets is considered. DOE

N82-15951# Brookhaven National Lab., Upton, N.Y. Accelerator Dept.

HEAT-LOAD MEASUREMENT OF PROTOTYPE CRYOGENIC MAGNETS AND LEADS FOR THE ISABELLE PROJECT

A. P. Werner, D. P. Brown, and W. J. Schneider 1981 8 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030550; BNL-30010; CONF-810835-24) Avail: NTIS HC A02/MF A01

A major feature in the cryogenic system development program for ISABELLE is the measurement of the heat loads of prototypical hardware. In particular, superconducting magnet assemblies, magnet power leads and magnet power lead vessels have been measured. In each of these cases it has been possible to build equipment which has a heat load equal to or less than the allowance for it in the heat load budget. DOE

N82-15952# Brookhaven National Lab., Upton, N.Y. Accelerator Dept.

MAGCOOL: THE PRODUCTION COOLING FACILITY FOR ISABELLE MAGNETS

J. A. Bamberger, M. Afrashteh, D. P. Brown, W. J. Schneider, J. H. Sondericker, and K. C. Wu 1981 8 p refs Presented at the Cryogenic Eng. Conf., San Diego, Calif., 10-14 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030554; BNL-30011; CONF-810835) Avail: NTIS HC A02/MF A01

The ISABELLE proton accelerator uses over one thousand superconducting magnets to guide the particle beams in two circular rings, 3.8 km in circumference. Prior to their installation in the tunnel, all magnets must be tested and measured at their 3.8 K operating temperature. The refrigeration system, called MAGCOOL, which accomplishes this task is described. DOE

N82-15953# Brookhaven National Lab., Upton, N. Y.

THERMAL CONDUCTIVITY MEASUREMENTS OF INSULATORS FOR FUSION BLANKETS

F. L. Horn, J. A. Fillo, and J. R. Powell 1981 5 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030028; BNL-29779; CONF-810831-50) Avail: NTIS HC A02/MF A01

Alumina-silica mat (8 lb/cu ft) varied in thermal conductivity in air and Ar from 0.06 W/m- K at 300 C to 0.22 W/m- K at 1000 C, but in He it increased to 0.24 W/m- K at 300 C and 0.54 W/m- K at 1000 C, while in steam it was about midway between these values. The carbon and graphite felts behaved similarly, but the rigid and denser (24 lb/cu ft) zirconia fiberboard exhibited superior insulating properties: 0.07 W/m- K at 300 C and 0.14 W/m- K at 1000 C in air and Ar, and 0.13 W/m- K at 300 C and 0.17 W/m- K at 1000 C in steam, but rising to 0.15 W/m- K at 300 C and 0.49 W/m- K at 1000 C in He. The lighter zirconia felt (14 lb/cu ft) in steam at 1000 C was thought to be best at 0.23 W/m- K and only 0.40 W/m- K in He at 1000 C. DOE

N82-15954# Los Alamos Scientific Lab., N. Mex.

ULTRA-HIGH-DENSITY PLASMA EXPERIMENTS: MHD SIMULATIONS

J. H. Brownell, I. R. Lindemuth, T. A. Oliphant, and D. L. Weiss Aug. 1981 6 p refs Presented at the 10th European Conf. on Controlled Fusion and Plasma Phys., Moscow, 14-19 Sep. 1981
(Contract W-7405-eng-36)
(DE81-030244; LA-UR-81-2572; CONF-810906-8) Avail: NTIS HC A02/MF A01

High density, laser initiated, gas embedded Z pinch experiments which are being performed at Los Alamos are being treated computationally using a two dimensional magnetohydrodynamic computer code. All aspects of the experiment are modeled including the laser optics system, the Marx bank/transmission line, electron avalanching, and the experimental diagnostics. Experimental observations have been reproduced very well. DOE

N82-15955# General Atomic Co., San Diego, Calif.

ALGORITHMS DEVELOPED TO OBTAIN PARTICULAR NUMERICAL SOLUTIONS TO THE IDEAL MHD EQUILIBRIUM PROBLEM

T. S. Wang and F. J. Helton Jul. 1981 31 p refs Presented at the European Workshop on the Behavior of Magnetically-Confined Plasma, Wildhaus, Switzerland, 9 Sep. 1981 Submitted for publication
(Contract DE-AT03-76eT-51011)
(DE81-029891; GA-A-16400; CONF-810947-3) Avail: NTIS HC A03/MF A01

The determination of axially symmetric magnetohydrodynamic (MHD) equilibria with free plasma-vacuum interface requires the solution of a two dimensional, elliptic, nonlinear partial differential equation. The shape of the boundary is not specified but is determined as the nonlinear response nor uniqueness of solution is guaranteed for this nonlinear elliptic free-boundary problem. In this paper we discuss algorithms developed to obtain particular numerical solution to the MHD equilibrium problem. These algorithms have been divided into two categories, those involving current initialization and those involving feedback stabilization. DOE

N82-15956# General Atomic Co., San Diego, Calif.

CURRENT DRIVEN NONIDEAL INSTABILITY IN A FORCE-FREE TOROIDAL PLASMA

M. S. Chu, F. J. Helton, J. K. Lee, R. W. Moore, J. M. Greene, and T. H. Jensen Jul. 1981 27 p refs Presented at the

European Workshop on the Behavior of Magnetically-Confined Plasmas, Wildhaus, Switzerland, 9 Sep. 1981
(Contract DE-AT03-76ET-51011)
(DE81-029892; GA-A-16418; CONF-810947-2) Avail: NTIS HC A03/MF A01

The problem of the current-driven linear instability of a general force free equilibrium has been formulated in terms of a variational problem with the vector potential as the trial function. The formalism allows A x B sub 0 not equal to 0 so that nonideal effects are modeled. The variational problem studied numerically for both infinite aspect ratio and finite aspect ratio Tokamaks. Results of these numerical studies are presented. DOE

N82-15957# General Atomic Co., San Diego, Calif.
GATO: AN MHD STABILITY CODE FOR AXISYMMETRIC PLASMAS WITH INTERNAL SEPARATRICES
L. C. Bernard, F. J. Helton, and R. W. Moore Jul. 1981 19 p refs Presented at the European Workshop on the Behavior of Magnetically-Confined Plasmas, Wildhaus, Switzerland, 9 Sep. 1981 Submitted for publication
(Contract DE-AT03-76ET-51011)
(DE81-029889; GA-A-16441; CONF-810947-1) Avail: NTIS HC A02/MF A01

The GATO code computes the growth rate of ideal magnetohydrodynamic instabilities in axisymmetric geometries with internal separatrices such as doublet and expanded spheromak. The basic method, which uses a variational principle and a Galerkin procedure to obtain a matrix eigenvalue problem, is common to the ERATO and PEST codes. A new coordinate system has been developed to handle the internal separatrix. Efficient algorithms have been developed to solve the matrix eigenvalue problem for matrices of rank as large as 40,000. Further improvement is expected using graph theoretical techniques to reorder the matrices. Using judicious mesh repartition, the marginal point can be determined with great precision. The code has been extensively used to optimize doublet and general Tokamak plasmas. DOE

N82-15958# Kernforschungsanlage, Juelich (West Germany). Inst. fuer Plasmaphysik.
AN ESTIMATE OF CONVECTION COOLING IN THE BOUNDARY LAYER OF TOROIDAL FUSION PLASMAS
G. H. Wolf Jul. 1980 18 p refs In GERMAN; ENGLISH summary
(Juel-1666; ISSN-0366-0885) Avail: NTIS HC A02/MF A01

By means of a simple model, the boundary layer plasma temperature T in toroidal fusion plasmas was estimated, supposing that the heating power transmitted to a toroidally confined plasma is eventually carried away by convective plasma flow in the boundary layer. The value of T is critical as regards plasma-wall interaction and heat loading of limiters and divertors. The boundary layer of thickness delta fills the interspace between the outermost closed magnetic surface and the first wall which encloses the plasma column toroidally. The model requires that delta is equal to or larger than (10 exp 15)/n cm, n being the average boundary plasma density. The model connects the total heating power with average values of the plasma parameters T and n in the boundary layer and of the angle epsilon which gives the direction of the plasma flow towards the wall. The values of epsilon and delta can be controlled by the field configuration of the magnetic limiter. This results in an estimate of T in front of the first wall (for epsilon xn = 10 exp 12 cm exp (-3) and using the parameters of the Tokamaks Textor and Intot, T is on the order of 10 eV or lower). Author (ESA)

N82-15959# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
A COMPILATION OF RAYLEIGH CROSS SECTIONS FOR THE LASER DIAGNOSTICS OF PLASMAS
K. Hirsch Oct. 1980 28 p refs In GERMAN; ENGLISH summary
(IPF-80-10) Avail: NTIS HC A03/MF A01

Fundamental notions of scattering, polarization, and cross sections were reviewed. The experimental scattering and detection set-up is described. Rayleigh data for nine gases were derived which are in excellent agreement with theoretical calculations. Together with established data from the literature, these results are compiled in tables and graphs of differential and total cross sections, ratio of Thomson to Rayleigh cross sections, and equivalent electron density. Author (ESA)

N82-15960# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
ENERGY ANALYSIS OF FAST IONS FROM PLASMA FOCUS DISCHARGES
A. Mozer Sep. 1980 120 p refs In GERMAN; ENGLISH summary
(IPF-80-11) Avail: NTIS HC A06/MF A01

A Thomson parabola spectrometer was developed and used for energy and mass analysis of the fast ions emitted by a plasma focus. The design of the spectrometer, the detection system using cellulose nitrate films error analysis, and the calibration and test procedure are described. Besides deuterons, results reveal the presence in the emitted flux of highly ionized impurity ions which attain energies up to 18 MeV. Their energy distribution is consistent with acceleration in an electric field reaching 4 MV/mm. The deuteron distribution is shown to depend on the filling pressure. Besides use as an intense neutron source, the plasma focus can be used as a heavy ion accelerator provided the heavy ion yield can be increased. Author (ESA)

N82-15961# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
RELATION BETWEEN NEUTRON PRODUCTION AND INSTABILITIES IN A PLASMA FOCUS [UEBER DEN ZUSAMMENHANG ZWISCHEN NEUTRONENPRODUKTION UND INSTABILITAETEN AM PLASMAFOKUS]
B. Rueckle Jan. 1981 100 p refs In GERMAN
(IPF-81-1) Avail: NTIS HC A05/MF A01

The macroscopically recognizable circumstances and requirements for a strong neutron emission from a plasma focus were experimentally studied. It was necessary to simultaneously employ many diagnostic techniques with high space and time resolution. A ten channel N2 laser interferometer was developed for the investigation of plasma density is described. Magnetic probes and scintillator multipliers were also used. Neutron and X-ray emissions are connected with the m = o (m = azimuthal periodicity) pinch instabilities at the end of the discharge. The relation of neutron production to the m = o instability is examined. Detail observations show that neutron production is most probably due to a beam-target mechanism. Due to microinstabilities, the plasma resistance is abnormally high during reexpansion after m = o instabilities and concomitant deuteron production is observed. Author (ESA)

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

N82-15962# Washington Univ., St. Louis, Mo. Semiconductor Research Lab.
THE 2-4-52 CHALCOPYRITES FOR HIGH SPEED DEVICES Annual Report, 1 Jun. 1980 - 31 May 1981
C. M. Wolfe, G. A. Davis, and S. Julie Hsieh 31 Jul. 1981 48 p refs
(Grant AF-AFOSR-0096-79; AF Proj. 2306)
(AD-A106107; Rept-59457-3; AFOSR-81-0646TR) Avail: NTIS HC A03/MF A01 CSCL 20/2

An open-tube, sliding-boat, liquid-phase system has been used to grow ZnxCd(1-x)SnP2 epitaxially on InP substrates. X-ray diffraction measurements indicate that this alloy grows on (100) substrates with the lattice-matched a-axis in the growth plane and the c-axis in the growth direction. Unintentionally-doped layers have electron concentrations as high as 3 time 10 to the -19th power cu cm with mobility values of about 2,000 sq cm/V sec. These mobility values are substantially larger than have been obtained in the equivalent III-V materials at similar concentrations. Attempts to grow ZnGeAs2 epitaxially on GaAs substrates with a Zn-Ge-AsCl3 and a Zn-GeCl4-Ge-As4 vapor-phase system have met with little success. Although the first system gives good control over the As flux and the second over Ge, reproducible results have not been achieved in either system. Our experience with these methods, however, indicates that most of the reproducibility problems can be overcome with a Zn-GeCl4-AsCl3 reactor. We are currently investigating this method. Calculations are presented on the I-V characteristics of a space-charge limited diode. If the electrons exhibit inertial motion (are not scattered), then they will quickly reach nonparabolic regions of the conduction band. When this nonparabolicity is taken into account, the current appears ohmic rather than exhibiting a V to the 3/2 power behavior, as has been previously supposed. GRA

N82-15963# Washington Univ., St. Louis, Mo. Semiconductor Research Lab.
IMPURITY AND DEFECT INTERACTIONS IN GaAs Annual Technical Report, 1 Aug. 1980 - 31 Jul. 1981
C. M. Wolfe, P. A. Fedders, G. E. Stillman, Camellia M. L. Yee, and R. T. Green 30 Sep. 1981 50 p refs
(Contract N00014-80-C-0762; RR0210203)
(AD-A106106; Rept-64422-1) Avail: NTIS HC A03/MF A01 CSCL 20/2

The construction of an epitaxial reactor to examine the basic aspects of complex formation in GaAs has been completed. This reactor is designed to simultaneously dope the growing layer with a donor impurity and Cr and/or O so that impurity interaction regions are obtained in the same sample. We are currently calibrating this system for several dopants. The redistribution of Cr during the annealing of uniform and ion-implanted bulk samples has been examined. Preliminary results indicate that the Cr build-up at the surface can be modified by applying an electric field to the surface during the annealing process. With the availability of high-purity GaAs from a variety of epitaxial growth techniques, improved donor identifications have been made by far infrared photoconductivity measurements. Samples grown by AsCl3-H2 VPE, AsCl3-N2 VPE, AsH3 VPE, LPE, MBE, and MOCVD have been examined and the common residual donors have been identified. GRA

N82-15964# University of Southern California, Los Angeles. Dept. of Chemistry.
PREPARATION AND MOLECULAR AND CRYSTAL STRUCTURE OF TRANS-R.S.-(Cr(2, 3, 2-TET)(NCS)2) NCS
Helmut R. Maeecke, Bernard F. Mentzen, Jean Pierre Puax, and Arthur W. Adamson 17 Sep. 1981 33 p refs Submitted for publication
(Contract N00014-76-C-0548; NR Proj. 051-601)
(AD-A105595; TR-17) Avail: NTIS HC A03/MF A01 CSCL 07/3

The complex Cr(2,3,2-tet)(NCS)2 NCS was prepared by a route expected to yield the cis form, namely by stereoretentive substitution of thiocyanate for chloride in cis-Cr(2,3,2-tet) Cl2(+). Crystal structure determination shows however, that it is the trans-isomer that actually is obtained. The structure determination was by X-ray single crystal analysis. The thiocyanate complex crystallizes in the monoclinic p sub 2 lc space group with a = 8.153 (2), b = 15.556 (2), and c = 14.175 (2) a, and dot beta = 99.84 (2). There are four formula units per unit cell. The structure was solved by the heavy-atom method, and full-matrix least squares refinement led to a final value of the R(R sub w) index of 0.0295 (0.0332) based on 2380 unique reflectors. The chromium atom is hexacoordinated and the six nitrogen atoms form a slightly distorted octahedron with a nearly planar CrN4 unit. The use of visible and infrared spectroscopy for isomer identification is discussed for the case of thiocyanate containing metal amine complexes. GRA

N82-15965# Naval Postgraduate School, Monterey, Calif.
A STUDY OF THE UNIPOLAR ARCING DAMAGE MECHANISM ON SELECTED CONDUCTORS AND SEMICONDUCTORS M.S. Thesis
Franklin Terrence Ryan and Stephen Tucker Shedd Jun. 1981 125 p refs
(AD-A105791) Avail: NTIS HC A06/MF A01 CSCL 20/12

A broad investigation, experimental and theoretical, of the mechanism of unipolar arcing has been conducted. A theoretical discussion of existing unipolar arc models is presented. Experimental and theoretical evidence is used to support the Schwirzke-Taylor Model at the expense of other models. Three current models of arc motion are examined and refuted. Experimental results show that Aluminum and various steels arc heavily, Molybdenum and Nickel to a lesser extent, and commercially prepared metallic glasses not at all. The semi-conductors showed some arcing on Germanium but none on Silicon. Experiments showed that grain boundaries play no significant role in unipolar arc initiation. Experiments were conducted in which a laser produced metallic glass is exposed to the plasma produced by the same laser pulse. The results are used to refute the microwhisker explosion models of unipolar arc initiation. GRA

N82-15966# State Univ. of New York, Stony Brook. Dept. of Physics.
POSSIBLE APPLICATIONS OF THE STEERING OF CHARGED PARTICLES BY BENT SINGLE CRYSTALS
R. A. Carrigan, Jr. (Fermi National Accelerator Lab.), W. M. Gibson, C. R. Sun, and E. N. Tsyganov (Joint Inst. for Nuclear Research, Moscow) Batavia, Ill. Fermi National Accelerator Lab. 1981 14 p refs Presented at the 9th Intern. Conf. on Atomic Collisions in Solids, Lyon, 6-10 Jul. 1981
(Contract DE-AC02-76CH-03000)
(DE81-028601; FERMILAB-CONF-81-50-EXP; CONF-810728-5) Avail: NTIS HC A02/MF A01

Some aspects of the steering of charged particles using channeling in bent crystals are reviewed. Crystal angular and spatial acceptance, deflection dechanneling, and radiation damage are discussed. Examples of possible bent transport, focusing, the possibility of charm particle separated beams, and magnetic moment determination. DOE

N82-15967# California Univ., Berkeley. Lawrence Berkeley Lab.
SMALL-ANGLE X-RAY SCATTERING SYSTEM WITH LINEAR POSITION-SENSITIVE DETECTOR
A. R. Forouhi, B. Sleaford, V. Perez-Mendez, D. deFontaine, and J. R. Fordor (Spectrolabs, Inc., Sylmar, Calif.) Apr. 1981 11 p refs Presented at the IEEE Symp. on Nucl. Sci., San Francisco, 21-23 Oct. 1981
(Contract W-7405-eng-48; Grant NSF DMR-79-20405)
(DE81-021920; LBL-12587; CONF-811012-1) Avail: NTIS HC A02/MF A01

A linear position-sensitive detector has been constructed for use in small-angle X-ray scattering experiments. It is a one dimensional, pressurized gas-filled detector with a delay line read out. Calculated efficiency of the detector at 8.04 keV and 45 psi for ArCH4 filling is 60%, and for Xe-CO2 filling is 90% limited only by the thickness of the entrance beryllium window. Inherent reslution of the detector is 0.1 mm for normal incident X-rays. The overall resolution of the detection system is determined by the width and angular divergencies of the point collimated CU K/sub alpha/ beam used in the experiment. The performance of the system is described in terms of measurements on Al-Zn alloy samples. DOE

N82-15968# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
DEPOPULATION RATES FOR COMBUSTION-RELATED SPECIES IN LONG-LIVED VIBRATIONALLY OR ELECTRONICALLY EXCITED LEVELS Technical Progress Report, 15 Jan. - 15 Jul. 1981
Robert W. Field and James L. Kinsey 1981 9 p refs
(Contract DE-AC02-81ER-10831)
(DE81-030042; DOE/ER-10831/1) Avail: NTIS HC A02/MF A01

Measures of molecular properties and the techniques and instrumentation used to obtain them are considered. The feasibility of using stimulated emission pumping to study the intramolecular and intermolecular energy redistribution processes is examined. Laser induced fluorescence from an acetylene is discussed. DOE

N82-15969# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
EFFECTS OF REAGENT TRANSLATIONAL AND VIBRATIONAL ENERGY ON THE DYNAMICS OF ENDOTHERMIC REACTIONS
D. Krajinovich, Z. Zhang, F. Huisken, Y. R. Shen, and Y. T. Lee Jul. 1981 15 p refs Presented at the 12th IPEAC Intern. Conf. on the Phys. of Electron. and Atomic Collisions, Gatlinburg, Tenn., 15-22 Jul. 1981

(Contract W-7405-eng-48)
(DE81-028122; LBL-12982; CONF-810754-1) Avail: NTIS HC A02/MF A01

The endothermic reactions Br + CH3I yields CH3 + IBr (delta H sub zero = 13 kcal/mole) and Br + CF3I yields CF3 + IBr (delta H sub zero = 11 kcal/mole) were studied by the crossed molecular beams method. Detailed center of mass contour maps of the IBr product flux as a function of recoil velocity and scattering angle are derived. For both systems it is found that the IBr product is sharply backward scattered with respect to the incident Br direction, and that most of the available energy goes into product translation. Vibrational enhancement of the Br + CF3I reaction was investigated by using the infrared multiphoton absorption process to prepare highly vibrationally excited CF3I. At a collision energy of 31 kcal/mole (several times the barrier height), reagent vibrational energy appears to be less effective than an equivalent amount of (additional) translational energy in promoting reaction. More forward scattered IBr is produced in reactions of Br with vibrationally hot CF3I.
DOE

N82-15970# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

INTEGRAL-CAPTURE MEASUREMENTS AND CROSS-SECTION ADJUSTMENTS FOR Nd, Sm, AND Eu

R. A. Anderl, F. Schmittroth (Hanford Engineering Development Lab.), and Y. D. Harker Jul. 1981 113 p refs
(Contract DE-AC07-76ID-01570)
(DE81-029635; EGG-PHYS-5182) Avail: NTIS HC A06/MF A01

Integral capture reaction rates are reported for Nd 143, Nd 144, Nd 145, Sm 147, Es 151, Eu 152, Eu 153 and Eu 154 irradiated in different neutron spectra in EBR. These reaction rates are based primarily on mass spectrometric measurements of the isotopic atom ratios of the capture product to the target nuclide. The neutron spectra are characterized using passive neutron dosimetry and spectrum unfolding with the FERRET least squares data analysis code. Reaction rates for the neutron spectrum monitors were determined by the radiometric technique using Ge(Li) spectrometers. The integral data for the rare earth samples and for the spectrum monitors were used in multi-group flux/cross sections adjustment analyses with FERRET to generate adjustments to 47 group representations of the ENDF/B-IV capture cross sections for the rare earth isotopes.
DOE

N82-15971# Oak Ridge National Lab., Tenn. Solid State Div.

IN-SITU ELECTRON MICROSCOPE FRACTURE STUDIES OF AMORPHOUS FILMS

S. Kobayashi and S. M. Ohr 1981 9 p refs Presented at the 4th Intern. Conf. on Rapidly Quenched Metals, Sendai, Japan, 24 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028141; CONF-810851-2) Avail: NTIS HC A02/MF A01

The in-situ electron microscope fracture technique is described. It was used to observe directly the propagation of cracks and the structure of the plastic zone ahead of the crack tip of amorphous films of niobium oxide.
L.F.M.

N82-15972# California Univ., Berkeley. Lawrence Berkeley Lab.

PRODUCTION AND DESTRUCTION OF D(-) BY CHARGE TRANSFER IN METAL VAPORS

A. S. Schlachter Jun. 1981 27 p refs Presented at the Joint Workshop on Negative Ions, Mexico City, 1-4 Apr. 1981
(Contract W-7405-eng-48; Grant NATO-172.80)
(DE81-028134; LBL-12995; CONF-810442-4) Avail: NTIS HC A03/MF A01

Experimental studies of D(-) collisions are of interest for basic physics, where experimental results can be used to test theoretical models for charge transfer, and for applications to ion sources for accelerators and for heating magnetically confined plasmas of interest for fusion. The high D(-) yield from charge transfer in a thick cesium-vapor target is consistent with recent cross section calculations and measurments. Recent theoretical calculations of cross sections in thick alkaline earth vapor targets, leading to prediction of a large D(-) yield at low energy, have been partially confirmed in recent measurments, in which a D(-) yield of 50% was observed at a D energy of 500 eV.
DOE

N82-15973# California Univ., Berkeley. Lawrence Berkeley Lab.

LOW TEMPERATURE DIFFUSION OF POSITIVE MUONS IN COPPER

C. W. Clawson, K. M. Crowe, S. E. Kohn, S. S. Rosenblum, C. Y. Huang, J. L. Smith, and J. H. Brewer 1981 10 p refs Presented at the 16th Intern. Conf. on Low Temperature Phys., Los Angeles, 19-25 Aug. 1981 Prepared in cooperation with LASL and British Columbia Univ.
(Contract W-7405-eng-36)
(DE81-030255; LA-UR-81-2473; CONF-810809-17) Avail: NTIS HC A02/MF A01

Measurement of the depolarization of positive muons in copper in zero external field shows that the hopping rate of the muons increases as the temperature decreases from 4.2 K to approximately 1K. An unambiguous demonstration of muon diffusion behavior which is not thermally activated.
DOE

N82-15974# Oak Ridge National Lab., Tenn. Solid State Div.

ELECTRICAL PROPERTY STUDIES OF OXYGEN IN CZOCHRALSKI-GROWN NEUTRON-TRANSMUTATION-DOPED SILICON

J. W. Cleland and N. Fukuoka (Osaka Univ., Japan) Oct. 1980 30 p refs Presented at the 3rd Intern. Conf. on NTD-Silicon, Copenhagen, 27 Aug. 1980
(Contract W-7405-eng-26)
(DE81-028143; CONF-800877-3) Avail: NTIS HC A03/MF A01

Electrically active oxygen-related donors can be formed in Czochralski (Cz) Si either during crystal growth or during subsequent heat treatment. The carrier concentration of Cz and neutron transmutation doping (NTD) Cz Si samples was determined as a function of the initial dopant, oxygen, and P concentration before and after isothermal or isochronal annealing. Low temperature 350 C to 500 C heat treatment can introduce a significant oxygen donor concentration in Cz Si and in NTD Cz Si that contains radiation-induced lattice defects. Intermediate temperature (550 C to 750 C) heat treatment to remove oxygen donors or lattice defects, can introduce other oxygen donors. Extended (20 h) high-temperature 1000 C to 1200 C annealing can remove oxygen donors and lattice defects. Results suggest that oxygen-related donor formation in NTD Cz Si at temperatures below 750 C may serve to mask any annealing study of lattice defects. Annealing for 30 min at 750 C is sufficient to remove radiation damage in NTD Cz Si when the separate effects of oxygen donor formation are included.
M.D.K.

N82-15975# Sandia Labs., Albuquerque, N. Mex.

RECENT ADVANCES IN THE STUDY OF STRUCTURAL PHASE TRANSISTORS AT HIGH PRESSURE

G. A. Samara 1981 8 p refs Presented at the Conf. on High Pressure Phys., Bad Honnef, W. Germany, Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030206; SAND-81-1151C; CONF-810828-6) Avail: NTIS HC A02/MF A01

The role of pressure in the study and understanding of some structural phase transitions in solids is discussed. Results on a number of crystals exhibiting displative, order-disorder and cooperative Jahn-Teler transitions are presented. The occurrence of each type of these transitions is determined by a balance between competing interactions, and pressure alters this balance and allows tests of our understanding of the physical phenomena involved. Some emphasis is on displacive transitions especially with regard to incommensurate structures and the behavior near the so called displacive limit. This limit is the special case where the transition temperature T/sub c/ = 0 K. As T/sub C/ decreases and approaches 0 K quantum effects can be expected to come into play. Pressure turns out to be an excellent variable to study the crossover from classical to quantum behavior expected on approaching the displacive limit.
DOE

N82-15976# Brookhaven National Lab., Upton, N. Y.

SLOW POSITRONS IN THE STUDY OF SURFACE AND

NEAR-SURFACE DEFECTS
K. G. Lynn 1981 54 p refs Presented at the Intern. School of Phys. Position in Solids Conf., Lake Como, Italy, 14 Jul. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030027; BNL-29798; CONF-810756-1) Avail: NTIS HC A04/MF A01

A general theoretical model is presented which includes the probability of a positron diffusing back to the surface after implantation, and thermalization in samples containing various defects. This model incorporates surface state and thermal desorption from this state, as well as reflection back into the bulk. With this model vacancy formation enthalpies, activation energies of positrons from surface states, and specific trapping rates are deduced from the positronium fraction data. An amorphous Al/sub x/O/sub y/ overlayer on Al is discussed as an example of trapping in overlayers. In well-annealed single crystal samples, the positron is shown to be freely diffusing at low temperatures, whereas in a neutron-irradiatied Al single crystal sample the positron is localized at low positron binding energy defects presumably created during irradiation. DOE

N82-15977# Brookhaven National Lab., Upton, N. Y.
PHASE TRANSITIONS AND VARIANT ACTIONS IN LATTICE GAUGE THEORY
Michael Creutz Jun. 1981 12 p refs Presented at the Workshop on Nonperturbative Studies in Quantum Chromodyn., Providence, 19-20 Jun. 1981
(Contract DE-AC02-76CH-00016)
(DE81-029324; BNL-29823; CONF-8106146-1) Avail: NTIS HC A02/MF A01

Unexpected phase structure in four dimensional lattice gauge theory based on the groups SO(3) and SU(5) have prompted studies of variations on the Wilson action for SU(2). A rich phase structure related to the decomposition of SU(2) into SO(3) and Z2 is found. The scale of asymptotic freedom has a dramatic dependence on the choice of lattice action. DOE

N82-15978# Brookhaven National Lab., Upton, N. Y.
NEUTRON SCATTERING STUDIES OF QUASI ONE- AND TWO-DIMENSIONAL HYDROGEN-BONDED FERROELECTRICS
R. W. Youngblood 1981 9 p refs Presented at the 5th Intern. Meeting on Ferroelec., University Park, Penn., 17 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030334; BNL-30004; CONF-810863-2) Avail: NTIS HC A02/MF A01

Neutron scattering studies of cooperative ordering in the hydrogen bond networks of stannous chloride dihydrate, copper formate tetrahydrate, and cesium dihydrogen phosphate are reviewed. In each case, there is an interesting nontrivial comparison to be made with an exactly solvable lattice model. DOE

N82-15979# Technische Universitaet, Brunswick (West Germany). Inst. fuer Geophysik und Meteorologie.
ANALYTICAL AND NUMERICAL MODEL EXPERIMENTS CONCERNING THE PHYSICS OF ROCK SALT FORMATION Ph.D Thesis - Carolo-Wilhelmina Tech. Univ., [ANALYTISCHE UND NUMERISCHE MODELLEXPERIMENTE ZUR PHYSIK DER SALZSTOCKBILDING]
Wolf-Dieter Woidt 1980 157 p refs In GERMAN
(Gamma-38) Avail: NTIS HC A08/MF A01

With the solution of the Rayleigh-Taylor instability for a multilayer case with arbitrary initial perturbation, a model was developed for the calculation of the plume phase of a natural salt structure (Northern Schleswig-Holstein, FRG). The geophysical parameters of this model were reconstructed, using geological findings and measurements. In order to calculate the dynamics of the diapiric phase, a simple two-layer model for arbitrary material boundary forms was numerically solved, using the finite element method. Good predictions of growth shape result. Author (ESA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-15980# Oak Ridge National Lab., Tenn.
CONTINUUM CAPTURE IN THE THREE-BODY PROBLEM
Ivan A. Sellin 1980 34 p refs Presented at the 7th Intern. Conf. on Atomic Phys., Cambridge, Mass., 4 Aug. 1980 Prepared jointly with Tennessee Univ., Knoxville
(Contract W-7405-eng-26)
(DE81-025467; CONF-8008120-1) Avail: NTIS HC A03/MF A01

The three body problem, especially the problem of electron capture to the continuum in heavy particle collisions is reviewed. Major topics covered include: second Born induced asymmetry in electron capture to the continuum; historical context, links to other tests of atomic scattering theory; experiments characterizing the velocity distribution of electronic components code electrons; other atomic physics tests of high velocity Born expansions, atom capture; capture by positrons; and pion capture to the continuum. DOE

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-15981# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
GRAD: A TOOL FOR PROGRAM ANALYSIS AND PROGRESS MONITORING
Winifred W. S. Yen and J. Dennis Lawrence Jun. 1981 5 p refs Presented at the Ann. Meeting of the Geothermal Resources Council, Houston, Tex., 25-29 Oct. 1981
(Contract W-7405-eng-48)
(DE81-028098; LBL-12820; CONF-811015-14) Avail: NTIS HC A02/MF A01

The development and operation of the Geothermal Resource Areas Database (GRAD) is described. The data base was created as part of the National Geothermal Progress Monitor System in 1979. The data base is organized around the concept of a geothermal area and provides broad coverage of geothermal development activities in the United States. Sixteen records, covering pre-lease, lease, and post-lease activities are defined for each area. Data collected in the various subject areas are critically evaluated, and then entered into an on-line interactive computer system. The system is publicly available for retrieval and use. DOE

N82-15982# Oak Ridge National Lab., Tenn.
ROLE OF ENGINEERING JUDGEMENT AND THE COMPUTER IN THE MANAGEMENT OF MATERIAL PROPERTY DATA
M. K. Booker 1980 5 p Presented at the ASMB Century 2 Emerging Technol. Conf., San Francisco, 13-14 Aug. 1980
(Contract W-7405-eng-26)
(DE81-028630; CONF-800804-43) Avail: NTIS HC A02/MF A01

The considerations involved in development of a successful computer based data system include: (1) several specialized systems are preferred to a single all encompassing system; (2) the system should be directed by materials experts, but should utilize computer experts; (3) all aspects of the system should emphasize flexibility; (4) an on line master file should be maintained with off line backup files; (5) characterization of data should take precedence over volume of data; (6) accuracy of input data should take precedence even over characterization, an interactive, on line textural numerical search and retrieval program is needed; and (7) the system should be a dynamic data management tool, not a passive repository for data flexible capabilities for analysis and display of data are essential. DOE

N82-15983# General Accounting Office, Washington, D. C. Procurement, Logistics, and Readiness Div.

FEDERAL RECORDS MANAGEMENT: A HISTORY OF NEGLECT

24 Feb. 1981 47 p refs
(PB81-237133; PLRD-81-2) Avail: NTIS HC A03/MF A01 CSCL 05A

Progress overcoming records management problems under the new legislation, the paperwork reduction act, was assessed. Serious deficiencies with records management have existed for years among Federal Government agencies. The National Archives and Records Service improving management oversight, and the Paperwork Reduction Act was enacted in 1980. The act imposes broad policy setting and oversight responsibilities on the Office of Management and Budget and requires reports to the Congress on agency information management activities.GRA

N82-15984# Dayton Univ., Ohio. Research Inst.

THE INFLUENCE OF AERONAUTICAL R&D EXPENDITURES UPON THE PRODUCTIVITY OF AIR TRANSPORTATION Final Report, 1926-1976

Ralph C. Lenz, John A. Machnic, and Anthony W. Elkins Jul. 1981 248 p refs
(Grant NSF SRS-79-10397)
(PB81-247140; UDR-TR-81-72; NSF/SIU-81-1) Avail: NTIS HC A11/MF A01 CSCL 05A

The impact which aeronautical R&D expenditures have had upon productivity growth in the air transportation industry over the 50-year period from 1926 to 1976 is examined. Quantitative analyses of the returns on U.S. investments in aeronautical R&D show that the net gains from such investments are very large in comparison with standard commercial opportunities during the same period. The gains were distributed primarily to the traveling public and, to a lesser extent, to the airline employees. Author

N82-15731*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

MANAGEMENT, PLANNING, AND IMPLEMENTATION OF MEDICAL OPERATIONS

Norman Belasco *In its* STS-1 Med. Rept. Dec. 1981 p 99-110
(For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 05A

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N82-15985* National Aeronautics and Space Administration, Washington, D. C.

INDEX TO NASA NEWS RELEASES AND SPEECHES, 1980

1981 131 p
Avail: NTIS HC A07/MF A01 CSCL 05B

A listing is provided of 201 news releases distributed by the Office of Public Affairs, NASA Headquarters and 10 selected speeches presented by Headquarters staff in 1980. Subject and name indexes are arranged alphabetically. Indexes to titles, news release numbers and accession numbers are arranged numerically. A.R.H.

N82-15986*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

TECHNICAL COMMUNICATION. PERSPECTIVES FOR THE EIGHTIES, PART 2

J. C. Mathes, comp. (Michigan Univ., Ann Arbor) and Thomas E. Pinelli, comp. Dec. 1981 316 p refs Papers presented at the 32nd Ann. Meeting of the Conf. on Coll. Composition and Commun., Dallas, 26-28 Mar. 1981 2 Vol.
(NASA-CP-2203-Pt-2; L-14899) Avail: NTIS HC A14/MF A01 CSCL 05B

The importance of technical writing as a separate discipline is suggested. Some specific areas addressed were: technical writing skills industry needs, definitions of technical writing, the hows and whys of inhouse writing, and the nature of the composing process in technical comunication. For individual titles, see N82-15987 through N82-15998.

N82-15987*# McDonnell-Douglas Corp., St. Louis, Mo.

SOME TECHNICAL WRITING SKILLS INDUSTRY NEEDS

F. R. Smith *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 335-341 (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

It is suggested that engineers and other technical students be taught three classes of skills in technical writing. First, 'Big Picture Things', which includes: the importance of clear writing, the wide scope of writing, the wide scope of writing tasks that will be faced in industry, and the principles of organization of technical materials such as: how to analyze, classify, partition, and interpret. Second, 'Writing Procedures', which encompasses: how to get words on paper efficiently and team-write. Third, 'Writing Details', in which two considerations are important: how to achieve precision in the use of language and the aspects of style. Three problems in style are cited: the problem of sentence transition, overuse of attributive adjectives, and verbosity in paragraph structure. The most important thing in technical writing is considered to be functionality, economy and clarity. M.D.K.

N82-15988*# Communication Support Services, Inc., Bedford, Tex.

TECHNICAL WRITING VERSUS TECHNICAL WRITING

J. W. Dillingham *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 343-348 refs (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

Two terms, two job categories, 'technical writer' and 'technical author' are discussed in terms of industrial and business requirements and standards. A distinction between 'technical writing' and technical 'writing' is made. The term 'technical editor' is also considered. Problems inherent in the design of programs to prepare and train students for these jobs are discussed. A closer alliance between industry and academia is suggested as a means of preparing students with competent technical communication skills (especially writing and editing skills) and good technical skills. M.D.K.

N82-15989*# Ethyl Corp., Detroit, Mich.

WHYS AND HOWS OF IN-HOUSE WRITING

John C. Lane *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 349-354 (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The combining of requisite technical knowledge with requisite writing ability is addressed. Considerations in the development of in-house writing courses, in-plant training, are presented and evaluated. Specific problems in past methodology are also detailed. It is suggested that teachers of technical writing should be technical people themselves, preferably with working experience in industry or business; the training provided should be user-oriented, not theory oriented. M.D.K.

N82-15990*# Ohio State Univ., Wooster. Agricultural Technical Inst.

TECHNICAL WRITING PRACTICALLY UNIFIED THROUGH INDUSTRY

Linda S. Houston *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 369-383 refs (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

General background details in the development of a university level technical writing program, based upon the writing tasks of the student's occupations, are summarized. Objectives and methods for unifying the courses of study with the needs of industry are discussed. Four academic course divisions, Industries Technologies, in which preparation and training are offered are: Animal, Horticulture, Agriculture, and Agricultural Business. Occupational competence is cited as the main goal for these programs in which technical writing is to be practically unified through industry. Course descriptions are also provided. M.D.K.

N82-15991*# New Mexico State Univ., Las Cruces. Dept. of English.

THE COMPOSING PROCESS IN TECHNICAL COMMUNICATION

Roger E. Masse *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 387-399 refs (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The theory and application of the composing process in technical communications is addressed. The composing process of engineers, some implications for composing research for the teaching and research of technical communication, and an interpretation of the processes as creative experience are also discussed. Two areas of technical communications summarized concern: the rhetorical features of technical communications, and the theoretical background for a process-based view, a problem-solving approach to technical writing. M.D.K.

N82-15992*# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Language, Literature, and Communication.

A CASE STUDY OF THE INFLUENCES OF AUDIENCE AND PURPOSE ON THE COMPOSING PROCESSES OF AN ENGINEER

Bonny J. Stalnaker *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 401-411 refs (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The design and preliminary findings of a study of composing processes (on the job) of engineers, managers, and scientists is presented. The influences of audience and purpose on the composing process of engineers was of concern; specifically, the cognitive processes, physical behaviors, and factors that influence the evoluton of a piece of writing. An overview of the study, related literature, outlines of research design, and preliminary findings from a case study of engineers are given. It is suggested that teaching be adapted to help students learn to represent rhetorical problems to guide composing for effective writing. M.D.K.

N82-15993*# University of Southern Illinois at Carbondale.

THE COMPOSING PROCESS IN TECHNICAL COMMUNICATIONS

Vivienne Lucas Hertz *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 423-433 refs (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The theoretical construct under which technical writing exercises operate and results from a survey distributed to a random sample of teachers of technical writing are described. The survey, part of a study to develop materials that did not stress prescriptive formats, drew on diverse elements in report writing to enhance writing as a process. Areas of agreement and disagreement related to problem solving, paper evaluation, and individualizing instruction were surveyed. Areas of concern in contemplating the composition process include: (1) the need to create an environment that helps students want to succeed, (2) the role of peer group activity in helping some students who might not respond through lecture or individual study, and (3) encouraging growth in abilities and helping motivate students' interest in writing projects through relevant assignments or simulations students perceive as relevant. N.W.

N82-15994*# Iowa State Univ. of Science and Technology, Ames.

USING SENTENCE COMBINING IN TECHNICAL WRITING CLASSES

M. Rosner and T. Paul *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 527-534 refs (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

Sentence combining exercises are advanced as a way to teach technical writing style without reliance upon abstractions, from which students do not learn. Such exercises: (1) give students regular writing practice; (2) teach the logic of sentence structure, sentence editing, and punctuation; (3) paragraph development and organization; and (4) rhetorical stance. Typical sentence, paragraph, and discourse level sentence combining exercises are described. N.W.

N82-15995*# Rensselaer Polytechnic Inst., Troy, N. Y.

TEACHING AUDIENCE ANALYSIS TO THE TECHNICAL STUDENT

M. B. Debs and L. V. Brillhart (Triton Coll., River Grove, Ill.) *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 537-542 refs (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

Teaching audience analysis, as practiced in a technical writing course for engineering students, is discussed. Audience analysis is described as the task of defining the audience for a particular piece of writing and determining those characteristics of the audience which constrain the writer and effect reception of the message. A mature technical writing style that shows the tension produced when a text is written to be read and understood is considered in terms of audience analysis. Techniques include: (1) conveying to students the concept that a reader with certain expectations exist, (2) team teaching to preserve the context of a given technical discipline, and (3) assigning a technical report that addresses a variety of readers, thus establishing the complexity of audience oriented writing. N.W.

N82-15996*# Oklahoma Univ., Norman.

THE COMPOSING PROCESS OF TECHNICAL WRITERS: A PRELIMINARY STUDY

David Mair and Nancy Roundy (Iowa State Univ. of Science and Technology) *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 543-549 (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The assumption that technical writers compose as do other writers is tested. The literature on the composing process, not limited to the pure or applied sciences, was reviewed, yielding three areas of general agreement. The composing process (1) consists of several stages, (2) is reflexive, and (3) may be mastered by means of strategies. Data on the ways technical writers compose were collected, and findings were related to the three areas of agreement. Questionnaires and interviews surveying 70 writers were used. The disciplines represented by these writers included civil, chemical, agricultural, geological, mechanical, electrical, and petroleum engineering, chemistry, hydrology, geology, and biology. Those providing consulting services, or performing research. No technical editors or professional writers were surveyed, only technicians, engineers, and researchers whose jobs involved composing reports. Three pedagogical implications are included. N.W.

N82-15997*# Minnesota Univ., St. Paul. Dept. of Rhetoric.

ANALOGICAL ACTS AS CONCEPTUAL STRATEGIES IN SCIENCE, ENGINEERING AND THE HUMANITIES

Victoria M. Winkler *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 559-568 refs (For primary document see N82-15986 06-82)
Avail: NTIS HC A14/MF A01 CSCL 05B

The composing models which operate by means of analogy are identified. The importance of analogical acts in the prewriting stage of the composing process is discussed. The relations between analogical acts and concept formation are explored. A basic correspondance between the analogical thinking employed in successful learning and analogical thinking as a composing strategy is discussed. Teaching analogical acts as conceptual strategies for exploring problems and generating the form and content of discourse is presented in support of the contention that writing is a unique mode of learning. N.W.

N82-15998*# Rice Univ., Houston, Tex.
TRENDS IN LIABILITY AFFECTING TECHNICAL WRITERS
L. P. Driskill *In* NASA. Langley Research Center Tech. Commun., Pt. 2 Dec. 1981 p 597-606 refs (For primary document see N82-15986 06-82)
Avail: NTIS HC A74/MF A01 CSCL 05B

Liability of technical writers for defective products is explored. Documents generated during a product's life cycle (including design memos, design tests, clinical trials, trial use reports, letters, and proposals) become relevant because they are likely to become the only available means of showing that the product was not defectively designed. These documents become the evidence that the product underwent balanced and well considered planning, development, testing, quality control, and field testing. The predicted increased involvement of technical writers in the prevention and defense of product liability claims is cited in view of a greater number of cases turning on 'failure to warn'. N.W.

N82-15999# Defense Technical Information Center, Alexandria, Va. Office of Information Systems and Technology.
ANALYSIS OF RESPONSES TO SURVEY OF DTIC'S MILITARY USERS ON CURRENT AND PLANNED TECHNICAL LIBRARY/INFORMATION CENTER AUTOMATION Final Report
Mary Belle Bonnett Oct. 1981 29 p refs
(AD-A105507) Avail: NTIS HC A03/MF A01 CSCL 05/2

This survey was undertaken to determine current use of automated functions in DTIC User Technical Libraries; areas where new services and support were desired from DTIC, and what automation efforts were planned and budgeted. Forty-seven percent of the responses indicate some automated functions in the library concerned, ranging from access to DROLS or commercial services by terminal to totally automated, integrated systems. Responses to the question requesting identification of additional or expanded services from DTIC, 123 requests were indicated. They include: remote site bibliographic files, 18; electronic mail service, 15; consultation and advice, 39; automated library model, 11; dial-up access to DROLS, 12; and other services, 28. A total of 195 specific automation projects were identified as in the plans of respondents. Author (GRA)

N82-16000# Center for Policy Research, Inc., Bethesda, Md.
A WORKSHOP ON QUALITATIVE INFORMATION RETRIEVAL
Stephen B. Weiner 28 Sep. 1981 66 p refs Workshop held on 18-20 Nov. 1980
(Contract N00014-80-C-0105; Grant NSF IST-80-18904; NR Proj. 049-473)
(AD-A105897) Avail: NTIS HC A04/MF A01 CSCL 05/2

Work in the Office of Administration of the Carter White House on the development of a non-intermediated information retrieval system led to consideration of the problem of information retrieval when controlled vocabulary fails. Discussion of that problem led to the development of a typology of such failures and to an examination of methods of resolving the problems. While a detailed discussion of the typology and the methods of resolution is not appropriate at this point, that typology was presented as the point of departure for deliberation by the Workshop on Qualitative Information Retrieval, the results of which this report summarizes. It is, therefore, appropriate to review briefly that typology. GRA

N82-16001# California Univ., Livermore. Lawrence Livermore Lab.
COST/BENEFIT ANALYSIS OF IMPLEMENTING LWG FORTRAN COMPILER/LIBRARY SYSTEMS
Terry Heidelberg 6 Jul. 1981 45 p refs
(Contract W-7405-eng-48)
(DE81-028252; UCID-30185) Avail: NTIS HC A03/MF A01

A cost benefit analysis for implementing Language Workshop group (LWG) FORTRAN through a rehostable compiler/library system is described. Increases in programmer productivity resulting from implementation of LWG FORTRAN are concluded. Four cost factors are included: implementation and centralized maintenance; program conversion costs at each LWG laboratory, programmer training costs, and local compiler maintenance. Two benefit factors, programming productivity and sharing of programs are also included. DOE

N82-16002# Battelle Pacific Northwest Labs., Richland, Wash.
DATA EDITING ON LARGE DATA SETS
James J. Thomas, Robert A. Burnett, and Janice R. Lewis 1981 11 p refs Presented at the 13th Symp. on the Computer Sci. and Statistics Interface, Pittsburgh, 12 Mar. 1981
(Contract DE-AC06-76RL-01830)
(DE81-028022; PNL-SA-9219; CONF-810342-2) Avail: NTIS HC A02/MF A01

A data editor, implemented as a single computational tool combining facilities from data management systems, text editors, graphics packages, and statistics packages with emphasis on research data base manipulation and subsetting techniques is described. The data editor provides an interactive environment to explore and manipulate in particular large data sets. It utilizes a relational data transportability to other data analysis packages. Editing large data sets is discussed. A technique for manipulating portions or subsets of large data sets without physical replication is introduced. An experimental command structure and operating environment are presented. DOE

N82-16003# Battelle Pacific Northwest Labs., Richland, Wash.
SUMMARY OF THE GRAPHIC INFORMATION DISPLAY SESSION
D. B. Carr Mar. 1981 5 p Presented at the DOE Statistics Symp., Berkeley, Calif., 27 Oct. 1981
(Contract DE-AC06-76RL-01830)
(DE81-028231; PNL-SA-9370; CONF-811031-1) Avail: NTIS HC A02/MF A01

Examples, principles, and ideas concerning color graphics data displays and n-dimensional pattern recognition in environmental systems are summarized. Access to graphics tools is sketched. Uses of color and exploratory data analysis is considered. State maps and scatter plots are compared. Problems in displaying multidimensional data were addressed. Computer generated movies, useful in displaying a third dimension by motion, and time dependent data, are mentioned. DOE

N82-16004# Battelle Pacific Northwest Labs., Richland, Wash.
SELF-DESCRIBING DATA FILE STRUCTURE FOR LARGE DATA SETS
Robert A. Burnett 1981 7 p refs Presented at the 13th Symp. on the Computer Sci. and Statistics Interface, Pittsburgh, 12 Mar. 1981
(Contract DE-AC06-76RL-01830)
(DE81-027997; PNL-SA-9179; CONF-810342-3) Avail: NTIS HC A02/MF A01

A self-describing binary (SDB) data file structure was designed and implemented together with a set of basic data manipulation functions and supporting SDB data access routines. Logical and physical data descriptors are stored in SDB files preceding the data values. SDB files thus provide a common data representation for interfacing diverse software components. The various types of data descriptors and data structures permitted by the file design are described. Data buffering, file segmentation, and a segment overflow handler are also discussed. DOE

N82-16005# Oak Ridge National Lab., Tenn.
PRELIMINARY INTERNAL DATA SCREENING: A COMPONENT OF QUANTITATIVE DATA ANALYSIS IN DATA VALIDATION
David J. Pack 1981 31 p refs Presented at the Am. Statist. Assoc. Meeting, Detroit, 10 Aug. 1981
(Contract W-7405-eng-26)
(CONF-810842-1) Avail: NTIS HC A03/MF A01

Two objectives of preliminary internal data screening are examined. The first, producing a frozen, archived database ready for efficient computer analysis, is defined. It is seen to be achievable through simple computer methodology. The second objective produces a general understanding of key variables, a rough cut at response meaningfulness, a qualification of the type of group present, and an assessment of the expected level of difficulty in comprehensive validation. Initial methodological suggestions for accomplishing the second objective are made. Appropriateness of its techniques for a general examination of a large database that may contain numerous errors is recognized. N.W.

N82-16006# Department of Energy, Washington, D. C.
MANAGING LARGE-SCALE MODELS: DBS
May 1981 319 p refs
(DE81-028683; DOE/EP-0006) Avail: NTIS HC A14/MF A01

A set of fundamental management tools for developing and operating a large scale model and data base system is presented. A broad range of generic management problems are classified into three groups: documentation, operations, and maintenance. System problems are identified, the solutions for gaining management control are discussed. Practical methods for dealing with these problems are presented. DOE

N82-16007# California Univ., Livermore. Lawrence Livermore Lab.
CONCERNING TECHNICAL MEANS FOR DEALING WITH ASPECTS OF THE NEAR-TERM INFORMATION ONSLAUGHT
Lowell Wood 1981 19 p Presented at the Conf. on Sci. and the Inform. Onslaught, Los Alamos, N. Mex., 1-5 Jun. 1981
(Contract W-7405-eng-48)
(DE81-030159; UCRL-86581; CONF-8106155-1) Avail: NTIS HC A02/MF A01

Predictions are given about the future capabilities of the electronics manufacturing industry to produce very-large-scale integrated circuit computers. Such computers would have three to six orders of magnitude more computing power than present systems. The implications of this increase are considered even in terms of implanted intelligence in humans. DOE

N82-15730*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
MEDICAL INFORMATION MANAGEMENT
Edward C. Moseley *In its* STS-1 Med. Rept. Dec. 1981 p 93-98
(For primary document see N82-15711 06-51)
Avail: NTIS HC A06/MF A01 CSCL 05B

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

No abstracts in this category.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

N82-16008*# Helicopter Association of America, Washington, D. C.
COMMUNITY ROTORCRAFT AIR TRANSPORTATION BENEFITS AND OPPORTUNITIES Final Report, Dec. 1981
Glen A. Gilbert, Darral J. Freund, Robert M. Winick, Nicholas J. Cafarelli, Richard F. Hodgkins, Tirey K. Vickers et al Dec. 1981 181 p refs
(Contract NAS2-10798)
(NASA-CR-166266) Avail: NTIS HC A09/MF A01 CSCL 01C

Information about rotorcraft that will assist community planners in assessing and planning for the use of rotorcraft transportation in their communities is provided. Information useful to helicopter researchers, manufacturers, and operators concerning helicopter opportunities and benefits is also given. Three primary topics are discussed: the current status and future projections of rotorcraft technology, and the comparison of that technology with other transportation vehicles; the community benefits of promising rotorcraft transportation opportunities; and the integration and interfacing considerations between rotorcraft and other transportation vehicles. Helicopter applications in a number of business and public service fields are examined in various geographical settings. R.J.F.

N82-16009*# National Aeronautics and Space Administration, Washington, D. C.
NASA: TECHNOLOGY TRANSFER
1982 14 p
(NASA-TM-84070) Avail: NTIS HC A02/MF A01 CSCL 05A

NASA's technology transfer program, a multifaceted effort designed to facilitate the use of aerospace technology in public and private sector application, is described. The effort embraces two major areas: (1) facilitating broader application of remote sensing technology and (2) fostering technology utilization, or encouraging reuse of technology emerging from NASA's mainline programs. N.W.

N82-16010# California Univ., Livermore. Lawrence Livermore Lab. Transportation Systems Research Dept.
DEVELOPMENT OF THE ALUMINUM-AIR BATTERY FOR ELECTRIC VEHICLE APPLICATIONS
John F. Cooper and Robert V. Homsy 12 Aug. 1981 11 p refs Presented at the 4th Intern. EVDG Conf. and Demonstration, London, 15-16 Sep. 1981
(Contract W-7405-eng-48)
(DE81-028446; UCRL-86560; CONF-810938-1) Avail: NTIS HC A02/MF A01

The development of hardware for the aluminum-air electric vehicle battery is discussed. The polarization curves of large-scale aluminum-air cells (0.1 sq m anodes) were replicated in rapidly-refuelable cells of subscale size (167-sq cm) which were constructed for stacking into multicell modules. Solution-side current collection by a structure which makes point or line contacts at the aluminum/electrolyte interface is described. The technique allows rapid anode addition, minimizes anode fabrication costs, and simplifies cell design. The possible application of solution-side current collection to wedge-shaped cells allowing continuous anode feed and full utilization is discussed. Life-cycle testing of air electrodes in candidate battery electrolytes is reported. Temperature and aluminate concentration transients are modeled using experimental rate data. Program structure, technical strategy, goals, and economic analysis are briefly discussed. DOE

N82-16011# New Zealand Energy Research and Development Committee, Auckland.
FEASIBILITY OF ELECTRIC VEHICLES IN NEW ZEALAND Final Report
J. P. Noble (Leyland Watson and Noble), J. West (Liquid Fuels Trust Board), J. B. Randle (New Zealand Electricity Div.), P. D. Ritchie (Ministry of Works and Development), and J. Owen (Barr Browns Ltd.) 1981 45 p refs Sponsored in part by Liquid Fuels Trust Board
(DE81-903684; NZERDC-61-Vol-1; ISSN-0110-1692; ISSN-0110-1191) Avail: NTIS HC A03/MF A01

A state of the art review of current electric vehicle technology in New Zealand and overseas is provided. The role of electric vehicles in New Zealand, with regard to local vehicle use patterns and the availability of alternative transport fuels, is determined. An economic assessment of electric vehicle applications in comparison to other vehicles is prepared. The national benefit of electric vehicle utilization is assessed. Further research, development, and demonstration requirements to define the potential of, and implementation strategies for electric vehicle use in New Zealand are identified. Results are presented and discussed. DOE

N82-16012# Applied Decision Analysis, Inc., Menlo Park, Calif.
EVALUATING R AND D OPTIONS UNDER UNCERTAINTY. VOLUME 2: ATMOSPHERIC FLUIDIZED-BED COMBUSTION COMMERCIALIZATION STRATEGIES Final Report
A. B. Borison, B. R. Judd, P. A. Morris, and E. C. Walters Aug. 1981 79 p Sponsored by Electric Power Research Inst.
(EPRI Proj. 1432-1)
(DE81-904246; EPRI-EA-1964-Vol-2) Avail: NTIS HC A05/MF A01

A quantitative framework for analyzing commercialization decisions for emerging electrical power generation technologies was developed. The framework addresses the general question of when to freeze a design for commercialization. The framework was developed to help evaluate the benefits of continuing the development of two different designs for atmospheric fluidized bed combustion boilers. EPRI staff participated actively in specifying the scope of the analysis and in providing technical information on the two designs. The framework was demonstrated using this information, supplemented with probablistic judgments by EPRI staff about possible outcomes from the pilot and demonstration stages of development. Based on the technical data and judgments supplied by EPRI staff, the analysis shows a net benefit for proceeding with the development of two designs. DOE

N82-16013# Applied Decision Analysis, Inc., Menlo Park, Calif.
EVALUATING R AND D OPTIONS UNDER UNCERTAINTY. VOLUME 3: AN ELECTRIC-UTILITY GENERATION-EXPANSION PLANNING MODEL Final Report
A. B. Borison, B. R. Judd, P. A. Morris, and E. C. Walters Aug. 1981 114 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1432-1)
(DE81-904237; EPRI-EA-1964-Vol-3) Avail: NTIS HC A06/MF A01

An electric utility generation expansion model developed for use in research and development (R and D) planning under uncertainty is described. The model provides a framework for examining broad utility and R and D planning issues, rather than the specific generation expansion decisions of individual utilities. Unlike existing approaches, the model focuses directly on the demand, technological, and regulatory uncertainties and the long term dynamics that affect the impact of R and D achievements. The model's somewhat aggregate approach to electric utility decision making (to allow repeated application at low cost) can be modified, as needed, for more detailed utility planning. When fully implemented, the model can be applied to the analysis of issues such as technology adoption, reserve margin, unit size, reliability, storage and load management effects, lead time, and government regulation. DOE

N82-16014# Brookhaven National Lab., Upton, N. Y.
APPLICATION OF AN LP MODEL TO STRATEGIC PLANNING OF MULTINATIONAL COOPERATIVE RD AND D PROGRAMS
V. L. Sailor 1981 10 p refs
(Contract DE-AC02-76CH-00016)
(DE81-028325; BNL-29657) Avail: NTIS HC A02/MF A01

An analytical study was initiated to serve as a basis for defining a cooperative strategy for RD and D among International Energy Agency member nations. A flexible energy system model, MARKAL, was developed as the primary tool for the analysis. The flexibility of MARKAL is demonstrated by the fact that the diverse energy systems of sixteen countries and the aggregated European Economic Community have been modeled successfully. MARKAL is a multi-period linear programming model which describes the energy flows, costs, and resource consumption of national energy systems over an extended period of time (1980 to 2020). Various policy options and assumptions about future world situations create a range of scenarios which control the MARKAL solutions. Such options and such postulated conditions, translated into operational indicators to drive the MARKAL model and constrain its solutions, are described. DOE

N82-16015# Netherlands Organization for Applied Scientific Research TNO, Delft.
RESEARCH IN URBAN PLANNING DURING THE 70'S [HET PLANOLOGISCH ONDERZOEK IN DE JAREN ZEVENTIG]
J. C. Daamen, M. V. Besselaar, H. C. Christerus, and C. W. W. vanLohuizen 1980 243 p refs In DUTCH
(TNO-80/PS/206) Avail: NTIS HC A11/MF A01

The extent, nature, and themes of urban planning research in the Netherlands are described. Projects were indexed for contribution to the promotion, coordination, and programming of research. The inventory contains public research projects and government research projects by order of the government. The different fields of research are only quantitatively (number of projects) assessed. Activities showing research trends in the first half of the decade are compared with those in the second half of the decade. Author (ESA)

N82-16016# Pintsch Oel Berlin G.m.b.H. (West Germany). Mineraloelraffinerie.
DEVELOPMENT OF AN Na DISTILLATION PROCESS FOR RE-REFINING WASTE OIL IN ORDER TO AVOID ENVIRONMENT POLLUTION. PHASE 1: PRELIMINARY TESTS IN BERN Final Report, Mar. 1979
Siegfried Draebert, Eberhard Rohner, Fritz Robert Ruhkopf, and Peter Schmitz Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 60 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-034; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 12,60

Test results show that compared to a sulfuric acid process, the sodium process: has a product yield 2 to 3% higher; product quality is better; environmental impact is lower; and is more economical. These tests show that the sodium process can also be used in practice. Author (ESA)

N82-16017# Transportation Research Board, Washington, D.C.
TRANSIT PLANNING AND MANAGEMENT
Walter Cherwony, Michael G. Ferreri, Louis J. Pignataro, William R. McShane, Anthony J. Wiener, Arnold J. Bloch, William H. Crowell, Genenieve Giuliano, Jerome M. Lutin, and Matthew Liotine 1981 89 p refs
(PB81-236032; TRB/TRR-797; ISBN-0-309-03211-32; LC-81-11205; ISSN-0361-1981) Avail: NTIS HC A05/MF A01; HC also avail: Transportation Research Board, 2101 Constitution Ave., N.W., Washington, D.C. CSCL 13B

Management and planning issues affecting primarily rail and bus mass transit are presented. Topics include strategic planning, future directions, environmental factors, modeling, demand analysis, employer subsidies, the Caracas subway, funding procedures, performance evaluation, operating expenditures, paraprivate transportation, logistics, pupil routing, and combined passenger and postal services. GRA

N82-16018# Alabama Univ., Birmingham. Dept. of Biology.
IMPROVING MUNICIPAL AND INDUSTRIAL WASTE TREATMENT PROCESSES: NUTRITIONAL AND PHYSICAL CONDITIONS THAT REGULATE FLOC FORMATION IN BACTERIA ISOLATED FROM ACTIVATED SLUDGE Project Completion Report, 1 Oct. 1979 - 30 Sep. 1980
Jospeh J. Gauthier 30 Jun. 1981 70 p refs
(Contract DI-14-34-0001-9101)
(PB81-246282; W81-05004; OWRT-A-068-ALA(1)) Avail. NTIS HC A04/MF A01 CSCL 06M

The mechanisms by which sludge microorganisms form floc were studied. In the activated sludge process, microorganisms are separated from the treated wastewater by settling in a clarifier. Sludge settling is dependent upon the ability of the microbes in the mixed liquor to adhere to one another. Several zoogloeal isolates, obtained from both municipal and industrial sludge, were tested for floccing efficiency when they were grown to the logarithmic and stationary phase. GRA

N82-16019# Environmental Protection Agency, Ann Arbor, Mich. Test and Evaluation Branch.
EVALUATION OF A DRESSERATOR SYSTEM TEST VEHICLE
Thomas J. Penninga Jun. 1981 38 p
(PB81-245722; EPA-AA-TEB-81-21) Avail: NTIS HC A03/MF A01 CSCL 13B

A vehicle was tested to determine the feasibility of the Dresser Sonic Flow Carburetor system as applied to a 3-way catalyst system. The testing conducted included: the standard Federal Testing Procedure, Highway Fuel Economy Testing, testing at 20, 40, 60, and 70 degrees F and sulfate testing. The test vehicle achieved emission levels below the 1981 and subsequent model year standards of .41 gm/mile hydrocarbon, 3.4 gm/mile carbon monoxide and 1.0 gm/mile NOx. The vehicle suffered starting problems at lower temperatures but had no driveability problems when warmed up. An extended idle period at the beginning of the cold start test procedure was also used at lower temperature. This modified FTP procedure improved driveability and lowered vehicle emissions somewhat. GRA

N82-16020# California State Dept. of Transportation, Sacramento.
GEOLOGIC HAZARDS AND THEIR RELATION TO PLANNING, LOCATION, AND DESIGN OF TRANSPORTATION FACILITIES Final Report
James Gamble Jan. 1981 325 p refs Sponsored by the FHA
(PB81-235467; TL-954129; FHWA/CA-81/04) Avail: NTIS HC A14/MF A01 CSCL 13B

The geologic hazards frequently encountered are described, together with field methods for efficiently obtaining the information required for recognition and subsequent documentation of these hazards in a Geologic Hazard Report. The need for District planners to recognize possible geologic hazards on a proposed project at an early stage is emphasized. The principle purpose of a Geologic Hazard Report is to facilitate preparation of the environmental document required for project. Failure of environmental report writers to fully utilize this material results in negative comments by reviewers of the draft copy, thus resulting in delays in achieving an approval of a final draft of Environmental Impact Statements or Negative Declarations. GRA

N82-16021# Transportation Research Board, Washington, D.C.
HIGHWAY SAFETY APPURTENANCES
Jarvis D. Michie, C. E. Kimball, Jr., M. E. Bronstad, Don L. Ivey, Richard Robertson, and Naomi Kassabian, ed. 1981 59 p refs Sponsored by FHA
(PB81-236085; TRB/TRR-796; ISBN-0-309-03210-5) Avail: NTIS HC A04/MF A01 CSCL 13B

Collision risk assessment is addressed. Heavy vehicle tests of tubular thrie beam retrofit bridge railing are reported. Barriers for construction zones are considered. Safety improvement alternatives for utility poles are covered. The strength of fillet welds in aluminum lighting poles is examined. Traffic barrier crash tests are presented. A self restoring traffic barrier is explained. GRA

88 SPACE SCIENCES (GENERAL)

N82-16022*# National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICS AND SPACE REPORT OF THE PRESIDENT, 1980 ACTIVITIES
1981 106 p
(NASA-TM-84079) Avail: NTIS HC A06/MF A01 CSCL 05A

The year's achievements in the areas of communication, Earth resources, environment, space sciences, transportation, and space energy are summarized and current and planned activities in these areas at the various departments and agencies of the Federal Government are summarized. Tables show U.S. and world spacecraft records, spacecraft launchings for 1980, and scientific payload and probes launched 1975-1980. Budget data are included. A.R.H.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-16023# Maryland Univ., College Park. Center for Archaeoastronomy.
ARCHAEOASTRONOMY IN THE AMERICAS
Ray A. Williamson, ed. Los Altos, Calif. Ballena Press 1981 407 p refs
(BP-AP-22; ISBN-0-087919-094-9) Avail: NTIS HC A18/MF A01

The state of the art of archaeoastronomy is discussed. Papers are presented which report findings in North America, Central America, South America, and Ireland. The role of archaeoastronomy in teaching is also discussed. S.L.

N82-16024# Max-Planck-Institut fuer Physik und Actrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.
CONSTRUCTION AND USE OF A STANDARD SOURCE FOR FAR INFRARED ASTRONOMY EXPERIMENTS [BAU UND EINSATZ EINER EICHQUELLE FUER FERNINFRAROT-ASTRONOMIE-EXPERIMENTE]
Winfried Jennert Feb. 1981 100 p refs In GERMAN
(MPI-PAE/Extraterr-165; ISSN-0340-8922) Avail: NTIS HC A05/MF A01

A flexible standard radiation source suited for far infrared astronomy experiments is analyzed. The source makes use of two black bodies built in a liquid nitrogen cooled dewar. One of them can be heated to a temperature between 80 and 400K, the other, the reference source, has the temperature of the nitrogen bath. The radiation flux is modulated by numerical control while the exit openings of the black bodies are imaged on the standard source outlet pupil, outside the dewar. The modulated radiation intensity can be adjusted and superposed on the constant reference intensity. A helium cooled Ge-Ga bolometer was calibrated and atmospheric absorption measurements were conducted. Author (ESA)

N82-16025# Centre National de la Recherche Scientifique, Marseilles (France). Lab. d'Astronomie Spatiale.
THREE MIRROR ANASTIGMATIC (TMA) TELESCOPE FOR OBSERVATION OF FAINT OBJECTS IN THE ULTRAVIOLET (1200 TO 1800 A) APPLIED IN THE GLASAR EXPERIMENT [TELESCOPE ANASTIGMAT A TROIS MIROIRS (TMA) POUR L'OBSERVATION ASTRONOMIQUE DANS L'ULTRAVIOLET (1200-1800 A) APPLIQUE A L'EXPERIENCE GLASAR]
Michel Saisse 1981 37 p refs In FRENCH Presented at Reunion Franco-Sovietique, Moscow, 16-22 Mar. 1981
Avail: NTIS HC A03/MF A01

The GLASAR experiment which uses a reflecting telescope on board Salyut for astronomical spectrometry in the far UV is discussed. Physical constraints imposed on the instrument are mentioned. A three mirror system and aberrations of the third order for the TMA telescope are described. An optimization method for the third order approximation is presented. Utilizing an automatic aberration correction program, final optimization of the system by reduction of higher order aberrations is achieved. Author (ESA)

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-16026*# California Univ., Berkeley. Space Sciences Lab.

ENERGETIC PARTICLES FLUX EXPERIMENT FOR ISEE MOTHER/DAUGHTER SPACECRAFT Final Report, 23 May 1974 - 31 Oct. 1979
K. A. Anderson Sep. 1981 96 p refs
(Contract NAS5-20079)
(NASA-CR-166761) Avail: NTIS HC A05/MF A01 CSCL 03B

The history of the energetic particle experiments on the International Sun Earth Explorer 1 and 2 spacecraft is outlined, and descriptions of the instruments are given. The inflight performance and data analysis are summarized. The research is completed and ongoing are described and a bibliography is included. Author

N82-16027# Los Alamos Scientific Lab., N. Mex.
SUPERNOVA HYDRODYNAMICS
Stirling A. Colgate 1981 8 p refs Presented at the Plasma Astrophys. Course and Workshop, Varenna, Italy, 27 Aug. - 7 Sep. 1981 Submitted for publication
(Contract W-7405-eng-36)
(DE81-030243; LA-UR-81-2575; CONF-810870-1) Avail: NTIS HC A02/MF A01

The phenomena of stellar explosions is interpreted, and the dynamical expansion of a star is described. The mechanism of explosion is studied in order to improve the ability to model the most extreme conditions of matter and hydrodynamics that occur presently and excessively in the universe. DOE

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-16028*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VIKING LANDER IMAGING INVESTIGATION DURING EXTENDED AND CONTINUATION AUTOMATIC MISSIONS. VOLUME 2: LANDER 2 PICTURE CATALOG OF EXPERIMENT DATA RECORD
Kenneth L. Jones, Mary Henshaw, Christe McMenomy, Andres Robles, Paul C. Scribner, Stephen D. Wall, and Jackson W. Wilson Apr. 1981 566 p refs 2 Vol.
(NASA-RP-1068-Vol-2; L-14054) Avail: NTIS HC A24/MF A01 CSCL 03B

Images returned by the two Viking landers during the extended and continuation automatic phases of the Viking Mission are presented. Information describing the conditions under which the images were acquired is included with skyline drawings showing the images positioned in the field of view of the cameras. Subsets of the images are listed in a variety of sequences to aid in locating images of interest. The format and organization of the digital magnetic tape storage of the images are described. A brief description of the mission and the camera system is also included. Author

N82-16029*# Arizona Univ., Tucson. Dept. of Planetary Sciences.
SPECTROSCOPIC OBSERVATIONS OF COMETS Final Report
[1982] 9 p refs
(Grant NAG5-86)
(NASA-CR-165077) Avail: NTIS HC A02/MF A01 CSCL 03B

Development of a spectrograph using a microchannel plate intensifier for observing faint comets is described. The spectrograph is capable of obtaining useful spectra of objects as faint as M(2) = 18. The increased guiding efficiency achieved by the optical coupling of the ISIT vidicon of the 154 cm telescope has resulted in a better signal to noise ratio. The ability to take a direct image of the comet aids in the interpretation of the spatial profile of the emissions. Spectra of comets Schwassmann-Wachmann 1, Bradfield, Encke, Tuttle, and Stephen-Oterma are discussed. J.D.H.

N82-16030*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VOYAGER 1 ENCOUNTERS SATURN
Dec. 1980 40 p Original contains color illustrations
(NASA-TM-84078; JPL-400-100) Avail: NTIS MF A01; HC SOD CSCL 03B

The Voyager 1 encounter with Saturn is described. Color photographs of Saturn and its moons are included. Mission objectives and spacecraft characteristics are discussed. Emphasis is placed on Saturn's atmosphere, the rings, the magnetosphere, and the moons. R.J.F.

N82-16031*# Arizona Univ., Tucson.
COMETS: GASES, ICES, GRAINS AND PLASMA Final Report
Laurel L. Wilkening 1981 75 p refs Colloq. at Tucson, Arizona, 11-14 Mar. 1981; sponsored in part by International Astronomical Union, American Astronomical Society, Committee on Space Research, NSF and Arizona Univ.
(Contract NASw-3413)
(NASA-CR-165073; IAU-Colloquium-61) Avail: NTIS HC A04/MF A01 CSCL 03B

The program and abstracts of the 97 papers delivered at the colloquium are presented. Cometary nuclei, comet dust, the coma, ion tails, several comet missions, and cometary origin and evolution were discussed. J.D.H.

N82-16032# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany). Lehrstuhl fuer Raumfahrttechnik.
INVESTIGATIONS OF MICROMETEROID IMPACTS IN LARGE AREAS AND LONG DURATION MISSIONS Final Report, Oct. 1980
Eduard Igenbergs (Technischen Univ., Munich) and Hugo Fechtig Bonn Bundesminesterium fuer Forschung und Technologie Aug. 1981 72 p refs In GERMAN; ENGLISH summary Sponsored by Bundesminesterium fuer Forschung und Technologie
(BMFT-FB-W-81-031; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformations-zentrum, Karlsruhe, West Germany DM 15.15

An assessment of the scientific benefit and the technical feasibility of micrometeoroid experiments in long duration missions with large exposure areas is described. The measurements and the theoretical models of the dust environment are described. A survey of future space missions was compiled average flow. With these data a proposal for a long duration experiment is discussed. Author

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-16033*# Xavier Univ. of Louisiana, New Orleans. Dept. of Physics/Pre-Engineering.
SOLAR RADIATION MEASUREMENT PROJECT Final Report
Juliette W. Ioup 31 Dec. 1981 53 p
(Grant NsG-8050)
(NASA-CR-165064) Avail: NTIS HC A04/MF A01 CSCL 03B

The Xavier solar radiation measurement project and station are described. Measurements of the total solar radiation on a horizontal surface from an Eppley pyranometer were collected into computer data files. Total radiation in watt hours was converted from ten minute intervals to hourly intervals. Graphs of this total radiation data are included. A computer program in Fortran was written to calculate the total extraterrestrial radiation on a horizontal surface for each day of the month. Educational and social benefits of the project are cited. R.J.F.

N82-16034# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE INSTRUMENTS OF THE PLASMA EXPERIMENT

ONBOARD THE HELIOS SOLAR PROBE Final Report
Helmut Rosenbauer, Rainer Schwenn, Hans Miggenrieder, Bernhard Meyer, Heiner Gruenwaldt, Karl-Heinz Muehlhaeuser, Heinz Pellkofer, and John H. Wolfe Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 228 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-015; ISSN-0170-1339) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 39.10

The plasma experiment on board the solar probe HELIOS, consisting of four instruments designed to investigate the interplanetary plasma, or solar wind, is discussed. The velocity distribution functions of the different kinds of particles are measured. Hydrodynamic parameters of the solar wind plasma can then be derived. Three instruments analyze the positive component of the solar wind (protons and heavier ions with energy-per-charge values from 0.155 to 15.32 kV). Two of them permit an angular resolution in both directions of incidence. One instrument measures electrons in the energy range from 0.5 to 1660 eV with a one-dimensional angular resolution.
Author

N82-16035# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
GAMMA RAY DETECTOR FOR SOLAR MAXIMUM MISSION (SMM) OF NASA Final Report, Jul. 1980
Wolfgang Brunner, Karl Brichzin, and Ernst Sach Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 174 p refs Partly in GERMAN and ENGLISH Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-020; ISSN-0170-1339) Avail: NTIS HC A08/MF A01; Fachinformationzentrum, Karlsruhe, West Germany DM 33.90

For the SMM (launch 14.2.80) a gamma ray detector was developed, manufactured and tested to measure solar high energetic gamma rays and neutron fluxes within the energy range 10-160 MeV, 4,43 MeV and 2.23 MeV. The main components of the sensor are 7 NaI crystals 3′ x 3′ and a CsI crystal 30 cm x 7.5 cm. The rejection of charged particles is done by two plastic scintillators and 4 CsI shields. From the beginning of the mission the experiment is working fully successful. Author

N82-16036# Technische Hochschule, Darmstadt (West Germany). Angewandte Geophysik.
THE INTERACTIONS OF THE HELIOS PROBE WITH THE SOLAR WIND PLASMA Final Report, Mar. 1981
Gerd-Hannes Voigt, Ulrich Isensee, and Henning Haassberg Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 278 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-036; ISSN-0170-1339) Avail: NTIS HC A13/MF A01; Fachinformatins-zentrum, Karlsruhe, West Germany DM 44.30

A space charge cloud is formed around the HELIOS solar probe due to strong photoelectron emission and fade out of solar wind particles. The conducting and isolating parts of the surface are differently charged, resulting in a very complex potential structure in the vicinity of the probe and on the surface. The interactions of the HELIOS probe with the solar wind plasma are described by models based on kinetic theory of plasma. The combination of these models yields and entire and consistent representation of the spacecraft charging and the potential structure. Electron spectra measured by the plasma experiment are analysed and compared with results of the theoretical models.
Author

N82-16037# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 441, MAY 1981. PART 1 (PROMPT REPORTS). DATA FOR APRIL 1981, MARCH 1981
Helen E. Coffey, ed. May 1981 178 p
(PB81-246688; SGD-441-Pt-1; NOAA-81071301) Avail: NTIS HC A09/MF A01 CSCL 03B

Data for April 1981 on alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, inferred interplanetary magnetic field polarities, mean solar magnetic field, and Boulder Geomagnetic Substorm Log are provided. Data for March 1981 on daily solar activity centers, solar radio emission, cosmic rays, geomagnetic indices, and radio propagation indices are also provided. Late data includes coronal holes March 1981, geomagnetic indices February 1981 and Solar Proton Event April 1981 (Provisional).
GRA

N82-16038# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 441, MAY 1981. PART 2 (COMPREHENSIVE REPORTS). DATA FOR NOVEMBER 1980
Helen E. Coffey, ed. May 1981 60 p refs
(PB81-246696; SGD-441-Pt-2; NOAA-81071302) Avail: NTIS HC A04/MF A01 CSCL 03B

Data for November 1980 on solar radio emission, solar X-ray radiation, and mass ejections from the Sun are provided. A new schedule will cause the Daily Flare Index and the Regional Flare Index to appear 13 and 14 months from the date of observation. Publication of the Abbreviated Calendar Record is being suspended indefinitely. Some other sources of Data are listed, including solar protons.
GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-16039# Kiel Univ. (West Germany). Inst. fuer Reine und Angewandte Kernphysik.
A COSMIC RAY EXPERIMENT ON BOARD THE SOLAR PROBES HELIOS 1 AND 2 (EXPERIMENT NUMBER 6) Final Report, Dec 1980
Horst Kunow, Gerd Wibberenz, Guenter Green, Horst Hempe, Bernd Iwers, Reinhold Mueller-Mellin, Manfred Witte, Joachim Fuckner, and Armin Popp (Dornieer-Werke GmbH, Friedrichshafen, West Germany) Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 118 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-016; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationzentrum, Karlsruhe, West Germany DM 24.80

The HELIOS Cosmic Ray Experiment (E6) is a newly developed instrument to measure high energy charged particles of solar, planetary and galactic origin in the inner solar system. Electrons above 0.3 MeV, protons and heavier nuclei up to Neon with energies above 1.3 MeV/N can be separated. The sensor is a telescope consisting of semiconductor-, Cerenkov- and Scintillaton detectors. The complex data processing system onboard and on ground was developed for optimum use of the very restricted telemetry capacity of the space probe. The properties of the instruments are discussed in detail, followed by short descriptions of the mission, the data evaluation, and the spectrum of scientific results.
Author

99 GENERAL

No abstracts in this category.

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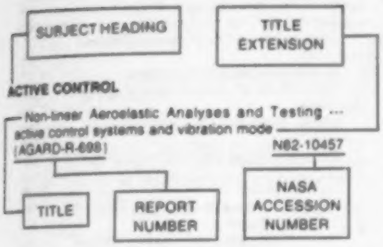

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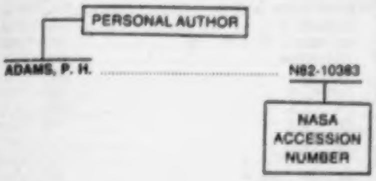

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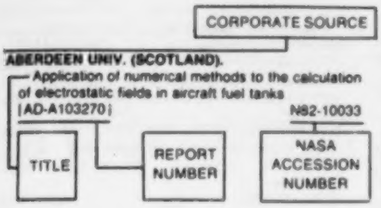
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[DE81-030467] N82-15872

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Optical recognition of statistical patterns
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Use of environmental satellite data for input to energy balance snowmelt models
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CALSPAN ADVANCED TECHNOLOGY CENTER, BUFFALO, N.Y.
In-flight investigation of the effects of pilot location and control system design on airplane flying qualities for approach and landing
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Force and moment coefficients for high deflection cascades N82-15046

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CENTER FOR POLICY RESEARCH, INC., BETHESDA, MD.
A Workshop on Qualitative Information Retrieval
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CENTRAL ELECTRICITY GENERATING BOARD, SOUTHAMPTON (ENGLAND).
Interfacial structures in nickel-based transition joints after long term service
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Analysis of satellite observations: Theoretical studies on the sampling problem
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Studies of the effects of operating the Mt. Elbert Pumped-Storage Powerplant on Twin Lakes, Colorado: 1979 report of findings
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COLORADO STATE UNIV., FORT COLLINS.
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Technical writing versus technical writing N82-15988

COMPUTER SCIENCES CORP., HAMPTON, VA.
NASTRAN user's guide (Level 17.5)
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An automated technique for estimating daily precipitation over the State of Virginia
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COMPUTER TECHNOLOGY ASSOCIATES, ARLINGTON, VA.
Office of Space Terrestrial Applications (OSTA)/Applications Data Service (ADS) data systems standards
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COMPUTERS/STRUCTURES INTERNATIONAL, OAKLAND, CALIF.
User's guide: Computer Program for Three-dimensional Analysis of Building Systems (CTABS80)
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CONNECTICUT UNIV., STORRS.
Stochastic control and identification of helicopter dynamic modes
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The influence of aeronautical R&D expenditures upon the productivity of air transportation
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DEFENSE TECHNICAL INFORMATION CENTER, ALEXANDRIA, VA.
Analysis of responses to survey of DTIC's military users on current and planned technical library/information center automation
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Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 3 August 1979
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Hydrogen as carrier of secondary energy: Proposal for a research and development program
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DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, WESSELING (WEST GERMANY).
The optical recognition of surface targets as a function of surrounding, target and observation parameters in air to surface observations
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The optical recognition of sea targets as a function of surrounding and observation parameters in air to water observations
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DEUTSCHER WETTERDIENST, OFFENBACH AM MAIN (WEST GERMANY).
Reports from the German Meteorological Service. Number 154: Statistics of the maximum mixing height according to radiosonde measurements for the aerological stations of the German Meteorological Service for the period 1957-1973
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Reports from the German Meteorological Service. Number 155: Two hundred years of meteorological observations at Hohenpeissenberg (1781-1980)
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DUKE UNIV., DURHAM, N. C.
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ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (SWITZERLAND).
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EG AND G WASHINGTON ANALYTICAL SERVICES CENTER, INC., POCOMOKE CITY, MD.
A global atlas of GEOS-3 significant waveheight data and comparison of the data with national buoy data
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EISEN UND METALL A.G., GELSENKIRCHEN (WEST GERMANY).
Recovery of raw materials by pyrolysis
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ENERGY/DEVELOPMENT INTERNATIONAL, PORT JEFFERSON, N.Y.
Energy and development in Central America. Volume 1: Regional assessment
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Energy and development in Central America. Volume 2: Country assessments
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ENERGY INFORMATION ADMINISTRATION, WASHINGTON, D.C.
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ENERGY RESOURCES CO., INC., CAMBRIDGE, MASS.
Potential environmental problems of enhanced oil and gas recovery techniques
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ENERTECH ENGINEERING AND RESEARCH CO., HOUSTON, TEX.
Temperature histories in geothermal wells: Survey of rock thermomechanical properties and drilling, production, and injection case studies
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Review and update of modeling analysis of carbon monoxide emissions in Mecklenburg County, North Carolina
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ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
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Air quality data for nonmetallic inorganic ions: Nitrate and sulfate for 1977 and 1978 from the National Air Surveillance Networks
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ENVIRONMENTAL PROTECTION AGENCY, SEATTLE, WASH.
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ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., CONCORD, MASS.
On-site meteorological instrumentation requirements to characterize diffusion from point sources: Workshop report
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ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
Development and evaluation of an automatic labeling technique for spring small grains
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ERLANGEN-NUREMBERG UNIV. (WEST GERMANY).
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ERNO RAUMFAHRTTECHNIK G.M.B.H., BREMEN (WEST GERMANY).
Concept study of a life sciences payload element (PLE) for the SL-D1 mission
[BMFT-FB-W-81-038] N82-15733

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Whys and hows of in-house writing N82-15989

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Heating and cooling applications of atriums and attached greenhouses: A state-of-the-art report
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FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.
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Elemental composition of aerosols in fourteen experiments of the Cloud Condensation Nuclei Workshop N82-15405

FLORIDA UNIV., GAINESVILLE.
Port Canaveral Entrance Glossary of inlets report no. 9
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FORSCHUNGSINSTITUT FUER FUNK UND MATHEMATIK, WERTHOVEN (WEST GERMANY).
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FRAUNHOFER-INST. FUER ANGEWANDTE FESTKOERPERPHYSIK, FREIBURG (WEST GERMANY).
Semiconductor technology for VLSI: Plasma etching and high pressure oxidation
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FRAUNHOFER-INST. FUER BETRIEBSFESTIGKEIT, DARMSTADT (WEST GERMANY).
Influence of throat and plate thickness on the fatigue strength of fillet welds
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Effect of gas pores from shop-primed plate material on the fatigue strength of longitudinal fillet welds
[LBF-FB-160(1981)] N82-15460

FRAUNHOFER-INST. FUER INFORMATIONS- UND DATENVERARBEITUNG, KARLSRUHE (WEST GERMANY).
Survey of the observer's performance with remotely piloted vehicles
[BMVG-FBWT-81-3] N82-15036

FRAUNHOFER-INST. FUER NATURWISSENSCHAFTLICH- TECHNISCHE TRENDANALYSEN, EUSKIRCHEN (WEST GERMANY).
Sensor footprints and homing range of terminal guidance munition
[BMVG-FBWT-81-5] N82-15111

FRAUNHOFER-INST. FUER PRODUCTIONSTECHNIK UND AUTOMATISIERUNG, STUTTGART (WEST GERMANY).
Investigation of a coherent optical method for roughness measurements
[BMFT-FB-T-81-065] N82-15923

FREIBURG UNIV. (WEST GERMANY).
Preparation of Spacelab experiments on Si, CdTe, and ZnS crystal growth during the E1 and D1 missions and construction and testing of a single ellipsoid mirror heating facility
[BMFT-FB-W-81-023] N82-15092

FREIE UNIV., BERLIN (WEST GERMANY).
Meteorological data, volume 134, number 3: The evolution of the circulation pattern at the 100 mbar level for the years 1973 and 1974 illustrated by maps of monthly mean values
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FUTURES GROUP, GLASTONBURY, CONN.
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An assessment of nonfossil hydrogen
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GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
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GENERAL ELECTRIC CO., PHILADELPHIA, PA.
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LANDSAT-2 and LANDSAT-3 flight evaluation report, 23 April to 23 July 1979
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LANDSAT-2 and LANDSAT-3 flight evaluation report, 23 October 1978 to 23 January 1979
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GEOLOGICAL SURVEY, BOISE, IDAHO.
Water resources data for Idaho, water year 1980. Volume 1: Great Basin and Snake River Basin above King Hill
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Water resources data for Idaho, water year 1980. Volume 2: Upper Columbia River Basin and Snake River Basin below King Hill
[PB81-244196] N82-15518

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Geologic applications of thermal-inertia mapping from satellite
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Water Resources Data for Connecticut, water year 1980
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GEOLOGICAL SURVEY, HELENA, MONT.
Steamflow characteristics of the Hudson Bay and upper Missouri River Basins, Montana, through 1979
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GEOLOGICAL SURVEY, INDIANAPOLIS, IND.
Effects of coal fly-ash disposal on water quality in and around the Indiana Dunes National Lakeshore, Indiana
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Water Resources Data for Wisconsin, water year 1980
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A compendium of hypokinetic and hypodynamic animal studies
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GULF UNIVERSITIES RESEARCH CONSORTIUM, BELLAIRE, TEX.
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Representative ground parameters for structural analysis of tunnels. Volume 1: Rational approach to site investigation
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HERAEUS (W. C.) G.M.B.H., HANAU (WEST GERMANY).
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HOCHSCHULE DER BUNDESWEHR, HAMBURG (WEST GERMANY).
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Climatology of high damaging wind in Illinois
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Response of reinforced concrete plate-column connections to dynamic and static horizontal loads
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ILLINOIS UNIV., URBANA.
Illustrative numerical comparisons between phonon mean free paths and phonon thermal conductivity
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INSTITUT FUER FESTKOERPERTECHNOLOGIE, MUNICH (WEST GERMANY).
Topography of the electrical properties of the silicon/oxide interface and the influence of technologic treatments
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INSTITUT FUER KERNTECHNIK UND ENERGIEWANDLUNG E.V., STUTTGART (WEST GERMANY).
Investigation of medium and high temperature phase change materials for thermal energy storage
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INSTITUT FUER ZUKUNFTSFORSCHUNG G.M.B.H., BERLIN (WEST GERMANY).
Data protection of computer aided telecommunication systems
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INSTITUT MAX VON LAUE/PAUL LANGEVIN, GRENOBLE (FRANCE).
Phonons in graphite intercalation compounds measured by neutron scattering
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INSTITUTE FOR PERCEPTION RVO-TNO, SOESTERBERG (NETHERLANDS).
The Link-Miles driver training simulator for tracked vehicles: A validation study
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Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 1: Color measurements
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INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
Wheat cultivation: identification and estimation of areas using LANDSAT data
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Quantitative analysis of drainage obtained from aerial photographs and RBV/LANDSAT images
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Downed dead woody fuel and biomass in the Northern Rocky Mountains
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Spectrophotometric studies on the RNA structure in E.coli ribosomes. Part 1: Fundamentals of ultraviolet spectrophotometry of nucleic acids
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ITT ELECTRO-OPTICAL PRODUCTS DIV., FORT WAYNE, IND.
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[NASA-RP-1068-VOL-2] N82-16028
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JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.
USSR report: Earth sciences, no. 18
[JPRS-79631] N82-15476
Model of Climate and Global Ecology N82-15477
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All-Union Conference on New Sources of Food Protein and Their Application N82-15765
Ecological and technological problem of biodamages N82-15766
Conference on plant virology N82-15767

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KAMAN TEMPO, SANTA BARBARA, CALIF.
The ROSCOE manual. Volume 28-1: Molecular band model parameters for thermal emissions: Expanded wavelength coverage
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KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
A theoretical investigation of wing rocking
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Development of an X.25 protocol converter
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Quantitative structural analysis of chromatically contrasted refractory alloys
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Baking of carbon anodes for the electrolysis of aluminum by electric resistance heating
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A cosmic ray experiment on board the solar probes HELIOS 1 and 2 (experiment number 6)
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Present possibilities for the use of microwaves in civil engineering: Bibliographical study
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LABORATORY FOR ELECTRONIC DEVELOPMENT OF THE ARMED FORCES, OEGSTGEEST (NETHERLANDS).
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LEICHER G.M.B.H. UND CIE., UNTERFOEHRING (WEST GERMANY).
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LEYBOLD-HERAEUS G.M.B.H., HANAU/MAIN (WEST GERMANY).
Process development for large-scale production of CdS thin film solar cells Sputtered copper sulfide layers and cadmium sulfide-copper sulfide heteorojunctions. Application of high rate sputtering using hot-pressed targets
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Preprototype nitrogen supply subsystem development
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Monitoring techniques for carbon fiber emissions: Evaluation B
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Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 1: Load alleviation/extended span development and flight tests
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MASCHINENFABRIK AUGSBURG-NUERNBERG A.G., MUNICH (WEST GERMANY).

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MAX-PLANCK-INSTITUT FUER KERNPHYSIK, HEIDELBERG (WEST GERMANY).

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MAX-PLANCK-INSTITUT FUER METALLFORSCHUNG, STUTTGART (WEST GERMANY).

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MAX-PLANCK-INSTITUT FUER PHYSIK UND ASTROPHYSIK, GARCHING (WEST GERMANY).

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MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).

Investigation by means of laser magnetic resonance of the OH/HO2 reaction yielding H2O/O2
[MPIS-18A/1980] N82-15161

Noble gas halogen laser induced fluorescence of benzene: Some of its derivatives, difluoromethyl radicals; and carbon monoxide
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Sound damping in a condensation loaded gas flow
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Potential determination of the system sodium (3 2P) plus mercury (6 1S) by measuring and analyzing the rainbow scattering in the superthermal energy domain between 0.3 and 3.2eV
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MCDONNELL-DOUGLAS CORP., ST. LOUIS, MO.

Some technical writing skills industry needs
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MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., MUNICH (WEST GERMANY).

Development and trial of a rotary balance for the 3 m-low speed wind tunnels in the Federal Republic of Germany
[BMFT-FB-W-81-022] N82-15083

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).
System analysis of alternative procedures for deep drilling technique for depth between 6,000 and 10,000 meters
[BMFT-FB-T-81-067] N82-15237
Organic fluids for the practical use in energy conversion systems of solar power plants
[BMFT-FB-T-81-154] N82-15537
Comparison of concepts for solar-heated or solar-driven absorption and compression cooling machines for air conditioning and food preservation purposes, phase 1
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Gamma ray detector for Solar Maximum Mission (SMM) of NASA
[BMFT-FB-W-81-020] N82-16005

METALLGESELLSCHAFT, A.G., FRANKFURT AM MAIN (WEST GERMANY).
Development and testing of materials for seawater desalination plants
[BMFT-FB-M-81-001] N82-15120

METEOROLOGICAL OFFICE, BRACKNELL (ENGLAND).
A description of the UK Meteorological Office CCN counter N82-15391

METEOROLOGY RESEARCH, INC., ALTADENA, CALIF.
MRI airborne research studies in support of HIPLEX
[PB81-243780] N82-15695

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Photoproduction of hydrogen by marine blue-green algae
[PB81-241424] N82-15234

MICHIGAN UNIV., ANN ARBOR.
Environmental controls on the composition of the surface microlayer in Lake Michigan
[PB81-239006] N82-15617

MICRO NETWORKS CORP., WORCESTER, MASS.
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Solar energy training program for code enforcement personnel
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[DE81-030363] N82-15564
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MIDWEST RESEARCH INST., GOLDEN, COLO.
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[DE81-029277] N82-15580
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MINNESOTA GEOLOGICAL SURVEY, ST. PAUL.
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MINNESOTA POWER AND LIGHT CO., DULUTH.
Investigation of geomagnetically induced currents in the proposed Winnipeg-Duluth-twin cities 500-kV transmission line
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MINNESOTA UNIV., MINNEAPOLIS.
Multifacet holographic optical elements N82-15920

MINNESOTA UNIV., ST. PAUL.
Analogical acts as conceptual strategies in science, engineering and the humanities N82-15997

MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
A proposal for continuation of support for the application of remotely sensed data to state and regional problems. Part 1: Technical proposal
[E82-10018] N82-15496

MISSOURI UNIV. -ROLLA.
UMR dual mode CCN counter (modes: CFD plus haze) N82-15367

MITRE CORP., MCLEAN, VA.
Overview of the current MITRE effort N82-15099
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Energy and development in Central America. Volume 1: Regional assessment
[PB81-231540] N82-15589
Energy and development in Central America. Volume 2: Country assessments
[PB81-231557] N82-15590
Proceedings of Software Verification and Validation Symposium
[PB81-236465] N82-15823

MITSUBISHI HEAVY-INDUSTRIES LTD., NAGASAKI (JAPAN).
On the numerical analysis of stall flutter in turbine cascades N82-15054

MITSUBISHI HEAVY-INDUSTRIES LTD., TAKASAGO (JAPAN).
Study of acoustic resonance of cascades N82-15068

MONSANTO RESEARCH CORP., DAYTON, OHIO.
Waste plastic recycling information exchange. Volume 1: Summary report
[PB81-242273] N82-15255
Low-cost mirror concentrator based on inflated, double-walled, metallized, tubular films
[DE81-027813] N82-15551
Engineering handbook for hazardous waste incineration
[PB81-248163] N82-15636

MONTANA DEPT. OF NATURAL RESOURCES AND CONSERVATION, HELENA.
Streamflow characteristics of the Hudson Bay and upper Missouri River Basins, Montana, through 1979
[PB81-247199] N82-15523

MOTOREN- UND TURBINEN-UNION MUENCHEN G.M.B.H. (WEST GERMANY).
Advanced compressor components. Phase 1: 1978 to 1979
[BMFT-FB-W-81-025] N82-15073

MOUND LAB., MIAMISBURG, OHIO.
Dissolution of surface oxide layers on titanium and titanium subhydride between 25 and 700 C
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Characterization of radiation-crosslinked, high-density polyethylene for thermal energy storge applications
[DE81-024915] N82-15549

N

NAGOYA UNIV. (JAPAN).
Design and performance of the new cathode readout proportional chambers in LASS
[DE81-028097] N82-15422

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Supplement to energy for rural development: Renewable resources and alternative technologies for developing countries
[PB81-231011] N82-15592

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Mission Operation Report: RCA-C1/Delta launch
[NASA-TM-84067] N82-15107
Characteristics for calculating parts made of reinforced plastics
[NASA-TM-75915] N82-15455
USSR Space Life Sciences Digest
[NASA-TM-84060] N82-15708
Aerospace Medicine and Biology. A continuing bibliography with indexes (supplement 225)
[NASA-SP-7011(225)] N82-15768
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NASA: Technology transfer
[NASA-TM-84070] N82-16009
Aeronautics and space report of the President, 1980 activities
[NASA-TM-84079] N82-16022

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
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[NASA-TM-81274] N82-15026
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. HUGH L. DRYDEN FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
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[NASA-TM-81368] N82-15079

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
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Space Transportation System Cargo projects: Inertial stage/spacecraft integrationn plan. Volume 1: Management plan
[NASA-CR-165068] N82-15115

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Low-speed aerodynamic performance of a high-aspect-ratio supercritical-wing transport model equipped with full-span slat and part-span double-slotted flaps
[NASA-TP-1580] N82-15015

DONBOL: A computer program for predicting axisymmetric nozzle afterbody pressure distributions and drag at subsonic speeds
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Longitudinal and lateral static stability and control characteristics of a 1/6-scale model of a remotely piloted research vehicle with a supercritical wing
[NASA-TP-1380] N82-15075

Relations for the thermodynamic and transport properties in the testing environment of the Langley hypersonic CF4 tunnel
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Technical communication. Perspectives for the Eighties, part 2
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.

Comparison of two and three dimensional flow computations with laser anemometer measurements in a transonic compressor rotor
[NASA-TM-82777] N82-15020

Computer program for aerodynamic and blading design of multistage axial-flow compressors
[NASA-TP-1946] N82-15039

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Thermodynamics and kinetics of the sulfation of porous calcium silicate
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[NASA-TM-82737] N82-15199

Proceedings of the Conference on High-temperature Electronics
[NASA-TM-84060] N82-15311

High temperature electronic requirements in aeropropulsion systems
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Application of steady state finite element and transient finite difference theory to sound propagation in a variable area duct: A comparison with experiment
[NASA-TM-82678] N82-15647

Role of optical computers in aeronautical control applications
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

System analysis approach to deriving design criteria (Loads) for Space Shuttle and its payloads. Volume 2: Typical examples
[NASA-TP-1950] N82-15106

The aerodynamics of bodies in a rarefied ionized gas with applications to spacecraft environmental dynamics
[NASA-TP-1933] N82-15116

Satellite Power System: Concept development and evaluation program. Volume 7: Space transportation
[NASA-TM-58238] N82-15524

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.

Faraday rotation measurement method and apparatus
[NASA-CASE-NPO-14839-1] N82-15381

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WALLOPS FLIGHT CENTER, WALLOPS ISLAND, VA.

Automated Pilot Advisory System
[NASA-TM-73296] N82-15027

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).

An algorithm which determines the global least squares equidistant spline fit
[NLR-TR-80008-U] N82-15637

On martingales and recursive optimal state estimation
[NLR-TR-80058-U] N82-15636

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.

NBS: Materials measurements
[NASA-CR-165076] N82-15121

The mass spectra and isotopic purity of compounds proposed for use in the master analytical scheme for the analysis of organic compounds in water
[PB81-238453] N82-15163

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[PB81-247017] N82-15164

Vaporization and chemical transport under coal gasification conditions
[PB81-245839] N82-15165

Development of test structures for characterization of the fabrication and performance of radiation-hardened Charge-Coupled Device (CCD) imagers
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[PB81-235053] N82-15436

A heat transfer analysis of scald injury
[PB81-238503] N82-15777

Using microcomputers to monitor the field performance of residential heat pumps
[PB81-240608] N82-15806

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.

The CHON photochemistry of the troposphere: GRASSLANDS project (summer colloquium 1980)
[PB81-233140] N82-15672

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER, DENVER, COLO.

The use of Lidar for emissions source opacity determinations: Second edition
[PB81-246662] N82-15627

NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER, BOULDER, COLO.

Solar-geophysical data number 441, May 1981. Part 1 (Prompt reports). Data for April 1981, March 1981
[PB81-246686] N82-16037

Solar-geophysical data number 441, May 1981. Part 2 (Comprehensive reports). Data for November 1980
[PB81-246696] N82-16038

NATIONAL INST. FOR OCCUPATIONAL SAFETY AND HEALTH, CINCINNATI, OHIO.

An evaluation of engineering control technology for spray painting
[PB81-243123] N82-15789

NATIONAL INST. ON DRUG ABUSE, ROCKVILLE, MD.

New approaches to treatment of chronic pain: A review of multidisciplinary pain clinics and pain centers
[PB81-240913] N82-15778

NATIONAL OCEAN SURVEY, ROCKVILLE, MD.

A history of flying and photography: In the Photogrammetry Division of the National Ocean Survey 1919 - 1979
[PB81-246738] N82-15520

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.

Assessment report on the effects of waste dumping in 106-mile ocean waste disposal site: Dumpsite evaluation report
[PB81-241572] N82-15660

Proceedings of a Symposium on Preliminary Results from the September 1979 RESEARCHER/PIERCE IXTOC-1 Cruise
[PB81-246068] N82-15704

HF radar measurements of surface currents in the German Bight during MARSEN phase 2
[PB81-244410] N82-15707

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.

Impact of weather and climate on agriculture: A selected bibliography
[PB81-245003] N82-15696

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.

National Hurricane operations plan
[PB81-247231] N82-15697

Environmental satellite imagery, March 1981
[PB81-248049] N82-15698

NATIONAL PHYSICAL LAB., TEDDINGTON (ENGLAND).

A bibliography of micro-hardness testing
[NPL-MOM-55] N82-15236

NATIONAL STANDARD REFERENCE DATA SYSTEM.

Physical properties data compilations relevant to energy storage. 4: Molton Salts: Data on additional single and multi-component salt systems
[PB81-244121] N82-15162

NATIONAL WATER WELL ASSOCIATION, WORTHINGTON, OHIO.

Disequilibrium of hydrogen sulfide in ground water by aeration
[PB81-244717] N82-15628

NATO COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY, BRUSSELS (BELGIUM).

Air Pollution Pilot Study: Assessment methodology and modeling, 1975 - 1979 (first follow-up report)
[PB81-242257] N82-15629

Practical demonstration of urban air quality simulation models. Part 1: A report of the NATO/CCMS pilot study on air pollution assessment methodology and modeling
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Air pollution emissions inventory systems. Appendix C: Emissions inventory in the Federal Republic of Germany
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NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.

Remote Medical Diagnosis System (RMDS) utilization study
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NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.

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NAVAL SURFACE WEAPONS CENTER, DAHLGREN, VA.

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[AD-A105612] N82-15700

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
Light depolarization as a measure of pavement surface texture
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NAVAL WEAPONS SUPPORT CENTER, CRANE, IND.
Evaluation program for secondary spacecraft cells: Seventeenth annual report of cycle life test
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NAVY EXPERIMENTAL DIVING UNIT, PANAMA CITY, FLA.
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Research in urban planning during the 70's
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Ultraviolet disinfection of a secondary wastewater treatment plant effluent
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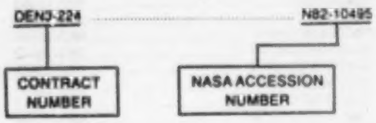

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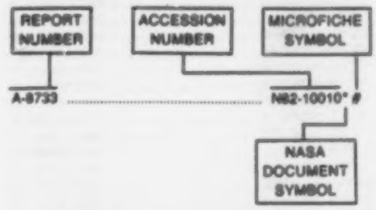

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For related information see also *14 Ground Support Systems and Facilities (Space)*.

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Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

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ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.

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39 STRUCTURAL MECHANICS **918**

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GEOSCIENCES

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SOCIAL SCIENCES

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Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

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Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.

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Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

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Includes cosmology; and interstellar and interplanetary gases and dust.

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Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design, Testing and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

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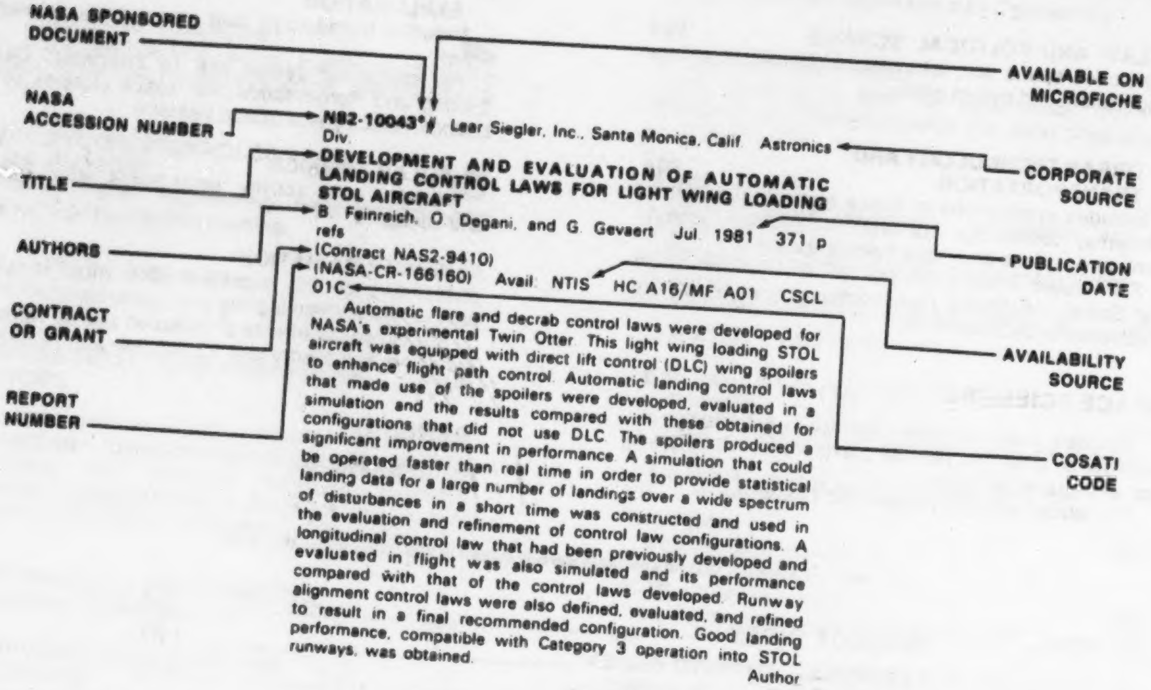
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N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
(Contract NAS2-9410)
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained.

Author

VOLUME 20 NUMBER 7 APRIL 8, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-16040* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING. A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 141, NOVEMBER 1981
Nov. 1981 122 p
(NASA-SP-7037(141)) Avail: NTIS HC $5.00 CSCL 01A

This bibliography lists 404 reports, articles, and other documents introduced into the NASA scientific and technical information system in October 1981. Author

N82-16041* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING. A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 142
Dec. 1981 114 p
(NASA-SP-7037(142)) Avail: NTIS HC $5.00 CSCL 01A

This bibliography lists 398 reports, articles, and other documents introduced into the NASA scientific and technical information system in November 1981. A.R.H.

N82-16042*# Boeing Vertol Co., Philadelphia, Pa.
PREDESIGN STUDY FOR A MODERN 4-BLADED ROTOR FOR THE NASA ROTOR SYSTEMS RESEARCH AIRCRAFT
H. E. Bishop, J. E. Burkam, R. C. Hemingway, C. N. Keys, K. E. Smith, J. H. Smith, and J. A. Staley Jan. 1981 312 p refs
(Contract NAS2-10689)
(NASA-CR-166153) Avail: NTIS HC A14/MF A01 CSCL 01B

Trade-off study results and the rationale for the final selection of an existing modern four-bladed rotor system that can be adapted for installation on the Rotor Systems Research Aircraft (RSRA) are reported. The results of the detailed integration studies, parameter change studies, and instrumentation studies and the recommended plan for development and qualification of the rotor system is also given. Its parameter variants, integration on the RSRA, and support of ground and flight test programs are also discussed. Author

N82-16043*# Hughes Helicopters, Culver City, Calif.
PRE-DESIGN STUDY FOR A MODERN FOUR-BLADED ROTOR FOR THE ROTOR SYSTEM RESEARCH AIRCRAFT (RSRA) Final Report
Charles W. Hughes and Andrew H. Logan Mar. 1981 140 p refs
(Contract NAS2-10690)
(NASA-CR-166154) Avail: NTIS HC A07/MF A01 CSCL 10A

Various candidate rotor systems were compared in an effort to select a modern four-bladed rotor for the RSRA. The YAH-64 rotor system was chosen as the candidate rotor system for further development for the RSRA. The process used to select the rotor system, studies conducted to mate the rotor with the RSRA and provide parametric variability, and the development plan which would be used to implement these studies are presented. Drawings are included. A.R.H.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-16044*# Universities Space Research Association, Columbia, Md.
CAS22 - FORTRAN PROGRAM FOR FAST DESIGN AND ANALYSIS OF SHOCK-FREE AIRFOIL CASCADES USING FICTITIOUS-GAS CONCEPT Final Report
Djordje S. Dulikravich and Helmut Sobieczky (DFVLR-Inst. fuer Theoretische Stroemungsmechanik, Goettingen, West Germany) Washington NASA Jan. 1982 59 p refs
(Contract NAS3-22532)
(NASA-CR-3507) Avail: NTIS HC A04/MF A01 CSCL 01A

A user-oriented computer program, CAS22, was developed that is applicable to aerodynamic analysis and transonic shock-free redesign of existing two-dimensional cascades of airfoils. This FORTRAN program can be used: (1) as an analysis code for full-potential, transonic, shocked or shock-free cascade flows; (2) as a design code for shock-free cascades that uses Sobieczky's fictitious-gas concept; and (3) as a shock-free design code followed automatically by the analysis in order to confirm that the newly obtained cascade shape provides for an entirely shock-free transonic flow field. A four-level boundary-conforming grid of an O type is generated. The shock-free design is performed by implementing Sobieczky's fictitious-gas concept of elliptic continuation from subsonic into supersonic flow domains. Recomputation inside each supersonic zone is performed by the method of characteristics in the rheograph plane by using isentropic gas relations. Besides converting existing cascade shapes with multiple shocked supersonic regions into shock-free cascades, CAS22 can also unchoke previously choked cascades and make them shock free. A.R.H.

N82-16045*# Pennsylvania State Univ., University Park. Applied Research Lab.
THE BOUNDARY LAYER ON COMPRESSOR CASCADE BLADES Semiannual Progress Report, 1 Jun. - 1 Dec. 1981
Steven Deutsch 1 Dec. 1981 19 p refs
(Grant NsG-3264)
(NASA-CR-165079) Avail: NTIS HC A02/MF A01 CSCL 01A

Some redesign of the cascade facility was necessary in order to incorporate the requirements of the LDA system into the design. Of particular importance was the intended use of a combination of suction upstream of the blade pack with diverging pack walls, as opposed to blade pack suction alone, for spanwise dimensionality control. An ARL blade was used to redo some tests using this arrangement. Preliminary testing and boundary layer measurements began on the double circular arc blades. A.R.H.

N82-16046*# Texas A&M Univ., College Station. Dept. of Aerospace Engineering.
SUMMARY OF THEORETICAL CONSIDERATIONS AND WIND TUNNEL TESTS OF AN AERODYNAMIC SPOILER FOR STALL PROOFING A GENERAL AVIATION AIRPLANE
Howard L. Chevalier Jan. 1982 55 p refs
(Grant NsG-1407)
(NASA-CR-165100) Avail: NTIS HC A04/MF A01 CSCL 01A

An airplane stall proofing system utilizing a spoiler was investigated for application on a low wing airplane representative of typical general aviation aircraft. Tests of the full scale airplane were conducted in the NASA Langley 30 x 60 foot full scale wind tunnel. The test velocity was 86 feet per second, corresponding to a Reynolds number of 2.20 million. The stall proofing capability of the spoiler is shown and a theoretical approach to the design of the spoiler and analysis of the spoiler's contribution to the airplane's trim and longitudinal stability is verified. Controlled spoiler deployment in a narrow angle of attack range, 4 degrees, immediately preceding the stall angle will stall proof the airplane. The results also show some of the limitations of flight tests to determine spoiler deployment rate for good handling qualities. M.G.

N82-16047*# Polytechnic Inst. of New York, Brooklyn. Dept. of Mechanical and Aerospace Engineering.
CALCULATION OF THREE-DIMENSIONAL, INVISCID, SUPERSONIC, STEADY FLOWS Final Report
Gino Moretti Dec. 1981 120 p refs
(Grant NsG-1248)
(NASA-CR-165110; POLY/M/AE-81-25) Avail: NTIS HC A06/MF A01 CSCL 20D

A detailed description of a computational program for the evaluation of three dimensional supersonic, inviscid, steady flow past airplanes is presented. Emphasis was put on how a powerful, automatic mapping technique is coupled to the fluid mechanical analysis. Each of the three constituents of the analysis (body geometry, mapping technique, and gas dynamical effects) was carefully coded and described. Results of computations based on sample geometrics and discussions are also presented. M.D.K.

N82-16048*# Texas A&M Univ., College Station. Dept. of Aerospace Engineering.
A UNIFIED THERMAL AND VERTICAL TRAJECTORY MODEL FOR THE PREDICTION OF HIGH ALTITUDE BALLOON PERFORMANCE Final Report
Leland A. Carlson and Walter J. Horn Jun. 1981 90 p refs
(Contract NAS6-3072)
(NASA-CR-156884; TAMRF-4217-81-01) Avail: NTIS HC A05/MF A01 CSCL 01A

A computer model for the prediction of the trajectory and thermal behavior of zero-pressure high altitude balloon was developed. In accord with flight data, the model permits radiative emission and absorption of the lifting gas and daytime gas temperatures above that of the balloon film. It also includes ballasting, venting, and valving. Predictions obtained with the model are compared with flight data from several flights and newly discovered features are discussed. Author

N82-16049*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
APPLICATION OF IMAGE PROCESSING TECHNIQUES TO FLUID FLOW DATA ANALYSIS
Charles C. Giamati 1981 16 p Presented at the 11th Ann. Computer Output Microfilm (COMtec) Conf., Lincolnshire, Ill., 24-26 Feb. 1981
(NASA-TM-82760; E-1081) Avail: NTIS HC A02/MF A01 CSCL 01A

The application of color coding techniques used in processing remote sensing imagery to analyze and display fluid flow data is discussed. A minicomputer based color film recording and color CRT display system is described. High quality, high resolution images of two-dimensional data are produced on the film recorder. Three dimensional data, in large volume, are used to generate color motion pictures in which time is used to represent the third dimension. Several applications and examples are presented. System hardware and software is described. M.G.

N82-16050# National Aerospace Lab., Tokyo (Japan).
SOME EXPERIMENTAL INVESTIGATIONS ON TRANSONIC FLUTTER CHARACTERISTICS OF THIN PLATE WING MODELS WITH SWEPTBACK AND TAPERED TIPS
Eiichi Nakai Sep. 1981 49 p refs In JAPANESE; ENGLISH summary
(NAL-TR-682; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

Some experimental investigations on the transonic flutter characteristics were conducted using thin plate cantilevered wing models with sweptback tapered tips, which were elastically supported at the root, in the NAL 0.6m x 0.6m transonic blowdown wind tunnel for flutter testing in the range of Mach numbers from 0.804 to 1.171. The wing models have the tip planform of sweptback angles of 35 degrees at the leading edge and 30 degrees at 1/4 chord line, and an aspect ratio of 1.017 and a taper ratio of 0.6. It is concluded that the flutter boundaries of the wing models have been obtained and the boundaries expressed by the 'experimental flutter speed coefficient' are characterized as having minimum values at around Mach number 1.0. It is also concluded that the considerable increase in the flutter instability area is caused by the decrease in the stiffness of the elastic support at the root of the model. Author

N82-16051# Air Force Flight Test Center, Edwards AFB, Calif.
A METHOD OF ESTIMATING UPWASH ANGLE AT NOSEBOOM-MOUNTED VANES Final Report
Kenneth Rawlings, III Jun. 1981 115 p refs
(AD-A106160; AFFTC-TIM-81-1) Avail: NTIS HC A06/MF A01 CSCL 20/4

This technical information memorandum documents a theoretically-based method of estimating the upwash angle at noseboom-mounted vanes of an arbitrary aircraft. The method is commonly called the Yaggy-Rogallo technique and has been used successfully for many years at the NASA/Dryden Flight Research Center (NASA/DFRC) and the Air Force Flight Test Center (AFFTC). The technique divides any aircraft into a collection of bodies of revolution and thin airfoils, makes upwash angle estimates for each component, and combines the individual estimates into a single estimate. Development of the theory for upwash angle estimates of both bodies of revolution and thin airfoils are presented. Recent improvements in solution and use of the Yaggy-Rogallo equations are also presented. Guidelines for using the upwash angle estimates in data reduction and analysis are presented along with comparisons to flight test upwash calibration data showing excellent results. FORTRAN V computer programs were written to simplify and expedite making upwash angle estimates. Listings of the program code, a user's guide, and a programmer's guide are included in the memorandum. Author (GRA)

N82-16052# Grumman Aerospace Corp., Bethpage, N.Y. Research Dept.
THE ANALYSIS AND DESIGN OF TWO-ELEMENT AIRFOIL CONFIGURATION IN TRANSONIC FLOW Final Report, 19 May 1975 - 30 Aug. 1979
Giuseppe Volpe Oct. 1981 67 p refs
(Contract N00014-75-C-0722)
(AD-A107547; ONR-CR-215) Avail: NTIS HC A04/MF A01 CSCL 20/4

This report describes the development of numerical techniques for predicting the flow over two-element airfoil configurations, such as airfoils with a slat or a flap, at transonic speeds and for designing such airfoil systems. The effort was divided in three phases. The first phase involved the development of a method to compute the inviscid flow over these configurations. In the second phase the inviscid code was coupled to a boundary layer calculation program in order to compute the loss in performance due to viscous effects. In the third phase an inverse design code that constructs the airfoil system corresponding to a desired pressure distribution was developed. Author (GRA)

N82-16053# Grumman Aerospace Corp., Bethpage, N.Y.
NONLINEAR ANALYSIS OF INTERFERING BODIES IN SUPERSONIC FLOW Final Report, 17 Mar. 1980 - 16 May 1981
Frank Marconi Jul. 1981 63 p refs
(Contract F49620-80-C-0044; AF Proj. 2307)
(AD-A108071; RE-631; AFOSR-81-0771TR) Avail: NTIS
HC A04/MF A01 CSCL 20/4

This report describes a study of the flow field about interfering bodies in a supersonic stream and is directed toward the prediction of supersonic store carriage/separation. The development of computational techniques aimed at producing a usable code is discussed. The code includes a characteristic based finite difference scheme to solve Euler's equations and a new and general shock fitting scheme. One problem uncovered during this first years effort is that of transition from a regular reflection to a Mach disc shock configuration. The basic finite difference scheme has been exercised extensively and was proven sound. More importantly the new shock fitting scheme is able to predict complex interactive shock patterns. GRA

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N82-16054# Federal Aviation Administration, Oklahoma City, Okla. Civil Aeromedical Inst.
THE PREVALENCE OF VISUAL DEFICIENCIES AMONG 1979 GENERAL AVIATION ACCIDENT AIRMEN
J. R. Dille and C. F. Booze, Jr. Jul. 1981 10 p refs
(AD-A106489; FAA-AM-81-14) Avail: NTIS
HC A02/MF A01 CSCL 01/2

Analyses of the accident experience of pilots who were monocular, did not meet (even the liberal) vision standards, had color vision defects and no operational restrictions, or wore contact lenses, have shown higher-than-expected accident experience in previous studies. However, no causal role had been assigned by accident investigators and reexamination of the records failed to show any obvious pattern or relationship between the defects and the accidents. In the present study of 1979 accidents, the relatively small number of pilots with aphakia and artificial lens implants, as well as the total eye pathology population, had significantly higher accident rates, but the monocular pilots did not. Again, no causal role had been ascribed. Some associations are debatable, but there is no clear recurring problem. There are still unresolved questions about the consistent operational performance of monocular pilots, those who are not fully corrected to 20/20 distant visual acuity bilaterally, airmen with near vision deficiencies only who are not required to wear corrective glasses, those without fusion, and several with appreciable pathology who have 20/20 corrected central visual acuity but about whom we know very little concerning their dynamic, peripheral, depth or accommodative function. Author (GRA)

N82-16055# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
A GENERALIZED ESCAPE SYSTEM SIMULATION COMPUTER PROGRAM: A USER'S MANUAL Final Report
Louis A. DAulerio, Kathleen M. Breakey (Computer Sciences Corp., Huntington Valley, Pa.), Shirley W. Trimble (Computer Sciences Corp., Huntington Valley, Pa.), and Bruce Waldron (Computer Sciences Corp., Huntington Valley, Pa.) Aug. 1981 105 p
(Contract N62269-78-C-0191)
(AD-A106152; NADC-81224-60) Avail: NTIS
HC A06/MF A01 CSCL 01/3

The Generalized Escape System Simulation Computer Program was developed to simulate the operation of various ejection seats. The program generates a three dimensional trajectory of the ejection seat and its occupant, and is intended to be used in the evaluation of ejection seat design and performance. The program is written in FORTRAN IV and is highly structured for ease of modification and updating. This report outlines the steps necessary to succesfully execute the program. Author (GRA)

N82-16056# Army Research and Technology Labs., Fort Eustis, Va. Applied Technology Lab.
TEST AND EVALUATION OF IMPROVED AIRCREW RESTRAINT SYSTEMS
G. T. Singley, III Sep. 1981 352 p refs
(DA Proj. 1L1-62209-AH-76)
(AD-A107576; USAAVRADCOM-TR-81-D-27) Avail: NTIS
HC A16/MF A01 CSCL 01/3

US Army aviation accident data shows that a majority of all injuries in attack helicopters could have been avoided if these aircraft had been equipped with crashworthy seat and restraint systems. The compactness of the cockpit and the close proximity of mission equipment to the aircrew in attack and scout helicopters pose serious crash impact hazards. Although not desirable from a crashworthiness standpoint, operational considerations may dictate that mission equipment and structure be located within the occupant's crash impact motion envelope, particularly for his head. The cockpit can be delethalized further when the improved restraint is complemented by padding potential strike surfaces in the cockpit; making contact surfaces frangible; and providing weapon system sights with frangibility, telescoping, and/or swing-away features. This report presents the results of an effort to test and compare the potential of several aircrew restraint systems to reduce the crash impact motion envelope of helicopter aircrewmen. Author (GRA)

N82-16057# Department of Energy, Washington, D. C.
SYMPOSIUM ON COMMERCIAL-AVIATION ENERGY-CONSERVATION STRATEGIES
1981 373 p refs Proceedings of Symp. on Commercial Aviation Energy Conserv. Strategies, Washington, D.C., 2-3 Apr. 1981 Sponsored in part by FAA, Washington, D.C.
(DE81-028406; CONF-8104103) Avail: NTIS
HC A16/MF A01

Energy conservation strategies applicable to commercial aviation are presented. General topics discussed include Federal and industry conservation programs such as flight operations, air traffic control, engineering and maintenance, and corporate management strategies. Included is a discussion of possible future actions. DOE

N82-16058# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
SPECIAL INVESTIGATION REPORT. SEARCH AND RESCUE PROCEDURES AND ARMING OF EMERGENCY LOCATOR TRANSMITTER: AIRCRAFT ACCIDENT NEAR MICHIGAN CITY, INDIANA, 7 DECEMBER, 1980
11 Aug. 1981 19 p
(PB81-249427; NTSB-SIR-81-2) Avail: NTIS
HC A02/MF A01 CSCL 01B

A special investigation of the circumstances surrounding the crash of a Beechcraft E-90, near Michigan City, Indiana, on December 7, 1980 and of the search and rescue activities following the accident, and the associated operation of the aircraft's emergency locator transmitter (ELT) is presented. As a result of not following proper notification procedures, coordination oversights, and communicaton gaps, the search for the missing aircraft was significantly hampered. The actual crash site was not reached by search personnel until nearly 4 hours after the crash. Some or all of the aircraft's four occupants, who died of hypothermia, probably survived the original crash. Examination of the ELT switch revealed that it was in the OFF position. A rescue could have been effected if the proper authorities had been notified and given the aircraft's last known position. GRA

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications*.

N82-16059* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SPECTRALLY BALANCED CHROMATIC LANDING APPROACH LIGHTING SYSTEM Patent
Wendell D. Chase, inventor (to NASA) Issued 22 Sep. 1981 10 p Filed 10 Dec. 1976 Supersedes N77-12031 (15 - 03, p 0286)
(NASA-Case-ARC-10990-1; US-Patent-4,291,294; US-Patent-Appl-SN-749420; US-Patent-Class-340-26; US-Patent-Class-244-114R) Avail: US Patent and Trademark Office CSCL 17G

Red warning lights delineate the runway approach with additional blue lights juxtaposed with the red lights such that the red lights are chromatically balanced. The red/blue point light sources result in the phenomenon that the red lights appear in front of the blue lights with about one and one-half times the diameter of the blue. To a pilot observing these lights along a glide path, those red lights directly below appear to be nearer than the blue lights. For those lights farther away seen in perspective at oblique angles, the red lights appear to be in a position closer to the pilot and hence appear to be above the corresponding blue lights. This produces a very pronounced three dimensional effect referred to as chromostereopsis which provides valuable visual cues to enable the pilot to perceive his actual position above the ground and the actual distance to the runway. Official Gazette of the U.S. Patent and Trademark Office

N82-16060*# Analytical Mechanics Associates, Inc., Hampton, Va.
TERMINAL AREA AUTOMATIC NAVIGATION, GUIDANCE, AND CONTROL RESEARCH USING THE MICROWAVE LANDING SYSTEM (MLS). PART 3: A COMPARISON OF WAYPOINT GUIDANCE ALGORITHMS FOR RNAV/MLS TRANSITION Final Report
Samuel Pines Washington NASA Jan. 1982 87 p refs
(Contract NAS1-15116)
(NASA-CR-3512; AMA-81-7) Avail: NTIS HC A05/MF A01 CSCL 17G

The results of an investigation carried out for the Langley Research Center Terminal Configured Vehicle Program are presented. The investigation generated and compared three path update algorithms designed to provide smooth transition for an aircraft guidance system from DME, VORTAC, and barometric navaids to the more precise MLS by modifying the desired 3-D flight path. The first, called the Zero Cross Track, eliminates the discontinuity in cross track and altitude error by designating the first valid MLS aircraft position as the desired first waypoint, while retaining all subsequent waypoints. The discontinuity in track angle is left unaltered. The second, called the Tangent Path also eliminates the discontinuity in cross track and altitude and choose a new desired heading to be tangent to the next oncoming circular arc turn. The third, called the Continued Track eliminates the discontinuity in cross track, altitude and track angle by accepting the current MLS position and track angle as the desired ones and recomputes the location of the next waypoint. A method is presented for providing a waypoint guidance path reconstruction which treats turns of less than, and greater than, 180 degrees in a uniform manner to construct the desired path. Author

N82-16061# Rome Air Development Center, Griffiss AFB, N.Y.
PASSIVE TRILATERATION POSITIONING PROCEDURE ERROR ANALYSIS
Dean C. Merchant Aug. 1981 25 p ref
(AF Proj. 4594)
(AD-A106690; RADC-TR-81-225) Avail: NTIS HC A02/MF A01 CSCL 17/7

This report presents the results of a conceptual and analytical study pertaining to the propagation of errors through a spatial trilateration network. The network consists of an aircraft, DME ground based units and an independent ground based tracker. The primary error sources treated are DME range errors, geodetic coordinate errors of the ground based DME units, timing errors and the 'Geodetic slice' between the local survey relating DME stations and the ground based tracker. The result is an algebraic tool for studying the influences of various system errors and geometry on the error in positioning an aircraft with respect to a ground based tracking unit. Author (GRA)

N82-16062# Eclectech Associates, Inc., North Stonington, Conn.
SIMULATOR EVALUATION OF ELECTRONIC RADIO AIDS TO NAVIGATION DISPLAYS. THE RA-2 EXPERIMENT Interim Report
R. B. Cooper, K. L. Marino, and W. R. Bertsche Jul. 1981 122 p
(Grant DOT-CG-835285-A)
(AD-A106672; EA-81-U-009; USCG-D-50-81) Avail: NTIS HC A06/MF A01 CSCL 17/7

The report describes a ship's bridge simulation evaluation of an electronic radio aids to navigation display for use by pilots in restricted waterways. The experiment known as RA-2 is the third in a series of experiments to trade off display information effectiveness with operational requirements and shipboard system cost. The RA-2 evaluation used a 'benchmark' true motion, trackup GRAPHIC display recommended in the previous experiment to conduct simulated poor visibility runs of a 30,000 dwt tanker around a 35-degree left bend in a 500-foot-wide channel. Experimental variables included two different navigation system noise levels which translated to random position errors of 16 and 32 meters RMS, and the use of an ALPHA-BETA tracker with 3-, 12-, or 24-second rise time, or gyro aiding, to represent a state-of-the-art navigation system filtering capability. Evaluation criteria included pilot trackkeeping and maneuvering performance as well as system acceptance. The report describes the rationale for variable selection, how they were simulated, and their potential effect on restricted waterway pilotage when the 'benchmark' display is used. Author (GRA)

N82-16063# Lincoln Lab., Mass. Inst. of Tech., Lexington.
ATCRBS UPLINK ENVIRONMENT MEASUREMENT NEAR JACKSONVILLE, FLORIDA
F. Nagy, Jr. 25 Sep. 1981 124 p
(Contracts F19638-80-C-0002; DOT-FA72WAI-261; FAA Proj. 052-241-04)
(AD-A108053; ATC-94; FAA-RD-80-70) Avail: NTIS HC A06/MF A01 CSCL 17/7

Airborne measurements of the Air Traffic Control Radar Beacon System (ATCRBS) 1030 MHz uplink environment are described. Measurements were made using the AMF, a special purpose airborne sensor-recorder, during a 23 May 1979 flight in the greater Jacksonville, Florida area. The 2-way flight covered the 450 nm coastline between Fayetteville (NC) and Vero Beach (FL) first at 10,000 then at 25,000 feet. Data recorded at 61 locations have been analyzed to plot combined pulse, interrogation and suppression rates for all locations and individual rates, received powers and angles for 37 locations. Fifty-nine ground interrogators were detected and a list included serves as an all-interrogator/all location (59 x 37) visibility matrix. PRI/PRF distributions of interrogations received are shown at three selected measurement locations. A pulse-by-pulse plot of over 50 Mode 4 interrogations shows their effect on a typical transponder. A worst location is examined for peak instantaneous interrogation rates capable of causing transponder reply-rate limiting (RRL), desensitization and track loss. Durations and periods of recurrence of synchronous jamming for 23 near-equal scan periods are computed. Probabilities or multiple mainbeam coincidences (multi-PRF jamming) are also calculated. Airborne (AMF) and ground based (FAA En-route) coverages are compared, and reported operational problems (target splits, lost tracks, poor coverage) are addressed. Author

N82-16064# Harry Diamond Labs., Adelphi, Md.
THE ZERO-DOPPLER POSITIONING SYSTEM
Wolfgang G. A. Wiebach and Barry L. Stann Sep. 1981 97 p refs

(DA Proj. 1G6-62707-A-576)
(AD-A107806; HDL-TR-1968) Avail: NTIS HC A05/MF A01
CSCL 17/7

This report investigates a radio positioning system for forward artillery observers. The theoretical basis is derived, and implementation schemes are discussed. The preferred implementation is developed in detail and an experimental hardware model is described, giving performance specifications and circuit diagrams of the more important subassemblies. A program of simulated field tests of various degrees of complexity was carried out in the Washington, DC, area; their results are presented.
Author (GRA)

N82-16065# Coast Guard Research and Development Center, Groton, Conn.
ANALYTICAL POSITIONING OF AIDS TO NAVIGATION Final Report
Miles A. Millbach Nov. 1981 130 p refs
(AD-A107811; CGR/DC-5/81; USCG-D-22-81) Avail: NTIS HC A07/MF A01 CSCL 17/7

Sophisticated systems such as the Global Positioning System (GPS) and the Inertial Positioning System (IPS) are not yet economically justified for widespread Coast Guard use in positioning aids to navigation. To improve accuracy and precision in positioning until such systems are justified, alternative procedures have been explored. Accuracy and precision are addressed to create various mathematical, statistical and operational procedures immediately applicable to the Coast Guard. This adventure into marine geodesy can help the Coast Guard employ error minimizing positioning procedures until more precise methods and reliable techniques are available.
Author (GRA)

N82-16066# Naval Surface Weapons Center, Dahlgren, Va. Strategic Systems Dept.
TIME CORRECTION OF DATA FROM THE NAVSTAR GEODETIC RECEIVER SYSTEM Final Report
Bruce R. Hermann Aug. 1981 75 p refs
(AD-A107643; NSWC/TR-81-174) Avail: NTIS HC A04/MF A01 CSCL 17/7

The NAVSTAR Global Positioning System (NGPS) can be used for geodetic applications. The NAVSTAR Geodetic Receiver System (NGRS) has been developed to demonstrate this capability. In order to use the pseudorange and Doppler observations to do precise point positioning, the time of each observation must be known in the GPS time system. The method used to convert local (NGRS) time to GPS time is described. Author (GRA)

N82-16067# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
AIRCRAFT POSITION MEASUREMENT USING LASER BEACON OPTICS M.S. Thesis - Princeton Univ.
Steven G. Webb 1981 107 p refs
(AD-A107973; AFIT-CI-81-58T) Avail: NTIS HC A06/MF A01 CSCL 17/7

The development of a system to precisely measure the relative position between two aircraft in-flight utilizing a laser beacon, an optical detector array, and on-board microprocessing is examined. The laser beacon board, mounted on the helicopter, consists of two orthogonal fan-shaped narrow width beams, which rotate at a constant four revolutions per second and have fields of view approaching 166 degrees. The photodiode transmits the detected beams, as pulses, to an electronics system where they pass through a band-pass filter and are converted into digital pulses for signal processing. The laser pulses are detected in the presence of background solar interference through optical spectral filtering of the incident light and electronic filtering of the photodiode signal. Initial tests of the laser beacon and the detector optics have demonstrated the potential for their use as elements of a relative position measurement system. GRA

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.
For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-16068*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPIN TESTS OF A SINGLE-ENGINE, HIGH-WING LIGHT AIRPLANE
Eric C. Stewart, William T. Suit, Thomas M. Moul, and Philip W. Brown Jan. 1982 93 p refs
(NASA-TP-1927; L-14305) Avail: NTIS HC A05/MF A01 CSCL 01C

The airplane has a relatively steep spin mode (low angle of attack) with a high load factor and high velocity. The airplane recovers almost immediately after any deviation from the prospin control positions, except for one maneuver with reduced flexibility in the elevator control system.
T.M.

N82-16069*# Nielsen Engineering and Research, Inc., Mountain View, Calif.
INTEGRATION OF A CODE FOR AEROELASTIC DESIGN OF CONVENTIONAL AND COMPOSITE WINGS INTO ACSYNT, AN AIRCRAFT SYNTHESIS PROGRAM Final Report, 1972 - 1974
Joseph Mullen, Jr. Ames Research Center, Calif. NASA May 1976 143 p refs
(Contract NAS2-8558)
(NASA-CR-137805) Avail: NTIS HC A07/MF A01 CSCL 01C

A comparison of program estimates of wing weight, material distribution, structural loads and elastic deformations with actual Northrop F-5A/B data is presented. Correlation coefficients obtained using data from a number of existing aircraft were computed for use in vehicle synthesis to estimate wing weights. The modifications necessary to adapt the WADES code for use in the ACSYNT program are described. Basic program flow and overlay structure is outlined. An example of the convergence of the procedure in estimating wing weights during the synthesis of a vehicle to satisfy F-5 mission requirements is given. A description of inputs required for use of the WADES program is included.
T.M.

N82-16070*# Lockheed-Georgia Co., Marietta.
TURBOPROP CARGO AIRCRAFT SYSTEMS STUDY
J. C. Muehlbauer, J. G. Hewell, Jr., S. P. Lindenbaum, C. C. Randall, N. Searle, and R. G. Stone, Jr. Nov. 1981 232 p refs
(Contract NAS1-15708)
(NASA-CR-165813; LG81ER0222) Avail: NTIS HC A11/MF A01 CSCL 01C

The effects of using advanced turboprop propulsion systems to reduce the fuel consumption and direct operating costs of cargo aircraft were studied, and the impact of these systems on aircraft noise and noise prints around a terminal area was determined. Parametric variations of aircraft and propeller characteristics were investigated to determine their effects on noiseprint areas, fuel consumption, and direct operating costs. From these results, three aircraft designs were selected and subjected to design refinements and sensitivity analyses. Three competitive turbofan aircraft were also defined from parametric studies to provide a basis for comparing the two types of propulsion.
S.L.

N82-16071# Aeronautical Research Labs., Melbourne (Australia).
RESONANCE TESTS ON A PIPER PA-32R TAILPLANE BEFORE AND AFTER DAMAGE Technical Memo, Feb. - Jul. 1980
A. Goldman and B. Quinn Apr. 1981 16 p ref
(AD-A106273; ARL/STRUC-TM-328) Avail: NTIS HC A02/MF A01 CSCL 01/3

Investigations have been carried out, on the tailplane of a Piper PA-32R aircraft, to determine the effect of damage, in the form of a split in the underside skin, on the modes of

vibration of the tailplane. Details and results of the investigations are described.
Author (GRA)

N82-16072# Rockwell International Corp., El Segundo, Calif. Aircraft Div.
CONFIGURATION DEVELOPMENT SYSTEM/NAVAIR REPORT Final Report
Daniel Paul Raymer 26 May 1981 8 p
(Contract N00019-80-C-0489)
(AD-A106727; NA-81-290) Avail: NTIS HC A02/MF A01 CSCL 01/3

A fixed price level of effort was performed to install Rockwell's Configuration Development System (CDS) at the Naval Air Systems Command (NAVAIR) facility in Washington, D.C. (Crystal City). Installation of CDS permits NAVAIR the capability to conceptually design aircraft concepts on an interactive graphics terminal and also perform conceptual analysis and concept iteration. Under the contract, the CDS system was converted to run on a VAX 11-780 computer. Program modifications were implemented to allow a greater degree of device-independence, especially for terminal input/output. Also, the CDS program was tested and debugged, the command interpreter was improved, and some additional capabilities were developed. The manual was rewritten including the addition of training materials for classroom and hands-on instruction. Finally, the system was installed and users were trained.
Author (GRA)

N82-16073# Aeronautical Research Labs., Melbourne (Australia).
GROUND CALIBRATION OF A STRAIN-GAUGED CT-4A AIRCRAFT (1979)
R. P. Carey and S. P. Costolloe Apr. 1981 53 p refs
(AD-A107847; ARL/SRUC-TM-330) Avail: NTIS HC A04/MF A01 CSCL 01/3

A strain gauged CT-4A aircraft was calibrated for external loadings as a supplement to flight testing. The loading has been described and the outputs from regression analyses on the strain/load data have been tabulated.
Author (GRA)

N82-16074# Army Aviation Engineering Flight Activity, Edwards AFB, Calif.
ICE PHOBICS BLADE TRACKING AND COMPARISON OF VIBRATION ANALYSIS TECHNIQUES Final Report, Jun. 1979 - Mar. 1980
William Y. Abbott, Floyd I. Dominick, and Stuart Arthur May 1981 64 p refs
(AD-A108121; USAAEFA-79-86) Avail: NTIS HC A04/MF A01 CSCL 01/3

The United States Army Aviation Engineering Flight Activity conducted an evaluation of two vibration measuring devices, the Chadwick-Helmuth VIBREX and the Scientific-Atlanta Vibration Signature Recorder, as flight test instrumentation. During the course of those evaluations, it was determined that the Dow Corning E2460-40-1 (redesignated E2978-46) ice phobic coating applied to the rotor blades of a UH-1H helicopter, did not induce undesirable vibrations. It was also concluded that the VIBREX may be used as test instrumentation if the frequencies of interest are already known, and the Scientific-Atlanta device provides good 'quick look' spectral vibration data.
Author (GRA)

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N82-16075* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
SYSTEM FOR PROVIDING AN INTEGRATED DISPLAY OF INSTANTANEOUS INFORMATION RELATIVE TO AIRCRAFT ATTITUDE, HEADING, ALTITUDE, AND HORIZONTAL SITUATION Patent
Robert James, inventor (to NASA) (James and Associates, Lancaster, Calif.) Issued 11 Aug. 1981 19 p Filed 30 May 1979 Supersedes N79-24988 (17 - 16, p 2074) Sponsored by NASA
(NASA-Case-FRC-11005-1; US-Patent-4,283,705; US-Patent-Appl-SN-043942; US-Patent-Class-340-27NA; US-Patent-Class-73-178R) Avail: US Patent and Trademark Office CSCL 01D

A display device is disclosed which is particularly suited for providing the pilot of an aircraft with combined inflight altitude, heading, altitude, and horizontal situation information previously available only by using two or three devices providing separate displays. The preferred embodiment combines a commonly used and commercially available flight director-type device for providing a display in combination with a miniature aircraft supported for angular displacement from a vertical orientation to indicate heading error, or heading offset, and an extended course deviation indicator bar which projects into juxtaposition with the miniature aircraft for providing a true picture of the aircraft's horizontal situation relative to a selective VOR, ILS, or MLS course.
Official Gazette of the U.S. Patent and Trademark Office

N82-16076*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THREAT PERCEPTION WHILE VIEWING SINGLE INTRUDER CONFLICTS ON A COCKPIT DISPLAY OF TRAFFIC INFORMATION
Stephen R. Ellis and Everett Palmer Jan. 1982 17 p refs
(NASA-TM-81341; A-8798) Avail: NTIS HC A02/MF A01 CSCL 01D

Subjective estimates of the threat posed by a single intruder aircraft were determined by showing pilots photographs of a cockpit display of traffic information. The time the intruder was away from the point of minimum separation was found to be the major determinant of the perception of threat. When asked to choose a maneuver to reduce the conflict, pilots selected maneuvers with a bias toward those that would have kept the intruders in sight had they been visible out the cockpit window.
Author

N82-16077# Boeing Commercial Airplane Co., Seattle, Wash.
AIRCRAFT ALERTING SYSTEMS STANDARDIZATION STUDY. VOLUME 2: AIRCRAFT ALERTING SYSTEM DESIGN GUIDELINES Final Report
B. L. Berson, D. A. Po-Chedley, G. P. Boucek, D. C. Hanson, M. F. Leffler, and R. L. Wasson Jan. 1981 186 p refs
(Contract DOT-FA79WA-4268)
(AD-A106732; D6-49976TN; FAA-RD-81-38-vol-2) Avail: NTIS HC A09/MF A01 CSCL 01/4

This report is one of a series of documented studies directed to the improvement and standardization of aircraft alerting systems. The purpose of the study was to develop and validate, through simulation, functional design criteria that can be used in designing effective aircraft alerting systems. The major objectives of this phase of the study were to: resolve system component questions; validate the two candidate system/concepts by comparison to a representative baseline system, for both the pilot and flight engineer stations; evaluate presentation media and display formats for time-critical warnings; and develop guidelines for the design of alerting systems. This document presents a set of design guidelines directed to the improvement and standardization of aircraft alerting systems. The objective of the guidelines is not to define a simple hardware design that each manufacturer must use, but rather to provide functional design criteria that can be used to develop effective alerting systems, and to promote standardization within the industry.
GRA

N82-16078# Simula, Inc., Tempe, Ariz.
OPERATOR'S MANUAL FOR VARIABLE WEIGHT, VARIABLE CG HELMET SIMULATOR
Craig M. Svoboda and James C. Warrick Fort Rucker, Ala. Army Aeromedical Research Lab. Sep. 1981 29 p Prepared for Wright State Univ.
(Contract DAMD17-80-C-0089)
(AD-A108093; USAARL-81-7) Avail: NTIS HC A03/MF A01 CSCL 05/5

A variable weight, variable CG helmet simulator has been designed to measure the effect of US Army headgear on muscle loading and fatigue. The helmet simulator consists of two weight concealment boxes attached to opposite sides of a supporting head which in turn is mounted on the wearer's head by a suspension system taken from an SPH-4 helmet. The weight and CG can be altered by positioning variable weights within the concealment boxes. Author (GRA)

N82-16079# TRW Defense and Space Systems Group, Redondo Beach, Calif.
DIGITAL AVIONICS INFORMATION SYSTEM (DAIS): DEVELOPMENT AND DEMONSTRATION Final Report, 1 Oct. 1978 - 31 Jul. 1981
M. J. Cook, R. C. Mason, J. L. Stautberg, L. E. Self, R. L. Ellison, and M. J. Strathman Wright-Patterson AFB, Ohio AFWAL Sep. 1981 201 p
(Contract F33615-78-C-1502; AF Proj. 2052)
(AD-A107906; AFWAL-TR-81-1165) Avail: NTIS HC A10/MF A01 CSCL 09/2

The Digital Avionics Information System (DAIS) represents a significant advance in the technology of avionics system architecture. DAIS is a total systems concept, exploiting standardization, modularity, and application independent executive software to provide a system architecture adaptable to many aircraft, missions, and avionics configurations and fully capable of accommodating new advances in technology. These fundamental system characteristics are described in this report; the specific system features which provide these characteristics and attributes are presented. GRA

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion.*

N82-16080*# United Technologies Research Center, East Hartford, Conn.
RESEARCH AND DEVELOPMENT PROGRAM FOR NONLINEAR STRUCTURAL MODELING WITH ADVANCED TIME-TEMPERATURE DEPENDENT CONSTITUTIVE RELATIONSHIPS Final Report
Kevin P. Walker 25 Nov. 1981 187 p refs
(Contract NAS3-22055)
(NASA-CR-165533; PWA-5700-50) Avail: NTIS HC A09/MF A01 CSCL 21E

Results of a 20-month research and development program for nonlinear structural modeling with advanced time-temperature constitutive relationships are reported. The program included: (1) the evaluation of a number of viscoplastic constitutive models in the published literature; (2) incorporation of three of the most appropriate constitutive models into the MARC nonlinear finite element program; (3) calibration of the three constitutive models against experimental data using Hastelloy-X material; and (4) application of the most appropriate constitutive model to a three dimensional finite element analysis of a cylindrical combustor liner louver test specimen to establish the capability of the viscoplastic model to predict component structural response. M.D.K.

N82-16081*# Pratt and Whitney Aircraft Group, East Hartford, Conn.
STUDY OF CONTROLLED DIFFUSION STATOR BLADING. 1. AERODYNAMIC AND MECHANICAL DESIGN REPORT
E. Canal, B. C. Chisholm, D. Lee, and D. A. Spear Jan. 1981 97 p refs
(Contract NAS3-22008)
(NASA-CR-165500; PWA-5698-28) Avail: NTIS HC A05/MF A01 CSCL 21E

Pratt & Whitney Aircraft is conducting a test program for NASA in order to demonstrate that a controlled-diffusion stator provides low losses at high loadings and Mach numbers. The technology has shown great promise in wind tunnel tests. Details of the design of the controlled diffusion stator vanes and the multiple-circular-arc rotor blades are presented. The stage, including stator and rotor, was designed to be suitable for the first-stage of an advanced multistage, high-pressure compressor. Author

N82-16082*# Oklahoma State Univ., Stillwater. School of Mechanical and Aerospace Engineering.
A COMPUTER CODE FOR SWIRLING TURBULENT AXISYMMETRIC RECIRCULATING FLOWS IN PRACTICAL ISOTHERMAL COMBUSTOR GEOMETRIES Final Report
D. G. Lilley and D. L. Rhode Washington NASA Feb. 1982 134 p refs
(Grant NAG3-74)
(NASA-CR-3442) Avail: NTIS HC A07/MF A01 CSCL 21E

A primitive pressure-velocity variable finite difference computer code was developed to predict swirling recirculating inert turbulent flows in axisymmetric combustors in general, and for application to a specific idealized combustion chamber with sudden or gradual expansion. The technique involves a staggered grid system for axial and radial velocities, a line relaxation procedure for efficient solution of the equations, a two-equation k-epsilon turbulence model, a stairstep boundary representation of the expansion flow, and realistic accommodation of swirl effects. A user's manual, dealing with the computational problem, showing how the mathematical basis and computational scheme may be translated into a computer program is presented. A flow chart, FORTRAN IV listing, notes about various subroutines and a user's guide are supplied as an aid to prospective users of the code. Author

N82-16083*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMPARISON OF ACOUSTIC DATA FROM A 102 MM CONIC NOZZLE AS MEASURED IN THE RAE 24-FOOT WIND TUNNEL AND THE NASA AMES 40- BY 80-FOOT WIND TUNNEL
A. Atencio, Jr. and J. McKie (Royal Aircraft Establishment, England) Jan. 1982 23 p refs
(NASA-TM-81343; A-8801) Avail: NTIS HC A02/MF A01 CSCL 21E

A cooperative program between the Royal Aircraft Establishment (RAE), England, and the NASA Ames Research Center was initiated to compare acoustic measurements made in the RAE 24-foot wind tunnel and in the Ames 40- by 80-foot wind tunnel. The acoustic measurements were made in both facilities using the same 102 mm conical nozzle supplied by the RAE. The nozzle was tested by each organization using its respective jet test rig. The mounting hardware and nozzle exit conditions were matched as closely as possible. The data from each wind tunnel were independently analyzed by the respective organization. The results from these tests show good agreement. In both facilities, interference with acoustic measurement is evident at angles in the forward quadrant. Author

N82-16084*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NASA RESEARCH ACTIVITIES IN AEROPROPULSION
John F. McCarthy, Jr. and Richard J. Weber 1982 30 p refs
Presented at the 24th Ann. Conf. on Aviation and Astronautics, Tel Aviv, Israel, 17-18 Feb. 1982
(NASA-TM-82788; E-1113) Avail: NTIS HC A03/MF A01 CSCL 21E

NASA is responsible for advancing technologies related to air transportation. A sampling of the work at NASA's Lewis Research Center aimed at improved aircraft propulsion systems is described. Particularly stressed are efforts related to reduced noise and fuel consumption of subsonic transports. Generic work in specific disciplines are reviewed including computational analysis, materials, structures, controls, diagnostics, alternative fuels, and high-speed propellers. Prospects for variable cycle engines are also discussed. Author

N82-16085# Ford Motor Co., Dearborn, Mich.
BRITTLE MATERIALS DESIGN, HIGH TEMPERATURE GAS TURBINE Final Report, 1 Jul. 1971 - 31 Aug. 1979
Arthur F. McLean and Eugene A. Fisher Mar. 1981 232 p refs
(Contract DAAG46-71-C-0162; DARPA Order 1849)
(AD-A106670; AMMRC-TR-81-14) Avail: NTIS HC A11/MF A01 CSCL 21/5

A goal of 200 hours of engine rig demonstrations for representative duty cycle temperatures in a regenerated vehicular gas turbine was chosen, with uncooled ceramic components to operate at least 25 hours at 2500 F, beyond the temperatures possible with uncooled metal components. The total systems approach included major efforts in ceramic design, materials development, fabrication process development, and test and evaluation methodology. Progress was made in each of these areas during the course of the program. For example, the strength of reaction bonded silicon nitride (RBSN) used in the stator and rotor blades was more than tripled. By the end of the program, 200 hours of duty cycle durability on turbine test rigs (between 1930 F - 2500 F) was attained on RBSN stationary components including stators, nose cones and turbine rotor tip shrouds. Similarly, 200 hours of duty cycling on test rigs was attained with reaction sintered SiC combustors and stators. GRA

N82-16086# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Turbine Engine Div.
A COMPUTER PROGRAM FOR VARIABLE-GEOMETRY SINGLE-STAGE AXIAL COMPRESSOR TEST DATA ANALYSIS (UD0400) Interim Report, 1 Jun. 1980 - 31 May 1981
C. Herbert Law Sep. 1981 147 p refs
(AF Proj. 2307)
(AD-A106676; AFWAL-TR-81-2078) Avail: NTIS
HC A07/MF A01 CSCL 21/5

This report describes a computer program that is designed for the analysis of single-stage axial compressor data. The axisymmetric flow of a thermally perfect compressible fluid is assumed, and the streamline curvature method of solution is employed. Details of the blade geometry may be computed or input, and a detailed account of the flow through the biading may be obtained. The analysis is limited to a single-stage compressor, but inlet guide vanes may be included. Variable geometry is permitted in both the inlet guide vanes and the stator vanes. An option in the analysis is to match computed and experimental static pressures at any radius by varying annulus blockage or relative flow deviation angles. Author (GRA)

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-16087*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
AN INVESTIGATION OF AUTOMATIC GUIDANCE CONCEPTS TO STEER A VTOL AIRCRAFT TO A SMALL AVIATION FACILITY SHIP
J. A. Sorensen, T. Goka, A. V. Phatak, and S. F. Schmidt Jul. 1980 253 p refs
(Contract NAS2-10288)
(NASA-CR-152407) Avail: NTIS HC A12/MF A01 CSCL 01C

A detailed system model of a VTOL aircraft approaching a small aviation facility ship was developed and used to investigate several approach guidance concepts. A preliminary analysis of the aircraft-vessel landing guidance requirements was conducted. The various subelements and constraints of the flight system are described including the landing scenario, lift fan aircraft, state rate feedback flight control, MLS-based navigation, sea state induced ship motion, and wake turbulence due to wind-over-deck effects. These elements are integrated into a systems model with various guidance concepts. Guidance is described in terms of lateral, vertical, and longitudinal axes steering modes and approach and landing phases divided by a nominal hover (or stationkeeping) point defined with respect to the landing pad. The approach guidance methods are evaluated, and the two better steering concepts are studied by both single pass and Monte Carlo statistical simulation runs. Four different guidance concepts are defined for further analysis for the landing phase of flight. J.M.S.

N82-16088*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AUTOMATION OF ON-BOARD FLIGHTPATH MANAGEMENT
Heinz Erzberger Dec. 1981 22 p refs
(NASA-TM-84212; A-8809) Avail: NTIS HC A02/MF A01 CSCL 07C

The status of concepts and techniques for the design of onboard flight path management systems is reviewed. Such systems are designed to increase flight efficiency and safety by automating the optimization of flight procedures onboard aircraft. After a brief review of the origins and functions of such systems, two complementary methods are described for attacking the key design problem, namely, the synthesis of efficient trajectories. One method optimizes en route, the other optimizes terminal area flight; both methods are rooted in optimal control theory. Simulation and flight test results are reviewed to illustrate the potential of these systems for fuel and cost savings. J.M.S.

N82-16089*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
A PROGRAM TO EVALUATE A CONTROL SYSTEM BASED ON FEEDBACK OF AERODYNAMIC PRESSURE DIFFERENTIALS Final Report
David W. Levy, Paul Finn, and Jan Roskam Dec. 1981 205 p refs
(Grant NAG4-5)
(NASA-CR-163466; KU-FRL-490-2) Avail: NTIS
HC A10/MF A01 CSCL 01C

The use of aerodynamic pressure differentials to position a control surface is evaluated. The system is a differential pressure command loop, analogous to a position command loop, where the surface is commanded to move until a desired differential pressure across the surface is achieved. This type of control is more direct and accurate because it is the differential pressure which causes the control forces and moments. A frequency response test was performed in a low speed wind tunnel to measure the performance of the system. Both pressure and position feedback were tested. The pressure feedback performed as well as position feedback implying that the actuator, with a break frequency on the order of 10 Rad/sec, was the limiting component. Theoretical considerations indicate that aerodynamic lags will not appear below frequencies of 50 Rad/sec, or higher. S.L.

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-16090*# Goodyear Aerospace Corp., Akron, Ohio.
STUDY OF GROUND HANDLING CHARACTERISTICS OF A MARITIME PATROL AIRSHIP Contractor Final Report, Oct. 1980 - Mar. 1981
Mar. 1981 280 p refs
(Contract NAS2-10448)
(NASA-CR-166253; GER-16948) Avail: NTIS
HC A13/MF A01 CSCL 01E

Mooring concepts appropriate for maritime patrol airship (MPA) vehicles are investigated. The evolution of ground handling systems and procedures for all airship types is reviewed to ensure that appropriate consideration is given to past experiences. A tri-rotor maritime patrol airship is identified and described. Wind loads on a moored airship and the effects of these loads on vehicle design are analyzed. Several mooring concepts are assessed with respect to the airship design, wind loads, and mooring site considerations. Basing requirements and applicability of expeditionary mooring also are addressed. Author

N82-16091*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

CALIBRATION OF THE AMES ANECHOIC FACILITY. PHASE 1: SHORT RANGE PLAN Final Report, Dec. 1980
David Hickey, Paul T. Soderman, K. Karamcheti, S. P. Koutsoyannis, R. Hopkins, and B. McLachlan Dec. 1980 129 p refs
Prepared in cooperation with Stanford Univ., Calif.
(NASA-TM-84081) Avail: NTIS HC A07/MF A01 CSCL 14B

A calibration was made of the acoustic and aerodynamic characteristics of a small, open-jet wind tunnel in an anechoic room. The jet nozzle was 102 mm diameter and was operated subsonically. The anechoic-room dimensions were 7.6 m by 5.5 m by 3.4 m high (wedge tip to wedge tip). Noise contours in the chamber were determined by various jet speeds and exhaust collector positions. The optimum nozzle/collector separation from an acoustic standpoint was 2.1 m. Jet velocity profiles and turbulence levels were measured using pressure probes and hot wires. The jet was found to be symmetric, with no unusual characteristics. The turbulence measurements were hampered by oil mist contamination of the airflow. Author

N82-16092*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESEARCH THROUGH SIMULATION
James L. Copeland, comp. [1982] 30 p refs
(NASA-Facts-125) Avail: NTIS HC A03/MF A01 CSCL 14B

The design of the computer operating system at Langley Research Center allows for concurrent support of time-critical simulations and background analytical computing on the same machine. Signal path interconnections between computing hardware and flight simulation hardware is provided to allow up to six simulation programs to be in operation at one time. Capabilities and research applications are discussed for the: (1) differential maneuvering simulator; (2) visual motion simulator; (3) terminal configured vehicle simulator; (4) general aviation aircraft simulator; (5) general purpose fixed based simulator; (6) transport simulator; (7) digital fly by wire simulator; (8) general purpose fighter simulator; and (9) the roll-up cockpit. The visual landing display system and graphics display system are described and their simulator support applications are listed. A.R.H.

N82-16093# Southwest Research Inst., San Antonio, Tex. Mobile Energy Div.
DEVELOPMENT OF THE AUTOMATED AFAPL ENGINE SIMULATOR TEST FOR LUBRICANT EVALUATION Final Technical Report, 1 May 1978 - 1 Jan. 1981
B. B. Baber, M. L. Valtierra, and J. E. Eichelberger Wright-Patterson AFB, Ohio AFWAL May 1981 104 p refs
(Contract F33615-78-C-2012; AF Proj. 3048)
(AD-A106128; SWRI-MED-119; AFWAL-TR-81-2022) Avail: NTIS HC A06/MF A01 CSCL 14/2

A description of an automated gas turbine engine simulator, designated the AFAPL engine simulator, and a discussion of the test results obtained using the simulator are presented. The No. 4-5 bearing compartment areas of a J57 turbine engine are used as the basic hardware for the simulator. The simulator is driven by a variable-speed drive system, through the accessory drive gearbox, providing simulator mainshaft speeds up to 10,000 rpm. Electrical resistance heaters are used to heat the air surrounding the oil-wetted areas within the No. 4-5 bearing compartment areas. The temperatures, pressures, and rpm are automatically controlled at predetermined levels and monitored throughout the 9120-6000 rpm speed cycling sequences and the soakback periods by a Hewlett-Packard mini-computer system, which is also programmed to automatically draw 5-hr interval test-oil samples, control test-oil sump level, provide safety shut-off protection, as well as print out and plot test information generated during each individual test. Simulator results obtained on eight turbine engine lubricants, for which full-scale engine data are available, show a very good correlation of the deposit ratings obtained using the AFAPL engine simulator and the deposit ratings from full-scale engine tests. Author (GRA)

N82-16094# Florida Inst. of Tech., Melbourne. Dept. of Electrical and Computer Engineering.
IMPLEMENTATION OF THE RECOMMENDATIONS MADE ON THE TECHNICAL REPORT TITLED ANALYSIS OF ADVANCED SIMULATOR FOR PILOT TRAINING Final Report
John Hadjilogiou Jun. 1981 111 p
(Grant AF-AFOSR-0120-81; AF Proj. 2313)
(AD-A106779; AFOSR-81-0704TR) Avail: NTIS HC A06/MF A01 CSCL 14/2

This study which was conducted to implement some of the recommendations made on the technical report titled 'Analysis of Advanced Simulator for Pilot Training'. The final report specify guidelines for writing custom micro-programs routine for the 32/75 computer. It includes the hardware feature of the digital system with special emphasis on micro-program control section. The micro-instruction format is analyzed in detail to allow the reader to follow the example of the SEL report reproduced on the Appendices. GRA

N82-16095# Aeronautical Research Labs., Melbourne (Australia).
PROGRAMS FOR THE TRANSONIC WIND TUNNEL DATA PROCESSING INSTALLATION. PART 9: PRESSURE MEASUREMENTS UPDATED
J. B. Willis May 1981 16 p refs
(AD-A106271; ARL/AERO-TM-329) Avail: NTIS HC A02/MF A01 CSCL 09/2

It is now ten years since the original pressure measurement program for the transonic wind tunnel PDP 8/I data processing installation was written. During this period considerable changes have been made, and this memorandum describes the current program. Author (GRA)

N82-16096# Aeronautical Research Labs., Melbourne (Australia).
CURRENT PRESSURE MEASURING SYSTEM IN THE TRANSONIC WIND TUNNEL
J. B. Willis May 1981 16 p ref
(AD-A106272; ARL/AERO-TM-328) Avail: NTIS HC A02/MF A01 CSCL 14/2

A simple system for wind tunnel pressure measurements is described. It is intended for use with Scanivalves, a minicomputer and stagger scans at a preset, variable rate. The scan may be started and stopped under program control, and all Scanivalves are automatically homed at the end of the computer initiated scan. Scanivalve number, port number, and four digits representing the measured pressure are displayed and provided for the minicomputer. Author (GRA)

N82-16097# Aeronautical Research Labs., Melbourne (Australia).
A VERSATILE DATA ACQUISITION SYSTEM FOR A LOW SPEED WIND TUNNEL
W. F. L. Sear, C. W. Sutton, and J. F. Harvey Nov. 1980 54 p
(AD-A106269; ARL/AERO-155; AR-002-248) Copyright. Avail: Issuing Activity CSCL 14/2

A data acquisition system for the Aeronautical Research Laboratories Low Speed Wind Tunnel is described. The system is versatile and simple to operate. Illuminated press button switches connect selected data sources with the addresses automatically generated within the system. Provision also exists for external addressing by a dedicated minicomputer. Author (GRA)

N82-16098# McDonnell-Douglas Corp., St. Louis, Mo. Arc Heater Lab.
ARC CONTROL EXPERIMENTS USING A HIGH PERFORMANCE ARC HEATER Final Report, 1 Sep. 1980 - 30 Jun. 1981
J. H. Painter Arnold Air Force Station, Tenn. AEDC Oct. 1981 80 p refs
(Contract F40600-80-C-0005)
(AD-A106140; AEDC-TR-81-20) Avail: NTIS HC A05/MF A01 CSCL 14/2

Arc control parameters varied in these experiments were: arc current, arc pressure, air flow rate, starting ramp rate, arc polarity, component resistance to ground, spin coil current, and gas injection distribution. Geometric parameters varied were: nozzle throat area, constrictor length, and gas injection radius. Arc characteristics were documented on high-speed motion picture film at rates to 10,800 frames per second and by oscillograph. Analysis of these data indicated all of the parameters investigated had an effect on arc behavior and these effects are documented herein. The role of gas circulation and internal magnetic fields dominated other variations of the control parameters. Reduction of the nozzle throat area by a factor of two had a strong influence on the circulation level and arc instabilities resulted. Intersegment arcing was photographed at high frame rates as were other arc instabilities such as blow-through, roll-over, and kinking. Methods of improving the arc control and stability were identified and evaluated within the scope of the program. A total of 50 arc heater tests were made at arc currents to 830 A and pressures to 50 atm. GRA

N82-16099# Tactical Air Warfare Center, Eglin AFB, Fla.
QOT AND E OF THE F-16 20MM AMMUNITION LOADING SYSTEM'S ABILITY TO UPLOAD/DOWNLOAD A-7D AIRCRAFT Final Report
27 Oct. 1981 8 p
(AD-A108007) Avail: NTIS HC A02/MF A01 CSCL 19/1

The purpose of this qualification operational test and evaluation (QOT and E) was to evaluate the ability of the F-16 20mm ALS to upload/download A-7D aircraft. Testing included uploading/downloading of 20mm ammunition on A-7D aircraft during normal day-to-day operations and during simulated combat conditions. A portion of the test was conducted with load crews wearing chemical warfare defense ensembles (CWDE). Specific Objectives are: Operational Effectiveness - to assess the capability of the F-16 ALS to upload/download ammunition into/from the A-7D aircraft; to assess the interoperability of the ALS with both the A-7D gun system and the modified replenisher, and to assess the capability of the modified replenisher to replenish the loader. Operational Suitability - Specific suitability objectives were not evaluated during this test. On site observations of some suitability areas (equipment failures, technical data, human factors, and chemical defense) were performed. GRA

N82-16100# Transportation Research Board, Washington, D.C. Commission on Sociotechnical Systems.
AIR SERVICE, AIRPORT ACCESS AND FUTURE TECHNOLOGY
Samuel Ewer Eastman, Frank LaMagna, Edward M. Whitlock, Mark Gorstein, and Richard Tilles 1981 60 p refs
(PB82-105958; TRB/TRR-803; ISBN-0-309-03717-2; ISSN-0361-1981; LC-81-14158) Avail: NTIS HC A04/MF A01; paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, D.C. 20418 CSCL 01B

Contents: (1) economic regulation of air service to small communities: origins of Airline Deregulation Act of 1978; (2) response to terminal access problems at American and United Airlines--John F. Kennedy International Airport; (3) automating the delivery of ground transportation information; (4) airport access--case study of a remote terminal operation; (5) airport geometric compatibility of future aircraft; (6) flight simulators; (7) gravitational-cueing system--an enhancement of aircraft flight simulation; and (8) laser system for visual simulation. GRA

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see 91 Lunar and Planetary Exploration.

N82-16101*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT Progress Report, Sep. and Oct. 1981
N. A. Renzetti, ed. 15 Dec. 1981 370 p refs
(NASA-CR-165111; JPL-TDA-PR-42-66) Avail: NTIS HC A16/MF A01 CSCL 22A

Deep Space Network operations, engineering, and implementation are reported. Developments in Earth-based radiotechnology as applied to other research programs in the fields of Geodynamics, Astrophysics, and programs related to radio searchers (instrumentation and methods) in extraterrestrial areas in the microwave region of the electromagnetic spectrum are also presented. For individual titles, see N82-16102 through N82-16139.

N82-16102*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RADIO ASTRONOMY c89
R. D. Shaffer, G. S. Levy, H. C. Wilck, M. J. Grimm, S. Gulkis, T. B. Kuiper, and E. T. Olsen *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 1-3 (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 03A

Activities of the Deep Space Network (DSN) 26-, 34-, and 64 meter antenna stations in support of Radio Astronomy Operations are reported. Systems support was given for: (1) Pulsar Rotation Constancy and Planetary Radio Astronomy, (2) the Radio Frequency Interference Surveillance System, and (3) observation of astronomical sources and spacecraft. M.D.K.

N82-16103*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PROPER FREQUENCIES OF A DOWN-LOOKING WATER-VAPOR RADIOMETER OVER SEA SURFACE c35
S. C. Wu *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 4-14 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 14B

Altimeter observation on board an Earth-orbiting satellite over sea surface is corrupted by the water vapor path delay. Such error can be calibrated for by a down-looking microwave radiometer. The effects of water vapor profile, sea surface temperature, wind speed and brightness temperature measurment error on the calibration precision were studied. Proper frequency combinations were also searched to minimize these effects. The analysis indicates that it is possible to achieve a subcentimeter estimate of water vapor path delay on nadir observation with an on-board microwave radiometer. M.D.K.

N82-16104*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
BLOCK 1 PHASE 2 VERY LONG BASELINE INTERFEROMETRY IMPLEMENTATION c14
J. H. Wilcher *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 15-18 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 14B

A status report on the implementation of the Block I VLBI System (Very Long Baseline Interferometry), a phased implementation in the Deep Space Network, is presented. Systems testing, data correlation and postcorrelation, and personnel training are discussed. Block diagrams of the Ground Communication Facility and Network Operations, Control Center configuration, and DSS (Deep Space Station) configuration are given. M.D.K.

N82-16105*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DSN PROGRAMMING SYSTEM c61
G. A. Madrid *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 19-23 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 09B

The DSN (Deep Space Network) programming system, its objectives, accomplishments, current status and plans is discussed. The basic structure of the DSN programming system is categorized and defined for these areas: (1) Software Standard Practices, (2) Standard Processors, (3) programming system data base, ((4) management aids, and (5) implementation aids. A need to review the design and structure of the current system is suggested. M.D.K.

N82-16106*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VOYAGER MISSION SUPPORT, 1 c14
N. Fanelli and H. Nance *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 24-26 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 22D

A Deep Space Network report on tracking and data acquisition for Project Voyager for the period July through 11 August 1981 is presented. Deep Space Station 43 Radio Science capabilities as assessed by operational readiness and operational verification tests are described. Systems support for spacecraft trajectory correction maneuvers, navigation cycles, and horizontal and vertical scan maneuvers is described. Software and hardware improvements and implementations are also discussed. M.D.K.

N82-16107*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

VOYAGER MISSION SUPPORT, 2 c14

N. Fanelli and H. Nance *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 27-29 (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 22D

Deep Space Network tracking and data acquisition support for Project Voyager, 12 August through September 1981 is described. Support for Voyager 1 and Voyager 2 observations of Saturn, its ring system, and satellite Phoebe are reported. Systems support for pre-Saturn encounter and near encounter operations and spacecraft acquisition of medium-band occultation data and trajectory corrections are also discussed. M.D.K.

N82-16108*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

A VLBI SURVEY OF THE NORTHERN POLAR CAP REGION c46

D. D. Morabito, R. A. Preston, and J. Faulkner *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 30-36 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 08E

A VLBI (Very Long Baseline Interferometry) survey at 2.29 GHz of the nothern polar cap region (declination > 69 deg) was conducted using a baseline consisting of the NASA Deep Space Network (DSN) sites at Goldstone, California and Madrid, Spain. The purpose of this survey was to identify sources in the northern polar cap region which possess milliarcsecond components. High declination VLBI sources provide valuable geometric coverage for determining the spin axis components of baselines. Out of 48 candidate sources selected from the Bonn 5-GHz survey, 42 were detected to have compact structure on the California/Spain baseline at the 2.29-GHz observing frequency. This polar survey is part of a more general VLBI sky survey. Author

N82-16109*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ARCSECOND POSITIONS FOR MILLIARSECOND VLBI NUCLEI OF EXTRAGALACTIC RADIO SOUCES. PART 1: 546 SOURCES c93

D. D. Morabito, R. A. Preston, M. A. Slade, and D. L. Jauncey (CSIRO, Sydney) *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 37-48 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 03B

Very long Baseline Interferometry measurements at 2290 MHz on baselines of approximately 10 to the 4th power km between Deep Space Network stations were used to identify sources that are suitable for precision astrometric applications. The use of relatively crude time delay measurements along with fringe frequency measurements to determine the positions of the milliarcsecond nuclei in 546 extragalactic sources with accuracies of generally approximately 1' is described. The calculated positions of the sources and the corresponding uncertainties are presented and the positions are referenced to the equinox of 1950.0 and elliptical aberration terms are included so as to agree with past astronomical convention. The source positions and position uncertainties for sources which were multiply observed were estimated from a weighted average. The reliability of the determined positions was demonstrated by testing the repeatability of multiple observations on the same source and by position comparisons with more accurate radio catalogs. M.D.K.

N82-16110*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

AN FM/CW METHOD FOR THE MEASUREMENTS OF TIME DELAYS OF LARGE CASSEGRAIN ANTENNAS c32

T. Y. Otoshi *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 49-59 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 20N

An FM/CW measurement technique which utilizes the time domain principle was developed to measure the time delays of large Cassegrain antennas. Measured primary path delays of 60 ns (or greater) typically agreed with calculated delays to within 3 ns. Multipath sources generated within the antenna optics region were identified. The FM/CW technique in conjuction with the horn-on-dish configuration proved to be the most rapid, convenient, and accurate method for calibrating absolute time delays for a large antenna. The FM/CW instrumentation was invaluable as a diagnostics tool and facilitated increased understanding of the mechanisms of multipath signal generation within the antenna optics media multipath signals that could be deleterious to accuracy of antenna time delay calibrations. M.D.K.

N82-16111*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

AN M-ARY COHERENT OPTICAL RECEIVER FOR THE FREE-SPACE CHANNEL c74

V. A. Vilnrotter *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 60-66 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 20F

The free-space channel is an ideal medium for communicating by means of spatially and temporally coherent optical fields. The structure of a coherent optical receiver for M-ary signals is derived assuming Poisson detection statistics. Receiver performance is evaluated for an M-ary signal set consisting of orthogonal Walsh-functions under the assumption of high-intensity symbol counts. The asymptotic performance bound is examined in the limit as both the dimension of the signal-set and the receiver bandwidth become arbitrarily large and it is shown that on the average a maximum of nearly three bits of information can be encoded onto each received photon using the above modulation scheme. Author

N82-16112*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THERMAL MEASUREMENT TECHNIQUE OF RIB ELEMENTS ON DSN ANTENNA STRUCTURE c32

S. Glazer and G. Gale *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 67-79 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 20N

An experimental test method for thermal measurement of antenna rib elements employing an imaging infrared radiometer is described. The ultimate goal is to use the dat in structural analysis codes to detemine the effects on dish deflection and RF performance. Basic radiometric theory is presented, along with a description of the test apparatus and current experimental test procedures. A sample set of antenna rib temperature using the developed methodology is also presented. J.D.H.

N82-16113*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

X-BAND NARROW-BEAM RADIOMETER FOR DSS 13 c35

M. M. Franco, S. D. Slobin, and C. T. Stelzried *In its* the Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 80-86 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 14B

The design and testing of a narrow-beam X-band (8.44 GHz) radiometer is described. Continuous calibration is obtained by switching the receiver sequentially among the hot termination, ambient termination, and antenna noise positions. The measured antenna noise temperatures (10 second total integration time) have a standard deviation of about 0.4 K, which is in good agreement with theory. It is felt that radiometer performance is satisfactory for the purpose of making atmospheric noise temperature measurements. J.D.H.

N82-16114*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DESIGN OF A 1.5-m, 32-GHz, CLEAR APERTURE ANTENNA c32

A. Cha *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 87-93 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 09C

Ground station antenna designs which have a clear aperture (no subreflector or strut blockage) and shaped reflector surfaces are described. The design of a 1.5-m, 32-GHz clear aperture

antenna model is discussed. Underlying considerations leading to the determination of the parameters defining the model antenna geometry are presented.
J.D.H.

N82-16115*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

POWER EFFICIENCY OF SEMICONDUCTOR INJECTION LASERS c36

J. Katz *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 94-100 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20E

Analysis of a model of semiconductor injection lasers was carried out in terms of the basic parameters relevant to efficient device operations (i.e., device length, mirror reflectivity, absorption coefficient and material conductivity). The efficiency is improved as the optical absorption coefficient and the resistivity of the laser material are reduced. The maximum output intensity or the maximum photon density of the laser are specified; these parameters are constrained by reliability considerations. When all these are determined, there will exist a unique value of laser length and laser reflectivity which will optimize the laser efficiency for each application. It is important to note that all the device parameters must be adequately designed in order to optimize its overall power efficiency.
N.W.

N82-16116*# Jet Propulsion Lab., California Inst of Tech., Pasadena

PHASE-LOCKING OF SEMICONDUCTOR INJECTION LASERS c36

J. Katz *In its* the Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 101-114 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20E

The problem of phase-locking of several semiconductor injection lasers via mutual coupling was investigated. The equations of motion of the parameters of both individual lasers and an array of lasers were derived considering both coupling via field overlapping and interactions via the active media. The solution of the equations was outlined and the conditions for obtaining phase-matching were derived. The sign of the coupling constraints must be negative, and its magnitude must be greater than the standard deviation of the laser transition frequency deviations. The actual magnitude of the coupling coefficients in several configurations were calculated, and the results indicate that is possible, although not trivial, to achieve the coupling conditions.
N.W.

N82-16117*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE 2.5-BIT/DETECTED PHOTON DEMONSTRATION PROGRAM: DESCRIPTION, ANALYSIS AND PHASE 1 RESULTS c74

J. R. Lesh, J. Katz, H. H. Tan, and D. Zwillinger *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 115-132 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20F

An optical communications demonstration program designed to demonstrate 2.5 bits of information transfer per single detected photon is described. The program was divided into four demonstration phases representing increasing degrees of complexity. The theoretical analysis of each of the phases is presented where it is shown that the 2.5-bit/detected photon goal can be achieved. The experimental results of phase one, which are in excellent agreement with the theory, are also presented.
N.W.

N82-16118*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DSS 13 UNATTENDED OPERATIONS STATION CONTROLLER Status Report c14

H. Cooper *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 133-137 (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 22D

A brief history of the unattended operations program is presented, followed by the status of the phase two station controller implementation. The unattended operations effort attempts to standardize on a minimum set of modules in order to reduce spares, and to develop a through understanding of the operation of the common modules used. The initial module selection consists of (1) BLC-80/204 single board computer, (2) BLC-064 64K RAM module, (3) BLC-8432 32K EPROM module, (4) BLC-8201 Floopy disk controller, (5) SBC-534 CH RS-232 module, (6) SBC-519 Parallel 1/0 module and (7) JPL-QSIA Jet Propulsion Lab designed interface module.
N.W.

N82-16119*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

A DIGITAL FILTER IMPLEMENTATION OF THE DEEP SPACE TRANSPONDER PHASE LOCK LOOP INTEGRATOR c33

J. W. Heller *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 138-147 ref (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 09C

Having suffered in reliability due to malfunctioning capacitors, the phase lock loop integrating filter in the NASA standard deep space transponder is reconsidered. An alternative design, using a digital filter which eliminates these critical components is presented. The analog-to-digital conversion, digital filtering, and digital-to-analog conversion are all performed by an Intel 2920 digital signal processing integrated circuit. The circuit was tested for its step response and frequency response. The output for a 0.75 volt step input was recorded over a 3 hour period at 5 minute intervals and compared with the ideal response to the linear integrator. The maximum error was 1.5 percent. The filter was not tested in a loop.
N.W.

N82-16120*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

IMPROVED CARRIER TRACKING PERFORMANCE WITH COUPLED PHASE-LOCKED LOOPS c32

D. Divsalar and J. H. Yuen (California Inst. of Technology) *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 148-171 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 17B

A carrier arraying system to combine the received carrier signals at geographically separated receivers with different carrier phases to improve carrier tracking performance is considered. This system basically couples several phase-locked loops to enhance received carrier signal-to-noise ratio. There is no extra alignment of carrier phases. This system automatically aligns the carrier phases, which results in coherent combining of the carrier signals. The tracking performance of this carrier arraying system are analyzed by assessing its rms phase jitter and radio loss. Carrier arraying alone will not provide any improvement in bit energy to noise spectral density ratio. However, carrier arraying provides reduction in radio loss with respect to the no carrier arraying case. Results were extended to the case of combined carrier and baseband arraying. Bit error rates and radio loss curves are given. Numerical results are given for three useful cases, namely, the array of 64/34, the array of 64/34/34 and the array of 64/34/34 meter-antenna stations of the NASA Deep Space Network.
N.W.

N82-16121*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

IMPLICATIONS OF THE PUTNAM SOFTWARE EQUATION ON CONFIDENCE LEVELS FOR PROJECT SUCCESS c61

R. C. Tausworthe *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 172-185 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 09B

The implications of assumed powerlaw relationships among size, duration, and effort on the probability that a given software project will be completed within its estimated schedule and manpower resources are investigated. Software development tasks are treated as sample point in a probability space characterized by three random variables: size, duration, and resource expenditure. The completion confidence factor is then computed. The most astonishing conclusion is the low confidence factor of the average project, significantly less than 25%. This low confidence factor is the results of correlation of the project duration and work effort by a tradeoff relationship referred to as 'Putnam's software equation'.
N.W.

N82-16122*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GAIN UNCERTAINTY OF ARRAYED ANTENNAS c32

B. L. Seidel *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 186-190 (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 20N

It is shown that (1) the array gain increases as antennas are added to the array, (2) the error bars do not grow under the constraint that the performance of all elements is equally well known, and (3) the knowledge of the 64-meter antenna performance is more important to the array than knowledge of the 34-meter antennas and therefore, most effort should be spent quantifying the larger antenna. N.W.

N82-16123*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

LIFE-CYCLE COST ANALYSIS OF PROJECTS USING A POLYNOMIAL CASH FLOW MODEL FOR NONUNIFORM MAINTENANCE AND OPERATIONS COSTS c83

D. S. Remer and G. Lorden (California Inst. of Technology) *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 191-201 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 05C

A mathematical model is developed for calculating the life-cycle costs for a project where the maintenance and operations (M&O) costs change in a nonlinear manner with time. Closed-form solutions are presented for computing the present worth of projects with periodic cash flow profiles that can be approximated by polynomial functions. The results show that the life-cycle cost for a project can be grossly underestimated (or overestimated) if the M&O costs increase or decrease nonuniformly over time rather than being constant or linear as is often assumed in project economic evaluations. The following range of variables is examined: (1) project life from 2 to 15 years, (2) interest rate from 0 to 30 percent per year, and (3) polynomials of order 0 to 5. Simplified solutions or the present worth are presented for two limiting cases: extented project lifetime and negligible interest rate. Also a simplified expression is provided for accurate present worth M&O estimates for DSN projects. In addition, a sensitivity analysis of the model based on graphical results and a numerical example plus tables and graphs are given to help the reader calculate M&O life-cycle costs over a wide range of variables. Author

N82-16124*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SINE WAVE RANGING REVISITED c32

A. I. Zygielbaum and A. Robinson *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 202-210 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 20N

It has been conjectured that DSN ranging accuracy would be improved if the range code were a sine wave. Measurements are presented which demonstrate that this is not the case but that the use of sine waves may be worthwhile to conserve the uplink frequency spectrum. Author

N82-16125*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

RADIO FREQUENCY INTERFERENCE BY EARTH ORBITING SATELLITES: DEEP SPACE INTERFERENCE PREDICTION PROGRAM c32

D. L. Cain and P. E. Beyer *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 211-213 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 20N

The sensitivity requirements of the DSN Flight Projects make them quite susceptible to radio frequency interference. Efforts to predict this interference from Earth orbiting satellites are reported. Software development in the areas of trajectory computations and telecommunications analysis are discussed. J.M.S.

N82-16126*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

NEW S-BAND TRANSMITTER AUTOMATION SOFTWARE c61

W. Stahnke *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 214-218 (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 09B

The status of the 20-kW S-band transmitter automation project is reported. A software design using a simplified multitasking approach is described that will improve subsystem performance, maintainability, and extensibility. J.M.S.

N82-16127*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE EFFECT OF PARTIAL COHERENCE IN RECEIVING SYSTEM NOISE TEMPERATURE ON ARRAY GAIN FOR TELEMETRY AND RADIO FREQUENCY CARRIER RECEPTION FOR SIMILAR RECEIVING SYSTEMS c32

M. H. Brockman *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 219-235 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 17B

The improvement of signal to noise ratios for arrayed receiving systems or stations when some portion of the predetection noise is coherent among the various receiving systems is examined. High-rate telemetry reception with residual radio frequency carrier arraying is addressed. The effect for arrayed receiving systems with essentially equal apertures, including the presence of a planet in the array beamwidth, is examined. J.D.H.

N82-16128*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

OPTIMUM EQUIPMENT MAINTENANCE/REPLACEMENT POLICY. PART 1: DYNAMIC PROGRAMMING APPROACH c81

T. Charng *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 236-245 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 05A

The optimization of equipment maintenance and/or replacement policy is considered. Over a given life-span of equipment, optimum policy is determined based on present costs, inflation rates, operating characteristics, future equipment developments, and other factors. A computer program utilizing the dynamic programming technique together with a numerical example is included. J.D.H.

N82-16129*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SYSTEM RELIABILITY ANALYSIS WITH DYNAMIC PROGRAMMING c38

T. Charng *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 246-267 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 09D

System reliability analysis using the Mission Success Diagram method is described. The basic building blocks and reliability prediction equations are presented. A BASIC computer program was written and tested with certain system configurations. This computer program can be modified for various system structures. J.D.H.

N82-16130*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

A COMPUTERIZED LIFE-CYCLE COST METHODOLOGY FOR ENGINEERING ANALYSIS c83

R. D. Hughes *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 268-287 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 05C

Life-Cycle Costing (LCC) is an essential selection criterion in making economical engineering decisions about alternative routes in design or investments. A discussion of LCC concepts is presented, along with a selected calculation procedure. A computer program (LCOMP) was written in FORTRAN to perform that calculation procedure. The program details are discussed, a sample calculation is presented, and a listing of the program is included. Author

N82-16131*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GCF-NOCC RECONFIGURATION

J. P. McClure *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 288-290 refs (For primary document see N82-16101 07-12) c14

Avail: NTIS HC A16/MF A01 CSCL 22D

The equipment and computer programs in the Network Operations Control Center (NOCC) and the Ground Communications Facility's (GCF's) Central Communication Terminal at the Jet Propulsion Laboratory were rearranged and supplemented to provide an improved operational capability. The reconfigured GCF-NOCC is described.

J.D.H.

N82-16132*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ANTENNA AZIMUTH BEARING MODEL EXPERIMENT

H. McGinness *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 291-306 ref (For primary document see N82-16101 07-12) c37

Avail: NTIS HC A16/MF A01 CSCL 13I

The concluding description of the model test is presented. Reasons for expecting a long service life from a large-scale prototype are given. The bearing is of the wheel and track type and employs a novel suspension of the wheel. Various aspects of the design are discussed.

J.D.H.

N82-16133*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

OPERATIONAL VLBI CLOCK SYNCHRONIZATION AND PLATFORM PARAMETER DETERMINATION

J. V. LuValle, R. D. Shaffer, M. G. Roth, T. M. Eubanks, and P. S. Callahan *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 307-318 ref (For primary document see N82-16101 07-12) c33

Avail: NTIS HC A16/MF A01 CSCL 09C

The operation and results of the Block I Very Long Baseline Interferometry (VLBI) system for clock synchronization and platform parameter determination are described. The history of system performance from July 1980 to August 1981 is given. The steps in producing clock synchronization and platform parameters are outlined. It is shown that the VLBI data provide useful monitoring of the Deep Space Network frequency and timing System performance and Earth orientation. Author

N82-16134*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SYNTHESIZER STABILITY EVALUATION

E. N. Sosa and D. A. Tyner *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 319-330 ref (For primary document see N82-16101 07-12) c33

Avail: NTIS HC A16/MF A01 CSCL 09C

An accurate and simple technique for measuring rms phase noise as a function of integration time for offset frequencies (0.001 Hz) close to the carrier is described. The accuracy of this method is verified by Allan variance measurements in the time domain and through the use of Hadamard variance for generating high-resolution spectral density measurements. Two different synthesizers are evaluated and the results are presented.

Author

N82-16135*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

INVESTIGATION OF DIGITALLY CONTROLLED OSCILLATOR OPERABILITY PROBLEMS

W. D. Weisman *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 331-334 refs (For primary document see N82-16101 07-12) c33

Avail: NTIS HC A16/MF A01 CSCL 09A

In order to provide adequate levels of flight project support, the elimination of procedural errors by Deep Space Network personnel is an important consideration. An investigation designed to identify and correct procedural error involving digitally controlled oscillator operations. The man-machine interface was examined. Problems regarding procedural documentation were resolved.

J.D.H.

N82-16136*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

EMERGENCY TELEMETRY PERFORMANCE

W. Tisdale *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 335-340 ref (For primary document see N82-16101 07-12) c17

Avail: NTIS HC A16/MF A01 CSCL 09F

Often an emergency telemetry mode is automatically selected by a spacecraft during emergencies. During such emergencies the Deep Space Network must acquire the spacecraft telemetry as rapidly as possible under weak fluctuating signal conditions. Test data herein show the bit error properties of one emergency telemetry mode candidate with a very low bit rate of 4 bits per second. Analysis reveals the E sub b/N sub O necessary to obtain the performance bit error rate threshold and associated acquisition times.

Author

N82-16137*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GOLDSTONE STDN 9-METER RADIATION TEST

J. R. Blain *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 341-351 (For primary document see N82-16101 07-12) c32

Avail: NTIS HC A16/MF A01 CSCL 20N

The Goldstone spaceflight tracking and data network (STDN) 9-meter tests were conducted from February through July 1981 to characterize the near-field radiation patterns of the S-band and fourth harmonic frequency emissions. The test configurations and results are presented with graphs of the antenna patterns. The tests indicated that X-band leakage may be suppressed to levels of approximately -190 dBm/sq cm at 200 meters.

Author

N82-16138*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

A SOLAR POWERED WATER PURIFICATION SYSTEM AT GOLDSTONE (DSS 13)

F. J. Monninger and R. J. Elder *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 352-354 (For primary document see N82-16101 07-12) c44

Avail: NTIS HC A16/MF A01 CSCL 10A

The present energy intensive electrically powered still at the Venus Deep Space Station (DSS 13) has reached its end-of-life. The electric still has been producing the pure water required for cooling the 400-kW klystron tube of the Venus 26-m antenna at Goldstone, California. A new passive solar still, unique to the Goldstone complex, has been designed to replace the electric still. This new system will deliver 100% of the pure water requirement for cooling the klystron tube and will consume an insignificant amount of electrical energy. Construction will be completed by the end of 1981, followed by a one-year test and evaluation period to gather data on performance characteristics.

Author

N82-16139*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ENERGY CONSUMPTION FOR THE ECHO STATION (DSS 12)

C. N. Guiar and D. Schonfeld *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 355-363 refs (For primary document see N82-16101 07-12) c44

Avail: NTIS HC A16/MF A01 CSCL 10B

Energy consumption for the Echo Station is analyzed. The HVAC equipment including vapor compression refrigeration units, absorption chillers, annd heating units such as boilers and heat pumps is shown to be the largest consumer of electrical energy. The energy consumption for the buildings at the station is itemized and compared to the electrical meter data. The figures for energy consumption as predicted by the ECP computer program are found to agree well with the meter data.

J.D.H.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

No abstracts in this category.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N82-16104*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
BLOCK 1 PHASE 2 VERY LONG BASELINE INTERFEROMETRY IMPLEMENTATION
J. H. Wilcher *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 15-18 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 14B

N82-16106*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VOYAGER MISSION SUPPORT, 1
N. Fanelli and H. Nance *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 24-26 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 22D

N82-16107*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VOYAGER MISSION SUPPORT, 2
N. Fanelli and H. Nance *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 27-29 (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 22D

N82-16118*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DSS 13 UNATTENDED OPERATIONS STATION CONTROLLER Status Report
H. Cooper *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 133-137 (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 22D

N82-16131*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GCF-NOCC RECONFIGURATION
J. P. McClure *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 288-290 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 22D

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-16140*# National Aeronautics and Space Administration, Washington, D. C.
AUXILIARY SUBPROGRAMS FOR CALCULATING THE NAVIGATIONAL PARAMETERS OF ARTIFICIAL EARTH SATELLITES. FORTRAN IV
V. I. Prokhorenko Jun. 1981 60 p refs Transl. into ENGLISH of "Vspomogatelnyye Podgrogrammy dlya Rascheta Navigatsionnykh Parametrov Iskusstvennykh Sputnikov Zemli. FORTRAN IV" rept. Pr-301, Moscow, 1976 59 p Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Inst. of Space Research, Academy of Sciences (USSR), Moscow (Contract NASw-3199)
(NASA-TM-75684) Avail: NTIS HC A04/MF A01 CSCL 22B

Subprograms for transforming coordinates and time, for determining the position of the Moon and Sun, and for calculating the atmosphere and disturbances, which are specified by anomalies of the Earth's gravitational field are described. The subprograms are written in FORTRAN IV and form a major part of the package of applied programs for calculating the navigational parameters of artificial Earth satellites. S.L.

N82-17053*# Carroll Coll., Helena, Mont. Dept. of Mathematics and Physics.
A STUDY OF THE VENT PIPE FOR THE GRAVITY PROBE-B
Ronald N. Knoshaug *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 19 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 22B

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N82-16141*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT: SPACE SHUTTLE PROGRAM STS-2
[1982] 25 p refs
(NASA-TM-84088; M-989-81-02) Avail: NTIS HC A02/MF A01 CSCL 22A

Objectives for the second space shuttle mission are reviewed and their achievement assessed. Details of the flight are described with emphasis on launch; ascent; solid rocket booster and external tank disposal; on-orbit; descent and landing; and ground operations and turnaround. The net result of the implementation of the adjusted preplanned minimum mission of 54 hours (instead of the 124 hour mission) was that approximately 90% of the major functional test objectives were successfully accomplished, and 60% of the tests requiring on-orbit crew involvement were completed. Of the total 308 tests planned for the full duration mission, 253 (82%) were accomplished. Of 94 desired science data takes, 64 were completed and about 73 hours of data were acquired on the various sensors. A.R.H.

N82-16142*# National Aeronautics and Space Administration, Washington, D. C.
REPORT BY THE AEROSPACE SAFETY ADVISORY PANEL Annual Report, 1981
1981 37 p refs
(NASA-TM-84094) Avail: NTIS HC A03/MF A01 CSCL 22A

The process of preparation for the first two shuttle flights was observed and information from both flights was gathered in order to confirm the concept and performance of the major elements of the space transportation system. To achieve truly operational operating safety, regularity, and minimum practical cost, the organization of efforts between the R&D community and any transportation service organization should be clearly separated with the latter organization assuming responsibilities for marketing its services; planning and acquiring prime hardware and spares; maintainance; certification of procedures; training; and creation of requirements for future development. A technical audit of the application of redundancy concepts to shuttle systems is suggested. The state of the art of space transportation hardware suggests that a number of concept changes may improve reliability, costs, and operational safety. For the remaining R&D

flights, it is suggested that a redline audit be made of limits that should not be exceeded for ready to launch. A.R.H.

N82-16143*# Engineering Analysis, Inc., Huntsville, Ala.
ADVANCED SPACE SHUTTLE SIMULATION MODEL
Frank B. Tatom and S. Ray Smith 11 Jan. 1982 108 p refs
(Contract NAS8-33818)
(NASA-CR-161958; EAI-TR-82-001) Avail: NTIS
HC A06/MF A01 CSCL 22B

A non-recursive model (based on von Karman spectra) for atmospheric turbulence along the flight path of the shuttle orbiter was developed. It provides for simulation of instantaneous vertical and horizontal gusts at the vehicle center-of-gravity, and also for simulation of instantaneous gusts gradients. Based on this model the time series for both gusts and gust gradients were generated and stored on a series of magnetic tapes, entitled Shuttle Simulation Turbulence Tapes (SSTT). The time series are designed to represent atmospheric turbulence from ground level to an altitude of 120,000 meters. A description of the turbulence generation procedure is provided. The results of validating the simulated turbulence are described. Conclusions and recommendations are presented. One-dimensional von Karman spectra are tabulated, while a discussion of the minimum frequency simulated is provided. The results of spectral and statistical analyses of the SSTT are presented. N.W.

N82-17051*# University of Central Florida, Orlando Dept. of Physics.
A PRELIMINARY STUDY OF THE PARTICULATE FALLOUT FROM THE SPACE SHUTTLE (STS-1)
G. Martin Hudson *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 8 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 22B

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N82-16144# Osborne-Hoffman, Inc., Point Pleasant Beach, N.J.
ADVANCED UNDERWATER TELEMETRY AND VOICE LINKS FOR INLAND AND COASTAL WATERS RESEARCH
E. Hoffman 1981 55 p refs
(Grant NSF DAR-80-09716)
(PB81-241408; NSF/MEA-81007) Avail: NTIS
HC A04/MF A01 CSCL 17B

The feasibility of the spread spectrum approach is demonstrated. Data from which a high rate underwater data link can be designed are derived. Underwater transmission rates of over 1 Kbit/s are shown to be feasible. GRA

N82-16136*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
EMERGENCY TELEMETRY PERFORMANCE
W. Tisdale *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 335-340 ref (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 09F

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-16145*# Lockheed Missiles and Space Co., Palo Alto, Calif.
FEASIBILITY STUDY FOR LONG LIFETIME HELIUM DEWAR Final Report, Jan. - Dec. 1981
R. T. Parmley Dec. 1981 191 p refs
(Contract NAS2-10848)
(NASA-CR-166254) Avail: NTIS HC A09/MF A01 CSCL 22B

A feasible concept for a launchable three year lifetime helium dewar was investigated. Current helium dewar designs were examined to see where the largest potential reductions in parasitic heat loads can be made. The study was also devoted to examining support concepts. The support concept chosen, a passive orbital disconnect strut (PODS), has an orbital support conductance that is lower by more than an order of magnitude over current tension band supports. This lower support conductance cuts the total dewar weight in half for the same three year life time requirements. Effort was also concentrated on efficient wire feed through designs and vapor cooling of the multilayer insulation, supports, wire feed throughs and plumbing penetrations. A single stage helium dewar vs. dual stage dewars with a guard cryogen of nitrogen or neon was examined. The single stage dewar concept was selected. Different support concepts were analyzed from which the PODS support concepts was chosen. A preliminary design of the dewar was thermally and structurally analyzed and laid out including system weights, thermal performance and performance sensitivities. S.L.

N82-16146# Communications Research Centre, Ottawa (Ontario). Space Technology and Applications Branch.
NATURAL MODES AND REAL MODAL VARIABLES FOR FLEXIBLE SPACECRAFT
F. R. Vigneron Nov. 1981 23 p refs
(CRC-1348) Avail: NTIS HC A02/MF A01

A natural model transformation theory which is applicable to flexible spacecraft with damping and gyroscopic forces is described. The theory is arranged into a form which is a generalization of the classical normal modes transformation theory. Modal differential equations are given in terms of real-value scalars. Block diagrams in the time and Laplace transform domains demonstrate the feed-forward and second-order filter characteristics of the structure of the equations. Results for a single-axis flexible dynamics example are compared with earlier published results to show the correlation with the classical normal modes transformation theory. B.W.

N82-16147*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME :PROGRAM AND SYSTEMS SUMMARIES: MECHANICAL AND THERMAL DETAILS Final Report
Robert O. Wales, ed. Nov. 1981 272 p refs 6 Vol.
(Contract NAS5-25464)
(NASA-RP-1080-Vol-1; Rept-81F0034-Vol-1) Avail: NTIS
HC A12/MF A01 CSCL 22B

The overall mission and spacecraft systems, testing, and operations are summarized. The mechanical subsystems are reviewed, encompassing mechanical design requirements; separation and deployment mechanisms; design and performance evaluation; and the television camera reflector monitor. Thermal control and contamination are discussed in terms of thermal control subsystems, design validation, subsystems performance, the advanced flight experiment, and the quartz-crystal microbalance contamination monitor. N.W.

N82-16148*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 2: ORBIT AND ATTITUDE CONTROLS Final Report
Robert O. Wales, ed. Nov. 1981 289 p refs 6 Vol.
(Contract NAS5-25464)
(NASA-RP-1080-Vol-2; Rept-81F0034-Vol-2) Avail: NTIS HC A13/MF A01

Attitude control is reviewed, encompassing the attitude control subsystem, spacecraft attitude precision pointing and slewing adaptive control experiment, and RF interferometer experiment. The spacecraft propulsion system (SPS) is discussed, including subsystem, SPS design description and validation, orbital operations and performance, in-orbit anomalies and contingency operations, and the cesium bombardment ion engine experiment. Thruster failure due to plugging of the propellant feed passages, a major cause for mission termination, are considered among the critical generic failures on the satellite. N.W.

N82-16149*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 3: TELECOMMUNICATIONS AND POWER Final Report
Robert O. Wales, ed. Nov. 1981 298 p refs 6 Vol.
(Contract NAS5-25464)
(NASA-RP-1080-Vol-3; Rept-81F0034-Vol-3) Avail: NTIS HC A13/MF A01 CSCL 22B

Functional design requirements and in-orbit operations, performance, and anomalies are discussed for (1) the communications subsystem, (2) the electrical power system, and (3) the telemetry and command subsystem. The latter includes a review of ground support. Tracking and data relay experiments and the Apollo-Soyuz test program are reviewed. N.W.

N82-16150*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 4: TELEVISION EXPERIMENTS Final Report
Robert O. Wales, ed. Nov. 1981 149 p refs 6 Vol.
(Contract NAS5-25464)
(NASA-RP-1080-Vol-4; Rept-81F0034-Vol-4) Avail: NTIS HC A04/MF A01 CSCL 22B

Experiments sponsored by the US Department of Health Education and Welfare are discussed, including telecommunications, Alaskan health service, Appalachian education satellite project, and the University of the West Indies. The Satellite Instructional Television Experiment in India is reviewed. Independent television experiments are addressed, including AIDSAT and Project Look Up. N.W.

N82-16151*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 5: PROPAGATION EXPERIMENTS Final Report
Robert O. Wales, ed. Nov. 1981 302 p refs 6 Vol.
(Contract NAS5-25464)
(NASA-RP-1080-Vol-5; Rept-81F0034-Vol-5) Avail: NTIS HC A14/MF A01 CSCL 22B

Propagation experiments at 1550 MHz to 1650 MHz are reviewed, including the Integrated L-Band Experiments system and results, and the Mobile L-Band Terminals for Satellite Communication system. Experiments at 4 GHz to 6 GHz are reported, including the Radio Frequency Interferometer Measurements system and results, and Earth station antenna evaluations. Experiments above 10 GHz are discussed, including Comsat and ATS-6 millimeter wave propagation/experiments, and communication ATS-6 version at 20 and 30 GHz. N.W.

N82-16152*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 6: SCIENTIFIC EXPERIMENTS Final Report
Robert O. Wales, ed. Nov. 1981 166 p refs 6 Vol.
(Contract NAS5-25464)
(NASA-RP-1080-Vol-6; Rept-81F0034-Vol-6) Avail: NTIS HC A08/MF A01 CSCL 22B

Evaluations include a very high resolution radiometer, a radio beacon experiment, environmental measurement experiments (EME), EME support hardware, EME anomalies and failures, EME results, and US/USSR magnetometer experiments. N.W.

N82-16153*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE MICROWAVE RADIOMETER SPACECRAFT: A DESIGN STUDY
Robert L. Wright, ed. Dec. 1981 239 p refs
(NASA-RP-1079; L-14258) Avail: NTIS HC A11/MF A01 CSCL 22B

A large passive microwave radiometer spacecraft with near all weather capability of monitoring soil moisture for global crop forecasting was designed. The design, emphasizing large space structures technology, characterized the mission hardware at the conceptual level in sufficient detail to identify enabling and pacing technologies. Mission and spacecraft requirements, design and structural concepts, electromagnetic concepts, and control concepts are addressed. For individual titles, see N82-16154 through N82-16167.

N82-16154*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE MICROWAVE RADIOMETER SPACECRAFT. A DESIGN STUDY: EXECUTIVE SUMMARY
Uriel M. Lovelace *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 1-14 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

A conceptual design was developed for a microwave radiometer spacecraft (MRS) using a large passive reflector, microwave radiometer, and advanced control concepts soil moisture mapping from microwave sensing for global crop forecasting. Mission requirements and tradeoffs were defined, and major subsystems (structural, electromagnetic surface, and attitude control) conceptually designed. An overview of the mission and a summary of the study results are presented. J.M.S.

N82-16155*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MISSION DEFINITION FOR A LARGE-APERTURE MICROWAVE RADIOMETER SPACECRAFT
Lloyd S. Keafer, Jr. *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 17-32 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

An Earth-observation measurements mission is defined for a large-aperture microwave radiometer spacecraft. This mission is defined without regard to any particular spacecraft design concept. Space data application needs, the measurement selection rationale, and broad spacecraft design requirements and constraints are described. The effects of orbital parameters and image quality requirements on the spacecraft and mission performance are discussed. Over the land the primary measurand is soil moisture; over the coastal zones and the oceans important measurands are salinity, surface temperature, surface winds, oil spill dimensions and ice boundaries; and specific measurement requirements have been selected for each. Near-all-weather operation and good spatial resolution are assured by operating at low microwave frequencies using an extremely large aperture antenna in a low-Earth-orbit contiguous mapping mode. Author

N82-16156*# Massachusetts Univ., Amherst.
HIGH-RESOLUTION PASSIVE MICROWAVE IMAGING OF THE SURFACE OF THE EARTH
Calvin T. Swift *In* NASA. Langley Research Center The Mirowave Radiometer Spacecraft Dec. 1981 p 3-41 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

The physics of passive microwave observations of the Earth and the system requirements for high-resolution imaging within this spectral band are summarized. High resolution is achieved in a straightforward manner by increasing the size of the primary antenna. However, with a single receiver, it is shown that the combination of high resolution and crosstrack scanning cannot produce images which have valuable geophysical content. The concept of a multiple receiver array located in the focal plane is presented as the only practical solution to the dilemma. Exploring this concept, system requirements are generated which, for the first order, appear to offer solutions to the problem. Author

N82-16157*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RADIOMETER DESIGN CONCEPTS FOR LARGE APERTURE MICROWAVE RADIOMETER SPACECRAFT
Lloyd S. Keafer, Jr. *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 43-49 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

Concepts involving active and passive microwave systems for soil-moisture monitoring are discussed. It is shown that the first major development efforts should be directed toward the simpler passive design concepts. Subsequently, five passive design concepts for a microwave radiometer spacecraft are outlined and compared. Some common technology needs, such as large space structures and controls, are shown to exist. Also, some peculiar technology needs are identified, such as complicated phasing networks, dielectric lenses, tapered illumination, and reflector-surface irregularity and distortion control techniques. More detailed studies to address these design concepts and assess the associated technology needs are recommended.
J.M.S.

N82-16158*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EVOLUTION AND DESIGN CHARACTERISTICS OF THE MICROWAVE RADIOMETER SPACECRAFT
Robert L. Wright *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 51-66 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

The evolution of the design of the microwave radiometer spacecraft from conception to preliminary design is described. Alternatives and tradeoff rationale are described, and the configuration and structural design features that were developed and refined during the design processes are presented for the three structural configurations studied (two geodesic trusses and a flexible catenary).
Author

N82-16159*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SYSTEMS DESIGN AND ANALYSIS OF THE MICROWAVE RADIOMETER SPACECRAFT
L. Bernard Garrett *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 69-94 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

Systems design and analysis data were generated for microwave radiometer spacecraft concept using the Large Advanced Space Systems (LASS) computer aided design and analysis program. Parametric analyses were conducted for perturbations off the nominal-orbital-altitude/antenna-reflector-size and for control/propulsion system options. Optimized spacecraft mass, structural element design, and on-orbit loading data are presented. Propulsion and rigid-body control systems sensitivities to current and advanced technology are established. Spacecraft-induced and environmental effects on antenna performance (surface accuracy, defocus, and boresight off-set) are quantified and structured material frequencies and modal shapes are defined.
Author

N82-16160*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRELIMINARY DESIGN OF TETRAHEDRAL TRUSS REFLECTOR STRUCTURE
Michael F. Card and J. Kermit Jensen (Kentron International, Inc.) *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 95-107 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

A baseline structure proposed for the microwave radiometer spacecraft (MRS) reflector is a large graphite-epoxy truss. The truss structure was selected to provide adequate stiffness to minimize control problems and to provide a low-expansion 'strong back' on which to mount and control reflector mesh panels. Details of the structural members, joints and assembly concepts are presented, a concept for the reflector mesh surface is discussed, and preliminary estimates of the mass and structural natural frequencies of the reflector system are presented. Author

N82-16161*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WEIGHT ESTIMATES AND PACKAGING TECHNIQUES FOR THE MICROWAVE RADIOMETER SPACECRAFT
J. Kermit Jensen (Kentron International, Inc.) and Robert L. Wright *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 109-125 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

Estimates of total spacecraft weight and packaging options were made for three conceptual designs of a microwave radiometer spacecraft. Erectable structures were found to be slightly lighter than deployable structures but could be packaged in one-tenth the volume. The tension rim concept, an unconventional design approach, was found to be the lightest and transportable to orbit in the least number of shuttle flights.
Author

N82-16162*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTROMAGNETIC DESIGN OF A MICROWAVE RADIOMETER ANTENNA SYSTEM
P. K. Agrawal (RCA, Moorestown, N.J.) and C. R. Cockrell *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 129-136 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

A preliminary electromagnetic (EM) design of a radiometric antenna system was developed for the microwave radiometer spacecraft mission. The antenna system consists of a large spherical reflector and an array of feed horns along a concentric circular arc in front of the reflector. The reflector antenna was sized to simultaneously produce 200 contiguous 1 km diameter footprints with an overall beam efficiency of 90 percent, and the feed horns and feed horn array were designed to monitor the radiation from the footprints.
Author

N82-16163*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF RANDOM DISTORTIONS ON THE SURFACE ACCURACY OF A LARGE ANTENNA
C. R. Cockrell and Leo Staton *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 137-140 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

The effects of random reflector distortions or irregularities on a reflector's radiation pattern are discussed. The importance of such surface deviations with respect to a radiometric reflector antenna is addressed.
Author

N82-16164*# Harris Corp., Melbourne, Fla.
EFFECTS OF ANTENNA BLOCKAGE ON RADIO FREQUENCY PERFORMANCE OF THE MICROWAVE RADIOMETER SPACECRAFT
L. D. Sikes and T. Hower *In* NASA. Langley Research Center The Microwave Radiometer Spacecraft Dec. 1981 p 141-165 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

Radio frequency scaled models of the microwave radiometer spacecraft suspended feed concept were tested to determine the effects of aperture blockage on the antenna radiation pattern. Contributors to the uncertainty of the test measurements were evaluated, and an estimate of the blockage effects was made for comparison with the test measurements. The gain loss budget associated with reflector performance characteristics (aperture blockage, surface reflectivity, reflector roughness, and defocus) was determined.
Author

N82-16165*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADAPTIVE CONTROL SYSTEM FOR LARGE ANNULAR MOMENTUM CONTROL DEVICE
Raymond C. Montgomery and C. Richard Johnson, Jr. (Virginia Polytechnic Inst. and State Univ.) *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 169-187 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

A dual momentum vector control concept, consisting of two counterrotating rings (each designated as an annular momentum control device), was studied for pointing and slewing control of large spacecraft. In a disturbance free space environment, the concept provides for three axis pointing and slewing capabilities while requiring no expendables. The approach utilizes two large diameter counterrotating rings or wheels suspended magnetically in many race supports distributed around the antenna structure. When the magnets are energized, attracting the two wheels, the resulting gyroscopic torque produces a rate along the appropriate axis. Roll control is provided by alternating the radiative rotational velocity of the two wheels. Wheels with diameters of 500 to 800 m and with sufficient momentum storage capability require rims only a few centimeters thick. The wheels are extremely flexible; therefore, it is necessary to account for the distributed nature of the rings in the design of the bearing controllers. Also, ring behavior is unpredictably sensitive to ring temperature, spin rate, manufacturing imperfections, and other variables. An adaptive control system designed to handle these problems is described. J.M.S.

N82-16166*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
BIAXIAL AND ELECTROSTATIC TENSIONING EFFECTS ON THIN MEMBRANE MATERIALS
William F. Hinson, J. W. Gosiee, John R. McIlhaney (Kentron International, Inc.), and James H. Ramsey (Kentron International, Inc.) *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 189-204 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

Thin membrane materials were subjected to biaxial and electrostatic tensioning loads to study techniques for maintaining surface smoothness of a thin membrane antenna. The basic mechanical and electrical setup for the tests is described and preliminary measurements of surface smoothness and surface deviation are presented. Author

N82-16167*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
BOOTLACE CATENARY CONCEPT FOR ANTENNA SHAPE CONTROL
James H. Ramsey (Kentron International, Inc.) and Robert L. Wright *In its* The Microwave Radiometer Spacecraft Dec. 1981 p 205-213 refs (For primary document see N82-16153 07-18)
Avail: NTIS HC A11/MF A01 CSCL 22B

A preliminary design of the microwave radiometer spacecraft (MRS) using the bootlace catenary shaping concept was developed. The application of this radically different design for shape control of the antenna membrane was assessed and possible sources of inaccuracies and errors were investigated. Author

N82-16168# Control Dynamics Co., Huntsville, Ala.
ACOSS NINE (ACTIVE CONTROL OF SPACE STRUCTURES) Final Technical Report, 1 Apr. 1980 - 1 Apr. 1981
Sherman M. Seltzer, H. Eugene Worley, Bernard A. Asner, Jr., and Dragoslav D. Siljak Griffiss AFB, N.Y. RADC Sep. 1981 132 p refs
(Contract F30602-80-C-0177; ARPA Order 3653; AF Proj. C654)
(AD-A106686; RADC-TR-81-240) Avail: NTIS HC A07/MF A01 CSCL 22/2

This is the Control Dynamics Final Report on the analysis and evaluation of Large Space Structures. The research was primarily aimed at mathematical model development and control system analysis and design tool development. Author (GRA)

N82-16169# Control Dynamics Co., Huntsville, Ala.
ACOSS SEVEN (ACTIVE CONTROL OF SPACE STRUCTURES) Final Technical Report, 17 Apr. - 19 Dec. 1980
John R. Sesak Griffiss AFB, N.Y. RADC Sep. 1981 103 p refs
(Contract F30602-80-C-0164; ARPA Order 3654; AF Proj. C654)
(AD-A106687; RADC-TR-81-241) Avail: NTIS HC A06/MF A01 CSCL 22/2

This report covers active structural control theory extensions, simulations, and demonstration test planning as they relate to precision control of large space systems. Theory material includes a filter accommodation technique for stabilizing higher modes without degrading controlled mode performance. Liapunov stability analysis, and disturbance accommodation techniques for systems where damping alone cannot meet requirements. Author (GRA)

N82-17046*# Eastern Connecticut State College, Willimantic. Dept. of Mathematical Sciences.
FUEL OPTIMAL MANEUVERS FOR SPACECRAFT WITH FIXED THRUSTERS
Thomas C. Carter *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 21 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 22B

N82-17057*# Clarkson Coll. of Technology, Potsdam, N.Y. Dept. of Electrical and Computer Engineering.
ATTITUDE CONTROL OF THE SPACE CONSTRUCTION BASE: A MODULAR APPROACH
Daniel A. OConnor *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 35 p (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 22B

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

N82-16170*# Ball Aerospace Systems Div., Boulder, Colo.
BREADBOARD STELLAR TRACKER SYSTEM TEST REPORT, VOLUME 1 Final Report
J. C. Kollodge, M. W. Hubbard, S. Jain, and C. A. Schons 1 Aug. 1981 192 p refs
(Contract NAS8-34263)
(NASA-CR-161953; TR-81-04-Vol-1) Avail: NTIS HC A09/MF A01 CSCL 14B

The performance of a star tracker equipped with a focal plane detector was evaluated. The CID board is an array of 256 x 256 pixels which are 20 x 20 micrometers in dimension. The tracker used for test was a breadboard tracker system developed by BASD. Unique acquisition and tracking algorithms are employed to enhance performance. A pattern recognition process is used to test for proper image spread function and to avoid false acquisition on noise. A very linear, high gain, interpixel transfer function is derived for interpolating star position. The lens used in the tracker has an EFL of 100 mm. The tracker has an FOV of 2.93 degrees resulting in a pixel angular subtense of 41.253 arc sec in each axis. The test procedure used for the program presented a star to the tracker in a circular pattern of positions; the pattern was formed by projecting a simulated star through a rotatable deviation wedge. Further tests determined readout noise, Noise Equivalent Displacement during track, and spatial noise during acquisition by taking related data and reducing it. M.D.K.

N82-16171*# Ball Aerospace Systems Div., Boulder, Colo.
BREADBOARD STELLAR TRACKER SYSTEM TEST REPORT, VOLUME 2 Final Report
1 Aug. 1981 284 p refs
(Contract NAS8-34263)
(NASA-CR-161954; TR-81-04-Vol-2) Avail: NTIS HC A12/MF A01 CSCL 14B

Complete data from a test program designed to evaluate the performance of a star tracker, a breadboard tracker system, is presented in tabular form. All data presented was normalized to the pixel dimension of 20 micrometers. Data from determination of maximum spatial noise as it applies to the coarse and fine acquisition modes is presented. Pointing accuracy test data, raw pixel data for the track cycle, and data from equipment related tests is also presented. M.D.K.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.
For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-16172*# Rockeldyne, Canoga Park, Calif.
REUSABLE ROCKET ENGINE MAINTENANCE STUDY Final Report, Sep. 1980 - Oct. 1981
Charles A. MacGregor Jan. 1982 306 p
(Contract NAS3-22652)
(NASA-CR-165569; RI/RD81-226) Avail: NTIS
HC A14/MF A01 CSCL 21H

Approximately 85,000 liquid rocket engine failure reports, obtained from 30 years of developing and delivering major pump feed engines, were reviewed and screened and reduced to 1771. These were categorized into 16 different failure modes. Failure propagation diagrams were established. The state of the art of engine condition monitoring for in-flight sensors and between flight inspection technology was determined. For the 16 failure modes, the potential measurands and diagnostic requirements were identified, assessed and ranked. Eight areas are identified requiring advanced technology development.
T.M.

N82-16173# ARO, Inc., Arnold Air Furce Station, Tenn.
TIME- AND SPACE-DEPENDENCE OF PARTICULATE EFFLUENT IN THE EXHAUST PLUME OF A PULSED LIQUID BIPROPELLANT ENGINE Final Report, 1 Oct. 1979 - 30 Jun. 1980
B. P. Curry, J. W. L. Lewis, J. H. Jones, and H. M. Powell
AEDC Oct. 1981 25 p refs
(AD-A106525; AEDC-TR-80-44) Avail: NTIS
HC A02/MF A01 CSCL 21/2

The temporal and radial profiles of particulate mean sizes and densities in the exhaust plume of a pulsed 5-lbf thrust liquid bipropellant rocket engine have been determined. The primary goal of this analysis has been to establish the capability of simulating the characteristics of multi-second firings at high altitude. The results demonstrate that steady-state particle formulation kinetics are achieved in times on the order of 10 milliseconds. Further, combustion instability was shown to be unimportant for combustion chamber length-to-diameter ratios less than 30. The particle size and flux measurements reported here additionally demonstrate the utility of Mie scattering techniques for pulsed engine testing and contamination tests.
Author (GRA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-16174* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SYNTHESIS OF POLYFORMALS Patent
Algirdas C. Poshkus, inventor (to NASA) (NAS-NRC, Washington, D.C.) Issued 7 Jul. 1981 3 p Filed 3 Jul. 1979 Supersedes N79-30376 (17 - 21, p 2793) Sponsored by NASA
(NASA-Case-ARC-11244-1; US-Patent-4,277,402; US-Patent-Appl-SN-054501; US-Patent-Class-260-340.9R; US-Patent-Class-568-445; US-Patent-Class-568-497) Avail: US Patent and Trademark Office CSCL 07C

Formals of CH2OH(CHOH) sub n CH2OH polyols (n = 2 to 4) are prepared in less than 15 minutes by heating to about 125 C, a mixture of e.g. sorbitol and paraformaldehyde in slight excess (5 to 10%), in the presence of e.g. sulfuric acid in catalytic quantities. Elution with methanol and filtration yield the pure solid cyclic triformal. The process can be carried in stages, using almost stoichiometric quantities of paraformaldehyde, but without any change in overall heating time.
Official Gazette of the U.S. Patent and Trademark Office

N82-16175*# National Aeronautics and Space Administration, Washington, D. C.
PLASMA CHEMISTRY AND ORGANIC SYNTHESIS
Meguru Tezuka Jul. 1980 16 p refs Transl. into ENGLISH from Kagaku Kogyo (Japan), Apr. 1980 p 348-352 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Saitama Technical Coll., Japan
(Contract NASw-3199)
(NASA-TM-75843) Avail: NTIS HC A02/MF A01 CSCL 07A

The characteristic features of chemical reactions using low temperature plasmas are described and differentiated from those seen in other reaction systems. A number of examples of applications of plasma chemistry to synthetic reactions are mentioned. The production of amino acids by discharge reactions in hydrocarbon-ammonia-water systems is discussed, and its implications for the origins of life are mentioned.
Author

N82-17047*# Alabama A & M Univ., Huntsville. Dept. of Chemistry.
SOLIDIFICATION PHENOMENA OF BINARY ORGANIC MIXTURES
Kichoon Chang *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 20 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 07A

24 COMPOSITE MATERIALS

Includes laminates.

N82-16176*# TRW, Inc., Cleveland, Ohio.
FABRICATION OF BORON/ALUMINUM FAN BLADES FOR SCR ENGINES Final Report, Jun. 1976 - Jun. 1980
G. S. Doble Mar. 1981 49 p refs
(Contract NAS3-20360)
(NASA-CR-165294; ER-7891-F) Avail: NTIS
HC A03/MF A01 CSCL 11D

The fabrication of boron/aluminum fan blades for the F-404 Supersonic Cruise Research prototype engine by rapid air bonding of fully dense monotapes is described, and the fan blades evaluated. The F-404 configuration is representative of a low aspect ratio advanced design blade with supersonic capability. Dovetail pull tests of this geometry, which substituted boron/aluminum for titanium, suggested that excessive shear stresses were present in the root. A re-designed blade, incorporating a titanium tang and root, was fabricated by hot isostatic pressing. Blades appeared well bonded but the airfoil contained sizable areas of deformation and identification from the alumina grain used as a pressure transmitting medium. The use of hot isostatic pressing with a formed steel encapsulator should eliminate this problem.
J.D.H.

N82-16177*# Materials Sciences Corp., Spring House, Pa.
DEVELOPMENT OF AN ENGINEERING ANALYSIS OF PROGRESSIVE DAMAGE IN COMPOSITES DURING LOW VELOCITY IMPACT Final Report, 3 Aug. 1979 - 15 Sep. 1981
E. A. Humphreys Jul. 1981 123 p refs
(Contract NAS1-15888)
(NASA-CR-165778; MSC-TFR-1205/0208) Avail: NTIS
HC A06/MF A01 CSCL 11D

A computerized, analytical methodology was developed to study damage accumulation during low velocity lateral impact of layered composite plates. The impact event was modeled as perfectly plastic with complete momentum transfer to the plate structure. A transient dynamic finite element approach was selected to predict the displacement time response of the plate structure. Composite ply and interlaminar stresses were computed at selected time intervals and subsequently evaluated to predict layer and interlaminar damage. The effects of damage on elemental stiffness were then incorporated back into the analysis for subsequent time steps. Damage predicted included fiber failure, matrix ply failure and interlaminar delamination. Author

N82-16178*# Boeing Commercial Airplane Co., Seattle, Wash.
ENVIRONMENTAL EXPOSURE EFFECTS ON COMPOSITE MATERIALS FOR COMMERCIAL AIRCRAFT Interim Technical Report, Nov. 1977 - Jul. 1981
Martin N. Gibbins and Daniel J. Hoffman Washington NASA Jan. 1982 129 p refs
(Contract NAS1-15148)
(NASA-CR-3502; D6-51227) Avail: NTIS HC A07/MF A01 CSCL 11D

The effects of environmental exposure on composite materials are studied. The environments considered are representative of those experienced by commercial jet aircraft. Initial results have been compiled for the following material systems: T300/5208, T300/5209 and T300/934. Specimens were exposed on the exterior and interior of Boeing 737 airplanes of three airlines, and to continuous ground level exposure at four locations. In addition specimens were exposed in the laboratory to conditions such as: simulated ground-air-ground, weatherometer, and moisture. Residual strength results are presented for specimens exposed for up to two years at three ground level exposure locations and on airplanes from two airlines. Test results are also given for specimens exposed to the laboratory simulated environments. Test results indicate that short beam shear strength is sensitive to environmental exposure and dependent on the level of absorbed moisture. S.L.

N82-16179*# National Aeronautics and Space Administration, Washington, D. C.
A PROCESS FOR THE PRODUCTION OF A SCALE-PROOF AND CORROSION-RESISTANT COATING ON GRAPHITE AND CARBON BODIES
Erich Fitzer Dec. 1981 8 p Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76785) Avail: NTIS HC A02/MF A01 CSCL 11D

A process for the production of a corrosion resistant coating on graphite and carbon bodies is described. The carbon or graphite body is coated or impregnated with titanium silicide under the addition of a metal containing wetting agent in a nitrogen free atmosphere, so that a tight coating is formed. J.D.H.

N82-16180*# National Aeronautics and Space Administration, Washington, D. C.
METHOD OF PREVENTING OXIDATION OF GRAPHITE FIREPROOF MATERIAL
S. Yamauchi and H. Suzuki Dec. 1981 10 p Transl. into ENGLISH of Japanese Patent no. 29-3485, 1954 10 p Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76786) Avail: NTIS HC A02/MF A01 CSCL 11D

A method of preventing oxidation of graphite fireproof material is given. A blend of 1 to 33 weight parts alumina and 3 to 19 parts of K2O + Na2O in 100 parts of SiO2 is pulverized followed by addition of 5 to 160 parts of silicon carbide powder in 100 parts of the mixture. This is thoroughly blended and coated on the surface of graphite fireproof material. J.D.H.

N82-16181*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PREDICTION OF COMPOSITE HYGRAL BEHAVIOR MADE SIMPLE
Christos C. Chamis and J. H. Sinclair 1982 30 p refs Presented at the 37th Ann. Conf. of the Soc. of the Plastics Ind. (SPI), Washington, D.C., 12-15 Jan. 1982
(NASA-TM-82780; E-1022) Avail: NTIS HC A03/MF A01 CSCL 11D

A convenient procedure is described to determine the hygral behavior (moisture expansion coefficients and moisture stresses) of angleplied fiber composites using a pocket calculator. The procedure consists of equations and appropriate graphs for various (+ or - theta) ply combinations. These graphs present reduced stiffness and moisture expansion coefficients as functions of (+ or - theta) in order to simplify and expedite the use of the equations. The procedure is applicable to all types of balanced, symmetric fiber composites including interply and intraply hybrids. The versatility and generality of the procedure is illustrated using several step-by-step numerical examples. Author

N82-16182*# Rensselaer Polytechnic Inst., Troy, N. Y. School of Engineering.
COMPOSITE STRUCTURAL MATERIALS Semiannual Progress Report, 30 Apr. - 30 Sep. 1981
George S. Ansell, Robert G. Loewy, and Stephen E. Wiberly Dec. 1981 164 p refs Sponsored in part by Air Force
(Grant NGL-33-018-003)
(NASA-CR-165121; SAR-41) Avail: NTIS HC A08/MF A01 CSCL 11D

Physical properties of fiber reinforced composites; structural concepts and analysis; manufacturing; reliability; and life prediction are subjects of research conducted to determine the long term integrity of composite aircraft structures under conditions pertinent to service use. Progress is reported in (1) characterizing homogeneity in composite materials; (2) developing methods for analyzing composite materials; (3) studying fatigue in composite materials; (4) determining the temperature and moisture effects on the mechanical properties of laminates; (5) numerically analyzing moisture effects; (6) numerically analyzing the micromechanics of composite fracture; (7) constructing the 727 elevator attachment rib; (8) developing the L-1011 engine drag strut (CAPCOMP 2 program); (9) analyzing mechanical joints in composites; (10) developing computer software; and (11) processing science and technology, with emphasis on the sailplane project. A.R.H.

N82-16183# Forest Products Lab., Madison, Wis.
OVERALL EFFECTIVE THERMAL RESISTANCE OF CORRUGATED FIBERBOARD CONTAINERS
David W. Bormett Aug. 1981 13 p refs
(AD-A106569; FSRP-FPL-406) Avail: NTIS HC A02/MF A01 CSCL 13/4

The overall effective thermal resistance of a corrugated fiberboard container was determined as a function of air velocity and board thickness, and an appropriate design curve is presented. The thermal resistance of the container is treated as a sum of resistance, with individual resistance values presented for the interior interfacial contact resistance, the board resistance, and the exterior boundary resistance. Behavioral differences were found for heating versus cooling at conventional board thickness and a possible explanation for this behavior is presented. GRA

N82-16184# Forest Products Lab., Madison, Wis.
EFFECT OF PAPERBOARD STRESS-STRAIN CHARACTERISTICS ON STRENGTH OF SINGLEWALL CORRUGATED FIBERBOARD: A THEORETICAL APPROACH
Thomas J. Urbanik Jul. 1981 18 p refs
(AD-A106566; FSRP-FPL-401) Avail: NTIS HC A02/MF A01 CSCL 11/5

The stress-strain relationship for paperboard loaded in edgewise compression relates to the strength of singlewall corrugated containers. This relationship can be approximated from the paperboard characteristics of stress measured at the maximum load and the initial modulus of elasticity. Based on typical characteristics for both linerboard and corrugating medium material a design matrix is constructed for a factorial analysis. Using a computer, various stress-strain relationships are paired together like they might be on the corrugator, and the theoretical effects of the stress-strain characteristics are investigated. Computer drawn design curves show how these linerboard and medium characteristics affect combined board edgewise compressive strength and box top-to-bottom compressive strength. The interaction between the stress-strain characteristics and paperboard thickness is used to suggest new criteria for evaluating paperboard. Author (GRA)

N82-16185# Hercules, Inc., Magna, Utah. Aerospace Div.
THERMAL DEGRADATION OF GRAPHITE/EPOXY COMPOSITE Final Report, 16 Apr. 1979 - 30 Sep. 1980
Harold L. Pritt 28 Nov. 1980 70 p refs
(Contract N62669-79-C-0240)
(AD-A106425; NADC-78118-60) Avail: NTIS HC A04/MF A01 CSCL 11/4

The purpose of this effort was to develop visual, NDI, and residual strength correlations as a result of thermal degradation upon thick composite laminates. These investigations were performed upon dry 0.25-inch-thick, coated graphite composite (AS-1/3501-6) laminates subjected to thermal shock on one side. Exposure temperatures were 350 degrees, 400 degrees, 500 degrees, 600 degrees, 800 degrees, 1200 degrees, 1600 degrees, and 1800 degrees F. Temperature gradients were obtained from instrumental panels under no-load conditions. Thermal shocking of panels and specimens while under sustained strain (2500 microns in./in.) conditions provided comparisons of load carrying ability. Other specimens were tested for residual strength after thermal exposure. Ultrasonic examinations were performed, as was monitoring of color changes. Permanent matrix damage began to occur during a 600 degrees F exposure.

Author (GRA)

N82-16186# Aeronautical Research Labs., Melbourne (Australia).
NDI OF COMPOSITE MATERIALS
I. G. Scott and C. M. Scala Jul. 1981 30 p refs
(AD-A106278; ARL/MAT-TM-379) Copyright. Avail: Issuing Activity CSCL 11/4

A review is given of NDI methods for fibre-reinforced composite materials such as carbon, boron, glass and KEVLAR. The capabilities of present methods such as ultrasonics, radiography, holography and thermography are evaluated for defect detection. In addition, techniques which show promise of development as predictors of failure, e.g., vibration measurement and acoustic emission, are examined. Author (GRA)

N82-16187# Dayton Univ., Ohio.
NONLINEAR FINITE ELEMENT ANALYSIS OF SANDWICH COMPOSITES Final Report, Sep. 1977 - Nov. 1980
Robert A. Brockman Wright-Patterson AFB, Ohio AFWAL Mar. 1981 112 p refs
(Contract F33615-77-C-3075; AF Proj. 2401)
(AD-A106378; UDR-TR-80-113; AFWAL-TR-81-3008) Avail: NTIS HC A06/MF A01 CSCL 11/4

Finite element analysis techniques are developed for the solution of nonlinear problems involving sandwich composite materials. Each layer of a sandwich panel is represented explicitly so that multicore panels and other configurations are easily considered. The finite element discretization is performed using arbitrary-shaped, fully compatible shell and continuum elements, as well as special elements representing full-depth and/or face sheet stiffeners. Each of these elements is capable of representing arbitrarily large displacements and rotations, since no simplifying assumptions are made in the theoretical formulation. Elastic-plastic effects may also be considered. An associated computer program is described which may be used to perform linear or nonlinear solutions for mechanical and thermal loading, linear natural frequency calculations. Several example problems are solved to demonstrate the capabilities of the program.

Author (GRA)

N82-16188# Delaware Univ., Newark. Dept. of Mechanical and Aerospace Engineering.
ANALYSIS OF BONDED JOINTS IN COMPOSITE MATERIALS STRUCTURES INVOLVING HYGROTHERMAL EFFECTS Final Report, 1978 - 1979
Jack R. Vinson Apr. 1981 56 p refs
(Contract N00014-78-C-0199)
(AD-A106720; MAE-TR-239) Avail: NTIS HC A04/MF A01 CSCL 11/4

Results of the analyses of stresses, strains and displacements in both the adhesive bond and the adherends of bonded composite material structures and bonded metallic structures are presented. Joint configurations include the single lap, the double lap, the single doubler, the double doubler, and the stepped lap joint. The methods will be useful in designing and analyzing such joints under static, dynamic and thermal loads, as well as accounting for stresses incurred during fabrication as well as hygrothermal histories. Also shown are the effects of important geometric and material parameters on the stress, strain and displacement distributions.

Author (GRA)

N82-16189# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Mechanics and Surface Interactions Branch.
INSTRUCTIONS FOR TI-59 COMBINED CARD/MODULE CALCULATIONS FOR IN-PLANE AND FLEXURAL PROPERTIES OF SYMMETRIC LAMINATES Final Report, May - Jul. 1981
Stephen W. Tsai and Stella D. Gates Sep. 1981 55 p
(AF Proj. 2419)
(AD-A107984; AFWAL-TR-81-4116) Avail: NTIS HC A04/MF A01 CSCL 11/4

This report contains the description and instructions for the combined use of composite materials module and, magnetic cards for TI-59 programmable calculators. These programs contain the key calculations of the stiffness and strength of unidirectional and laminated composites. This can include sandwich core laminates. Both in-plane and flexural loadings can be applied. With the combination of the module and magnetic cards, instant calculations can be made for practical use. With the use of a printer, these can be immediately outputted and recorded permanently.

GRA

N82-16190# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
DEPOSITION AND CHARACTERIZATION OF PYROCARBON COATINGS PRODUCED BY USE OF CO2 DILUTION
D. P. Stinton and W. J. Lackey Oct. 1981 17 p refs
(Contract W-7405-eng-26)
(PB82-000900; ORNL/TM-7853) Avail: NTIS HC A02/MF A01 CSCL 11D

A Biso-coated fuel particle for the high temperature gas cooled reactor consists of a 500 micrometers ThO2 kernel, an 85 micrometer layer of low density carbon, and a 75 micrometer layer of high density pyrocarbon. Coatings produced from mixtures of 50% propylene, 25% CO2 and 25% Ar were found to be more gastight than were coatings produced from mixtures of propylene and argon, helium, or H2. Higher concentrations of CO2 in the gas mixture caused severe oxidation of graphite components within the coating furnace. The permeability of coatings deposited by use of CO2 dilution was found to depend on the deposition temperature. Low deposition temperatures produced more gastight coatings. It was determined that CO2 had little or no effect on coating anisotropy.

DOE

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-16191# IBM Watson Research Center, Yorktown Heights, N.Y.
VIBRATIONAL OVERTONE SPECTROSCOPY OF BENZENE AND PYRIDINE ON Ag(111)
Ph. Avouris and J. E. Demuth Sep. 1981 17 p refs Submitted for publication
(Contract N00014-77-C-0366; NR Proj. 056-123)
(AD-A106396; TR-17) Avail: NTIS HC A02/MF A01 CSCL 07/3

Electron energy-loss results are presented which permit the detection of up to the fourth vibrational state of the CH stretching vibrations of benzene and pyridine adsorbed on Ag(111). A reduced anharmonicity is observed for adsorbed benzene while both alpha and beta, gamma-CH groups for pyridine can be observed. The life time for the V=0 yields 4 vibrational excitation of benzene is estimated to be 2 x 10 to the -14 power sec. GRA

N82-16192# Alberta Univ., Edmonton. Dept. of Chemistry.
VIBRATIONAL SPECTROSCOPY OF THE ELECTRODE-ELECTROLYTE INTERFACE. USE OF FOURIER TRANSFORM INFRARED SPECTROSCOPY
Timothy Davidson, B. Stanley Pons (Southampton Univ.), Alan Bewick, and Parbury P. Schmidt (Oakland Univ.) 1 Aug. 1981 20 p refs Submitted for publication

(Grant N00014-80-G-0107; NR Proj. 359-718)
(AD-A106231; TR-5) Avail: NTIS HC A02/MF A01 CSCL 07/4

Reported is the first application of Fourier transform infrared spectroscopy as an analytical probe for the in situ monitoring of electrochemical interfacial phenomena. The structure of acetonitrile at the interface is reported. Author (GRA)

N82-16193# Brown Univ., Providence, R. I. Dept. of Chemistry.
PREPARATION AND CHARACTERIZATION OF CONDUCTING IRON TUNGSTATES
H. Leiva, K. Dwight, and Aaron Wold 23 Oct. 1981 26 p refs Submitted for publication
(Contract N00014-77-C-0387; NR Proj. 359-653)
(AD-A106541; TR-17) Avail: NTIS HC A03/MF A01 CSCL 07/2

Several iron(III) tungstates have been prepared, and their crystallographic, magnetic, electric and photoelectronic properties have been characterized. The compounds crystallize with the tri-alpha-PbO2 structure, and the actual ordering of the MO6 octahedra (M = Fe or W) appears to determine these properties. Under illumination, Fe2WO6 photoanodes show an intermediate photoresponse between conducting alpha-Fe2O3 and WO3, although the flat-band potential is still too positive. Author (GRA)

N82-16194# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
FEASIBILITY OF INTERFACING A MICROCOMPUTER WITH A MULTICHANNEL ANALYZER TO PERFORM GAMMA RAY SPECTROSCOPY M.S. Thesis
DeFrance Clarke, III Mar. 1981 140 p refs
(AD-A106176; AFIT/GNE/PH/81M-2) Avail: NTIS HC A07/MF A01 CSCL 20/8

Interfacing a microcomputer to a Nuclear Data Series 2200 multichannel analyzer has been demonstrated. Programs for data transfer, peak detection, peak net area integration, peak centroid location, and energy calibration were written. Data transfer and peak detection scan were demonstrated on 4096 channel spectra in less than 5 minutes. Multibyte integer arithmetic routines for the 8080 microprocessor were written to conserve space and time. A proposed system for gamma ray spectrum analysis is described in hardware and software terms. The hardware for the proposed system would cost less than $9000 while commercial multichannel analyzers with the same capabilities would cost in excess of $23,000. GRA

N82-16195# Alberta Univ., Edmonton. Dept. of Chemistry.
REDUCTIONS IN APROTIC MEDIA. 1: CATHODIC REDUCTION LIMITS IN ACETONITRILE AT A PLATINUM ELECTRODE
B. Stanley Pons and S. B. Khoo 15 Aug. 1981 43 p refs
(Contract N00014-80-C-0107)
(AD-A106815; TR-6) Avail: NTIS HC A03/MF A01 CSCL 09/1

The cathodic behavior of acetonitrile of a platinum electrode is strongly dependent on the cation of the supporting electrolyte, and contamination by moisture. Hydride ion is formed at negative potentials in anhydrous solutions. Author (GRA)

N82-16196# Aerospace Corp., El Segundo, Calif. Materials Sciences Lab.
CARBON VAPOR PRESSURE IN THE RANGE 3450 TO 4500 K AND EVIDENCE FOR MELTING AT APPROXIMATELY 3800 K
Arthur G. Whittaker, Paul I. Kinter, L. S. Nelson (Sandia Corp., Albuquerque, N. Mex.), and N. Richardson (Sandia Corp., Albuquerque, N. Mex.) 1 Sep. 1981 57 p refs
(Contract F04701-80-C-0081)
(AD-A106134; TR-0081(6950-02)-1; SD-TR-81-60) Avail: NTIS HC A04/MF A01 CSCL 07/3

The vapor pressure of carbon was determined over the temperature range 3470 to 4490 K by using a laser heating technique. The solid-liquid-vapor triple point was located at approximately 3800 K and a pressure of approximately 13,000 Pa, and the normal boiling point was found to be approximately 4140 K. Evidence for a solid-solid-vapor triple point was found at approximately 3560 K. Liquid carbon was produced in a free state, and some of its properties were determined. Superheated liquid carbon was produced at low pressure by using sufficient laser power. Spectroscopic methods were used to determine the carbon gas temperature and as a cross-check on the temperature determined by an optical pyrometer. Author (GRA)

N82-16197# Naval Research Lab., Washington, D. C.
CONSTRUCTION OF LARGE REACTION MECHANISMS Final Report
D. Indritz, M. Maday, R. Sheinson, and W. Shaub 9 Oct. 1981 30 p refs
(RR0240241)
(AD-A106139; NRL-8498) Avail: NTIS HC A03/MF A01 CSCL 07/4

An algorithm was developed to systematically and objectively generate tractable reaction mechanisms using as input information the species present, and their enthalpies, entropies, number of atoms, and number of bonds. The algorithm generates all possible reactions subject to the constraints of mass balance, energy, entropy, and number of bonds broken and formed. Bimolecular, unimolecular decomposition, addition and isomerization reactions are considered. This method reduces error and still allows for the application of chemical intuition by the researcher. GRA

N82-16198# University of Southern California, Los Angeles.
REACTIVE AND ENERGY TRANSFER PROCESSES OF THE NEUTRAL RADICAL SPECIES HgBr IN GAS PHASE COLLISIONS Final Technical Report, May 1978 - May 1981
H. Helvajian and C. Wittig 5 Nov. 1981 52 p refs
(Contract N00014-78-C-0585)
(AD-A107718) Avail: NTIS HC A04/MF A01 CSCL 20/3

Experimental investigations were conducted wherein kinetic process associated with the gas phase radical species HgBr were studied. These studies serve to provide pertinent information about the development of the blue-green HgBr (B yields X) laser. The experiments utilize laser induced fluorescence and/or chemiluminescence as a means for observing the collisional behavior of HgBr radicals. GRA

N82-16199# Army Materials and Mechanics Research Center, Watertown, Mass. Polymer Research Div.
DETERMINATION OF YTTRIUM IN HIGH DENSITY SILICON NITRIDE BY EMISSION AND X-RAY FLUORESCENCE SPECTROSCOPY Final Report
Bernard H. Strauss Aug. 1981 15 p
(AD-A107596; AMMRC-TR-81-39) Avail: NTIS HC A02/MF A01 CSCL 07/4

Two spectrographic methods were developed for the determination of yttrium in high density yttrium-doped silicon nitride. The first method employs emission spectrographic techniques which compares a solution of the dissolved sample with that of aqueous synthetic standards. The second method uses energy dispersive X-ray fluorescence techniques to compare fusion buttons made from the samples with those fabricated from pure yttria and undensified silicon nitride. Synthetic standards were required in both methods because there were no available yttrium-densified silicon nitride standards. Seven samples were analyzed whose yttrium content ranged from two to sixteen weight percent. Data on results are furnished. GRA

N82-16200# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va. Fuels and Lubricants Div.
IDENTIFICATION OF SYNTHETIC FLUIDS UTILIZING PYROLYSIS GAS LIQUID CHROMATOGRAPHIC TECHNIQUES Final Report
Robert G. Jamison Sep. 1981 47 p refs
(AD-A108117; MERADCOM-2340) Avail: NTIS HC A03/MF A01 CSCL 11/8

Because of the increasing use of synthetic-based lubricants and functional fluids, a study was initiated to develop a rapid gas liquid phase chromatographic method that would enable qualitative identification of differing types of base stock ingredients. Results of this investigation revealed that by utilizing pyrolysis gas liquid-phase chromatographic techniques, identification of many different types of materials can be successfully accomplished

in a relatively short period of time. Utilization of this technology will greatly enhance the resolution of field problems and permit a greater understanding of fluid and lubricant research.
Author (GRA)

N82-16201# Sandia Labs., Albuquerque, N. Mex.
OXIDATION OF POLYCRYSTALLINE BORON: THE INTERPRETATION OF AES AND ELS RESULTS
J. E. Rogers, Jr. and M. L. Knotek 1981 6 p refs Presented at Am. Vacuum Soc. Natl. Symp., Anaheim, Calif., 3 Nov. 1981
(Contract DE-AC04-76DP-00789)
(DE82-000087; SAND-81-1487C; CONF-811113-13) Avail: NTIS HC A02/MF A01

The asymmetrical shape of the high energy side of the B (KVV) transitions accompanying surface oxidation indicates a superposition of clean and oxide derived features. Two maxima are resolved at 164 and 154 eV; a shoulder is present at 141 eV. Energy loss spectroscopy loss peaks in oxidized boron are at 4, 8.6, 10.8, 16.7, 23.1, and 36 eV; they are interpreted. DOE

N82-16202# Los Alamos Scientific Lab., N. Mex.
APPLICATIONS OF DHDECMP EXTRACTION CHROMATOGRAPHY TO NUCLEAR ANALYTICAL CHEMISTRY
S. F. Marsh and O. R. Simi 1981 10 p refs Presented at the 25th Conf. on Anal. Chem. in Energy Technol., Gatlinburg, Tenn., 6-8 Oct. 1981
(Contract W-7405-eng-36)
(DE81-030134; LA-UR-81-2533; CONF-811025-1) Avail: NTIS HC A02/MF A01

Dihexyl-N,N-diethylcarbamyl methylene phosphonate (DHDECMP) is a highly selective extractant for actimides and lanthanides. This reagent, extensively studied for process-scale operations, also has valuable analytical applications. Extraction chromatographic columns of DHDECMP, supported on inert, porous, polymer beads effectively separate most metallic impurity elements from the retained transition elements. The retained elements can be separated into individual fractions of lanthanides, americium, plutonium, and uranium by mixed-solvent anion exchange.
DOE

N82-16203# Brookhaven National Lab., Upton, N. Y.
AIR DESORPTION FROM A WATER FILM
D. Edwards, Jr. 1981 7 p ref Presented at the Am. Vacuum Soc. Natl. Symp. Anaheim, Calif., 2-6 Nov. 1981
(Contract DE-AC02-76CH-00016)
(DE81-031961; BNL-30100; CONF-811113-15) Avail: NTIS HC A02/MF A01

The thermal desorption of air cryotrapped in a water film is reported. In addition, the non-effect of pure water overlayers is observed. The practical implication is that this type of system could be able to be used as a pump of air in a vacuum system.
DOE

N82-16204# California Univ., Livermore. Lawrence Livermore Lab.
FLAME INHIBITION BY METHYL BROMIDE
Charles K. Westbrook 27 Aug. 1981 34 p refs Presented at Western States Sec. of the Combust. Inst., Tempe, Ariz., 19-20 Oct. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-030995; UCRL-86456; CONF-811041-1) Avail: NTIS HC A03/MF A01

A numerical flame model is used to investigate the inhibition of laminar hydrocarbon-air and hydrocarbon-oxygen flames by methyl bromide. The detailed kinetic mechanism consists of 97 elementary reactions involving 30 chemical species and is based on a previous model for flame inhibition by HBr to which have been added reactions in which Br atoms are abstracted from CH3Br. The resulting mechanism is validated by comparison between experimental data on low pressure CH4-O2-CH3Br flames. Subsequently, the model is used to predict the response of a series of fuel-air mixtures to the addition of varying amounts of CH3Br. Fuels considered include methane, methanol, and ethylene. It is found that the inhibition efficiency depends on fuel-air equivalence ratio, pressure and fuel type. The kinetic factors responsible for this behavior are discussed in detail. DOE

N82-16205# Tennessee Technological Univ., Cookeville. Dept. of Chemical Engineering.
CONVERSION OF ORNL WASTE PAPER TO SUGAR USING ACID HYDROLYSIS
E. C. Clausen, A. H. Shah, P. R. Saggurti, W. P. Teichert, and M. E. Harrison 1981 34 p refs Presented at the 7th Ann. Meeting of Am. Inst. of Chem. Eng., New Orleans, Nov. 1981
(Contract W-7405-eng-26)
(DE82-000462; K/SUB-80-7994/1; CONF-811108-5) Avail: NTIS HC A03/MF A01

The Oak Ridge National Laboratory generates large quantities of waste paper that is presently being landfilled. Three processes were investigated in the laboratory for acid hydrolyzing this waste paper to glucose which may be later fermented to ethanol for fuel. Laboratory yields and operating conditions for a high temperature dilute acid process, a concentrated acid process and a process which utilizes waste acid are presented. DOE

N82-16206# Los Alamos Scientific Lab., N. Mex.
EXPERIMENTAL WORK RELATED TO TWO BISMUTH SULFATE CYCLES AND THEIR POSSIBLE IMPROVEMENT. OUTLINE OF A POSSIBLE ANTIMONYL SULFATE CYCLE WITH SEPARATE EVOLUTION OF SULFUR DIOXIDE AND OXYGEN
Wesley M. Jones 1981 10 p refs Presented at the 4th Tech. Workshop (Task 1), Thermochem. Processes, Juelich, West Germany, 23-25 Sep. 1981 Submitted for publication
(Contract W-7405-eng-36)
(DE81-030236; LA-UR-81-2627; CONF-810942-4) Avail: NTIS HC A02/MF A01

The key reactions of both cycles are listed. Cycle 1 proceeds through the intermediate oxysulfates Bi2O2(SO4)2 and Bi2O2SO4 and Cycle 2 through Bi2O2SO4. Cycle 1 has the advantage of generating 2.3 moles of H2 per mole of Bi2O3, compared with 1.3 for Cycle 2. The efficiency for electrochemical formation of H2SO4 and H2 seems at present to be a maximum at around 30 wt% H2SO4. Thermodynamic data obtained for the decomposition reactions are presented. A possible improvement in these cycles is discussed which may provide a solution to a problem of sorption of H2SO4 solution by the solids and might allow use of a more dilute acid than in Cycle 1 above. A brief discussion on the possible simplification of the SO3-SO2-O2 separation problem with a sulfuric acid-antimonly sulfate hybrid cycle is presented.
DOE

N82-16207# Mound Lab., Miamisburg, Ohio.
SURFACE STUDIES OF PLASTIC-BONDED PETN AND RDX BY X-RAY PHOTOELECTRON SPECTROSCOPY (XPS) AND ION-SCATTERING SPECTROSCOPY (ISS)
P. S. Wang, W. E. Moddeman, L. D. Haws, T. N. Wittberg (Dayton Univ.), and J. A. Peters (Dayton Univ.) 1981 25 p refs Presented at 11th Symp. on Explosives and Pyrotech., Philadelphia, 15 Sep. 1981
(Contract DE-AC04-76DP-00053)
(DE81-030402; MLM-2860-OP; CONF-810926-5) Avail: NTIS HC A02/MF A01

Surface structures of plastic bonded PETN and RDX were studied by high resolution X-ray Photoelectrons Spectroscopy (XPS) and Ion Scattering Spectroscopy (ISS). The coating material is a copolymer of vinyl chloride and chlorotrifluoroethylene. Specimens with 6 wt % of the coating on RDX and 4 wt % on PETN were used in these studies. High resolution elemented XPS spectra of F 1s, N 1s, C 1s, and Cl 2p indicate that the surface of coated RDX (PBX-9407) is covered and the coating film is thicker than 100A; the results with coated PETN (LX-16) show the surface layer to be thinner than 100A. He(+) ISS data on LX-16 suggest that the coating on PETN is not uniform and is, in fact, absent in some regions.
DOE

N82-16208# Harvard Medical School, Boston, Mass. Dept. of Pharmacology.
SMALL UNILAMELLAR VESICLES AS REAGENTS: A CHEMICALLY DEFINED QUANTITATIVE ASSAY FOR LECTINS
Robert K. Rando 1981 17 p refs
(Contract DE-AC02-79EV-10208)
(DE81-030365; DOE/EV-10268/2) Avail: NTIS HC A02/MF A01

Small unilamellar vesicles containing synthetic glycolipids can be prepared. These vesicles are aggregated by the appropriate lectin (Orr et al., 1979; Rando and Bangerter, 1979; Slama and Rando, 1980). It is shown here that extent of aggregation of these vesicles as measured by light scattering at 360 nm. is, under certain conditions, linear with amount of lectin added. This forms the basis of a rapid and simple quantitative assay for lectins using the modified vesicles as a defined chemical substrate. The assay is sensitive to lectin concentrations in the low microgram range. The assay is applied here to studies on concanavalin A, Ricinus communis agglutinin and the alpha fucosyl binding lectin from Ulex europaeus (Type I). DOE

N82-16209# Electrochimica Corp., Mountain View, Calif.
STUDY OF THE SECONDARY Li ELECTRODE IN ORGANIC ELECTROLYTE Final Report, 15 Jun. 1980 - 28 Feb. 1981
M. Eisenberg Apr. 1981 45 p refs Prepared for California Univ., Berkeley. Lawrence Berkeley Lab.
(Contract W-7405-eng-48)
(DE82-001508; LBL-13263) Avail: NTIS HC A03/MF A01

The objective of this eight month program was a preliminary Phase I study of the electrochemical and morphology aspects of lithium anode rechargeability in organic electrolyte ambient temperature systems. It is now increasingly recognized that the limitation of lithium anode rechargeability may have a serious effect on the future development and capabilities of ambient temperature high energy secondary lithium batteries. To provide a basis for future reliable evaluation of electrolyte systems, it was necessary to examine the technique of stripping efficiency studies for lithium with particular reference to the effect of substrates, amount of charge passed, current density and other conditions. Next was a development of a technique for lithium electrode preparation for electrodeposition for scanning electron microscopy (SEM) studies. With these techniques, a number of basic electrolyte systems were examined in order to elucidate directions in which future efforts in this area should be made. DOE

N82-16210# Cities Service Research and Development Co., Tulsa, Okla.
FLASH HYDROPYROLYSIS OF WESTERN KENTUCKY NO. 9 BITUMINOUS COAL WITH CATALYST Final Technical Progress Report
31 Mar. 1981 254 p refs
(Contract DE-AC22-79ET-14943)
(DE81-029631; DOE/ET-14943/T1) Avail: NTIS HC A12/MF A01

The effects of selected catalysts on liquefaction of caking and noncaking pulverized coals were investigated. With caking coals, the free fall flash hydropyrolysis reactor operated satisfactorily between temperatures of 1250 to 1550 F and between 900 to 950 F with and without catalyst additions. Noncaking coals could be treated at all ranges of temperatures with or without catalyst additions. Up to two pounds per hour of coal and four pounds per hour of hydrogen were fed into the reactor. Of the catalysts tested, zinc chloride proved most effective, but only at low temperature of about 900 F. At temperatures of 1250 to 1450 F, zinc chloride, as well as other catalysts, proved to be ineffective. At 1400 to 1450 F and 1000 psig with 0.5 seconds solids residence time, about 47 percent of the carbon in caking coals were converted into useful gas and liquid products: 10 percent BTX, 7 percent light oil, 10 percent heavy oil, 27 percent total oil, 12 percent methane, 8 percent ethane, and 20 percent total gas. DOE

N82-16211# Minnick (L. John), Plymouth Meeting, Pa.
DEVELOPMENT OF POTENTIAL USES FOR THE RESIDUE FROM FLUIDIZED-BED-COMBUSTION PROCESSES Quarterly Technical Progress Report, Mar. - May 1981
L. John Minnick 1981 30 p
(Contract DE-AC21-77ET-10415)
(DE81-030157; DOE/ET-10415/T4) Avail: NTIS HC A03/MF A01

Evaluation of the solid wastes from fluidized bed combustion for potential commercial uses is described. Methods by which the material can be safely disposed of should commercial applications be slow in developing were explored. It was shown that spent bed materials from atmospheric fluidized bed (AFB) boilers are potentially useful in a number of commercial applications. AFB residue materials from different sources do contain a substantial component of reactive lime which can, after proper processing, be concentrated and effectively separated from the residue. Spent bed materials also exhibit unusual cementitious properties when used as received or after processing in certain construction related compositions. Evaluation of a number of different sources of AFB residue in the following areas of research was emphasized in the study: (1) characterization of AFB by-product materials; (2) determination of most effective means of beneficiation or separation of materials; (3) laboratory evaluation of the feasibility for use of AFB residue in such applications as a lime substitute, neutralization of acidic trade wastes, flue gas desulfurization, and the stabilization of highly plastic soils; and (4) performance testing of commercial applications involving some cementitious activity. M.D.K.

N82-16212# Montana State Univ., Bozeman. Dept. of Chemical Engineering.
CATALYTIC HYDROGENATION OF COAL-DERIVED LIQUIDS Interim Report, Jun. - Aug. 1981
L. Berg Sep. 1981 37 p
(Contract DE-AC22-76ET-10495)
(DE82-003250; DOE/ET-10495/T3) Avail: NTIS HC A03/MF A01

The development of special catalysts to convert SRC-II into a feedstock acceptable to a conventional petroleum refinery proceeded with the carrying out of several long cycle runs. A catalyst comprising 4% CoO, 8% MoO3, 1% NiO and 8% WO3 on NALCO base 78-6008 was operated for 102 hours with burnoffs and resulfiding every three hours. The same catalyst was operated for 104 hours with regeneration every eight hours. This catalyst was then operated for runs of 60, 100 and 300 hours with no burnoff. Harshaw's HT400 with 15% MoO3 and 3% coO was operated for a single cycle of 165 hours before cogeneration. These runs produced typically liquid yields of 90 to 100 vol. %, < 0.3 wt. % N2 and < 0.3 wt. % S in the product, and a yield of 45% of 40 to 2050 C. gasoline prossessing octane numbers of 75.1 MON, 88.3 RON, 81.7 (R+M)/2. A study of regeneration via burnoff and resulfiding snowed a slight reduction in the size of the pores of the catalyst. Catalysts were prepared by impregnating 4% coO, 2% MoO3 and 2% WO3 on seven different bases having pore diameters ranging from 90A to 420A. These catalysts as well as the unimpregnated bases were evaluated for denitrogenation ability with SRC-II. Preliminary results point to the 220A pore diameter as the best compromise between diffusion limitation and reduction in surface area. DOE

N82-16213# Washington State Univ., Pullman. Dept. of Mechanical Engineering.
CHARACTERISTICS OF COAL/LIGHT HYDROCARBON SLURRIES IN SPRAY COMBUSTION Semiannual Progress Report, 1 Mar. - 31 Aug. 1981
W. L. Grosshandler, Clayton T. Crowe, and Jacob N. Chung Sep. 1981 23 p refs
(Contract DE-FG22-80PC-30216)
(DE82-000387; DOE/PC-30216/T2) Avail: NTIS HC A02/MF A01

The status of the atomization process, recirculation within the droplet, and the combustion of coal/vaporized fuel in a diffusion burner is discussed. The droplet spray apparatus was completed and checked out for mixing effectiveness and spray uniformity. Initial runs with pure methanol were completed. Preliminary tests were run with slurries composed of 15% and 30% mixtures of coal in liquid with mean particle sizes of 50 and 150 (Sigma)m. Analysis of the data shows small increases in Sauter mean diameter due to the presence of coal particles. The equations of motion for coal particles translating inside a circulating light hydrocarbon were developed. A computer program has been written to solve for the particle motion numerically. Particle trajectories and general distribution patterns are predicted. The combustion facility was designed and built. Initial testing to assess the stability and flatness of the reaction zone is described. Both a spouted bed and fluidized bed feeder were built to control the mass flow of coal to the burner, and the stability and flow rate of each are being assessed. DOE

N82-16214# OPTO-Elektronische Instrument G.m.b.H. und Co. K.G., Karlsruhe (West Germany).

DEVELOPMENT OF A PARTICLE COLLECTOR FOR ABSOLUTE MEASUREMENTS OF PARTICLE FORM, PARTICLE SIZE AND PARTICLE CONCENTRATION Final Report, Aug. 1979

Rolf Kleine and Siegbert Bittighofer Bonn Bundesministerium fuer Forschung und Technologie Feb. 1981 54 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-029; ISSN-0340-7608) Avail: NTIS
HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9,90

A particle collector system in which the collecting element is constituted by copper oxide whiskers grown on fine meshed and highly transparent bronze wire grids was developed. An absolute determination of size and shape is provided By electron microscope imagery of the meshes onto which liquid droplets or solid particles adhesively stick. The whisker growing technique and the automated picture analysis method are described. Section probes and pump units were developed for isokinetic sampling. It is indicated that the whisker collectors are suited for analyzing fine aerosols below 1 micron and that they can be used for absolute calibration of optical particulate sampling instruments.
Author (ESA)

N82-16215# National Bureau of Standards, Washington, D.C. Center for Fire Research.

SMOLDERING COMBUSTION HAZARDS OF THERMAL INSULATION MATERIALS Interim Report, 1 Oct. 1979 - 30 Apr. 1981

T. J. Ohlemiller Aug. 1981 69 p refs Sponsored in part by ORNL, Tenn.
(PB82-107046; NBSIR-81-2350) Avail: NTIS
HC A04/MF A01 CSCL 13M

The smoldering combustion hazards of cellulosic loose fill insulation materials (smolder initiation, smolder propagation and transition from smoldering into flaming) were investigated. An improved smolder ignition test method is being designed to give ignition temperatures comparable to those in practice. The test method requires checking against full-scale mock-up results before implementation. Analysis of experimental profiles for temperature, oxygen level, and remaining organic fraction strongly indicate that the smolder wave is oxygen supply controlled and involves both first and second stages of oxidative heat release from the insulation material. Efforts to develop improved means of suppressing smolder propagation should be directed at the entire oxidation process.
M.D.K.

N82-17074*# Athens Coll., Ala. Dept. of Biology.

DESIGN CONSIDERATIONS OF A THERMALLY STABILIZED CONTINUOUS FLOW ELECTROPHORESIS CHAMBER 2

Thomas S. Jandebeur *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 6 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 07D

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-16216*# Miami Univ., Coral Gables, Fla. Dept. of Mechanical Engineering.

EFFECTS OF ENVIRONMENTAL VARIABLES ON THE CRACK INITIATION STAGES OF CORROSION FATIGUE OF HIGH STRENGTH ALUMINUM ALLOYS Final Report

Laurence E. Poteat 18 Dec. 1981 26 p refs
(Grant NsG-1283)
(NASA-CR-165115) Avail: NTIS HC A03/MF A01 CSCL 11F

Fatigue initiation in six aluminum alloys used in the aircraft industry was investigated. Cyclic loading superimposed on a constant stress was alternated with atmospheric corrosion. Tests made at different stress levels revealed that a residual stress as low as 39% of the yield strength caused stress corrosion cracking in some of the alloys. An atmospheric corrosion rate meter developed to measure the corrosivity of the atmosphere is described. An easily duplicated hole in the square test specimen with a self-induced residual stress was developed.
J.D.H.

N82-16217# Systems Research Labs., Inc., Dayton, Ohio.

CHARACTERIZATION OF MICROSTRUCTURES Final Report, 1 May 1977 - 1 Oct. 1980

Allen G. Jackson, Ralph E. Omlor, Richard J. Bacon, M. Brewster Strope, Pamela F. Lloyd, Robert D. Brodecki, Walter J. Custer, Fritz O. Deutscher, J. Cheryl Conley, and James G. Paine Wright-Patterson AFB, Ohio AFWAL May 1981 92 p refs
(Contract F33615-77-C-5008; AF Proj. 2418)
(AD-A106351; SRL-6945; AFWAL-TR-81-4047) Avail: NTIS
HC A05/MF A01 CSCL 11/6

Research related to the characterization of microstructures of various metallic and nonmetallic materials is summarized. Metals included aluminum alloys, titanium alloys, nickel-base superalloys, nonmetallics such as graphite fibers and polymers, titanium matrix composites and ceramics (TiC, sialons). Techniques employed were various types of electron microscopy (TEM, SEM, EPMA), optical microscopy, quantitative metallography, and various heat treatments. Improvements in techniques were made in each method applied. Major subprojects included characterization of titanium powders, examination of Ti-5Al-2.5Sn PM alloy, formulation of a color micrograph method for titanium-hydride determination, and use of new microcomputer methods for stereological analyses of microstructures. The Materials Characterization Facility is described in terms of the physical plant and the methods of operation used in accomplishing the research on microstructures.
Author (GRA)

N82-16218# Naval Ship Research and Development Center, Bethesda, Md. Ship Materials Engineering Dept.

AN EXPERIMENTAL EVALUATION OF TEARING INSTABILITY USING THE COMPACT SPECIMEN Final Report

Michael G. Vassilaros and James A. Joyce Nov. 1981 30 p refs
(AD-A107633; DTNSRDC-81/029) Avail: NTIS
HC A03/MF A01 CSCL 20/11

The objective of this investigation was to produce experimental verification of the tearing instability theory proposed by Paris and coworkers. This theory states that ductile crack extension will occur in an unstable fashion whenever the applied tearing force is greater than the material tearing resistance. In this investigation, a series of compact specimens of aluminum, titanium, and steel alloys were tested in a variably compliant test machine to generate a range of applied tearing forces. The material tearing resistance was measured from the JI-R curves of the stable specimens and compared to the applied tearing force necessary to generate ductile tearing instability in each material. The Paris theory was found to accurately predict the onset of gross instability behavior. Some limited instability behavior was found, however, at values of tearing force less than the average material tearing resistance obtained from an unloading compliance JI-R curve test. Limited instability behavior was characterized by repeated short steps of rapid but ductile crack extension, separated by regions of slow stable tearing.
Author (GRA)

N82-16219# Oak Ridge National Lab., Tenn.

SWELLING AND MICROSTRUCTURE OF HFIR IRRADIATED AUSTENITIC STAINLESS STEELS

P. J. Maziasz 1980 16 p Presented at the ADIP Program Rev. Meeting, Germantown, Md., 30 Sep. - 1 Oct. 1980
(Contract W-7405-eng-26)
(DE82-000158; CONF-8009179-3) Avail: NTIS
HC A02/MF A01

The swelling and microstructural information available from HFIR-CTRs-9-13 are summarized and compared for CW 316 and CW(316 + Ti). These experiments were irradiated to moderate fluences of about 8 to 16 dpa and 500 to 1000 at. ppm He at irradiation temperatures ranging from 285 to 670 C. The results are compared to higher fluence HFIR irradiation of CW 316 from HFIR-CTRs-2-8 irradiated at 375 to 680 C at fluences up to 61 dpa and 4200 at. ppm He. Both the high- and low-fluence cavity volume fraction swelling curves for CW 316 have a similar shape. The curves show a definite swelling minimum at 470 to

570 C that corresponds to the temperature of maximum precipitation. The swelling increases rather sharply with temperature at the higher and lower temperatures. The moderate fluence swelling levels are all below 0.5% Delta V/V sub o.DOE

N82-16220# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
TENSILE PROPERTIES AND MIROSTRUCTURE OF HELIUM-INJECTED AND REACTOR-IRRADIATED V-20 Ti
M. P. Tanaka, E. E. Bloom, and J. A. Horak 1981 16 p
Presented at the ADIP Program Rev. Meeting, Germantown, Md., 30 Sep. - 1 Oct. 1980
(Contract W-7405-eng-26)
(DE81-032005; CONF-8009179-4) Avail: NTIS HC A02/MF A01

The effect of preinjected helium followed by neutron irradiation on the mechanical properties and microstructure of V-20% Ti was determined. DOE

N82-16221# Oak Ridge National Lab., Tenn.
RESISTANCE OF (Fe,Ni)SUB3V LONG-RANGE-ORDERED ALLOYS TO RADIATION DAMAGE
D. N. Braski 1980 16 p Presented at the ADIP Program Rev. Meeting, Germantown, Md., 30 Sep. - 1 Oct. 1980
(Contract W-7405-eng-26)
(DE81-032006; CONF-8009179-5; ORNL/DWG-80-17709)
Avail: NTIS HC A02/MF A01

The (Fe,Ni)3V long-range-ordered (LRO) alloys being developed for possible application as a first-wall material for a fusion reactor are considered. Alloys with different Fe/Ni ratios were screened to their resistance to radiation by irradiating them with 4 MeV Ni ions to 70 dpa at temperatures from 525 to 680 C. Helium (8 at ppM/dpa) and deuterium ions (28 at ppM/dpa) were simultaneously injected to better simulate fusion reactor conditions. Alloy LRO-16 (31 wt% Ni) contained sigma phase and showed swelling behavior similar to the 20% cold-worked 316 stainless steel that was used as an internal standard. Alloy LRO-20 (39.5 wt% Ni), without sigma phase, swelled slightly less than the 316 stainless steel. Both alloys demonstrated noticeably lower swelling behavior when their composition was changed to include 0.4 wt% Ti. DOE

N82-16222# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
INFLUENCE OF IRRADIATION ON THE TENSILE PROPERTIES OF AUSTENITIC STAINLESS STEEL WELDMENTS
F. W. Wiffen, D. P. Edmonds, J. A. Horak, and J. F. King 1980 17 p Presented at the ADIP Program Rev. Meeting Mater. and Radiation Effects Branch, Germantown, Md., 30 Sep. - 1 Oct. 1980
(Contract W-7405-eng-36)
(DE81-032002; CONF-8009179-6) Avail: NTIS HC A02/MF A01

Weldments in the first wall and front sections of the blanket of a fusion reactor will be exposed to approximately the same operating conditions as will the base metal. Thus the irradiation response of weld metal, of the weld heat affected zones in the base metal, and of the base metal are all of equal concern. Austenitic stainless steels will most likely be joined by a gas tungsten arc welding process. Welds were made by this process between sections of 6-mm-thick (0.25 in.) base plate of type 316 in the 20%-cold-worked condition, with either type 316 or 16-8-2 stainless steel filler metal. Rod tensile specimens were cut through the welds, containing weld metal in the central gage portion. Weld-containing tensile specimens were irradiated at 55 C and throughout the temperature range 280 to 620 C. The displacement damage levels range from 4.5 to 12.1 dpps, and the holium generation from the thermal neutron captures in nickel resulted in 100 to 550 at ppM He. DOE

N82-16223# Hanford Engineering Development Lab., Richland, Wash.
VOID SWELLING IN THE MOLYBDENUM ALLOY TZM IRRADIATED TO HIGH FLUENCES
D. S. Gelles, D. T. Peterson, and J. F. Bates 1981 6 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9-12 Aug. 1981
(Contract DE-AC14-76FF-02170)
(DE81-029802; HEDL-SA-2336-FP; CONF-810831-41) Avail: NTIS HC A02/MF A01

Microstructural development and density change measurements are reported for TZM, a commercial molybdenum base alloy, following fast neutron irradiation in EBR-2 to high fluence over the temperature range 400 C to 650 C. Uniformly distributed voids arrayed in a lattice and constituting 3% swelling were observed following irradiation at 650 C to 14.7 x 10 to the 22nd power n/sq cm (E > 0.1 MeV) (53 dpa). Nonuniformly distributed rafts of voids in lattice arrays were observed following irradiation at 540 C to 13.6 x 10 to the 22nd power n/sq cm Void swelling was not resolved following irradiation at 425 C to 12.2 x 10 to the 22nd power n/sq cm. Void swelling measurements corroborated density change results which showed peak void swelling behavior saturating at 590 C. Two mechanisms for the behavior observed are considered. DOE

N82-16224# Hanford Engineering Development Lab., Richland, Wash.
FRACTURE TOUGHNESS TESTING ON FERRITIC ALLOYS USING THE ELECTROPOTENTIAL TECHNIQUE
F. H. Huang and G. L. Wire 11 Jun. 1981 19 p refs Presented at Fusion Reactor Mater. Meeting, Seattle, 9-12 Aug. 1981
(Contract DE-AC14-76FF-02170)
(DE81-029776; HEDL-SA-2474-FP; CONF-810831-43) Avail: NTIS HC A02/MF A01

Fracture toughness measurments as done conventionally require large specimens (5 x 5 x 2.5 cm) which would be prohibitively expensive to irradiate over the fluence and temperature ranges required for first wall design. To overcome this difficulty a single specimen technique for J integral fracture toughness measurements on miniature specimens (1.6 cm OD x 0.25 cm thick) was developed. Comparisons with specimens three times as thick show that the derived J sub Ic is constant, validating the specimen for first wall applications. The electropotential technique was used to obtain continuous crack extension measurements, allowing a ductile fracture resistence curve to be constructed from a single specimen. The irradiation test volume required for fracture toughness measurements using both miniature specimens and single specimen J measurements was reduced a factor of 320, making it possible to perform a systematic exploration or irradiation temperature and dose variables as required for qualification of HT-9 and 9Cr-1Mo base metal and welds for first wall application. Fracture toughness test results for HT-9 and 9Cr-1 Mo from 25 to 539 C are presented to illustrate the single specimen technique. DOE

N82-16225# General Atomic Co., San Diego, Calif.
EFFECT OF MICROSTRUCTURE ON THE MECHANICAL PROPERTIES OF A COMMERCIAL 12Cr-1Mo STEEL (HT-9)
Thomas A. Lechtenberg Aug. 1981 6 p refs Presented at Fusion Reactor Mater. Meeting, Seattle, 9-12 Aug. 1981 Submitted for publication
(Contract DE-AT03-76ET-51011; GA Proj. 3235)
(DE82-000082; GA-A-16339; CONF-810831-57) Avail: NTIS HC A02/MF A01

The microstructure of a commercial 12CR1Mo steel (HT-9) and its associated effect on strength and toughness properties is studied in order to qualify the alloy for use in fusion energy machines. Interim results show this alloy is subject to a degree of tempered martensite embrittlement and temper embrittlement. For applications projected for fusion machines at lower temperatures, a heat treatment (1000 C, 1 h, air cooled followed by 650 C tempering) at lower temperatures and is shorter times than the vendor recommended heat treatment is identified. Microstructural differences between the treatments are discussed, and mechanical properties are correlated. DOE

N82-16226# Department of Atomic Energy, Bombay (India).
PROCEEDINGS OF THE INTERDISCIPLINARY MEETING ON HYDROGEN IN METALS
1980 325 p refs Meeting held at Bombay, 19-20 Feb. 1980
(DE81-904020; CONF-800280) Avail: NTIS HC A14/MF A01

Hydrogen embrittlement of steels and titanium, nickel, and zirconium alloys was investigated. Neutron scattering studies of hydrogen-metal systems and hydrogen diffusion in metals were discussed. The role of hydrogen in stress corrosion cracking was considered. Methods for determination of hydrogen in metals were described. DOE

N82-16227# LaQue Center for Corrosion Technology, Inc., Wrightsville Beach, N.C.

CREVICE CORROSION AND METAL-ION CONCENTRATION CELL-CORROSION RESISTANCE OF CANDIDATE MATERIALS FOR OTEC HEAT EXCHANGERS, PARTS 1 AND 2

R. M. Kain May 1981 92 p refs Prepared for Argonne National Lab.
(Contract W-31-109-eng-38)
(DE82-000909; ANL/OTEC-BCM-022) Avail: NTIS HC A05/MF A01

Two separate studies are reported. In the first, titanium, stainless alloy AL-6X, Alclad 3003, aluminum alloy 5052, C70600, C72200 and Cu-10Ni-8Sn sheet materials were exposed to ambient temperature, low velocity seawater for 6 months and crevice corrosion and metal-ion concentration cell corrosion evaluations were conducted. Conditions were sufficiently critical to initiate crevice crack attack on control samples of Type 316 stainless steel. While no evidence of corrosion was detected for titanium and AL-6X, the five aluminum and copper base alloys all exhibited varying degrees of general and/or localized attack. In the second study, laboratory tests in low velocity, filtered seawater at 300 C resulted in initiation of crevice attack for 12 of the 13 stainless alloys included in the evaluation. For the most part, evidence of crevice corrosion initiation was detected within the first 30 days of exposure, although considerable variation in the observed time to initiation of crevice corrosion was noted. DOE

N82-16228# Virginia Polytechnic Inst. and State Univ., Blacksburg.

DEVELOPMENT AND APPLICATION OF ANALYTICAL TECHNIQUES TO CHEMISTRY OF DONOR SOLVENT LIQUEFACTION Quarterly Progress Report, Jul. - Sep. 1981

H. C. Dorn and L. T. Taylor Oct. 1981 29 p refs
(Contract DE-AC02-89PC-30041)
(DE82-001076; DOE/PC-30041/T7) Avail: NTIS HC A03/MF A01

The quantitation and speciation of organically bound trace metals in coal liquefaction soluble products presents a real challenge. Quantitation methods have been minimal and have involved single element analysis via atomic absorption spectrometry (AAS) or multi-element analysis via inductively coupled plasma atomic emission spectrometry (ICP-AES) both on acid digested aqueous-based matrices. These methods have not proven highly satisfactory because acid digestion introduces, in some cases, a substantial blank value, requires a great amount of time and in the AAS case provides for only single element determinations with mandatory background correction. Elimination of the sample step preparation coupled with use of ICP-AES seems highly attractive for trace multielement quantitative analysis of coal liquefaction products. We have recently established the capability for metal detection in an organic matrix. DOE

N82-16229# Southwest Research Inst., San Antonio, Tex.

RESIDUAL STRESS MEASUREMENTS IN STRUCTURAL STEELS Final Report, Aug. 1976 - Nov. 1979

R. R. King and V. D. Smith Apr. 1981 100 p refs
(Contract DOT-FH-11-9133)
(PB81-241499; SWRI-15-4660; FHWA/RD-81/086) Avail: NTIS HC A05/MF A01 CSCL 11F

A nondestructive system for in-situ measurement of residual stresses in steel highway structures was developed. Based on a literature survey, 26 candidate methods were evaluated. The Barkhausen noise analysis method was selected for indicating surface stresses and the ultrasonic shear wave birefringence method was selected for indicating bulk stresses in structural steels. GRA

N82-16230# Castle Technology Corp., Woburn, Mass.

ELECTROREFINING OF ALUMINUM

J. Paul Pemsler and Michael Dempsey 1 Apr. 1981 25 p refs
(Grant NSF DAR-80-09300)
(PB81-243693; NSF/CPE-81012) Avail: NTIS HC A02/MF A01 CSCL 11F

An inexpensive, energy-efficient approach to the electrorefining of contaminated aluminum scrap to a product suitable for recycle to wrought alloys was investigated. The method uses a low temperature aluminum chloride, sodium chloride electrolyte with stable organic additives to promote a dense, adherent solid aluminum electrodeposit. The organic leveling agent also permits electrodeposition at current densities two or three times greater than without the additive. Aluminum alloy samples containing magnesium, silicon, copper, chromium, and iron were electrorefined in the low temperature molten salt with additive to produce aluminum of high purity. Author

N82-16231# Inco Research and Development Center, Suffern, N. Y.

CHROMIUM SUBSTITUTION IN STAINLESS STEELS Final Report

S. Floreen Nov. 1980 80 p refs
(Contract DI-BM-NO-295070)
(PB81-235475; BM-OFR-110-81) Avail: NTIS HC A05/MF A01 CSCL 11F

A series of vacuum melted austenitic stainless steels were investigated that contained zero to 18 percent Cr and additions of Mo, V, Cu, Si, Al, Mn, or N. The corrosion resistance was evaluated in a number of environments. The results indicate that it is feasible to develop a stainless steel containing approximately 9 percent Cr along with additions of Mo and possibly Cu and V that would have corrosion resistance comparable to 18 percent Cr steels in less severe environments. The mechanical properties, fabricability, and weldability of such an alloy would be acceptable. GRA

N82-16232# Hazen Research, Inc., Golden, Colo.

INVESTIGATION OF BY-PRODUCT MOLYBDENUM RECOVERY

N. J. Preimesberger and D. R. Shaw Jun. 1981 187 p refs
(Grant NSF DAR-80-10576)
(PB81-246514; NSF/CPE-81014) Avail: NTIS HC A09/MF A01 CSCL 11F

A critical technical evaluation of some of the more prominent aspects of the recovery of by-product molybdenum by the froth flotation process is presented and some of the inadequacies and limitations which govern molybdenum recoveries are identified. Based upon these findings, general methods resulting in improvement in molybdenum recoveries are defined. Excluding the possibility of increased particle liberation, the changes to the various systems involve relatively basic modifications to the fundamental pulp chemistry in the flotation of copper and molybdenum bearing ores. GRA

N82-16233# American Gas Association Labs., Cleveland, Ohio.

CORROSIVE EFFECTS OF CONDENSATE

D. W. DeWerth and A. M. Waters Apr. 1981 47 p Sponsored by Gas Research Inst.
(PB81-244782; GRI-80/0069) Avail: NTIS HC A03/MF A01 CSCL 11F

A program was initiated to determine a suitable heat exchanger material to provide corrosion resistance for high efficiency gas fired condensing appliances. A special rig was designed and built. The analysis of the chemical compositions of flue gas condensate samples was completed for the six different fuel gases and pulse combustion furnace field study. Suitable methods were developed to measure for sulfate, sulfite, nitrate, nitrite, copper, nickel and iron and other metals. GRA

N82-16234# Ceramatec, Inc., Salt Lake City, Utah.

ELECTROREFINING OF SODIUM USING SOLID STATE RAPID ION CONDUCTORS Final Phase 1 Report, 1 Sep. 1980 - 28 Feb. 1981

Ronald S. Gordon Feb. 1981 33 p refs
(Grant NSF DAR-80-09646)
(PB81-243867; CER-30-81-001; NSF/CFE-81013) Avail: NTIS HC A03/MF A01 CSCL 11F

The presently available technology and selling costs for low cost sodium metal were investigated. An approach to the recovery of sodium containing salts as well as the refining of technical grade sodium was developed and an experimental program was then designed to determine the ability of a particular solid state rapid ion conductor to selectively conduct sodium ions in a sodium purification cell. GRA

N82-16235# National Bureau of Standards, Washington, D.C. Corrosion and Electrodeposition Group.
PLATING ON ALUMINUM Final Report
David S. Lashmore Nov. 1980 66 p refs Sponsored in part by American Electroplater Society and Aluminum Association
(PB81-239501; NBSIR-80-2142) Avail: NTIS HC A04/MF A01 CSCL 11F

The program includes both anodizing and immersion pretreatments as well as a discussion of adhesion. In addition to the summary of results, some details of the last seven months of the project are presented including the morphology of the initial stages of anodic film formation, the morphology of the interface of nickel coated anodized aluminum, and a discussion of adhesion. Author

N82-16236# Battelle Pacific Northwest Labs., Richland, Wash.
METAL PRODUCTION BY ELECTROLYSIS OF MOLTEN SALT-METAL SULFIDE SLURRIES
H. T. Fullam and J. N. Hartley Feb. 1981 69 p refs
(Grant NSF DAR-79-10072)
(PB81-235434; NSF/CPE-81004) Avail: NTIS HC A04/MF A01 CSCL 11F

A slurry electrolysis process for producing zinc and sulfur from sphalerite concentrate, and lead and sulfur from galena concentrate is investigated. The process involves the electrolysis of a molten metal chloride slurry containing metal sulfide particulates to produce molten metal at the cathode and sulfur at the anode. GRA

N82-16237# General Accounting Office, Washington, D. C. Procurement, Logistics and Readiness Div.
CIVIL AGENCIES SHOULD SAVE MILLIONS BY RECOVERING SILVER FROM PHOTOGRAPHIC WASTES
31 Jul. 1981 84 p refs
(PB81-243479; PLRD-81-48) Avail: NTIS HC A05/MF A01 CSCL 11F

The recovery of silver in government photo laboratories is recommended. Internal audits to enforce compliance with recommended GSA regulations are advocated. Dollar savings of the recommended program are outlined. GRA

N82-17054*# Missouri Univ. -Rolla. Dept. of Metallurgical Engineering.
THE DETERMINATION OF THE STACKING FAULT ENERGY IN COPPER-NICKEL ALLOYS
H. P. Leighly, Jr. *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 9 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 11F

N82-17067*# Tennessee Univ. Space Inst., Tullahoma. Dept. of Engineering Science and Mechanics.
SOLIDIFICATION OF A BINARY MIXTURE
Basil N. Antar *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 15 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 11F

N82-17071*# Alabama Univ. in Huntsville. Dept. of Physics.
ALUMINUM AND CHROMIUM ION PARTICLE STUDIES FOR ENHANCEMENT OF SURFACE PROPERTIES
In its the 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 12 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 11F

N82-17078*# Clemson Univ., S.C. Materials Engineering Program.
ON RELATIONSHIP BETWEEN MICROFISSURING AND MICROSTRUCTURE IN THE HAZ OF INCONEL 718
Raymond G. Thompson *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 24 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 11F

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-16238* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
HEAT SEALABLE, FLAME AND ABRASION RESISTANT COATED FABRIC Patent
Richard P. Tschirch (Little (Arthur D.), Inc., Cambridge, Mass.) and Kenneth R. Sidman, inventors (to NASA) (Little (Arthur D.), Inc., Cambridge, Mass.) Issued 18 Aug. 1981 5 p Filed 30 Apr. 1980 Supersedes N80-24440 (18 - 15, p 1959) Sponsored by NASA
(NASA-Case-MSC-18382-1; US-Patent-4,284,682; US-Patent-Appl-SN-145107; US-Patent-Class-428-263; US-Patent-Class-106-18.16; US-Patent-Class-106-18.24; US-Patent-Class-260-45.7R; US-Patent-Class-427-393.3; US-Patent-Class-428-264; US-Patent-Class-428-265; US-Patent-Class-428-267; US-Patent-Class-428-272) Avail: US Patent and Trademark Office CSCL 07C

Flame retardant, abrasion resistant elastomeric compositions are comprised of thermoplastic polyurethane polymer and flame retarding amounts of a filler selected from decabromodiphenyloxide and antimony oxide in a 3:1 weight ratio, and decabromodiphenyloxide, antimony oxide, and ammonium polyphosphate in a 3:1:3 weight ratio respectively. Coated fabrics employing such elastomeric compositions as coating film are flexible, lightweight, and air impermeable and can be made using heat or dielectric sealing procedures.

Official Gazette of the U.S. Patent and Trademark Office

N82-16239*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TRIBOLOGICAL CHARACTERISTICS OF A COMPOSITE TOTAL-SURFACE HIP REPLACEMENT Final Report
William R. Jones, Jr., Jack C. Roberts (Rensselaer Polytechnic Inst.), and Frederick F. Ling (Rensselaer Polytechnic Inst.) Washington NASA Jan. 1982 17 p refs Presented at the ASME-ASLE Joint Lubrication Conf., New Orleans, 5-7 Oct. 1981
(NASA-TP-1953; E-709) Avail: NTIS HC A02/MF A01 CSCL 11H

Continuous fiber, woven E glass composite femoral shells having the same elastic properties as bone were fabricated. The shells were then encrusted with filled epoxy wear resistant coatings and run dry against ultrahigh molecular weight polyethylene acetabular cups in 42,000 and 250,000 cycle wear tests on a total hip simulator. The tribological characteristics of these continuous fiber particulate composite femoral shells articulating with ultrahigh molecular weight polyethylene acetabular cups were comparable to those of a vitallium ball articulating with an ultrahigh molecular weight polyethylene acetabular cup. Author

N82-16240# Forest Products Lab., Madison, Wis.
BEHAVIOR OF CONSTRUCTION ADHESIVES UNDER LONG-TERM LOAD
Bryan H. River and Robert H. Gillespie Jun. 1981 17 p refs
(AD-A106565; FSRP-FPL-400) Avail: NTIS HC A02/MF A01 CSCL 11/1

Six construction adhesives and a conventional polyvinyl acetate adhesive were placed under dead load at five stress levels and three temperatures for 2 months. The shear slip was measured after 10, 100, 1,000, 10,000, and 100,000 minutes (70 days) under load. The results show four general types of behavior. Three construction adhesives with crosslinking capability had fair resistance to creep and showed evidence that a creep limit might be reached under moderate dead load and environmental conditions. Two adhesives had very poor creep resistance and failed under moderate dead load and environmental conditions. The sixth adhesive was extremely flexible but with excellent recovery capability. A polyvinyl acetate adhesive was not observed to creep under the low humidity conditions of this study. Adhesives showing evidence of a creep limit may be useful for long-term design loads, but further study of their behavior, especially under varying moisture conditions, is required. Author (GRA)

N82-16241# Martin Marietta Corp., Baltimore, Md.
MECHANICAL PROPERTIES OF ADHESIVELY BONDED ALUMINUM STRUCTURES PROTECTED WITH HYDRATED INHIBITORS Progress Report, 1 Jul. 1980 - 30 Jun. 1981
J. S. Ahearn, G. D. Davis, A. Desai, and J. D. Venables 1 Oct. 1981 39 p refs
(Contract N00014-80-C-0718)
(AD-A106222; MML-TR-81-46C) Avail: NTIS HC A03/MF A01 CSCL 11/1

Research has shown that the adsorbed monolayer inhibitor films that slow the conversion of Al-oxide to hydroxide substantially improve the bond durability of 2024Al adherends prepared with the Forest Products Laboratory process (FPL). An inhibitor coating of nitrilotris (methylene) phosphonic acid produced a bond durability in adherends prepared with the FPL process. As determined by X-ray photoelectron spectroscopy, the inhibitor coverage needed to produce the maximum improvement in bond durability was approximately one monolayer. Results suggest that a compound's effectiveness in improving bond durability of adherends prepared with the FPL process depends on both its ability to inhibit the conversion of Al-oxide to hydroxide and to form chemical bonds with the adhesive. M.D.K.

N82-16242# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
A FINITE ELEMENT MODEL OF A WHITE-METZNER VISCOELASTIC POLYMER EXTRUDATE M.S. Thesis - MIT
Brent R. Collins Feb. 1981 135 p refs
(AD-A106740; AFIT-CI-81-31T) Avail: NTIS HC A07/MF A01 CSCL 20/11

A finite element model of a viscoelastic polymer melt characterized by a White-Metzner rheological equation of state was developed. For creeping flow wherein the inertia terms are negligible non-linear finite element equations were solved by a method of direct substitution termed Picard iteration. Four flow geometries were examined: cross channel, plane couette, entry, and step flow. A comparison of two bi-quadradic isoparametric element types (8 node 'serendipity' and 9 node 'Lagrange') showed general superior behavior of the Lagrange elements. The 'penalty' method of incompressible flow was used with the Galerkin method to formulate the finite element equation, yielding satisfactory behavior for creeping inelastic and viscoelastic flow. The non-linear equations yielded numerical convergence up to Weissenberg numbers of 0.01. Techniques of expanding this radius of convergence were examined and proposed for future effort. Author (GRA)

N82-16243# Stanford Univ., Calif. Lab. of Physics.
PIEZOELECTRIC PVF2 POLYMER FILMS AND DEVICES Final Report, 1 Aug. 1977 - 31 Jan. 1981
D. G. Weinstein and H. J. Shaw Nov. 1981 130 p refs
(Contract N00014-77-C-0582; NR Proj. 384-925)
(AD-A107642; GL-3355) Avail: NTIS HC A07/MF A01 CSCL 20/3

Acoustic transducers and imaging arrays using PVF2 piezoelectric film as the active element have been extensively explored. Thin disk PVF2 bulk wave transducers were experimentally developed and studied using a computer model. Aspects of transducer behavior studied include bandwidth, impulse response, insertion loss, internal loss, impedance matching, and angular response. A monolithic multielement PVF2 transducer array is described which uses photolithographic techniques to achieve a reproducible, inexpensive and highly accurate integrated device for ultrasonic imaging applications. This array was used to produce an electronically focused and scanned acoustic beam. Two dimensional acoustic images of small test objects were performed, to investigate the beam shape and imaging characteristics, which were found to be consistent with theoretical predictions. At a frequency of 2.25 MHz and an f/number of 5, a resolution in the range of 3 mm was observed. Author (GRA)

N82-16244# Tennessee Univ., Knoxville.
PROCESS FOR THE FORMATION OF BIAXIALLY ORIENTED FILMS OF POLY(P-PHENYLENE TEREPHTHALAMIDE) (PPD-T) FROM LIQUID CRYSTALLINE SOLUTIONS Technical Report, 1 Jan. 1980 - 15 Sep. 1981
John E. Flood, James L. White, and John F. Fellers 12 Nov. 1981 44 p refs
(Contract N00014-77-C-0236)
(AD-A108058; PATRA-176; TR-6) Avail: NTIS HC A03/MF A01 CSCL 11/9

A new process for making equal biaxially oriented films from liquid crystalline solutions of poly (p-phenylene terephthalamide) (PPD-T) is described. The process involves extruding solutions of PPD-T/H2SO4 through an annular die and over an oil coated mandrel into a coagulation bath. The films were studied using wide angle X-ray diffraction (WAXS) and scanning electron microscopy (SEM). Tensile stress-strain properties were obtained on samples cut at various directions in the plane of the film. Biaxially oriented films were produced which possess equal properties in the various directions in the plane of the film. GRA

N82-16245# Utah Univ., Salt Lake City. Dept. of Chemistry.
STUDIES OF THE EFFECT OF ORIENTATION ON THE ELASTIC CONSTANTS OF STRETCHED AND HYDROSTATICALLY EXTRUDED POLY(CHLOROTRIFLOUROETHYLENE): A MODEL OF AFFINE ORIENTATION IN SEMI-CRYSTALLINE POLYMERS
D. B. Cavanaugh and C. H. Wang 13 Nov. 1981 35 p refs
(Contract N00014-79-C-0507)
(AD-A107909; TR-7) Avail: NTIS HC A03/MF A01 CSCL 11/9

A model of affine orientation of polymer solids is given. The solid is described as a collection of small, orientable units. The elastic constants of the oriented polymer are given as a combination of the elastic constants of the orientable units and of the orientation parameters (P sub 2(cos Theta)) and (P sub 4 (cos Theta)). The elastic constants of stretched and hydrostatically extruded samples of poly (chlorotriflouroethylene) are obtained with Brillouin light scattering. These are fitted to the model and the orientation parameters are calculated. The elastic constants from the extruded samples are fit well by the model but the fit to the stretched film is less satisfactory by the model. Hydrostatic extrusion in polymers is thus assumed to be an affine orientation process in the amorphous phase and the stretching process is non-affine. Author (GRA)

N82-16246# Utah Univ., Salt Lake City. Dept. of Chemistry.
ASSIGNMENT OF AN ANOMALOUS PEAK IN THE BRILLOUIN SPECTRUM OF ORIENTED POLYMER FILMS
D. B. Cavanaugh and C. H. Wang 13 Nov. 1981 18 p refs
(Contract N00014-79-C-0507)
(AD-A107897; TR-8) Avail: NTIS HC A02/MF A01 CSCL 11/9

The origin of a previously unassigned peak in the Brillouin spectrum of an oriented polymer film has been clarified. This peak is shown to be due to backscattering from a quasitransverse acoustic phonon from the reflected laser beam. Studies of this peak are expected to provide the information concerning the birefringence effect of the oriented film. GRA

N82-16247# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Polymers Branch.
SYNTHESIS OF ARTICULATED ALL-PARA POLYMERS Final Report, Nov. 1977 - Dec. 1979
R. C. Evers, F. E. Arnold, and T. E. Helminiak Oct. 1981 35 p refs
(AF Proj. 2303)
(AD-A107554; AFWAL-TR-81-4098) Avail: NTIS HC A03/MF A01 CSCL 11/9

Articulated all-para-polymers with 2,6-benzobisoxazole, 2,6-benzobisthiazole, and 2,6-benzobisimidazole units in the backbone were synthesized by copolycondensation in polyphosphoric acid of 4,6-diamino-1,3-benzenediol dihydrochloride, 2,5-diamino-1,4-benzenedithiol dihydrochloride, and 1,2,4,5-tetraaminobenzene tetrahydrochloride, respectively, with terephthalic acid and reactive diphenoxybenzene monomers. Inherent viscosities of up to 12.57 dL/g (CH3SO3H, 25 C, 0.2g/d1) were achieved. The average length of the rod-like all-para segments between the relatively flexible diphenoxybenzene units was controlled by the stoichiometry of the copolycondensation reactions. Films which exhibited optical birefringence under crossed polars could be cast from methanesulfonic acid solutions of the polymers. Modulus and tensile strength values as high as 4696 mPa and 93 mPa, respectively, were recorded. Thermooxidative stability of the articulated polymers was evaluated by isothermal aging in air at 316 C. Stability for the articulated polybenzobisoxazoles was found to decrease with increased content of the diphenoxybenzene structure. The articulated polybenzobisoxazole structure was shown to be less stable than the anlogous polybenzobisthiazole structure but more stable than the articulated polybenzobisimidazole structure. GRA

N82-16248# Sandia Labs., Albuquerque, N. Mex.
AQUEOUS DISSOLUTION OF CALCIUM METAPHOSPHATE GLASSES
Bruce C. Bunker 1981 9 p refs Presented at the JOWOG-12 Conf., Aldermaston, UK, 21 Sep. 1981
(Contract DE-AC04-76DP-00656)
(DE81-030130; CONF-810953-2) Avail: NTIS HC A02/MF A01

A series of experiments was conducted to determine the kinetics and mechanisms of aqueous dissolution for a series of phosphate glasses having the mole % composition (50X) M2 O.XCaO.5OP2O5, where M is either Na or Li. Results of experimentation are discussed. M.D.K.

N82-16249# Los Alamos Scientific Lab., N. Mex.
PREPARATION OF MULTISHELL ICF TARGET PLASTIC-FOAM CUSHION MATERIALS BY THERMALLY INDUCED PHASE-INVERSION PROCESSES
A. T. Young, D. K. Moreno, and R. G. Marsters 1981 18 p refs Presented at the 28th Natl. Vacuum Symp., Anaheim, Calif., 3-6 Nov. 1981
(Contract W-7405-eng-36)
(DE82-000574; LA-UR-81-2722; CONF-811113-10) Avail: NTIS HC A02/MF A01

Homogenous, low-density plastic foams for laser fusion targets were prepared by thermally induced phase inversion processes. Uniform, open cell foams were obtained by the rapid freezing of water solutions of modified cellulose polymers with densities in the range of 5 mg/cu cm to 0.7 mg/cu cm and respective average cell sizes of 2 to 40 micrometers. In addition, low-density, microcellular foams were prepared from the hydrocarbon polymer poly(4-methyl-l-pentene) via a similar phase inversion process using homogenous solutions in organic solvents. These foams have densities from 2 to 5 mg/cu cm and average cell sizes of 20 micrometers. The physical-chemical aspects of the thermally induced phase inversion process are presented. DOE

N82-16250# Pacific Northwest Lab., Richland, Wash.
MATERIALS AND DESIGN EXPERIENCE IN A SLURRY-FED ELECTRIC GLASS MELTER
S. M. Barnes and D. E. Larson Aug. 1981 194 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000957; PNL-3959) Avail: NTIS HC A09/MF A01

The design of a slurry-fed electric glass melter and an examination of the construction materials were completed. The joule-heated, ceramic-lined melter was constructed to test the applicability of materials and processes for high-level waste vitrification. The developmental liquid-fed ceramic melter was operated for three years with simulated high-level waste and was subjected to conditions more severe than those expected for a nuclear waste vitrification plant. DOE

N82-16251# California Univ., Livermore. Lawrence Livermore Lab.
METAL-CONTAINING PLASMA-POLYMERIZED COATINGS FOR LASER-FUSION TARGETS
S. A. Letts and C. W. Jordan 14 Sep. 1981 9 p refs Presented at the Am. Vacuum Soc. Natl. Symp., Anaheim, Calif., 2-6 Nov. 1981
(Contract W-7405-eng-48)
(DE82-000346; UCRL-86184; CONF-811113-9) Avail: NTIS HC A02/MF A01

Addition of metal to plastic layers in some direct drive laser fusion targets is needed to reduce electron induced fuel preheat. A plasma polymerization coating system was constructed to produce a metal seeded polymer by adding an organometallic gas to the usual trans-2-butene and hydrogen feedstocks. Since organometallic gases are highly reactive and toxic, safety is a major concern in the design of a coating system. The coating apparatus was designed with three levels of containment to assure protection of the operator. The gas handling system has redundant valves and was designed to fail safe. Several sensor controlled interlocks assure safe operating conditions. Waste materials are collected on a specially designed cold trap. Waste disposal is accomplished by heating the traps and purging volatile products through a reactor vessel. The design, operating procedure, and safety interlocks of this coating system are described. DOE

N82-16252# Sandia Labs., Albuquerque, N. Mex.
INTERFEROMETRIC STUDY OF EPOXY RESIN GELATION
K. R. Hirschbuehler 1981 28 p refs Presented at Office of Naval Res. Critical Rev.: Techniques for the Characterization of Composite Mater., Cambridge, Mass., 8 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030128; CONF-8106158-1) Avail: NTIS HC A03/MF A01

The transition of epoxy resins from a mobile liquid to a rubbery gel is a complex process depending on chemical reaction kinetics and both heat and mass transfer. The purpose of this study is to determine the locus of initial gelation in an epoxy resin, and the course of gelation through both neat resins and glass fiber/epoxy resin composites. This was accomplished by monitoring the local changes in refractive index in transparent epoxy castings using laser interferometry, supplemented by temperature profiles obtained from thermocouple arrays. These experiments were carried out on pure DGEBA epoxy (DOW DER-332) cured with a variety of primary amine, secondary amine, and anhydride curing agents. DOE

N82-16253# Council for Scientific and Industrial Research, Pretoria (South Africa). National Timber Research Inst.
SUBSTITUTES FOR PARAFORMALDEHYDE HARDENER AND ZINC ACETATE AS AN ACCELERATOR IN WATTLE-TANNIN BASED ADHESIVES FOR EXTERIOR GRADE PARTICLE BOARD
F. A. Cameron and A. Pizzi Sep. 1980 36 p refs
(PB81-245755; CSIR/SR/HOUT-201; ISBN-0-7988-2018-7) Avail: NTIS HC A03/MF A01 CSCL 11A

A series of experiments carried out to find a suitable substitute for paraformaldehyde as a hardener in modified wattle-tannin based adhesive used in the manufacture of exterior grade particleboard are described. The use of zinc acetate in modified wattle-tannin based adhesives for exterior grade particle-board in order to bring about curing of the adhesive at lower pressing temperatures with the subsequent possibility of reducing the percentage of resin solids on core chips is investigated. GRA

N82-16254# National Timber Research Inst., Pretoria (South Africa).
FAST-SETTING PHENOLIC AND TANNIN-BASED HONEYMOON ADHESIVE SYSTEMS FOR EXTERIOR GRADE FINGER JOINTS
A. Pizzi, D. DuT. Rossouw, W. Knueffel, and M. Singmin Mar. 1980 38 p refs
(PB81-245748; CSIR/SR/HOUT-184; ISBN-0-7988-1784-4) Avail: NTIS HC A03/MF A01 CSCL 11A

The development of alternative tannin-based fast setting adhesives is described. Adhesives not containing m-aminophenol and phenolic/phenolic, tannin/tannin and tannin/phenolic adhesive systems which can be used for the same purpose were developed. GRA

N82-16255# Maryland Univ., College Park. Photomechanics Lab.
CRACK BRANCHING IN BRITTLE MATERIALS. PART 1: ANALYTICAL ASPECTS
H. P. Rossmanith 1980 148 p refs
(Grant NSF DAR-77-05171)
(PB81-243735; NSF/RA-800560) Avail: NTIS HC A07/MF A01 CSCL 11B

Fracture processes associated with crack acceleration and branching, conditions for branching, and the dependence of the branching angle on fracture test specimen geometry and loading conditions are discussed. Stress wave induced crack branching was investigated. A comparative study of explosively induced fracture and crack branching in glass, polymers, and rock is included. Some of the most frequently employed static and dynamic crack models are summarized and briefly discussed. Information on mathematical models for dynamic crack branching covers pre-branching analysis, elastic crack problem, elasto-plastic crack problem, secondary cracking ahead of the crack tip, the c-K-relationship, and the dynamic c-K-curve. GRA

N82-16256# Harvard Univ., Cambridge, Mass. Center for Conservation and Technical Studies.
SOME APPLICATIONS OF FOURIER TRANSFORM INFRARED SPECTROSCOPY IN THE EXAMINATION OF PAINTING MATERIALS
Richard Newman 1981 29 p refs
(Grant NEA-92-2033-386)
(PB81-249575) Avail: NTIS HC A03/MF A01 CSCL 11C

Although limited in its applications to painting materials, infrared spectroscopy nevertheless is very useful and even essential in helping to fully characterize certain of these materials. Fourier transform infrared spectroscopy offers several advantages over traditional dispersive infrared spectrophotometry, and generally gives spectra of higher quality than those obtainable with older instrumentation. Applications to resins and several traditional modern pigments are described, and the theoretical basis for spectral correlations in inorganic compounds containing polyatomic ions (which include many pigments) is briefly discussed. GRA

N82-17044*# Tennessee Technological Univ., Cookeville. Dept. of Chemistry.
DEVELOPMENT OF TOUGHENED EPOXY POLYMERS FOR HIGH PERFORMANCE COMPOSITE AND ABLATIVE APPLICATIONS
Vernon R. Allen *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 17 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 07C

N82-17050*# Mississippi State Univ., State College. Dept. of Chemical Engineering.
DEVELOPMENT OF HIGH STRENGTH, HIGH TEMPERATURE CERAMICS
William B. Hall *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 11 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 07C

N82-17055*# Alabama Univ. in Huntsville. Dept. of Chemistry.
SYNTHESIS OF AMINOSILANE AND AROMATIC DIAMINE INTERMEDIATES FOR POLYMERIZATION
Samuel P. McManus *In its* The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 9 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 07C

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-16257# Ogden Air Logistics Center, Hill AFB, Utah. Propellant Lab. Sect.
PROPELLANT SURVEILLANCE REPORT LGM-30 A, B, F AND G STAGE I TP-H1043 AFT CLOSURE PROPELLANT Semiannual Report
John A. Thompson Oct. 1981 70 p refs
(AD-A107877; MANPA-462(81)) Avail: NTIS HC A04/MF A01 CSCL 21/9

This report contains propellant test results from cartons of TP-H1043 propellant representing selected batches used in the aft closure of First Stage Minuteman Motors. Data from TP-H1043 propellant obtained from the aft closures of the LGM-30 A, B, F, and G Motors are reported in regression analyses for the sixth time and the fifth time using the G085 Computer System. In previous reports, A, B, F, and G data were combined for statistical analysis. For this report, a separate statistical analysis was made for A and B (wing 2) and F and G (wing 6). The statistical analysis includes regressions and covariance analysis. Testing was accomplished in accordance with MMWRBA Project M8293C. An analysis of all parameters indicate that no significant degradation is anticipated for at least two years past the oldest data point. Each point on the regression plot represents all samples at that particular age. The number of samples of each point is indicated on the sample size summary sheet on the page accompanying each regression plot. The data range at any age can be found by suitable inquiry of the G085 System. Author (GRA)

N82-16258# Mason and Hanger-Silas Mason Co., Inc., Amarillo, Tex.
SKID-TEST EVALUATION OF PROTECTIVE COVERINGS FOR EXPLOSIVE BILLETS
Jim A. Crutchmer Sep. 1981 8 p ref
(Contract DE-AC04-76DP-00487)
(DE82-000072; MHSMP-81-39; Process-Develop-Endeavor-301) Avail: NTIS HC A02/MF A01

A total of thirteen materials were evaluated for use as protective coverings for as-pressed explosive billets. A small sample of material was taped over the contact area of the skid billets during testing. Preliminary skid testing indicated several of these materials may be effective as protective coverings. Three of the materials were selected, based on their strength and ease of handling, for complete skid test evaluation using as-pressed PBX 9404. Nylon mesh, style 8664 was found to give the greatest protection against accidental detonation of the explosive. DOE

N82-16259# Bevilacqua (O. M.) and Associates, Oakland, Calif.
ENVIRONMENTAL ASSESSMENT OF THE USE OF ALCOHOL FUELS IN HIGHWAY VEHICLES
O. M. Bevilacqua, M. J. Bernard, III, D. Sperling, S. Rosenberg, L. J. Hill, D. Fingleton (WAPORA, Inc., Chicago), P. DEliscu (Santa Clara Univ.), and J. R. Gasper Dec. 1980 307 p refs
Prepared jointly with Argonne National Lab.
(Contract W-7405-eng-38)
(DE82-000887; ANL/CNSV-14) Avail: NTIS HC A14/MF A01

Impact associated with alcohol fuel storage, distribution, and use are assessed under four possible scenarios of alcohol fuel use during the period 1980 to 2000. Alcohol use is projected to range from 196 million bbl/yr by 2000, up from 5 million barrels in 1980. In addition to effects on the physical environment (aquatic and terrestrial ecosystems, air quality, and energy resources), consideration is given to the impacts of alcohol fuel use on such social and economic concerns as health and safety, employment, retail fuel costs, balance of trade, capital investments, and regulatory needs. Although some potentially negative impacts are identified, in general, the assessment finds that the use of alcohol fuels would have a positive or neutral effect on the environment; moreover, the negative impacts could be mitigated through the judicious application of existing regulatory controls and procedural standards. DOE

N82-16260# Boeing Engineering and Construction, Seattle, Wash.
AGRI GRAIN POWER ETHANOL-FOR-FUEL PROJECT FEASIBILITY STUDY REPORT. VOLUME 1: PROJECT CONCEPTUAL DESIGN
Apr. 1981 86 p Sponsored in part by AGRI Industries, Grain Processing Corp. and Industries of Iowa 3 Vol.
(Contract DE-FG01-80RA-50331)
(DE82-000474; DOE/RA-50331/T1-Vol-1) Avail: NTIS HC A05/MF A01

The feasibility of the AGRI grain power (AGP) project to evaluate the commercial viability and assess the desirability of implementing a large grain based grass roots anhydrous ethanol fuel project near Des Moines, Iowa is evaluated. The conceptual design is presented. DOE

N82-16261# Boeing Engineering and Construction, Seattle, Wash.

AGRI GRAIN POWER ETHANOL-FOR-FUEL PROJECT FEASIBILITY STUDY REPORT. VOLUME 2: PROJECT MARKETING/ECONOMIC/FINANCIAL AND ORGANIZATION

Apr. 1981 146 p Sponsored in part by AGRI Industries, Grain Processing Corp. and Industries of Iowa 3 Vol.
(Contract DE-FG07-80RA-50331)
(DE82-000472; DOE/RA-50331/T1-Vol-2) Avail: NTIS HC A07/MF A01

The feasibility of the AGRI grain power (AGP) project to evaluate the commercial viability and assess the desirability of implementing a large grain based grass-roots anhydrous ethanol fuel project near Des Moines, Iowa is evaluated. The results of marketing, economic, and financial studies are reported. DOE

N82-16262# Boeing Engineering and Construction, Seattle, Wash.

AGRI GRAIN POWER ETHANOL-FOR-FUEL PROJECT FEASIBILITY STUDY REPORT. VOLUME 3: PROJECT ENVIRONMENTAL/HEALTH/SAFETY AND SOCIOECONOMICS

Apr. 1981 128 p Sponsored in part by AGRI Industries, Grain Processing Corp. and Industries of Iowa 3 Vol.
(DE82-000473; DOE/RA-50331/T1-Vol-3) Avail: NTIS HC A07/MF A01

The feasibility of the AGRI grain power (AGP) project to evaluate the commercial viability and assess the desirability of implementing a large grain based grass-roots anhydrous ethanol fuel project near Des Moines, Iowa is evaluated. The results of the environmental, health, safety, and socioeconomic studies are presented. DOE

N82-16263# Oak Ridge National Lab., Tenn. Instrumentation and Controls Div.

POTENTIAL ECONOMIC BENEFITS FROM PROCESS CONTROL OF COAL PREPARATION PLANTS

N. C. Bradley, G. O. Allgood, and J. C. Moyers Oct. 1981 55 p refs
(Contract W-7405-eng-26)
(DE82-000881; ORNL-5736) Avail: NTIS HC A04/MF A01

In practically all US coal preparation plants, the machines and instrumentation and control devices are manually operated to clean the run-of-the-mine coal of mud, rock, and other contaminants that are removed from the earth with the desired product. The result is a large loss of a valuable natural resource. Based on 1978 production figures, 10 million tons of discarded coal could have been saved by on-line measurement and control techniques. Measurement sensors for on-line control of coal cleaning process should be developed because there are no commercial, moderate-cost sensors of medium accuracy (5 to 10 percent) available for such applications. An expenditure of approximately $10 million to develop measurement sensors and process control techniques for coal preparation would be recovered by the conservation of coal. DOE

N82-16264# Department of Agriculture and Fisheries, Silverton (South Africa). Div. of Agricultural Engineering.

SUNFLOWER SEED OIL AS AN EXTENDER FOR DIESEL FUEL IN AGRICULTURAL TRACTORS

J. J. Bruwer, B. vanD. Boshoff, F. J. C. Hugo, L. M. duPlessis, J. Fuls, C. Hawkins, A. N. vanderWalt, and A. Engelbrecht 1980 8 p refs Presented at the Symp. of the South African Inst. of Agr. Engr., Silverton, South Africa, 11 Jun. 1980
(DE81-903440; CONF-8006187-1) Avail: NTIS US Sales Only HC A02/MF A01; DOE Depository Libraries

The use of sunflower seeds as an extender for diesel fuels in agricultural tractors is considered. Production requirements to meet the demand are briefly reviewed. Physical and chemical properties of sunflower seed oil are discussed. Tractor engines using diesel fuel or sunflower seed oil were tested as well as engines using various blends of sunflower seed oil with gasoline, diesel fuel, power kerosene, and illuminating kerosene. Results were compared. Engine service life and injection equipment performance are discussed. DOE

N82-16265# Fulton Energy Corp., Tulsa, Okla.

ASSESSMENT OF THE ECONOMIC, TECHNICAL, AND ENVIRONMENTAL FEASIBILITY OF DEVELOPING, CONSTRUCTING, AND OPERATING A 25-MILLION-GALLON-PER-YEAR GRAIN-ETHANOL-PRODUCTION FACILITY. VOLUME 1: EXECUTIVE SUMMARY

May 1981 47 p 4 Vol.
(Contract DE-FG07-80RA-50365)
(DE82-000294; DOE/RA-50365/T1-Vol-1) Avail: NTIS HC A03/MF A01

The economic, technical, and environmental feasibility of developing, constructing, and operating a 25 million gallon per year ethanol facility in northeastern Oklahoma was determined. The executive summary is presented. A site providing the necessary grain, energy, and labor resources; flexible transportation methods and alternatives for receiving and shipping; nearby markets for products and by-products; an existing environmental quality able to withstand the minor impacts of the process; and a receptive and growing business and community environment was selected. The ability to produce a high quality product at a reasonable and competitive price with or without federal assistance or state assistance in the form of tax exemptions is demonstrated. It is shown that coal burning technologies are efficient, whether conventional burning methods or innovative methods such as fluidized-bed combustion are used. All resources for the process are available nearby. The grains required come from carryover reserves, thus not impacting the food supply. The residual by-products are in high demand. DOE

N82-16266# Fulton Energy Corp., Tulsa, Okla.

ASSESSMENT OF THE ECONOMIC, TECHNICAL, AND ENVIRONMENTAL FEASIBILITY OF DEVELOPING, CONSTRUCTING, AND OPERATING A 25-MILLION-GALLON-PER-YEAR GRAIN-ETHANOL-PRODUCTION FACILITY. VOLUME 2: TECHNICAL ANALYSIS

May 1981 178 p 4 Vol.
(Contract DE-FG07-80RA-50365)
(DE82-000479; DOE/RA-50365/T1-Vol-2) Avail: NTIS HC A09/MF A01

The technical analysis of a study to determine the economic technical, and environmental feasibility of developing, constructing, and operating a 25 million-gallon per year ethanol facility in northeastern Oklahoma is presented. It is shown that coal burning technologies are efficient, whether conventional burning methods or innovative methods such a fluidized-bed combustion are used. All resources for the process are available nearby. The grains required come from carryover reserves, thus not impacting the food supply. The residual by-products are in high demand. DOE

N82-16267# Fulton Energy Corp., Tulsa, Okla.

ASSESSMENT OF THE ECONOMIC, TECHNICAL, AND ENVIRONMENTAL FEASIBILITY OF DEVELOPING, CONSTRUCTING, AND OPERATING A 25-MILLION-GALLON-PER-YEAR GRAIN-ETHANOL-PRODUCTION FACILITY. VOLUME 3: PROCUREMENT ANALYSIS, MARKETING ANALYSIS, AND ENVIRONMENTAL AND REGULATORY ANALYSIS

May 1981 260 p 4 Vol.
(Contract DE-FG07-80RA-50365)
(DE82-000478; DOE/RA-50365/T1-Vol-3) Avail: NTIS HC A12/MF A01

The economic, technical, and environmental feasibility of developing, constructing and operating a 25 million-gallon per year ethanol facility in northeastern Oklahoma was investigated. The resource procurement analysis, the marketing analysis, and the environmental, health, safety, and socioeconomic analyses are presented. DOE

N82-16268# Fulton Energy Corp., Tulsa, Okla.

ASSESSMENT OF THE ECONOMIC, TECHNICAL, AND ENVIRONMENTAL FEASIBILITY OF DEVELOPING, CONSTRUCTING, AND OPERATING A 25-MILLION-GALLON-PER-YEAR GRAIN-ETHANOL-PRODUCTION FACILITY. VOLUME 4: ECONOMIC AND FINANCIAL ANALYSIS.

MANAGEMENT ANALYSIS
May 1981 286 p refs 4 Vol.
(Contract DE-FG07-80RA-50365)
(DE82-000477; DOE/RA-50365/T1-Vol-4) Avail: NTIS HC A13/MF A01

The economic, technical, and environmental feasibility of developing, constructing and operating a 25 million-gallon per year ethanol facility in northeastern Oklahoma was investigated. The economic and financial analysis portion of the investigation is presented. DOE

N82-16269# California Univ., Livermore. Lawrence Livermore Lab.
LLNL GAS-STIMULATION PROGRAM Semiannual Progress Report, Oct. 1980 - Mar. 1981
M. E. Hanson, G. D. Anderson, and R. J. Shaffer 9 Jun. 1981 52 p refs
(Contract W-7405-eng-48)
(DE82-000802; UCRL-50036-81-1) Avail: NTIS HC A04/MF A01

Preliminary theoretical and experimental analyses of fracture propagation in a nonuniform stress field were performed. Preliminary analyses of fluid flow in apertures were completed. The mechanical properties of some of the core material from Mesaverde sandstones and shales from wells in Wyoming and Colorado were characterized. The feasibility of ultrasonic techniques in measuring in-situ stresses was investigated. Development of a transducer package to test the measurements in a borehole, and techniques to evaluate and interpret measurements are described. The effect of stress on velocity anisotropy was investigated. Geologic studies relating in-situ stresses to geologic structure and examining the effects of pore pressure increases on fracturing in the Green River Basin due to gas generation were performed. DOE

N82-16270# Brookhaven National Lab., Upton, N. Y. - National Center for Analysis of Energy Systems.
SYSTEMS ANALYSIS OF H2/NATURAL GAS SUPPLEMENTATION AND SEPARATION
M. Beller and J. DAcierno 1981 5 p refs Presented at Ann. Contractors' Rev. Meeting on Thermal and Chem. Storage, Tysons Corner, Va.
(Contract DE-AC02-76CH-00016)
(DE81-030031; BNL-29962; CONF-810940-3) Avail: NTIS HC A02/MF A01

A systems analysis of the concept of supplementing natural gas with hydrogen was conducted in terms of present fuel supplies and prices. An added option was analyzed; this involves separation of the hydrogen from the mixed stream for use as a nonenergy commodity. The study concludes that no insurmountable barriers exist for the supplementation concept; the separation option will depend only upon economic factors. DOE

N82-16271# Stearns-Roger Corp., Denver, Colo.
BI-GAS PILOT PLANT OPERATION Quarterly Technical Progress Report, 1 Oct. - 31 Dec. 1980
1980 139 p
(Contract DE-AC01-80ET-14705)
(DE82-000223; DOE/ET-14705/22) Avail: NTIS HC A07/MF A01

At present, the major development effort is concentrated on gasification. As is typical for developmental projects of this magnitude, a large number of operating difficulties have been experienced and overcome since the first operations in August of 1976. Currently the overcoming of operating difficulties still requires some effort. However, most tests are stable and allow the gathering of process design data in the form of validated heat and material balances. These are applied in model simulations of gasifier operation. DOE

N82-16272# Radian Corp., McLean, Va.
VERIFICATION OF THE FOREIGN SYNFUELS INDUSTRIALIZATION EXPERIENCE Final Report
Sep. 1981 88 p refs Prepared jointly with Institute of Gas Technology, Chicago and Research Planning Associates, Paris
(Contract DE-AC01-80RA-50006)
(DE82-000230; DOE/RA-50006/T1; DCN-81-207-001-08) Avail: NTIS HC A05/MF A01

A survey of foreign commercial gasifiers is presented. A master list of commercial gasifiers operating in foreign countries was prepared, listing facilities which are currently operating or have been shut down for less than five years. This list represents the set of sources from which gasifier operation information is potentially available. On site visits to two facilities are reported. DOE

N82-16273# Instituto de Pesquisas Tecnologicas, Sao Paulo (Brazil).
PROCEEDINGS OF THE 4TH INTERNATIONAL SYMPOSIUM ON ALCOHOL FUELS TECHNOLOGY, VOLUME 1
1980 483 p refs In PORTUGUESE and ENGLISH Symp. held at Sao Paulo, Brazil, 5-8 Oct. 1980 2 Vol.
(DE81-903753; CONF-801030-Vol-1) Avail: NTIS (US Sales Only) HC A21/MF A01; DOE Depository Libraries

Progress in alcohol and biomass fuels research is reported. Three main areas regarding the alcohol and biomass fuels are covered: production and distribution, utilization, and socio-economical impacts. DOE

N82-16274# Instituto de Pesquisas Tecnologicas, Sao Paulo (Brazil).
PROCEEDINGS OF THE 4TH INTERNATIONAL SYMPOSIUM ON ALCOHOL FUELS TECHNOLOGY, VOLUME 2
1980 433 p refs In PORTUGUESE and ENGLISH Symp. held at Sao Paulo, Brazil, 5-8 Oct. 1980 2 Vol.
(DE81-903754; CONF-801030-Vol-2) Avail: NTIS (US Sales Only) HC A19/MF A01; DOE Depository Libraries

An overview of alcohol fuels technology is given. Topics covered include: diesel engines, fleet tests, lubrication and emission, socioeconomic aspects, and project summaries. DOE

N82-16275# Los Alamos Scientific Lab., N. Mex.
CATALYTIC COAL CONVERSION SUPPORT: USE OF LASER FLASH-PYROLYSIS FOR STRUCTURAL ANALYSIS Progress Report, 1 Oct. - 31 Dec. 1980
C. K. Rofer-Depoorter, comp. Oct. 1981 5 p
(Contract W-7405-eng-36)
(DE82-004221; LA-9033-PR) Avail: NTIS HC A02/MF A01

A coal processing apparatus that will allow online sampling of gases generated during coal processing is operational. Improvements were made in the lasers and the GC/MS. Lignin impregnated with ZnCl2, coal extracted with liquid CO2, and isolated resinite and fusinite were pyrolyzed. A thermal model of the pyrolysis is being developed. DOE

N82-16276# McElroy (Ralph) Co., Austin, Tex.
IMPROVEMENTS IN EXPLOSIVE CHARGES
1981 12 p Transl. into ENGLISH of French Patent no. 971,324 (16 Jan. 1951) Prepared for Los Alamos Scientific Lab.
(Contract W-7405-eng-36)
(DE81-028977; LA-tr-81-23) Avail: NTIS HC A02/MF A01

The perfection of explosive charges made up chiefly of uranium and thorium is liable to cause, because of neutron activity, a chain reaction. Improvements are described that consist of determining the mass or critical conditions, of assembling the explosive charge so that at the desired time the critical conditions are attained or surpassed and, at the instant of the explosive charge's use, to achieve those conditions equal or superior to the critical conditions, whether gradually or all at once, and in any case, preferably at extreme speed at the end of the process. DOE

N82-16277# Sandia Labs., Albuquerque, N. Mex.
REVERSIBILITY OF COAL LIQUEFACTION
M. G. Thomas, T. C. Bickel, and D. E. Trudell 1981 16 p refs Presented at the Ann. Meeting of the Inst. of Chem. Engr., New Orleans, 8 Nov. 1981
(Contract DE-AC04-76DP-00789)
(DE81-027804; SAND-81-0211C; CONF-811108-3) Avail: NTIS HC A02/MF A01

Dissolution of coal was shown to be affected by the amount of preasphaltenes formed which is related to the repolymerization of preasphaltenes when solvent quantity and/or quality are limited. Repolymerized preasphaltenes are shown to be reactive suggesting that a process reversibility exists for this first step of the liquefaction sequence and explaining limited solvation for early stage liquefaction. This reversibility is direct evidence that gas formation is a non-essential side reaction that is a consequence of time at temperature, not the interconversion of coal derived materials. Addition of asphaltenes, increases the amount of oil produced. This increase is accompanied by some polymerization of the asphaltenes. Process reversibility is thus observed for both the primary and secondary step of liquefaction. The effect of increases in hydrogen availability by chemical spikes and/or H-donor molecules was shown to partially compensate for the solvent deficiencies observed in the later stages of processing. M.D.K.

N82-16278# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

SMALL-SCALE FUEL-ALCOHOL PLANT. VOLUME 2: DETAILED EQUIPMENT INFORMATION Design Report

Aug. 1981 206 p
(Contract DE-AC07-76ID-01570)
(DE82-001037; DOE/TIC-2001037-Vol-2; ID-10102-Vol-2)
Avail: NTIS HC A10/MF A01

Technical information about the equipment used in the Small Scale Fuel Alcohol Plant (SSFAP) is reported. Details are provided in the form of data sheets for off-the-shelf mechanical equipment and instrumentation. A specification is also included for a microprocessor. Complete drawings are included for mechanical hardware specifically designed for this plant. The information is arranged with all instrument and equipment data sheets grouped by the type of equipment. Vendor listings are provided for each type of equipment required. The design in this report represents the design after startup testing and some short periods of operation but before continuous production began. It is expected that a person or firm desiring to build a similar plant would hire a consultant or architect-engineering firm to modify this design to fit the specific application and site. DOE

N82-16279# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

SMALL-SCALE-FUEL-ALCOHOL PLANT. VOLUME 3: CONSTRUCTION INFORMATION Design Report

Aug. 1981 140 p
(Contract DE-AC07-76ID-01570)
(DE82-001036; DOE/TIC-2001036-Vol-3; ID-10102-Vol-3)
Avail: NTIS HC A07/MF A01

General information about the construction of the Small-Scale Fuel Alcohol Plant (SSFAP) is reported. Suggested design changes are listed: it is recommended that anyone planning to build a plant similar to this one consider incorporating these changes. The construction information included here consists of photographs of the plant, a list of important mechanical construction details, electrical drawings showing the power distribution schematic, and end-to-end wiring schematics for the plant control. The photographs show the relative locations of major equipment and can be used in conjunction with the Piping and Instrumentation Diagrams (P and IDs) in Appendix F of Volume 1 to physically lay out the plant. The design in this volume represents the design after startup testing and some short periods of operation but before continuous production began. It is expected that a person or firm desiring to build a similar plant would hire a consultant or architect-engineering firm. DOE

N82-16280# Oak Ridge National Lab., Tenn.

CONTROL OF FRACTIONATION-AREA CORROSION AT SRC PILOT PLANTS

J. R. Keiser, R. R. Judkins, V. B. Baylor, D. R. Canfield, and W. P. Barnett Oct. 1981 33 p refs
(Contract W-7405-eng-26)
(DE82-001949; ORNL/TM-7937) Avail: NTIS HC A03/MF A01

Fractionating columns at the Fort Lewis, Washington, and Wilsonville, Alabama, solvent refined coal pilot plants have experienced severe corrosion. This corrosion is most serious for materials exposed in the 230 to 2500 C range. Corrosion rates as high as 25 mm/year (1000 mils/year) on carbon steel and 6.4 mm/year (250 mils/year) on type 18-8 stainless steels have been observed. This corrosion problem was studied through exposure of coupons in the columns, analysis of failed through components from pilot plants, chemical analysis of liquids from the pilot plants, and operation of laboratory experiments. The in plant exposure of coupons shows that certain nickel base alloys have adequate corrosion resistance for the environment. Chemical analyses of pilot plant liquids show that the presence of appreciable levels of water soluble chloride is a necessary but not sufficient condition for these oils to be corrosive. DOE

N82-16281# Gilbert (Glen A.) and Associates, Inc., Oak Ridge, Tenn.

FOREIGN COAL-LIQUEFACTION-TECHNOLOGY SURVEY AND ASSESSMENT

T. D. Pay and S. S. Patel Oct. 1981 341 p refs Prepared for ORNL
(Contract W-7405-eng-26)
(DE82-0009555; ORNL/Sub-79/13837/6) Avail: NTIS HC A15/MF A01

The Foreign Coal Liquefaction Technology survey and Assessment is part of the International Energy Technology Assessment effort. Six countries were chosen. They are Australia, the Federal Republic of Germany (FRG), Japan, New Zealand, South Africa and the United Kingdom. These countries have active coal liquefaction programs, are using or developing technologies that could be used in the US and/or involved with US coal liquefaction programs. The resources that each has and the policies that have been adopted by their governments are presented. Although each of these countries has numerous programs underway or planned, the amount of information available on each program varies. Brief descriptions of the programs are given in the first chapter; the second chapter deals only with those liquefaction projects and gasifiers associated with direct liquefaction for which an adequate amount of reference material could be found. In the third chapter, critical areas common to all or many liquefaction systems are described. DOE

N82-16282# Utah Univ., Salt Lake City. Dept. of Mining, Metallurgical and Fuels Engineering.

CONCEPTS OF FUNDAMENTAL PROCESSES RELATED TO GASIFICATION OF COAL Quarterly Progress Report, Jan. - Mar. 1981

W. H. Wiser Sep. 1981 3 p
(Contract DE-AM03-77SF-01484)
(DE82-000763; DOE/SF-01484/T2) Avail: NTIS HC A02/MF A01

The primary objective of the research on single stage catalytic coal gasification is to optimize the process variables and catalyst systems to maximize yields. The 200 mesh coal will be slurried in a hydrogen donor solvent, tetralin, in a ratio of 2 parts solvent to 1 part coal by weight, and initially a sulfided Ni-W/SiO2-Al2O3 catalyst will be used. All of the required equipment arrived and the system has undergone pressure testing and some minor redesign. The objective of the project on single stage coal gasification to high Btu gas is to investigate the potential for obtaining high methane yields by direct catalytic hydrogenation of coal in a single stage with a maximum temperature of 5500 C. The work completed so far has included a thermodynamic feasibility study which involved investigating the effect of various parameters, temperature, pressure, and steam percent in hydrogen feed. Fifteen experimental runs have been completed. DOE

N82-16283# Pittsburg Univ., Pa. Dept. of Chemical and Petroleum Engineering.

EXPERIMENTAL STUDY OF THE MULTIPLE STEADY STATES IN AN ADIABATIC COAL-LIQUEFACTION REACTOR Annual Report, 1 Sep. 1980 - 31 Aug. 1981

Y. T. Shah and P. C. Singh Sep. 1981 75 p refs
(Contract DE-FG22-80PC-30243)
(DE82-000770; DOE/PC-30243/T2) Avail: NTIS HC A04/MF A01

The purpose of the proposed study is to investigate experimentally the thermal behavior of coal liquefaction reactors. Stability of the steady state is specifically planned to be investigated in the adiabatic continuous stirred tank reactor used in the A-1 unit of the Gulf Research Center. When a reactor has more than one possible temperature for steady state operation, large temperature excursions may result from a small perturbation. An efficient control of temperature is then needed to avoid this type of run away of the reactor. In case of coal liquefaction reactors, below 4500 C no substantial reaction is observed, while above 4650 C there is every possibility of coking of the reactor.

The operating range is thus very narrow and it is undesirable to have temperature excursions. A theoretical investigation of these reactors has shown multiple steady states in pilot plant operations. Industrial coal liquefaction reactors operate very close to an adiabatic mode. DOE

N82-16284# Brigham Young Univ., Provo, Utah.
INVESTIGATION OF SULFUR-TOLERANT CATALYSTS FOR SELECTIVE SYNTHESIS OF HYDROCARBON LIQUIDS FROM COAL-DERIVED GASES Quarterly Technical Progress Report, 19 Mar. - 18 Jun. 1981
C. H. Bartholomew 15 Jul. 1981 32 p refs
(Contract DE-AC01-79ET-14809)
(DE82-000274; DOE/ET-14809/7-7) Avail: NTIS HC A03/MF A01

During the seventh quarter, preparation of the proposed boride-promoted catalysts was completed. An aqueous solution technique was found to improve the preparation of the supported metal boride catalysts. Characterization of 3 and 15% cobalt catalysts by O2 titration and H2 and CO chemisorptions showed dispersions to be near 7.3%. Reduction was optimum after 36 hours at 623 K. Activity/selectivity measurements showed Co/SiO2 catalysts to be more active by an order of magnitude than corresponding Fe/SiO2 catalysts in Fischer-Tropsch synthesis. The unsupported cobalt boride was found to be less active, though it produced a higher molecular weight product than similar silica--support cobalt catalysts. H2S deactivation equipment construction and calibration has been completed and preliminary tests performed. DOE

N82-16285# Washington Univ., St. Louis, Mo. Dept. of Chemical Engineering.
DYNAMIC BEHAVIOR OF MOVING-BED COAL-GASIFICATION REACTORS Annual Report, 1 Sep. 1980 - 31 Aug. 1981
B. Joseph Sep. 1981 82 p refs
(Contract DE-FG22-80PC-30219)
(DE82-000595; DOE/PC-30219/T1) Avail: NTIS HC A05/MF A01

A rigorous dynamic model of the two moving-bed coal gasifier was developed. The resulting coupled nonlinear partial differential equations were solved numerically using a digital computer. The model was validated through comparison with steady state pilot plant operating data and with results of existing steady state models. A number of transient studies were conducted using the dynamic mode including response to variations in coal feed rate, steam rate and oxygen feed rate. The internal solid and gas temperature profiles as well as the product gas composition were tracked as a function of time. The stability of the gasifier under various types of feedback control strategies were studied. The results are given in the form of response curves to typical input disturbances. DOE

N82-16286# Southwest Research Inst., San Antonio, Tex. Dept. of Engine and Vehicle Research.
ALTERNATE FUELS IN MEDIUM-SPEED DIESEL ENGINES: OFF-SPECIFICATION DIESEL FUELS, SIMULATED COAL-DERIVED FUEL AND METHANOL
Q. A. Baker Jan. 1981 155 p refs
(Contract DOE-EM-78-C-4266)
(PB81-242562; FRA/ORD-80/40.I; Rept-1) Avail: NTIS HC A08/MF A01 CSCL 21D

The first year of research activity of a multi-year research, development, and demonstration effort to investigate the use of alternate fuels in medium-speed diesel engines is described. Tests were performed on a laboratory two cylinder medium speed diesel engine in an attempt to define its ability to operate on alternate fuels and to define the performance and emission characteristics of the engine under such operation. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-16287# Los Alamos Scientific Lab., N. Mex.
SUMMER-HEAT-GAIN CONTROL IN PASSIVE-SOLAR-HEATED BUILDINGS: FIXED HORIZONTAL OVERHANGS
Robert W. Jones 1981 6 p refs Presented at the Intern. Passive and Hybrid Cooling Conf., Miami Beach, Fla., 11-13 Nov. 1981
(Contract W-7405-eng-36)
(DE81-028700; LA-UR-81-2297; CONF-81109-2) Avail: NTIS HC A02/MF A01

When there is a substantial winter heating requirement, and when the winter heating needs are met in part by a passive solar heating system, then the potential aggravation of summer cooling loads by the heating system is an important design issue. An approach to quantitative design rules for the sizing of a shading overhang to minimize total annual space conditioning energy needs is outlined. DOE

N82-16288# Oak Ridge National Lab., Tenn. Engineering Technology Div.
DEVELOPMENT OF ADVANCED BUILDING MATERIALS FOR THE PASSIVE SOLAR APPLICATION
J. J. Tomlinson 1981 5 p refs Presented at the Thermal Energy Storage Ann. Contr. Rev. Meeting, Washington, D.C. 14-16 Sep. 1981
(Contract W-7405-eng-26)
(DE81-032009; CONF-810940-7) Avail: NTIS HC A02/MF A01

A program to develop the concept of incorporation of phase change materials (PCMs) into conventional building materials has been initiated and consists of in-house analyses to characterize the thermal performance of a porous matrix suffused with a PCM, and concept experimental development through subcontracted efforts. The program is directed toward the development of material concepts which provide greater collection/storage efficiency and increased levels of thermal comfort in direct gain passive solar applications. DOE

N82-16289# Water and Power Resources Service, Denver, Colo. Geotechnical Branch.
CLOSED-SYSTEM FREEZING OF SOILS IN LININGS AND EARTH EMBANKMENT DAMS
Chester W. Jones Mar. 1981 56 p refs
(PB81-240491; REC-ERC-81-1) Avail: NTIS HC A04/MF A01 CSCL 13B

A brief review of studies of closed-system freezing (no source of water except that in voids) of compacted soil canal linings, laboratory and field test results show that under certain soil and temperature conditions, freezing decreases soil density near the surface, but increases density at depth. In two linings, the average density increased slightly during a 20-year period. Frost penetration measurements made during the 1978-79 winter on a 1.5-thick reservoir lining, on three earth dams under construction, and on the Teton Dam remnant are shown along with associated soil conditions, air freezing indexes, and insulating effects of snow and, for one dam, a loose soil cover. Author

N82-16290# Utah Dept. of Transportation, Salt Lake City. Materials and Research Station.
EVALUATION OF FLEXIBLE PAVEMENT CRACK SEALING METHODS USED IN UTAH Final Report
Michael C. Belangie and Douglas I. Anderson Jan. 1981 121 p refs Sponsored by Federal Highway Administration
(PB81-239469; UDOT-MR-81-1; FHWA/UT-81/1) Avail: NTIS HC A06/MF A01 CSCL 13B

Criteria to improve the effectiveness of Utah's flexible pavements crack sealing practice were studied. Field measurements, in-depth interviews questionaires were used. Findings indicate that flexible pavement cracking is a significant problem in the Far West, Rocky Mountains, Great Lakes and New England. Choice of materials is effected by storage requirements and equipment available. Prepackaging of materials designed for crack sealing has resulted in improvements in control of mix and material properties. Low temperature and freeze thaw cycles significantly effect the amount of thermal cracking and the performance of crack sealant. Ductile sealants, such as Crumb rubber/asphalt cement mixes, in combination with routing appear to offer substantial gains in sealant life and performance. M.D.K.

N82-16291# URS/Blume (John A.) and Associates, San Francisco, Calif.

EARTHQUAKE ENGINEERING OF LARGE UNDERGROUND STRUCTURES Final Report, Apr. 1978 - Sep. 1980

G. Norman Owen and Roger E. Scholl Jan. 1981 299 p refs
Sponsored in part by Federal Highway Administration
(Grant NSF PFR-77-06505)
(PB81-247918; JAB-7821; FHWA/RD-80/195) Avail: NTIS HC A13/MF A01 CSCL 13B

The current state of the art of earthquake engineering of transportation tunnels and other large underground structures is evaluated. A review of the past performance of 127 underground openings during earthquakes indicates that underground structures in general are less severely affected than surface structures at the same geographic location. However, some severe damage, including collapse, has been reported. Stability of tunnels during seismic motion is affected by peak ground motion parameters, earthquake duration, type of support, ground conditions, and in situ stresses. The literature on the nature of underground seismic motion is reviewed in detail. Although recorded underground motions tend to substantiate the idea that motion does reduce with depth, amplification at depth has been observed. GRA

N82-16292# New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.

EXPERIMENTAL PAVEMENT DELINEATION TREATMENTS Interim Report

James E. Bryden and Ronald A. Lorini Jun. 1981 42 p refs
(PB81-249161; RR-81-87; FHWA/NY/RR-81/87; IR-2) Avail: NTIS HC A03/MF A01 CSCL 13B

Visibility and durability of materials used to delineate shoulders and medians adjacent to asphalt pavements were evaluated. Materials evaluated were polysulfide and coal tar epoxies, one and two component polyesters, portland cement, acrylic paints, modified-alkyd traffic paint, preformed plastic tape, and thermoplastic markings. Neat applications, sand mortars, and surface treatments were installed in several geometric patterns including cross hatches, solid median treatments, and various widths of edge lines. Thermoplastic pavement markings generally performed very well, providing good visibility under adverse viewing conditions for at least 4 years. Thermoplastic 4 in. wide edge lines appear to provide adequate visibility for most conditions. Author

N82-16293# Florida State Dept. of Transportation, Gainesville. Office of Materials and Research.

LABORATORY PAVEMENT POLISHING DEVICE (WEAR MACHINE) VERSUS FIELD FRICTION TEST UNITS AND ACCUMULATIVE TRAFFIC (ADT). PHASE 2. CORRELATION STUDY Final Report

H. F. Godwin, D. B. Loyed, W. G. Miley, and G. C. Page Apr. 1981 63 p refs
(PB81-233256; FL/DOT/OMR-81/240; FHWA/FL-81/240) Avail: NTIS HC A04/MF A01 CSCL 13B

The degree to which pavement wear (vehicular traffic) could be predicted from testing samples of in-service pavements in the laboratory pavement polishing device was determined. This investigation was made on asphaltic concrete pavements, primarily friction courses used in Florida. These pavements were tested at different levels of accumulative traffic (ADT) for approximately 2 years. T.M.

N82-16294# Federal Highway Administration, Washington, D.C. Structures and Applied Mechanics Div.

A PRELIMINARY EVALUATION OF THE SYSTEM FOR INVENTORYING ROAD SURFACE TOPOGRAPHY (SIRST) Evaluation Report, Jun. 1979 - May 1980

J. C. Wambold and L. C. Meczkowski Jul. 1981 45 p
(PB81-249336; FHWA/RC-81/089) Avail: NTIS HC A03/MF A01 CSCL 13B

A brief overview of a System for Inventorying Road Surface Topography (SIRST) is described. A description of the operating principle is given as well as a description of the individual components. A preliminary evaluation of the system and its components is included, together with a discussion of the operating experience. It is concluded that the present system is usable; however, a more complete evaluation and further development are needed to adapt the system for highway department use. Several modifications are recommended for over the road environment and ease of calibration. GRA

N82-16295# Applied Research Association, Inc., Albuquerque, N. Mex.

EVALUATION OF THE FEASIBILITY OF ESTABLISHING A NATIONAL TESTING CAPABILITY FOR THE SIMULATION OF EARTHQUAKE LOADS ON LARGE-SCALE STRUCTURES

Cornelius J. Higgins and D. W. Steedman Mar. 1981 57 p refs
(Grant NSF PFR-80-09884)
(PB81-243875; NSF/CEE-81018) Avail: NTIS HC A04/MF A01 CSCL 13M

Literature investigations and communications with engineers and scientists active in the field of earthquake engineering were conducted. The need for large-scale testing, high priority projects, test facility requirements, management concepts, and funding requirements were evaluated. There was a consensus that there is strong justification for a national large-scale testing program. Testing is needed to allow thorough investigation of the nonlinearities and inelasticities in the behavior of realistic structures as they approach their ultimate capacity. The definition of large-scale, the place of large-scale testing in the overall scheme of earthquake engineering research, the planning and cost estimating for the development of test support requirements, and a management concept integrating the capabilities and interests of university, industry, consulting, and government engineers and scientists were topics addressed. M.D.K.

N82-16296# National Bureau of Standards, Washington, D.C. Center for Building Technology.

BUILDING TECHNOLOGY PROJECT SUMMARIES, 1980 - 1981

Noel Raufaste and Michael Olmert Jul. 1981 89 p
(PB82-106105; NBS-SP-446-5) Avail: NTIS HC A05/MF A01 CSCL 13M

The mission of the Center for Building Technology (CBT) is to increase the usefulness, safety, and economy of buildings through the advancement of building technology and its application to the improvement of building practice. CBT's research activities support the building technology programs of Federal, State, and local governments; assist the design professions, building officials, and the research community by developing improved design criteria; and assist manufacturers of building products by developing methods for evaluating innovative materials, components, and systems. CBT provides an objective source of technical information for national consensus standards and model code organizations. Close cooperation with these groups leads to standard practices that meet the needs of the regulatory authorities of State and local governments. Research providing the knowledge for these standard practices is conducted in cooperation with Government, university, and industry laboratories. This report summarizes CBT's research for 1980-1981. GRA

N82-16297# Massachusetts Univ., Amherst. Dept. of Mechanical Engineering.

DESIGN FOR MANUFACTURABILITY: DESIGN FOR FORGING, PART 2 M.S. Thesis

A. Rigioni and G. Boothroyd Apr. 1981 122 p refs
(Grant NSF APR-77-10197)
(PB82-101692; NSF/MEA-81008-Pt-2; Rept-13) Avail: NTIS HC A06/MF A01 CSCL 13H

Practical design recommendations for conventional forgings are presented. Recommendations are considered for the design of individual features such as ribs, depressions, and holes. Forging tolerances and allowances, as well as forging drafting practices, are explained. Included are some guidelines for evaluating parting line location. Forging design data sheets are described, including a brief explanation of how they were obtained. The use of the handbook is illustrated by means of a practical example, outlining all of the necessary steps in the design of a forged product. The appendix contains a list of forging terms and their definitions. GRA

N82-16298# Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.

EVALUATION OF MAINTENANCE/REHABILITATION ALTERNATIVES FOR CONTINUOUSLY REINFORCED CONCRETE PAVEMENT Interim Report, 1978 - 1981
Terry L. Barnett, Michael I. Darter, and Ned R. Laybourne May 1981 152 p refs Prepared in cooperation with the Illinois State Dept. of Transportation, Springfield and DOT
(PB82-105792; TRANSPORTATION-ENGR-SER-28;
UIUC-ENG-80-2011; FHWA/IL/UI-185) Avail: NTIS
HC A08/MF A01 CSCL 13C

The design, construction, performance, and costs of several maintenance and rehabilitation methods were evaluated. Patching, cement grout and asphalt undersealing, epoxying of cracks, and an asphalt overlay were considered. Nondestructive testing, deflections, reflection cracking, cost, and statistical analyses were used to evaluate the methods. Author (GRA)

N82-16299# National Bureau of Standards, Washington, D.C.
FACTORS AFFECTING THE SOUNDNESS OF BLENDED CEMENTS
Paul Wencil Brown and James R. Clifton Jun. 1981 27 p refs Sponsored in part by DOE
(PB82-104746; NBSIR-81-2273) Avail: NTIS
HC A03/MF A01 CSCL 13C

Blended cements containing fly ash and blast furnace slag were examined to assess their soundness in the presence of admixed MgO. Measurements of linear expansion were combined with compressive strength determinations to evaluate the volume stabilities of samples cured under various conditions. The effects of magnesium silicate formation on volume stability were also examined. Author

N82-16300# Institut Rudjer Boskovic, Zagreb (Yugoslavia).
DEVELOPMENT OF STRENGTH IN CEMENTS Interim Report, Sep. 1977 - Sep. 1979
B. Matkovic Washington Federal Highway Administration Apr. 1981 149 p refs Sponsored in part by DOT and Yugoslav Joint Board on Scientific and Technological Cooperation
(PB82-103979; FHWA/RD-80/128) Avail: NTIS
HC A07/MF A01 CSCL 13C

The production of doped belite (dicalcium silicate) clinkers as a prospective means for saving energy in Portland cement production is described. This is accomplished by small additions of either barium sulfate (BaSO4), calcium tribasic phosphate (Ca5(PO4)3OH), or vanadium oxide (V2O5) to belite (Ca2SiO4) clinker. In addition to conserving energy, doping the belite with barium sulfate imparts greater strength to the resulting modified belite. Reactants, additives, and factors contributing to the fabrication of Sorel cement are described. Author (GRA)

N82-16301# GAI Consultants, Inc., Monroeville, Pa.
INVESTIGATION OF THE USE OF COAL REFUSE-FLY ASH COMPOSITIONS AS HIGHWAY BASE COURSE MATERIAL Final Report, Oct. 1977 - Sep. 1980
Paul V. McQuade, W. J. Head, and Robert B. Anderson Jun. 1981 68 p Prepared in cooperation with West Virginia Univ., Morgantown
(Contract DOT-FH-11-9324)
(PB82-101940; FHWA/RD-80/129; Rept-77-522) Avail: NTIS HC A04/MF A01 CSCL 13C

The utilization of coal refuse-fly ash compositions as highway base course material is surveyed. The results of a laboratory testing program into the physical and engineering properties of mixtures of these waste products are presented. A comparison of serviceability index and physical damage parameters based on the VESYS Predictive Design Procedure between crushed stone and coal refuse-fly ash compositions are presented. These findings indicate that substituting stabilized coal refuse-fly ash blends in place of conventional base course material is technically and economically feasible. Procedures for developing design mixes and conducting field tests of coal refuse-fly ash base course material are described. Author

N82-16302# Portland Cement Association, Skokie, Ill. Construction Technology Labs.
EVALUATION OF SUPER-WATER REDUCERS FOR HIGHWAY APPLICATIONS Final Report
D. Whiting Washington Federal Highway Administration Mar. 1981 184 p refs
(Contract DOT-FH-11-9258)
(PB82-101106; FHWA/RD-80/132) Avail: NTIS
HC A09/MF A01 CSCL 13C

Super-water reducers were characterized and evaluated as potential candidates for production of low water to cement ratio, high strength concretes for highway construction applications. Admixtures were composed of either naphthalene or melamine sulfonated formaldehyde condensates. A mini-slump procedure was used to assess dosage requirements and behavior of workability with time of cement pastes. Required dosage was found to be a function of tricalcium aluminate content, alkali content, and fineness of the cement. Concretes exhibited high rates of slump loss when super-water reducers were used. The most promising area of application of these products appears to be in production of dense, high cement content concrete using mobile concrete mixer/transporters. Author (GRA)

N82-16303# Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
MECHANISTIC INTERPRETATION OF NONDESTRUCTIVE PAVEMENT TESTING DEFLECTIONS Interim Report
M. S. Hoffman and M. R. Thompson Jun. 1981 262 p refs Sponsored in part by Illinois State Dept. of Transportation
(PB82-107095; TRANSPORTATION-ENGR-SER-32;
UILU-ENG-81-2010; FHWA/IL/UI-190) Avail: NTIS
HC A12/MF A01 CSCL 13B

A method for the back calculation of material properties in flexible pavements based on the interpretation of surface deflection measurements is proposed. The ILLI-PAVE, a stress-dependent finite element pavement model, was used to generate data for developing algorithms and nomographs for deflection basin interpretation. Twenty four different flexible pavement sections throughout the State of Illinois were studied. Deflections were measured and loading mode effects on pavement response were investigated. The factors controlling the pavement response to different loading modes are identified and explained. Correlations between different devices are developed. The back calculated parameters derived from the proposed evaluation procedure can be used as inputs for asphalt concrete overlay design. Author (GRA)

N82-16304# Massachusetts Inst. of Tech., Cambridge. Lab. for Manufacturing and Productivity.
EXPLORATORY STUDY OF CONSTRAINTS ON DESIGN BY FUNCTIONAL REQUIREMENTS AND MANUFACTURING Annual Report, 1979 - 1980
Nam P. Suh, Adam C. Bell, David R. Wilson, and James R. Rinderle Jan. 1981 146 p refs
(Grant NSF DAR-77-13296)
(PB82-101858; LMP/AXM-81-02; NSF/MEA-81008) Avail: NTIS HC A07/MF A01 CSCL 13H

Some of the concepts and terminology of the axiomatic approach to design and manufacturing are presented. The manner in which this approach fits into the overall design process is illustrated. Two axioms are derived: maintain the independence of functional requirements; and minimize the information content. Coupling in a design as it relates to the first axiom is discussed. Some quantitative measures of coupling are presented with examples to illustrate the concepts of coupled and uncoupled designs. The issue of complexity in design and manufacturing is considered, including the relativity and consequences of a particular measure of complexity. Author

N82-16305# Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.
WATER REPELLENT SOILS: A STATE-OF-THE-ART Final General Technical Report
Leonard F. DeBano Mar. 1981 27 p refs
(PB81-248270; FSGTR-PSW-46) Avail: NTIS
HC A03/MF A01 CSCL 08M

Most problems of water repellancy in soils arise because of poor infiltration, difficulties in establishing plants, increased runoff and erosion, and plant diseases. An especially acute problem in southern California is the relationship between these soils and the high rates of runoff and erosion of freshly burned watersheds. Water repellent substances are beneficial in harvesting water and reducing evaporation losses. These same substances provide a practical method of improving soil structure and aggregate stability. Much is known about the physics of water movement through these soils and the role of fire in their formation. GRA

N82-16306# Brookhaven National Lab., Upton, N. Y. Process Sciences Div.

TECHNOLOGY FOR IMPROVING THE WEAR RESISTANCE OF AGGREGATES BY MATERIALS IMPREGNATION Final Report, May 1977 - Dec. 1980

Ronald P. Webster and Jack J. Fontana Aug. 1981 80 p refs

(Contract DOT-FH-7-3-0070)

(PB81-246191; FHWA/RD-81/115) Avail: NTIS HC A05/MF A01 CSCL 13C

Tests performed to evaluate the effect of impregnation on the physical, mechanical, wear resistance and polish resistance properties of the aggregates included: petrographic analysis, Los Angeles abrasion loss, sodium sulfate soundness loss, the British polish wheel, aggregate surface microtexture analysis, and two circular test track studies. Impregnants studied included: MMA based and styrene based monomer systems, water based phenol formaldehyde resin, and sodium silicate. In general, it was found that the physical and mechanical properties of natural aggregates can be significantly improved by impregnation. Significant improvements in wear resistance can also be obtained, however, in some instances, this improvement is accompanied by a decrease in polish resistance. T.M.

N82-16307# Purdue Univ., Lafayette, Ind. Office of Joint Highway Research Project.

THIN, APPLIED SURFACING FOR IMPROVING SKID RESISTANCE OF CONCRETE PAVEMENTS Final Report

Charles F. Scholer 3 Dec. 1980 29 p Sponsored in part by Indiana State Highway Commission

(PB81-247744; JHRP-80-16; FHWA/IN/JHRP-80/16) Avail: NTIS HC A03/MF A01 CSCL 13B

The use of select aggregate in a thin wearing surface of portland cement mortar to prolone or restore a concrete pavement's ability to develop high friction was accomplished. Two fine aggregates, blast furnace slag and lightweight expanded shale were found to exhibit skid resistance greater than the other aggregates evaluated. The British polishing wheel was used in the laboratory evaluation of aggregate to simulate wear. The need for a method of restoring friction to a worn, but otherwise sound concrete pavement led to a field evaluation of several different techniques for placing a very thin overlay. The successful method was a broomed, very thin layer of mortar, 3 mm thick. GRA

N82-16308# National Bureau of Standards, Washington, D.C. Automated Production Technology Div.

PRECISION MEASUREMENTS ON FIBROUS GLASS INSULATION

B. Branthover, R. Veale, and C. Siu Nov. 1980 37 p refs

(PB81-239634; NBSIR-80-2091) Avail: NTIS HC A03/MF A01 CSCL 13C

A technique for measuring the thickness of low density fibrous glass materials is investigated. The method of measurement described provides a higher degree of accuracy than previously accomplished. The procedure determined a specific force to be used for measuring. Also, a stacking technique was carried out to see what effect placing a number of test samples on top of each other would have. The results of the entire testing will aid in the development of a standard reference material be used for thermal resistance measurement systems. GRA

N82-16309# Transportation Research Board, Washington, D.C.

BRIDGE AND PAVEMENT MAINTENANCE

Michael W. Fitzpatrick, David A. Law, William C. Dixon, Gary E. Elkins, B. Frank MuCullough, Michael I. Darter, Eldon J. Yoder, R. H. Florence, Jr., Stanley J. Virkler, K. H. McGhee et al 1981 56 p refs

(PB81-247504; TRB/TRR-800; ISSN-0361-1981) Avail: NTIS HC A04/MF A01 CSCL 13B

Deterioration of New York State Highway structures; precast repair of continuously reinforced concrete pavement (abridgment) patching of continuously reinforced concrete pavements, evaluation of several maintenance methods for continuously reinforced concrete pavement, patching jointed concrete pavements, highway pavement repairs by using polymer concrete, pressure grouting of concrete pavements, and choosing cost-effective maintenance are discussed. Author

N82-16310# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.

THE OPTIMAL PLANNING OF COMPUTERIZED MANUFACTURING SYSTEMS

William C. Lewis, Jr., Moshe M. Barash, and J. J. Solberg Dec. 1980 207 p refs

(Grant NSF APR-74-15256)

(PB81-241564; NSF/RA-800556; REPT-18) Avail: NTIS HC A10/MF A01 CSCL 13H

A new class of control algorithms for computer operated manufacturing systems (CMS) was defined and tested. The definition is sufficient to permit construction of any element of the new class by a practitioner with backgrounds in electronic devices, NC machine tools, computer operating systems, and data flow. Reliability, repairability, and extensibility were considered. The test applied the new class to control two simulated systems-one similar to existing systems, the other using adaptive machine tools. For each system, the new class functioned successfully. Non-failing machine tool utilization exceeded 95 percent for failure rates from 3-16 percent per machine tool. The batch weights had a strong effect on relative flow time. GRA

N82-16311# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.

THE OPTIMAL PLANNING OF COMPUTERIZED MANUFACTURING SYSTEMS

M. M. Barash, E. Bartlett, I. I. Finfter, and W. C. Lewis, Jr. Dec. 1980 98 p refs

(Grant NSF APR-74-15256)

(PB81-245276; NSF/RA-800555; REPT-17) Avail: NTIS HC A05/MF A01 CSCL 13H

An automated machining process planning systems is demonstrated. Enough information is given to construct any member of the class, which is characterized by use of a recursive algorithm. The algorithm emphasizes the use of one well-defined tool, in one way, at each step of a process plan. Functioning is demonstrated by a Pascal program. Testing the generality of the system is proposed. The project illustrates application of selected software development methods to make the software compatible with social verification. GRA

N82-16312# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.

THE OPTIMAL PLANNING COMPUTERIZED MANUFACTURING SYSTEMS

M. F. Neuts, D. M. Lucanton, and C. Geiszler Feb. 1981 35 p refs

(Grant NSF APR-74-15256)

(PB81-245284; NSF/MEA-81006; Rept-19) Avail: NTIS HC A03/MF A01 CSCL 13H

The utility of interactive computation in answering questions on the behavior, design, and control of certain service systems is demonstrated. The stationary distributions of various waiting times are also discussed. A queue with N servers which may break down and require repair at a facility which has C repair crews is studied. Under exponential assumptions, this model has an algorithmically tractable solution. It is then a particular case of the M/M/n queue in a Markovian environment. It is shown that during periods when most servers are down, large build-ups may occur which affect the queue adversely for a long time afterwards. Potential applications are in manpower planning, as in a typing pool where persons may be absent, and in determining the size of a battery of machines, where machines may be inoperative due to maintenance and repair. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also 04 Aircraft Communications and Navigation and 17 Spacecraft Communications, Command and Tracking.

N82-16313*# Ohio State Univ., Columbus. ElectroScience Lab.
UTD ANALYSIS OF ELECTROMAGNETIC SCATTERING BY FLAT STRUCTURES Ph.D. Thesis
F. A. Sikta and Leon Peters, Jr. Dec. 1981 389 p refs
(Grant NsG-1613)
(NASA-CR-165099; TR-711930-2) Avail: NTIS HC A17/MF A01 CSCL 20N

The different scattering mechanisms that contribute to the radar cross of finite flat plates were identified and analyzed. The geometrical theory of diffraction, the equivalent current and the corner diffraction are used for this study. A study of the cross polarized field for a monopole mounted on a plate is presented, using novel edge wave mechanism in the analysis. The results are compared with moment method solutions as well as measured data. J.D.H.

N82-16314*# City Univ. of New York, N. Y. Communications Systems Lab.
COMPUTER SIMULATOR FOR A MOBILE TELEPHONE SYSTEM Technical Report, 1 Nov. 1980 - 31 Oct. 1981
Donald L. Schilling 31 Oct. 1981 105 p refs
(Grant NAG3-119)
(NASA-CR-164808) Avail: NTIS HC A06/MF A01 CSCL 17B

A software simulator was developed to assist NASA in the design of the land mobile satellite service. Structured programming techniques were used by developing the algorithm using an ALCOL-like pseudo language and then encoding the algorithm into FORTRAN 4. The basic input data to the system is a sine wave signal although future plans call for actual sampled voice as the input signal. The simulator is capable of studying all the possible combinations of types and modes of calls through the use of five communication scenarios: single hop systems; double hop, signal gateway system; double hop, double gateway system; mobile to wireline system; and wireline to mobile system. The transmitter, fading channel, and interference source simulation are also discussed. A.R.H.

N82-16315*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
DEVELOPMENT OF A SURFACE PANEL MEASUREMENT SYSTEM Final Report
D. L. Jones 4 Aug. 1981 57 p refs Prepared for JPL
(Contracts NAS7-100; JPL-955987)
(NASA-CR-163469; JPL-9950-600) Avail: NTIS HC A04/MF A01 CSCL 17I

Reflector measurement systems are studied in support of the reshaping of the 34 meter antenna at Goldstone. The requirements for measurement systems are presented. A survey is made of the surface errors of existing antennas. Reflector measurement systems are divided into three categories and representative examples of each category are illustrated and discussed. Parametric error analyses are made of selected optical systems. The existing measurement method using a theodolite at the vertex is retained. A method using a theodolite on the RF cone is a possible variant. S.L.

N82-16316# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Uebertragungstechnik und Elektroakustik.
DIGITAL SINGLE SIDEBAND MODULATORS FOR ANALOG SIGNALS [DIGITALE EINSEITENBANDMODULATOREN FUER ANALOGSIGNALE]
K. Hoffmann and N. Roethe Mar. 1981 32 p refs In GERMAN
(IND-FB-105) Avail: NTIS HC A03/MF A01

Digital system application of single sideband and modulators to analog signals is discussed. The characteristics and applications of the single sideband systems are described. The general preparation for analog techniques is reviewed. The digital, time discrete realization of these preparations is analyzed. A complete dimensional modulator for the finished product and the application of the digital process is shown. Transl. by E.A.K.

N82-16317# Teledyne Micronetics, San Diego, Calif.
ADAPTIVE PROCESSING FOR LOW RCS TARGETS Final Technical Report, Apr. 1979 - Feb. 1980
Lee A. Morgan and Steven Weisbrod Griffiss AFB, N.Y. RADC Aug. 1981 50 p refs
(Contract F30602-79-C-0142; AF Proj. 4506)
(AD-A106685; RB-80) Avail: NTIS HC A03/MF A01 CSCL 17/9

An adaptive system to determine and transmit a radar signal matched to a target's impulse response was designed, breadboarded and tested. The application is to targets which consist of discrete point-like scatterers. A pilot signal consisting of a single short pulse is transmitted. The return from this pilot pulse is range gated in a network which generates a piecewise approximation of the conjugate of the impulse response. This approximation becomes the matched signal which is then transmitted. The system was demonstrated to provide nearly theoretical target enhancement even when the pilot pulse return was at the receiver noise level. Operation under situations where the target-impulse response was changing was also demonstrated. Problem areas in the implementation are described. Author (GRA)

N82-16318# Max-Planck-Institut fuer Aeronomie, Lindau Uber Northeim (West Germany).
HIGH ALTITUDE ATMOSPHERIC INVESTIGATIONS. PART 2: DEVELOPMENT OF IN-SITU EXPERIMENTS FOR MEASUREMENTS IN THE D-REGION OF THE IONOSPHERE AND THEIR RESULTS Final Report, 1 Aug. 1975 - 1 Aug. 1980
Hans-Ulrich Widdel 3 Jun. 1981 118 p refs
(Grant DA-ERO-75-G-076; DA Proj. 1T1-61102-BH-57)
(AD-A106770) Avail: NTIS HC A06/MF A01 CSCL 20/14

Results of A3 absorption, radio absorption measured from the ground is determined by the integral over the electron density weighted with the collision frequency of the electrons with the ambient neutral gas. The boundaries of the relevant conditions are difficult to establish. Absorption is also affected by properties of the ionosphere, and these properties change with seasons, Sun position, and other factors. These multiple effectors make unambiguous interpretation impossible. The report describes attempts to select and describe parameters that might most strongly influence radio wave absorption. Technical details of in-situ experiments to measure wind and electron density are communicated and some results obtained with these instruments are presented. It was found that the ratio between the positive ion current and the electron current measured with the guarding, probe experiment is affected by both, the ion composition in the ion sheath and by neutral air temperature. This might explain the ambiguities found when a direct comparison of results obtained with 'Langmuir' probes and wave propagation experiments is attempted. The effect might be used to derive local air temperatures provided that the ion composition of the ion sheath is known and that a quantitative theoretical description can be established. Author (GRA)

N82-16319# Computer Systems Management, Inc., Arlington, Va.
THE DESIGN, DEVELOPMENT, DEMONSTRATION, AND TRANSFER OF ADVANCED COMMAND AND CONTROL (C2) COMPUTER-BASED SYSTEMS Final Technical Report, 1 Jul. - 31 Oct. 1981
James F. Wittmeyer, III 31 Oct. 1981 35 p refs
(Contract MDA903-80-C-0155; ARPA Order 3829)
(AD-A106787; CSM-81-04) Avail: NTIS HC A03/MF A03 CSCL 09/2

The design, development, demonstration, documentation, and transfer of advanced C2 computer- and video-based systems is enhanced by systematic requirements, user assessments, and prudent software engineering. New opportunities lie in the video disc, networking, and micrographic systems areas, with applications in the unconventional documentation, information management, and advanced systems design, among other areas. CRA

N82-16320# Massachusetts Univ., Amherst. Dept. of Electrical and Computer Engineering.
PROPAGATION OF TRANSIENT SIGNALS THROUGH NONLINEAR, IONIZED MEDIA Final Report, 30 Sep. 1978 - 30 Jun. 1981
Robert E. McIntosh 30 Jun. 1981 8 p
(Grant AF-AFOSR-3729-78; AF Proj. 2310)
(AD-A106754; AFOSR-81-0698TR) Avail: NTIS
HC A02/MF A01 CSCL 17/2

The diurnal and random motion of the ionosphere cause both translation and spreading of the frequency spectrum of signals transmitted through it. A predictive model was built and compared to experimental data and found to successfully predict frequency shifts and spreads induced by ionospheric inhomogeneities. Another model was developed to describe the reflection of HF pulses by a randomly inhomogeneous, dispersive and absorptive ionosphere. It is seen that delay distortion, diffuse multipath and frequency incoherence effects are small compared to the discrete multipath spread resulting from large scale variations of the ionospheric electron number density. In laboratory experiments the electron number density profile of a low pressure RF-generated Argon plasma was measured concurrently using microwave and optical diagnostic techniques. In a peripheral study, interesting results in antenna performance for efficient pulse radiation were found. Author (GRA)

N82-16321# Stanford Univ., Calif.
RESEARCH ON ALGORITHMS FOR ADAPTIVE ANTENNA ARRAYS Annual Interim Report, Dec. 1979 - Dec. 1980
Bernard Widrow, W. Newman, R. Gooch, K. Duvall, and D. Shur
Griffiss AFB, N.Y. RADC Aug. 1981 97 p refs
(Contract F30602-80-C-0046; AF Proj. 2305)
(AD-A106684; RADC-TR-81-206) Avail: NTIS
HC A05/MF A01 CSCL 09/5

The fundamental efficiency of adaptive algorithms is analyzed. It is found that noise in the adaptive weights increases with convergence speed. This causes loss in mean-square-error performance. Efficiency is considered from the point of view of misadjustment versus speed of convergence. A new version of the LMS algorithm based on Newton's method is analyzed and shown to make maximally efficient use of real-time input data. The performance of this algorithm is not affected by eigenvalue disparity. Practical algorithms can be devised that closely approximate Newton's method. In certain cases, the steepest descent version of LMS performs as well as Newton's method. The efficiency of adaptive algorithms with nonstationary input environments is analyzed where signals, jammers, and background noises can be of a transient and nonstationary nature. A new adaptive filtering method for broadband adaptive beamforming is described which uses both poles and zeros in the adaptive signal filtering paths from the antenna elements to the final array output. GRA

N82-16322# Ohio State Univ., Columbus. ElectroScience Lab.
A STUDY OF EIGENVALUE BEHAVIOR IN ADAPTIVE ARRAYS M.S. Thesis
Kah-jing Suen Aug. 1981 81 p refs
(Contract N00019-81-C-0093)
(AD-A106544; ESL-713603-2) Avail: NTIS
HC A05/MF A01 CSCL 20/14

This report discusses the eigenvalues of the covariance matrix for an N-element LMS adaptive array. The effects of the signal and array parameters on these eigenvalues are discussed. A simple relation between the array output SINR and one of the eigenvalues is obtained for the case of strong interference and CW signals. Author (GRA)

N82-16323# Ohio State Univ., Columbus. ElectroScience Lab.
ADVANCED ADAPTIVE ANTENNA TECHNIQUES Final Quarterly Report
R. T. Compton, Jr. Apr. 1981 12 p refs
(Contract ZN00019-80-C-0181)
(AD-A106545; ESL-712684-9) Avail: NTIS
HC A02/MF A01 CSCL 09/5

This report describes progress under Naval Air Systems Command Contract N00019-80-C-0181 during the fourth quarterly period. Research on advanced adaptive antenna techniques is summarized. Author (GRA)

N82-16324# Naval Underwater Systems Center, New London, Conn. Submarine Electromagnetic Systems Dept.
VLF/LF/MF WHISPERING GALLERY PROPAGATION STUDIES
Peter R. Bannister 9 Sep. 1981 46 p refs
(AD-A106517; NUSC-TR-6503) Avail: NTIS
HC A03/MF A01 CSCL 20/14

The propagation of very low frequency (VLF) and low frequency (LF) radio waves in the Earth-ionosphere waveguide is affected profoundly by the Earth's curvature. In particular, for frequencies greater than about 20 kHz, some modes are possible for which the energy is concentrated near the base of the ionosphere and the field strength near the ground is small. It is useful to think of such modes as being composed of waves repeatedly reflected at the inside surface of the ionosphere. Using analogy with sound waves, we can call these modes whispering-gallery modes. Since they depend only very slightly on ground conductivity, these modes are also referred to as Earth-detached modes. The Navy currently is pursuing efforts leading to a feasibility demonstration of a balloon gateway communications system that would employ a balloon-to-balloon cross link based on the whispering-gallery propagation modes. This report discusses some recent whispering-gallery theoretical advances and simplifications. Author (GRA)

N82-16325# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
KAFJORD, NORWAY TRANSMISSION LINE VLF ANTENNA TESTS, 1979 - 1980
M. H. Dazey 15 Sep. 1981 41 p refs
(Contract F04701-80-C-0081; Grant NSF ATM-77-19361)
(AD-A106430; TR-0081(6960-06)-3; SD-TR-81-80) Avail: NTIS HC A03/MF A01 CSCL 17/2

The 100 kW Transportable Very-Low-Frequency (TVLF) system was used at Kafjord, Norway, for transmissions to the SCATHA and GEOS spacecraft. A 22 kV 14 km long transmission line was used as an antenna. Modifications were made in the line to reduce telephone interference, and components were designed and installed to reduce the resonant frequency and increase the antenna current. Final practical operating current was 40 amperes at 1280 Hz, which resulted in power dissipation of 72 kW and an estimated radiated power of 29 watts. Author (GRA)

N82-16326# General Dynamics Corp., San Diego, Calif. Electronics Div.
WAVE PROPAGATION THROUGH AXIALLY SYMMETRIC DIELECTRIC SHELLS Final Technical Report, 12 Dec. 1979 - 30 Jun. 1981
G. Tricoles, E. L. Rope, and R. A. Hayward Jun. 1981 100 p refs
(Contract N00019-79-C-0638)
(AD-A106762; R-81-125) Avail: NTIS HC A05/MF A01 CSCL 17/9

Radomes significantly reduce missile guidance accuracy by producing boresight error (BSE), an error in target direction as determined by a seeker or radar system. Despite decades of development and use, radomes are a problem because newer missiles require small angular rates of change of BSE and because newer seekers have greater frequency bandwidths. The electromagnetic design process, for boresight error and bandwidth, is largely empirical because radome shapes are non-separable, making analysis approximate. The need for improving radome performance motivates efforts to improve analytical methods. The purpose of the research is to develop improved methods for analyzing radome electromagnetic effects. The main goals are as follows: Develop a geometric theory of diffraction (GTD) for dielectrics and in particular hollow dielectric shells. Extend the moment method for use with hollow dielectric shells. The GTD is intended to be relatively simple, and the moment method is intended to be accurate although more complex than the GTD. Author (GRA)

N82-16327# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

ANALYSIS OF MAXIMIN MATCHED-FILTER DESIGN FOR COMMUNICATION THROUGH A NONLINEARLY DISTORTING CHANNEL M.S. Thesis
Clifton J. Alston 1981 41 p refs
(AD-A106789; AFIT-CI-81-13T) Avail: NTIS HC A03/MF A01 CSCL 17/2

This thesis describes a study of the problem of antipodal signalling through a nonlinearly distorting channel. Maximin design criteria are presented, and general expressions are derived for the robust filter and its performance in terms of the eigenfunctions and eigenvalues of certain additive noise autocorrelations. In particular, the results of baseband detection in triangular-kernel noise, ideally bandlimited noise, and the Wiever noise processes are presented. Author (GRA)

N82-16328# Naval Ocean Systems Center, San Diego, Calif.
SKYWAVE COMMUNICATION TECHNIQUES. DECISION FEEDBACK EQUILIZATION FOR SERIALLY MODULATED SPREAD-SPECTRUM SIGNALS IN THE HF BAND YIELDS IMPROVED RELIABILITY Final Report, 1977 - 1981
L. E. Hoff and A. R. King 30 Mar. 1981 56 p refs
(AD-A106380; NOSC/TR-709) Avail: NTIS HC A04/MF A01 CSCL 17/2

Summarizes the Skywave Communication task. Presents some results of the work on wide-band channel modeling, adaptive equalization, and the field test, which demonstrated that serial modulation spread-spectrum signals can be used to provide reliable communication at HF under multipath conditions. Author

N82-16329# ARO, Inc., Arnold Air Force Station, Tenn.
MULTIPOLE EXPANSION FOR TRANSIENT ELECTRIC AND MAGNETIC FIELDS IN AN INTERNALLY EXCITED SPHERICAL CAVITY CONTANING DAMPERS OF FINITE THICKNESS WITH DISTRIBUTED ELECTRICAL PROPERTIES Final Report, 1 Oct. 1979 - 30 Sep. 1980
B. P. Curry AEDC Oct. 1981 64 p refs Sponsored by AF
(AD-A106384; AEDC-TR-80-58) Avail: NTIS HC A04/MF A01 CSCL 14/2

The multipole expansion coefficients needed to calculate transient electromagnetic fields and cavity frequency response in an internally excited, damped cavity are derived for an arbitrary but centralized distribution of source currents and an arbitrary number of dampers which have finite width. A block matrix procedure is devised to solve the N damper boundary value problems, but specific solutions are presented for the cases of zero, one, and two dampers. Also, the TM wave multipole coefficients for an uncapped biconical antenna used as excitation source are obtained in closed form, with use of Schelkunoff's mode solution for the antenna currents. Finally, coupled integrodifferential equations for the current distribution in the end caps and the conical sections of a capped bicone source are presented. This entire theory will be encoded to permit analysis of AEDC experiments. Author (GRA)

N82-16330# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
VOICE FLOW CONTROL IN INTEGRATED PACKET NETWORKS M.S. Thesis
Howard Paul Hayden Oct. 1981 165 p refs
(Contract N00014-75-C-1183; ARPA Order 3045)
(AD-A106722; LIDS-TH-1152) Avail: NTIS HC A08/MF A01 CSCL 17/2

Packet-switched networks are used primarily to handle data traffic, but considerable interest has recently been generated in extending packet-switching methods to also handle digitized voice traffic. New network control procedures are needed to deal with packetized voice traffic, as its characteristics are different from regular data traffic. We present two flow control algorithms which can be executed in a distributed manner to adjust source rates according to prevailing network conditions. Although the algorithms were developed for packet-voice networks, they are quite general and are applicable to many other systems. One algorithm is based on an optimization theoretic formulation of the flow control problem. The other has as its major premise a specific notion of fairness. Convergence is shown for both algorithms under static conditions. A program is developed which simulates the behavior of a general packet-switched network on an individual packet basis. It is used to examine the performance of the second flow control algorithm under realistic conditions. Author (GRA)

N82-16331# Mitre Corp., Bedford, Mass.
COHERENT SCATTER OF MICROWAVES FROM MODERATELY ROUGH SURFACES
M. M. Weiner and G. A. Robertshaw Aug. 1981 33 p refs
(Contract F19628-81-C-0001; AF Proj. 4290)
(AD-A106133; MTR-8299) Avail: NTIS HC A03/MF A01 CSCL 20/14

An improved model is reported for the effect of surface roughness on coherent scatter of microwaves from moderately rough terrain and sea surfaces. This model gives agreement with microwave and acoustical experimental data for surface height standard deviations as much as 400% larger than for a widely accepted model discussed by Beckmann and other investigators. The improved agreement with data is achieved by assuming a symmetrical exponential probability density of the surface height random variable. This model lends itself to an interesting physical interpretation of the stochastic process associated with the surface profile. Author (GRA)

N82-16332# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
ANTENNA CONSIDERATIONS AND SIGNAL PROCESSING TECHNIQUES FOR THE IDENTIFICATION OF BURIED NON-METALLIC OBJECTS Final Report
W. J. Steinway and J. A. Fuller Jun. 1981 112 p refs
(Contract DAAK70-78-C-0081)
(AD-A107752) Avail: NTIS HC A06/MF A01 CSCL 19/1

The U. S. Army Mobility Equipment Research and Development Command (MERADCOM) has been involved in a program for the development of an off-road mine detection system. In 1978, the Georgia Institute of Technology Engineering Experiment Station (GIT/EES) began a 36 month contract to gather and analyze radar data and investigate antenna designs with the goal of improving the ability to detect, discriminate and classify buried targets. The project included tasks of initial data analysis, antenna design and fabrication, extensive data collection, and algorithm development. Section 2 describes the data collection methods used with both the NBS measurement equipment and the MERADCOM short-pulse radar and a preliminary analysis of the data. Section 3 deals with the survey of candidate antennas, the design and fabrication of the 'best' choices, and the testing of those antennas. Test results for a cavity-backed spiral, and a broadband horn are presented and compared with a dipole antenna. Section 4 develops the discrimination concept using frequency spectra data and spartial correlation. Both FFT and MEM were used to obtain spectral data for comparison. The results of the discrimination algorithms are given. GRA

N82-16333# Nebraska Univ., Lincoln. Dept. of Electrical Engineering.
FULL WAVE ANALYSIS FOR SCATTERING CROSS SECTIONS Interim Report
Ezekiel Bahar Griffiss AFB, New York RADC Aug. 1981 51 p refs
(Contract F19628-81-K-0025; AF Proj. 2305)
(AD-A107704; RADC-TR-81-204) Avail: NTIS HC A04/MF A01 CSCL 20/14

Part 1: Scattering Cross Sections for Random Rough Surfaces - Full Wave Analysis. The full wave approach developed earlier to evaluate the radiation fields scattered by deterministic two dimensionally rough surfaces is used to determine the scattering cross sections for random rough surfaces. The medium below the irregular boundary is characterized by complex permittivity and permeability. For slightly rough surfaces, the full wave solutions for the incoherent scattered fields are shown to be in agreement with the perturbation solution. However, when the major contributions to the scattered fields come from the region of the rough surface around the stationary phase (specular) points, the full wave solutions are in agreement with the physical optics solutions. Thus, the full wave solutions which reduce the perturbation, the physical optics and the geometrical optics approximations in special cases, precisely determine the limitations of these approximations and reconcile the differences between them. Part 2: Scattering Cross Sections for Composite Random Surfaces - Full Wave Analysis. The full wave approach to rough surface scattering is applied to composite models of rough surfaces. In this work the principal distinguishing features of the individual rough surface is its correlation distance. Thus this model can be applied to scattering by rough seas as well as hilly terrain. GRA

N82-16334# University of South Florida, Tampa. Dept. of Physics.
COMSTAR SATELLITE 19/29 GHz PROPAGATION EXPERIMENT Final Report, 1977 - 1981
S. C. Bloch, D. Davidson, and D. D. Tang Aug. 1981 110 p refs Prepared in cooperation with GTE Labs., Inc., Waltham, Mass.
(Grant DAAG29-77-G-0224)
(AD-A108001; USF-PPL-45; ARO-15012.3-GS) Avail: NTIS HC A06/MF A01 CSCL 20/14

Results and analysis are presented for the 19/29-GHz satellite propagation experiments using beacons aboard the COMSTAR series. Emphasis is on diversity performance of the Tampa, Florida, Triad and single-site attenuation distributions in intense rain, and on single-site performance at Waltham, Massachusetts. The substantial data base evolved to show a flattish tail on distributions due to rapid rate-of-change at onset and recovery; this type of distribution found in Tampa rain environment was not found in Waltham. Author (GRA)

N82-16335# IIT Research Inst., Annapolis, Md.
A MODEL TO CALCULATE EM FIELDS IN TROPOSPHERIC DUCT ENVIRONMENTS AT FREQUENCIES THROUGH SHF Final Report
Sherman Marcus and William D. Stuart Sep. 1981 236 p refs
(Contract F19628-80-C-0042)
(AD-A107710; ESD-TR-81-102) Avail: NTIS HC A11/MF A01 CSCL 20/14

Non-monotonic variations of the atmospheric refractivity with height often enable energy to be propagated in a duct mode with little attenuation over long distances. A duct model employing a waveguide-mode method of analysis was developed to calculate the field strength when the refractivity variation with height, is known. The developed numerical procedure methodically determines all significant eigenmodes for elevated and surface ducts at all frequencies through SHF. Computer model results for beyond-the-horizon ducts compare favorably with measurements taken at frequencies between 65 MHz and 3.3 GHz. GRA

N82-16336# Kathrein-Werke K.G., Rosenheim (West Germany).
METHOD TO TREAT PICTURE AND SOUND CARRIERS TO OBTAIN A CONSTANT AND ADJUSTABLE LEVEL SPACING BETWEEN THE PICTURE CARRIER AND THE SECOND CARRIER OF A TV SIGNAL WHEN THERE ARE VARIATIONS OF FIELD INTENSITY BETWEEN THE CARRIERS Final Report, Jan. 1980
Hans Hodapp and Peter Maier Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 80 p ref In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-041; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16,60

A procedure was investigated, allowing correction of the relation between the television (TV) picture carrier and the sound carrier of the IF range amplifier, realized with relatively small changes of the circuitry. The principle is based on adding to or substracting from the original sound carrier of the IF main signal the selected and treated sound carrier obtained via a bypass. The range of variation of the sound carrier level is + or - 12 db when compared with the picture carrier level. Errors of the amplitude and the group delay occuring in the video frequency part of the TV signal remain within the permissable tolerance of the standard specifications. Measurements of the AF signals show that harmonic distortions are 1%. Installations into the cable TV head-end unit prove its conformity to practical utilization. Author (ESA)

N82-16337# Middleton (David), New York.
PERFORMANCE OF TELECOMMUNICATIONS SYSTEMS IN THE SPECTRAL-USE ENVIRONMENT. 6: ANALYTICAL RESULTS FOR LAND-MOBILE SCENARIOS IN CLASS B INTERFERENCE, WITH FADING AND MULTIPATH
David Middleton Jun. 1981 50 p refs
(Contract HO-A01-78-00-1158)
(PB81-249344; NTIA-CR-81-12) Avail: NTIS HC A03/MF A01 CSCL 17B

A canonical model of receiver performance for land-mobile systems is constructed, for Class B interference environments. The measure of performance is the probability of noninterference criterion (PNIC) Pa, with the desired signal (to the desired receiver) propagating according to a r to the minus 2 gamma power law, where the signal source (or intended receiver) performs a random walk vis-a-vis receiver (or source). Analytical evaluation of the PNIC is carried out, in terms of appropriately defined input signal-to-receiver noise ratios, for Class B EMI environments, which describe the correspondingly different nongaussian noise fields, including random walks with variances, and signals obeying general propagation and fading laws. Author

N82-16338# Middleton (David), New York.
SOME CANONICAL APPROACHES TO THE EVALUATION OF TELECOMMUNICATION SYSTEM PERFORMANCE
David Middleton Jun. 1981 37 p refs
(Contract HO-A01-78-00-1158)
(PB81-249310; NTIA-CR-81-11) Avail: NTIS HC A03/MF A01 CSCL 17B

Canonical approaches for determining optimum receiver structure and performance in a variety of telecommunication applications are described. In particular, one aim of the present effort is to extend the more limited techniques of system evaluation based on signal-to-noise ratios, or on the probability of noninterference criterion, to the general decision-theoretic methods where the error probabilities (or probabilities of correct decisions) are used to contruct more realistic and complete measures of performance, and to obtain optimal systems as well. This is not generally possible at all input signal levels, but a canonical threshold, or weak-signal, theory is, which can be exploited to establish limiting bounds on performance, system comparisons, and structure insights into the required processing algorithms. Author

N82-16339# Academy for Educational Development, Inc., Washington, D. C. Rural Satellite Program.
SATELLITE OPTIONS FOR RURAL TELECOMMUNICATIONS IN DEVELOPING COUNTRIES
Jun. 1981 182 p
(Contract AID-DSPE/C-0081)
(PB81-244766; AED/RSP-81/01; Policy-Study-1) Avail: NTIS HC A09/MF A01 CSCL 17B

Present and planned communication satellite systems with service available for developing countries are described. For each system there is a summary of background information, a chart of technical characteristics and footprint maps (where available) of each satellite's coverage. Trends in Earth station costs and satellite lease charges are discussed. Author

N82-16110*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN FM/CW METHOD FOR THE MEASUREMENTS OF TIME DELAYS OF LARGE CASSEGRAIN ANTENNAS
T. Y. Otoshi *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 49-59 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20N

N82-16112*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THERMAL MEASUREMENT TECHNIQUE OF RIB ELEMENTS ON DSN ANTENNA STRUCTURE
S.Glazer and G.Gale *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 67-79 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20N

N82-16114*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DESIGN OF A 1.5-m, 32-GHz, CLEAR APERTURE ANTENNA

A. Cha *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 87-93 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 09C

N82-16120*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
IMPROVED CARRIER TRACKING PERFORMANCE WITH COUPLED PHASE-LOCKED LOOPS
D. Divsalar and J. H. Yuen (California Inst. of Technology) *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 148-171 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 17B

N82-16122*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GAIN UNCERTAINTY OF ARRAYED ANTENNAS
B. L. Seidel *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 186-190 (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20N

N82-16124*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SINE WAVE RANGING REVISITED
A. I. Zygielbaum and A. Robinson *In its* The Telecommun and Data Acquisition Rept. 15 Dec. 1981 p 202-210 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20N

N82-16125*# Jet Propulsion Lab., California Inst. of Tech. Pasadena.
RADIO FREQUENCY INTERFERENCE BY EARTH ORBITING SATELLITES: DEEP SPACE INTERFERENCE PREDICTION PROGRAM
D. L. Cain and P. E. Beyer *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 211-213 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20N

N82-16127*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE EFFECT OF PARTIAL COHERENCE IN RECEIVING SYSTEM NOISE TEMPERATURE ON ARRAY GAIN FOR TELEMETRY AND RADIO FREQUENCY CARRIER RECEPTION FOR SIMILAR RECEIVING SYSTEMS
M. H. Brockman *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 219-235 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 17B

N82-16137*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GOLDSTONE STDN 9-METER RADIATION TEST
J. R. Blain *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 341-351 (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20N

N82-17070*# Alabama Univ. in Huntsville. Dept. of Physics.
A NEW SPS ANTENNA DESIGN TO REDUCE GRATING LOBES
C. H. Chan *In its* The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 14 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20N

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-16340* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MICROWAVE SWITCHING POWER DIVIDER Patent
Ronald J. Stockton and Russell W. Johnson, inventors (to NASA) Issued 24 Nov. 1981 11 p Filed 12 Mar. 1980 Supersedes N80-21670 (18 - 12, p 1572) Sponsored by NASA
(NASA-Case-GSC-12420-1; US-Patent-4,302,734; US-Patent-Appl-SN-129793; US-Patent-Class-333-104; US-Patent-Class-333-246) Avail: US Patent and Trademark Office CSCL 09C

A pair of parallel, spaced-apart circular ground planes define a microwave cavity with multi-port microwave power distributing switching circuitry formed on opposite sides of a thin circular dielectric substrate disposed between the ground planes. The power distributing circuitry includes a conductive disk located at the center of the substrate and connected to a source of microwave energy. A high speed, low insertion loss switching diode and a dc blocking capacitor are connected in series between the outer end of a transmission line and an output port. A high impedance, microwave blocking dc bias choke is connected between each switching diode and a source of switching current. The switching source forward biases the diodes to couple microwave energy from the conductive disk to selected output ports and, to associated antenna elements connected to the output ports to form a synthesized antenna pattern.
Official Gazette of the U.S. Patent and Trademark Office

N82-16341*# Tuskegee Inst., Ala. School of Engineering.
A TEST AND INSTRUMENTATION SYSTEM FOR THE INVESTIGATION OF DEGRADATION OF ELECTRICAL INSULATING MATERIALS
Jan. 1982 55 p refs
(Grant NAG8-005)
(NASA-CR-165109) Avail: NTIS HC A04/MF A01 CSCL 09C

The basic test methods of aging and deterioration mechanisms of electrical insulating materials are discussed. A comprehensive test system developed to study the degradation process is described. This system is completely checked, and calibrated with a few insulating material samples. S.L.

N82-16342*# National Aeronautics and Space Administration, Washington, D. C.
GUNN DIODES AND DEVICES (BIBLIOGRAPHY FOR 1978-1980)
Ye. G. Yelenskiy, A. S. Kosov, and I. A. Strukov Oct. 1981 47 p refs Transl. into ENGLISH of "Diody Ganna i Ustroystva na Ikh Osnove, (bibliografiya za 1978-1980 gg)", Acad. of Sci. USSR, Rept. Pr-614, 1980 p 1-57 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Inst. of Space Research
(Contract NASw-3541)
(NASA-TM-76750) Avail: NTIS HC A03/MF A01 CSCL 09A

A listing of about 500 works from Soviet and foreign scientific literature on Gunn diodes and devices based on them is presented. The bibliography includes publications in which various questions pertinent to all (or several) types of semiconductor instruments in the superhigh frequency range are mentioned. A subject index is included. J.D.H.

N82-16343*# Boeing Aerospace Co., Kent, Wash.
ANALYSIS OF FIELD USAGE FAILURE RATE DATA FOR PLASTIC ENCAPSULATED SOLID STATE DEVICES Final Report
23 Dec. 1981 257 p refs
(Contract NAS8-33079)
(NASA-CR-161946; D180-25325-1) Avail: NTIS HC A12/MF A01 CSCL 09A

Survey and questionnaire techniques were used to gather data from users and manufacturers on the failure rates in the field of plastic encapsulated semiconductors. It was found that such solid state devices are being successfully used by commercial companies which impose certain screening and qualification procedures. The reliability of these semiconductors is now adequate to support their consideration in NASA systems, particularly in low cost systems. The cost of performing necessary screening for NASA applications was assessed. A.R.H.

N82-16344*# Boeing Aerospace Co., Seattle, Wash. Engineering Technology Div.

DEVELOPMENT OF DESIGN, QUALIFICATION, SCREENING, AND APPLICATION REQUIREMENTS FOR PLASTIC ENCAPSULATED SOLID-STATE DEVICES FOR SPACE APPLICATIONS Final Report

23 Dec. 1981 198 p refs
(Contract NAS8-33079)
(NASA-CR-161947; D180-26784-1) Avail: NTIS
HC A09/MF A01 CSCL 09A

Test data were collected on 1035 plastic encapsulated devices and 75 hermetically scaled control group devices that were purchased from each of five different manufacturers in the categories of (1) low power Schottky TTL (bipolar) digital circuits; (2) CMOS digital circuits; (3) operational amplifier linear circuits; and (4) NPN transistors. These parts were subjected to three different initial screening conditions, then to extended life testing, to determine any possible advantages or trends for any particular screen. Several tests were carried out in the areas of flammability testing, humidity testing, high pressure steam (auroclave) testing, and high temperature storage testing. Test results are presented. Procurement and application considerations for use of plastic encapsulated semiconductors are presented and a statistical analysis program written to study the log normal distributions resulting from life testing is concluded. A.R.H.

N82-16345# Thomas Electronics Inc., Wayne N. J.

MANUFACTURING METHODS AND TECHNOLOGY (MM&T) SPECIFICATION FOR MINIATURE CATHODE RAY TUBE Quarterly Report, 1 Feb. - 31 Mar. 1981

Fred M. Bruno 30 Apr. 1981 19 p
(Contract DAAK70-80-C-0168)
(AD-A106433; TEI-A009-2; QR-2) Avail: NTIS
HC A02/MF A01 CSCL 19/1

The 1st submission of one (1) Phase I - Engineering Sample is ready for shipment to the contractor's representative. Test Data Forms contain results obtained by TEI's Engineering and Quality Assurance Departments during inspection and testing. Author (GRA)

N82-16346# Thomas Electronics Inc., Wayne N. J.

MANUFACTURING METHODS AND TECHNOLOGY (MM&T) SPECIFICATIONS FOR MINIATURE CATHODE RAY TUBE Quarterly Report, Oct. 1980 - Jan. 1981

Fred M. Bruno 10 Feb. 1981 14 p
(Contract DAAK70-80-C-0168)
(AD-A106432; TEI-A009-1; QR-1) Avail: NTIS
HC A02/MF A01 CSCL 19/1

An alternate design was proposed for the neck shield. This design encapsulates the anode lead within the shield in order to decrease the possibility of damage due to handling and installation. Materials have been received, inspected, and are available for fabrication and test of the first engineering sample during the next quarter - 1 February 1981 through 30 April 1981. Author (GRA)

N82-16347# Princeton Univ., N. J. Dept. of Electrical Engineering and Computer Science.

NOVEL DIGITAL SIGNAL PROCESSING AND DETECTION TECHNIQUES Final Report, 1 Sep. 1976 - 30 Aug. 1981

Bede Liu 30 Sep. 1981 17 p
(Grant AF-AFOSR-3083-81; AF Proj. 2304)
(AD-A106774; AFOSR-81-0714TR) Avail: NTIS
HC A02/MF A01 CSCL 09/3

In the area of narrowband signal processing, design rules are developed for optimum decimator and interpolator, a new efficient scheme using recursive filter for decimation/interpolation is proposed, and a novel approach to the computation of narrowband spectra is shown to yield substantial saving over conventional approaches. Results on the implementation of recursive filters with poles near the unit circle that produces significantly reduced roundoff error include a transformation technique, a scheme to modify the quantizer error spectrum, and a new computationally efficient low noise filter structure. In the area of nonclassical signal detection, several results were derived on nonparametric sequential procedures and on the quantization of signal for detection. In addition, a programmable charge transfer device filter is developed, several problems concerning ADPCM are investigated, results are obtained on FFT roundoff error including the prime factor algorithm, and an effective method of generating random sequences is studied. GRA

N82-16348# Lincoln Lab., Mass. Inst. of Tech., Lexington.

ADVANCED ELECTRONIC TECHNOLOGY Quarterly Technical Summary Report, 1 Feb. - 30 Apr. 1981

Alan J. McLaughlin and Alan L. McWhorter 15 May 1981 22 p ref
(Contract F19628-80-C-0002; AF Proj. 649L)
(AD-A106671; ESD-TR-81-92) Avail: NTIS
HC A02/MF A01 CSCL 09/3

The complementary metal oxide semiconductor process was debugged, and 4 bit counters were built and successfully tested. A restructurable VLSI demonstration wafer which uses that counter is in process, and cell layouts were finished for two whole wafer RVLSI designs. The laser link insulator was modified to allow higher temperature processing. Thin oxynitride gate transistors showed excellent radiation resistance. Other topics covered include solid state device research, quantum electronics, materials research, microelectronics, and analog device technology. GRA

N82-16349# Lincoln Lab., Mass. Inst. of Tech., Lexington.

CHARACTERIZATION OF POWER MESFETS AT 21 GHz

Mark L. Stevens 15 Sep. 1981 37 p refs
(Contract F19628-80-C-0002)
(AD-A106673; TR-579; ESD-TR-81-191) Avail: NTIS
HC A03/MF A01 CSCL 09/5

This report describes the development of GaAs MESFET power amplifiers at 21 GHz. Techniques for making large-signal loadpull and 'S' parameter measurements at these frequencies, and the measured device characteristics are presented. A unique method of obtaining accurate gain and power measurements is discussed. Design methods and data are presented on 21 GHz amplifiers with more CW power and higher efficiency than previously achieved. Author (GRA)

N82-16350# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

THE COMPLEXITY OF MANIPULATING HIERARCHICALLY DEFINED SETS OF RECTANGLES Interim Report

Jon Louis Bentley and Thomas Ottmann (Karlsruhe Univ.) Apr. 1981 43 p refs
(Contract N00014-76-C-0370)
(AD-A106552; CMU-CS-81-109) Avail: NTIS
HC A03/MF A01 CSCL 09/5

Algorithms that manipulate sets of rectangles are of great practical importance in VLSI design systems and other applications. Although much theoretical work has appeared recently on the complexity of rectangle problems, it has assumed that the inputs are given as a list of rectangles. In this paper we study the complexity of rectangle problems when the inputs are given in a hierarchical language that allows the designer to build large designs by replicating small designs. We will see that while most of the problems are NP-hard in the general case, there are O(N lg N) algorithms that process inputs obeying certain restrictions. Author (GRA)

N82-16351# Lincoln Lab., Mass. Inst. of Tech., Lexington.

EHF TEST-BED SUBHARMONIC MIXER

Maurice J. Aghion 14 Jul. 1981 82 p refs
(Contract F19628-80-C-0002; AF Proj. 2029)
(AD-A106156; TR-567; ESD-TR-81-190) Avail: NTIS
HC A05/MF A01 CSCL 09/5

The development, design and construction of a subharmonically pumped mixer at 44 GHz using GaAs Schottky beam lead diodes is discussed. A simplified theory is used to derive a three-port equivalent circuit of the complete mixer which includes effects such as diode parasitics and filter characteristics. Specific design criteria are developed at each of the three mixer signal frequencies, RF, LO and IF, which relate this equivalent circuit to the observed performance. Author (GRA)

N82-16352# Rockwell International Corp., Thousand Oaks, Calif. Microelectronics Research and Development Center.

LSI/VLSI ION IMPLANTED GaAs IC PROCESSING Quarterly Technical Report, 1 Feb. - 30 Apr. 1981

R. Zucca, B. M. Welch, C. P. Lee, Y. D. Shen, P. Asbeck, C. G.

Kirkpatrick, A. Firstenberg, and G. Kaelin Sep. 1981 71 p refs
(Contract F49620-80-C-0101; ARPA Order 3384; AF Proj. 3384)
(AD-A107623; MRDC41070.9QR; AFOSR-81-0745TR; QTR-3) Avail: NTIS HC A04/MF A01 CSCL 09/3

This report covers the third quarter of a program on LSI/VLSI ion implanted planar GaAs integrated circuit processing. The goal of this program is to realize the full potential of GaAs digital integrated circuits employing depletion mode MESFETs by developing the necessary processing methods and material capabilities to extend device complexity to VLSI. In the third quarter the digitization of mask set AR6 was completed. Masks are expected from the vendor shortly. Evaluation of refinements in the fabrication process aimed at improving reliability has continued, while evaluation of circuit reliability has been started. GRA

N82-16353# Stanford Univ., Calif. Lab. of Physics.
REPORT OF SIGNIFICANT ACCOMPLISHMENTS Annual Progress Report, 1 Apr. 1980 - 31 Mar. 1981
A. E. Siegman, B. A. Auld, M. R. Beasley, R. L. Byer, G. S. Kino, and H. J. Shaw Apr. 1981 113 p refs
(Contract N00014-75-C-0632)
(AD-A107607; GL-3315) Avail: NTIS HC A06/MF A01 CSCL 09/5

This report summarizes the research progress and activity on Joint Services Electronics Program for the period 1 April 1980 through 31 March 1981. Specific Projects are: (1) High Tc Superconducting Weak-Link Josephson Junctions and Circuits; (2) Acoustic Surface Wave Scanning of Optical Images; (3) Research on Fiber Optic Interactions with Application to High Speed Signal Processing; (4) Nonlinear Interactions of Acoustic Waves with Domains in Ferroic Materials; (5) Measurements of Ultrafast Physical Phenomena; and (6) Optical and Nonlinear Optical Studies of Single Crystal Fibers. GRA

N82-16354# University of Southern California, Los Angeles. Electronic Sciences Lab.
RESEARCH IN ELECTRONICS: JSEP Final Report, 1 Apr. 1976 - 31 Mar. 1981
Z. A. Kaprielian Mar. 1981 80 p refs
(Contract F44620-76-C-0061; AF Proj. 2305)
(AD-A107624; AFOSR-81-0722TR) Avail: NTIS HC A05/MF A01 CSCL 09/3

This final technical report summarizes accomplishments and progress of 31 work units (project) for research performed during the reporting period under the Joint Services Electronics Program by the USC Electronic Sciences Laboratory. Author (GRA)

N82-16355# Varian Associates, Palo Alto, Calif. Solid State Lab.
RESEARCH ON InGaAs FETs Final Report, May 1978 - Aug. 1981
R. Yeats, K. VonDessonneck, S. Bandy, and Y. G. Chai Sep. 1981 37 p refs
(Contract N00014-78-C-0380; NR Proj. 251-030)
(AD-A108016) Avail: NTIS HC A03/MF A01 CSCL 09/1

A process has been established for fabricating In.53Ga.47As JFETs on InP substrates that is capable of making JFETs with small gate lengths (almost equal to 0.5 micrometer), low source resistance (2 omega), low gate series resistance (2 omega), low gate series resistance (< 4 omega), negligible 'sidewall' capacitance, and low gate leakage current (approximately 100 nA). The process involves a shallow localized Zn diffusion and a controlled etch using the gate metal as a mask. The effective gate length is somewhat smaller than the gate metal 'length', thus facilitating the formation of submicron gates. At modest reverse-bias gate voltages, these JFETs have g sub m values approching twice that which would be expected for corresponding GaAs MESFETs. However, near zero-gate bias, there is substatial g sub m compression, perhaps arising from defects associated with the Zn-diffusion process. Further devise optimization is still required along the lines of increasing channel doping, decreasing gate length, and developing improved diffusion processes (e.g., ion-implantation). Optimized In .53Ga.47As JFETs will probably outperform even the best GaAs MESFETs. GRA

N82-16356# Los Alamos Scientific Lab., N. Mex.
PARTIAL DISCHARGE CHARACTERISTICS OF LIQUID-IMPREGNATED LAMINATE DIELECTRIC STRUCTURES
K. J. Bickford, W. J. Sarjeant, and G. H. Mauldin 1981 9 p refs Presented at IEEE Conf. on Elec. Insulation and Dielec. Phenomena, Pokenose, N.J.
(Contract W-7405-eng-36)
(DE81-028745; LA-UR-81-2119; CONF-811112-11) Avail: NTIS HC A02/MF A01

Foil edge partial discharge phenomena in high energy density, spirally wound capacitors were investigated. A partial discharge dependency on voltage found to exist in liquid impregnated, laminar plastic film dielectric structures. Experiments support the hypothesis that electric charges are injected into the dielectric regions heat the foil edge by field controlled charge objectives during impressed voltage transients. The resulting conduction current space charge can establish equilibrium by reduction of the electric field intensity below the partial discharge inception threshold. A temporal characterization of this space charge injection is discussed relative to the effect on partial discharge inception at the foil edge. DOE

N82-16357# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
MICROCOMPUTER BASED TEST SYSTEM FOR CHARGE COUPLED DEVICES
S. Sidman Feb. 1981 6 p refs Presented at IEEE Conf. on Appl. of Mini and Microcomputers, San Francisco, 9 Nov. 1981
(Contract W-7405-eng-48)
(DE81-029860; LBL-12303) Avail: NTIS HC A02/MF A01

A microcomputer based system for testing analog charge coupled integrated circuits is described. It measures device performance for three parameters, dynamic range, baseline shift due to leakage current, and transfer efficiency. A companion board tester was developed. The software consists of a collection of BASIC and Assembly language routines developed on the test system microcomputer. DOE

N82-16358# Lincoln Lab., Mass. Inst. of Tech., Lexington.
EVALUATION TESTS OF ABACUS 6 kVA UTILITY-INTERACTIVE INVERTER
E. E. Landsman Aug. 1981 19 p
(Contract DE-AC02-76ET-20279)
(DE82-001352; DOE/ET-20279/145) Avail: NTIS HC A02/MF A01

The voltage pattern spectra were analyzed for 100% and 50% pattern ratios and harmonics analyses are provided for the Abacus inverter. The harmonics are compared with those calculated for a simple model with no agreement. AC waveforms and inverter current spectra are given as well as basic electrical data. DOE

N82-16359# Bharat Heavy Electricals Ltd., Bhopal (India).
SEMINAR: ENERGY CONSERVATION. ROLE OF POWER CAPACITORS: CONCEPTS AND POLICY ISSUES
R. K. Pachauri 6 Aug. 1981 44 p refs
(PB81-247967) Avail: NTIS HC A03/MF A01 CSCL 09C

Energy conservation and power capacitors concepts and policy issues energy conservation by application of power capacitors in Indian power system network, the application of dynamic shunt compensation, and the application of series capacitors in distribution circuits are discussed. Author

N82-16360# Mitre Corp., McLean, Va.
A SURVEY OF ELECTRIC PROPULSION MOTORS FOR AUTOMATED GUIDEWAY TRANSIT VEHICLES
Lisandro delCid Jul. 1981 104 p refs
(Contract DTUM60-80-C-71020)
(PB82-109307; MTR-80W274; UMTA-VA-06-0056-81-1) Avail: NTIS HC A06/MF A01 CSCL 13F

An overview of the current status of electric motors with potential applications in automated guideway transit (AGT) systems is presented. Direct current (dc) motors are surveyed, and induction, synchronous, and linear electric motors reviewed. Performance characteristics of typical state of the art dc and induction motors are provided. Current work on improved and advanced designs of rotary and linear motors is also reviewed. It is concluded that performance requirements of existing AGT concepts can be satisfied with available technology traction motors, conventional dc motors with switched power supplies will continue to be the most widely used motor for traction application, and solid state devices are a major factor in achieving improved motor performance. Author (GRA)

N82-16361# National Bureau of Standards, Washington, D.C. Electron Devices Div.

SEMICONDUCTOR MEASUREMENT TECHNOLOGY: THE DESIGN, TESTING, AND ANALYSIS OF A COMPREHENSIVE TEST PATTERN FOR MEASURING CMOS/SOS PROCESS PERFORMANCE AND CONTROL Final Report

Loren W. Linholm Aug. 1981 148 p refs Sponsored in part by Air Force and DNA

(PB81-245342; NBS-SP-400-66; LC-81-600078) Avail: NTIS HC A07/MF A01 CSCL 09E

A Process Validation Wafer (PVW) is a wafer containing only test patterns. One PVW accompanies a product lot during the fabrication process. Test patterns designed to be used on PVWs contain both process parameter test structures and random fault test structures. Eighteen PVWs fabricated in a radiation hardened silicon gate CMOS/SOS process were tested on a high speed computer controlled dc test system. Test results from the process parameter test structures were used to establish the baseline electrical parameters for each product lot and to produce an eight level gray scale wafer map for these parameters. GRA

N82-16119*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

A DIGITAL FILTER IMPLEMENTATION OF THE DEEP SPACE TRANSPONDER PHASE LOCK LOOP INTEGRATOR

J. W. Heller *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 138-147 ref (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 09C

N82-16133*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

OPERATIONAL VLBI CLOCK SYNCHRONIZATION AND PLATFORM PARAMETER DETERMINATION

J. V. LuValle, R. D. Shaffer, M. G. Roth, T. M. Eubanks, and P. S. Callahan *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 307-318 ref (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 09C

N82-16134*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SYNTHESIZER STABILITY EVALUATION

E. N. Sosa and D. A. Tyner *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 319-330 ref (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 09C

N82-16135*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

INVESTIGATION OF DIGITALLY CONTROLLED OSCILLATOR OPERABILITY PROBLEMS

W. D. Weisman *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 331-334 refs (For primary document see N82-16101 07-12)

Avail: NTIS HC A16/MF A01 CSCL 09A

N82-17052*# Fort Valley State Coll., Ga. Dept. of Electronic Engineering Technology.

DETECTION AND ANALYSIS OF RADIO FREQUENCY LIGHTNING EMISSIONS

Fereydoun Jalali *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 20 p refs (For primary document see N82-17043 07-99)

Avail: NTIS HC A25/MF A01 CSCL 09C

N82-17059*# South Carolina State Coll., Orangeburg. Dept. of Natural Sciences.

THE DESIGN AND EVALUATION OF SUPERCONDUCTING CONNECTORS

James E. Payne *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 10 p refs (For primary document see N82-17043 07-99)

Avail: NTIS HC A25/MF A01 CSCL 09A

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N82-16362# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

CALCULATION OF THE TEMPERATURE OF A PERMANENT INCOMPRESSIBLE LAMINAR FLOW IN A TUBE WITH KNOWN WALL TEMPERATURE DISTRIBUTION M.S. Thesis [CALCULO DE TEMPERATURA EM UM ESCOAMENTO LAMINAR INCOMPRESSIVEL PERMANENTE EM UM TUBO COM DISTRIBUICAO DE TEMPERATURA CONHECIDA NA PAREDE]

Jeronimo dos Santos Travelho Jul. 1981 47 p refs In PORTUGUESE; ENGLISH abstract

(INPE-2153-TDL/057) Avail: NTIS HC A03/MF A01

The solution of the energy equation for an incompressible fluid that flows through a pipe of circular section is obtained. The effects of axial conduction and viscosity are considered. It is shown that this solution should be applied to problems with first, second and third kind boundary conditions. An example is solved using boundary conditions of the first kind. Author

N82-16363*# Old Dominion Univ., Norfolk, Va. School of Sciences and Health Professions.

A MODIFIED DODGE ALGORITHM FOR THE PARABOLIZED NAVIER-STOKES EQUATION AND COMPRESSIBLE DUCT FLOWS Final Report, 15 Apr. 1978 - 30 Nov. 1981

C. H. Cooke Dec. 1981 34 p refs

(Grant NsG-1517)

(NASA-CR-165080) Avail: NTIS HC A03/MF A01 CSCL 20D

A revised version of Dodge's split-velocity method for numerical calculation of compressible duct flow was developed. The revision incorporates balancing of mass flow rates on each marching step in order to maintain front-to-back continuity during the calculation. The (checkerboard) zebra algorithm is applied to solution of the three dimensional continuity equation in conservative form. A second-order A-stable linear multistep method is employed in effecting a marching solution of the parabolized momentum equations. A checkerboard iteration is used to solve the resulting implicit nonlinear systems of finite-difference equations which govern stepwise transition. Qualitive agreement with analytical predictions and experimental results was obtained for some flows with well-known solutions. Author

N82-16364*# Cooper Union, New York.

A COMPREHENSIVE MODEL TO DETERMINE THE EFFECTS OF TEMPERATURE AND SPECIES FLUCTUATIONS ON REACTION RATES IN TURBULENT REACTING FLOWS Semiannual Status Report, 1 Aug. 1981 - 31 Jan. 1982

E. Foy, G. Ronan, and W. Chinitz 31 Jan. 1982 77 p refs

(Grant NAG1-18)

(NASA-CR-165108) Avail: NTIS HC A05/MF A01 CSCL 20D

A principal element to be derived from modeling turbulent reacting flows is an expression for the reaction rates of the various species involved in any particular combustion process under consideration. A temperature-derived most-likely probability density function (pdf) was used to describe the effects of temperature fluctuations on the Arrhenius reaction rate constant. A most-likely bivariate pdf described the effects of temperature and species concentrations fluctuations on the reaction rate. A criterion is developed for the use of an 'appropriate' temperature pdf. The formulation of models to calculate the mean turbulent Arrhenius reaction rate constant and the mean turbulent reaction rate is considered and the results of calculations using these models are presented. A.R.H.

N82-16365# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.

CRITICAL PARAMETERS FOR DETONATION PROPAGATION AND INITIATION OF SOLID EXPLOSIVES

Donna Price 10 Sep. 1981 105 p refs
(AD-A106485; NSWC/TR-80-339) Avail: NTIS HC A06/MF A01 CSCL 19/1

The complicated relations and interdependence of the various critical parameters are demonstrated. In particular, the critical diameter is determined by charge temperature, initial particle size, density, confinement, composition, and shock sensitivity. The critical initiating pressure is also a multivariant function and depends on the same set of variables. Relations between different gap (shock sensitivity) test results and between those of gap and wedge tests are also shown. Author (GRA)

N82-16366# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.

USE OF THE PITOT TUBE IN VERY LOW DENSITY FLOWS Final Report, Feb. 1964 - Jan. 1981

W. B. Stephenson AEDC Oct. 1981 34 p refs Sponsored by AF
(AD-A106374; AEDC-TR-81-11) Avail: NTIS HC A03/MF A01 CSCL 14/2

The cryogenically pumped vacuum chamber has made it possible to generate gas dynamic flows of much lower density than conventional wind tunnels. In the process of calibrating these flows since 1964, pitot tube data have been obtained in a regime that corresponds to very high altitude flight, low Reynolds numbers (< 100/cm), or high Knudsen numbers (mean-free-path > 40X pitot diameter). Under these conditions, pitot pressures may be four times the inviscid stagnation pressure. Therefore, a substantial correction must be applied to the measured pitot tube data to use it for gas stream calibrations. The available pitot data are correlated in concise form with Reynolds number evaluated behind a normal shock, Re2, and total temperature as a parameter. The physical variables are combined in a form of presentation that permits direct determination of stream properties in nozzle or free-jet expansions without the usual successive approximations. The data are presented in a form that permits selection of pitot tube size, transducer range, and applicability of the instrument in specific flow conditions. The use of the pitot tube to survey the rarefied flow of jet from a rocket motor in a space chamber is discussed. The low density nozzles used in Aerospace Chamber (10V) are probably unique in the low density limit, and the pitot pressure data provide an insight into the gas dynamics of rarefied flows. GRA

N82-16367# New Jersey Inst. of Tech., Newark.

HEAT TRANSFER FROM IMPINGING JETS. A LITERATURE REVIEW Final Report, Sep. 1979 - Nov. 1980

Peter Hrycak Wright-Patterson AFB, Ohio AFWAL Jun. 1981 71 p refs
(Contract F33615-79-C-3417; AF Proj. 2402)
(AD-A106723; AFWAL-TR-81-3054) Avail: NTIS HC A04/MF A01 CSCL 20/4

This report is a literature survey of the state-of-the-art of heat transfer from impinging air jets. Over 70 references are cited. Author (GRA)

N82-16368# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.

LASER VELOCIMETER MEASUREMENTS IN TURBULENT AND MIXING FLOWS, PART 3 Final Technical Report, 1 Mar. 1977 - 31 Dec. 1980

Warren H. Stevenson, H. Doyle Thompson, and T. S. Luchik Wright-Patterson, AFB, Ohio AFAPL Jun. 1981 39 p refs
(Contract F33615-77-C-2010; AF Proj. 2308)
(AD-A106130; AFAPL-TR-79-2009-Pt-3) Avail: NTIS HC A03/MF A01 CSCL 20/4

Experimental and analytical studies of subsonic flow over a backward facing 2-D step and in a cylindrical simulated dump combustor were conducted. A laser velocimeter was used to obtain mean velocities and turbulence quantities. A method for detecting and eliminating velocity bias errors in such measurements was developed. The 2/E/FIX computer code used for numerical modeling predicted the mean velocity field satisfactorily, but was less effective in computing turbulence quantities. Author (GRA)

N82-16369# General Atomic Co., San Diego, Calif.

FLUID MECHANICS AND HEAT TRANSFER SPIRALLY FLUTED TUBING

J. C. LaRue, P. A. Libby, and J. S. Yampolsky Aug. 1981 57 p refs
(Contract N00014-79-C-0773)
(AD-A107983; GA-A-16541) Avail: NTIS HC A04/MF A01 CSCL 20/4

The objective of this program is to develop both a qualitative and a quantitative understanding of the fluid mechanics and heat transfer mechanisms that underlie the measured performance of the spirally fluted tubes under development at General Atomic. The reason for the interest in the spirally fluted tubes is that results to date have indicated three advantages to this tubing concept: The fabrication technique of rolling flutes on strip and subsequently spiralling and simultaneously welding the strip to form tubing results in low fabrication costs, approximately equal to those of commercially welded tubing. The heat transfer coefficient is increased without a concomitant increase of the friction coefficient on the inside of the tube. In single-phase axial flow of water, the helical flutes continuously induce rotation of the flow both within and without the tube as a result of the effect of curvature. An increase in condensation heat transfer on the outside of the tube is achieved. In a vertical orientation with fluid condensing on the outside of the helically fluted tube, the flutes provide a channel for draining the condensed fluid. GRA

N82-16370# Naval Surface Weapons Center, Dahlgren, Va. Combat Systems Dept.

FAR FIELD OVERPRESSURE FROM TNT EXPLOSIONS: A SURVEY OF AVAILABLE MODELS Final Report

L. L. Pater Apr. 1981 25 p refs
(AD-A107952; NSWC/TR-81-132) Avail: NTIS HC A03/MF A01 CSCL 19/4

Available mathematical models for peak blast wave overpressure at large distances from TNT explosions were surveyed. Analytical and empirical models are discussed. Author (GRA)

N82-16371# Aeronautical Research Labs., Melbourne (Australia).

A PREDICTION METHOD FOR TURBULENT BOUNDARY LAYERS IN ADVERSE PRESSURE GRADIENTS

W. H. Schofield Feb. 1981 57 p refs
(AD-A107849; ARL/MECH-ENG-NOTE-385) Avail: NTIS HC A04/MF A01 CSCL 20/4

A prediction method for turbulent boundary layers in moderate to strong adverse pressure gradients is presented. The closure hypothesis for the method is the universal velocity defect law of Schofield and Perry (1972) which restricts the method to the prediction of layers in moderate to strong adverse pressure gradient. The method is tested against nine experimentally measured boundary layers. Predictions for velocity profile shape, boundary layer thicknesses and velocity scale ratio were generally in good agreement with the experimental measurements and were superior to those given by other prediction methods. Unlike other methods the present method also gives reasonably accurate predictions for the shear stress profile of a layer. The analysis presented is compared with previous work and helps to resolve some disagreements discerned in the literature. GRA

N82-16372# Ballistic Research Labs., Aberdeen Proving Ground, Md.

AN EXPERIMENTAL STUDY OF FORCED ASYMMETRIC OSCILLATIONS IN A ROTATING LIQUID-FILLED CYLINDER Final Report

Richard D. Whiting Oct. 1981 85 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A107948; ARBRL-TR-02376) Avail: NTIS HC A05/MF A01 CSCL 20/4

An experimental study was made of forced asymmetric oscillations in a liquid-filled, rapidly-rotating, right circular cylinder. Oscillations were forced by causing the cylinder to cone about an axis passing through the center of the cylinder but offset by a small angle from the axis of rotation; the motion is similar to precession of a gyrostat but constrained to fixed frequency and amplitude. The fluctuating pressure response of the liquid in the cylinder was measured using pressure transducers mounted in an end wall. Fluctuating pressure was measured for non-dimensional coning frequencies of .030 to .075, for coning angles of .00018 x .035 radians, and for Reynolds numbers of 5,000 to 500,000. Comparisons were made to existing linear theories of the liquid response. The results agreed with theoretical predictions at the highest Reynolds number, and smallest angles. At the smallest Reynolds number, the data agreed better with the solution of a forced oscillation problem than with the solution of a free oscillation problem. At coning angles as small as .0005, the data showed significant departure from the predictions of linear theory, and at coning angles as small as .0008, the liquid exhibited nonstationary behavior suggestive of a flow instability. GRA

N82-16373# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
SIMPLE COMPUTER PROGRAM TO MODEL 3-DIMENSIONAL UNDERGROUND HEAT FLOW WITH REALISTIC BOUNDARY CONDITIONS
P. D. Metz 1981 13 p refs Presented at the Am. Soc. of Mech. Engrs. Winter Ann. Meeting ASME Solar Energy Div., Washington, D.C., 15-20 Nov 1981
(Contract DE-AC02-76CH-00016)
(DE81-030213; BNL-29776; CONF-811101-11) Avail: NTIS HC A02/MF A01

A FORTRAN computer program called GROCS (GRound Coupled Systems) has been developed to study 3-dimensional underground heat flow. Features include the use of up to 30 finite elements or blocks of Earth which interact via finite difference heat flow equations and a subprogram which sets realistic time and depth dependent boundary conditions. No explicit consideration of mositure movement or freezing is given. GROCS has been used to model the thermal behavior of buried solar heat storage tanks (with and without insulation) and serpentine pipe fields for solar heat pump space conditioning systems. The program is available independently or in a form compatible with specially written TRNSYS component TYPE subroutines. The approach taken in the design of GROCS, the mathematics contained and the program architecture, are described. Then, the operation of the stand-alone version is explained. Finally, the validity of GROCS is discussed. DOE

N82-16374# Washington State Univ., Pullman. Dept. of Mechanical Engineering.
STUDY OF NON-DARCY NATURAL CONVECTION FROM A VERTICAL HEATED SURFACE IN A SATURATED POROUS MEDIUM
J. C. Huenefeld and O. A. Plumb 1981 8 p ref Presented at the 20th Natl. Heat Transfer Conference, Milwaukee, 2 Aug. 1981; sponsored by ASME
(Contract DE-AC06-76RL-01830-; Grant NSF ENG-78-20145)
(DE81-030081; PNL-SA-9712; CONF-810804-17; Rept-81-HT-45) Avail: NTIS HC A02/MF A01

Experimental investigation of the buoyancy induced boundary layer adjacent to a vertical uniformly heated foil imbedded in a saturated porous medium is described. Temperature profiles were measured for Rayleigh numbers ranging from 136 to 4640 corresponding to Reynolds numbers based on the particle diameter of from 0.85 to 10.5. For Reynolds numbers in excess of 3, the temperature profiles exhibit spatial and temporal fluctuations. The discrepancy in heat transfer is in part attributed to non-Darcy effects. The effect of the permeability increase at the wall/porous medium interface is qualitatively examined for different size particles. The results indicate that the wall effect is a strong function of particle diameter. DOE

N82-16375# California Univ., Livermore. Lawrence Livermore Lab.
EFFECTS OF GAS-FLOW PATTERN ON CAVITY SHAPE
John R. Creighton 22 Jul. 1981 16 p refs Presented at the 7th Ann. Underground Coal Conversion Symp., Fallen Leaf Lake, Calif., 7-11 Sep. 1981
(Contract W-7405-eng-48)
(DE82-000347; UCRL-85907; CONF-810923-10) Avail: NTIS HC A02/MF A01

The effects of different gas flow patterns on the cavity shape in laboratory scale coal block experiments are shown. The burning of pure carbon is modeled. The rate of removal of carbon from the cavity wall is shown to depend on the local rate of oxygen transport to the wall. A numerical model which assumes plug flow in the cavity with a laminar boundary layer gives cavities shaped like an exponential horn, with the largest radius next to the inlet. The downstream shape is in reasonable agreement with experiment. When cavity flow is calculated using the full Navier-Stokes equations the flow near the inlet resembles an expanding jet surrounded by a torroidal vortex. The maximum rate of oxygen transport to the wall occurs where the jet strikes the converging cavity wall some distance downstream. The reduced oxygen transport near the inlet causes the upstream portion of the cavity to be rounded. The downstream portion of the cavity is similar to that with plug flow. DOE

N82-17079*# Alabama Univ. in Huntsville. Dept. of Mechanical Engineering.
HEAT LOSS AND DRAG OF SPHERICAL DROP TUBE SAMPLES
Donald B. Wallace *In its* the 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 31 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20D

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-16376# Pennsylvania State Univ., University Park. Applied Research Lab.
THE ARL/FED ANECHOIC CHAMBER
R. C. Marboe and J. M. Fitzgerald 4 Aug. 1981 32 p refs
(Contract N00024-81-C-6043)
(AD-A106352; ARL/PSU-TM-81-184) Avail: NTIS HC A03/MF A01 CSCL 14/2

This report documents the design and acoustic characteristics of the Applied Research Laboratory Department anechoic chamber. It is located on the above-console deck of the Garfield Thomas Water Tunnel situated so as to allow its use in conjunction with the Axial Flow Research Fan (AFRF). The internal free dimensions of the chamber are 2.74 x 3.05 x 1.98 meters (9 x 10 x 6.5 ft.). The sound absorbing walls are composed of polyurethane foam acoustic wedges, air voids, embossed acoustic foam wall lining, plywood and wood frame members. Air intake ducts, baffled and lined with a lead-foam sheet, provide an adequate air volume for the AFRF. Based on measurements of transmission loss and inverse square law, the chamber is considered anechoic for frequencies above 230 Hz and semi-anechoic for lower frequencies. GRA

N82-16377# Honeywell Systems and Research Center, Minneapolis, Minn.
DUAL POLARIZATION FIBER OPTIC GYRO Final Report, 1 Oct. 1980 - 30 Sep. 1981
Joel G. Hanse, Robert B. Smith, and Gordon L. Mitchell 30 Oct. 1981 91 p refs
(Contract N00173-80-C-0344)
(AD-A106731; HONEYWELL-81SRC75) Avail: NTIS HC A05/MF A01 CSCL 17/7

This report presents results from a Naval Research Laboratory-sponsored investigation of dual polarization gyros. The dual polarization concept is a new fiber optic gyro configuration designed to provide independence from principal gyro bias error sources. Experimental results indicate an order of magnitude improvement in bias error performance. Important results from a new modeling capability are also included. In addition to examination of dual polarization gyro performance, a number of

fiber gyro configurations have been examined. Results of this effort include development of an improved understanding of fiber optic depolarizers and identification of a previously unreported error team for gyros using 3 dB distributed couplers.
Author (GRA)

N82-16378# TRW Defense and Space Systems Group, Redondo Beach, Calif.
THE 403 MHz SAW OSCILLATOR Final Report
D. J. Dodson Fort Monmouth, N.J. ERADCOM Nov. 1981 83 p
(Contract DAAK20-80-C-0260)
(AD-A107588; DELET-TR-80-0260-F) Avail: NTIS HC A05/MF A01 CSCL 09/5

This contract provides for a sixteen month program for the investigation and exploratory development of a 200 mW, SAW stabilized oscillator which can be frequency and amplitude modulated. The oscillator is to have its center frequency at 403 MHz and be tunable over a + or - 3MHz bandwidth. Trade-off design studies have been performed to determine techniques which will provide the most effective interaction of essential oscillator components, i.e., SAW delay-line, phase shifter, coupler and amplifier, to provide a high degree of frequency stability. A significant effort was made to implement the required circuit functions in a low-cost printed circuit approach rather than utilize high-cost commercially available components, since the oscillator is intended for use in an expendable application.
Author (GRA)

N82-16379# Brookhaven National Lab., Upton, N. Y. National Synchrotron Light Source.
THEORY OF A MODIFIED WADSWORTH MONOCHROMATOR MATCHED TO A LOW ENERGY STORAGE RING SOURCE
Malcolm R. Howells 1981 21 p refs Presented at the 2nd Natl. Conf. on Synchrotron Radiation Instrumentation, Ithaca, N.Y., 15 Jul. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030034; BNL-29838; CONF-810750-3) Avail: NTIS HC A02/MF A01

The concave diffraction grating in the Wadsworth mounting has been popular with synchrotron radiation spectroscopists because of its use of parallel light. This is well matched to experimental stations which are a great distance away from the source as would be the case in using a high energy synchrotron. For low energy storage rings the working distance is quite small and in this case it is appropriate to use a collimating mirror. Large collection angles are possible with this arrangement and reasonable resolution can be obtained using spherical surfaces. Astigmatism is much lower than for Rowland circle mountings. These questions are analyzed using an optical path function development and calculations are presented which include the aberrations both in the two optics and those caused by the large extension of the source in the direction of the radiation emission.
DOE

N82-16380# Washington State Univ., Pullman. Dept. of Mechanical Engineering.
VENTURI DESIGN FOR METERING SOLIDS FLOW IN GAS-SOLIDS SUSPENSIONS Semiannual Progress Report
C. T. Crowe 31 Sep. 1981 30 p
(Contract DE-FG22-80PC-30212)
(DE81-031944; DOE/PC-30212/T2) Avail: NTIS HC A03/MF A01

The possibility of extending the usefulness of the Venturi as a gas/solids meter to larger particle sizes by modifying the inlet geometry was investigated. The adaptability of the annular Venturi to meter gas-solids flows in length-constrained systems has also been investigated. The optimal inlet geometry to maximize the Venturi sensitivity to loading was identified. Laser light attenuation across the throat section of the venturimeter was carried out to determine if such measurements could provide an independent measure of solids loading in the gas/solids suspension.
DOE

N82-16381# Los Alamos Scientific Lab., N. Mex.
COAL-GASIFICATION INSTRUMENTATION PROGRAM (PR 11734) Quarterly Progress Report, 1 Jul. - 30 Sep. 1981
1 Oct. 1981 38 p refs
(Contract W-7405-eng-36)
(DE82-001153; DOE/TIC-2001153) Avail: NTIS HC A03/MF A01

Methods of measuring alkali metals, NO, NH3 and H2S in coal gasification products are being studied using laser-induced breakdown spectroscopy, coherent anti-Stokes Raman spectroscopy and infrared spectroscopy. Detection limits under various conditions and comparison with gas chromatography results are presented.
DOE

N82-16382# Science Applications, Inc., Las Vegas, Nev. Nuclear Instrumentation Div.
TAPE RECORDING AND TRIGGERING SYSTEMS Open File Report, 20 Jun. 1978 - 15 Aug. 1979
Kenneth R. Sites and Lawrence A. Millonzi 7 Jun. 1981 17 p ref
(Contract DI-BM-H0-282926)
(PB81-243248; BM-OFR-116-81) Avail: NTIS HC A02/MF A01 CSCL 14C

Two tape recording and triggering systems were developed and delivered for use in the microseismic program. The systems are designed to improve the effectiveness of the Sangamo 3500 series and SABRE VI instrumentation tape recorders. The system is designed to capture random microseismic data, digitize and temporarily store these data, start the tape recorder, and then transfer the data to magnetic tape for permanent storage. The system is designed to pack data on tape such that the tape may be simply played back through galvo drives onto an oscillograph such that a continuous series of analog records, with corresponding time of day information, are reproduced without excessive oscillograph paper waste or the need for the operator to search for valid events.
GRA

N82-16383# Bureau of Reclamation, Denver, Colo. Engineering and Research Center.
HIGH-VOLTAGE TESTING CURRENT MEASUREMENT TECHNIQUES
B. Milano Jun. 1981 12 p
(PB81-240038; REC-ERC-81-9) Avail: NTIS HC A02/MF A01 CSCL 14B

A discussion of the effects of power supply ripple on dc insulation testing is presented. A meter to overcome these effects is described. Equations indicating the ripple effects are developed.
Author

N82-16384# Bureau of Reclamation, Denver, Colo. Engineering and Research Center.
A SYSTEM FOR MEASURING STEADY-STATE TORQUE ON A ROTATING SHAFT
E. Campbell Apr. 1981 19 p refs
(PB81-240632; REC-ERC-81-2) Avail: NTIS HC A02/MF A01 CSCL 14B

A system to transfer torque signals from a rotating shaft to stationary equipment using a transformer concept is described. The system has error correcting capabilities to eliminate drift. The system was successfully used on large generators and pumps.
Author

N82-16385# Dynamic Science, Phoenix, Ariz.
ADVANCED RECORDER DESIGN AND DEVELOPMENT Final Report, Jun. 1977 - Feb. 1981
Carroll D. Thatcher Feb. 1981 192 p refs
(Contract DOT-HS-7-01640)
(PB81-244105; DOT-HS-805914) Avail: NTIS HC A09/MF A01 CSCL 13L

A prototype crash recorder measuring and storing time histories of vehicle lateral and longitudinal accelerations, during a collision was designed, fabricated, and subjected to environmental tests. The recorder features low cost accelerometers, signal conditioning circuitry, A/D converter, microprocessor and digital storage. Accelerometer outputs are continuously sampled and stored in digital memory. The microprocessor monitors Delta V and compares it to a selectable criterion. When Delta V exceeds the criterion recent acceleration time histories are permanently stored in memory. The stored signals include acceleration data prior to and subsequent to the crash event. Methods of implementing the recorder including discussion of distribution in vehicle fleets, data retrieval, including hardware and software, and data processing software are provided. DOE

N82-16386# Spectron Development Labs., Inc., Costa Mesa, Calif.
DEVELOPMENT OF A PIPE LOCATION SYSTEM Final Report, Sep. 1980 - Jun. 1981
B. P. Hildebrand 15 Jun. 1981 52 p refs
(GRI Proj. 5080-353-0335)
(PB81-246530; SDL-81-2163-09DF; GRI-80/0068) Avail: NTIS HC A04/MF A01 CSCL 14E

A portable system capable of making an image of buried structures, such as pipe, and displaying it in real time in an isometric format was investigated. Linear impulse holography was developed to convert either acoustic or radar time-of-flight data into such an image containing all information required to accurately locate the pipe. GRA

N82-16387# KLD Associates, Inc., Huntington, N. Y.
ACOUSTICAL CONCEPT FOR MEASURING PARTICLE SIZE DISTRIBUTIONS
David S. Mahler Feb. 1981 74 p refs
(Grant NSF DAR-80-09595)
(PB81-235301; NSF/DMR-81001) Avail: NTIS HC A05/MF A01 CSCL 14B

A device for measuring particle size and distribution for air pollution control applications was investigated. The Acoustic Particulate Monitor, can measure total mass loading, mean particle diameter, and width of particle size distributions on an in-situ basis. It is based on observations that the presence of dust in air causes a reduction in the speed of sound as a function of transmitted frequency. Reductions in sound speed are small and the accompanying shift in the acoustical phase is a highly sensitive method for detecting such effects. Magnitudes of phase shift are related to mass loading. The frequency associated with maximum phase shift is defined as the acoustic frequency, fA. Experimentally determining fA provides a measure of the mean particle size of the distribution. Experimental results were verified using direct mass measurements and microphotographs. GRA

N82-16388# National Bureau of Standards, Washington, D.C. National Engineering Lab.
CRYOGENIC FLUIDS DENSITY REFERENCE SYSTEM: PROVISIONAL ACCURACY STATEMENT (1980)
J. D. Siegwarth and J. F. LaBrecque Apr. 1981 61 p refs Sponsored by Gas Research Inst.
(PB81-244865; NBS-TN-1041) Avail: NTIS HC A04/MF A01 CSCL 14B

An improved Density Reference System, reference densimeter, and method of determining sample density are described. The uncertainty of the density reference system is + or -0.055 percent. The contribution from the estimated systematic error in density was + or -0.022 percent. The estimated uncertainty caused by random error is three times the standard deviation of 0.011 percent and is based on measurements of densities of saturated liquid methane. Total density uncertainty is the sum of the systematic and random errors for a density range of 400 to 480 kg/cu m at pressures from 0.8 to 4 bar absolute and temperatures between 109 and 128 K. This accuracy statement is expected to apply over ranges of at least 400 to 1000 kg/cu m in density, 77 to 300 K in temperature and 0.8 to 7 bar in pressure. This system has great accuracy, speed, reliability, and flexibility. GRA

N82-16389# Harvard Univ., Cambridge, Mass.
PLATINUM: THE PRICE OF PHOTOGRAPHIC PRINTING MATERIALS
Debbie Hess Norris 1981 18 p refs
(Grant NEA-92-2033-386)
(PB81-249542) Avail: NTIS HC A02/MF A01 CSCL 14E

The historical development and subsequent modifications of the platinum printing process are discussed. Chemical structure, surface character, and typical deterioration encountered with platinum prints are identified. Possible procedures and problems encountered during treatment are presented. GRA

N82-16390# National Bureau of Standards, Washington, D.C. Center for Electronics and Electrical Engineering.
NBS PHASE ANGLE CALIBRATION STANDARD Final Technical Note
R. S. Turgel, N. M. Oldham, G. N. Stenbakken, and T. H. Kibalo Jul. 1981 130 p refs Sponsored by Dept. of Defense
(PB81-244899; NBS-TN-1144) Avail: NTIS HC A07/MF A01 CSCL 14B

The construction and operation of a calibration standard designed for use with phase meters is described. The resolution of the calibrator is approximately 2 millidegrees and its accuracy is of the order of 5 to 10 millidegrees depending somewhat on frequency and amplitude ratio of the output. Author (GRA)

N82-16391# National Bureau of Standards, Washington, D.C. Center for Materials Science.
TECHNICAL ACTIVITIES 1980: CENTER FOR MATERIALS SCIENCE
John B. Wachtman, Jr. and John D. Hoffman Oct. 1980 480 p refs
(PB81-245318; NBSIR-80-2108) Avail: NTIS HC A21/MF A01 CSCL 14B

Part of the National Measurement Laboratory, one of the principal laboratories comprising the National Bureau of Standards, the Materials Science Center is organized in six divisions, each having responsibility in different areas of materials science appropriate to the major classes of materials metals, polymers, and ceramics and glass. These Divisions vary in their balance between theory and experiments, between direct standards work and research, and in their orientation toward industrial and Government needs and the needs of other components of the scientific and technical community. Achievements reported relate to signal processing and imaging; fracture theory; conformational changes in polymers; chemical stability and corrosion; fracture deformation; polymer science and standards; metallurgy and alloys; ceramics, glass, and solid state; and reactor radiation. GRA

N82-16392# National Bureau of Standards, Washington, D.C. Electromagnetic Technology Div.
WR 10 MILLIMETER WAVE MICROCALORIMETER
Manly P. Weidman and Paul A. Hudson Jun. 1981 18 p refs
(PB81-246639; NBS-TN-1044) Avail: NTIS HC A02/MF A01 CSCL 14B

A microcalorimeter has been built in WR 10 waveguide, 75-110 GHz, to serve as a power standard at the National Bureau of Standards. Included here is an evaluation of the errors in using the microcalorimeter for the measurement of effective efficiency of bolometer mounts. DOE

N82-16393# National Bureau of Standards, Washington, D.C. Center for Absolute Physical Quantities.
TECHNICAL ACTIVITIES 1980 CENTER FOR ABSOLUTE PHYSICAL QUANTITIES
Karl G. Kessler Oct. 1980 236 p refs
(PB81-248478; NBSIR-80-2165) Avail: NTIS HC A11/MF A01 CSCL 14B

Research projects, measurement method development, calibration and data evaluation activities are summarized. These activities fall in the areas of quantum metrology, measurements and standards for electrical units, temperature and pressure, length and mass, time and frequency, and quantum physics. Author

N82-16394# National Bureau of Standards, Washington, D.C. Thermal Processes Div.
ANALYSIS OF RESULTS OF MINI ROUND ROBIN REFLECTANCE TEST
Joseph C. Richmond Jul. 1981 34 p
(PB81-244873; NBSIR-81-2311) Avail: NTIS HC A03/MF A01 CSCL 14B

A mini round robin test was conducted in which four national laboratories participated. The spectral directional-hemispherical reflectance for near-normal incidence of two samples, one black and one white, was measured in the wavelength range of 250 to 2500 nm. The solar reflectance of the white sample and the solar absorptance of the black sample was then computed. Each laboratory used a different procedure for making the computations. GRA

N82-16395# National Bureau of Standards, Washington, D.C. Center for Electronics and Electrical Engineering.
A CALIBRATION SERVICE FOR ANALOG-TO-DIGITAL AND DIGITAL-TO-ANALOG CONVERTERS Final Report
T. M. Souders, D. R. Flach, and B. A. Bell Jul. 1981 75 p refs Sponsored in part by Dept. of Defense
(PB81-243404; NBS-TN-1145) Avail: NTIS HC A04/MF A01 CSCL 14B

A calibration service for high performance 12- to 18-bit analog-to-digital converters (ADC's) and digital-to-analog converters (DAC's) is described. The service offers comprehensive measurements of linearity, differential linearity, gain, offset, and rms input noise (for ADC's), with systematic uncertainties as low as 3 ppm. Measurements are made at a minimum of 1024 different codewords. The measurement approach, design features, test programs, and data reduction techniques are documented, as are the methods of error estimation and quality control. Representative reports of tests are included for both DAC's and ADC's. Author (GRA)

N82-16103*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PROPER FREQUENCIES OF A DOWN-LOOKING WATER-VAPOR RADIOMETER OVER SEA SURFACE
S. C. Wu *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 4-14 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 14B

N82-16113*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
X-BAND NARROW-BEAM RADIOMETER FOR DSS 13
M. M. Franco, S. D. Slobin, and C. T. Stelzried *In its* the Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 80-86 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 14B

N82-17066*# Alabama A & M Univ., Huntsville. Dept. of Physics.
DETERMINATION OF THE EFFICIENCY OF A PROPORTIONAL COUNTER FOR DETECTING X-RAYS
Alton C. Williams *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 6 p (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 14B

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-16396* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LASER MEASURING SYSTEM FOR INCREMENTAL ASSEMBLIES Patent
John G. Etzel and James A. Munford, inventors (to NASA) Issued 10 Nov. 1981 6 p Filed 7 Dec. 1979 Supersedes N80-18380 (18 - 09, p 1142)
(NASA-Case-GSC-12321-1; US-Patent-4,299,492;
US-Patent-Appl-SN-102001; US-Patent-Class-356-386;
US-Patent-Class-356-349) Avail: US Patent and Trademark Office

Wire-wrapped frame assemblies used in spark chambers and the like can be measured using a system which utilizes a laser, an interferometer, and a retroreflector to precisely measure distance. A light source and a photodetector are located adjacent the incremental assembly and mounted on a movable carriage. The interferometer is also mounted on the movable carriage, while the laser and retroreflector are positioned at either end of the carriage track. The carriage is moved along one edge of the incremental assembly between the retroreflector and the laser, and as the carriage is moved, the light from the light source to the photodetector is interrupted. This produces a trigger command to a control unit which in turn causes a distance measurement to be made. A printout is provided for each sampling trigger command to list such items as ideal position, actual position and amount of error.

Official Gazette of the U.S. Patent and Trademark Office

N82-16397# Washington State Univ., Pullman. Dept. of Physics.
STABILITY OF OPTICAL COATINGS IN HOSTILE EXCIMER LASER ENVIRONMENTS Annual Technical Report, Jul. 1980 - 30 Jun. 1981
Ansgar W. Schmid 31 Aug. 1981 52 p refs
(Contract N00014-80-C-0709)
(AD-A106756; AD-E001180) Avail: NTIS HC A04/MF A01 CSCL 20/5

E-beam evaporated SiO_2 films were investigated during and after exposure to XeF laser gas components. Experimental methods and results are described, indicating that (1) impurities in the films reduce chemical film stability even without laser photons present; (2) low energy ions from the laser plasma enhance film decomposition; (3) mirror substrate temperature between room temperature and 100 C does not influence etching significantly. GRA

N82-16398# Naval Research Lab., Washington, D. C. Plasma Physics Div.
NON-LINEAR ANALYSIS OF THE FREE ELECTRON LASERS UTILIZING A LINEAR WIGGLER FIELD Interim Report
Cha-Mei Tang and P. Sprangle 19 Oct. 1981 35 p refs
(DARPA Order 3817)
(AD-A106229; NRL-MR-4354) Avail: NTIS HC A03/MF A01 CSCL 20/5

A one dimensional steady state (FEL) amplifier, utilizing a linearly polarized magnetic wiggler field, is analyzed in the linear and non-linear operating regimes. Our formulation of the FEL problem includes all the efficiency enhancements schemes, electron beam thermal effects and collective effects, i.e., space charge waves. The axial electron velocity, due to a linearly polarized wiggler field, has a spatially oscillatory component. It is shown that this axial velocity jiggle does not result in phase incoherence between the electrons and the ponderomotive wave. The axial velocity jiggle is explicitly incorporated into our analytical model. The inclusion of the electron jiggle velocity is shown to have a quantitative effect on the non-linear wave particle dynamics. The electron trapping potential associated with the ponderomotive wave is also derived. Finally, a number of numerical examples pertinent to the design of a 10 micron FEL amplifier are presented. GRA

N82-16399# National Bureau of Standards, Washington, D.C.
LASER INDUCED DAMAGE IN OPTICAL MATERIALS Final Report
Harold E. Bennett, Alexander Glass, J. (LLL), Arthur H. Guenther (AFWL, Kirtland AFB, N. Mex.), and Brian E. Newman (LASL) Oct. 1981 486 p refs Proc. of symp. held in Boulder, Colo., 30 Sep. - 10 Oct. 1980
(AD-A106548; NBS-SP-620; LC-81-600110) Avail: NTIS MF A01; SOD HC $9.50 CSCL 20/5

The Symposium was divided into sessions concerning Materials and Measurements, Mirrors and Surfaces, Thin Films, and finally Fundamental Mechanisms. The emphasis of the papers presented at the Symposium was directed toward new frontiers and new developments. Particular emphasis was given to materials for high power systems. The wavelength range of prime interest was from 10.6 microns to the uv region. Highlights included surface characterization, thin film-substrate boundaries, and advances in fundamental laser-matter threshold interactions and mechanisms. The scaling of damage thresholds with pulse duration, focal area, and wavelength was discussed in detail. GRA

N82-16400# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.
RATE ENHANCEMENT RESULTING FROM REAGENT VIBRATIONAL EXCITATION AS ESTIMATED BY THE BEBO METHOD
Norman Cohen and Stanley W. Mayer 1 Sep. 1981 27 p refs
(Contract F04701-80-C-0081)

(AD-A106431; TR-0081(6940-01)-1; SD-TR-81-64) Avail: NTIS HC A03/MF A01 CSCL 20/5

The bond-energy bond-order (BEBO) method for calculating rate coefficients and activation energies on the basis of molecular properties has been applied to estimating rate coefficients and activation energies for H-transfer reactions involving vibrationally excited reactants. The reactions examined included Br + H2(v equals 0, 1) equals H + HBr, Br + HC1(v equals 0, 1, 2) equals C1 + HBr, and F + HC1(v equals 0, 1) equals C1 + HF. Good agreement was obtained between the computed BEBO rate coefficients and published rate coefficients. It is important to note that the rate enhancement resulting from vibrational excitation could be explained for most of the reactions as being largely caused by the lower bond dissociation energy of the vibrationally excited reagent. Because of the significance of vibrational de-excitation rates in chemical lasers, BEBO computations were made for HF and DF deexcitation by reactions with H, D, F, and other atoms. The highest computed deexcitation rate coefficients were those involving reactions with F-atoms. Reagent vibrational excitation to v equals 10 was examined. Computations were also made to estimate rate coefficients for several possible deuterium isotope separation methods based on the use of vibrationally excited reactants. Author (GRA)

N82-16401# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.

VIBRATIONAL RELAXATION OF DF (V=1 AND 3) IN H2, D2, N2, AND HF AT 200 K

J. F. Bott 1 Sep. 1981 24 p refs

(Contract F04701-80-C-0081)

(AD-A106142; TR-0081(6603)-1; SD-TR-81-66) Avail: NTIS HC A02/MF A01 CSCL 20/5

The laser-induced fluorescence technique was used to measure the rate coefficients for the deactivation of DF(v = 1) and DF (v = 3) in H2, D2, N2, and HF at 200 + or - 5 K. The rate coefficients for deactivation by H2, N2, and HF were found to scale with v as v to the 1.9 + or - 0.1 power, essentially the same as the scaling at 295 K. The relaxation rates for DF(v = 1) were compared with data obtained at higher temperatures. At 200 K, the exchange probability of HF(1) + H2(O) was the same as that of DF(1) + D2(O) (within 10%) when the endothermicities were considered. Author (GRA)

N82-16402# University of Southern California, Los Angeles.

LASER KINETIC SPECTROSCOPIC STUDIES (A) THE UNIMOLECULAR REACTIONS OF NITROALKANES AND, (B) ELEMENTARY REACTIONS IMPORTANT IN COMBUSTION Annual Progress Report, 1 Jan. - 31 Aug. 1981

R. C. Estler, H. Reisler, and C. Wittig 31 Aug. 1981 37 p refs

(Contract N00014-80-C-0539)

(AD-A107820) Avail: NTIS HC A03/MF A01 CSCL 20/5

The multiphoton ionization (MPI) of NO is used to probe the dynamics of the photodissociation of NO2 in a one-color experiment. The resulting MPI spectra clearly indicate the high internal rotational energy in the NO ragment. MPI shows promise as a highly-sensitive, information-rich diagnostic for internal state determinations of nitric oxide. We report that the 300 K reaction of C2H with O2 has as one of its product channels CH + CO2. By monitoring time resolved CH chemiluminescence following laser photolysis production of C2H in the presence of O2, we have measured rate coefficients for reactions of C2H with O2, H2, and CH4. GRA

N82-16403# Washington State Univ., Pullman. Picosecond Laser Lab.

NANOSECOND AND PICOSECOND SPECTROSCOPY AND KINETICS OF DYNAMIC ABSORBING MATERIALS Final Report, Jun. 1976 - Jun. 1981

Maurice W. Windsor 8 Oct. 1981 132 p refs

(Grant DAAG29-76-G-0275)

(AD-A107733; ARO-14081.11-C) Avail: NTIS HC A07/MF A01 CSCL 20/5

There is an increasing need to provide protection for both personnel and electronic sensors against laser radiation in the visible and near infra-red regions. The proliferation of laser frequencies and the advent of tunable lasers combine to create a threat that static filters alone cannot combat. Dynamic filters that become highly absorbing only on exposure to the incident laser radiation would provide an attractive solution, especially if the dynamic absorption could be made to develop very rapidly and also be rapidly reversible after the laser pulse is over. This report describes research aimed at the further development of ultra-fast spectroscopic instrumentation constructed in the author's laboratory and its application to studying several phenomena capable of giving rise to dynamic absorption in selected classes of chemical compounds. These phenomena include the direct photoproduction on the picosecond time scale of absorbing transient species such as excited singlet states and excited triplet states of conjugated organic molecules and dyes, the production of radical ions of similar compounds via photoexcitation followed by fast electron transfer and the production of various excited states of inorganic complexes. A low-cost automated, picosecond laser spectrometer based on a two-dimensional optical multichannel analyzer (OMA) interfaced to a home assembled microcomputer has been developed. GRA

N82-16404# United Technologies Research Center, East Hartford, Conn.

ENERGETICS AND COLLISION DYNAMICS OF ELECTRONIC TRANSITION LASERS Final Report, 1 Aug. 1980 - 31 Jul. 1981

H. Harvey Michels and R. H. Hobbs Sep. 1981 46 p refs

(Contract F49620-80-C-0095; AF Proj. 2303)

(AD-A107591; UTRC-R81-925293; AFOSR-81-0750TR) Avail: NTIS HC A03/MF A01 CSCL 20/5

Knowledge of the partition of energy between the products of a chemical reaction is fundamental to understanding the dynamics of collisional reactions. Atom-atom and atom-molecule reactions that yield vibrationally excited diatomic molecules are of particular scientific and military interest. An understanding of the dynamics of these reactions and of at least limited regions of potential energy surfaces is important in analyzing and predicting vibrational and rotational relaxation rates. A program to develop theoretical techniques and construct computer programs for calculating potential energy surfaces and kinetic cross sections for calculating potential energy surfaces and kinetic cross sections for simple collision processes is discussed. The potential energy surfaces of concern include both atom-atom and atom-diatom systems with special emphasis on molecular reactions yielding electronically excited products which have potential as visible or UV chemical lasers. These systems include metal oxides and halides, metal excimers and the noble gas-halides. GRA

N82-16405# Avco-Everett Research Lab., Mass.

RECYCLABILITY ISSUES IN XeF LASERS Final Technical Report, 15 Jun. 1980 - 15 Apr. 1981

A. Mandl, R. Slater, and D. Trainor Wright-Patterson AFB, Ohio AFWAL Aug. 1981 60 p refs

(Contract F33615-80-C-2060; AF Proj. 2301; AF Proj. 3938)

(AD-A107759; AFWAL-TR-81-2085) Avail: NTIS HC A04/MF A01 CSCL 20/5

This report describes three experiments designed to assess various aspects of XeF laser operation at elevated temperatures. Measurements of the rate of loss of NF3 and NF2 in contact with metals and quartz were obtained in one experiment. Nickel, quartz and aluminum appear to be less reactive than titanium, stainless steel and copper. The feasibility of using metal-filled reactors to scrub F2 from XeF laser gas mixtures was investigated. Titanium was shown to be a selective F2 scrubber. XeF laser performance was studied as a function of NF3 and NF2 mole fractions. These experiments indicate that the presence of NF2 degrades laser performance using a stainless steel cell. The cell construction material appears to play a significant role in determining the extent of degradation. Author (GRA)

N82-16406# California Univ., Livermore. Lawrence Livermore Lab.

AUTOMATIC GAS-LEVITATION SYSTEM FOR VACUUM DEPOSITION OF LASER-FUSION TARGETS

C. W. Jordan, G. R. Cameron, R. M. Krenik, and J. K. Crane 8 Sep. 1981 13 p refs Presented at the Am. Vacuum Soc. Natl. Symp., Anaheim, Calif., 2-6 Nov. 1981

(Contract W-7405-eng-48)

(DE82-000296; UCRL-86185; CONF-8111113-8) Avail: NTIS

HC A02/MF A01

An improved simple system was developed to gas-levitate microspheres vacuum-deposition processes. The automatic operation relies on two effects: a lateral stabilizing force provided by a centering-ring; and an automatically incremented gas metering system to offset weight increases during coatings. The system is described. DOE

N82-16407# KMS Fusion, Inc., Ann Arbor, Mich.
LASER HEATED GAS-JET: A SOFT X-RAY SOURCE
G. Charatis, D. C. Slater, F. J. Mayer, J. A. Tarvin, G. E. Busch, D. Sullivan, D. Musinski, D. L. Matthews (California Univ., Livermore, Lawrence Livermore Lab.), and Lou Koppel (California Univ., Livermore. Lawrence Livermore Lab.) 1981 6 p refs Presented at the Topical Conf. on Low-Energy X-Ray Diagnostics, Livermore, Calif., 8 Jun. 1981
(Contract DE-AC08-78DP-40030)
(DE81-029627; KMSF-U-1109; CONF-810651-7) Avail: NTIS HC A02/MF A01

The laser irradiated gas jet soft X-ray source in scattering processes was studied. It is a reproducible and stationary source with large yield and plasma properties characterized by conventional diagnostic techniques. X-ray pinhole photographs show an axially symmetric radiating plume located at the electron density critical surface. The density gradient is obtained by holograhic interferometry using a 0.26 microwavelength probe pulse. Electron temperatures are determined by spatially resolving X-ray crystal spectroscopy to record and analyze line emission from H and He like configurations. DOE

N82-16115*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
POWER EFFICIENCY OF SEMICONDUCTOR INJECTION LASERS
J. Katz *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 94-100 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20E

N82-16116*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PHASE-LOCKING OF SEMICONDUCTOR INJECTION LASERS
J. Katz *In its* the Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 101-114 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20E

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-16408* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SURFACE CONFORMING THERMAL/PRESSURE SEAL Patent
Martin L. Stevens, inventor (to NASA) (Fairchild Republic Co.) Issued 22 Sep. 1981 9 p Filed 12 Dec. 1979 Supersedes N80-114400 (18 - 05, p 0605) Sponsored by NASA
(NASA-Case-MSC-18422-1; US-Patent-4,290,612;
US-Patent-Appl-SN-102593; US-Patent-Class-277-81R;
US-Patent-Class-277-189; US-Patent-Class-244-113;
US-Patent-Class-244-217; US-Patent-Class-244-163;
US-Patent-Class-418-113; US-Patent-Class-418-142) Avail: US Patent and Trademark Office CSCL 11A

An assembly is disclosed for sealing a variable gap between the surface of element and a second element in movable relation to it. A seal housing is attached to the second element for movement therewith and has a sealing surface. At least one elongated seal member carried by the housing has first and second conjugate sealing surfaces. The first sealing surface is for rubbing and sealing engagement with the first element surface and the second sealing surface is for sliding and sealing engagement with the housing sealing surface. A biasing assembly may be carried by the housing for biasing the first and second conjugate sealing surfaces of the sealing member toward sealing engagement with the first element surface and housing sealing surface, respectively.

Official Gazette of the U.S. Patent and Trademark Office

N82-16409*# Transmission Research, Inc., Cleveland, Ohio.
TRACTION CONTACT PERFORMANCE EVALUATION AT HIGH SPEEDS Interim Report
Joseph L. Tevaarwerk (Applied Tribology Ltd.) Sep. 1981 193 p refs
(Contract DEN3-35; EC-77-A-31-1011)
(NASA-CR-165226; DOE/NASA/0035-1) Avail: NTIS HC A09/MF A01 CSCL 13I

The results of traction tests performed on two fluids are presented. These tests covered a pressure range of 1.0 to 2.5 GPa, an inlet temperature range of 30 °C to 70 °C, a speed range of 10 to 80 m/sec, aspect ratios of .5 to 5 and spin from 0 to 2.1 percent. The test results are presented in the form of two dimensionless parameters, the initial traction slope and the maximum traction peak. With the use of a suitable rheological fluid model the actual traction curves measured can now be reconstituted from the two fluid parameters. More importantly, the knowledge of these parameters together with the fluid rheological model, allow the prediction of traction under conditions of spin, slip and any combination thereof. Comparison between theoretically predicted traction under these conditions and those measured in actual traction tests shows that this method gives good results. Author

N82-16410*# Eaton Corp., Southfield, Mich. Engineering and Research Center.
SMALL PASSENGER CAR TRANSMISSION TEST: CHEVROLET MALIBU 200C TRANSMISSION WITH LOCKUP
M. P. Bujold Aug. 1981 245 p refs
(Contracts DEN3-124; DE-AI01-77CS-51044)
(NASA-CR-165182; DOE/NASA/0124-6; ERC-TR-8125) Avail: NTIS CSCL 13F

The small passenger car transmission test was initiated to supply electric vehicle manufacturers with technical information regarding the performance of commercially available transmissions. This information would enable EV manufacturers to design a more energy efficient vehicle. With this information the manufacturers would be able to estimate vehicle driving range as well as speed and torque requirements for specific road load performance characteristics. This report covers the testing of a Chevrolet Malibu 200C automatic transmission with lockup. The transmission was tested in accordance with a passenger car automatic transmission test code (SAE J651b) which required drive performance, coast performance, and no load test conditions. Under these test conditions, the transmission attained maximum efficiencies in the mid 90 percent range both for drive performance test and coast performance tests. The torque, speed and efficiency curves map the complete performance characteristics for the Chevrolet Malibu 200C automatic transmission with lockup. Author

N82-16411*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF SEALS ON ROTOR SYSTEMS
David P. Fleming 1982 16 p refs Presented at the 52nd Shock and Vibration Symp., New Orleans 27-29 Oct. 1981; sponsored by NRL and the Machinery Vibration Monitoring and Anal. Meeting, Oak Brook, Ill., 30 Mar. - 1 Apr. 1982; sponsored by the Vibration Inst.
(NASA-TM-82786; E-1121) Avail: NTIS HC A02/MF A01 CSCL 11A

Seals can exert large forces on rotors. As an example, in turbopump ring seals film stiffness as high as 90 MN/m (500,000 lb/in) have been calculated. This stiffness is comparable to the stiffness of rotor support bearings; thus seals can play an important part in supporting and stabilizing rotor systems. The work done to determine forces generated in ring seals is reviewed. Working formulas are presented for seal stiffness and damping, and geometries to maximize stiffness are discussed. An example is described where a change in seal design stabilized a previously unstable rotor. Author

N82-16412*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECTS OF ARTIFICIALLY PRODUCED DEFECTS ON FILM THICKNESS DISTRIBUTION IN SLIDING EHD POINT CONTACTS

C. Cusano (Illinois Univ. at Urbana-Champaign) and L. D. Wedeven 1981 31 p refs Presented at the Joint Lubrication Conf., New Orleans, 5-7 Oct. 1981; sponsored by the Am. Soc. of Lubrication Engr. and ASME
(NASA-TM-82732; E-1042) Avail: NTIS HC A03/MF A01 CSCL 20K

The effects of artificially produced dents and grooves on the elastohydrodynamic (EHD) film thickness profile in a sliding point contact were investigated by means of optical interferometry. The defects, formed on the surface of a highly polished ball, were held stationary at various locations within and in the vicinity of the contact region while the disk was rotating. It is shown that the defects, having a geometry similar to what can be expected in practice, can dramatically change the film thickness which exists when no defects are present in or near the contact. This change in film thickness is mainly a function of the position of the defects in the inlet region, the geometry of the defects, the orientation of the defects in the case of grooves, and the depth of the defect relative to the central film thickness. Author

N82-16413*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

BASIC LUBRICATION EQUATIONS

Bernard J. Hamrock and Duncan Dowson (Leeds Univ.) Dec. 1981 87 p refs Repr. from Ball Bearing Lubrication, chapter 5, Sep. 1981
(NASA-TM-81693; E-209) Avail: NTIS HC A05/MF A01 CSCL 11H

Lubricants, usually Newtonian fluids, are assumed to experience laminar flow. The basic equations used to describe the flow are the Navier-Stokes equation of motion. The study of hydrodynamic lubrication is, from a mathematical standpoint, the application of a reduced form of these Navier-Stokes equations in association with the continuity equation. The Reynolds equation can also be derived from first principles, provided of course that the same basic assumptions are adopted in each case. Both methods are used in deriving the Reynolds equation, and the assumptions inherent in reducing the Navier-Stokes equations are specified. Because the Reynolds equation contains viscosity and density terms and these properties depend on temperature and pressure, it is often necessary to couple the Reynolds with energy equation. The lubricant properties and the energy equation are presented. Film thickness, a parameter of the Reynolds equation, is a function of the elastic behavior of the bearing surface. The governing elasticity equation is therefore presented. A.R.H.

N82-16414# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.

HEAT SOURCE: MATERIALS INTERACTIONS DURING FUSION WELDING Annual Technical Report

T. W. Eagar, A. Block-Bolten, C. Allemand, D. Hardt, J. Katz, and C. Huntington 30 Apr. 1981 45 p refs
(Contract N00014-80-C-0384)
(AD-A107717; ATR-1) Avail: NTIS HC A03/MF A01 CSCL 13/8

The first year of progress in studies involving vapor emission from weld pools, design of an infrared microscope for measurement of the weld surface temperature, ultrasonic detection of the weld pool shape, surface reflectivity of aluminum, signal analysis of the weld noise voltage and reflectivity of aluminum by a carbon dioxide laser is summarized. The results presented are to date preliminary. GRA

N82-16415# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.

HIGH-CURRENT RESISTANCE WELDING OF NUCLEAR-WASTE CONTAINERS

B. J. Eberhard and J. W. Kelker, Jr. Jul. 1981 19 p ref Presented at the 62nd Am. Welding Soc. Conf., Cleveland, 6-10 Apr. 1981
(Contract DE-AC09-76SR-00001)
(DE81-030403; DPSPU-80-30-9; CONF-810404-2) Avail: NTIS HC A02/MF A01

Upset welding was selected as the process best suited for sealing the fill hole in stainless steel canisters for high level nuclear wastes, since this process is amenable to use in a remotely operated facility. Welding parameters are readily controlled and dynamically recorded during the course of the weld. Weld quality can be controlled and assessed through control of the process. The process was shown to be suitable for producing welds up to 5 in. in diameter and having 0.38-in. throat thickness. Weld current of 230,000 A AC, electrode force of 75,000 lb. and weld time of 2.0 seconds were required for a 5-in. diameter weld. The welds have a wrought structure and the tensile strength of the weld metal equals or exceeds that of the annealed base material. The size weld that can be produced appears limited only by the ability to provide sufficient welding current. A welder designed to deliver 400,000 A DC is being installed in a nonradioactive nuclear waste pilot facility. DOE

N82-16416# Ricardo & Co., Engineers (1927) Ltd., Shoreham-by-Sea (England).

ACOUSTIC AND EMISSION CHARACTERISTICS OF SMALL, HIGH-SPEED INTERNAL COMBUSTION ENGINES Final Report, Jun. 1976 - Sep. 1979

D. Morrison and R. V. Karsick Jul. 1981 362 p Prepared for Calspan Advanced Technology Center
(Contract DOT-TSC-1242)
(PB82-104225; DOT-HS-805830) Avail: NTIS HC A16/MF A01 CSCL 13F

The acoustic aspects of small high speed internal combustion engines were evaluated. Outdoor noise tests on SAAB and Peugeot vehicles, and noise tests on a selection of European passenger vehicles, on the SAAB 2 liter gasoline engine, and on the Peugeot 2.3 liter diesel engine are described, and test results compared. An urban traffic noise model for high speed gasoline and diesel powered light duty vehicles is presented. Author (GRA)

N82-16417# Department of Energy, Bartlesville, Okla. Energy Technology Center.

PERFORMANCE CHARACTERISTICS OF AUTOMOTIVE ENGINES IN THE UNITED STATES, THIRD SERIES, 1978 BUICK 196 CID (3.2L), 2V Interim Report, Jun. 1981

D. E. Koehler, W. F. Marshall, and K. R. Stamper Jun. 1981 57 p
(Contract DOT/TSC-RA-77-07)
(PB81-236630; BETC/OP-81/52; DOT-TSC-NHTSA-81-7; DOT-HS-805813; Rept-14) Avail: NTIS HC A04/MF A01 CSCL 21G

The 1978 Buick 196 CID engine was dynamometrically tested to determine fuel consumption and emissions (hydrocarbon, carbon monoxide, oxides of nitrogen) at steady state engine operating modes. The objective is to obtain engine performance data to estimating emissions and fuel economy for varied engine service and duty. The intent is to provide basic engine characteristic data required as input for engineering calculations involving ground transportation. GRA

N82-16132*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ANTENNA AZIMUTH BEARING MODEL EXPERIMENT

H. McGinness *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 291-306 ref (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 13I

N82-17080*# Wisconsin Univ. - Platteville. Dept. of Civil Engineering.

INCIPIENT FAILURE DETECTION (IFD) OF SSME BALL BEARINGS

In Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 20 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 13H

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-16418# Spectron Development Labs., Inc., Costa Mesa, Calif.
NEAR SURFACE FLAW DETECTION BY ULTRASONIC ANGLE IMAGING Final Report
B. Percy Hildebrand and Gerald L. Fitzpatrick 27 Feb. 1981 55 p refs
(Grant NSF DAR-80-08279)
(PB81-235939; SDL-81-2175-01F; NSF/DMR-81002) Avail: NTIS HC A04/MF A01 CSCL 14B

The use of measurable quantities to form images of near surface defects in ceramic and super alloy materials was examined. Ultrasound, the Rayleigh critical angle, is used as a sensitive indicator of near surface conditions. The behavior of reflected sound at this angle is influenced by material parameters such as grain size, hardness, surface residual stress, and material variation. Amplitude and phase of the reflected wave, frequency of least reflection, and the critical angle itself were used as measurable quantities. The combination of these measurables, determines separately grain size, surface stress, and material defects in the near surface region of the material. GRA

N82-16129*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SYSTEM RELIABILITY ANALYSIS WITH DYNAMIC PROGRAMMING
T. Charng *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 246-267 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 09D

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N82-16419*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ELEVATED TEMPERATURE FATIGUE TESTING OF METALS
Marvin H. Hirschberg Dec. 1981 24 p refs
(NASA-TM-82745; E-1058) Avail: NTIS HC A02/MF A01 CSCL 20K

The major technology areas needed to perform a life prediction of an aircraft turbine engine hot section component are discussed and the steps required for life prediction are outlined. These include the determination of the operating environment, the calculation of the thermal and mechanical loading of the component, the cyclic stress-strain and creep behavior of the material required for structural analysis, and the structural analysis to determine the local stress-strain-temperature-time response of the material at the critical location in the components. From a knowledge of the fatigue, creep, and failure resistance of the material, a prediction of the life of the component is made. Material characterization and evaluation conducted for the purpose of calculating fatigue crack initiation lives of components operating at elevated temperatures are emphasized. J.D.H.

N82-16420# National Aerospace Lab., Tokyo (Japan).
ANALYSIS OF STRAIN DISTRIBUTION FOR FIBER REINFORCED COMPOSITES BY MOIRE METHOD
Shinichi Koshide Aug. 1981 21 p refs In JAPANESE; ENGLISH summary
(NAL-TR-681; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Analysis by the moire method of strain distribution on a plane of fiber reinforced composites with high rigidity was made. The strain distribution can be determined from moire fringe patterns and an electrical resistance strain gage, or fringe patterns which are obtained by a testing procedure using combined specimens. The fringe patterns are obtained by a fringe reconstructor which is an optical spatial filtering system with coherent light. The method was applied to analysis of strain distribution in strips of aluminum alloy and epoxy resin, with a circular notch, under tension. A comparison of the results with values of theoretical analysis confirms that the method is applicable to the determination of strain distribution on a plane of rigid structural materials, such as composites with circular or semi-circular notches. The influences of the notch on the mechanical properties of material under tension for each of the above composites is discussed. M.D.K.

N82-16421# Forest Products Lab., Madison, Wis.
STRENGTH AND STIFFNESS OF SMALL GLUED-LAMINATED BEAMS WITH DIFFERENT QUALITIES OF TENSION LAMINATIONS
Catherine M. Marx and Russell C. Moody May 1981 50 p refs
(AD-A106562; FSRP-FPL-381) Avail: NTIS HC A03/MF A01 CSCL 11/9

The objective of this research study was twofold: (1) to determine at what beam depth specially graded 302-24 (2) tension laminations are required to attain a 2,400 lb/sq. in. design stress; (2) to determine the appropriate design stress for specification type beams with the regular laminating grades of L1 Douglas Fir-Larch (DF-L) or No. 1D Southern Pine (SP) as the tension laminations. The 302-24 grade of lumber required for tension laminations on 24F4 deep beams is a limited resource and is not as readily available as L1 or No. 1D lumber now used as the tension lamination on 24F shallow beams thus necessitating objective (2). The 180 glued laminated beams evaluated were of near minimum quality; each selected tension lamination had a near maximum size, strength reducing characteristics positioned in the most highly stressed region of the test beams. Author (GRA)

N82-16422# Forest Products Lab., Madison, Wis.
A SUMMARY OF MODULUS OF ELASTICITY AND KNOT SIZE SURVEYS FOR LAMINATING GRADES OF LUMBER
R. W. Wolfe and R. C. Moody Jun. 1981 22 p
(AD-A106561; FSGTR-FPL-31) Avail: NTIS HC A02/MF A01 CSCL 11/12

A summary of modulus of elasticity (MOE) and knot data is presented for grades of lumber commonly used to manufacture glued laminated (glulam) timber by the laminating industry. Tabulated values represent 30 different studies covering a time span of over 16 years. Statistical estimates of average and near maximum knot sizes as well as mean and coefficient of variation for MOE are given. Modulus of elasticity values are compared with those published for design. Author (GRA)

N82-16423# Materials Research Labs., Ascot Vale (Australia).
USE OF WEIGHT FUNCTIONS TO DETERMINE THE STRESS INTENSITY FOR A CRACKED THICK-WALLED CYLINDER
Graham Clark May 1981 21 p refs
(AD-A106270; MRL-R-814) Copyright. Avail: Issuing Activity CSCL 20/11

The use of weight functions to determine stress intensities for cracked specimens is relatively simple, and, while the initial derivation of a suitable weight function for some specimen geometries may be complex, the technique offers substantial benefits. In particular, stress intensities may be estimated for any initial stress distribution, and variations in stress intensity which result from the introduction of residual stress fields may be handled without the need to perform a full re-analysis for each case. The stress intensity at the tip of a crack which grows through a known stress field has been estimated using a weight function technique. The geometry considered is a thick-walled cylinder ($Ro/Ri = 1.8$) containing a longitudinal crack along the bore surface, and stress distributions corresponding to a variety of loading arrangements are used as examples. Author (GRA)

N82-16424# Akron Univ., Ohio. Inst. of Polymer Science.
FAILURE LOADS FOR MODEL ADHESIVE JOINTS SUBJECTED TO TENSION, COMPRESSION OR TORSION
A. N. Gent and O. H. Yeoh 25 Oct. 1981 42 p refs
(Contract N00014-76-C-0408; NR Proj. 092-555)
(AD-A106724; TR-14) Avail: NTIS HC A03/MF A01 CSCL 11/1

A simple theoretical analysis, based upon Griffith's fracture criterion, has been developed to predict the loads required to cause adhesive failure when model joints are subjected to different types of loading, viz. Tension, compression, and torsion. Two model joints are considered: a rigid cylinder partly embedded in and bonded to an elastic cylinder (termed 'rod joint' here), and, an elastic cylinder inserted partway into, and bonded to, a rigid tube (termed 'sleeve joint' here). Both types of joint have been constructed, using vulcanized rubber cylinders bonded to aluminum rods and sleeves. Measurements have been made of the failure loads under tension, compression and torsional loading. They were found to be in satisfactory agreement with the theoretical predictions except, in some instances, for rod joints subjected to tension or torsional loading when the failure loads were as much as three times the predicted values. This discrepancy is attributed to friction between the partially-detached rubber cylinder and the embedded rod, enhanced to a major degree by the tendency of the rubber cylinder to shrink in radius on stretching or twisting. A theoretical analysis of the effect of friction is presented. It predicts increasingly large pull-out forces or torques, as the depth of embedment increases, until frictional seizure occurs. Experimentally, frictional effects were eliminated by applying an internal gas pressure to the region being detached. All of the failure loads were then found to be in satisfactory agreement with the original theory, ignoring frictional effects.
GRA

N82-16425# California Inst. of Tech., Pasadena. Div. of Engineering and Applied Science.
LARGE DEFORMATIONS NEAR THE TIPS OF AN INTERFACE-CRACK BETWEEN TWO NEO-HOOKEAN SHEETS
J. K. Knowles and Eli Sternberg Sep. 1981 74 p refs
(Contract N00014-75-C-0196)
(AD-A106147; TR-48) Avail: NTIS HC A04/MF A01 CSCL 20/11

This paper contains an asymptotic investigation (within the nonlinear theory of elastostatic plane stress) of the deformations and stresses near the tips of a traction-free interface-crack between two dissimilar semi-infinite Neo-Hookean sheets. The results obtained are free of oscillatory singularities of the kind predicted by the linearized theory, which would require the two deformed faces of an interface-crack to overlap in the vicinity of its tips. Instead, the crack is found to open smoothly near its ends, regardless of the specific loading at infinity. Author (GRA)

N82-16426# Ballistic Research Labs., Aberdeen Proving Ground, Md.
CRITICAL ANGLES AND GRAZING INCIDENCE: THE BREAKDOWN OF REGULAR SHOCK REFLECTION IN SOLIDS
Thomas W. Wright Nov. 1981 58 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A107665; ARBRL-TR-02381) Avail: NTIS HC A04/MF A01 CSCL 20/11

The regular pattern for shock reflection in a nonlinear hyperelastic solid is a centered array of shocks and simple wave fans. As the angle of incidence approaches grazing incidence or a critical angle, the reflection pattern overtakes the incident wave until finally the regular pattern can no longer be sustained. By expanding the reflection solution in powers of ampliture about the linear reflection solution, it is possible to develop a procedure to solve the reflection problem for weak but finite shocks for any material symmetry. Explicit solutions can be exhibited for isotrophic materials, including relationships between amplitude and limiting angle for various boundary conditions and incident waves. Some problems require consideration of a nonlinear boundary condition even in the first approximation. Typically, these cases lead to considerable amplification in the leading reflected wave. Author (GRA)

N82-16427# TRW, Inc., McLean, Va.
ALTERNATIVES TO CERAMIC BRICKS AND CERAMIC-BRICK SYSTEMS
J. Michael MacDonald 1981 10 p refs Presented at the Thermal and Chem. Storage Ann. Rev. Meeting, Washington, D.C., 14-16 Sep. 1981
(Contract W-7405-eng-26)
(DE81-032029; CONF-810940-4) Avail: NTIS HC A02/MF A01

Alternative materials for use as thermal energy storage media in electric storage furnaces were evaluated and selected. Selections were based on low cost, availability, durability, and energy storage density. The materials selected were taconite pellets, river gravel, crushed stone, and crushed (air cooled) blast furnace slag. Essential material properties and energy storage densities were established. A conceptual design for an electric storage furnace using these low cost materials was developed. The performance of this conceptual furnace was characterized by an analytical model and a computer code for the model developed. Performance and design comparisons between present day furnaces and the prototype furnace were made. A significant cost advantage for the proposed furnace over existing electric storage furnaces cannot be established.
DOE

N82-16428# California Univ., Livermore. Lawrence Livermore Lab.
CALCULATIONS OF ELASTIC WAVE SCATTERING FROM VOIDS AND CRACK-LIKE DEFECTS BY THE METHOD OF OPTIMAL TRUNCATION
Joel L. Opsal 29 Jun. 1981 7 p refs Presented at DARPA/AFML Review of Progress in Quantitative NDE Conf., La Jolla, Calif., 14-18 July 1980 Submitted for publication
(Contract W-7405-eng-48)
(DE81-030770; UCRL-86333; CONF-800767-4) Avail: NTIS HC A02/MF A01

Visscher's method of optimal truncation for solving elastic wave scattering problems is applied to voids having surface cracks and sharp edges including some for which experimental data are becoming available. A number of interesting aspects of these results are discussed and comparisons with existing experimental data presented.
DOE

N82-16429# Illinois Univ., Urbana. Lab. of Physics.
THERMAL EXPANSION OF ALKALI-GRAPHITE INTERCALATION COMPOUNDS
S. E. Hardcastle 1981 4 p refs Presented at the Intern. Conf. on Phonon Phys., Bloomington, Ind., 30 Aug. 1981
(Contract DE-AC02-76ER-01198)
(DE82-000060; DOE/ER-01198/1364; CONF-810872-3) Avail: NTIS HC A02/MF A01

The c-axis thermal expansion of several alkali-graphite intercalation compounds was measured by means of X-ray scattering between 15 and 300 K. The thermal expansion depends strongly on the stage of the compound and is largest for C8M (M = K, Rb, Cs) compounds. The data are analyzed in terms of an one-dimensional quasi-harmonic approximation, which yields Gruneisen parameters two or three times as large as for pristine graphite.
DOE

N82-16430# California Univ., Livermore. Lawrence Livermore Lab.
STRESSED KEVLAR STRAND TEST
H. Golopol, J. Clarkson, R. Moore, and N. Hetherington 10 Sep. 1981 16 p refs Presented at the JOWOG 12/25 Conf., Aldermaston, England, 21-25 Sep. 1981; sponsored by AWRE
(Contract W-7405-eng-48)
(DE81-030769; UCRL-86034; CONF-810953-3) Avail: NTIS HC A02/MF A01

The effect of time, temperature, and chemical environment on the strength retention of stressed Kevlar strands were determined. A stess load of 20% of the ultimate tensile strength was applied. Strands were hung with a suitable weight in a closed container. Each container was then provided with its own heater and chemical environment. No significant loss of strength retention was found on these stressed strands. DOE

N82-16431# Washington Univ., Seattle. Dept. of Mechanical Engineering.

STATIC STRESS-INTENSITY FACTORS AND DYNAMIC CRACK PROPAGATION IN PIPES Annual Report, Sep. 1981
A. F. Emery, A. S. Kobayashi, and W. J. Love Sep. 1981 206 p refs Sponsored in part by EPRI
(EPRI Proj. 231-1)
(DE82-900365; EPRI-NP-2024) Avail: NTIS HC A10/MF A01

Predictive models for critical flaw sizes, initiation crack propagation of dynamic cracks in pipes, and behavior of dynamic crack propagation in compact specimens are described. Parametric results are reported that may be used to predict critical flaw sizes for the initiation of a running crack as well as the crack propagation rate under fatigue in precracked pressurized and thermally shocked cylinders and nozzle-cylinder intersections. Fundamental properties governing rapid crack propagation and crack arrest are described, as are studies on the initiation and propagation of circumferential through cracks in pipes subjected to axial tension. Included are discussions of the use (1) the three dimensional finite element code, SAP IV, to analyze the dynamic fracture response of preexisting axially oriented through cracks at the centers of a local bulge in pressurized pipe and (2) the thermal hydraulic code LEAKER to predict the nondimensionalized depressurization rates measured in a series of dynamic pipe-rupture experiments. GRA

N82-16432# Agbabian Associates, El Segundo, Calif.
INVESTIGATION OF REINFORCED BRICK MASONRY BUILDINGS UNDAMAGED BY THE SAN FERNANDO EARTHQUAKE
S. A. Adham May 1981 188 p refs
(Grant NSF PFR-79-00013)
(PB82-104217; NSF/CEE-81014) Avail: NTIS HC A09/MF A01 CSCL 13M

Behavior of the buildings of the Sepulveda Veterans Administration Hospital during the 1971 San Fernando earthquake was examined. The study explored why these buildings sustained minimal structural damage while other buildings in close proximity sustained major damage. A literature review was conducted and seismic input motions at the site during the earthquake were estimated. Verifications of seismic analysis techniques using a two dimensional finite element model were determined through studies of observed earthquake damage to a six-story building. Relative displacements were calculated at the expansion joints and compared to damage of the flexible joints. Also verified were seismic analysis techniques through a study of observed earthquake damage to the boiler house building. The calibrated motions were used as input to a three dimensional model of a reinforced brick masonry building. GRA

N82-16433# Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
EVALUATION OF THE FRACTURE BEHAVIOR OF CONCRETE WITH THE J-INTEGRAL
Robert C. Andren, Thomas J. Powell, Frederick V. Lawrence, and Clyde Kesler Apr. 1981 150 p refs
(Grant NSF ENG-78-07742)
(PB81-235855; NSF/ECS-81003) Avail: NTIS HC A07/MF A01 CSCL 13C

The application of the J-integral concept to concrete fracture mechanics was investigated. The J-integral is path independent line integal that is a measure of the elasto plastic stresses strain field near a crack tip. Factors were evaluated to ascertain which ones significantly affect the performance of the J-integral as a one parameter measure of fracture toughness. The critical value of the J-integal (JC) was compared with other fracture toughness parameters. GRA

N82-16434# Sydney Univ. (Australia). Civil Engineering Labs.
EXPERIMENTS ON CONTINUOUS COMPOSITE BEAMS
P. Ansourian Mar. 1981 61 p refs
(PB81-247116; R-384) Avail: NTIS HC A04/MF A01 CSCL 20K

Six continuous composite beams of 9 m length and with compact steel section were tested. Two had limited rotation capacity and were tested under severe sagging rotation conditions; the other four were loaded symmetrically. The vertical shear resistance of the slab at interior supports assessed. It is concluded that simple plastic design incorporating full plastic moment values may be used in continuous composite beams were compact steel section, adequate slab and shear connection, even under conditions of severe rotation requirement. GRA

N82-16435# Sydney Univ. (Australia). Civil Engineering Labs.
BOLTED CONNECTIONS IN COMPOSITE STRUCTURES
P. Ansourian and Tokuzo Sase Jan. 1981 42 p refs
(PB81-247124; R-382) Avail: NTIS HC A03/MF A01 CSCL 20K

The behavior of composite connection specimens consisting of studded T-beams in negative bending and encased I-section columns bent about the major axis is examined. Both interior and exterior column connections are tested, with the joint between the major steel components effected with simple bolted joints. At interior columns, the ultimate behavior is almost indistinguishable from that of connections with welded joints, and the full plastic moment of the beam including all the reinforcement is exceeded. At external columns, the strength and stiffness are greatly enhanced by the slab and the concrete casing, but the plastic moment of the beam is not transmitted before brittle collapse of the slab. GRA

N82-17056*# Alabama A & M Univ., Huntsville. Dept. of Civil Engineering.
A STUDY OF COMPONENT DESIGN LOADS DUE TO DYNAMIC ENVIRONMENT
Rajinder S. Mehta *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 12 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20K

N82-17063*# Alabama Univ. in Huntsville. Dept. of Mathematics.
SURFACE CONTOUR OF A BIAXIALLY STRAINED, DOUBLY CURVED ANTENNA REFLECTIVE MESH
Annie V. Saylor *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE summer Fac. Fellowship Program Jan. 1982 11 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20K

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N82-16436* National Aeronautics and Space Administration, Washington, D. C.
EARTH RESOURCES: A CONTINUING BIBLIOGRAPHY, WITH INDEXES, ISSUE 31
Oct. 1981 120 p refs
(NASA-SP-7041(31)) Avail: NTIS HC $10.50 CSCL 05B

This bibliography lists 505 reports, articles, and other documents introduced into the NASA scientific and technical information system. Emphasis is placed on the use of remote sensing and geophysical instrumentation in spacecraft and aircraft to survey and inventory natural resources and urban areas. Subject matter is grouped according to agriculture and forestry, environmental changes and cultural resources, geodesy and cartography, geology and mineral resources, hydrology and water management, data processing and distribution systems, instrumentation and sensors, and economic analysis. M.G.

N82-16437*# Wisconsin Univ. - Madison. Environmental Remote Sensing Center.

WETLAND MAPPING FROM DIGITIZED AERIAL PHOTOGRAPHY

F. L. Scarpace, B. K. Quirk, R. W. Kiefer, and S. L. Wynn, Principal Investigators [1982] 31 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS
(E82-10019; NASA-CR-164816) Avail: NTIS HC A03/MF A01 CSCL 08B

Aerial photographic imagery of the Sheboygan Marsh in Wisconsin was scanned through three different narrow band interference filters centered at .45, .55, and .65 micrometers. The output data was transformed into log exposures and corrected for lens fall-off. The scanned area was approximately 253 hectares, with each pixel representing an area of 6.0 meters square on the ground. Training sets were extracted from the digital file of the imagery using the map generated from the photointerpretation and computer generated character displays from the digital file as first approximations. From these training sets, statistics were generated to be used with an elliptical classifier. The classifier generated a digital file from which color coded thematic representations of the classifications could be produced. A two stage table-look-up elliptical algorithm was used as the classification procedure. The wetland boundary was easily delineated, but there was difficulty in mapping the boundaries of vegetation within the wetland. A.R.H.

N82-16438*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

PARTIALLY PROCESSED MULTISPECTRAL SCANNER LANDSAT HIGH-DENSITY TAPES REFORMATTING SYSTEM (HDT-AM/AMC) DESIGN SPECIFICATIONS

Omar J. Holguin, Principal Investigator Dec. 1980 37 p ERTS
(Contract NAS9-15800)
(E82-10020; NASA-CR-161046; JSC-17101; LEMSCO-15905) Avail: NTIS HC A03/MF A01 CSCL 05B

The data interface formats and communication conventions used by the system (HDTRS) are defined. They are used to retrieve partially processed MSS and return beam vidicon type data. T.M.

N82-16439*# Wisconsin Univ., Madison. Inst. for Environmental Studies.

MULTIDISCIPLINARY RESEARCH ON THE APPLICATION OF REMOTE SENSING TO WATER RESOURCES PROBLEMS Progress Report, Aug. 1979 - Jul. 1980

Ralph W. Kiefer, Principal Investigator Jul. 1980 45 p ERTS
(Grant NGL-50-002-127)
(E82-10021; NASA-CR-164815) Avail: NTIS HC A03/MF A01 CSCL 08H

Progress is reported in the following NASA-funded projects: (1) sediment plume study; (2) atmospheric correction to LANDSAT imagery; (3) demonstrating and evaluating opportunites for operational application of LANDSAT data in Wisconsin; and (4) the development of a facility to process imagery for the study of land cover, land use, water quality, electrophoresis gel analysis, prediction of storm and snow flow conditions, physical oceanography, and soils. Associated projects summarized are concerned with vegetation mapping in Sheboygan Marsh, surveying the Green Bay watershed to estimate the impact of land development on bay water quality; thermal scanning of ocean fronts; lake water quality, the Irondequoit River watershed, a model of thermal environment for land use planning, and changes in wetland vegetation near the Columbia Generating Station. Emphasis was focused on the selection of equipment for the efficient processing of images used for water-quality analysis and the development of supporting software for application by users. A.R.H.

N82-16440*# General Electric Co., Philadelphia, Pa. Space Div.

LANDSAT-2 AND LANDSAT-3 FLIGHT EVALUATION REPORT, 23 JANUARY TO 23 JULY 1980

1 Aug. 1980 241 p ERTS
(Contract NAS5-21808)
(E82-10022; NASA-CR-164392; Doc-80SDS4229) Avail: NTIS HC A11/MF A01 CSCL 05B

Flight performance analyses of LANDSAT 2 and LANDSAT 3 are presented. Spacecraft operations and orbital parameters are summarized for each spacecraft. Data are provided on the performance and operation of the following onboard subsystems: power; attitude control; command/clock; telemetry; orbit adjust; magnetic moment compensation assembly; unified S-band/premodulation processor; electrical interface; thermal; narrowband tape recorders; wideband tape recorders; return beam vidicon; multispace multispectral scanner; and data collection. Orbit reference tables for January 1980 through July 1981 are included. A.R.H.

N82-16441*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

CNPQ/INPE: LANDSAT SYSTEM Progress Report, 1 Jun. 1980 - 30 Apr. 1981

Nelson deJesusParada, Principal Investigator and Marcio Nogueira Barbosa May 1981 26 p Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS
(E82-10023; NASA-CR-164814; INPE-2063-RPE/305) Avail: NTIS HC A03/MF A01 CSCL 05B

The current status of the Brazilian LANDSAT facilities is reported. The activities at the Cuiaba tracking and receiving station, and at the electronic processing and photo laboratories are presented. The image data bank is discussed. Operation statistics are given and include: scenes received and recorded, and scenes converted to images; images distributed to users and revenues; CCT's produced to users and revenues; images and CCT's distributed (summary); and LANDSAT data sales/distribution analysis for the year of 1980. The status of the LANDSAT-D project is also reported. T.M.

N82-16442*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

REPORT ON A SHORT COURSE IN REMOTE SENSING AND THE GEOLOGICAL APPLICATIONS OF LANDSAT MSS IMAGERY AT INPE

Nelson deJesusParada, Principal Investigator and Kampta Persaud (Geological Survey Dept. (Guyana)) Oct. 1980 48 p refs Sponsored by NASA ERTS
(E82-10024; NASA-CR-164813; INPE-1923-RPE/249) Avail: NTIS HC A03/MF A01 CSCL 05B

Training in the theory of remote sensing in Brazil involves studying the principles of electromagnetic radiation and the instrumentation used to measure the radiation characteristics of a body. The overall LANDSAT system is considered with emphasis on the multispectral band scanner and Brazil's participation in the LANDSAT Program. Geologic information from MSS imagery is at a regional scale, and three basic types are available: rock and soil, geologic structures, and landforms. Discrimination between alluvium and sedimentary or crystalline bedrock, and between units in thick sedimentary sequences is best, primarily because of topographic expressions and vegetation differences. Discrimination between crystalline rock types is poor. Folds and fractures are the best displayed geologic features and are recognizable by topographic expressions, drainage patterns, and rock or vegetational tonal patterns. Landforms are easily discriminated by their familiar shapes and patterns. The IMAGE-100 computer has the ability to extract thematic information and to enhance the image. A.R.H.

N82-16443*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

REMOTE SENSING DATA APPLIED TO LAND-USE SURVEY AT THE PARAIBA VALLEY

Nelson deJesusParada, Principal Investigator, Magda Adelaide Lombardo, Evlyn Marcia Leao DeMoraesNovo, Madalena Niero, and Celina Foresti May 1981 10 p refs Presented at the 7th Intern. Symp. on Machine Process. of Remotely Sensed Data, West Lafayette, Ind., 23-26 Jun. 1981 Sponsored by NASA ERTS
(E82-10025; NASA-CR-164812; INPE-2081-RPE/315) Avail: NTIS HC A02/MF A01 CSCL 08B

The Paraiba Valley (state of Sao Paulo) was selected as the test site in a study to develop a methodology for land-use survey and to determine the land-use modification rates using data of LANDSAT system. Both visual and automatic interpretation methods were employed to analyze seven land-use classes. They are: urban area, industrial area, bare soil, cultivated area, pastureland, reforestation and natural vegetation. By means of visual interpretation little spectral differences among those classes were observed. The automatic classification of LANDSAT MSS data using maximum likelihood algorithm shows a 39% average error of omission and a 3.4% error of commission for the seven classes. The classification results were under the influences of the complexity of land-uses in the study area, the large spectral variations of analyzed classes and the low resolution of LANDSAT data. Author

N82-16444*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

BRAZILIAN REMOTE SENSING ACTIVITIES, CURRENT AND PROSPECTIVE NEEDS

Nelson deJesusParada, Principal Investigator Apr. 1981 55 p Presented at the United Nations Regional Seminar on Remote Sensing Appl. and Satellite Commun. for Education and Develop., Toulouse, 21-25 Apr. 1981 Sponsored by NASA ERTS
(E82-10026; NASA-CR-164811) Avail: NTIS HC A04/MF A01 CSCL 05A

Remote sensing activities began in Brazil in 1968 and are now concentrated in a satellite and a side-looking radar program. The radar program systematically surveys the natural resources of the whole national territory in a level of detail compatible with a 1:1,000,000 scale, focusing on geology, geomorphology, soil, agricultural aptitude, ecology, and potential land use. The satellite program receives, processes, and disseminates remotely sensed data (basically LANDSAT data) and develops methodologies for applying these data for surveying, monitoring and mapping. Special emphasis is given to national priorities, particularly food and energy. Major results obtained and difficulties encountered in the following applications are described: crop forecasting, reforestation, mineral exploration, fishing chart models, land use, sedimentation in reservoirs, and deforestation in the Amazon forest. A decision was made to upgrade existing LANDSAT reception and processing stations to receive and process MSS and thematic data from LANDSAT-D and from SPOT and to construct two satellites for launch in 1987-1990. A.R.H.

N82-16445*# South Dakota State Univ., Brookings. Remote Sensing Inst.

REMOTE SENSING APPLICATIONS TO RESOURCE PROBLEMS IN SOUTH DAKOTA Semiannual Progress Report, 1 Jul. 1980 - 1 Jan. 1981

Victor I. Myers, Principal Investigator, T. Bailey, R. G. Best, J. C. Eidenshink, D. Hause, H. Haivala, F. A. Schmer, M. Wehde, and K. Winks 1 Jan. 1981 102 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS
(Grant NGL-42-003-007)
(E82-10027; NASA-CR-164810; SDSU-RSI-81-03) Avail: NTIS HC A06/MF A01 CSCL 05A

Data obtained from field studies, aerial color infrared photography, and LANDSAT imagery are being used for resources management in South Dakota. The procedures used and results obtained are described for the following applications: (1) detecting Dutch elm disease in the city of Watertown; (2) determining the distribution and abundance of grasshoppers in Corcon County; (3) inventerying sagebrush in Butte County to support sage grouse management; (4) computerized digitization of aerial thermography of the concentration of Canada geese on the Missouri River Reservoir; (5) surveying to determine the diversion of water along the Belle Fourche River from the Keyhole Reservoir in eastern Wyoming to the City of Belle Fourche in western South Dakota; (6) identifying and locating areas of the Lower James River where stream blockages, streambank erosion, and flooding occur; and (7) acquiring and analyzing data on the landcover in the Lake Herman watershed for the national pilot Model Implementation program. A.R.H.

N82-16446*# Stanford Univ., Calif. Remote Sensing Lab.

INTEGRATION OF LANDSAT WITH GEOLOGY AND AIRBORNE GEOPHYSICS INTO AN OPERATIONAL MINERAL EXPLORATION SYSTEM Final Report, Jun. 1978 - Dec. 1980

R. J. P. Lyon and M. F. Crawford, Principal Investigators Mar. 1981 270 p refs Prepared for JPL, Pasadena, Calif. Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS
(Contract JPL-955047)
(E82-10028; NASA-CR-164433) Avail: NTIS HC A12/MF A01 CSCL 08G

Digital data, gamma-ray spectrometry and aeromagnetic data were digitally combined and analyzed for the Bearlodge area (northeastern Wyoming) where potential resources of thorium and rare earths occur. The combined LANDSAT-geophysical data set revealed several geologic structures that were not evident in a single data set for the study area. Both qualitative and quantitative methods of analysis were performed on the combined data sets. Qualitative analysis of the data was done on a computer controlled, interactive color TV display system by overlaying the various data sets in different colors. In the Bearlodge area, this analysis revealed a pair of northwest-southeast tranding lineaments in the LANDSAT image which appeared to truncate a zone of high radioactivity. An elliptical feature formed by drainages is found. An intense thorium-gamma ray anomaly which coincides with thorium-rare earth mineralization, occurs inside this elliptical feature. T.M.

N82-16447*# Kansas Univ., Lawrence. Space Technology Center.

THE APPLICATION OF REMOTE SENSING TO RESOURCE MANAGEMENT AND ENVIRONMENTAL QUALITY PROGRAMS IN KANSAS Annual Report, 1 Apr. 1980 - 31 Mar. 1981

B. G. Barr and E. A. Martinko, Principal Investigators Jul. 1981 164 p ERTS
(Grant NGL-17-004-024)
(E82-10029; NASA-CR-164756) Avail: NTIS HC A08/MF A01 CSCL 05A

Cooperative demonstration projects involved three principal areas of effort: agricultural and rural development; wildlife habitat and environmental quality; urban and regional planning. Several projects are reported including: an analysis of rangeland conditions in the Cimarron National Grasslands; an inventory of land use and land cover, particularly concerning forested lands, in two Indian reservations in northeast Kansas; an identification of homogeneous revenue regions in the state; an applied agricultural research and development project for Farmland Industries, Inc.; and an analysis of crop phenology and crop patterns in the high plains for identifying optimal dates of LANDSAT data for identifying irrigated lands. Several long-term projects include: weed pest surveys; irrigated lands data compilation from LANDSAT; and the development of an inventory of abandoned mined lands and potential hazard assessment in Kansas. T.M.

N82-16448*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.

DOCUMENTATION OF COMPUTER PROCEDURES FOR LABELING SPRING GRAINS AND DISCRIMINATING BETWEEN SPRING WHEAT AND BARLEY USING LANDSAT DATA

Robert Horvath, Principal Investigator, J. A. Finkler, and E. P. Crist Jul. 1981 81 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15476; Proj. AgRISTARS)
(E82-10030; NASA-CR-161081; SR-EI-04131; ERIM-152400-5-T) Avail: NTIS HC A05/MF A01 CSCL 02C

The computer software necessary to perform two research labeling procedures is described and documented. The first labeling technique identifies spring small grain fields based on similarity of growing season and temporal spectral patterns of development in LANDSAT data. The second technique further labels these fields as either wheat, barley or unknown spring grain, based on their spectral position in Tasseled Cap Greenness-Brightness space for a given day around the dough stage of wheat. The subroutines which carry out the steps of the procedure are coded in PREFOR, a preprocessed FORTRAN. The subroutines were designed to fit into the U.S. Corn/Soybeam baseline procedure software developed for use in the AgRISTARS Program. Documentation of the subroutines are provided in an appendix. Author

N82-16449# Colorado Energy Research Inst., Golden.
OIL SHALE 1982: A TECHNOLOGY AND POLICY PRIMER
Nov. 1981 92 p refs Prepared in cooperation with Colorado School of Mines, Golden
Avail: NTIS HC A05/MF A01

An updated policy primer and technology assessment of the oil shale industry is presented for the benefit of policy makers and the general public. Methods for the development, management, and use of energy are discussed. The biological, economic, social, and political impacts and controversies surrounding current and future energy related activities are considered. Mining methods, retort processing, and methods for disposing of the shale are also discussed. M.D.K.

N82-16450# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SIMPLIFIED ALGORITHM FOR CALCULATING RADIATIVE TRANSFER IN SATELLITE IMAGES [ALGORITMO SIMPLIFICADO PARA CALCULO DE TRANSFERENCIA RADIATIVA EM IMAGENS DE SATELITE]
L. A. V. Dias, A. E. C. Pereira, and G. Camara Jul. 1981 17 p refs In PORTUGUESE; ENGLISH abstract Presented at the 33rd Reuniao Anual da SBPC, 8-15 Jul. 1981, Salvador, Brazil
(INPE-2169-RPE/385) Avail: NTIS HC A02/MF A01

Temporal variations of Earth's atmosphere may cause problems on remote sensing data analysis of satellites, such as LANDSAT, SKYLAB and NIMBUS-7. The apparent radiance of surface features which an orbiting spacecraft measures differs from the intrinsic surface radiance of the object, due to the presence of the intervening atmosphere of Earth. An algorithm for atmospheric correction is presented. J.D.H.

N82-16451*# National Aeronautics and Space Administration, Washington, D. C.
RELATIONSHIPS BETWEEN SOIL MOISTURE-HOLDING PROPERTIES AND SOIL TEXTURE, ORGANIC MATTER CONTENT, AND BULK DENSITY
Hugh C. F. Riley Aug. 1981 26 p refs Transl. into ENGLISH of Rept. no. 49 Kise Agricultural Research Station, Hedmark, Norway, 13 Mar. 1979 p 379-398 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-76674) Avail: NTIS HC A03/MF A01 CSCL 08M

Specimens from the surface horizon and the subsoil of 62 soil horizons in Hedmark and Oppland were investigated to study how the mechanical composition of the soil, the organic matter content and the bulk density affect their porosity and air capacity and their total and available water content. Most of the specimens belonged to the loam group, and a smaller number was from sandy and silty types of soil. Equations were established to make it possible to calculate the water retention curves and the amount of available water from the above mentioned parameters. As a rule, errors derived from the equations are no greater than those which are found in similar research in other countries. Author

N82-16452*# Texas Univ. at Arlington. Applied Research Labs.
DIGITAL CORRELATION OF DDRS DATA Final Report, 1 Oct. 1980 - 30 Sep. 1981
Carroll R. Griffin and James M. Estes 24 Nov. 1981 42 p refs
(Contract NAS9-16208)
(NASA-CR-167494; ARL-TR-81-51) Avail: NTIS HC A03/MF A01 CSCL 05B

The reduction of digital SAR (synthetic aperture radar) data to radar images for use in remote sensing applications was investigated. The critical software operations are discussed in detail, and suggestions and recommendations are made for improving the algorithms currently being used. J.M.S.

N82-16453# Mississippi State Univ., Mississippi State. Mississippi Remote Sensing Center.
DISCRIMATION OF UNIQUE BIOLOGICAL COMMUNITIES IN THE MISSISSIPPI LIGNITE BELT
W. Frank Miller and James D. Culter Jul. 1981 57 p refs Sponsored by the Mississippi Natural Heritage Program
Avail: NTIS HC A04/MF A01

Cost effective remote sensing techniques were developed for identifying large continuous areas of old growth hardwoods within Mississippi's lignite belt that do not exhibit signs of recent disturbance. General implementation of this study was carried out in three phases, with the intent of employing a multistage sampling technique. S.L.

N82-16454*# Ketron, Inc., Wayne, Pa.
UNDERGROUND COAL MINING SECTION DATA Final Report
Charles P. Gabrill and Jack T. Urie 24 Sep. 1981 151 p refs Prepared for JPL
(NASA-CR-168393; JPL-9950-601) Avail: NTIS HC A08/MF A01 CSCL 08I

A set of tables which display the allocation of time for ten personnel and eight pieces of underground coal mining equipment to ten function categories is provided. Data from 125 full shift time studies contained in the KETRON database was utilized as the primary source data. The KETRON activity and delay codes were mapped onto JPL equipment, personnel and function categories. Computer processing was then performed to aggregate the shift level data and generate the matrices. Additional, documented time study data were analyzed and used to supplement the KETRON databased. The source data including the number of shifts are described. Specific parameters of the mines from which there data were extracted are presented. The result of the data processing including the required JPL matrices is presented. A brief comparison with a time study analysis of continuous mining systems is presented. The procedures used for processing the source data are described. N.W.

N82-16455# Colorado State Univ., Fort Collins. Dept. of Forest and Wood Sciences.
THERMAL VEGETATION CANOPY MODEL STUDIES Final Report, 1 Oct. 1978 - 1 Feb. 1980
James A. Smith, K. Jon Ranson, Duong Nguyen, and Lewis E. Link (Army Engineer Waterways Experiment Station, Vicksburg, Miss.) Aug. 1981 221 p refs
(Contract DACW39-77-C-0073; DA Proj. 4A7-62730-AT-42)
(AD-A106422; WES/TR/EL-81-6) Avail: NTIS HC A10/MF A01 CSCL 17/5

This is the final report in a series. Overall objectives of this project are concerned with developing comprehensive optical and thermal signature data bases, the development and evaluation of optical and thermal canopy radiation models, and the interpretation of these measurements. Previous technical reports in this series have described optical and thermal measurements obtained over a coniferous site (Pinus contorta) in Leadville, Colorado. This earlier data set served as a test bed for the development and initial evaluation of first, individual components, that is, needle and leaves, thermal models, and then a composite canopy terrain model. GRA

N82-16456# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
A MODEL FOR SOLVING MULTIPERIOD MULTIRESERVOIR WATER RESOURCES PROBLEMS WITH STOCHASTIC INFLOWS Ph.D. Thesis - Texas Univ. at Austin
Douglas Dewitt Cochard May 1981 282 p refs
(AD-A106769; AFIT-CI-81-48D) Copyright. Avail: Issuing Activity CSCL 13/2

The model developed solves the multiperiod multireservoir water resources problem with stochastic inflows. Of unique importance is the development of a generalized network model which solves nonlinear nonseparable quadratic problems. Quadratic functions are used to measure the future value of water to the system. The nonseparable form stems from the realization that interaction exists between the benefits to be gained from a multireservoir system. Historically this interactive nature has been ignored due to the computational difficulty of measuring and solving such relationships. Also developed is a stochastic dynamic programming approach which utilizes the results to the network optimization as data for a least squares regression analysis. A quadratic function is fit to this data and is used to represent the future value of water to the system for the next period in the dynamic programming approach. This functional representation of the future value of water replaces the standard discrete matrix representation of dynamic programming and greatly reduces the dimensionality problems associated with the dynamic programming approach. In the end, this work represents a rare combination of generalized-nonlinear network flow programming, stochastic dynamic programming and regression analysis. GRA

N82-16457# Defense Mapping Agency, Washington, D.C.

THE DEFENSE MAPPING AGENCY'S PILOT DIGITAL OPERATIONS

Bruce K. Opitz, Jerry Becker, and Henry Cook Nov. 1981 20 p
(AD-A108092) Avail: NTIS HC 02/MF A01 CSCL 08/5

The Pilot Digital Operations (PDO) project is an investigation by the Defense Mapping Agency (DMA) into the practicality and utility of computer mapping. PDO is a set of experiments whose results will be used to help in the evaluation of the feasibility and desirability of performing the MC&G production operations in the digital domain. The importance of this effort is based on the nature of future mapping sources, the desire to automate, as much as possible, the production operations and the basic trends of forthcoming technology. The experiments are meant to test available off the shelf technology. By assessing the current state of the art, DMA can determine what areas require further R&D and what are the risks associated with a digital production system. The early experiments test some basic classes of image processing algorithms. The next set test MC&G production functions. This leads to an experiment which involves actually generating a DMA product. Other experiments deal with general design issues emphasizing the human factors and data base aspects of the problems. PDO is scheduled to be completed by the end of 1982. The results to date are discussed and a brief description of the remaining experiments is given. Author (GRA)

N82-16458# Brookhaven National Lab., Upton, N. Y. Process Sciences Div.

CARBON DIOXIDE POWER PLANT FOR TOTAL EMISSION CONTROL AND ENHANCED OIL RECOVERY

Frederick L. Horn and Meyer Steinberg Aug. 1981 28 p refs
(Contract DE-AC02-76CH-00016)
(DE81-030734; BNL-30046) Avail: NTIS HC A03/MF A01

The design of a compact environmentally acceptable carbon dioxide diluted coal-oxygen fired power plant is described. The plant releases no combustion products to the atmosphere. The oxygen for combustion is separated in an air liquefaction plant and the effluent nitrogen is available for use in oil well production. Recycle carbon dioxide mixed with oxygen replaces the nitrogen for the combustion of coal in the burners. The carbon dioxide produced is used in enhanced oil recovery operations and injected into spent wells and excavated salt cavities for long-term storage. The recovery of CO2 from a coal-burning power plant by this method appears to have the lowest energy expenditure and the lowest by-product cost compared to alternative removal and recovery processes. DOE

N82-16459# Los Alamos Scientific Lab., N. Mex.

STUDY OF THE NOCTURNAL DRAINAGE FLOW OVER A SLOPING PLATEAU IN NORTH-CENTRAL NEW MEXICO

Brent M. Bowen, Jean M. Dewart, and Fred G. Fernald 1981 9 p refs Presented at the 2nd AMS Conf. on Mt. Meteorol., Steamboat Springs, Colo., 9-12 Nov. 1981 Sponsored in part by California Univ.
(Contract W-7405-eng-36)
(DE81-028744; LA-UR-81-2121; CONF-811104-6) Avail: NTIS HC A02/MF A01

The drainage winds at Los Alamos are analyzed. Other local winds are discussed: (1) upslope wind, (2) mountain-valley wind, (3) downslope flow due to terrain-forced thunderstorms, and (4) strong nighttime winds due to inversion decoupling. DOE

N82-16460# Los Alamos Scientific Lab., N. Mex.

NOCTURNAL DRAINAGE FLOW OVER COMPLEX TERRAIN USING A GENERALIZED SHALLOW-FLUID APPROXIMATION

B. E. Freeman, S. S. Bunker, and C. G. Davis 1981 5 p refs Presented at the AMS Conf. on Mountain Meteorology, Steamboat Springs, Colo., 10 Nov. 1981
(Contract W-7405-eng-36)
(DE81-028693; LA-UR-81-2087; CONF-811104-7) Avail: NTIS HC A02/MF A01

An approximate formulation of the problem of nocturnal drainage flow was incorporated into a computer code. This formulation representing a generalization of the shallow fluid approximation, is applicable to complex terrain and accounts for many of the salient physical effects exhibited by drainage flow. These include the dynamics of the katabatic flow, radiation cooling, surface drag, entrainment of the overlying layer, the Coriolis force and interaction with the synoptic flow. Example calculations were performed in one and two horizontal dimensions. These calculations exhibit a number of interesting qualitative flow features which have been observed, such as thinning of the layer over ridges and pooling in valleys. Hydraulic jumps in the flow are discussed. The calculation shows qualitatively correct behavior at modest computational cost. Several processes which are represented parametrically can probably be tuned by comparison with data. DOE

N82-16461# Federal Energy Regulatory Commission, Washington, D. C.

WATER RESOURCES APPRAISAL FOR HYDROELECTRIC LICENSING: JORDAN RIVER BASIN, UTAH

Aug. 1981 75 p refs
(DE82-000416; FERC-0084) Avail: NTIS HC A04/MF A01

The water resources of the Jordan River Basin which covers approximately 3450 sq.mi. in north central Utah are evaluated. Data are presented on existing and potential water resource development, on water use by existing and proposed steam-electric generating plants, and on the status of hydroelectric power plant licensing. Past and current planning studies are summarized. DOE

N82-16462# Department of Energy, Morgantown, W. Va. Energy Technology Center.

PRELIMINARY RESOURCE ASSESSMENT OF COALBED METHANE IN THE UNITED STATES

Apr. 1981 30 p refs
(DE82-001356; DOE/METC/SP-186) Avail: NTIS HC A03/MF A01

Preliminary results of the DOE Methane Recovery from Coalbeds Project reveal that many of the coal regions in the United States have significant volumes of coalbed methane. These results show that 45 cooperative wells drilled to date have helped to update the estimates of methane in the various coal regions. The most promising coal region is in the Green River Basin where preliminary estimates show that the methane potential may be over 23 trillion cubic feet. Another area of considerable interest is in the Arkoma Basin where the methane content of coal samples ranged from 200 to 400 cubic feet per ton (cf/ton) of coal. The methane estimate in this basin is between 1.6 to 3.6 trillion cubic feet. The Piceance Creek coal region is an area presently generating considerable interest and industry activity. The methane content of the coal samples extracted from this basin averaged over 100 cf/ton. The Northern Appalachian region also shows considerable promise. DOE

N82-16463# Oak Ridge National Lab., Tenn. Environmental Sciences Div.

ENVIRONMENTAL IMPACTS ASSOCIATED WITH USING PEAT FOR ENERGY

R. M. Reed, L. D. Voorhees, and P. J. Mulholland 1981 12 p refs Presented at the Intern. Gas Res. Conf., Los Angeles, 28 Sep. 1981
(Contract W-7405-eng-26)
(DE81-032000; CONF-810909-8; Publ-1795) Avail: NTIS HC A02/MF A01

It is found that the major environmental constraints associated with development of peatlands are related to disruption of important regional wetland ecosystems in terms of ground and surface water hydrology, water and air quality, critical habitats for species of limited distribution, and unique ecosystems that have important scientific and educational values. Development of peat resources for energy can be accomplished in an environmentally acceptable manner but will require detailed environmental planning and evaluation of these important regional ecosystems. DOE

N82-16464# New Mexico State Univ., Las Cruces. Dept. of Chemical Engineering.
ENHANCED OIL RECOVERY BY CO2 FOAM FLOODING Quarterly Report, 1 Jul. - 30 Sep. 1981
S. Holbrook, Murty Kuntamukkula, John T. Patton, and Ken Spence (Bartlesville Energy Technology Center, Okla.) 30 Sep. 1981 6 p
(Contract DE-AS21-78ET-12083)
(DE82-000949; DOE/MC-12083/14) Avail: NTIS HC A02/MF A01

Progress reports are presented for the following tasks: apparatus design and construction; foam generation and static stability; dynamic foam stability; foam rheology; oil displacement efficiency; mathematical modeling; and final reports. The past quarter was productive with the major effort directed toward bringing the project to a successful completion. All project objectives were met and the results are encouraging with respect to potential commercial applications. DOE

N82-16465# Rensselaer Polytechnic Inst., Troy, N. Y. Office of Contracts and Grants.
EFFECTS OF POROSITY TYPE, PORE GEOMETRY, AND DIAGENETIC HISTORY ON TERTIARY RECOVERY OF PETROLEUM FROM CARBONATE RESERVOIRS Final Report, 1 Jul. 1979 - 30 Nov. 1980
G. M. Friedman, Kenneth Ruzyla, and Anne Reeckmann Sep. 1981 228 p refs
(Contract DE-AC21-79MC-11580)
(DE82-000896; DOE/MC-11580/5) Avail: NTIS HC A11/MF A01

The mechanisms controlling porosity in Red River formation (Upper Ordovician) carbonate reservoirs, were studied in order to determine what types of pore systems result from a given set of depositional and diagenetic conditions. The Red River Formation of Montana is a major oil-producing reservoir in the area and Cabin Creek Field is a good candidate to undergo tertiary recovery in the future. The stratigraphy, distribution of lithofacies, despositional environments, and diagenesis of the study area are discussed. The various types of porosity present, their origin, how they are distributed throughout the upper Red River reservoirs, and how they relate to depositional environment are discussed. Size and shape of pores and pore throats are in terms of statistical measures from capillary-pressure curves, and by interpretation of scanning-electron micrographs of resin-pore casts. Petrophysical relationships, diagenetic controls on the development and geometry of pore systems, and the role of pore geometry in the determination of carbonate reservior characteristics are also addressed. DOE

N82-16466# Geological Survey, Lincoln, Nebr. Water Resources Div.
ANALYSIS OF STREAM-AQUIFER SYSTEM INTERRELATIONSHIPS IN THE BIG BLUE AND LITTLE BLUE RIVER BASINS IN GAGE AND JEFFERSON COUNTIES, NEBRASKA Final Water-resources Investigation
Michael J. Ellis Jun. 1981 56 p refs Prepared in cooperation with the Kansas-Nebraska Big Blue River Compact Administration, Lincoln, Nebr.
(PB81-245870; USGS/WRD/WRI/81-074; USGS/WRI-81-29) Avail: NTIS HC A04/MF A01 CSCL 08H

Seepage measurements made during the fall of 1978 at 21 sites in the Big Blue River basin and at 35 sites in the Little Blue River basin were used to determine stream gains or losses in 20 drainage areas in the Big Blue River basin and 31 drainage areas in the Little Blue River basin. Analyses of data from these seepage measurements and of available hydrogeologic data indicate that the most significant ground-water contributions to streamflow in the Big Blue and Little Blue River drainage basins in Gage and Jefferson Counties, NE., occur where a direct hydraulic connection exists between a stream and buried coarse-grained deposits of Quaternary age. These deposits occur in two buried bedrock valleys that trend east-northeasterly across the area. GRA

N82-16467# Department of Agriculture, Washington, D.C. Natural Resource Economics Div.
IMPLICATIONS OF LAND, WATER AND ENERGY RESOURCE POLICIES ON AGRICULTURAL PRODUCTION
Klaus Alt, Norman Landgren, Richard Clark, Veral Benson, and William Anderson May 1981 96 p refs
(PB81-244063; AGESS-810513) Avail: NTIS HC A05/MF A01 CSCL 02A

The nature and potential impact of several natural resource and environmental policies on the use of land and water in agricultural production are discussed. The land control policies considered are those which may cause the owners to change land use to reduce soil erosion, to decrease wetland drainage and to preserve prime farmland in agriculture. Water policies are considered which related to the preservation of minimum in stream water flows, increasing the efficiency of irrigation, and meeting competition for water from energy production. DOE

N82-16468# SRI International Corp., Menlo Park, Calif. Atmospheric Science Center.
THE APRAC-3/MOBILE 1 EMISSIONS AND DIFFUSION MODELING PACKAGE: USER'S MANUAL Final Report
P. B. Simmon, R. M. Patterson, F. L. Ludwig, and L. B. Jones Jul. 1981 333 p refs
(Contract EPA-68-02-2548; SRI Proj. 8955)
(PB82-103763; EPA-909/9-81-002) Avail: NTIS HC A07/MF A01 CSCL 13B

Instructions on the use and applicability of the APRAC3/MOBILE1 emissions and diffusion model are presented in this manual. The previous version of the model, APRAC-2, completely revised the methodology of the original model, APRAC-1A. The latest version of the model remains basically the same as APRAC-2 with the exception of two important modifications. First, the emission factor computation methodology has been revised to reflect the EPA's latest update, and the portion of the code that performs those computations has been separated from the model's emission rate and diffusion modules to facilitate incorporation of future emission factor methodology updates. The second modification to the model will increase computation efficiency by automatically treating traffic links in the primary network with low vehicle miles of travel (VMT) as area sources. This will allow the remaining primary link file to fit into core storage rather than incurring the numerous and expensive input/output operations necessary when the primary traffic file is large. GRA

N82-16469# Illinois State Water Survey, Champaign.
ADEQUACY AND ECONOMICS OF WATER SUPPLY IN NORTHEASTERN ILLINOIS, 1985 - 2010
Krishan P. Singh and J. Rodger Adams 1980 212 p refs
(PB82-105495; ISWS/RI-97/80) Avail: NTIS HC A10/MF A01 CSCL 13B

Plans were developed for optimal use of available groundwater and surface water resources for adequate and dependable water supply to all towns in Cook, DuPage, Kane, Lake, McHenery, and Will Counties in Illinois. An effective water-demand model, based on a town's population and industrial employment, was used for future demand projections. The potential yield of sand and gravel and Silurian dolomite aquifers was investigated. Cost functions were developed in terms of July 1980 dollars for wells, pumps, water conveyance system components, reservoirs, and treatment plants. GRA

N82-16470# Little (Arthur D.), Inc., Cambridge, Mass.
DEVELOPMENT OF A THROUGH-THE-EARTH MONITOR SYSTEM Final Open File Report, Oct. 1977 - Dec. 1980
Dec. 1980 32 p refs
(Contract DI-BM-HO-177098)
(PB81-237646; BM-OFR-99-81) Avail: NTIS HC A03/MF A01 CSCL 08I

The system developed uses the mine pager phone line as the primary communication channel and also has the capability of using 208 Hz in the ELF band for wireless transmission through the Earth. The depth for through-the-Earth transmission is expected to be about 80 to 90 meters in high conductivity soil and is limited by the noise level in the ELF band-pass filters. The underground components of the TEM System are energized by mine power through a battery charger-storage battery power

supply. In the event of mine power failure the battery capacity is more than sufficient for 1 week's operation with interrogations every 4 hours.
GRA

N82-16471# Ohio State Univ., Columbus. Water Resources Center.
THE SOURCE AND TRANSPORT OF ARSENIC IN NORTHEASTERN OHIO GROUNDWATERS
Gerald Matisoff, Christopher J. Khourey, and John F. Hall 1981 75 p refs Prepared in cooperation with Case Western Reserve Univ.
(PB81-240525; W81-04658; OWRT-A-061-OHIO(1)) Avail: NTIS HC A04/MF A01 CSCL 08H

Groundwaters in the Northwest School System area of Canal Fulton, Ohio were examined for their hydrologic and chemical properties. In general, the groundwaters were interconnected by a complex system of aquifer and aquitards. Arsenic concentrations were above EPA limits in two wells, but were elevated above the background value throughout much of the area. Theoretical and laboratory studies of arsenic in these groundwaters demonstrates that it is entirely of inorganic make-up, and consists of about equal parts of arsenate and arsenite. Redox considerations suggest that arsenic is controlled by an adsorption equilibrium with ferric hydroxides, and that the reduction of the ferric hydroxides by a recent lowering of Eh and/or pH in the aquifier has liberated both iron and arsenic to solution.
GRA

N82-16472# Terra Tek, Inc., Salt Lake City, Utah. Drilling Research Lab.
SMALL BUSINESS INNOVATION RESEARCH: OIL RECOVERY ENHANCEMENT BY ACOUSTIC MEANS Final Report
Ahmed S. Abou-Sayed, George J. Dvorak, Sidney J. Green, Arion H. Jones, Richard Lingle, and Joseph B. Walsh Feb. 1981 47 p refs
(Grant NSF DAR-79-17712)
(PB81-243842; NSF/IST-81001) Avail: NTIS HC A03/MF A01 CSCL 08I

The effect of a stress wave pulse on a porous saturated rock was studied. Three different situations were analyzed: The presence of a linear viscoelastic (Newtonian) fluid in the pore space; the presence of a nonlinear (non-Newtonian) fluid in the pore space without a pore filled pressure gradient, i.e., fluid flow; and the presence of a nonlinear (non-Newtonian) fluid in the pore space with a pore fluid pressure gradient, i.e., fluid flow. It was found that there can be no pumping action with a periodic stress wave in a system containing a linear, Newtonian fluid for stress pulses in the low frequency range. Pumping will occur for frequencies above about 1,000 cycles per second for the material and pore spacing considered in the study typical of some rocks.
GRA

N82-16473# Geological Survey, St. Paul, Minn.
HYDROGEOLOGIC SETTING OF THE GLACIAL LAKE AGASSIZ PEATLANDS, NORTHERN MINNESOTA
D. I. Siegel Jul. 1981 36 p refs Prepared in cooperation with Dept. of Natural Resources, St. Paul, Minn., and EPA, Washington, D.C.
(PB81-249328; USGS/WRI-81-24; USGS/WRD/WRI/81-077) Avail: NTIS HC A03/MF A01 CSCL 08H

Seven test holes drilled in the Glacial Lake Agassiz Peatlands indicate that the thickness of surficial materials along a north-south traverse parallel to Minnesota Highway 72 ranges from 163 feet near Blackduck, Minnesota to 57 feet about 3 miles south of Upper Red Lake. Lenses of sand and gravel occur immediately above bedrock on the Itasca moraine and are interbedded with lake clay and till under the peatlands. Vertical head gradients measured in a piezometer nest near Blackduck on the moraine are downward, indicative of recharge to the regional ground-water-flow system.
GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-16474* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MULTI-CHANNEL TEMPERATURE MEASUREMENT AMPLIFICATION SYSTEM Patent
James R. Currie, inventor (to NASA) Issued 11 Aug. 1981 8 p Filed 29 Nov. 1979 Supersedes N80-17421 (18 - 08, p 1006)
(NASA-Case-MFS-23775-1; US-Patent-4,282,752;
US-Patent-Appl-SN-098569; US-Patent-Class-73-341) Avail: US Patent and Trademark Office CSCL 10C

A number of differential outputs of thermocouples are sequentially amplified by a common amplifier. The amplified outputs are compared with a reference temperature signal in an offset correction amplifier, and a particularly poled output signal is provided when a differential output is of a discrete level compared with a reference temperature signal.
Official Gazette of the U.S. Patent and Trademark Office

N82-16475* National Aeronautics and Space Administration. Pasadena Office, Calif.
SOLAR HEATED FLUIDIZED BED GASIFICATION SYSTEM Patent
Shaik A. Qader, inventor (to NASA) (JPL, California Inst. of Technology Pasadena) Issued 22 Sep. 1981 5 p Filed 15 May 1980 Supersedes N80-24747 (18 - 15, p 2002) Sponsored by NASA
(NASA-Case-NPO-15071-1; US-Patent-4,290,779;
US-Patent-Appl-SN-150115; US-Patent-Class-48-89;
US-Patent-Class-48-99; US-Patent-Class-126-438;
US-Patent-Class-250-527) Avail: US Patent and Trademark Office CSCL 10A

A solar-powered fluidized bed gasification system for gasifying carbonaceous material is presented. The system includes a solar gasifier which is heated by fluidizing gas and steam. Energy to heat the gas and steam is supplied by a high heat capacity refractory honeycomb which surrounds the fluid bed reactor zone. The high heat capacity refractory honeycomb is heated by solar energy focused on the honeycomb by solar concentrator through solar window. The fluid bed reaction zone is also heated directly and uniformly by thermal contact of the high heat capacity ceramic honeycomb with the walls of the fluidized bed reactor. Provisions are also made for recovering and recycling catalysts used in the gasification process. Back-up furnace is provided for start-up procedures and for supplying heat to the fluid bed reaction zone when adequate supplies of solar energy are not available.
Official Gazette of the U.S. Patent and Trademark Office

N82-16476# Technische Hogeschool, Delft (Netherlands).
INDOOR CLIMATE, OUTDOOR CLIMATE AND ENERGY CONSUMPTION: A NEW APPROACH TO THE CALCULATION OF THE EFFECT OF THE OUTDOOR AND INDOOR CLIMATE ON THE ENERGY CONSUMPTION IN BUILDINGS BASED ON METHODS OF STATISTICAL ANALYSIS
Adolph Hendricus Cornelis vanPaassen 22 Oct. 1981 131 p refs
Avail: NTIS HC A07/MF A01

The calculation efficiency of the yearly energy consumption of HVAC systems by improving the calculation method and by developing compact models of the building's thermal behavior and of the outdoor climate. Emphasis is on modeling the outdoor climate. The thermal behavior of the building is the combined effect of the solar radiation, the outdoor temperature, the energy sources and sinks within the building and the thermal behavior of the structure. It is characterized with the response factor method. With this method an excitation variable (for example the solar radiation) and the variable of interest (the indoor temperature or the cooling load) are related by a series of response factors. An experimental validation is given based on measurements of the indoor- and outdoor climate of a specific room in an excisting building. Also measurements are done on a 'climate room', which is specially designed to check these response factors. T.M.

N82-16477*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NEW FEATURES AND APPLICATIONS OF PRESTO, A COMPUTER CODE FOR THE PERFORMANCE OF REGENERATIVE, SUPERHEATED STEAM TURBINE CYCLES
Yung K. Choo and Peter J. Staiger Jan. 1982 39 p refs
(NASA-TP-1954; E-721) Avail: NTIS HC A03/MF A01 CSCL 10B

The code was designed to analyze performance at valves-wide-open design flow. The code can model conventional steam cycles as well as cycles that include such special features as process steam extraction and induction and feedwater heating by external heat sources. Convenience features and extensions to the special features were incorporated into the PRESTO code. The features are described, and detailed examples illustrating the use of both the original and the special features are given. T.M.

N82-16478*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
VARIABLE GAIN FOR A WIND TURBINE PITCH CONTROL Final Report
Robert C. Seidel and Arthur G. Birchenough Dec. 1981 14 p refs
(Contract DE-AI01-76ET-20320)
(NASA-TM-82751; DOE/NASA/20320-34; E-1067) Avail: NTIS HC A02/MF A01 CSCL 10A

The gain variation is made in the software logic of the pitch angle controller. The gain level is changed depending upon the level of power error. The control uses low gain for low pitch activity the majority of the time. If the power exceeds ten percent offset above rated, the gain is increased to a higher gain to more effectively limit power. A variable gain control functioned well in tests on the Mod-0 wind turbine. T.M.

N82-16479*# New Mexico Univ., Albuquerque. Dept. of Electrical and Computer Engineering.
STUDY OF THE PHOTOVOLTAIC EFFECT IN THIN FILM BARIUM TITANATE Annual Report
W. W. Grannemann and Vineet S. Dharmadhikari Jan. 1982 24 p
(Grant NAG1-95)
(NASA-CR-165081; EE-273(82)NASA-931-1) Avail: NTIS HC A02/MF A01 CSCL 10A

Ferroelectric films of barium titanate were synthesized on silicon and quartz substrates, and the photoelectric effect in the structure consisting of metal deposited ferroelectric barium titanate film silicon was studied. A photovoltage with polarity that depends on the direction of the remanent polarization was observed. The deposition of BaTiO3 on silicon and fused quartz substrates was accomplished by an RF sputtering technique. A series of experiments to study the growth of ferroelectric BaTiO3 films on single crystal silicon and fused quartz substrates were conducted. The ferroelectric character in these films was found on the basis of evidence from the polarization electric field hysteresis loops, capacitance voltage and capacitance temperature techniques and from X-ray diffraction studies. S.L.

N82-16480*# Engelhard Industries, Inc., Edison, N.J.
DEVELOP AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEMS. PHASE 3: FULL-SCALE POWER PLANT DEVELOPMENT Quarterly Progress Report, Feb. - Apr. 1981
24 Jun. 1981 51 p
(Contracts DEN3-241; DE-AI01-80ET-17088)
(NASA-CR-165328; DOE/NASA/0241-1; QR-1) Avail: NTIS HC A04/MF A01 CSCL 10A

Progress toward an integrated 5kW power system based upon methanol fuel and a phosphoric acid fuel cell operating at about 473 K is described in detail. Description includes test results of advanced fuel cell catalysts, a semi-automatic acid replenishment system and a completed 5kW methanol/steam reformer. Design features of a 5kW fuel cell stack are included. The results of a preliminary system test on a reformer/stack/inverter combination are reported. An initial design for a 25 kW stack is presented. Experimental plans are outlined for data acquisition necessary for design of a 50 kW methanol/steam reformer. Activities related to complete mathematical modelling of the integrated power system, including wasteheat utilization are described. T.M.

N82-16481*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SUMMARY AND EVALUATION OF THE CONCEPTUAL DESIGN STUDY OF A POTENTIAL EARLY COMMERCIAL MHD POWER PLANT (CSPEC) Final Report
P. J. Staiger and P. F. Penko Jan. 1982 22 p refs
(Contract DE-AI01-77ET-10769)
(NASA-TM-82734; DOE/NASA/10769-21; E-1046) Avail: NTIS HC A02/MF A01 CSCL 10B

The conceptual design study of a potential early commercial MHD power plant (CSPEC) is described and the results are summarized. Each of two contractors did a conceptual design of an approximately 1000 MWe open-cycle MHD/steam plant with oxygen enriched combustion air preheated to an intermediate temperature in a metallic heat exchanger. The contractors were close in their overall plant efficiency estimates but differed in their capital cost and cost of electricity estimates, primarily because of differences in balance-of-plant material, contingency, and operating and maintenance cost estimates. One contractor concluded that its MHD plant design compared favorably in cost of electricity with conventional coal-fired steam plants. The other contractor is making such a comparison as part of a follow-on study. Each contractor did a preliminary investigation of part-load performance and plant availability. The results of NASA studies investigating the effect of plant size and oxidizer preheat temperature on the performance of CSPEC-type MHD plants are also described. The efficiency of a 1000 MWe plant is about three points higher than of a 200 MWe plant. Preheating to 1600 F gives an efficiency about one and one-half points higher than preheating to 800 F for all plant sizes. For each plant size and preheat temperature there is an oxidizer enrichment level and MHD generator length that gives the highest plant efficiency. B.W.

N82-16482*# Energy Research Corp., Danbury, Conn.
TECHNOLOGY DEVELOPMENT FOR PHOSPHORIC ACID FUEL CELL POWERPLANT, PHASE 2 Final Technical Report
Larry Christner Dec. 1981 159 p refs
(Contracts DEN3-67; DE-AI03-79ET-11272)
(NASA-CR-165426; DOE/NASA/0067-79/7) Avail: NTIS HC A08/MF A01 CSCL 10A

The development of materials, cell components, and reformers for on site integrated energy systems is described. Progress includes: (1) heat-treatment of 25 sq cm, 350 sq cm and 1200 sq cm cell test hardware was accomplished. Performance of fuel cells is improved by using this material; (2) electrochemical and chemical corrosion rates of heat-treated and as-molded graphite/phenolic resin composites in phosphoric acid were determined; (3) three cell, 5 in. x 15 in. stacks operated for up to 10,000 hours and 12 in. x 17 in. five cell stacks were tested for 5,000 hours; (4) a three cell 5 in. x 15 in. stack with 0.12 mg Pt/sq cm anodes and 0.25 mg Pt/sq cm cathodes was operated for 4,500 hours; and (5) an ERC proprietary high bubble pressure matrix, MAT-1, was tested for up to 10,000 hours. A.R.H.

N82-16483*# Engelhard Industries, Inc., Edison, N.J. Industries Div.
DEVELOP AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEMS. PHASE 3: FULL-SCALE POWER PLANT DEVELOPMENT Quarterly Report, May - Jul. 1981
25 Aug. 1981 35 p refs
(Contracts DEN3-241; DE-AI01-80ET-17088)
(NASA-CR-165455; DOE/NASA/0241-2; QR-2) Avail: NTIS HC A03/MF A01 CSCL 10B

A schematic and physical layout is given for the 5kW integrated system and the development status of individual components is described. The results of using a one dimensional mathematical model of the 5kW reformer are presented. Plans for a single-tube reformer test unit for the acquisition of temperature profile data are described. Tentative specifications for a 50kW dc-to-ac inverter are listed. Performance data are given on two 3-cell stacks incorporating semiautomatic acid replenishment systems and improved electrocatalysts. A qualification test on methanol/steam reforming catalyst T2107RS is reported, including a portion in which the catalyst was deliberately poisoned with 800 ppm ethanol in the feed. Author

N82-16484*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.

DEMONSTRATION OF CATALYTIC COMBUSTION WITH RESIDUAL FUEL Final Report

W. J. Dodds and E. E. Ekstedt Aug. 1981 106 p refs
(Contracts DEN3-155; DE-A101-77ET-10350)
(NASA-CR-165369; DOE/NASA/0155-1; R81AEG590) Avail: NTIS HC A06/MF A01 CSCL 10B

An experimental program was conducted to demonstrate catalytic combustion of a residual fuel oil. Three catalytic reactors, including a baseline configuration and two backup configurations based on baseline test results, were operated on No. 6 fuel oil. All reactors were multielement configurations consisting of ceramic honeycomb catalyzed with palladium on stabilized alumina. Stable operation on residual oil was demonstrated with the baseline configuration at a reactor inlet temperature of about 825 K (1025 F). At low inlet temperature, operation was precluded by apparent plugging of the catalytic reactor with residual oil. Reduced plugging tendency was demonstrated in the backup reactors by increasing the size of the catalyst channels at the reactor inlet, but plugging still occurred at inlet temperature below 725 K (845 F). Operation at the original design inlet temperature of 589 K (600 F) could not be demonstrated. Combustion efficiency above 99.5% was obtained with less than 5% reactor pressure drop. Thermally formed NO sub x levels were very low (less than 0.5 g NO2/kg fuel) but nearly 100% conversion of fuel-bound nitrogen to NO sub x was observed. M.D.K.

N82-16485*# Ford Motor Co., Dearborn, Mich.

ADVANCED GAS TURBINE (AGT) POWERTRAIN SYSTEM INITIAL DEVELOPMENT REPORT Progress Report, 20 May - 24 Sep. 1979

Aug. 1980 150 p Prepared in cooperation with AiResearch Mfg. Co., Phoenix, Ariz.
(Contract DEN3-37)
(NASA-CR-165130; DOE/NASA/0037-80/2; DDA-ADR-10086) Avail: NTIS HC A07/MF A01 CSCL 10B

The powertrain consists of a single shaft regenerated gas turbine engine utilizing ceramic hot section components, coupled to a slit differential gearbox with an available variable stator torque converter and an available Ford intergral overdrive four-speed automatic transmission. Predicted fuel economy using gasoline fuel over the combined federal driving cycle (CFDC) is 15.3 km/1, which represents a 59% improvement over the spark-ignition-powered baseline vehicle. Using DF2 fuel, CFDC mileage estimates are 17.43 km/1. Zero to 96.6 km/hr acceleration time is 11.9 seconds with a four-second acclera-tion distance of 21.0 m. The ceramic radial turbine rotor is discussed along with the control system for the powertrain. T.M.

N82-16486*# Texas Research and Engineering Inst., Inc., Port Neches.

SILICON PRODUCTION PROCESS EVALUATIONS Quarterly Technical Progress Report, 1 Aug. - 31 Oct. 1981

Dec. 1981 18 p refs Prepared for JPL
(Contract JPL-956045)
(NASA-CR-163470; DOE/JPL-956045-81/2; JPL-9950-621; QTPR-2) Avail: NTIS HC A02/MF A01 CSCL 10A

Chemical engineering analysis of the HSC process (Hemlock Semiconductor Corporation) for producing silicon from dichlorosilane in a 1,000 MT/yr plant was continued. Progress and status for the chemical engineering analysis of the HSC process are reported for the primary process design engineering activities: base case conditions (85%), reaction chemistry (85%), process flow diagram (60%), material balance (60%), energy balance (30%), property data (30%), equipment design (20%) and major equipment list (10%). Engineering design of the initial distillation column (D-01, stripper column) in the process was initiated. The function of the distillation column is to remove volatile gases (such as hydrogen and nitrogen) which are dissolved in liquid chlorosilanes. Initial specifications and results for the distillation column design are reported including the variation of tray requirements (equilibrium stages) with reflux ratio for the distillation. T.M.

N82-16487*# Honeywell Corporate Material Sciences Center, Bloomington, Minn.

SILICON-ON CERAMIC PROCESS: SILICON SHEET GROWTH AND DEVICE DEVELOPMENT FOR THE LARGE-AREA SILICON SHEET TASK OF THE LOW-COST SOLAR ARRAY PROJECT Final Report

B. L. Grung, J. D. Heaps, F. M. Schmit, S. B. Schuldt, and J. D. Zook 3 Mar. 1981 239 p refs Sponsored in part by DOE Prepared for JPL
(Contract JPL-954356)
(NASA-CR-163476; DOE/JPL-954356-80/15; JPL-9950-617) Avail: NTIS HC A11/MF A01 CSCL 10A

The technical feasibility of producing solar-cell-quality sheet silicon to meet the Department of Energy (DOE) 1986 overall price goal of $0.70/watt was investigated. With the silicon-on-ceramic (SOC) approach, a low-cost ceramic substrate is coated with large-grain polycrystalline silicon by unidirectional solidification of molten silicon. This effort was divided into several areas of investigation in order to most efficiently meet the goals of the program. These areas include: (1) dip-coating; (2) continuous coating designated SCIM-coating, and acronym for Silicon Coating by an Inverted Meniscus (SCIM); (3) material characterization; (4) cell fabrication and evaluation; and (5) theoretical analysis. Both coating approaches were successful in producing thin layers of large grain, solar-cell-quality silicon. The dip-coating approach was initially investigated and considerable effort was given to this technique. The SCIM technique was adopted because of its scale-up potential and its capability to produce more conventiently large areas of SOC. N.W.

N82-16488*# Hemlock Semiconductor Corp., Mich.

DEVELOPMENT OF A POLYSILICON PROCESS BASED ON CHEMICAL VAPOR DEPOSITION (PHASE 1) Quarterly Progress Report, 1 Jan. - 31 Mar. 1981

J. McCormick, A. Arvidson, D. Sawyer, and F. Plahutnik Jun. 1981 51 p refs Sponsored in part by DOE Prepared for JPL
(Contract JPL-955533)
(NASA-CR-163475; DOE/JPL-955533-81/6; JPL-9950-618; QPR-6) Avail: NTIS HC A04/MF A01 CSCL 10A

A dichlorosilane-based reductive chemical vapor deposition (CVD) process demonstrated is capable of producing, at low cost, high quality polycrystalline silicon. Testing of decomposition reactor heat shields to insure that the shield provides adequate personnel protection assuming a worst case explosion was completed. Minor modifications to a production reactor heat shield provided adequate heat shield integrity. Construction of the redesigned PDU (Process Development Unit) to accommodate all safety related information proceeded on schedule. Structural steel work was completed as is the piping and instrumentation design work. Major pieces of process equipment were received and positioned in the support structure and all transfer piping and conduits to the PDU were installed. Construction was completed on a feed system for supplying DCS to an intermediate sized reactor. The feed system was successfully interfaced with a reactor equipped with a modified heat shield. Reactor checkout was completed. Author

N82-16489*# Texas Univ. at Arlington. Center for Electromechanics.

A STUDY PERTAINING TO INERTIAL ENERGY STORAGE MACHINE DESIGNS FOR SPACE APPLICATIONS Final Report

Raymond C. Zowarka Aug. 1981 68 p refs Prepared for JPL
(Contract JPL-955969)
(NASA-CR-163465) Avail: NTIS HC A04/MF A01 CSCL 10C

The preliminary design of a counterrotating fast discharge homopolar generator (HPG) and a counterrotating active rotary flux compressor (CARFC) for space application is reported. The HPG is a counterrotating spool-type homopolar with superconducting field coil excitation. It delivers a 20-ms, 145-kJ pulse to a magnetoplasmahydrodynamic thruster. The peak output current is 42.7 kA at 240 V. After 20 ms the current is 29.7 kA at 167 V. The CARFC delivers ten 50-kJ, 250 microsecond pulses at 50-ms interval to six Xenon flash lamps pumping an Nd glass laser. The flux compressor is counterrotating for torque compensation. Current is started in the machine with a 5-kV, 5-kJ pulse-charged capacitor. Both designs were based upon demonstrated technology. The sensitivity of the designs to technology that may be available in five to ten years was determined. Author

N82-16490*# Spire Corp., Bedford, Mass.
DEVELOPMENT AND FABRICATION OF A SOLAR CELL JUNCTION PROCESSING SYSTEM
S. Bunker Oct. 1981 30 p refs Sponsored in part by DOE Prepared for JPL
(Contracts NAS7-100; JPL-955640)
(NASA-CR-163474; DOE/JPL-955640-81/7; JPL-9950-623; QR-10073-07; QR-7) Avail: NTIS HC A03/MF A01 CSCL 10A

A solar cell junction processing system was developed and fabricated. A pulsed electron beam for the four inch wafers is being assembled and tested, wafers were successfully pulsed, and solar cells fabricated. Assembly of the transport locks is completed. The transport was operated successfully but not with sufficient reproducibility. An experiment test facility to examine potential scaleup problems associated with the proposed ion implanter design was constructed and operated. Cells were implanted and found to have efficiency identical to the normal Spire implant process. S.L.

N82-16491*# Motorola, Inc., Phoenix, Ariz. Semiconductor Group.
PROCESSING EXPERIMENTS ON NON-CZOCHRALSKI SILICON SHEET Final Report
R. A. Pryor, L. A. Grenon, N. G. Sakiotis, E. M. Pastirik, T. O. Sparks, and R. N. Legge Apr. 1981 221 p refs Sponsored in part by DOE Prepared for JPL
(Contract JPL-955844)
(NASA-CR-163473; DOE/JPL-955844-81/2; JPL-9950-624) Avail: NTIS HC A10/MF A01 CSCL 10A

A program is described which supports and promotes the development of processing techniques which may be successfully and cost-effectively applied to low-cost sheets for solar cell fabrication. Results are reported in the areas of process technology, cell design, cell metallization, and production cost simulation. T.M.

N82-16492*# Boeing Engineering and Construction, Seattle, Wash. Solar Systems Group.
A CONCEPTUAL DESIGN STUDY OF POINT FOCUSING THIN-FILM SOLAR CONCENTRATORS Final Report
11 Nov. 1981 128 p refs Prepared for JPL
(Contract JPL-955804)
(NASA-CR-163472; JPL-9950-625) Avail: NTIS HC A07/MF A01 CSCL 10A

Candidates for reflector panel design concepts, including materials and configurations, were identified. The large list of candidates was screened and reduced to the five most promising ones. Cost and technical factors were used in making the final choices for the panel conceptual design, which was a stiffened steel skin substrate with a bonded, acrylic overcoated, aluminized polyester film reflective surface. Computer simulations were run for the concentrator optics using the selected panel design, and experimentally determined specularity and reflectivity values. Intercept factor curves and energy to the aperture curves were produced. These curves indicate that surface errors of 2 mrad (milliradians) or less would be required to capture the desired energy for a Brayton cycle 816 C case. Two test panels were fabricated to demonstrate manufacturability and optically tested for surface error. Surface errors in the range of 1.75 mrad and 2.2 mrad were measured. T.M.

N82-16493*# Astro Research Corp., Carpinteria, Calif.
EFFICIENT STRUCTURES FOR GEOSYNCHRONOUS SPACECRAFT SOLAR ARRAYS. PHASE 1, 2 AND 3 Final Report
Louis R. Adams and John M. Hedgepeth 14 Sep. 1981 102 p refs Prepared for JPL
(Contracts NAS7-100; JPL-955647)
(NASA-CR-163471; ARC-TN-1098; JPL-9950-626) Avail: NTIS HC A06/MF A01 CSCL 10A

Structural concepts for deploying and supporting lightweight solar-array blankets for geosynchronous electrical power are evaluated. It is recommended that the STACBEAM solar-array system should be the object of further study and detailed evaluation. The STACBEAM system provides high stiffness at low mass, and with the use of a low mass deployment mechanism, full structural properties can be maintained throughout deployment. The stowed volume of the STACBEAM is acceptably small, and its linear deployment characteristic allows periodic attachments to the solar-array blanket to be established in the stowed configuration and maintained during deployment. N.W.

N82-16494*# IIT Research Inst., Chicago, Ill.
INTERNATIONAL MARKET ASSESSMENT OF STAND-ALONE PHOTOVOLTAIC POWER SYSTEMS FOR COTTAGE INDUSTRY APPLICATIONS Final Report
Therese M. Philippi Nov. 1981 290 p refs
(Contracts DEN3-197; DE-AI01-79ET-20485)
(NASA-CR-165287; DOE/NASA/0197-1; IITRI-J06519) Avail: NTIS HC A13/MF A01 CSCL 10B

The final result of an international assessment of the market for stand-alone photovoltaic systems in cottage industry applications is reported. Nonindustrialized countries without centrally planned economies were considered. Cottage industries were defined as small rural manufacturers, employing less than 50 people, producing consumer and simple products. The data to support this analysis were obtained from secondary and expert sources in the U.S. and in-country field investigations of the Philippines and Mexico. The near-term market for photovoltaics for rural cottage industry applications appears to be limited to demonstration projects and pilot programs, based on an in-depth study of the nature of cottage industry, its role in the rural economy, the electric energy requirements of cottage industry, and a financial analysis of stand-alone photovoltaic systems as compared to their most viable competitor, diesel driven generators. Photovoltaics are shown to be a better long-term option only for very low power requirements. Some of these uses would include clay mixers, grinders, centrifuges, lathes, power saws and lighting of a workshop. Author

N82-16495*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE NASA LEWIS LARGE WIND TURBINE PROGRAM
R. L. Thomas and D. H. Baldwin 1981 24 p refs Presented at the 5th Biennial Wind Energy Conf. and Workshop, Washington, D.C., 5-7 Oct. 1981
(Contract DE-AI01-79ET-20305)
(NASA-TM-82761; DOE/NASA/20305-7; E-1082) Avail: NTIS HC A01/MF A01 CSCL 10B

The program is directed toward development of the technology for safe, reliable, environmentally acceptable large wind turbines that have the potential to generate a significant amount of electricity at costs competitive with conventional electric generation systems. In addition, these large wind turbines must be fully compatible with electric utility operations and interface requirements. Advances are made by gaining a better understanding of the system design drivers, improvements in the analytical design tools, verification of design methods with operating field data, and the incorporation of new technology and innovative designs. An overview of the program activities is presented and includes results from the first and second generation field machines (Mod-OA, -1, and -2), the design phase of the third generation wind turbine (Mod-5) and the advanced technology projects. Also included is the status of the Department of Interior WTS-4 machine. T.M.

N82-16496# Technische Hogeschool, Delft (Netherlands). Dept. of Urban and Regional Planning.
WIND ENERGY PLANNING CONSIDERATIONS [WINDEN-

ERGIE IN PLANOGISCH PERSPEKTIEF]

A. vanSetten and H. Voogd Apr. 1980 19 p refs In DUTCH Presented at Planning Conf., Amsterdam, Apr. 1980
(PM-80-4) Avail: NTIS HC A02/MF A01

Windpowered utilization in the Netherlands and the search for wind rich areas is discussed. It is suggested that large water areas, like the North Sea and Market Lake, are the preferred areas for wind powered energy production. Storage of wind energy in large water basins is suggested. Government wind energy production programs like the installation of wind parks, and difficulties because of opposing local interests are discussed. Windmill exploration by small private industry, rather than by government administered programs, are outlined. E.A.K.

N82-16497# Eagle-Picher Industries, Inc., Joplin, Mo. Electronics Div.

CALCIUM INORGANIC ELECTROLYTE BATTERY DEVELOPMENT Final Report, Aug. 1977 - Oct. 1980

R. L. Higgins Wright-Patterson AFB, Ohio AFWAL Aug. 1981 82 p refs
(Contract F33615-77-C-2020; AF Proj. 3145)
(AD-A106199; AFWAL-TR-81-2064) Avail: NTIS HC A05/MF A01 CSCL 10/3

Further development of Ca/SOC12 was studied. The use of lithium (Li) anodes with thionyl chloride (SOC12) was investigated advancing from laboratory cells to a viable 400-600 WH/Kg system demonstrated in cell sizes up to 17000 AH. Performance improvements were made, espcially in problems such as voltage delay due to anode passivation. Response to abuse of Li/SOC12 cells primarily results from the reactivity of molten Li, a problem compounded by its low melting point of 180 C. It is assumed that most Group I and II metals are highly reactive in the molten state and the problems might be reduced by using materials with higher melting points. Several Group I and II elements have energy densities near that of Li, such as Na, Ca and Mg; of these three however, only Ca and Mg have acceptable melting points. Ca, though lower in energy density than Mg, is capable of 5.93 WH/cc, has a working voltage of approximately 3.0V, and has a higher melting point than Mg. E.A.K.

N82-16498# Mid-American Solar Energy Complex, Minneapolis, Minn.

PASSIVE-SOLAR RETROFIT CONCEPTS

Sep. 1981 49 p
(Contract DE-AC02-79CS-30150)
(DE82-000453; MASEC-PA-81-030) Avail: NTIS HC A03/MF A01

Four retrofit passive solar designs for single family dwellings are presented. The first design, for a house in Minnesota, involves insulating wall cavities and the attic with blown cellulose, reduction of infiltration, and installation of insulating shades on all windows. The second, for a house in Michigan, combines weatherization, a sunspace with clerestory, and a thermosiphoning collector. The third, for a house in Missouri, involves the addition of a large sunspace with a passive solar hot water preheater for a hot tub. The fourth, for a house in Indiana, combines intensive weatherization with a two story sunspace and thermal chimney addition. All designs are thoroughly illustrated. DOE

N82-16499# Mid-American Solar Energy Complex, Minneapolis, Minn.

PASSIVE-SOLAR MULTI-FAMILY CONCEPTS

Aug. 1981 88 p
(Contract DE-AC02-79CS-30150)
(DE82-000456; MASEC-PA-81-033) Avail: NTIS HC A05/MF A01

The potential for saving energy and money through the use of passive solar techniques in multi family buildings is examined. Seven designs for passive solar apartment/townhouse buildings are presented. Each design is described and illustrated. The buildings are sited in Indiana, Michigan, Missouri, Ohio, South Dakota, and Minnesota. DOE

N82-16500# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

SIMPLE PREDICTIVE MODEL FOR PERFORMANCE OF DESICCANT BEDS FOR SOLAR DEHUMIDIFICATION

Robert S. Barlow Aug. 1981 7 p refs Presented at the Intern. Passive and Hybrid Cooling Conf., Miami Beach, Fla., 11-13 Nov. 1981; sponsored by the America Section of the International Solar Energy Society
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-023606; SERI/TP-631-1329; CONF-811109-1) Avail: NTIS HC A02/MF A01

A computer model for the absorption/desorption process that predicts the performance of desiccant beds for solar regenerated dehumidification of passively cooled buildings is outlined. The model uses simple algebraic equations for steady state heat and mass exchangers. The validity and accuracy of the model is demonstrated. The physics of the adsorption process in two psychrometric process lines is discussed. DOE

N82-16501# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

CASE STUDIES OF LOW-TO-MODERATE TEMPERATURE HYDROTHERMAL ENERGY DEVELOPMENT

Oct. 1981 126 p refs Prepared in cooperation with California Univ., Lawrence Berkeley Lab.
(Contract DE-AC07-76ID-01570)
(DE82-000883; IDO-10098) Avail: NTIS HC A07/MF A01

Six development projects that use low to moderate temperature geothermal resources were examined. The projects illustrate many facets of hydrothermal development. The history of this development, its exploratory methods, and its resource definition, are described and address legal, environmental, and institutional constraints. DOE

N82-16502# Los Alamos Scientific Lab., N. Mex.

ALTERNATE THERMOCHEMICAL CYCLES

Charles M. Hollabaugh, Malvin G. Bowman, and Charles L. Peterson 1981 6 p refs Presented at Ann. Contractors' Rev. Meeting on Thermal and Chem. Storage, Tysons Corners, Va., 14-16 Sep. 1981 Submitted for publication
(DE81-030248; LA-UR-81-2513; CONF-810940-5) Avail: NTIS HC A02/MF A01

Experimental verification of all steps in the bismuth sulfate cycle was obtained. At acid concentrations greater than 52.7 wt percent, normal Bi2(SO4)3 is formed but at lower concentrations, greater than 3.0 wt percent, the bismuth oxysulfate, BiO(SO4)2, is formed. Upon heating to temperatures in the range of 975 to 1150 K, both decompose by the loss of SO3 to a final composition of Bi2O2 3(SO4)07. The higher sulfates are regenerated by reaction of this product with H2SO4. Solids handling and decomposition were studied in a laboratory-scale rotary kiln and a dual-particle fluidized bed. Kiln experiments with Bi2O(SO4)2, ZnSO4, and Co3O4 show that in temperature range of 1125 to 1285 K, over 90 percent decomposition occurs during the 60 s residence time. A higher temperature is required for La2(SO4)3 decomposition. A dual-particle fluidized bed was constructed and tested with ZnSO4 powder. T.M.

N82-16503# Sandia Labs., Albuquerque, N. Mex.

COMPATIBILITY AND ACCELERATED AGING STUDY FOR Li(Si)/FeS2 THERMALLY ACTIVATED BATTERIES

J. W. Mead, J. Q. Searcy, P. A. Neiswander, and R. L. Poole 1981 12 p refs Presented at the JOWOG-12 Conf., Alermaston, England, 21 Sep. 1981
(DE81-030210; SAND-81-1955C; CONF-810953-1) Avail: NTIS HC A02/MF A01

Thermally activated batteries using Li(Si)/FeS2 for use in systems which require a storage life of 25 years and high reliability are examined. All of the materials in the system, both organic and inorganic are incorporated except the heat paper and electric match are studied. No compatibility or aging problems are indicated. The following results are reported: oxygen vanishes from the overgas in containers that were accelerated aged; hydrogen increases sharply in the overgas initially but generally decreases as aging progresses. No unexpected or significant changes were observed in the volume resistivity, glass transition temperature, or shear modulus or organic materials. DOE

N82-16504# Oak Ridge National Lab., Tenn.

ENERGY IN THE 1980S: A CALL FOR LEADERSHIP. THE PUBLIC AWARENESS SYMPOSIUM

Jul. 1981 79 p refs Presented at WATTec Energy Awareness Conf., Knoxville, Tenn., 18-20 Feb. 1981

(Contract W-7405-eng-26)
(DE81-027613; CONF-810250) Avail: NTIS
HC A05/MF A01

A variety of programs was offered. Issues relevant to US energy problems were addressed. The energy-related wares of 43 leading domestic and foreign industrial and commercial institutions were displayed. The public awareness symposium included business, government, religious, and educational leaders. The technical societies' presidents' program brought together 25 national presidents or their representatives to discuss mutual concerns. Finally, two $1000 engineering and communication scholarships were awarded for creating new and novel ways of providing the general public with information on complex energy-related technical matters. DOE

N82-16505# Sandia Labs., Albuquerque, N. Mex.

POTENTIAL FOR USING PARABOLIC TROUGH COLLECTORS TO SUPPLEMENT POWER CYCLE BOILERS

W. P. Schimmel, Jr. and L. L. Lukens 1981 17 p refs Presented at Winter Ann. Meeting of the ASME Technol. and Soc. Div., Washington, D.C., 15 Nov. 1981
(Contract DE-AC04-76DP-00789)
(SAND-81-0572C; CONF-811101-3) Avail: NTIS
HC A02/MF A01

The advantage of such a system is that solar energy is used to heat the water in a steam Rankine cycle device up to the superheat regime, thus displacing the fossil fuel usually required. The temperature associated with this portion of the power cycle is typically on the order of 320 C or less, which makes it compatible with current parabolic trough collector systems. A system model which lends itself to optimization studies was constructed and exercised over a range of the multiparameter space involved. The collector field, storage, supplementary fossil boiler and superheater, and turbine/generator traded off to obtain a series of economically optimal systems for various years and solar fractions. DOE

N82-16506# Oak Ridge National Lab., Tenn.

DEVELOPMENT OF A HIGH-EFFICIENCY GAS-FIRED WATER HEATER

A. D. Vasilakis, J. Gerstmann, J. F. Pearson, and D. J. Walukas (Union Carbide Corp., Oak Ridge, Tenn.) 1981 11 p refs Presented at Intern. Gas Res. Conf., Los Angeles, 28 Sep. 1981
(Contract W-7405-eng-26)
(DE81-032026; CONF-810909-6) Avail: NTIS
HC A02/MF A01

Unlike conventional water heaters which use a center-flue water storage tank, the design decouples the water heating and storage functions through the use of an external heat exchanger, thus reducing standby losses. The compact high-effectiveness heat exchanger achieves a recovery efficiency of 82 percent, using a naturally-aspirated, 100 percent premixed burner. Besides its low cost, this burner has the additional advantage of producing very low emissions of NO sub x. The use of an internally insulated polyethylene lined 40 gallon storage tank is expected to provide significantly longer service life than conventionally-lined steel tanks, thereby enhancing consumer acceptance. A description of the design of the water heater and the results of prototype efficiency and emission tests are included. Also included are data on heat exchanger and storage tank temperature distributions, standby losses, and hot water delivery capability. T.M.

N82-16507# Oak Ridge National Lab., Tenn. Health and Safety Research Div.

RISK OF PRODUCING ENERGY, AND CONSERVING IT

H. Inhaber, G. Caton, and R. Gove 1981 25 p refs Presented at 6th Intern. Symp. on the Uranium Inst., London, Sep. 1981
(Contract W-7405-eng-26)
(DE81-030807; CONF-810965-1) Avail: NTIS
HC A02/MF A01

The idea that society can have a free lunch in the form of a risk-free energy system is rapidly fading away. All energy systems have some risk to human health, and for some it can be substantial. Nuclear power seems to have both a low occupational and public risk compared to other forms. In addition to this, research is presented with calculations on some of the risk associated with sealing up houses to keep heat in. When the effects of the accumulated radon are included; the risk per unit energy saved for this form of conservation can be great. Indeed, it appears to be much greater than the public risk of nuclear power. DOE

N82-16508# Oak Ridge National Lab., Tenn. Energy Div.

GAS-HEAT-PUMP DEVELOPMENT

Frederick A. Creswick 1981 6 p Presented at the Intern. Gas Res. Conf., Los Angeles, 28 Sep. - 1 Oct. 1981
(Contract W-7405-eng-26)
(DE81-031991; CONF-810909-7) Avail: NTIS
HC A02/MF A01

Incentives for the development of gas heat pumps are discussed. Technical progress made on several promising technologies was reviewed. The status of development of gas-engine-driven heat pumps, the absorption cycle for the near- and long-term gas heat pump systems, the Stirling engine, the small Rankine-cycle engines, and gas-turbine-driven heat pump systems were briefly reviewed. Progress in the US, Japan, and Europe is noted. DOE

N82-16509# Rasor Associates, Inc., Sunnyvale, Calif.

THERMIONIC-COMBUSTOR COMBINED-CYCLE SYSTEM. VOLUME 3: A THERMIONIC CONVERTER DESIGN FOR GAS-TURBINE COMBINED-CYCLE SYSTEMS

G. O. Fitzpatrick, E. J. Britt, and R. S. Dick, Jr. May 1981 19 p refs
(Contract DE-AC02-76ET-11293)
(DE82-000729; DOE/ET-11293/T4-Vol-3;
COO-2263-20-Vol-3; NSR-2-20-Vol-3) Avail: NTIS
HC A02/MF A01

Thermionic converter design is strongly influenced by the configuration of the heat source and heat sink. These two externally imposed conditions are of major importance in arriving at a viable converter design. In addition to these two factors, the economical and reliable transfer of energy internally within the converter is another major item in the design. The engineering trade-offs effects made in arriving at the design chosen for the gas turbine combined cycle combustor are reviewed. DOE

N82-16510# Department of Energy, Washington, D.C. Assistant Secretary for International Affairs.

ENERGY INDUSTRIES ABROAD

Sep. 1981 299 p refs
(DE82-001896; DOE/IA-0012) Avail: NTIS
HC A13/MF A01

The relationships between foreign governments and energy industries in many of the world's most important energy producing and consuming nations are examined. The history of hydrocarbon exploration and production is traced and the concessidnary and other contractual arrangements entered into by foreign governments and international oil companies are reviewed. Petroleum legislation that was enacted, how government institutions gradually assumed more responsibility for energy matters, and how the former concessionaires adapted to accommodate this increased government participation in the energy sector is described. DOE

N82-16511# Lincoln Lab., Mass. Inst. of Tech., Lexington.

REDUCING CONVECTIVE LOSSES FROM COVER GLAZINGS OF SOLAR-THERMAL COLLECTORS

Pattabiraman Raghuraman and Daniel Kon 1981 8 p refs Presented at the Winter Ann. Meeting of the ASME Technol. and Soc. Div., Washington, D.C., 15-20 Nov. 1981
(Contract DE-AC02-76ET-20279)
(DE81-025726; DOE/ET-20279/146; CONF-811101-9) Avail: NTIS HC A02/MF A01

Convective heat losses from cover glazings of solar thermal collectors are reduced by forming perpendicular crisscross rectangular grooves on the glazing which cause the air flow to form recirculating zones in the grooves. Experiments on the effects of varying groove geometry show that the cover-glazing convective heat transfer coefficient can be reduced by a factor of four or better. Results of the experimental and analytical work and a description of the design considerations in optimizing the groove geometry are presented. DOE

N82-16512# California Univ., Livermore. Lawrence Livermore Lab.
TEMPERATURE AND CONCENTRATION TRANSIENTS IN THE ALUMINUM-AIR BATTERY
Robert V. Homsy 26 Aug. 1981 22 p refs Presented at the Electrochem. Soc. Conf. Denver, Colo., 11 Oct. 1981
(Contract W-7405-eng-48)
(DE81-030338; UCRL-86648; CONF-811013-4) Avail: NTIS HC A02/MF A01

Coupled conservation equations of heat and mass transfer are solved that predict temperature and concentration of the electrolyte of an aluminum-air battery system upon start-up and shutdown. Results of laboratory studies investigating the crystallization kinetics and solubility of the caustic-aluminate electrolyte system are used in the predictions. Temperature and concentration start-up transients are short, while during standby conditions, temperature increases to maximum and decreases slowly.
DOE

N82-16513# Arizona Univ., Tucson. Engineering Experiment Station.
CHOICE AND UTILIZATION OF ENERGY-USING DURABLES
Electric Power Research Inst. Aug. 1981 349 p refs Workshop held in Boston, 1-2 Nov. 1979 Sponsored by Electric Power Research Inst.
(EPRI Proj. 1050)
(DE81-904228; EPRI-EA-1981; CONF-7911164) Avail: NTIS HC A15/MF A01

The adequacy of state of the art methods to analyze the choice and utilization of energy using durables by households is assessed. The long run adjustment process of households to higher energy prices is characterized in large part by their choice of type and efficiency of new energy using durables (e.g., major appliances and automobiles). Trade-offs must be made between original purchase price and future operating costs, the latter depending not only on prospective energy costs but on expected levels of utilization. Considerable progress has been made in modeling these important factors and their interactions. DOE

N82-16514# Pacific Northwest Lab., Richland, Wash.
ANALYSIS TO DEVELOP A PROGRAM FOR ENERGY-INTEGRATED FARM SYSTEMS
D. E. Eakin, M. A. Clark, L. K. Inaba, and K. I. Johnson Sep. 1981 127 p refs
(Contract DE-AC06-76RL-01830)
(DE82-000318; PNL-3981) Avail: NTIS HC A07/MF A01

A program to use renewable energy resources and possibly develop decentralization of energy systems for agriculture is discussed. The program's objective is determined by: (1) an analysis of the technologies that could be utilized to transform renewable farm resources to energy by the year 2000, (2) the quantity of renewable farm resources that are available, and (3) current energy-use patterns. Individual research, development, and demonstration projects are fit into a national program of energy-integrated farm systems on the basis of market need, conversion potential, technological opportunities, and acceptability. Quantification of these factors for the purpose of establishing program guidelines is conducted using the following four precepts: (1) market need is identified by current use of energy for agricultural production; (2) conversion potential is determined by the availability of renewable resources; and (3) technological opportunities are determined by the state-of-the-art methods, techniques, and processes that can convert renewable resources into farm energy.
DOE

N82-16515# Department of Energy, Washington, D. C. Office of Assistant Secretary for Conservation and Renewable Energy.
DAYLIGHTING
Sep. 1981 12 p
(DE82-000930; DOE/CE-0022) Avail: NTIS HC A02/MF A01

A catalog focusing on daylighting design and calculation methods in commercial buildings is presented. Primary sources of daylight in buildings are described briefly. Problems of appropriate design to maximize the use of daylighting; lighting controls; and operable Sun control devices are discussed. DOE

N82-16516# Oak Ridge National Lab., Tenn. Engineering Technology Div.
ASSESSMENT OF SEASONAL-EFFICIENCY MODELS FOR NATURAL-GAS-FIRED RESIDENTIAL FURNACES
N. Domingo and E. G. Keshock Sep. 1981 81 p refs
(DE82-000499; ORNL-5801) Avail: NTIS HC A05/MF A01

Several methods for determining the seasonal efficiency and operating costs of residential fossil-fuel-fired heating systems are discussed. Four computer models for determining such efficiency, the Honeywell HFLAME model, the National Bureau of Standards DEPAF model, the Institute of Gas Technology SPACE-FI model, and the Carrier Corporation model, are separately described, discussed, and evaluated in relation to their use in predicting seasonal performance of residential gas-fired heating systems. A general conclusion is that purely analytical estimations of seasonal furnace efficiencies are not generally reliable principally because of: (1) a variety of furnace designs; and (2) the different infiltration characteristics of homes.
DOE

N82-16517# Foster Wheeler Corp., Livingston, N.J.
INDUSTRIAL STEAM SUPPLY SYSTEM CHARACTERISTICS PROGRAM. PHASE 2: LOW- AND MEDIUM-Btu GAS-FIRED BOILERS WITH ASSOCIATED GASIFICATION PLANTS *Final Report*
Sep. 1981 292 p refs Prepared for ORNL
(Contract W-7405-eng-26)
(DE82-000535; ORNL/Sub-80/13847/2; FWDC-9-41-8903) Avail: NTIS HC A13/MF A01

For each system, two coal sources were considered, an Eastern high-sulfur bituminous coal and a Western low-sulfur subbituminous coal. Eight different systems were studied and conceptual cost estimates prepared for each of them. Scaling factors were developed over a range of plant sizes; cost ratios were prepared for multiple unit systems; and cost sensitivities vs degree of sulfur removal were developd for each of the on-site gasification systems.
T.M.

N82-16518# Brookhaven National Lab., Upton, N. Y. Technology and Data Div.
MODELING SOLAR-ENERGY SYSTEMS FOR ECONOMIC OPTIMIZATION
Richard W. Leigh 1981 6 p refs Presented at the 4th World Eng. Congr., Atlanta, 12 Oct. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030030; BNL-29963; CONF-811030-2) Avail: NTIS HC A02/MF A01

A simple analytic model of solar energy systems is presented which can describe how the performance of the system depends on collector area and storage capacity with surprising accuracy. The model can then be used to determine easily the optimal (lower cost) configuration of collector area and storage capacity, and to see how this configuration will change under various possible fuel, collector, or storage costs.
DOE

N82-16519# Booz-Allen and Hamilton, Inc., Bethesda, Md. Energy Analysis and Environment Div.
ASSESSMENT OF EMERGING ENERGY SOURCES *Summary Report*
Sep. 1981 43 p refs
(DE82-900318; EPRI-EA-2023-SY) Avail: NTIS HC A03/MF A01

The results of a broad review and analysis of the commercialization potential for eight emerging sources of energy are summarized. Tight gas sands, heavy oil, methane from geopressured aquifers, oil shale, enhanced oil recovery, advanced coal mining technologies, and underground coal gasification are discussed. Each source of energy or technology was evaluated with respect to six factors affecting commercialization: size and characteristics of resource; technical and economic performance; relevant energy market growth rates; logistical considerations; development lead times; and regulatory and institutional factors. The evaluation was based on a review of existing literature, extensive interviews with industry expert, and an overall assessment of the degree to which these factors would constrain commercial development. In addition, estimates were made of supply potential from each emerging energy.
DOE

N82-16520# Oak Ridge Associated Universities, Tenn. Labor and Policy Studies Program.

SOME EMPLOYMENT AND EARNINGS IMPLICATIONS OF REGIONAL BIOMASS ENERGY UTILIZATION: NEW ENGLAND AND THE CORNBELT STATES

Wayne Stevenson, Sharon E. Bell, Larry M. Blair, Ruth M. Gove, and Joanna R. Little Aug. 1981 244 p refs
(Contract DE-AC05-76OR-00033)
(DE81-030689; ORAU-181) Avail: NTIS HC A11/MF A01

Because of their abundant forest and agricultural biomass resources, New England and the Cornbelt are likely to grow considerably in the development of biomass energy systems during the next decade or two. Forty thousand or more permanent jobs might be created in New England's wood energy industry by the end of the century. If alcohol-fuel use continues to grow, even greater potential for employment in biomass energy exists in the Cornbelt states. The associated earnings would be quite substantial for both regions. The direct combustion of wood and activities related to alcohol-fuel production are expected to be the major contributors to biomass energy production, employment, and earnings; but other biomass systems show potential as well. Energy extraction from municipal waste, anaerobic digestion of animal manure, and other biomass conversion systems will all generate employment as they grow in use. DOE

N82-16521# Exxon Research and Engineering Co., Linden, N.J. Advanced Energy Systems Labs.

DESIGN AND COST ANALYSIS OF A 20-kWh BIPOLAR ZINC-BROMINE BATTERY

Harry Einstein, Richard V. Bellows, Patrick Grimes, Edward Kantner, Paul Malachesky, and Kenneth Newby 1981 4 p refs Presented at 6th Elec. Vehicle Council Symp., Baltimore, 21 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030117; SAND-81-7147C; CONF-811010-4) Avail: NTIS HC A02/MF A01

Exxon's approach to the system uses conductive carbon plastic electrodes in a bipolar configuration, separable bromine complexes, and selective membranes in a circulating electrolyte design. The battery design consists of two kWh battery stacks placed back-to-back with a common center electrolyte feed block. Each of the two battery stacks consists of 78 cells for a system voltage of 120 volt output. Active electrode area per electrode is 12 sq dm cell-to-cell spacing is 0.25 cm. The two-stack module is assembled over a tray serving as a cover for the plastic electrolyte reservoir. Unit cells are comprised of alternating bipolar electrodes and separator assemblies. The projected battery factor price is discussed, along with the manufacturing, materials, and labor costs. T.M.

N82-16522# Power Technologies, Inc., Schenectady, N. Y.

DYNAMICS OF SINGLE- AND MULTI-UNIT WIND-ENERGY CONVERSION PLANTS SUPPLYING ELECTRIC UTILITY SYSTEMS

E. N. Hinrichsen and P. J. Nolan Aug. 1981 141 p refs
(Contract DE-AC01-78ET-20466)
(DE82-000666; DOE/ET-20466/78/1) Avail: NTIS HC A07/MF A01

The development of large wind turbine generators (WTGs) and their integration into electric power systems is accelerating. Since wind is neither as steady nor as dense a form of energy as steam or water, wind turbine generators differ greatly in construction and operation from steam and hydro turbine generators. The dynamic behavior of WTGs connected to utility power systems, was examined. DOE

N82-16523# Argonne National Lab., Ill. Energy and Environment Systems Div.

ANALYSIS OF STATE-ENERGY-PROGRAM CAPABILITIES

John Tatar, Donald Clifford, Forrest Gunnison (Science Applications, Inc.), and Barbara Humphrey May 1981 62 p refs
(Contract W-31-109-eng-38)
(DE82-001963; ANL/CNSV-TM-82) Avail: NTIS HC A04/MF A01

The potential effects on state energy programs of a reduction in the financial assistance available through the state and local assistance programs and the distribution of those effects are assessed. The assessment is based on a survey of nine state energy offices (SEOs), which were selected on the basis of state support of energy programs weighted by state energy consumption. The nine SEOs surveyed were the Arizona Energy Office, Arkansas Department of Energy, California Energy Commission, Florida Governor's Energy Office, Illinois Institute of Natural Resources, Minnesota Energy Agency, New Jersey Department of Energy, South Carolina Governor's Division of Energy Resources, and Washington State Energy Office. T.M.

N82-16524# Public Service Co. of Indiana, Plainfield.

COMPRESSED AIR ENERGY STORAGE PRELIMINARY DESIGN AND SITE DEVELOPMENT PROGRAM IN AN AQUIFER. TURBOMACHINERY DESIGN Final Report

P. A. Berman, J. S. Bonk, W. F. Kobett, N. S. Kosanovich, L. J. Long, and D. J. Marinacci 31 Jul. 1981 559 p Prepared in cooperation with Westinghouse Electric Corp., Concordville, Pa. Sponsored in part by EPRI
(Contracts DE-AC02-78ET-29232; ET-78-C-01-2159; EPRI Proj. RP 1081-3)
(DE82-000672; DOE/ET-29232/T4-Vol-5-Pt-1) Avail: NTIS HC A24/MF A01

Compressed Air Energy Storage (CAES) is a means of storing electrical energy generated by utility baseload power plants during off-peak hours. This stored energy will be used during periods of high demand. Compressed Air Energy Storage (CAES) system uses off-peak power from an electrical grid to operate an electric dynamo. This is used as a motor to drive a compressor train that charges atmospheric air at elevated pressure into an underground aquifer. During high electrical demand periods, the pressurized air is withdrawn from the aquifer and channeled to combustors where it is heated and then expanded through a combustion turbine. The turbine drives the electric dynamo, being operated as a generator, to supply power back to the grid. Since the CAES turbine train is divorced from the compressor during power generation, the net output power is about three times that of a normal combustion turbine. Although the fuel consumption rate is nearly the same, the heat rate is much lower. DOE

N82-16525# Mathematical Sciences Northwest, Inc., Bellevue, Wash.

ENERGY EXCHANGER PERFORMANCE AND POWER CYCLE EVALUATION, EXPERIMENTS AND ANALYSIS Final Report, 23 May 1978 - 31 Dec. 1980

W. J. Thayer, III, Robert T. Taussig, John F. Zumdieck, Thinium S. Vaidyanathan, and Walter H. Christiansen Apr. 1981 161 p refs
(Contract DE-AC06-78ER-01084)
(DE82-001069; DOE/ER-01084/T1) Avail: NTIS HC A08/MF A01

The energy exchanger, or pressure exchanger, is a rotating, axial flow machine which utilizes unsteady gasdynamic processes to directly transfer work between two gas streams. A program which has provided technology required for the development of efficient energy exchangers for power operation applications is described. The program contains three major elements: testing of a laboratory scale device, development of an energy exchanger flow model, and analysis of potential applications in advanced power generation cycles. The test energy exchanger was developed and tested over a range of operating conditions. This device transferred approximately 100 kW of mechanical power between two gas streams by simultaneously expanding one stream and compressing the other through pressure ratios of approximately 2.5. The efficiency of this transfer process was as high as 74%. DOE

N82-16526# Technical Univ. of Denmark, Copenhagen. Thermal Insulation Lab.

HEAT STORAGE WITH AN INCONGRUENTLY MELTING SALT HYDRATE AS STORAGE MEDIUM BASED ON THE EXTRA WATER PRINCIPLE

Simon Furbo Dec. 1980 17 p refs
(DE82-901186; DTH-LV-MEDD-108; Rept-8) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

The extra water principle, a heat of fusion storage method, is described. The extra water principle uses an inorganic, incongruently melting salt hydrate as a reliable and stable storage medium in an inexpensive way. Different heat storages using the extra water principle are described. The advantages of using a heat fusion storage unit based on Na2S2O(3).5H2O and the extra water principle instead of a traditional hot water tank in small solar heating systems for domestic hot water supply are shown. In small solar heating systems the heat fusion storage supplies all the wanted hot water in the summer during longer periods than an ordinary hot water storage. It is concluded that the heat of fusion storage is favorable in domestic hot water supply systems with an auxiliary energy source which during the summer have a large energy consumption compared with the energy demands for the hot water supply. DOE

N82-16527# Battelle Pacific Northwest Labs., Richland, Wash.
DEVELOPMENT OF A LOW-COST BLACK-LIQUID SOLAR COLLECTOR, PHASE 2 Final Report, Sep. 1979 - Jul. 1981
D. K. Landstrom, S. G. Talbert, and V. D. McGinnise 30 Sep. 1981 225 p refs
(Contract DE-AC04-79CS-30171)
(DE82-000033; DOE/CS-30171/3) Avail: NTIS HC A10/MF A01

Research efforts were directed toward: evaluating the long-term durability of various plastic materials and solar collector designs; obtaining sufficient outdoor performance data to design a full-scale demonstration of a black liquid solar collector for a commercial application; working closely with a company willing to investigate the possible commercialization of a black liquid plastic collector; and incorporating improved black liquides with the identified plastic collector designs. Indoor weathering tests of various plastics have continued and two outdoor automated test facilities were constructed. One unit was installed at Columbus, Ohio, and the other unit was installed in Phoenix, Arizona. In addition, test facilities in Florida were utilized for static outdoor testing of candidate materials. Results indicate that the black liquid collector is a viable concept and the collectors manufactured during the course of this study, were able to perform as theoretically predicted. There are some long-term durabilty problems still associated with the black liquid collector systems. However, current indications are that a suitable system can be built that should have an expected lifetime of up to 15 years with only marginal (less than 10%) performance degradation. DOE

N82-16528# Argonne National Lab., Ill.
DESIGN, CONSTRUCTION, AND INITIAL OPERATION OF THE ANL RESEARCH
Y. S. Cha, W. T. Sha, and J. R. Hull Aug. 1981 50 p refs
(Contract W-31-109-eng-38)
(DE82-001961; ANL-81-55) Avail: NTIS HC A03/MF A01

The design consideration of a 1/4 acre research salt-gradient solar pond is described. Experience learned during the construction of the solar pond is presented. Initial operation of the pond indicates that the construction of the pond is sound and no leakage has occurred. The pond began to warm up during March of 1981. The maximum pond temperature reached 630 C at the end of July and it is still rising. All signs indicate that the operation of the well instrumented pond will be a success and the performance of the pond will be as expected, if not better. DOE

N82-16529# Institute of Gas Technology, Chicago, Ill.
DEVELOPMENT OF HYDROCONVERSION OF BIOMASS TO SYNETHETIC FUELS. PROJECT 61042 TECHNICAL REPORT Technical Progress Report, 16 May - 30 Sep. 1980
Dec. 1980 57 p refs
(Contract DE-AC02-80CS-83004)
(DE82-000874; DOE/CS-83004/1) Avail: NTIS HC A04/MF A01

The objective of this program is to develop the hydroconversion (in-situ production and addition of hydrogen to carbonaceous species) of biomass (forest and crop residues) to produce substitute natural gas. The program will also include experiments to investigate the production of hydrocarbon liquids from biomass. Progress made during the first reporting period is reported. A list of recent biomass survey and availability literature was compiled; samples of wood materials were obtained for characterization, handling, and bench-scale testing. Standard chemical and physical tests for biomass materials were identified for use in characterizing each material and its char in the program. The initial analysis and testing began with a sample of Douglas fir hog fuel. Bench-scale hydrodevolatilization and char gasification tests were performed. Experiments with maple hardwood chips are in progress. A detailed report describing the process development unit design was submitted. DOE

N82-16530# Oak Ridge National Lab., Tenn.
MATERIALS TESTING FOR SOLAR-THERMAL CHEMICAL PROCESS HEAT
T. N. Tiegs Oct. 1981 63 p refs
(Contract W-7405-eng-26)
(DE82-002003; ORNL/TM-7833) Avail: NTIS HC A04/MF A01

Considerable interest has arisen recently in the production of hydrogen from water using solar thermal energy. The most advanced chemical cycles being developed in the United States and abroad all have the decomposition of sulfuric acid at elevated temperatures as the final step in the cycle. Materials required in the production of hydrogen were tested. The materials tested included (-)-SiC, siliconized SiC, MgO, ZrO2(Y2O3 stabilized), ZrO2(MgO stabilized), and silicon aluminum oxynitride (or sialon). Ring specimens of these materials were exposed for varying periods of time in a simulated H2SO4 decomposition environment at 1000 and 12250 C. The specimens were examined visually, metallographically, by X-ray diffraction, and with a scanning electron microscopes. In addition, the specimens were tested for changes in their fracture stress and weight. The silicon carbide materials, both alpha and siliconized, were the best performers. The other materials tested showed V)-iron(II) oxides of 10 kcal/mol, and the amount of analytical solution. DOE

N82-16531# Winter (Steven) Associates, Inc., New York, N.Y.
CODE WORKBOOK FOR ACTIVE AND PASSIVE SOLAR DESIGN: SINGLE-FAMILY RESIDENTIAL CONSTRUCTION
Sep. 1981 109 p refs
(DE82-000637; MASEC-SCR-81-085) Avail: NTIS HC A06/MF A01

Important codes and standards enforced or referenced in the Mid-American Solar Energy Complex region are described. Analyses of the basic codes written by major code agencies and those Federal agency guidelines which have a significant impact on building activity in the MASEC region are included. State and local codes and code agencies are identified. DOE

N82-16532# Mid-American Solar Energy Complex, Minneapolis, Minn.
CASE STUDIES OF RETROFIT APPLICATIONS OF SOLAR ENERGY IN THE MASEC REGION
Sep. 1981 11 p refs
(Contract DE-AC02-79CS-30150)
(DE82-001712; MASEC-R-81-081; A-101-6) Avail: NTIS HC A02/MF A01

Six case studies are presented of residential solar retrofits. Each case study includes a photograph illustrating the type of retrofit, system description, siting orientation, system cost, energy savings, operational problems, and the homeowner's assessment of system performance and satisfaction. The retrofits presented cover a wide geographic area, and include active solar domestic hot water, greenhouses, and passive solar direct gain. DOE

N82-16533# Mid-American Solar Energy Complex, Minneapolis, Minn.
THE CLASS C PASSIVE PERFORMANCE EVALUATION PROGRAM Final Report
Sep. 1981 24 p
(Contract DE-AC02-79CS-30150)
(DE82-000454; MASEC-R-81-014; P-101-2) Avail: NTIS HC A02/MF A01

The Class-C performance which provides information on qualities of passive solar features which make them attractive to buyers was evaluated. The following topics are discussed: design of an audit form; design of regionally specific audit addenda; determination of site selection criteria; identification of sites; selection, training, and management of auditors; and packaging of materials of subcontractors for evaluation. Results and findings are presented as follows: demographic profile, passive solar home profile, cost, financing, and payback considerations, expectations, realizations, and satisfaction, and decisionmaking. DOE

N82-16534# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
BOISE CASCADE: INEL SOLAR HOME Data Report, 1 Jul. 1980 - 31 Mar. 1981
Ken H. Liebelt, Adrienne H. Novick, and James I. Mills Jul. 1981 107 p refs
(Contract DE-AC07-76ID-01570)
(DE82-003778; EGG-CS-5504) Avail: NTIS HC A06/MF A01

The operating data on the Bosie Cascade-INEL solar homes located in Boise and Idaho Falls, Idaho, are summarized for the period from July 1, 1980 through March 31, 1981. All three major system functions are discussed: space heating, domestic hot water heating, and space cooling. In addition, the update data acquisition system, which allows for simultaneous acquisition and analysis of data, and also the new data reduction and analysis capabilities are discussed. The general performance of the houses during the reporting period is summarized, but it is beyond the scope of this report to present a detailed analysis of the data or to completely address existing data anomalies. DOE

N82-16535# Argonne National Lab., Ill. Energy and Environmental Systems Div.
EFFECTS OF AMMONIA CONTAMINATION BY WATER ON OTEC POWER SYSTEM PERFORMANCE
C. B. Panchal, J. J. Lorenz, and D. L. Hillis Aug. 1981 51 p refs
(Contract W-31-109-eng-38)
(DE82-001832; ANL/OTEC-PS-8) Avail: NTIS HC A04/MF A01

Tests were conducted with evaporators produced by Trane, Johns Hopkins University's Applied Physics Laboratory (APL), and Linde to determine the loss in heat-transfer performance resulting from contamination of ammonia by water. A stepwise integration procedure was developed to determine the overall heat-transfer coefficients from experimental data. Results indicated that the heat-transfer coefficient of the evaporator decreases with increasing water content of the ammonia. At water concentrations below 0.1%, the reduction in the overall heat-transfer coefficient was less than 1% for all three evaporators. For more than 0.1% water, the loss in performance becomes increasingly significant. At 1% water, the reduction in the heat-transfer coefficient was found to be 4%, 8%, and 10%, for the Trane, APL, and Linde evaporators, respectively. DOE

N82-16536# Oak Ridge Y-12 Plant, Tenn. Nuclear Div.
ROTOR TESTING IN FY 1981
R. S. Steele, Jr. and E. F. Babelay, Jr. 13 Jul. 1981 8 p refs Presented at the Mech., Magnetic and Underground Energy Storage Ann. Contractors' Rev., Washington, D.C., 24-26 Aug. 1981
(Contract W-7405-eng-26)
(DE81-028340; Y/DX-338; CONF-810833-4) Avail: NTIS HC A02/MF A01

Flywheel spin tests conducted for the mechanical energy storage technology project are summarized. Two types of tests are discussed: (1) an ultimate speed test, which includes ultimate speed evaluations for a tapered, quasi isotropic, graphite composite flywheel, a constant thickness disk with an SMC core and circumferentially wound graphite restraining ring, and a constant thickness disk with an S-glass alpha-ply layup core and circumferentially wound graphite ring; (2) a cyclic fatigue test. A matching flywheel was used as the first test unit. Test results and general observations and conclusions are presented. DOE

N82-16537# Alabama Energy Management Board, Montgomery.
OPELIKA RESOURCE RECOVERY PROJECT: REPORT ON THE TECHNOLOGICAL AND ECONOMIC EVALUATION
Jul. 1981 127 p refs
(Contract DE-FG01-79CS-20243)
(DE81-030098; DOE/CS-20243/1) Avail: NTIS HC A07/MF A01

A resource recovery facility for the city of Opelika, Alabama was investigated and surrounding areas were examined for waste stream characteristics. Technological options for waste disposal were examined. The technological options were ranked according to specific criteria of market characteristics, compatibility, and commercial viability. A particular resource recovery system applicable to Opelika was identified and an economic analysis performed to compare its relative costs to that of landfilling. DOE

N82-16538# Northeast Solar Energy Center, Boston, Mass. Dept. of Consumer Affairs.
SOLAR CONSUMER ASSURANCE: AN ASSESSMENT OF MECHANISMS IN THE NORTHEAST
Roberta Ward Welsh May 1981 88 p
(Contract DE-AC02-80CS-30149)
(DE81-030052; NESEC-9) Avail: NTIS HC A05/MF A01

Results and analysis of assessments in the nine states served by the Northeast Solar Energy Center are reported. Mechanisms were categorized according to the following objectives the informal consumer, the competent installer, assuring product quality and performance, and responsiveness to consumer grievances. DOE

N82-16539# RMR Associates, Palo Alto, Calif.
COGENERATION POTENTIAL: ENHANCED OIL RECOVERY Final Report
R. M. Rodden and J. L. Boyen Aug. 1981 69 p refs Sponsored by EPRI
(EPRI Proj. 1276-7)
(DE81-904202; EPRI-EM-1996) Avail: NTIS HC A04/MF A01

The purpose of this project was to perform preliminary evaluation of the potential in the United States for generating electric power in connection with producing steam for the enhanced recovery of oil. The analysis identified the size and location of the heavy oil resource base and developed estimates of oil recovery potential. Using these data, estimates were made of electric power capacity that could result if cogeneration were used to supply the necessary steam for thermal recovery. Incentives and obstacles to the use of cogeneration for thermally enhanced oil recovery are identified and discussed. The attitudes of the utilities companies and the petroleum producers toward the possible use of cogeneration for thermal oil recovery are also identified and discussed. The report presents preliminary design information on cogeneration systems that would be suitable for thermally enhanced recovery. DOE

N82-16540# Mid-American Solar Energy Complex, Minneapolis, Minn.
PASSIVE SOLAR PRODUCTS CATALOG, 1981
M. M. Dotseth 1981 362 p
(Contract DE-AC02-79CS-30150)
(DE82-000292; MASEC-H-81-041) Avail: NTIS HC A16/MF A01

The Passive Solar Products Catalog was compiled through contacts with over 500 manufacturers and distributors across the country. The product listings are from manufacturers who responded to requests for information and the descriptions are based on information contained in the product literature. Only those products which can be marketed at this time are listed in the 1981 catalog. The catalog contains over 300 product listings. The catalog is organized according to product function and application including passive solar components and design resonances and miscellaneous products. Manufacturer and product indexes are included as a cross reference in the back of the catalog. Distributors are not listed since most manufacturers prefer to have product inquiries initially directed to them. DOE

N82-16541# Argonne National Lab., Ill. Energy and Environmental Systems Div.
OTEC PERFORMANCE TESTS OF THE TRANE PLATE-FIN HEAT EXCHANGER
C. B. Panchal, D. L. Hillis, J. J. Lorenz, and D. T. Yung Apr. 1981 48 p refs
(Contract W-31-109-eng-38)
(DE82-001833; ANL/OTEC-PS-7) Avail: NTIS HC A03/MF A01

The Trane heat exchanger was tested as an evaporator, and separately as a condenser, at the following nominal operating conditions: water flow rate, heat duty, and ammonia feed rate (applicable to evaporator test only). Operated as an evaporator in the forced convection mode, the overall heat transfer coefficient (UO) of the unit was 1235 Btu/h.ft(2).OF. Tests were conducted at heat duties ranging from 2.4 million to 4 million Btu/h, and at ammonia feed rates ranging from 18 to 40 gpm. Operated as an evaporator in the falling film mode, at the same nominal conditions as listed above, UO and 1035 Btu/h.ft(2).OF. At a constant heat duty, increasing ammonia feed rate from 22 to 50 gpm increased UO by about 30%. Operated as a condenser, the unit's UO was 870 Btu/h.ft(2).OF. DOE

N82-16542# Houston Univ., Tex. Energy Lab.
SOLAR ENERGY SYSTEMS SIMULATION AND ANALYSIS Quarterly Progress Report, 1 Nov. - 30 Dec. 1980
Loren L. Vant-Hull 10 Jan. 1981 36 p refs
(Contract DE-AC03-76SF-10763)
(DE81-026975; DOE/SF-10763/T10; QPR-5) Avail: NTIS HC A03/MF A01

A subrountine to provide central receiver performance simulation code STEAEC with the capability of interpolating the UofH NS code performance summary has been written and is documented herein. A call of this subroutine obviates the need to extrapolate day/hour output efficiencies to produce the elevation-azimuth field performance data, which often involves non-physical Sun locations. The changes are completely transparent to the user. The aspect ratio study was delayed while substantive improvements to the handling of heliostats spacing subject to mechanical limits were made. Mechanical limits play a definitive roll as the aspect ratio increases. The improvements are described. Work on insolation modeling is being culminated with the development of a new procedure for accounting for atmospheric transmission losses between heliostat and receiver. A detailed interpolation/extrapolation procedure based on the LOWTRAN 3 analysis was developed. Subroutines to provide all the necessary input data were also generated. Work has begun on a tentative basis which will lead to a user compatible version of the IH code and to an accompanying users guide. DOE

N82-16543# RCA Labs., Princeton, N. J.
PHOTOVOLTAIC MECHANISMS IN POLYCRYSTALLINE THIN-FILM SILICON SOLAR CELLS Final Report, 31 May 1979 - 30 May 1981
D. Redfield Jun. 1981 79 p refs
(Contract DE-AC01-79ET-23108)
(DE82-000868; DOE/ET-23108/8) Avail: NTIS HC A05/MF A01

The emphasis during this two-year program began with analysis of fundamental limitations to silicon solar-cell efficiency caused by heavy-doping effects. Near the middle, the emphasis shifted to explanation of the varied electronic properties of grain boundaries in Si. In the first area, and it was shown that all previous analyses which had neglected Auger recombination were necessarily invalid. Important consequences were also found for the strong gradients in dopant concentration that always occur in heavily doped diffused p-n junctions. When these new effects are combined, a simple, natural model results to explain limitations in Si solar-cell performance due to either front or base region effects on either J/sub sc/ or V/sub oc/. As part of this work, a new method was developed for accurate evaluation of the overall performance of AR coatings. DOE

N82-16544# National Mechanical Engineering Research Inst., Pretoria (South Africa).
DEVELOPMENTS IN SOLAR-POWERED AIR CONDITIONING: STATE-OF-THE-ART AND PROSPECTS FOR SOUTH AFRICA
A. Johannsen 1980 19 p refs Presented at Frigair Symp., Pretoria, 17-18 Jun. 1980; sponsored by the South African Inst. of Refrigeration and Air Conditioning
(PB81-246076; CSIR-ME-436; Paper-10) Avail: NTIS HC A02/MF A01 CSCL 13A

The state of the art of solar powered air conditioning is reviewed and its potential for South African conditions examined. Three basic cycles, namely the absorption cycle, the Rankine cycle, and desiccant cycle are discussed and their advantages and disadvantages compared. The open cycle type desiccant systems which appear to be well suited for South African conditions are discussed in greater detail. Included is a review of the various system configurations with solid and liquid desiccant and a comparison of their performance under different climatic conditions. Author

N82-16545# Economic Research Service, Washington, D. C. Natural Resource Economics Div.
COAL DEVELOPMENT IN RURAL AMERICA: THE RESOURCES AT RISK
Wallace McMartin, Virgil Whetzel, and Paul R. Myers Aug. 1981 92 p refs
(PB81-243313; RDRR-29) Avail: NTIS HC A05/MF A01 CSCL 10A

The resource base in rural America that will be affected by future mining, transportation, and use of coal is described. These resources are land, water, vegetation, people, and farm or ranch enterprises. Author

N82-16546# Groupe Centrale des Villes Nouvelles, Paris (France).
A COMPARISON OF ENERGY TECHNOLOGIES AND THEIR USE IN URBAN PLANNING
Claud Martinand and Eric Pebeyrotte Oct. 1980 21 p Presented at the 4th Ann. Conf. of the Intern. New Towns Assoc., Cairo, 6-14 Oct. 1980
(PB81-239592) Avail: NTIS HC A02/MF A01 CSCL 10A

A view of the new energy sources used in construction of new towns in France is given. The energies discussed include solar, geothermal, wind, refuse incineration, and cogeneration; the energy technologies outlined include heat pumps and load shedding. GRA

N82-16547# FDO Technische Adviseurs B.V. (Netherlands).
EXCHANGE OF NATIONAL EXPERIENCE IN THE FIELD OF NEW ENERGY SOURCES: IN PARTICULAR, SOLAR, WIND, AND GEOTHERMAL ENERGY: THE 25 m EXPERIMENTAL HORIZONTAL AXIS WIND TURBINE (25 m HAT)
G. B. Geerdink Oct. 1980 19 p Presented at the Sem. on Technol. Related to New Energy Sources, Juelich, West Germany, 8-12 Dec. 1980; sponsored by the Senior Advisers to ECE Governments on Science and Technology Sponsored by the Government of the Netherlands Prepared for the United Nations Economic Commission for Europe
(PB81-239568; UN-ECE-SC-TECH-SEM-7-R-6) Avail: NTIS HC A02/MF A01 CSCL 10B

The design of the wind generator, its rotor's capabilities, electricity generated, safety, various loadings, and instrumentation are discussed. Overall dimensions and weight of comments, the characteristics of the electrical system, of the yard mechanism and others are given in detail, including photos, drawings and graphs. GRA

N82-16548# National Bureau of Standards, Washington, D.C. Center for Building Technology.
ENERGY CONSERVATION BY MULTIPLE GLAZING ON HEAVY MASONRY BUILDINGS
E. Thomas Pierce Aug. 1981 29 p refs Sponsored in part by Architect of the Capitol
(PB81-246977; NBSIR-81-2317) Avail: NTIS HC A01/MF A01 CSCL 13A

The BLAST-2 computer program was used to investigate multiple glazing as a means to reduce the energy consumption of two buildings of the Library Congress in Washington, DC. The Thomas Jefferson building is of very heavy masonry construction, and the John Adams building is of heavy masonry. The techniques of modeling the building load and air system performance are explained. The results are presented and discussed. GRA

N82-16549# Little (Arthur D.), Inc., Cambridge, Mass.
NEW YORK STATE PLAN TO ENCOURAGE COMMERCIALIZATION OF MORE EFFICIENT GAS TECHNOLOGIES
Aug. 1981 189 p refs Sponsored by New York State Energy Research and Development Authority and New York Gas Group
(PB81-249997; NYSERDA-81-15) Avail: NTIS HC A09/MF A01 CSCL 10A

The results of a study to determine what field testing demonstration projects would be required to encourage commercialization of more efficient gas technologies and appliances in New York State are given as well as the elements of a plan to carry out the tests and demonstrations. The present status of over 50 energy-saving gas technologies applicable to space conditioning, water heating, and cooking is examined. Three of the most promising technologies for commercialization were found to be: condensing furnaces and boilers; waste heat recovery; and fuel cells. GRA

N82-16550# General Accounting Office, Washington, D. C.
RESIDENTIAL ENERGY CONSERVATION OUTREACH ACTIVITIES: A NEW FEDERAL APPROACH
11 Feb. 1981 40 p refs
(PB81-242349; EMD-81-3) Avail: NTIS HC A03/MF A01 CSCL 10A

An evaluation of the Department of Energy's residential energy conservation outreach activities is presented. The contribution that outreach can make in achieving energy conservation is examined. The effectiveness of alternative techniques and DOE's current program and management are also examined. GRA

N82-16138*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A SOLAR POWERED WATER PURIFICATION SYSTEM AT GOLDSTONE (DSS 13)
F. J. Menninger and R. J. Elder *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 352-354 (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 10A

N82-16139*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ENERGY CONSUMPTION FOR THE ECHO STATION (DSS 12)
C. N. Guiar and D. Schonfeld *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 355-363 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 10B

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-16551# Council for Scientific and Industrial Research, Pretoria (South Africa). Air Pollution Research Group.
AIR POLLUTION AND RELATED PHENOMENA IN SOUTH AFRICA Annual Report, 1 Jul. 1979 - 30 Jun. 1980
30 Jun. 1980 63 p refs
(SR-APRG-12; IBSN-04-4986-2027-6) Avail: NTIS HC A04/MF A01

Progress in the monitoring of various pollutants, development of analytical methods for monitoring pollution effectively, and the study of the underlying physical and chemical processes governing the behavior of pollutants in the atmosphere is reported. Modeling of the wind field, momentum and energy transfer by eddy diffusion, and evaluation of diffusion models are among the topics addressed. J.M.S.

N82-16552# Air Force Engineering and Services Center, Tyndall AFB, Fla. Engineering and Services Lab.
METHOD AND TECHNOLOGIES FOR REDUCING THE GENERATION OF METAL-BEARING SLUDGES AT AFLC INDUSTRIAL WASTE TREATMENT PLANTS Final Report, Jun. 1979 - May 1981
Anthony M. Wachinski Aug. 1981 126 p refs
(AF Proj. 2103)
(AD-A107552; AFESC/ESL-TR-81-29) Avail: NTIS HC A07/MF A01 CSCL 13/8

At present, the Air Force provides maintenance for its inventory of aircraft and associated systems at five industrial-complexes called Air Logistic Centers (ALCs). Wastewaters generated at the ALCs are treated by industrial waste treatment plants located on-site. The effluent is then discharged to a nearby stream or to a Privately Owned Treatment Works (POTW). During the period, 16 July 1979 to 3 May 1980, these facilities were surveyed for ways to reduce the volume of metal-bearing sludges generated by the IWTPs. Results of the surveys showed that the volume of sludge could be significantly reduced by a coordinated program of wastewater reduction, plating chemicals conservation, optimization of IWTP operation and sludge dewatering. Analyses of the sludges showed them to be nonhazardous by the EPA Toxicant Extraction Method. Data suggested that efforts to delist the sludges as nonhazardous were warranted. Also included are in-depth discussions of evaporation, ion exchange, and reverse osmosis and their application as recovery processes in Air Force electroplating operations. Author (GRA)

N82-16553# Brookhaven National Lab., Upton, N. Y.
MODIFICATIONS OF TRAJECTORY MODELS NEEDED FOR POLLUTANT SOURCE-RECEPTOR ANALYSIS
Paul Michael and Gilbert S. Raynor 1981 10 p refs Presented at the NATO/CCMS 12th Intern. Tech. Meeting on Air Pollution Modeling and its Appl., Palo Alto, Calif., 25-28 Aug. 1981 Submitted for publication
(Contracts DE-AC02-76CH-00016; EPA-79-DX-0533)
(DE81-029915; BNL-29924; CONF-810841-3) Avail: NTIS HC A02/MF A01

The difficulties one should expect to encounter when using the usual trajectory models to calculate source-receptor relationships for the incorporation of pollutants into precipitation are described. Sources of difficulty, the results of trajectory calculations that were performed to test the sensitivity of source-receptor relationships to transport layer assumptions, and some suggestions for future developments are presented. DOE

N82-16554# Oak Ridge National Lab., Tenn. Chemical Technology Div.
USE OF A PHENOLIC-CARBOXYLIC ACID CATION RESIN IN THE TREATMENT OF LOW-LEVEL LIQUID WASTE AT OAK RIDGE NATIONAL LABORATORY
J. M. Chilton Sep. 1981 18 p refs
(Contract W-7405-eng-26)
(DE82-000500; ORNL/TM-7524) Avail: NTIS HC A02/MF A01

The loading capacity of CS-100 resin, using plant waste as feed, was found to be significantly reduced after 20 loading-elution cycles; or less of the original capacity was retained after 30 cycles. Since the distribution coefficients for calcium and strontium are about six times greater than that for cesium, no loss of Sr 90 would be expected while Cs 137 is loading. Laboratory results obtained by using plant conditions and feed indicate that a typical bed would remove 96 percent of Sr 90 in the feed. Cobalt-60 is generally the greatest contributor to the radioactivity of the plant effluent. Laboratory tests indicate that this Co-60 is present as a mixture of a soluble anionic complex and insoluble colloids. The anionic complex could be removed by placing an anion exchange column in the effluent from the CS-100 resin bed. In studies of the dynamics of loading on CS-100 resin, the contact time in plant operation (3 to 4 min per column volume) was found to be more than adequate to obtain the desired results. DOE

N82-16555# Oak Ridge National Lab., Tenn. Environmental Scienes Div.
ACID RAIN AND FOREST PRODUCTIVITY
D. W. Johnson 1981 37 p refs Presented at IUFRO Meeting, Kyoto, Sep. 1981
(Contract W-7405-eng-26; EPRI Proj. 1813-1)
(DE81-030916; Publ-1717; CONF-810967-1) Avail: NTIS HC A03/MF A01

It is noted that acid rain can cause increases or decreases in forest productivity depending on site nutrient status and the duration and rate of inputs. Some acid irrigation studies have shown short-term growth increases due to increased N availability, yet long-term growth reductions remain theortically possible because of cation depletion and toxic aluminum accumulations in soils. It cannot be overremphasized that the problem of assessing acid rain effects on forest productivity is one of quantification. Generalization about acid rain effects without reference to the amount of acidic input and site nutrient conditions are hazardous. DOE

N82-16556# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
ATMOSPHERIC DEPOSITION OF HEAVY METALS AND THEIR INTERACTION WITH ACID PRECIPITATION IN A NORTH AMERICAN DECIDUOUS FOREST
S. E. Lindberg, R. R. Turner, D. S. Shriner, and D. D. Huff 1981 4 p refs Presented at the Intern. Conf. on Heavy Metals in the Environment, Amsterdam, Sep. 1981
(Contract W-7405-eng-26)
(DE81-032004; CONF-810963-1) Avail: NTIS HC A02/MF A01

Atmospheric deposition dominates the landscape cycle of Pb and has a measurable influence on the cycles of Cd and Zn but a minimal influence on the Mn cycle in a deciduous forest in the eastern United States. Rain event deposition rates are orders of magnitude greater than the intervening dry deposition rates; however, dry deposition supplies 20 to 90 percent of the total annual input to the forest. Interactions between dry deposition and acid precipitation result in concentrations of metals and H(+) in the canopy 100 to 1000 times higher than rain concentrations alone. DOE

N82-16557# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
THERMODYNAMIC DATA FOR FLUE-GAS DESULFURIZATION PROCESSES
Leo Brewer Aug. 1981 56 p refs Presented at the FGD Symp., Morgantown, W. Va., 6-7 Nov. 1980
(Contract W-7405-eng-48)
(DE81-030545; LBL-11758; CONF-801176-1) Avail: NTIS HC A04/MF A01

Thermodynamic and kinetic data for the various materials that might be used in desulfurization processes resulting from cool and oil combustion are presented. Examination of the available thermodynamic data for sulfur compounds indicates serious uncertainties and a complete review is planned to provide the best set of internally consistent values obtainable from the literature and from current experiments. Although the main emphasis will be on information needed for aqueous limestone or lime slurry treatment, the data could also be used for other processes covering a wider temperature range. Thus it is planned to provide the data, when possible, for the range from room temperature to at least 1000K. The present compilation covers most of the materials that might play a role in SO2 extraction processes and for which data were found. Supplements will be issued as data are obtained for additional substances of interest. DOE

N82-16558# Paducah Gaseous Diffusion Plant, Ky.
DENITRIFICATION OF NITRATE-CONTAINING HEAVY-METAL-FILTRATE SOLUTIONS
W. N. Whinnery 1 Jul. 1981 61 p refs
(Contract W-7405-eng-26)
(DE82-000701; KY-712) Avail: NTIS HC A04/MF A01

The results indicate that biodenitrification of the PGDP heavy metal wastes reduced the nitrate concentration from 129,000 ppM to 10 ppM. Although batch treatment of the heavy metal filtrate proved successful at a low denitrification rate, continuous operation was not accomplished due to the accumulation of heavy metals in the sludge and the high metal content of the feed solution. Effects of the heavy metal solution filtrate as the biodenitrification feed solution are presented in relation to reactor operation and performance. An economic evaluation of a typical plant scale biodenitrification system, using present generation rates, would result in a disposal cost of greater than $250/barrel. T.M.

N82-16559# Argonne National Lab., Ill. Integrated Assessments and Policy Evaluation Group.
FLUE-GAS DESULFURIZATION: REVIEW OF SELECTED COMMERCIAL AND ADVANCED TECHNOLOGIES
Jerry L. Gillette and Shen-Yann Chiu Feb. 1981 187 p refs
(Contract W-31-109-eng-38)
(DE82-001960; ANL/FE-81-51) Avail: NTIS HC A09/MF A01

Selected technologies for the desulfurization of flue gas are reviewed and evaluated. One of the technologies, wet scrubbing of the gas with a slurry containing either lime or limestone, has attained widespread commercial usage and for this reason is presented as the base case against which 10 second-generation systems of flue-gas desulfurization (FGD) are compared. The new technology include chemical-treatment, or scrubbing, processes and processes that combine scrubbing and filtering of the flue gas. The two combination processes use baghouse filters, with the SO2-collecting material either injected dry or sprayed into the system. The eight straight-scrubbing processes use either wet or dry collecting materials and are identified as follows: aqueous-carbonate, copper-oxide, Bergbau-Forschung, sodium-sulfite-based double-alkali, DOA double-alkali, Chiyoda-121, magnesia, and Wellman-Lord. DOE

N82-16560# Exxon Research and Engineering Co., Linden, N.J. Contract Research Div.
FORMATION OF NO SUB x AND OTHER PRODUCTS FROM CHEMICALLY BOUND NITROGEN IN COAL COMBUSTION Final Report
David W. Blair and J. O. L. Wendt Jun. 1981 298 p refs
(Contract DE-AC21-77ET-11314)
(DE81-028536; DOE/ET-11314/T1) Avail: NTIS HC A13/MF A01

The purpose of this project was to advance the fundamental understanding of fuel nitrogen conversion in coal combustion towards the ultimate end of providing for the rational design of coal combustors with acceptably low NO/sub x/ outputs. In pursuit of this objective the program attacked the problem both experimentally and theoretically. Experimental work concentrated upon the pyrolysis stage of coal combustion. It investigated the loss of mass, nitrogen, and sulfur from the solid phase and the distribution of important chemical species in the pyrolyzate under simulated combustion heating conditions. Experimentally variables included temperature, heating rate, atmospheric reactivity, thermal history (preheating, reheating) and coal type. These experiments were performed upon twenty coals of widely varying types, two chars, and one petroleum coke. The results of the work suggest that the conditions of coal nitrogen conversion can be controlled by adjusting external variables. DOE

N82-16561# International Coal Refining Co., Allentown, Pa.
HAZARDOUS WASTE PRELIMINARY PLANNING REQUIREMENTS FOR SRC-1 DEMONSTRATION PLANT IN NEWMAN, KENTUCKY
29 May 1981 362 p refs Prepared for Kentucky Dept. of Natural Resources and Environmental Protection
(Contract DE-AC05-78OR-03054)
(DE82-001346; DOE/OR-03054/T8) Avail: NTIS HC A16/MF A01

The questions of soil types and permeability, suitability of the site for the proposed use, surface and subsurface geology, and hazards (seismic activities, flood, subsidence) are addressed. Information on the location and preliminary design concepts of hazardous waste disposal facilities are provided. The results of a geotechnical engineering study are reported along with an engineering interpretation of these with respect to the available project characteristics and recommendations to aid in the design and construction of foundations and other Earth related phases of the project. Additional liquefaction analyses were performed which considered both acceleration levels of 5 and 10% gravity and several flood conditions. T.M.

N82-16562# Department of Energy, Morgantown, W. Va.
ADVANCED ENVIRONMENTAL CONTROL TECHNOLOGY PROGRAM
Aug. 1981 32 p refs
(DE82-000898; DOE/METC/SP-187) Avail: NTIS HC A03/MF A01

The Department of Energy has established the Advanced Environmental Control Technology Program to protect the environment while supporting the development of more efficient and acceptable technologies utilizing domestic fossil fuels. This program consolidates cleanup efforts in ongoing technology specific DOE programs (such as combustion and gasification, and cleanup projects transferred from EPA to DOE) with new project initiates into a coordinated program that addresses cleanup technology development. There are numerous problems associated with using coal to replace oil and gas as a primary fuel. Sulfur, nitrogen, alkali and halogen compounds, and mineral particulate matter, all found in varying proportions in the domestic coals, are released during gasification and combustion. These contaminants of coal, as well as the soot and tars produced by incomplete combustion or gasification, can potentially degrade the performance of the energy producing system. DOE

N82-16563# Pacific Northwest Lab., Richland, Wash.
ASSESSMENT OF ENVIRONMENTAL HEALTH AND SAFETY ISSUES ASSOCIATED WITH THE COMMERCIALIZATION OF UNCONVENTIONAL GAS RECOVERY: DEVONIAN SHALE
Sep. 1981 88 p refs
(Contract DE-AC06-76RL-01830)
(DE82-001047; PNL-3848) Avail: NTIS HC A05/MF A01

Potential public health and safety issues and the potential environmental impacts from recovery of natural gas from Devonian age shale are identified. The resource and the DOE eastern gas shales project are described. The new and developing recovery technologies associated with Devonian shale are described. An assessment of the environment, health and safety impacts associated with a typical field is presented. The typical field for this assessment occupies ten square miles and is developed on a 40-acre spacing (that is, there is a well in each 40-acre grid). This field thus has a total of 160 wells. Finally, conclusions and recommendations are presented. A reference list is provided to give a greater plant. Based on the estimated plant cost and the various cases of operating income, an economic analysis was performed employing a profitability index criterion of discounted cash flow to determine an interest rate of return on the plant investment. DOE

N82-16564# Gulf Coast Research Lab., Ocean Springs, Miss.
STUDIES ON TOXICITY OF OTEC PLANT COMPONENTS ON MARINE ANIMALS FROM THE GULF OF MEXICO Final Report, 1 Sep. 1978 - 30 Nov. 1980
A. Venkataramiah, G. J. Lakshmi, Christine Best, Gordon Gunter, Eric Hartwig, and Patrick Wilde Jun. 1981 126 p refs
Prepared jointly with California Univ., Berkeley. Lawrence Berkeley Lab.
(Contracts DE-AS02-78ET-20512; ET-78-S-02-5071)
(DE81-030167; DOE/ET-20512/T1) Avail: NTIS HC A07/MF A01

Ammonia and chlorine were chosen for toxicity studies as they pose the greatest potential environmental threat. Acute and chronic bioassays determined the LT sub 50 LC sub 50 and the behavior of filefish (Monocanthus hispidus). The chronic bioassays were carried out making in sublehal concentrations of ammonia and chlorine. It is indicated that high concentrations of ammonia and chlorine from the OTEC plants are toxic to marine animals and that the level of toxicity is related to the species, their habitats and life stages. DOE

N82-16565# Urban Systems Research and Engineering, Inc., Cambridge, Mass.
ENERGY AND ENVIRONMENTAL QUALITY: CASE HISTORIES OF IMPACT MANAGEMENT
Jun. 1981 117 p
(Contract DE-AC01-79EV-10012)
(DE81-028435; DOE/EP-10012/1) Avail: NTIS HC A06/MF A01

A discussion of energy source developments and environmental protection dealing with impacts, and legal aspects of pollution controls and resource management, and case history studies of major energy projects is presented. DOE

N82-16566# Argonne National Lab., Ill. Integrated Assessments and Policy Evaluation Group.
PUBLIC HEALTH HAZARDS OF LURGI/FISCHER TROPSCH COAL LIQUEFACTION
J. R. Gasper and S. E. Rosenberg Jan. 1981 63 p refs
(Contract W-31-109-eng-38)
(DE82-001617; ANL-EES-TM-153) Avail: NTIS HC A04/MF A01

The public hazards of wastes from Lurgi/Fischer-Tropsch coal liquefaction were identified. Data on dose response and synergism are not available for many of the waste chemicals from this process. This approach employs two measures of hazards: (1) body burdens that result from exposure to Lurgi/Fischer-Tropsch wastes are compared to body burdens from other sources of the same chemicals; (2) ambient concentrations of pollutants from Lurgi/Fischer-Tropsch operations are projected and compared to various air and water quality standards. DOE

N82-16567# Aerojet Energy Conservation Co., Sacramento, Calif.
COMBUSTION ENHANCEMENT AND POLLUTANT-CONTROL RESEARCH WITH ACOUSTICALLY INDUCED MIXING Technical Progress Report, Jun. - Sep. 1981
R. J. Faeser and M. I. Rudnicki Sep. 1981 31 p
(Contract DE-AC22-80PC-40270)
(DE82-001100; DOE/PC-40270/2) Avail: NTIS HC A03/MF A01

An experimental research program was initiated to evaluate the possibility that beneficial effects can result when acoustic energy is impressed on the combustion zone of pulverized coal furnaces. These benefits include the reduction in NO/sub x/ generation, the increase in combustion intensity, and the increase in turndown ratio (maximum flow/minimum flow). The postulated reason for these possible benefits is the increased relative motion of the gas and coal particles and the fine stirring action resulting from high frequency acoustic waves. During the second, three-month period of this contract, the design and fabrication of the combustor were completed and the test facility buildup was 70% completed. A checkout test of the acoustic equipment and a preliminary acoustic survey test of the combustor response were also completed. DOE

N82-16568# Idaho Univ., Moscow. Dept. of Chemistry.
SULFUR GAS EMISSIONS FROM STORED FLUE GAS DESULFURIZATION SOLIDS Final Report
D. F. Adams Oct. 1981 87 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 856-2)
(DE82-900859; EPRI-EA-2067) Avail: NTIS HC A05/MF A01

The emissions of volatile, sulfur-containing compounds from the surfaces of 13 flue gas desulfurization (FGD) solids field storage sites were characterized. The sulfur gas emissions from these storage surfaces were determined by measuring the sulfur gas enhancement of sulfur-free sweep air passing through a dynamic emission flux chamber placed over selected sampling areas. Samples of the enclosure sweep air were cryogenically concentrated in surface-deactivated Pyrex U traps. Analyses were conducted by wall-coated, open-tubular, capillary column, cryogenic, temperature-programmed gas chromatography using a sulfur-selective flame photometric detector. Several major variables associated with FGD sludge production processes were examined in relation to the measured range and variations in sulfur fluxes including: the sulfur dioxide scrubbing reagent used, sludge sulfite oxidation, unfixed or stabilized (fixed) RGD solids, and ponding or landfill storage. The composition and concentration of the measured sulfur gas emissions were found to vary with the type of solids, the effectiveness of rainwater drainage from the landfill surface, the method of impoundment, and the sulfate/sulfite ratio of the solids. DOE

N82-16569# Du Pont de Nemours (E. I.) and Co., Deepwater, N.J. Chambers Works.
FULL-SCALE DEMONSTRATION OF INDUSTRIAL WASTE-WATER TREATMENT UTILIZING DU PONT'S PACT (TRADE NAME) PROCESS Final Report, Nov. 1976 - Dec. 1979
Harry W. Heath, Jr. Sep. 1981 164 p refs
(Grant EPA-S-804943)
(PB81-248122; EPA-600/2-81-159) Avail: NTIS HC A08/MF A01 CSCL 13B

Operating and cost data on startup and the initial 30 months of operation of 150,000 cu m/day industrial wastewater treatment plant using Du Pont's PACT process are reported. The process effectively provides secondary/tertiary treatment by adding powdered activated carbon to the aerator in an activated sludge process. Removals were consistent even though the waste contained many relatively toxic, nonbiodegradable organics and varied drastically in composition. A synergistic enhancement of biological activity in the presence of activated carbon was observed. Activated carbon was regenerated in a multiple hearth furnace. GRA

N82-16570# Clayton (D. B.) and Associates, Houston, Tex.
CONSERVATION OF COOLING WATER BY SILICA REMOVAL WITH ACTIVATED ALUMINA
Richard Mouche and Jack V. Matson 1980 44 p refs
(Grant NSF PFR-79-17072)
(PB81-247959; NSF/RA-800535) Avail: NTIS HC A03/MF A01 CSCL 13B

Activated alumina which selectively and effectively remove silica from water was investigated. Batch isotherm tests were performed to find out how much silica could be adsorbed by a known quantity of activated alumina and kinetic studies were performing to reveal temperature effects on the rate of adsorption. It is suggested that the sidestream activated alumina process has both environmental and economic benefits over the conventional cooling water systems. GRA

N82-16571# Centec Consultants, Inc., Reston, Va.
ASSESSMENT OF EMERGING TECHNOLOGIES FOR METAL FINISHING POLLUTION CONTROL: THREE CASE STUDIES Final Report, Apr. - Dec. 1980
Philip A. Militello Aug. 1981 74 p refs
(Contract EPA-68-03-2907)
(PB81-244485; EPA-600/2-81-153) Avail: NTIS HC A04/MF A01 CSCL 13B

Approaches to treatment of electroplating wastewater were evaluated. The most promising of these were selected for further investigation to include sampling performance verification, and cost analysis. The treatment methods include a system for treatment of electroplating wastes with ozone, a technique for chrome recovery by ion transfer, and a method of treating mixed wastestreams using ion exchange. Performance of each of these technologies was evaluated through sampling and analysis of prototype operation under normal production conditions. Performance data and cost projections for each system are presented herein. T.M.

N82-16572# North Carolina Water Resources Research Inst., Raleigh.
ON-SITE WASTEWATER TREATMENT PROBLEMS AND ALTERNATIVES FOR WESTERN NORTH CAROLINA
Steven J. Berkowitz Jun. 1981 154 p refs Prepared in cooperation with Univ. of Western Carolina, Cullowhee, N.C.
(PB81-240541; UNC-WRRI-81-163; W81-04661; OWRT-A-999-NC(54)) Avail: NTIS HC A08/MF A01 CSCL 13B

The results of a project intended to help improve wastewater management in the western North Carolina mountains by developing a comprehensive picture of the region's on site wastewater management practices and related problems are summarized. It provides a basis for evaluating the potential role alternative practices and programs could play in solving these problems. Four representative mountain counties--Graham, Haywood, Jackson, and Macon--were analyzed in detail. Approximately 100,000 people live in 40,000 homes within the four study counties. About three quarters of these homes depend on individual wastewater disposal systems, primarily conventional septic tank systems. GRA

N82-16573# Geological Survey, Albany, N.Y. Water Resources Div.
POLYCHLORINATED BIPHENYL TRANSPORT IN THE HUDSON RIVER, NEW YORK Final Water-Resources Investigation, 1976-1977
John T. Turk and David E. Troutman Mar. 1981 18 p refs Prepared in cooperation with Board of Water Commissioners of the Town of Waterford, N.Y. and New York State Dept. of Environmental Conservation
(PB81-249757; USGS/WRD/WRI-81/079; USGS/WRI-81-9) Avail: NTIS HC A02/MF A01 CSCL 13B

The PCB concentrations in the Hudson River at Waterford, New York are controlled by two processes. At discharges that are not extremely high (less than 600 cubic meters per second) a constant flux of PCB's from bottom deposits is the major source. At discharges greater than 600 cubic meters per second, resuspension of bottom materials containing PCB's is the principal mechanism. PCB concentration resulting from either or both processes can be predicted from river discharge by equations developed and verified in this study. The transport rate of PCB's into the Hudson River estuary is approximately 1,700 kilograms per year, of which about 40 percent is transported at discharges greater than 600 cubic meters per second. GRA

N82-16574# Consumer Dynamics, Inc., Rockville, Md.
VOCATIONAL EDUCATION TRAINING IN ENVIRONMENTAL HEALTH SCIENCES: COLLECTING STREAM SAMPLES FOR WATER QUALITY, MODULE 16
Fredric C. May Jul. 1981 43 p refs
(Contract OE-300-80-0088)
(PB81-249690; DE/OVAE-80-0088-16) Avail: NTIS HC A03/MF A01 CSCL 13B

A self-instruction learning package which describes the procedures for collecting stream samples for specific laboratory analyses is presented. Training prerequisites are outlined. GRA

N82-16575# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
MESA (MARINE ECOSYSTEM ANALYSIS) NEW YORK BIGHT PROJECT: WINKLER OXYGEN DATA, EXPANDED WATER COLUMN CHARACTERIZATION CRUISES (XWCC-2 TO SWCC-24), NOAA SHIPS RESEARCHER AND GEORGE B. KELEZ, 1975 - 1979
Antonio Mendez and George A. Berberian May 1981 287 p refs 9 Vol.
(PB82-100975; NOAA-DR-OMPA-2; NOAA-81072212) Avail: NTIS HC A12/MF A01 CSCL 06F

Using the period of February 1975 to August 1979, twenty-three oceanographic cruises were made by the NOAA Ships Researcher and George B. Kelez in the New York Bight. The objective of the cruises was to supply data to provide a base for analysis of the water characteristics and movements, and to provide a baseline to be used in assessing the impacts of contaminants in the New York Bight. This report presents Winkler dissolved oxygen values from samples collected in the New York Bight during Expanded Water Column Characterization cruises (XWCC-2 to XWCC-24) conducted in this period. GRA

N82-16576# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
MESA (MARINE ECOSYSTEM ANALYSIS) NEW YORK BIGHT PROJECT: EXPANDED WATER COLUMN CHARACTERIZATION CRUISE (XWCC-17), NOAA SHIP GEORGE B. KELEZ, APRIL 1978
John B. Hazelworth, Terren M. Niedrauer, and Philip G. Hanson May 1981 207 p refs 9 Vol.
(PB82-100983; NOAA-DR-OMPA-3; NOAA-81072211) Avail: NTIS HC A10/MF A01 CSCL 06F

During the period 10-18 April 1978, an oceanographic cruise was made on the NOAA Ship George B. Kelez in the New York Bight. The objective of the cruise was to supply data to provide a base for analysis of the water characteristics and movements in the highly impacted ecosystem. This report represents the corrected physical and chemical (nutrient) data from this cruise. GRA

N82-16577# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
MESA (MARINE ECOSYSTEM ANALYSIS) NEW YORK BIGHT PROJECT. EXPANDED WATER COLUMN CHARACTERIZATION CRUISE (XWCC-18), NOAA SHIP GEORGE B. KELEZ, JUN. 1978
John B. Hazelworth, Terren M. Niedrauer, and George A. Berberian May 1981 229 p refs 9 Vol.
(PB82-100991; NOAA-DR-OMPA-4; NOAA-81072210) Avail: NTIS HC A11/MF A01 CSCL 06F

During the period 20 May-9 June 1978, an oceanographic cruise was made on the NOAA Ship George B. Kelez in the New York Bight. The objective of the cruise was to supply data to provide a base for anaysis of the water characteristics highly impacted ecosystem. This report represents the corrected physical and chemical (nutrient) data from the cruise. GRA

N82-16578# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
MESA (MARINE ECOSYSTEM ANALYSIS) NEW YORK BIGHT PROJECT: EXPANDED WATER COLUMN CHARAC-

TERIZATION CRUISE (XWCC-19), NOAA SHIP GEORGE B. KELEZ, JULY 1978
John B. Hazelworth, Terran M. Niedrauer, and George A. Berberian May 1981 247 p refs 9 Vol.
(PB82-101007; NOAA-DR-OMPA-5; NOAA-81072209) Avail: NTIS HC A11/MF A01 CSCL 06F

During the period 5 to 15 July 1978, an oceanographic cruise was made on the NOAA Ship George B. Kelez in the New York Bight. The objective of the cruise was to supply data to provide a base for analysis of the water characteristics and movements in the highly impacted ecosystem. This report represents the corrected physical and chemical (nutrient) data from this cruise. GRA

N82-16579# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
MESA (MARINE ECOSYSTEM ANALYSIS) NEW YORK BIGHT PROJECT. EXPANDED WATER COLUMN CHARACTERIZATION CRUISE (XWCC-20), NOAA SHIP GEORGE B. KELEZ, JULY-AUGUST 1978
John B. Hazelworth and George A. Berberian May 1981 247 p refs 9 Vol.
(PB82-101015; NOAA-DR-OMPA-6; NOAA-81072208) Avail: NTIS HC A11/MF A01 CSCL 06F

During the period 31 July to 9 August 1978, an oceanographic cruise was made on the NOAA Ship George B. Kelez in the New York Bight. The objective of the cruise was to supply data to provide a base for analysis of the water characteristics and movements in the highly impacted ecosystem. This report represents the corrected physical and chemical (nutrient) data from this cruise. GRA

N82-16580# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
MESA (MARINE ECOSYSTEM ANALYSIS) NEW YORK BIGHT PROJECT: EXPANDED WATER COLUMN CHARACTERIZATION CRUISE (XWCC-21), NOAA SHIP GEORGE B. KELEZ, APRIL 1979
John B. Hazelworth and George A. Berberian May 1981 227 p refs 9 Vol.
(PB82-101023; NOAA-DR-OMPA-7; NOAA-81072207) Avail: NTIS HC A11/MF A01 CSCL 06F

During the period 9-18 April 1979, an oceanographic cruise was made on the NOAA Ship George B. Kelez in the New York Bight. The objective of the cruise was to supply data to provide a base for analysis of the water characteristics and movements in the highly impacted ecosystem. This report represents the corrected physical and chemical (nutrient) data from this cruise. GRA

N82-16581# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
MESA (MARINE ECOSYSTEM ANALYSIS) NEW YORK BIGHT PROJECT: EXPANDED WATER COLUMN CHARACTERIZATION CRUISE (XWCC-22), NOAA SHIP GEORGE B. KELEZ, MAY-JUNE 1979
John B. Hazelworth, George A. Berberian, and Carol Gutherman May 1981 225 p refs
(PB82-101031; NOAA-DR-OMPA-8; NOAA-81072206) Avail: NTIS HC A10/MF A01 CSCL 06F

During the period 29 May - 7 June 1979, an oceanographic cruise was made on the NOAA Ship George B. Kelez in the New York Bight. The objective of the cruise was to supply data to provide a base for analysis of the water characteristics and movements in the highly impacted ecosystem. This report represents the corrected physical and chemical (nutrient) data from this cruise. GRA

N82-16582# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
MESA (MARINE ECOSYSTEM ANALYSIS) NEW YORK BIGHT PROJECT: EXPANDED WATER COLUMN CHARACTERIZATION CRUISE (XWCC-23), NOAA SHIP GEORGE B. KELEZ, JULY 1979
John B. Hazelworth, George A. Berberian, and Carol Gutherman May 1981 277 p refs 9 Vol.
(PB82-101049; NOAA-DR-OMPA-9; NOAA-81072205) Avail: NTIS HC A13/MF A01 CSCL 06F

During the period 16 to 27 July 1979, an oceanographic cruise was made on the NOAA Ship George B. Kelez in the New York Bight. The objective of the cruise was to supply data to provide a base for analysis of the water characteristics and movements in the highly impacted ecosystem and supply data to provide a base for analysis of the water characteristics and movements in the highly impacted ecosystem. This report represents the corrected physical and chemical (nutrient) data from this cruise. GRA

N82-16583# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
MESA (MARINE ECOSYSTEM ANALYSIS) NEW YORK BIGHT PROJECT: EXPANDED WATER COLUMN CHARACTERIZATION CRUISE (XWCC-24), NOAA SHIP GEORGE B. KELEZ, AUGUST 1979
John B. Hazelworth, George A. Berberian, and Carol Gutherman May 1981 291 p refs 9 Vol.
(PB82-101056; NOAA-DR-OMPA-10; NOAA-81072204) Avail: NTIS HC A13/MF A01 CSCL 06F

During the period 13 to 23 August 1979, an oceanographic cruise was made on the NOAA Ship George B. Kelez in the New York Bight. The objective of the cruise was to supply data to provide a base for analysis of the water characteristics and movements in the highly impacted ecosystem. This report represents the corrected physical and chemical (nutrient) data from this cruise. GRA

N82-16584# Virginia Univ., Charlottesville. Dept. of Environmental Sciences.
IMPACT OF TOPOGRAPHIC CIRCULATIONS ON THE TRANSPORT AND DISPERSION OF AIR POLLUTANTS Final Report, Oct. 1978 - Apr. 1981
Roger A. Pielke and Richard T. McNider Aug. 1981 224 p refs
(Contract EPA-R-806207)
(PB82-102435; EPA-600/4-81-068) Avail: NTIS HC A10/MF A01 CSCL 13B

A numerical mesoscale model is utilized to examine slope flows and the classic mountain plain circulation for idealized topography. Special emphasis is given to turbulent parameterization in the stable boundary layer and the unique characteristics of turbulent mixing in the slope flows. A Lagrangian particle model, operating in the terrain following coordinate system of the mesoscale model, was developed to examine pollutant transport in the modeled circulations while a Markov statistical process was used to evaluate turbulent dispersion. Results of dispersion tests in the modeled slope flows showed enhanced vertical dispersion in the slope flows, compared to flow over a flat boundary, and importantly, that normal surface scaling parameters for pollutant dispersion such as friction velocity were inappropriate for the slope flows. GRA

N82-16585# PEDCo-Environmental, Inc., Kansas City, Mo.
FEDERAL INITIATIVE FOR CLEAN AIR: INSPECTION AND MAINTENANCE
Feb. 1981 87 p
(Contract EPA-68-02-2535)
(PB82-102500; EPA-907/9-81-001; PN-3280-V) Avail: NTIS HC A05/MF A01 CSCL 13B

The regulation new car emissions and ensurance that the production of vehicles, if properly maintained, will meet applicable emission standards throughout their useful life is discussed. Inspection/maintenance (I/M) aims at the control of motor vehicle emissions and the reduction of air pollution through required periodic inspection of motor vehicles and maintenance of those that do not pass inspection. It is estimated that a properly operated designed I/M program can reduce auto air pollution emissions by 20 to 30% after several years of program implementation. GRA

N82-16586# Environmental Protection Agency, Ann Arbor, Mich. Test and Evaluation Branch.
EXHAUST EMISSIONS FROM HIGH-MILEAGE CATALYST-EQUIPPED PASSENGER CARS
Gary T. Jones Jul. 1981 15 p refs
(PB82-103326; EPA-AA-TEB-81-20) Avail: NTIS HC A02/MF A01 CSCL 13B

Vehicles from the 1975 through 1981 model years were used to examine the effect of 'high mileage' on levels of exhaust emissions. The emission levels from the vehicles involved were examined from four basic views: (1) 'as received' results of the top 15% (by odometer) versus similar results from the bottom 15% and 85%; (2) 'as received' results of vehicles with over 50,000 miles versus those with under 50,000; (3) the effects of restorative maintenance on high mileage vehicles; and (4) the effects of catalyst replacement on high mileage vehicles. The results show that the high mileage vehicles exhibit higher average HC and CO emissions than the lower mileage vehicles. It was also found that on the averge, catalytic converters remain active beyond a vehicle's statutory 'useful life' of 50,000 miles and that restorative maintenance is an effective method to reduce average emission levels. GRA

N82-16587# Environmental Protection Agency, Chicago, Ill. Surveillance and Analysis Div.
ASSESSMENT OF THE REGION V WATER MONITORING ACTIVITIES Final Report
Jan. 1981 179 p
(PB82-103334; EPA-905/4-81-001) Avail: NTIS
HC A09/MF A01 CSCL 13B

The water monitoring activities within the region to determine the adequacy of existing monitoring activities to meet program needs are reviewed. The need to develop monitoring capability for toxics and hazardous materials are also reviewed. The changing direction in resource utilization are considered. Findings and recommendations are formulated leading to a monitoring management strategy which results in the coordination of resource utilization and the redirection of monitoring resources needed for a data base. Information on program needs, monitoring program objectives and the assessment of current programs are described. GRA

N82-16588# Environmental Protection Agency, Research Triangle Park, N.C.
AIR POLLUTANTS IN SELECTED SALT LAKE BASIN COMMUNITIES, 1971 - 1975
Gary F. Evans, Peter L. Finkelstein, and Gerald G. Akland Aug. 1981 50 p refs
(PB82-103664; EPA-600/4-81-046) Avail: NTIS
HC A03/MF A01 CSCL 13B

Aerometric data are reported for various air pollutants measured by the United States Environmental Protection Agency from 1971 through 1975 in four Utah communities. The communities (Kearns, Magna, Ogden, and Salt Lake City) are situated in or near the Great Salt Lake Basin in which a large copper smelter represented the largest point source of sulfur oxide emissions during the study period. Measurements were made of total suspended particulate, nitrate, sulfate, and sulfur dioxide. In addition to describing the spatial, seasonal, and long term variations in the air quality data, the report includes discussions of related meteorology, quality assurance, and emission data. GRA

N82-16589# Environmental Sciences Research Lab., Research Triangle Park, N.C. Meteorology and Assessment Div.
CARBON MONOXIDE COMMUTER EXPOSURE DATA BASE: A 5-DAY STUDY IN LOS ANGELES
William B. Peterson, Rodney H. Allen (Comp-Aid, Inc.), Richard A. Ziskind (Science Applications, Inc.), and Michael B. Rogozen (Science Applications, Inc.) Aug. 1981 77 p
(PB82-103607; EPA-600/4-81-069) Avail: NTIS
HC A05/MF A01 CSCL 13B

Carbon monoxide exposure to the commuter population was monitored to assess the CO exposure to Los Angeles commuters. Interior carbon monoxide, exterior carbon monoxide and vehicle speed for three vehicles traveling typical commute routes during the morning and evening peak traffic periods were measured. Hourly average CO measurements were taken from eight south coastal air quality management district fixed site monitoring stations and six California transportation agency cans in the proximity of the commuter routes. GRA

N82-16590# National Energy Information Center, Washington, D. C.
NEIC MANUAL FOR GROUNDWATER/SUBSURFACE INVESTIGATIONS AT HAZARDOUS WASTE SITES Final Report
Steven W. Sisk Jul. 1981 213 p refs
(PB82-103755; EPA-330/9-81-002) Avail: NTIS
HC A10/MF A01 CSCL 13B

A systematic approach to conducting groundwater/subsurface (hydrogeologic) investigations at hazardous waste sites is presented. The procedures include obtaining background information, inspecting and monitoring the site, and installing monitoring wells. By considering the potential data use in each subject area and the characteristics of the site under study, the investigator determines the types and extent of information required to define a particular pollution problem. Also included are appendices that describe sources of hydrogeologic and other relevant data fundamentals of groundwater hydrology procedures for well drilling and equipment for borehole air sampling. GRA

N82-16591# Atlantic Research Corp., Alexandria, Va.
RESTORING HAZARDOUS SPILL-DAMAGED AREAS: TECHNIQUE IDENTIFICATION/ASSESSMENT Final Report
Randall S. Wentsel, Roberta H. Foutch, William E. Harward, III, William E. Jones, III, and Judith F. Kitchens Sep. 1981 374 p refs
(Contract EPA-68-03-2648)
(PB82-103870; EPA-600/2-81-208) Avail: NTIS
HC A16/MF A01 CSCL 13B

The goal of this study was to identify and assess methods that could be used to accelerate the restoration of lands damaged by spills of hazardous materials. The literature was reviewed to determine what response methods had been used in the past to clean up spills on land and identify other techniques that could be developed for detoxification of hazardous, spill-damaged lands. Four biological techniques were evaluated for accelerating the restoration of spill-damaged lands in the laboratory. The techniques and the chemicals used were the following: (1) enhancement of microbial degradation by indigenous for chlorobenzene and ethion organisms; (2) addition of mixed microorganisms from primary sewage for formaldehyde and aniline; (3) addition of adapted/mutant microbial cultures for dinitrophenol and chlordane; and (4) selective absorption by harvestable plants for lead and cadmium. GRA

N82-16592# Mitre Corp., Bedford, Mass.
EVALUATION OF POLLUTION ABATEMENT ALTERNATIVES: PICILLO PROPERTY, COVENTRY, RHODE ISLAND Final Report
Nancy L. Cichowicz, Robert W. Pease, Jr., Paul J. Stoller, and Harold J. Yaffe Sep. 1981 95 p
(Contract EPA-68-01-5051)
(PB82-103888; EPA-600/2-81-186) Avail: NTIS
HC A05/MF A01 CSCL 13B

The second phase of an investigation to determine the nature and severity of ground and surface water contamination at the Picillo property in Coventry, Rhode Island is presented. Recommendations for permanent abatement of the situation are made. Bedrock sampling, installation of bedrock wells, field permeability testing, exploratory excavation of drums, ground penetrating radar survey, seismic refraction survey, and collection and chemical analysis of additional soil, ground water, and surface water samples are described. Author

N82-16593# Mitre Corp., Bedford, Mass.
USE OF REMOTE SENSING TECHNIQUES IN A SYSTEMATIC INVESTIGATION OF AN UNCONTROLLED HAZARDOUS WASTE SITE Final Report
Nancy L. Cichowicz, Robert W. Pease, Jr., Paul J. Stoller, and Harold J. Yaffe Sep. 1981 79 p refs
(Contract EPA-68-01-5051)
(PB82-103896; EPA-600/2-81-187) Avail: NTIS
HC A05/MF A01 CSCL 13B

The use and evaluation of several remote sensing techniques in conjunction with direct sample collection to develop a systematic approach for subsurface investigations at uncontrolled hazardous waste sites is described. Remote sensing techniques were employed to determine the extent (and sequence) to which they may be integrated with the more conventional methods of test drilling, installation of monitoring wells, and excavation for determining information such as the following: ground water contamination, presence and number of buried drums, topography and condition of bedrock, and costs and effectiveness of several abatement methods. Both the remote sensing and conventional sampling methods were used at an abandoned hazardous waste dump in Coventry, Rhode Island. GRA

N82-16594# Environmental Protection Agency, Ann Arbor, Mich. Test and Evaluation Branch.

EMISSION CHARACTERISTICS OF 1979 AND 1980 CALIFORNIA PASSENGER CARS EQUIPPED WITH THREE-WAY CATALYSTS

Gary T. Jones and Matthew M. Macocha Aug. 1981 18 p refs

(PB82-105073; EPA-AA-TEB-81-24) Avail: NTIS HC A02/MF A01 CSCL 13F

Exhaust emissions data gathered on in use vehicles equipped with three way catalyst systems are presented. Information on current systems in customer use for projections on the ability of the three way system to meet emission standards of the future were obtained. It is indicated that vehicles equipped with these systems are capable of achieving low exhaust emission levels although high levels do occur due to defects, deterioration or tampering with the emission control equipment. GRA

N82-16595# Environmental Protection Agency, Ann Arbor, Mich. Emission Control Technology Div.

FUEL ECONOMY AND EXHAUST EMISSIONS OF A METHANOL-FUEL CHEVETTE

H. Anthony Ashby May 1981 7 p refs

(PB82-101783; EPA-AA-TEB-81-23) Avail: NTIS HC A02/MF A01 CSCL 13F

The results of a series of tests conducted over a period of several months on a 1979 Chevrolet Chevette powered by anhydrous methanol are presented. Baseline tests with gasoline were also conducted about three months before the methanol test series began. The exhaust emissions from this car were greatly affected by air-fuel ratio and state of tune. Driveability was not good during most tests when CO met Federal standards. The best optimized adjustments gave a 10 percent better energy efficiency on pure methanol than on gasoline with approximately similar exhaust emission levels. GRA

N82-16596# Southwest Research Inst., San Antonio, Tex.

UNREGULATED EXHAUST EMISSIONS FROM NONCATALYST BASELINE CARS UNDER MALFUNCTION CONDITIONS Final Report, Jun. 1980 - May 1981

Charles Urban May 1981 185 p refs

(Contract EPA-68-03-2884)

(PB82-101130; EPA-460/3-81-020) Avail: NTIS HC A09/MF A01 CSCL 13F

Laboratory efforts to characterize regulated and unregulated exhaust emissions from 1970 model noncatalyst gasoline automobiles operating under malfunction conditions are described. Four automobiles were evaluated over three driving schedules in the unmodified configuration and in up to three engine and/or emission control system malfunction configurations. Exhaust emission constituents measured, in addition to the currently regulated emissions, include: particulates, sulfates, aldehydes, sulfides, amines, metals and several additional elements and compounds. Additional evaluations in each of the configurations involved the measurement of the regulated emissions over four short test procedures. GRA

N82-16597# Southwest Research Inst., San Antonio, Tex.

ESTIMATING MOBILE SOURCE POLLUTANTS IN MICROSCALE EXPOSURE SITUATIONS Final Report, Jan. 1980 - Feb. 1981

Melvin N. Ingalls Jul. 1981 162 p refs

(Contract EPA-68-03-2884)

(PB82-101114; EPA-460/3-81-021) Avail: NTIS HC A08/MF A01 CSCL 13F

The concentration of any vehicle generated pollutant in areas where people are in close proximity, to vehicles (microscale exposure situations) was estimated. The situations studied are: residential garages, parking garages, tunnels, street canyons and expressways. For each of the situations dispersion model was selected for use in obtaining pollutant concentrations. The exposure level for each case was determined by calculating the pollutant concentrations for typical and severe actual situations. Actual locations were chosen to represent the typical and severe exposure for each situation. Pollutant concentrations were calculated by using the chosen dispersion models. GRA

N82-16598# APT, Inc., San Diego, Calif.

SPRAY CHARGING AND TRAPPING SCRUBBER FOR FUGITIVE PARTICLE EMISSION CONTROL Final Report, Aug. 1978 - Aug. 1980

Shui-Chow Yung, Julie Curran, and Seymour Calvert Jul. 1981 265 p refs

(Contract EPA-68-02-3109)

(PB82-115304; EPA-600/7-81-125) Avail: NTIS HC A12/MF A01 CSCL 13B

The control of fugitive particle emissions (FPE) with a Spray Charging and Trapping (SCAT) Scrubber that uses an air curtain and/or jets to contain, convey, and divert the FPE into a charged spray scrubber was evaluated. The effects of charge levels on drops and particles, nozzle type, drop size, gas velocity, and liquid/gas ratio on collection efficiency were determined. It is shown that collection efficiency can be improved by charging the water and/or particles. Measured particle penetration agrees with theoretical predictions for the unaugmented scrubber. For the electrostatically augmented scrubber, measured penetration is lower than predicted. An air curtain was developed for conveying the FPE to the spray scrubber. The design and air flow field for the air curtain are presented. GRA

N82-16599# Environmental Protection Agency, Atlanta, Ga. Environmental Impact Statement.

CENTRAL HILLSBOROUGH COUNTY-TAMPA, FLORIDA: 201 FACILITIES PLAN. VOLUME 1: WASTEWATER FACILITIES EXISTING ENVIRONMENT TECHNICAL REFERENCE DOCUMENT

Sep. 1981 373 p refs

(PB82-107913; EPA-904/9-81-078A) Avail: NTIS HC A16/MF A01; also available in set of 3 reports HC E20 as PB82-107897 CSCL 13B

Proposed wastewater facilities for the City of Tampa, the City of Temple Terrace and portions of management alternatives were evaluated with particular attention to the impacts of alternative management systems on growth patterns and primary and secondary impacts on wetlands and other area water resources. Present social, economic, and natural environmental features of the planning area are described. Natural and man made features of the area are documented. GRA

N82-16600# Environmental Protection Agency, Atlanta, Ga. Environmental Impact Statement.

CENTRAL HILLSBOROUGH COUNTY-TAMPA, FLORIDA: 201 FACILITIES PLAN. VOLUME 2: ALTERNATIVES EVALUATION TECHNICAL REFERENCE DOCUMENT

Sep. 1981 211 p refs

(PB82-107921; EPA-904/9-81-078B) Avail: NTIS HC A10/MF A01; also available in set of 3 reports HC E20 as PB82-107897 CSCL 13B

Proposed wastewater facilities for the City of Tampa, the City of Temple Terrace and portions of management alternatives were evaluated. The impacts of alternative management systems on growth patterns and primary and secondary impacts on wetlands and other area water resources are emphasized. GRA

N82-16601# Weston (Roy F.), Inc., West Chester, Pa.

HOURLY DIURNAL FLOW VARIATIONS IN PUBLICLY-OWNED WASTEWATER TREATMENT FACILITIES Final Report, 1979

Sep. 1981 122 p refs

(Contract EPA-68-03-2775)

(PB82-107954; EPA-600/2-81-218) Avail: NTIS HC A06/MF A01 CSCL 13B

Sanitary sewer collection systems were surveyed to determine the magnitude of hourly peak flows and to identify parameters most influencing the observed peaks. The significant parameters include: industrial contribution, collection system age, depth to groundwater and low lift preplant pumping stations. Collection systems with larger industrial contributions had higher peak flows than those with small industrial contributions. Variations in peak flows were exhibited between spring and summer periods in high groundwater and among old age systems due to infiltration during the spring season. Low lift preplant pumping stations create extremely high peak flows and pulses that do not reflect normal diurnal influent flow patterns. GRA

N82-16602# Environmental Protection Agency, Research Triangle Park, N.C. Quality Assurance Div.
A SUMMARY OF THE EPA NATIONAL SOURCE PERFORMANCE AUDIT PROGRAM - 1980 Final Report
R. G. Fuerst, E. W. Streib, and M. R. Midgett Oct. 1981 68 p refs
(PB82-108127; EPA-600/4-81-077) Avail: NTIS
HC A04/MF A01 CSCL 13B

A national quality assurance audit program for methods used in stationary source tests was conducted in 1980 by the Quality Assurance Division of the Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. In this program, quality assurance materials were sent to interested participants for the measurement of a gas volume (dry gas meter only) or the analysis of liquid samples simulating collected sulfur dioxide and nitrogen oxides. Each participant returned the analytical results to the Source Branch, Quality Assurance Division, for evaluation. An individual report was returned to each participant after processing. This report summarizes the audit results of 1980 for those three source test methods. GRA

N82-16603# California Univ., Davis. Dept. of Engineering.
PERFORMANCE OF TRICKLING FILTER PLANTS: RELIABILITY, STABILITY, VARIABILITY Final Report
Richard Haugh, Salar Niku, Edward D. Schroeder, and George Tchobanoglous Sep. 1981 111 p refs
(Grant EPA-R-805097)
(PB82-108143; EPA-600/2-81-228) Avail: NTIS
HC A06/MF A01 CSCL 13B

Effluent quality variability from trickling filters was examined. Distributions of most effluent data were skewed to the right, and daily suspended solids data exhibited more variation than daily BOD5 data. Three distributions, two parameter empirical, gamma and lognormal were adequate. Daily effluent BOD5 and suspended solids data contained both random and nonrandom components. Effluent BOD and suspended solids concentrations were higher in winter than in summer when pooled data from all plants was examined. Multiple regression analysis determined the effects of various process parameters on effluent quality. Primary effluent BOD5 and suspended solids concentrations and wastewater temperature had the greatest effect. Methods to incorporate statistical concepts into trickling filter design and operation are discussed. GRA

N82-16604# Purdue Univ., Lafayette, Ind.
HEAVY METAL SOURCES AND FLOWS IN A MUNICIPAL SEWAGE SYSTEM: LITERATURE SURVEY AND FIELD INVESTIGATION OF THE KOKOMO, INDIANA SEWAGE SYSTEM Final Report, Oct. 1977 - Jan. 1981
K. J. Yost, R. F. Wukasch, T. G. Adams, and Bert Michalczyk Sep. 1981 282 p refs
(Grant EPA-R-805631)
(PB82-108366; EPA-600/2-81-224) Avail: NTIS
HC A13/MF A01 CSCL 13B

The flow of heavy metals (Cu, Ni, Cr, Cd, Zn, PB) and cyanide in the Kokomo, Indiana collection system and wastewater treatment plant was analyzed. The relative contributions of domestic and nondomestic sources to the total pollutant load in the system, were determined. The levels of discharge control required for the disposal of municipal sludge by landfill or agricultural landspreading were assessed. Sampling was conducted at point source locations, in major sewer trunk and feeder lines, and at the treatment plant. Production and waste treatment data are presented for point sources sampled to characterize metal and cyanide discharges as a function of these parameters. GRA

N82-16605# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
AN APPLICATION OF DECISION ANALYSIS TO TECHNOLOGY ASSESSMENT: AN ASSESSMENT OF DECENTRALIZED WASTE TREATMENT METHODS
Ronald Howard, William Balson, Daniel Owen, Patricia A. Owen, and Gerry Sauer 13 Apr. 1981 157 p refs
(Grant NSF PRA-79-08615)
(PB82-109018; NSF/PRA-81001) Avail: NTIS
HC A08/MF A01 CSCL 13B

A technology assessment of waste management systems for individual households is presented. Decisionmaking rather than the prospect of technological advance is assessed. Strategic alternatives for waste treatment, categories of decisionmakers studied, the pollution attributes of waste, and the model and data utilized are outlined. Technical factors in the choice between onsite and central technologies are examined. A decision analysis paradigm and description of the structural model are included. GRA

N82-16606# Enviro Control, Inc., Rockville, Md.
PROCEEDINGS OF THE CONFERENCE ON INNOVATION IN THE ENVIRONMENTAL TECHNOLOGY INDUSTRY
Sep. 1981 3 p refs Conf. held in Washington, D.C., 5-6 Nov. 1980; sponsored in part by Water Pollution Control Federation, Air Pollution Control Association, and Environmental Industry Council
(Contract EPA-68-03-2674)
(PB82-109588; EPA-600/9-81-030) Avail: NTIS
HC A02/MF A01 CSCL 13B

Innovation in the environmental technology industry was discussed. Major areas addressed include assessment of pollution control technologies, venture capital constraints and considerations, impact of regulatory policies on new markets and development, Federal patent policy changes and impact on innovation, investment firms perspective for ventures and foreign technology exchange, sources, barriers and approaches. GRA

N82-16607# Environmental Protection Agency, Dallas, Tex.
WASTEWATER TREATMENT FACILITIES. TWINING WATER AND SANITATION DISTRICT, TAOS COUNTY, NEW MEXICO Draft Environmental Impact Statement
Aug. 1981 284 p refs
(PB82-104670; EPA-906/9-81-002) Avail: NTIS
HC A13/MF A01 CSCL 13B

The Twining Water and Sanitation District has considered alternatives for wastewater management which would solve a pollution problem in the high-quality Rio Hondo watershed of northern New Mexico. The district proposes construction of a new advanced treatment plant with a capacity of 95,000 gallons per day. A major alternative is to rehabilitate the existing plant and provide only the capacity needed to treat existing wastewater flows (83,000 gallons per day). EPA is considering approval and funding of either alternative (as well as providing no funding). Many complex issues bear on EPA's decision, including impacts on water quality, water supply, and socio-economic conditions. GRA

N82-16608# Surface Technology, Inc., Princeton, N. J.
SURFACE CHEMICAL TECHNOLOGY FOR IMPROVED WETTING OF COAL DUST Open File Report, 13 Sep. 1979 - 13 Sep. 1980
Nathan Feldstein Feb. 1981 50 p refs
(Contract DI-BM-JO-199050)
(PB82-104654; BM-OFR-127-81) Avail: NTIS
HC A03/MF A01 CSCL 13B

The wetting of coal dust by aqueous solutions of surface active agents (surfactants) was studied. Thirty coals and typical surfactants were selected. The wetting of the coals was examined by column flow, contact angle, and settling rate measurements. Results indicated that both anionic and nonionic surfactants are to be considered viable for use; low critical micelle concentration values are also preferred for the surfactants. Native waters showed variation in pH, calcium ion concentration, and conductance. Combinations of nonionic and anionic surfactants have, in certain instances, produced synergistic enhancement in the coal wetting superior to the effectiveness of each surfactant alone. GRA

N82-16609# Battelle Columbus Labs., Ohio.
TECHNIQUES FOR HANDLING LANDBORNE SPILLS OF VOLATILE HAZARDOUS SUBSTANCES Final Report
D. Brown, R. Craig, M. Edwards, N. Henderson, and T. J. Thomas Sep 1981 101 p refs
(Contract EPA-68-02-1323)

(PB82-106230: EPA-600/2-81-207) Avail: NTIS HC A06/MF A01 CSCL 13B

Response needs of teams charged with handling spills of hazardous volatile materials on land are considered. Items of hardware which could be adapted or developed to improve spill response capabilities are suggested. The available technology employed in current spill responses is examined. The phenomena that accompany spill volatilization are assessed to determine and justify physical/chemical mechanisms that could potentially be used to control the hazards arising from volatility. A set of spill scenarios is developed to compare the new suggested technology items with current spill response procedures. GRA

N82-16610# Rutgers - The State Univ., New Brunswick, N. J. Dept. of Chemical and Biochemical Engineering.

OIL SLICK DISPERSAL MECHANICS Final Report

Chukwuka A. Osamor and Robert C. Ahlert Sep. 1981 238 p refs
(Grant EPA-R-805901)
(PB82-105560: EPA-600/2-81-199) Avail: NTIS HC A11/MF A01 CSCL 13B

The spreading and dissolution behavior of small oil slicks formed from spills of 12 oils was investigated. The increases in area covered by the oils during spreading experiments were determined using photographic techniques. The rate of dissolution of the oils in tap water at 25 C were investigated by equilibrating oils with water in open static tests. Limits of solubilities were established for the oils from equilibration in closed vessels. Six oils were also equilibrated with salt water. A segmented mathematical model were derived and used to correlate experimental data. The primary mechanisms are quantified by analogy to homogeneous and heterogeneous catalysis and detergency. Parameters investigated include oil and dispersant types, oil to dispersant ratios, degree of agitation, and the effect of salt water. GRA

N82-16611# Denver Research Inst., Colo.

GEOTHERMAL EFFLUENT SAMPLING WORKSHOP Final Report

Jul. 1981 60 p Workshop held in Denver, May 1980
(Grant EPA-R-807469)
(PB82-105628: EPA-600/4-81-051) Avail: NTIS HC A04/MF A01 CSCL 13B

Recommendations to identify gaps in existing geothermal effluent sampling methodologies define needed research to fill those gaps, and recommend strategies to lead to a standardized sampling methodology are outlined. Topics discussed are: gas sampling; two phase gas sampling; liquid sampling; quality control/assurance. GRA

N82-16612# Jones and Stokes Associates, Inc., Sacramento, Calif.

WASTEWATER MANAGEMENT PLAN FOR THE LAKE WASHINGTON/GREEN RIVER BASINS Final Environmental Impact Statement

Roger Mochnick Seattle, Wash. EPA Aug. 1981 529 p refs
(PB82-105982: EPA-910/9-80-077F) Avail: NTIS HC A23/MF A01 CSCL 13B

The EPA proposes to approve for federal funding a long term wastewater management plan for the Renton study area. The program includes expansion of the Renton treatment plant's capacity, and construction of a tunnel and outfall for treated discharge into Puget Sound. Of the two locations considered for the outfall, Alki Point has been chosen as environmentally preferable over Seahurst Park. EPA also recommends additional studies on the design of the selected route, as well as on the monitoring procedure for the outfall and Puget Sound water quality conditions. GRA

N82-16613# National Oceanic and Atmospheric Administration, Silver Spring, Md. Air Resources Labs.

DEMONSTRATION OF A LONG-RANGE ATMOSPHERIC TRACER SYSTEM USING PERFLUOROCARBONS

Gilbert J. Ferber, Kosta Telegadas, Jerome L. Heffter, C. Ray Dickson, Russell N. Dietz, and Philip W. Krey Apr. 1981 84 p refs
(Contract DE-AI01-80EV-10081)
(PB82-106246: NOAA-TM-ERL-ARL-101; NOAA-81080301) Avail: NTIS HC A05/MF A01 CSCL 13B

Regional-scale tracer experiments are needed to validate atmospheric dispersion aspects of air pollution models. The capability of a new system, using perfluorocarbon tracers (PFTs), for long-range dispersion experiments at reasonable cost was demonstrated in two experiments. Two PFTs (C7F14 and C8F16) were released simultaneously with SF6 and two heavy methanes. The PFT system provides automatic sequential samplers and rapid, inexpensive analyses down to 2 parts per 10 to the + 15th power of air. PFT concentrations were measured 600 km away, up to three days after release. Performance of the PFT system was excellent and a consistent set of tracer data was obtained. GRA

N82-16614# Bureau of Mines, Salt Lake City, Utah.

HYDROGEN SULFIDE GENERATION BY REACTION OF NATURAL GAS, SULFUR AND STEAM Report of Investigations, Jul. 1981

S. R. Crane, Laird Crocker, and W. I. Nissen Jul. 1981 61 p refs
(PB82-106998; BM-RI-8539) Avail: NTIS HC A04/MF A01 CSCL 13B

A regenerable flue gas desulfurization process was developed. The citrate process uses a buffered weak acid solution to absorb SO2 from the waste gas. The absorbed SO2 is reacted with H2S to precipitate elemental sulfur and regenerate the solution for recycle. The H2S feedstock xor the process may be produced by reacting two-thirds of the recovered elemental sulfur with natural gas and steam. Laboratory investigations and pilot plant operations were conducted by the Bureau to determine if H2S from the natural gas, sulfur, and steam reaction was suitable for the citrate process. The laboratory investigations, in which an H2S generator was integrated with other citrate process operations, provided a basis for design and operation of the pilot plant. The objective was to provide H2S for citrate process pilot plant. GRA

N82-16615# Calspan Corp., Buffalo, N. Y.

GUIDELINES FOR THE USE OF CHEMICALS IN REMOVING HAZARDOUS SUBSTANCE DISCHARGES

C. K. Akers, R. J. Pilie, and J. G. Michalovic Sep. 1981 82 p refs
(Contract EPA-68-03-2093)
(PB82-107483: EPA-600/2-81-205) Avail: NTIS HC A05/MF A01 CSCL 13B

Guidelines were developed on the use of various chemical and biological agents to mitigate discharge of hazardous substances. Eight categories of mitigative agents and their potential uses in removing hazardous substances discharged on land and in waterways are discussed. The agents are classified as follows: (1) Mass Transfer Media; (2) Absorbents; (3) Thickening and Gelling Agents; (4) Biological Treatment Agents; (5) Dispersing Agents; (6) Precipitating Agents; (7) Neutralizing Agents; and (8) Oxidizing Agents. The classification of each agent is developed in terms of: (a) Characteristic properties of the mitigative agent; (b) Potential spill situations on which the agent could be used; (c) The effects on the environment caused by use of the agent; (d) Possible toxic side effects caused by byproduct formation; and (e) Recommendations for use of the agent. GRA

N82-16616# SCS Engineers, Reston, Va.

EVALUATION OF ON-SITE WASTEWATER TREATMENT AND DISPOSAL OPTIONS Final Report, Oct. 1977 - Oct. 1978

David H. Bauer, E. T. Conrad, and Donald G. Sherman Sep. 1981 234 p refs
(Contract EPA-68-03-2627)
(PB82-101635: EPA-600/2-81-178) Avail: NTIS HC A11/MF A01 CSCL 13B

Conceivable alternatives of on site systems, wastewater manipulation, treatment and disposal options were identified. Wastewater manipulation includes flow reduction, wasteload reduction and waste segregation. Treatment options include disinfection, biological, and physical/chemical methods. Disposal options included air, soil and surface water methods, and practical combinations. An equipment inventory to determine the availability of hardware for the systems and system components was performed. Performance, operation and maintenance, environmental acceptability, and total annual cost for 15 specific site conditions were evaluated. Site conditions are defined by soil percolation rate, soil depth, slope, available land area, direct discharge effluent requirements, and net evaporation. GRA

N82-16617# Pittsburg Univ., Pa.
PENNSYLVANIA BASELINE
Maurice A. Shapiro, ed. Apr. 1981 632 p refs
(Grant EPA-R-805608)
(PB82-101742; EPA-600/7-81-059) Avail: NTIS
HC A99/MF A01 CSCL 06F

This was prepared as part of the Ohio River Basin Energy Study (ORBES), a multidisciplinary policy research program supported by the Environmental Protection Agency. Its purpose is to provide baseline information on Pennsylvania, one of the six states included partly or totally in the ORBES region. The topics covered are a historical synopsis of human activities in western Pennsylvania; geology, climatology, and soils; terrestrial ecology; surface hydrology; water quality; aquatic ecology; and socioeconomic characteristics. GRA

N82-16618# Versar, Inc., Springfield, Va.
ENVIRONMENTAL ASSESSMENT, SOURCE TEST AND EVALUATION REPORT: COAL PREPARATION PLANT NO. 2 Final Report, Sep. 1979 - Mar. 1981
J. Buroff, J. Strauss, A. Jung, and L. McGilvray Apr. 1981 304 p refs
(Contract EPA-68-02-3136)
(PB82-103573; EPA-600/7-81-071B) Avail: NTIS
HC A14/MF A01 CSCL 06F

Results and conclusions are given of a source test and evaluation program at a coal preparation plant, representing cleaning plants that process run of mine coal with high pyritic sulfur content, use high technology coal cleaning processes, operate in a high rainfall environment, and have a low soil neutralization potential. The major objective of the program was to perform an environmental assessment on the plant's waste streams and fugitive emissions. Chemical analysis results indicated that all streams, except fugitive particulates, contained constituents which may have a potentially harmful health and/or ecological effect. For streams showing potential for ecological effects, Mn was of concern for streams showing a potentially harmful health effect, Mn and Or were of prime concern. Contrary to previous studies, high NI-13 concentrations were observed in the leachate. Further investigation of the NI-13 source is warranted. Bioassays for fugitive particulates, sedimentation pond waters, and fine refuse slurry solid samples indicated moderate biological effects. GRA

N82-16619# Camp, Dresser and McKee, Inc., Boston, Mass.
DENSITY LEVELS OF PATHOGENIC ORGANISMS IN MUNICIPAL WASTEWATER SLUDGE, A LITERATURE REVIEW Final Report
Dana C. Pedersen Sep. 1981 298 p refs
(Contract EPA-68-03-2803)
(PB82-102286; EPA-600/2-81-170) Avail: NTIS
HC A13/MF A01 CSCL 13B

Density levels of indicator and pathogenic organisms in municipal wastewater sludges and septage were examined. The effectiveness of conventional municipal sludge stabilization processes (mesophilic anaerobic and aerobic digestion, composting and lime stabilization) and dewatering processes (drying beds, lagooning/storage, and sludge conditioning/mechanical dewatering) was evaluated for reducing density levels of indicator and pathogenic organisms. All literature published on this topic between 1940 and 1980 was reviewed. An annotated bibliography presents all citations reviewed, with pertinent abstracts and methods used by researchers. GRA

N82-16620# Camp, Dresser and McKee, Inc., Boston, Mass.
ENGINEERING AND ECONOMIC ASSESSMENT OF AUTOHEATED THERMOPHILIC AEROBIC DIGESTION WITH AIR AERATION Final Report
Sep. 1981 48 p refs
(Contract EPA-68-03-2803)
(PB82-102310; EPA-600/2-81-171) Avail: NTIS
HC A03/MF A01 CSCL 13B

A major disadvantage of aerobic digestion is that it requires long detention times, particularly in colder climates, to insure adequate stabilization. Autoheated thermophilic aerobic digestion (ATAD) offers the potential to decrease the required detention time. ATAD takes advantage of the heat generated by microoganisms as they degrade organic material. Heat losses are controlled so that the system will be self heating (authothermal) and reach thermophilic range (at least 45 C). ATAD is shown to be feasible with a mixture of thickened waste activated and primary municipal sludge. ATAD systems appear economical compared with ambient aerobic digestion and anaerobic digestion. The system is also more effective in decreasing the pathogen content of sludge. T.M.

N82-16621# Los Angeles County Sanitation District, Whittier, Calif.
WASTEWATER DECHLORINATION STATE-OF-THE-ART FIELD SURVEY AND PILOT STUDIES Final Report, Jun. 1973 - Sep. 1979
Ching-Lin Chen and Henry B. Gan Sep. 1981 104 p refs
(Contracts EPA-14-12-150; EPA-68-03-2745)
(PB82-102336; EPA-600/2-81-169) Avail: NTIS
HC A06/MF A01 CSCL 13B

The utility and efficiency of the sulfur dioxide method was determined and a cost-effectiveness comparison of sulfur dioxide and two other methods of dechlorination, namely, activated carbon and holding tank processes is provided. Pilot-scale testing indicates that no degradation of physical and chemical water quality occurred in the dechlorinated effluents from any of the three dechlorination processes investigated. The field survey involved the canvassing of 55 operating plants and although overdosing of sulfur dioxide was frequently necessary to meet the residual chlorine discharge standards, most installations found pH adjustment and reaeration of the dechlorinated effluent unnecessary. Process cost estimates indicate that sulfur dioxide process is the most cost-effective method for dechlorination. T.M.

N82-16622# Tulane Univ., New Orleans, La. School of Public Health and Tropical Medicine.
PARASITES IN SOUTHERN SLUDGES AND DISINFECTION BY STANDARD SLUDGE TREATMENT
R. S. Reimers, M. D. Little, A. J. Englande, D. B. Leftwich, D. D. Bowman, and R. F. Wilkinson Sep. 1981 203 p refs
(Grant EPA-R-805107)
(PB82-102344; EPA-600/2-81-166) Avail: NTIS
HC A10/MF A01 CSCL 13B

The inactivation of parasites by lime stabilization of sewage sludges seeded with selected intestinal parasites was investigated. Sludge samples examined in each of the four seasons from 27 municipal wastewater treatment plants indicated the following: viable eggs of Ascaris and Toxocara were observed at least once from every plant; viable eggs of T. vulpis and T. trichiura were observed at least once from 26 and 15 plants, respectively, and viable eggs of at least 10 other helminths and cysts of a few protozoa were observed in fewer numbers and less frequently. Certain drying bed conditions such as previous sludge stabilization, high temperature, and low moisture content appear to inactivate parasite eggs synergistically between 60 percent to 5 percent sludge moisture content. Laboratory studies indicate that destruction of resistant parasite eggs is primarily due to temperature and not to a specific digestion process. T.M.

N82-16623# Acurex Corp., Mountain View, Calif. Energy and Environment Div.
FUEL NOx CONTROL BY CATALYTIC COMBUSTION Final Report, Oct. 1978 - Apr. 1979
E. K. Chu, K. D. Seifert, R. M. Kendall, and J. P. Kesselring Sep. 1981 103 p refs
(Contract EPA-68-02-2611)
(PB82-102351; EPA-600/7-81-151; IERL-RTP-1247) Avail: NTIS HC A06/MF A01 CSCL 13B

Operating conditions for catalytic combustors that give low levels of NOx emissions for fuel-bound nitrogen compounds were defined, and fuel nitrogen during catalytic combustor was determined. Fuel NOx emissions are strongly dependent on catalyst type; however, varying mass throughput, bed temperature, fuel, and fuel nitrogen type had virtually no effect on fuel NOx. The dominant nitrogenous products resulting from the catalytic combustion of a nitrogen containing fuel were NO, N2, NH3, and HCN. GRA

N82-16624# Faucett (Jack) Associates, Inc., Chevy Chase, Md.
SIMPLIFIED NOISE STRATEGY MANUAL
Mones E. Hawley Jul. 1981 98 p refs
(Contract EPA-68-01-4944)
(PB81-243016) Avail: NTIS HC A05/MF A01 CSCL 13B

A manual system for planning the noise control strategy for abating a community's noise problems is described. It assists communities in determining, in an objective manner, the efficient allocation of funds for reducing the adverse effects of noise in their community. A noise planner is assisted in selecting the most cost effective noise abatement measures and the amount of money which should be spent on each. The primary criterion for optimization is based on economic and acoustical data gathered in the community. GRA

N82-16625# Michigan Univ., Ann Arbor. Seagrant Program.
POLLUTION PROBLEMS OF THE GREAT LAKES REGION. REPORT OF THE GREAT LAKES REGION CONFERENCE
Russel Moll, ed., Suzanne Tainter, ed., and Stephen R. Schneider, ed. Jan. 1981 74 p refs Conf. held at Traverse City, Mich., 9-11 Jun. 1981
(PB81-246951; UMICH-SG-81-900; NOAA-81070804; Working-Paper-3) Avail: NTIS HC A04/MF A01 CSCL 08H

The most important pollution problems of the Great Lakes were identified. Important problem areas are: the impact of pollutants of human health, the impact of pollutants on overall ecosystem health, the longevity or reversibility of the consequences of the pollutant, the areal extent of the pollutant, and the future magnitude of the problem. Topics discussed are: food and fiber production water uses; industrial water uses; municipal water uses; recreation and wildlife water uses; social, economic and institutional water uses; and transportation water uses. GRA

N82-16626# Temple Univ., Philadelphia, Pa. Inst. of Survey Research.
COMMUNITY NOISE ATTITUDINAL SURVEY GUIDELINES
Jul. 1981 147 p
(Contract EPA-68-01-3840)
(PB81-244295) Avail: NTIS HC A07/MF A01 CSCL 13B

The community noise assessment manual provides a comprehensive and computerized system for assessing the noise problems of a community and then planning a noise control strategy for its abatement. This report provides a procedure for implementing a survey of people's attitudes toward noise. An attitudinal questionnaire to be administered to city residents is provided. The procedures for using a probability sampling techniques to estimate the characteristics of the population are provided and a method for analyzing the collected data is discussed. GRA

N82-16627# Geological Survey, Albany, N.Y. Water Resources Div.
RELATIONSHIP OF WATER QUALITY OF HUDSON RIVER, NEW YORK DURING PEAK DISCHARGES TO GEOLOGIC CHARACTERISTICS OF CONTRIBUTING SUBBASINS Final Report, 1977 - 1979
John T. Turk and David E. Troutman 1981 22 p refs Prepared jointly with Board of Commissioners of the Town of Waterford, N.Y. and New York State Dept. of Environmental Conservation
(PB81-249740; USGS/WRD/WRI-81-078; USGS/WRI-80-108) Avail: NTIS HC A02/MF A01 CSCL 08H

Water samples from two Hudson River floods in 1977, one originating mainly in shale subbasins that produce high sediment loads, the other in soil poor, crystalline rock terrain that yields little sediment, were analyzed to evaluate the relationship of iron, manganese, lead, phosphorus, and polychlorinated biplanyis (PCB's) to suspended sediment concentration. During the flood of high sediment discharge, ratios for all substances studied except PCB's reflected their concentration within the basin regolith. During the flood of smaller magnitude, from the low sediment crystalline terrain, however, only the ratio for iron correlated with predicted concentrations in the basin, which suggests that the chemical constituents studied were contributed principally from other sources, possibly antropogenic sources. GRA

N82-16628# Environmental Protection Agency, Washington, D.C. Facilities Requirements Div.
OPERATION AND MAINTENANCE COSTS FOR MUNICIPAL WASTEWATER FACILITIES
Sep. 1981 140 p refs
(PB81-249971; EPA-430/9-81-004; FRD-22) Avail: NTIS HC A07/MF A01 CSCL 13B

The results of the latest and most comprehensive effort to obtain and analyze operation and maintenance costs for wastewater treatment works are presented. Data from more than 900 treatment plants and almost 500 conveyance systems throughout 40 of the 48 contiguous United States, including all ten EPA regions is summarized. Included is information on administrative costs, sludge handling costs, and staffing. Basic information from site visits was combined into a simple data base and examined for relationships between total operation and maintenance costs, facility design parameters, and plant operation parameters. These relationships were developed for the general national level and, where possible, for smaller geographic units. Where appropriate in analyzing the data, total operation and maintenance costs were reduced to their major components. GRA

N82-16629# Environmental Protection Agency, Washington, D.C. Office of Water Program Operations.
COMPOSTING PROCESSES TO STABILIZE AND DISINFECT MUNICIPAL SEWAGE SLUDGE
Jul. 1981 55 p
(PB81-240509; EPA-430/9-81-011; EPA/MCD-79) Avail: NTIS HC A04/MF A01 CSCL 13B

The design and operation of sewage sludge compositing facilities is discussed. Operational procedures and performance levels related to the composting facilities are given. The performance levels recommended are flexible enough to allow for innovation in composing system designs. The recommendations will assure that adequate sludge stabilization and disinfection (pathogen reduction) are achieved. GRA

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation*.

N82-16630# Office of Technology Assessment, Washington, D. C.
CRITERIA FOR EVALUATING THE IMPLEMENTATION PLAN REQUIRED BY THE EARTHQUAKE HAZARDS REDUCTION ACT OF 1977
1980 79 p
(PB81-241663; OTA-BP-X-2) Copyright. Avail: Issuing Activity CSCL 08K

The Earthquake Hazards Reduction Act of 1977 which proposes to reduce the risk to life and property from future earthquakes by establishing and maintaining an earthquake hazards reduction program is discussed. The Act also required that an implementation plan be submitted to Congress within 210 days of enactment. Fourteen basic issues or conflicts with which the implementation plan must cope in order to achieve its objectives are identified. These issues and the associated questions developed under each of them in the text comprise criteria which may be useful to Congress in its evaluation of the plan. GRA

N82-16631# Committee on Science and Technology (U. S. House).
EARTHQUAKE HAZARDS REDUCTION PROGRAM AND FIRE PREVENTION AND CONTROL PROGRAM
Washington GPO 1981 51 p Rept. to accompany H. R. 3356 presented by the Comm. on Sci. and Technol. and the Comm. on Interior an Insular Affairs at the 97th Congr., 1st Sess., 30 Apr. 1981

(GPO-78-756; H-Rept-97-59-Pt-2) Avail: US Capitol, House Document Room

The bill to amend the Earthquake Hazards Reduction Act of 1977 and the Federal Fire Prevention and Control Act of 1974 was reviewed. The bill authorizes the appropriation of funds to carry out the earthquake hazards reductions program and the fire prevention and control program. It was recommended that the bill be passed without amendment. S.L.

N82-16632# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

IONOSPHERIC DISTURBANCES PROPAGATING EASTWARD IN A LOW LATITUDE DETECTED BY VHF POLARIMETERS

I. J. Kantor, M. A. Abdu, and I. S. Batista Aug. 1981 16 p refs In PORTUGUESE; ENGLISH summary Presented at the 33d Reuniao Anal da SBPC, Salvador, Jul. 1981

(INPE-2202-PRE/011) Avail: NTIS HC A02/MF A01

Simultaneous measurements of the total electron content (TEC) through observations of the Faraday rotation angle of vhf signals transmitted by the GOES-1 geostationary satellite, using polarimeters located at Sao Jose dos Campos geographic coordinates (23 deg S, 46 deg W) and Cachoeira Paulista geographic coordinates (23 deg S, 45 deg W), show disurbances in TEC propagating eastward. These disturbances occur especially in the period between sunset and, midnight and are associated with spread F as detected in the Cachoeira Paulista ionograms. Statistics of these events, their velocities and their association with equatorial spread F are presented. T.M.

N82-16633# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

NUMERICAL SIMULATION OF RAYLEIGH-TAYLOR INSTABILITY IN THE EQUATORIAL IONOSPHERIC PLASMA [SIMULACAO NUMERICA DA INSTABILIDADE RALYEIGH-TAYLOR NO PLASMA IONOSFERICO EQUATORIAL]

Y. Nakamura, J. H. A. Sobral, and M. A. Abdu Jul. 1981 28 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Reuniao Anual da SBPC, Salvador, Brazil, 1981

(INPE-2172-RPE/388) Avail: NTIS HC A03/MF A01

Ionospheric irregularities near the magnetic equator are studied. A numerical simulation is done for the generation and evolution of the ionospheric bubble based on the theory of the collisional Rayleigh-Taylor instability for two fluids, for the magnetic equatorial region. The regions of depletion in density were assumed to be aligned with the Earth's magnetic field, extending from higher altitudes at the equatorial region down to the arbitrary height of 150 km. Assuming the electron density profile perturbed by the bubble, the 6300 A intensity was calculated for various latitudes arbitrarily taken within the photometer scanning range. The calculated airglow results show that, as the bubble moves upward, the disturbance in the airglow intensity propagate from north to south, in agreement with observed results. Author

N82-16634*# Alaska Univ., Fairbanks. Geophysical Inst.

NUMERICAL SIMULATION OF THE INTERACTION OF THE PLASMA SHEET WITH THE LOBES OF THE EARTH'S MAGNETOTAIL

Daniel W. Swift [1982] 46 p refs

(Grants NsG-7625; NSF AM-79-23614)

(NASA-CR-168508) Avail: NTIS HC A03/MF A01 CSCL 04A

Codes involving one and two spatial dimensions and three velocity dimensions were used to model the Earth's magnetotail. It was shown that the magnetotail can become inflated as a consequence of low energy plasma convection toward the neutral plane. The computer study exhibits a conversion of both magnetic field energy and of energy supplied by the convection electric field into particle energy. The numerical simulations suggest that much of the magnetotail substorm morphology may be a simple consequence of an increase, followed by a decrease, in the convection electric field, without the requirement of any magnetospheric size scale plasma instability or other disruptive processes. It is also concluded that the presence of the convection electric field and a continuing replenishment of low energy particles in the magnetotail are both necessary for maintenance of the magnetotail. M.D.K.

N82-16635*# California Univ., Berkeley. Space Sciences Lab.

DOUBLE LAYERS ON AURORAL FIELD LINES

M. K. Hudson, W. Lotko, and E. Witt [1982] 22 p refs

(Grant NAGw-75)

(NASA-CR-165113) Avail: NTIS HC A02/MF A01 CSCL 04A

Time-stationary solutions to the Vlasov-Poisson equation for ion holes and double layers were examined along with particle simulations which pertain to recent observations of small amplitude (e phi)/t sub e approx. 1 electric field structures on auroral field lines. Both the time-stationary analysis and the simulations suggest that double layers evolve from holes in ion phase space when their amplitude reaches (e phi)/t sub e approx. 1. Multiple small amplitude double layers which are seen in long simulation systems and are seen to propagate past spacecraft may account for the acceleration of plasma sheet electrons to produce the discrete aurora. T.M.

N82-16636*# Max-Planck-Institut fuer Extraterrestrische Physik, Garching (West Germany).

DYNAMICS OF MAGNETOSPHERE-IONOSPHERE COUPLING INCLUDING TURBULENT TRANSPORT

Robert L. Lysak and Christian T. Dum [1982] 4 p refs

(Grant NAGw-75)

(NASA-CR-165098) Avail: NTIS HC A02/MF A01 CSCL 04A

A two dimensional two-fluid MHD model including anomalous resistivity was used to investigate the dynamics of magnetosphere-ionosphere coupling. When a field-aligned current is generated on auroral field lines, the disturbance propagates towards the ionosphere in the form of a kinetic Alfven wave. When the current exceeds a critical value, microscopic turbulence is produced, which modifies the propagation of the Alfven wave. This process is modeled by a nonlinear collision frequency, which increases with the excess of the drift velocity over the critical value. Turbulence leads to absorption and reflection of the Alfven wave, partially decoupling the generator from the ionosphere. The approach to a steady-state is strongly dependent on the presence or absence of the turbulence. The current is self-limiting, since a current in excess of critical causes a diffusion of the magnetic field perturbation and a reduction of current. Author

N82-16637*# Ohio State Univ., Columbus.

PREDICTION OF EARTH ROTATION AND POLAR MOTION

Sheng Yuan Zhu Sep. 1981 39 p refs

(Grant NsG-5265)

(NASA-CR-163468; Rept-320) Avail: NTIS HC A03/MF A01 CSCL 08E

Based on the analysis of the polar motion behavior, the possibility of predicting polar motion up to one year in advance was found. Comparing these predicted polar coordinates with the observed ones (smoothed), the root mean square (rms) of the differences is about 0.02 seconds. The differences of the relative polar motion are much smaller. For any time interval of 20 to 30 days throughout the whole year, the rms of the relative polar motion differences is about 0.01 second. Compared with the best available VLBI results (from 1977 to 1980), the rms of pred. to obs. is 0.013 seconds, and the relative rms (for time intervals less than two months) is 0.008 seconds (here the observed data is unsmoothed). It appears that 80 to 90% of the polar motion is composed of the stable, predictable Chandler and annual terms. The UT1-UTC has more complicated changes than polar motion making it difficult to find a satisfactory method of long term prediction. So far the rms prediction error is 0.0023 s for up to 30 days. N.W.

N82-16638# Photometrics, Inc., Woburn, Mass.

DETERMINATION OF UPPER ATMOSPHERIC WINDS AND TURBULENT DIFFUSION AND DISSIPATION FROM ARTIFICIAL CLOUD EXPANSION AND GROWTH Final Report, 22 Jun. 1978 - 21 Jun. 1981

Christian A. Trowbridge 22 Jul. 1981 27 p refs

(Contract F19628-78-C-0171; AF Proj. 6690)

(AD-A106387; PHM-04-81; AFGL-TR-81-0200) Avail: NTIS HC A03/MF A01 CSCL 04/1

Microdensitometric reduction and computer analysis were applied in analyzing radiometrically and photogrammetrically calibrated photographic images of chemical and particulate tracers in the stratosphere, mesosphere and thermosphere. Digitized optical density distributions were processed by Fourier and configuration space analyses to determine turbulent atmospheric heating rates, diffusion coefficients, and other parameters descriptive of upper-atmospheric turbulence. Richardson numbers, heating, and turbulent diffusivity were also determined from wind data derived by the smoke trail method. Author (GRA)

N82-16639# Teledyne Geotechnical, Alexandria, Va. Seismic Data Analysis Center.

USE OF BACK AZIMUTH MEASUREMENTS IN SEISMIC EVENT LOCATION WITH REGIONAL DATA

D. W. Rivers, J. A. Burnetti, and A. C. Chang Alexandria, Va. VELA Seismic Center 9 Jan. 1981 84 p refs
(Contract F08606-79-C-0007; DARPA Order 2551)
(AD-A106429; SDAC-TR-81-3; VSG-TR-81-17) Avail: NTIS HC A05/MF A01 CSCL 17/1

Conventional methods for seismic event location, which are based on measurements of signal arrival times, may be inadequate for events detected at only regional distances, because there may be an insufficient number of observations. This shortcoming can be alleviated by supplementing the measurements of P-wave arrival times with measurements of the event's back azimuth made by applying Smart's (1978) three-component processor to the regional phase Lg. Back azimuth measurements can also be used as an analyst's tool to calculate an approximate epicenter for use in the association of mixed events with the appropriate signal arrivals or for use as the initial value in an iterative location scheme. An algorithm is herein presented which performs event location by treating arrival time measurements and back azimuth measurements in an analogous fashion. Tests of this algorithm which were run in the depth-restrained mode for two events show that it can be effective for sparse data sets but also that it can lead to large errors if there is a poor geometrical distribution of detecting stations. Computations of the confidence region about the epicenter demonstrates an insufficiency in the theory for calculating F-statistic confidence ellipses for azimuths and travel-time data if the measurement variances are not known a priori. The theory is satisfactory for the standard chi-squared ellipses. Author (GRA)

N82-16640# University Coll., London (England). Dept. of Physics and Astronomy.

TROPOSPHERIC: STRATOSPHERIC TIDAL INVESTIGATIONS. PART 3: HOUGH COMPONENTS OF SURFACE PRESSURE Final Scientific Report, 1 Dec. 1976 - 30 Sep. 1981

Gerald V. Groves and A. Wilsch 31 Aug. 1981 50 p refs
(Grant AF-AFOSR-3224-77; AF Proj. 6687)
(AD-A106386; AFGL-TR-81-0301) Avail: NTIS HC A03/MF A01 CSCL 04/1

The report contains two papers. In the first of these, diurnal and semidiurnal Hough components of surface pressure are evaluated by classical tidal theory for previously presented profiles of water vapour and ozone heating and the values obtained are compared with the observed results of Haurwitz and Cowley (1973). The second paper presents profiles of terdiurnal ozone and water vapour heating from which the corresponding surface pressure oscillations are evaluated by classical tidal theory and compared with earlier evaluations and observationally derived results. In both papers the calculations underpredict the observed values and indicate a need for additional tidal heating to be identified. Author (GRA)

N82-16641# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

GRAVITATIONAL AGGLOMERATION OF POST-HCDA LMFBR NONSPHERICAL AEROSOLS Ph.D. Thesis - Missouri Univ. - Rolla

Ronald Forraster Tuttle Dec. 1980 274 p refs
(AD-A106766; AFIT-CI-80-82D) Avail: NTIS HC A12/MF A01 CSCL 13/7

A theoretical investigation of collisional dynamics of two particle interactions in a gravitational field is reported. This research is unique in that it is the first attempt at modeling the hydrodynamic interactions between a nonspherical particle and a spherical particle undergoing gravitational collisions in an LMFBR environment. Basic definitions and expressions are developed for nonspherical particles and related to spherical particles by means of shape factors. Using volume equivalent diameter as the defining length in the gravitational collision kernel, the aerodynamic shape factor, k, the density correction factor, alpha, and the gravitational collision shape factor, beta, are used to correct the collision kernel for the case of collisions between aerosol agglomerates. The Navier-Stokes equation in oblate spheroidal coordinates is solved to model a nonspherical particle and then the dynamic equations for two particle motions are developed. A computer program NGCEFF is constructed, the Navier-Stokes equation is solved by the finite difference method, and the dynamical equations are solved by Gear's method. It is concluded that the aerosol gravitational collision shape factor can be determined by further theoretical work based on the concepts and methods developed in this dissertation. GRA

N82-16642# California Univ., Berkeley. Space Sciences Lab.

VECTOR ELECTRIC FIELDS Final Report, 1 Oct. 1974 - 30 Sep. 1980

Forrest S. Mozer 29 Sep. 1981 5 p refs
(Contract N00014-75-C-0294)
(AD-A106784) Avail: NTIS HC A02/MF A01 CSCL 04/1

Funds provided by this contract were used to design and build the first electric field experiment that has successfully measured magnetospheric electric fields above the ionosphere, and to analyze the electric field data thereby obtained. The instrument was flown into an elliptical polar orbit on the S3-3 satellite where it made measurements for about two years following its July, 1977 launch. The S3-3 satellite was, perhaps, the most important magnetospheric satellite launched in the past decade, since it discovered and studied the low altitude particle acceleration region that produces discrete auroral arcs and much of the magnetospheric energetic ion population. During the period of this contract, twenty-one scientific papers were written on these topics, invited papers were presented at an additional twelve meetings. In the year following termination of this contract, an additional eleven scientific papers have been either published or submitted for publication. A bibliography of these publications is attached. Author (GRA)

N82-16643# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.

THE ROLE OF HISS IN MAGNETOSPHERIC CHORUS EMISSIONS

Harry C. Koons 28 Sep. 1981 54 p refs
(Contract F04701-80-C-0081; Grant NSF ATM-80-19060)
(AD-A106479; TR-0081(6960-06)-10; SD-TR-81-77) Avail: NTIS HC A04/MF A01 CSCL 04/1

The simultaneous presence of narrowband hiss emissions with ELF chorus emissions outside of the plasmasphere are discussed. Chorus emissions are often observed to start at frequencies that are within a hiss band. Spectra show large variations in amplitude between adjacent bins with relative maxima 10 to 15 db above adjacent minima. Electrons in a narrow range of energies and pitch angles are organized in phase by the Doppler shifted cyclotron resonance with the large amplitude spectra components in the hiss band. The bandwidth of the cyclotron resonance is sufficiently narrow so that the electrons are not dephased by waves in adjacent portions of the highly structured spectrum. The amplitude of the hiss is sufficient to significantly phase bunch the electrons in the calculated interaction time. The chorus emission is generated as the phase bunched electrons moves adiabatically along the geomagnetic field line. This mechanisms accounts for the chorus emissions detected at frequencies above a hiss band in the Jovian magnetosphere. E.A.K.

N82-16644# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.

THE CONVERSION OF AIRCRAFT ICE CRYSTAL MEASUREMENTS INTO TERMS OF LIQUID WATER USING SIMULATED DATA Interim Report

Robert O. Berthel 16 Jun. 1981 46 p refs
(AF Proj. 6670; AF Proj. 2310)
(AD-A106419; AFGL-TR-81-0173; AFGL-ERP-745) Avail: NTIS HC A03/MF A01 CSCL 04/1

This investigation presents simulated environments of ice crystals to computer analysis as a means of imitating particle measurements made by electro-optical devices such as the Particle Measuring System's 1-D instrument. A mathematical model is developed so that single crystals of known geometric form can be processed by considering each crystal's spatial relationship to the assumed measuring instrument. Crystal orientation is defined using a random number technique. The results of the assumed measurements are converted into mass of equivalent liquid water by different methods and are compared with the known mass of the simulated environment. Relationships are derived for the conversion of several forms of single ice crystals into terms of equivalent melted diameters of liquid water and a comparison is made between the mass calculated from the derived equations with the conversion equations relating measured length to equivalent melted diameter currently in use. Author (GRA)

N82-16645# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

COMPARISON OF THE DYNAMIC PROCESSES DURING MAJOR AND MINOR STRATOSPHERIC WARMINGS IN A NUMERICAL MODEL M.S. Thesis - Utah Univ.

James Howard Davenport Jun. 1981 109 p refs

(AD-A106371; AFIT-CI-81-29T) Copyright. Avail: Issuing Activity CSCL 04/1

In this study we have analyzed the processes involved in a major and minor warming based on data generated from a 31-layer primitive equation spectral model consisting of a 5-layer troposphere, 12-layer stratosphere and 14-layer mesosphere. The forcing of the model consisted of orographic features designed to simulate the major Northern Hemisphere continents. This gave a combination of wave number 1 and wave number 2 forcing. The analysis of the simulated major and minor warmings indicated several similarities and differences between the cases. The initial difference between the cases is that case 1 (major warming) had a weak polar vortex, while case 2 (minor warming) had a strong polar vortex. This resulted in case 2 having much larger turbulent flux terms, but not sufficient to reverse the mean polar winds. Case 1 produces a major warming in the polar stratosphere. GRA

N82-16646# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.

LOW-ENERGY ION PITCH-ANGLE DISTRIBUTION IN THE OUTER MAGNETOSPHERE: ION ZIPPER DISTRIBUTIONS

J. F. Fennell, D. R. Croley, Jr., and S. M. Kaye (Lockheed Missile and Space Co., Palo Alto, Calif.) 28 Sep. 1981 31 p refs (Contract F04701-80-C-0081)

(AD-A106153; TR-0081(6960-05)-15; SD-TR-81-81) Avail: NTIS HC A03/MF A01 CSCL 04/1

Ion pitch-angle distributions, measured in a near synchronous orbit, are predominantly field-aligned at low energies and predominantly peaked perpendicular to the magnetic field at higher energies. The transition from field-aligned fluxes to fluxes peaked predominantly perpendicular to the magnetic field occurs over a very narrow energy range. These ion distributions have been observed at all local times between 5.3 Re and 7.8 Re. This transition energy correlates between the ion transition energy and magnetic local time, L, Kp, or Dst. Author (GRA)

N82-16647# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.

MAGNETIC SHELL TRACING: A SIMPLIFIED APPROACH

Janet G. Luhmann and Michael Schulz 15 Sep. 1981 22 p refs

(Contract F04701-80-C-0081)

(AD-A106714; TR-0081(6960-05)-9; SD-TR-81-78) Avail: NTIS HC A02/MF A01 CSCL 04/1

We consider the adiabatic motion of electrons trapped in the model geomagnetic field derived from a scalar potential. The drift shell is specified analytically (i.e., by an approximation given in closed form) in terms of the equatorial pitch angle. The 'radial gradient' is inferred from the diurnal variation of particle flux. This procedure offers an internal test for the absence of time-varying coefficients in the expansion of V. The pitch-angle distribution is directly observed at the noon meridian. The parameters thus determined allow the pitch-angle distribution at other longitudes to be obtained from Liouville's theorem. The results, at least for a well-studied test case, are comparable in quality to those obtained by more difficult methods, using a more complicated field model and the data from two spacecraft, i.e., are in similarly good agreement with the observational data obtained at other longitudes. In particular, we find that the maximum flux at alpha sub 0 = pi/2 occurs at noon (phi = pi) and that the maximum flux j(alpha sub 0, phi = 0) at midnight (phi = 0) occurs at alpha sub 0 not = pi/2. GRA

N82-16648# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Atmospheric Sciencz.

A CLIMATE INDEX DERIVED FROM SATELLITE MEASURED SPECTRAL INFRARED RADIATION Ph.D. Thesis

Michael David Abel Apr. 1981 160 p refs

(AD-A106733; AFIT-CI-81-46D) Avail: NTIS HC A08/MF A01 CSCL 04/1

This thesis introduces a climate index based on radiative transfer theory and derived from the spectral radiances typically used to retrieve temperature profiles. It is assumed that clouds and climate are closely related and a change in one will result in a change in the other. Because the index developed in this paper is primarily a function of the cloud distribution and also dependent upon temperature and moisture distributions, it may be used as a climate index. The advantage is that the index is more accurately retrieved from satellite data than cloudiness per se. This index, hereafter referred to as the VIRES index (for Vertical Infrared Radiative Emitting Structure), is based upon the shape and relative magnitude of the broadband weighting function of the infrared radiative transfer equation. The broadband weighting curves (VIRES curves) are retrieved from simulated satellite infrared sounder data (spectral radiances). The VIRES index is a useful means of classifying the VIRES curves. This thesis describes the retrieval procedure and investigates error sensitivities of this method. Advantages of the approach include: day and night capability, no need to know cloud radiative properties, retrieval ability when cloud fraction or cloud emittance is less than 1.0, retrieved information below sensor resolution, minimum influence on the index from low tropospheric retrieval errors, and the ability to statistically discriminate between VIRES curves retrieved from different scenes. Operational VIRES index retrieval strategies and a number of specific applications are also proposed. Author (GRA)

N82-16649# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

AN ALTERNATE APPROACH TO THE MEASUREMENT OF SOIL SURFACE HEAT FLUX M.S. Thesis - Arizona Univ.

Bruce Rex Merrill 1981 59 p refs

(AD-A106741; AFIT-CI-81-33T) Avail: NTIS HC A04/MF A01 CSCL 08/13

A new approach to the measurement of the conductive heat flux at the soil surface is presented. This approach provides the means to make measurements of the soil conduction heat flux. By sensing the temperature of the soil surface and using a temperature control circuit one forces an artificially created portion of the soil surface to mimic the temperature of the natural surface. By monitoring the power to maintain this control one makes a direct measurement of the conduction heat flux at the soil surface. Although the present instrument works only when the conduction heat flux is directed out of the ground there is nothing in principle to prevent the instrument from working when the flux is in the other direction. The error analysis shows that the two main sources of error are due to the electronics design and the errors associated with measuring the true temperature of a surface. Laboratory testing shows that unexplained error amounts to only a few percent at most. Laboratory testing also shows that the instrument is capable of measuring fluxes down to tenths of milliwatts per square centimeter. Author (GRA)

N82-16650# Smithsonian Astrophysical Observatory, Cambridge, Mass.

ANALYSIS OF DATA FOR THE DEVELOPMENT OF DENSITY AND COMPOSITION MODELS OF THE UPPER ATMOSPHERE Final Report, 1 Jun. 1978 - 31 May 1981

Luigi G. Jacchia and Jack W. Slowey Hanscom AFB, Mass. Jul. 1981 19 p refs

(Contract F19628-78-C-0126; AF Proj. 6690)
(AD-A106420; AFGL-TR-81-0230) Avail: NTIS HC A02/MF A01 CSCL 04/1

This work was directed toward the ultimate goal of developing an improved model of the temperature, density and composition of that region of the Earth's neutral atmosphere above the turbopause. A wealth of data has become available, mainly in the form of total density and composition from satellite-borne mass-spectrometers, in recent years. Most of the work performed under the contract consisted of the analysis of data from the ESRO 4 mass spectrometer with a view towards improvement of the model of the geomagnetic variation in the thermosphere and exosphere. GRA

N82-16651# California Univ., Livermore. Lawrence Livermore Lab.

AN OVERVIEW, CURRENT STATUS, AND FUTURE PLANS FOR THE DOE ATMOSPHERIC STUDIES IN COMPLEX TERRAIN (ASCOT) PROGRAM

Marvin H. Dickerson Jun. 1981 5 p refs Presented at AMS Second Conf. on Mt. Meteorol., Steamboat Springs, Colo., 10-13 Nov. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-024417; UCRL-85725; CONF-811104-2) Avail: NTIS HC A02/MF A01

The problem of pollutant transport over complex terrain is investigated. The nocturnal valley drainage flow is chosen as the initial focus of the ASCOT program. The Geyser geothermal area in northern California is the initial study site. Objectives were defined as: (1) to augment the present knowledge of the physical mechanisms involved in the development, perpetuation, and breakup of nocturnal drainage flows; (2) to develop an integrated measurement and modeling methodology to perform as quality impact assessment and control strategies for energy development in areas subject to drainage flows; and (3) to provide the developed methodology with special applications to the H2S emissions associated with the Geysers geothermal development. DOE

N82-16652# Stanford Univ., Calif. Petroleum Research Inst.

EFFECTS OF CONFINING PRESSURE, PORE PRESSURE AND TEMPERATURE ON ABSOLUTE PERMEABILITY

Brian D. Gobran, Henry J. Ramey, Jr., and W. E. Brigham Oct. 1981 115 p refs
(Contract DE-AC03-76ET-12056)
(DE81-030336; DOE/ET-12056/27) Avail: NTIS HC A06/MF A01

The absolute permeability of consolidated sandstone and unconsolidated sand cores to distilled water as a function of the confining pressure on the core, the pore pressure of the flowing fluid, and the temperature of the system was studied. It is found that inaccurate measurement of temperature at ambient conditions and non-equilibrium of temperature in the core can lead to a fictitious permeability reduction with temperature increase. The results of this study on the effect of confining pressure and pore pressure support the theory that as confining pressure is increased or pore pressure decreased, the permeability is reduced. The effects of confining pressure and pore pressure changes on absolute permeability are given explicitly. DOE

N82-16653# Environmental Exploration, Morgantown, W. Va.

HANDBOOK OF GEOPHYSICAL CAVITY-LOCATING TECHNIQUES WITH EMPHASIS ON ELECTRICAL RESISTIVITY

Keith G. Kirk and Eberhard Werner Washington Federal Highway Administration Apr. 1981 187 p refs
(PB81-242711; FHWA/IP-81/3) Avail: NTIS HC A09/MF A01 CSCL 13B

A method in locating cavities in the Earth resistivity technique is examined. The methodology of using Earth resistivity techniques for locating cavities is described. The theoretical considerations behind these techniques are mentioned. GRA

N82-16108*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

A VLBI SURVEY OF THE NORTHERN POLAR CAP REGION

D. D. Morabito, R. A. Preston, and J. Faulkner *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 30-36 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 08E

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-16654# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

SYNOPTIC SCENARIO OF THE INVASION OF COLD AIR DURING THE FREEZE OF MAY 1979 AND FROST MAPPING TO FORECAST AREAS OF MAJOR RISK

Michael Fortune Jul. 1981 4 p refs In PORTUGUESE; ENGLISH summary Presented at the 2nd Brazilian Agrometeorology Congr., Pelotas, 5-10 Jul. 1981
(INPE-2166-RPE/383) Avail: NTIS HC A02/MF A01

Satellite images obtained at INPE were analyzed with synoptic data from drifting buoys, radiosondings, and satellite winds and soundings when a strong invasion of polar air led to damaging frosts in Brazil. The analysis showed: a long wave in the west central Pacific began to amplify unusually three days before frontogenesis and five days before the severest frosts in Brazil, with the superposition of a short wave on the deepening long wave trough in Argentina, frontogenesis occurred. The next day this front surged rapidly into Brazil, and was accompanied by four or more squall lines. The front reached within 1 deg. of the equator, and the extraordinarily deep trough channelled subantarctic air into Brazil under clear skies, this led to severe frost in five southern states. S.L.

N82-16655*# MCS, Inc., Boulder, Colo.

NUMERICAL AND FLIGHT SIMULATOR TEST OF THE FLIGHT DETERIORATION CONCEPT Interim Report

John McCarthy and Vern Norviel Washington NASA Jan. 1982 37 p refs
(Contract NAS8-33458)
(NASA-CR-3500; M-370) Avail: NTIS HC A03/MF A01 CSCL 04B

Manned flight simulator response to theoretical wind shear profiles was studied in an effort to calibrate fixed-stick and pilot-in-the-loop numerical models of jet transport aircraft on approach to landing. Results of the study indicate that both fixed-stick and pilot-in-the-loop models overpredict the deleterious effects of aircraft approaches when compared to pilot performance in the manned simulator. Although the pilot-in-the-loop model does a better job than does the fixed-stick model, the study suggests that the pilot-in-the-loop model is suitable for use in meteorological predictions of adverse low-level wind shear along approach and departure courses to identify situations in which pilots may find difficulty. The model should not be used to predict the success or failure of a specific aircraft. It is suggested that the pilot model be used as part of a ground-based Doppler radar low-level wind shear detection and warning system. T.M.

N82-16656# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

COMPRESSION OF METEOROLOGICAL SATELLITE IMAGES [COMPRESSAO EM IMAGENS DE SATELITES METEOROLOGICOS]

Valter Rodrigues and Aydano B. Carleial Jul. 1981 15 p refs In PORTUGUESE; ENGLISH summary
(INPE-2182-RPE/393) Avail: NTIS HC A02/MF A01

Some techniques for compression of high resolution meteorological satellite images are analyzed. These techniques are of two kinds: linear operations, and linear and adaptive delta codification. The effects of transmission errors are analyzed in some algorithms. Simulations are presented in one form of meteorological photographs. Author

N82-16657*# Desert Research Inst., Reno, Nev.

STUDY TO PERFORM PRELIMINARY EXPERIMENTS TO EVALUATE PARTICLE GENERATION AND CHARACTERIZATION TECHNIQUES FOR ZERO-GRAVITY CLOUD PHYSICS

EXPERIMENTS Final Report
Ulrich Katz Washington NASA Jan. 1982 195 p refs
(Contract NAS8-32313)
(NASA-CR-3486; M-368) Avail: NTIS HC A09/MF A01 CSCL 04B

Methods of particle generation and characterization with regard to their applicability for experiments requiring cloud condensation nuclei (CCN) of specified properties were investigated. Since aerosol characterization is a prerequisite to assessing performance of particle generation equipment, techniques for characterizing aerosol were evaluated. Aerosol generation is discussed, and atomizer and photolytic generators including preparation of hydrosols (used with atomizers) and the evaluation of a flight version of an atomizer are studied. E.A.K.

N82-16658*# Wisconsin Univ. - Madison. Dept. of Meteorology.
EFFECTS OF DIABATIC HEATING ON THE AGEOSTROPHIC CIRCULATION OF AN UPPER TROPOSPHERIC JET STREAK Interim Report
Dennis Arthur Keyser and Donald R. Johnson Jan. 1982 135 p refs
(Contract NAS8-33222)
(NASA-CR-3497; M-369) Avail: NTIS HC A07/MF A01 CSCL 04B

Interaction between the mass circulation within a mesoscale convective complex (MCC) and a direct mass circulation in the entrance region of an upper tropospheric polar jet streak was examined within the isentropic structure to investigate mechanisms responsible for linking these two scales of motion. The results establish that latent heating in the MCC modifies the direct mass circulation in the jet streak entrance region through the diabatically induced components of ageostrophic motion analyzed within isentropic coordinates. Within the strong mesoscale mass circulation of each MCC, strong horizontal mass flux convergence into the MCC at low levels is balanced by strong horizontal mass flux divergence away from the convergence at upper levels. Locations of large diabatic heating rates correspond well to the MCC position for each case; diabatic heating forces the upward vertical branch for the mesoscale mass circulation. T.M.

N82-16659*# FWG Associates, Inc., Tullahoma, Tenn.
DESIGN OF PROTOTYPE CHARGED PARTICLE FOG DISPERSAL UNIT Final Report
Frank G. Collins, Walter Frost, and Philip Kessel Washington, D.C. NASA Dec. 1981 41 p refs
(Contract NAS3-33541)
(NASA-CR-3481; M364) Avail: NTIS HC A03/MF A01 CSCL 04B

The unit was designed to be easily modified so that certain features that influence the output current and particle size distribution could be examined. An experimental program was designed to measure the performance of the unit. The program described includes measurements in a fog chamber and in the field. Features of the nozzle and estimated nozzle characteristics are presented. T.M.

N82-16660*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
NASA/MSFC FY-81 ATMOSPHERIC PROCESSES RESEARCH REVIEW
Robert E. Turner, comp. Dec. 1981 161 p refs Review held in Huntsville, Ala., 1-3 Sep. 1981
(NASA-CP-2204; M-367) Avail: NTIS HC A08/MF A01 CSCL 04B

Progress in ongoing research programs and future plans for satellite investigations into global weather, upper atmospheric phenomena, and severe storms and local weather are summarized. Principle investigators and publications since June 1980 are listed. For individual titles, see N82-16661 through N82-16663.

N82-16661*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
UPPER ATMOSPHERIC SECTION
In its NASA/MSFC FY-81 Atmospheric Processes Res. Rev. Dec. 1981 p 1-7 refs (For primary document see N82-16660 07-47)
Avail: NTIS HC A08/MF A01 CSCL 04B

Research, technology and monitoring of the upper atmosphere are summarized. Temperature response and polyatomic molecule decomposition in the stratosphere during a geomagnetic storm and the fabrication and verification of software for the atmospheric emissions photometric imager on Spacelab are described. J.D.H.

N82-16662*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GLOBAL WEATHER RESEARCH
In its NASA/MSFC FY-81 Atmospheric Processes Res. Rev. Dec. 1981 p 9-50 refs (For primary document see N82-16660 07-47)
Avail: NTIS HC A08/MF A01 CSCL 04B

Modeling, prediction, and analysis of global meteorological phenomena influencing the large scale behavior of the atmosphere are summarized. Prediction of global weather phenomena based on satellite data is discussed and models of global phenomena developed. The atmospheric general circulation model (AGCE) is reviewed, axisymmetric flow calculated, and axisymmetric states in cylindrical, spherical, three dimensional, and spin up numerical models for AGCE described. The role of latent heat release in baroclinic waves, latent heat and cyclonic systems, and a theoretical study of baroclinic flow related to the AGCE and the flow regime were studied with a simplified general circulation model. AGCE and the geophysical fluid flow cell (GFFC) instrumentation are discussed. Investigation of solar and planetary convection for GFFC is described. The utilization of satellite cloud observations to diagnose the energy state and transformations in extratropical cyclones is reviewed. J.D.H.

N82-16663*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SEVERE STORMS AND LOCAL WEATHER RESEARCH
In its NASA/MSFC FY-81 Atmospheric Processes Res. Rev. Dec. 1981 p 51-140 refs (For primary document see N82-16660 07-47)
Avail: NTIS HC A08/MF A01 CSCL 04B

Developments in the use of space related techniques to understand storms and local weather are summarized. The observation of lightning, storm development, cloud development, mesoscale phenomena, and ageostrophic circulation are discussed. Data acquisition, analysis, and the development of improved sensor and computer systems capability are described. Signal processing and analysis and application of Doppler lidar data are discussed. Progress in numerous experiments is summarized. J.D.H.

N82-16664# Materials Research Labs., Ascot Vale (Australia).
CLIMATIC CONDITIONS AT AIR FORCE BASES IN AUSTRALIA
Barry T. Murrell and John A. McRae Oct. 1980 124 p refs
(AD-A106275; MRL-R-787) Copyright. Avail: Issuing Activity CSCL 04/2

The climatic conditions at ground level expected to be encountered at Air Force bases in the Australian Region are tabulated. Mean conditions for each season and the extremes for return periods up to 1000 years are given for temperature, humidity, wind speed and rainfall of various durations as well as information about solar radiation and a number of meteorological conditions including hail, snow, frost, fog, thunder, dust and haze. Author (GRA)

N82-16665# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.
DEVELOPMENT OF A LARGE SCALE CLOUD SYSTEM, 23-27 MARCH 1978
Ian D. Cohen 4 May 1981 111 p refs
(AF Proj. 2310)
(AD-A106417; AFGL-TR-81-0127; AFGL ERP-739) Avail: NTIS HC A06/MF A01 CSCL 04/2

The visual and microphysical properties of a large scale cloud system are described as that system developed from an open wave in Oklahoma to a deep occlusion covering most of the east coast of the United States. Microphysical properties examined include particle size, liquid water content, particle density, crystal type, and Form Factor (a measure of uniformity of particle sizes within a sample). Visual and microphysical observations were made at four levels, approximately at the 400, 400, 700, and 850-mb surfaces, on four consecutive days. On each day the

MC-130E aircraft instrumented for cloud physics research by AFGL flew at each level for approximately 30 minutes. In addition to examination of the continuous data provided by the aircraft, a detailed examination of 32 samples of 2 min each was undertaken. Sampling was conducted in the northeast quadrant of the storm. During the first day, the storm was mainly convective in nature, and as a result, had high liquid water content and particle distributions which were uniform along the vertical axis. As the storm moved eastward, it became more stratified. As it did, the observed particle size and types showed greater variations. The upper levels were affected less than the lower levels, thus reducing the uniformity along the vertical axis. As the system occluded, it lost moisture, producing smaller hydrometeors, lower liquid water content, and lighter precipitation at the surface. Later, an influx of water air increased the liquid water content and the intensity of the precipitation. GRA

N82-16666# Scripps Institution of Oceanography, La Jolla, Calif. Visibility Lab.

WINTER AND SUMMER MEASUREMENTS OF EUROPEAN VERY LOW ALTITUDE VOLUME SCATTERING COEFFICIENTS Interim Scientific Report

Richard W. Johnson Jun. 1981 26 p refs
(Contract F19628-78-C-0200; AF Proj. 7670)
(AD-A106363; SIO-REF-81-26; AFGL-TR-81-0154; ISR-5)
Avail: NTIS HC A03/MF A01 CSCL 04/2

This report presents measurements of atmospheric volume scattering coefficients collected during twenty-nine low altitude flights made during the winter and summer seasons of 1978 at four different European locations. The measurements were conducted during an instrumented aircraft's final approach and landing at its staging airbase. The measurements were made using a pseudo-photopic spectral response and thus are suitable for comparison with data associated with standard visual determinations of airfield visibility. The data illustrate that in twenty-six of twenty-nine cases, there was little or no significant variation in the value of scattering coefficient as the aircraft approached the surface from an altitude of several hundred meters. Author (GRA)

N82-16667# Texas A&M Univ., College Station. Dept. of Meteorology.

PRECIPITATION FIELD AND INTRASTORM FLOW OF SUPERCELL CONVECTIVE STORMS Final Report

Daniel James McMorrow Aug. 1981 280 p refs
(Grant AF-AFOSR-0063-80; AF Proj. 2310)
(AD-A106752; AFOSR-81-0699TR) Avail: NTIS
HC A13/MF A01 CSCL 04/2

Single-Doppler radar data, when supplemented by surface and upper-air information, provides good estimates of the intrastorm kinematic structure of supercell storms. Spatially derived fields of radial velocity, defined as radial stretching and cross-beam shear, can be used to identify and track major intrastorm kinematic features. These fields can be computed quickly and required neither storm motion information nor a favorable beam-flow alignment. Comparisons between multi-Doppler analyses (and numerical simulation) and the single-Doppler fields show good correlations of the updraft and downdraft zones as well as storm inflow and outflow areas. Changes in surface precipitation rates, from isolated and squall line supercells, are reflected in changes in the intrastorm flow inferred from single-Doppler data. This offers a new technique for single-Doppler radar analyses. In addition, a detailed study of the changes in supercell surface rainfall rates, over a high-resolution raingage network, suggests that a simple linear relationship exists between the maximum point rainfall rate and the areal coverage of threshold rates of 25 mm hr-1 and 55 mm hr-1. Point-area statistical models are presented for individual rain cores, the storm rainfall, and for rainfall over a 4000 km2 watershed. This investigation is the first known detailed study of single-Doppler data and surface rainfall observed over a short time interval. Temporal changes in supercell kinematic structure are related to changes in surface rainfall rates. Supercell rainfall in several different environments are presented. The results suggest that changes in surface rainfall rates are related to changes in intrastorm kinematic flow. Author (GRA)

N82-16668# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

SYNOPTIC CLIMATOLOGY OF BELL-SHAPED THUNDERSTORMS M.S. Thesis - Oklahoma Univ.

Carlton R. Parks 1981 96 p refs
(AD-A106158; AFIT-CI-81-27T) Avail: NTIS
HC A05/MF A01 CSCL 04/2

Eleven cases of bell-shaped thunderstorm occurrence are analyzed for characteristic features of synoptic patterns, vertical wind shear, and temperature and moisture stratification. Comparisons are made with certain well-documented supercell and multi-cell cases. A model synoptic pattern, sounding, and hodograph are presented. Major findings are: the storms formed in a highly unstable environment just ahead of a dryline, often near a dryline/front intersection. A strong upper-level disturbance was not required to trigger the storms. The storms formed as isolated cells, often to the south of a broker line of existing storms, and oftan continued as isolated cells for several hours. Except for being slightly more unstable, the environment of the storms did not differ significantly from that of the supercells, but did differ significantly from that of the multi-cell storms. An intense updraft, and the absence of a water-loaded downdraft, may be responsible for many of the physical characteristics of the storms. Author (GRA)

N82-16669# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Atmospheric Science.

TROPICAL CYCLONE INTENSITY CHANGE: A QUANTITATIVE FORECASTING SCHEME M.S. Thesis - Colorado State Univ.

Kenneth M. Dropco 2 Apr. 1981 95 p refs
(Grant NOAA-NA79-RAD-00002)
(AD-A106157; AFIT-CI-81-30T) Avail: NTIS
HC A05/MF A01 CSCL 04/2

Tropical cyclone intensity change is investigated by comparing tropical cyclone systems which intensify to those which do not. The basis of the intensity change problem was to investigate the effects of baroclinic interaction on the poleward side of cyclone systems. Therefore, cyclones found in the Gulf of Mexico during the period 1957-1977 were examined primarily because of the abundance of data on the north side of these systems. When common meteorological differences could not be found by examination of the weather charts, a rawinsonde composite analysis was performed to investigate mean differences between the two systems. The results obtained were significant. Very large differences were found on the northern side of the cyclone particularly in the 200 mb height field, the 850 mb temperature field, the 200 mb zonal wind and the vertical shears of the zonal wind. The individual cyclones which made up the composite study were examined for these same parameters and the results obtained were also significant. GRA

N82-16670# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Atmospheric Sciences.

AN OBSERVATIONAL STUDY OF BLOCKING M.S. Thesis

Michael Lindley DSpain 8 Jun. 1981 133 p refs
(AD-A106739; AFIT-CI-81-28T) Avail: NTIS
HC A07/MF A01 CSCL 04/2

The initial purpose of this paper was to use the original concept developed by Hartmann and Ghan (1979) of separating the anomalous ridges solely on the basis of duration and proceed to formulate 3-dimensional pictures from the 1000, 850, 500, and 100 mb pressure levels of the long and short lived ridges, observing any differences which might exist. The three areas of ridge formation studied were defined as [illegible]e Pacific Ocean (175E-155W), the Pacific Coast (140W-11[illegible]nd the Atlantic Ocean (65W-25E). The Pacific regions were characterized by a well developed upstream trough, the ridge itself, and the downstream wavetrains. Both Pacific cases appear consistent with the idea of enhanced production of wave energy due to heating over either the mid-latitude or tropical ocean as suggested by Hoskins and Karoly (1981). The Atlantic cases did not exhibit the same downstream influences as the Pacific cases. The similarity in the height fields over North America between the short and long-lived ridges and the differences in the thermal fields suggests a relationship between the cold temperatures over North America and the long-lived ridges over the Atlantic. Author (GRA)

N82-16671# Control Data Corp., Minneapolis, Minn.
A CLIMATOLOGY OF A NEWLY DEFINED TROPOPAUSE USING SIMULTANEOUS OZONE TEMPERATURE PROFILES Final Report, 1 Jul. 1979 - 1 Jul. 1981
J. M. Roe Hanscom AFB, Mass. AFGL May 1981 109 p refs
(Contract F19628-79-C-0098; AF Proj. 6687)
(AD-A106399; AFGL-TR-81-0190) Avail: NTIS HC A06/MF A01 CSCL 04/2

A physical distinction between stratosphere and troposphere can be made in terms of potential vorticity or ozone. The World Meteorological Organization (WMO) tropopause, based only on thermal stability, does not always separate the different physical properties of the two regions. It is the purpose of this paper to show that the altitude in a vertical ozone profile at which ozone, and therefore potential vorticity, begins to increase rapidly is determinable from the temperature profile alone. The tropopause definition developed here reduces the WMO temperature gradient and thickness criteria and relies on the relative change of temperature lapse rate. The new definition determines heights of the tropopause that are in excellent agreement with ozone profile information. The proposed tropopause definition was applied to an archived ten year global radiosonde data set to prepare a climatology. The definition was also applied to an archived set of several thousand ozonesonde temperature profiles to prepare a climatology of vertical ozone gradient at the tropopause.
Author (GRA)

N82-16672# California Univ., Livermore. Lawrence Livermore Lab.
IMPLICATION OF SPATIAL AVERAGING IN COMPLEX TERRAIN WIND STUDIES
William Porch 19 Jun. 1981 8 p refs Presented at the AMS Conf. on Mt. Meteorol., Steamboat Springs, Colo., Nov. 1981
(Contract W-7405-eng-48)
(DE81-024451; UCRL-85525-Rev-1; CONF-811104-1) Avail: NTIS HC A02/MF A01

Studies of wind over complex terrain were conducted at two different times at the Geyser's geothermal region of northern California. Optical anemometers with spatial averaging over path lengths of 0.6 to .1 km and conventional cup vane anemometers were utilized. Measurements of spatially averaged wind were used to obtain the average drainaged wind speed component down a small sloping valley with few locations with reasonable instrument exposure accessible to cup anemometers. By comparing the point and spatially averaged wind measurements, it was hoped that data periods could be chosen for numerical wind field model testing when the two measurements were similar.
DOE

N82-16673# Pacific Northwest Lab., Richland, Wash.
THE WIND CHARACTERISTICS PROGRAM ELEMENT Annual Report, Oct. 1979 - Sep. 1980
L. L. Wendell, W. R. Barchet, J. R. Connell, A. H. Miller, W. T. Pennell, and D. S. Renne Sep. 1981 200 p refs
(Contract DE-AC06-76RL-01830)
(DE82-004876; PNL-3876) Avail: NTIS HC A09/MF A01

The progress accomplished directly by the Pacific Northwest Laboratory (PNL) and by subcontractors funded directly by DOE or through PNL is reported. To expedite the management of the activities to produce the required information, the WCPE was divided into three program areas: wind energy prospecting, support for design and operations, and site evaluation. Accomplishments in each of these program areas provide a highlight of WCPE activities.
DOE

N82-16674# Oregon State Univ., Corvallis. Dept. of Atmospheric Sciences.
GUIDE TO BIOLOGICAL WIND PROSPECTING
J. E. Wade and E. W. Hewson Oct. 1981 123 p refs
(Contract DE-AT06-76ET-20316)
(DE82-001425; DOE/ET-20316/80-2) Avail: NTIS HC A06/MF A01

Biological wind prospecting provides techniques for using the natural indicators around us as a guide to the strength, speed, frequency, and direction of the wind. The basis for this wind prospecting is interpretation and study of the shape and distribution of trees, shrubs, insects, and animals, combined with analysis of the impressions of people living in the areas under investigation. The quantitative relationship between mean annual wind speed and three indices of wind effects on trees is shown. Trees can be used successfully to determine mean wind direction, identify the occurrence of severe wind or ice loads, and, most importantly, to estimate mean annual wind speed.
DOE

N82-16675# Miami Univ., Fla. School of Marine and Atmospheric Science.
ON THE ANALYSIS OF SEASAT WINDS
Mariano A. Estoque and Jose J. Fernandez-Partagas Apr. 1981 24 p refs
(Grant NA-79-SAC-00737)
(PB81-245649; UM-RSMAS-81001; NOAA-81071407) Avail: NTIS HC A02/MF A01 CSCL 04B

A method for analyzing Seasat-A winds in tropical regions is described which eliminates the ambiguity in the Seasat wind measurement. The ambiguity is eliminated by using wind estimates from low-level cloud motions and synoptic cloud patterns based on satellite pictures, surface wind climatology as well as space-time continuity. In addition, the method takes advantage of certain characteristics of the Seasat wind observations such as the existance of (1) only two solutions at a single point and (2) small angles between solutions. The accuracy of the method has been evaluated by comparing the results of the analysis technique with indepndent observations from ships.
GRA

N82-16676# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
ICE CRYSTAL PROCESSES IN COLORADO, UPSLOPE SNOWSTORMS. ARTICLE 1: CASE STUDY OF AN UPSLOPE SNOWSTORM
H. Riehl and R. F. Reinking Apr. 1981 39 p refs
(PB82-109547; NOAA-81080502) Avail: NTIS HC A03/MF A01 CSCL 04B

The structure and cloud physics characteristics of the lower atmosphere were measured during upslope circulations. Low level air moving westward and upward over the high plains toward the Colorado front range was presumed to induce snowfall or ice deposit on the ground. A cyclonic event occurred in the last week of December, and aircraft missions were flown on 27 December when the storm was at its height east of the mountains. The synoptic system was an upper level cold low advancing at an average speed from southwest into southern Colorado. On the forward side, mesoscale waves appeared to form along the cold front, one of these was crossed by the aircraft. Maximum concentrations of liquid water, turbulence, and shift in thermal advective pattern was found there.
GRA

N82-16677# National Weather Service, Fort Worth, Tex. Scientific Services Div.
WEATHER SATELLITE INTERPRETATION: INTRODUCTION TO WEATHER SATELLITE IMAGERY
David L. Carlson Jun. 1981 54 p refs
(PB82-107657; NOAA-TM-NWS-SR-103; NOAA-81081105) Avail: NTIS HC A04/MF A01 CSCL 04B

This manual was designed to be a basic self-study course for the new GOES (Geostationary Operational Environmental Satellite). They may also be referred to as SMS, Synchronous Meteorological Satellite. Five GOES satellites launched by the U.S. and two others launched by Europe and Japan provide global coverage plus backup capability. Content of the manual includes basic operation of the GOES system and detailed explanations of some of the most commonly used GOES photos. The test consists of two chapters, a criterion test at the end of each chapter, and a comprehensive photo interpretation examination.
GRA

N82-16678# Environmental Research and Technology, Inc., Concord, Mass.
SATELLITE CLOUD ANALYSIS OVER THE GATE AREA ON 4 AUGUST 1974
James H. Willand May 1981 21 p refs
(Grant NOAA-NA81-AA-A-01207)
(PB82-107582; ERT-P-A845; NOAA-81081109) Avail: NTIS HC A02/MF A01 CSCL 04B

Capabilities in deriving cloud statistics, Satellite Cloud Data

Sets were assessed. An objective cloud analysis technique using satellite infrared and visible data is discussed. The method used for obtaining cloud statistics, some results obtained and problems concerning the extraction of global cloud statistics from satellites are presented. GRA

N82-16679# Chicago Univ., Ill. Satellite and Mesometeorology Research Project.
MESOSCALE ASPECTS OF CONVECTIVE STORMS
T. Theodore Fujita Aug. 1981 12 p refs Presented at Nowcasting Symp., Hamburg, 12-28 Aug. 1981 Submitted for publication
(Grants NA80AA-D-00001; NGR-14-001-008; NSF ATM-79-21260)
(PB81-247249; SMRP-RP-191; NOAA-81071408) Avail: NTIS HC A02/MF A01 CSCL 04B

Mesoscale phenomena is studied as it relates to severe local and rain storms. It is concluded that a very accurate combination of radar and satellite measurements hold the key to forecasting the ,nature of mesoscale clouds, the inducers of severe local storms. Extensive use is made of cloud photographs in analyzing mesoscale phenomena. Examples of severe storm wakes are examined, as are flash flood causing clouds. GRA

N82-16680# Intermountain Forest and Range Experiment Station, Ogden, Utah.
WHY WINDSPEEDS INCREASE ON HIGH MOUNTAIN SLOPES AT NIGHT
Robert G. Baughman Jul. 1981 12 p refs
(PB81-243909; FSRP-INT-276) Avail: NTIS HC A02/MF A01 CSCL 02F

The contention that the well documented windspeed increase on high mountain slopes at night is due to the occurrence of a low level jet wind. Various aspects of the meteorological situation most likely to produce these winds are discussed. An example of a low level jet wind that produced strong winds on a ridgetop fire at night is given. T.M.

N82-16681# National Hurricane Center, Coral Gables, Fla.
ANNUAL DATA AND VERIFICATION TABULATION ATLANTIC TROPICAL CYCLONES, 1980
Glenn Taylor Jun. 1981 84 p refs
(PB81-246050; NOAA-TM-NWS-NHC-15; NOAA-81070904; Rept-7) Avail: NTIS HC A05/MF A01 CSCL 04B

A summary of cyclone statistics is given. Tracks of named storms are shown. T.M.

N82-16682# National Weather Service, Silver Spring, Md. National Hurricane Center.
FREQUENCY AND MOTION OF ATLANTIC TROPICAL CYCLONES
C. J. Neumann and M. J. Pryslak Mar. 1981 71 p refs
(PB81-247256; NOAA-TR-NWS-26; NOAA-81070901) Avail: NTIS HC A04/MF A01 CSCL 04B

A statistical analysis of 663 tropical storms recorded over the Atlantic area over the period 1899 to 1978 are presented. Numerous charts are included indicate the average storm frequency per unit area per 100 year interval, mean result speed and direction, and the storm tracks upon which the above data was based. Tables also present the means and standard deviations of storm translation speed. GRA

N82-17058*# Auburn Univ., Ala. Dept. of Mathematics.
A STUDY OF THE GEOGRAPHIC COVERAGE PROPERTIES OF A SATELLITE BORNE DOPPLER LIDAR WIND VELOCITY MEASURING SYSTEM
Thomas H. Pate *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 26 p (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 04B

N82-17065*# Newberry Coll., S.C. Dept. of Mathematics and Physics.
THUNDERSTORM ELECTRIC FIELD MODELLING
Arjun Tan *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 10 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 04B

N82-17072*# Alabama Univ. in Huntsville. Dept. of Mathematics.
STATISTICAL ANALYSIS OF DAILY MEAN TEMPERATURES
Deva C. Ross *In its* The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1980 13 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 04B

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-16683*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.
NOSS ALTIMETER ALGORITHM SPECIFICATIONS
D. W. Hancock, R. G. Forsythe, and J. D. McMillan (Washington Analytical Services Center, Pocomoke City, Md.) Jan. 1982 112 p refs
(NASA-RP-1083) Avail: NTIS HC A06/MF A01 CSCL 08C

A description of all algorithms required for altimeter processing is given. Each description includes title, description, inputs/outputs, general algebraic sequences and data volume. All required input/output data files are described and the computer resources required for the entire altimeter processing system were estimated. The majority of the data processing requirements for any radar altimeter of the Seasat-1 type are scoped. Additions and deletions could be made for the specific altimeter products required by other projects. T.M.

N82-16684# Electronics Research Lab., Adelaide (Australia).
WATER TURBIDITY MEASUREMENTS IN GULF SAINT VINCENT
D. M. Phillips, M. L. Scholz, and R. H. Abbot Feb. 1981 28 p refs
(AD-A106274; ERL-0186-TR) Copyright. Avail: Issuing Activity CSCL 08/1

Large scale surveys have been made of the horizontal and vertical distributions of turbidity in the waters of Gulf St. Vincent in South Australia. The beam attenuation coefficient at a wavelength of 530 nm was determined from measurements made with a transmissometer operated from a boat. Both horizontal and vertical stratification of turbidity was observed and explanations for these two conditions are offered. Two methods for determining water turbidity from an aircraft were investigated. They involved measuring the amplitude and attenuation of the backscatter envelope from a laser pulse transmitted from the aircraft into the water. The relative merits of the two methods are evaluated. Author (GRA)

N82-16685# Washington Univ., St. Louis, Mo. Center for the Space Sciences.
QUANTITATIVE DATA ON THE ABUNDANCES AND DISTRIBUTION OF SEAMOUNTS IN THE PACIFIC OCEAN Report, 1980 - 1981
Rodey Batiza 1981 27 p
(Contract N00014-80-C-0856)
(AD-A107853; MCP-498) Avail: NTIS HC A03/MF A01 CSCL 08/10

The purpose of this report is to outline the methods used in the course of work on 'Statistical Studies of Oceanic Volcanoes.' It includes a description of the procedures used in the study, a description of the data base of Pacific Ocean seamounts which was compiled as part of the study, and descriptions of FORTRAN programs which were written to facilitate data analysis. In addition, this report contains examples of data tables and graphs of raw data to show their format and contents. This report is intended to facilitate use of the seamount data base by others and to provide the materials necessary for implementing use of the data base for purposes other than those of the present study. Complete listings of the data and plots are available from the author. Author (GRA)

N82-16686# California Univ., Berkeley. Lawrence Berkeley Lab. Earth Sciences Div.

CURRENT MEASUREMENTS OFF KEAHOLE POINT, HAWAII: APPLICATION TO OTEC-1
Volker W. Harms Jun. 1981 11 p refs Presented at the DOE/The Marine Technol. Soc. 8th Ocean Energy Conf., 1981, Washington, D.C., 7-11 Jun. 1981
(Contract W-7405-eng-48)
(DE81-030539; LBL-13208; CONF-810622-9) Avail: NTIS HC A02/MF A01

Detailed current measurements from the OTEC 1 vessel permits a preliminary analysis to be made of current induced hydrodynamic loads on the cold water pipe and hydrodynamic mixing along the trajectory of the mixed sea water plume. The measured equilibrium depth of the plume agrees well with that predicted by the plume model and occurs near the base of the ocean mixed layer. Ocean turbulence is found to provide some mixing. Several possible causes for excessive hydrodynamic loading on the cold water pipe are enumerated. DOE

N82-16687# Minnesota Univ. - Duluth.
SEA GRANT PROGRAM, UNIVERSITY OF MINNESOTA Annual Report, 1979
1980 20 p refs
(PB81-243958; NOAA-81063005) Avail: NTIS HC A02/MF A01 CSCL 08J

Minnesota's second year as a comprehensive Sea Grant effort was marked by some major accomplishments. Particularly noteworthy was the expansion of the research program. During 1978-1979 the total research effort was doubled and water safety added as an important new sub-program component. In addition, the Sea Grant Extension Program added a recreational and commercial fisheries agent to develop educational programs for the state's important fishery resource. GRA

N82-16688# National Ocean Survey, Rockville, Md. Circulatory Surveys Branch.
COOK INLET CIRCULATORY SURVEY: 1973-75
Richard C. Patchen, James T. Bruce, and Michael J. Connolly Jun. 1981 97 p refs
(PB81-245235; NOAA-NOS-OCS-4; NOAA-81070902) Avail: NTIS HC A05/MF A01 CSCL 08C

The 3-year circulatory survey conducted by the National Ocean Survey in Cook Inlet, AL is reported. Station location maps and station information tables for the physical parameters are provided. Results of the harmonic analysis performed on the current meter records are included. GRA

N82-16689# Delft Hydraulics Lab. (Netherlands).
NEAR-BOTTOM VELOCITIES IN WAVES WITH A CURRENT
W. T. Bakker Dec. 1980 28 p refs
(PB81-238685; Pub-208; ISSN-0166-7251) Avail: NTIS HC A03/MF A01 CSCL 08C

A mathematical model concerning the sand concentration and velocity distribution in an oscillatory turbulent flow, with or without resultant current, is developed. The flow is assumed to be uniform in horizontal direction. The numerical accuracy of the model was investigated and diagrams are presented which enable the computation by hand of global velocity profiles. GRA

N82-16690# New England Coastal Engineers, Bangor (Maine).
PROCEEDINGS OF THE GULF CIRCULATION STUDIES WORKSHOP Final Report
May 1981 96 p Workshop Held at New Orleans, 14-15 May 1981 Prepared in cooperation with Tetra Tech., Inc., Melville, N.Y.
(Contract DI-AA851-CTO-72)
(PB81-248254; BLM-YM-P/T-81-005-3331) Avail: NTIS HC A05/MF A01 CSCL 08C

On-going and prospective energy-related uses support continued research on the physical processes governing Gulf of Mexico circulation. A circulation modeling effort for the southwest Florida shelf, and a circulation model of the entire Gulf system are described. A three-year research program to obtain physical oceanographic data in the Gulf is discussed. Because the Gulf loop current is the dominating circulation feature, a primary goal of this measurement program is to improve our understanding of the driving forces of the loop current, and the loop current's interaction with general Gulf-wide circulation. T.M.

N82-16691# Texas A&M Univ., College Station. Dept. of Oceanography.
NORTHERN GULF OF MEXICO TOPOGRAPHIC FEATURES STUDY, EXECUTIVE SUMMARY Summary Report
Mar. 1981 140 p refs 6 Vol.
(Contract DI-AA550-CT8-35)
(PB81-248643; TR-81-2-T) Avail: NTIS HC A07/MF A01; also available in set of 6 reports HC E99 as PB81-248635 CSCL 08J

This study characterizes selected topographic features in the Gulf of Mexico. Mapping, subbottom profiling, and descriptive reconnaissance studies were completed for the Florida Middle Ground and Alderdice, Coffee Lump, Diaphus, Elvers, Fishnet, Geyer, Jakkula, and Rezak-Sidney Banks. These studies assess the geology and biology of the banks as observed from the submersible DRV DIAPHUS. The report also provides information on four previously studied. Applebaum (previously called Little Sister), 32 Fathom, and the East and West Flower Garden Banks. The East Flower Garden monitoring study was continued, an identical monitoring program was instituted at the West Flower Garden, and maps of the West Flower Garden were prepared. Chemical analysis of sediments for trace metals, high molecular weight hydrocarbons, Delta C-13, and total organic carbon was conducted for Coffee Lump and the East and West Flower Garden Banks. Other studies at the Flower Garden Banks include analysis of 'Spondylus' and certain fish species for trace metals and high molecular weight hydrocarbons, and analysis of water samples for nutrients and dissolved oxygen. GRA

N82-16692# Texas A&M Univ., College Station. Dept. of Oceanography.
NOTHERN GULF OF MEXICO TOPOGRAPHIC FEATURES STUDY, VOLUME 1: MANAGEMENT GEOLOGY, BIOLOGY, WATER AND SEDIMENT DYNAMICS. SUMMARY AND BIBLIOGRAPHY Final Report
Mar. 1981 135 p refs 6 Vol.
(Contract DI-AA550-CT8-35)
(PB81-248650; TR-81-2-T-Vol-1; BLM-YM-P/T-81-007-3331-Vol-1) Avail: NTIS HC A07/MF A01; also available in set of 6 reports HC E99 as PB81-248635 CSCL 08J

Data from selected areas and topographic features in the Gulf of Mexico and then reduced, mapped, analyzed, synthesized and integrated. The findings and conclusions are reported. Geological, chemical, physical, geophysical, and biological oceanographic data were collected from the Florida Middle Ground (off the west Florida coast) and from twelve topographic features off the Louisiana-Texas coast. GRA

N82-16693# Texas A&M Univ., College Station. Dept. of Oceanography.
NORTHERN GULF OF MEXICO TOPOGRAPHIC FEATURES STUDY. VOLUME 2: METHODS, FOSSIL COCCOLITHS, CHEMICAL ANALYSES Final Report
Mar. 1981 162 p refs 6 Vol.
(Contract DI-AA550-CT8-35)
(PB81-248668; TR-81-2-T; BLM-TM-T/T-81-008-3331) Avail: NTIS HC A08/MF A01; also available in set of 6 reports HC E99 as PB81-2486-35 CSCL 08J

Methods and procedures for analyses and sample collection are presented. The distribution of reworked fossil coccoliths on the South Texas Outer Continental Shelf is discussed. GRA

N82-16694# Texas A&M Univ., College Station. Dept. of Oceanography.
NORTHERN GULF OF MEXICO TOPOGRAPHIC FEATURES STUDY, VOLUME 3 Final Report
Mar. 1981 179 p refs 6 Vol.
(Contract DI-AA550-CT8-35)
(PB81-248676; TR-81-2-T-Vol-3; BLM-YM-P/T-81-009-3331-Vol-3) Avail: NTIS HC A09/MF A01; also available in set of 6 reports HC E99 as PB81-248635 CSCL 08J

Environmental monitoring of reef communities is presented. The study includes intensive sampling and a variety of in-water sampling and observational activities both by SCUBA and from the DRV DIAPHUS submersible. GRA

N82-16695# Texas A&M Univ., College Station.
NORTHERN GULF OF MEXICO TOPOGRAPHIC FEATURES STUDY. VOLUME 4: OTHER BANKS Final Report
Mar. 1981 182 p refs 6 Vol.
(Contract DI-AA550-CT8-35)
(PB81-248684; TR-81-2-T-Vol-4; BLM-YM-P/T-81-010-3331-Vol-4) Avail: NTIS HC A09/MF A01: also available in set of 6 reports HC E99 as PB81-248635 CSCL 08J

In addition to geological and biological reconnaissance and sampling from the submersible studies at Coffee Lump Bank includes mapping and subbottom profiling, hydrographic sampling, and chemical analysis of sediment samples for high molecular weight hydrocarbons. Delta C-13, and total organic carbon. Results of these studies are presented. GRA

N82-16696# Texas A&M Univ., College Station. Dept. of Oceanography.
NORTHERN GULF OF MEXICO TOPOGRAPHIC FEATURES STUDY. VOLUME 5: FLORIDA MIDDLE GROUND Final Report
Mar. 1981 268 p refs 6 Vol.
(Contract DI-AA550-CT8-35)
(PB81-248692; TR-81-2-T-Vol-5; BLM-YM-P/T-81-011-3331-Vol-5) Avail: NTIS HC A12/MF A01; also available in set of 6 reports HC E99 as PB81-248635 CSCL 08J

This chapter provides an integrated multidisciplinary overview of the Florida Middle Ground. The overview is designed to integrate complete geophysical mapping with site specific submarine ground truthing, geological sampling, physical oceanographic, in situ, and time series recording, and biological and chemical sampling. The geophysical, physical, and geological data are used to describe the setting for biological data. The collection of biological data itself was designed around management concepts to address two diverse management objectives. GRA

N82-16697# SRI International Corp., Menlo Park, Calif.
AN EXPERIMENTAL PROGRAM TO PROVIDE REMOTE MEASUREMENT AND ANALYSIS OF OCEAN WAVES, SEA LEVEL WINDS AND BALANCED PRESSURE IN SUPPORT OF SEASAT-A Final Report
J. W. Maresca, Jr., R. M. Endlich, C. T. Carlson, and D. E. Wolf Feb. 1981 50 p refs
(Contract NA79SA-C-00738; SRI Proj. 8808)
(PB81-246035; NOAA-81071410) Avail: NTIS HC A03/MF A01 CSCL 08C

Wide Aperture Research Facility (WARF) HF skywave radar and Seasat-A measurements of rms wave height and wind direction were compared for 17 July and 3 October 1978. Estimates of rms wave height were made during the 2 October period from skywave radar data recorded directly below the satellite. Sea level balanced pressure fields were computed from the Seasat-A satellite scatterometer (SASS) derived wind field on both days and compared to the National Weather Service (NWS) surface pressure charts. GRA

N82-16698# National Ocean Survey, Rockville, Md.
TIDE TABLES 1982 HIGH AND LOW WATER PREDICTIONS. EAST COAST OF NORTH AND SOUTH AMERICA INCLUDING GREENLAND
1981 292 p
(PB81-241622; NOAA-81070702) Avail: NTIS HC A13/MF A01 CSCL 08C

Full daily predictions for 48 reference ports and differences and other constants for about 2,000 stations in North America, South America, and Greenland are contained. Tables for obtaining the approximate height of the tide at any time, local mean time of sunrise and sunset for every 5th day of the year for different latitudes, the reduction of local mean time to standard time, moonrise and moonset for 8 places, and the Greenwich mean time of the Moon's phases are also contained. Apogee, perigee, greatest north and south and zero declination, the time of the solar equinoxes and solstices, and a glossary of terms are included. GRA

N82-16699# National Weather Service, Silver Spring, Md.
AN INTRODUCTION TO SEA STATE FORECASTING
Graham P. Britton (Royal Navy) and Kenneth E. Lilly, Jr., ed. 1980 229 p refs
(Contract DOC-7-35218)
(PB81-242687) Avail: NTIS HC A11/MF A01; HC Avail: SOD CSCL 08C

The forecasting of sea states is shown to be dependent upon an analysis of the relationships existing between the atmosphere and the ocean. Observation and measurement of the sea and swells, and the structure of the atmosphere overlying the sea surface are discussed. The effects of variations in air and water density on sea and swell generation are examined as well as the dynamics of the atmospheric boundary layer and the effect of fronts. The use of wave spectra data in marine synoptic analysis, the monitoring of cold air outbreaks, and the theoretical treatment of waves are discussed. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-16700# Oak Ridge National Lab., Tenn. Biology Div.
POSSIBLE MECHANISM FOR CHEMICAL INDUCTION OF CHROMOSOME ABERRATIONS IN MALE MEIOTIC AND POSTMEIOTIC GERM CELLS OF MICE
Walderico M. Generoso 1981 16 p refs Presented at 4th Intern. Symp. of the Radiation Biol. Center, Kyoto, 28 Sep. 1981 Sponsored in part by EPA
(DE81-031999; CONF-810966-1) Avail: NTIS HC A02/MF A01

The mechanisms by which chemically induced lesions in the chromosomes of mammalian germ cells are actually converted to aberrations and transmitted to progeny are investigated. An attempt is made to explain how dominant-lethal mutations and heritable translocations are produced from chemical treatment of meiotic and postmeiostic germ cells of male mice. DOE

N82-16701# Environmental Protection Agency, Corvallis, Oreg. Environmental Research Lab.
VARIATION IN PLANT RESPONSE TO OZONE: A CONCEPTUAL MODEL OF PHYSIOLOGICAL EVENTS
D. T. Tingey and G. E. Taylor, Jr. 1980 47 p refs Presented at 32nd Symp. on Effects of Gaseous Air Pollution in Agr. and Hort., Nottingham, England, 1 Sep. 1980 Prepared in cooperation with Oak Ridge National Lab.
(Contract W-7405-eng-26)
(DE81-029692; CONF-8009172-1) Avail: NTIS HC A03/MF A01

The environment and genotype exert profound influences on a plant's ozone response. Based on the multiplicity of physiological mechanisms responsible for variable response, a common progression of events is proposed: ozone conductance (gas and liquid phase), perturbation, homeostasis, and injury. Injury is the repercussion of the preceeding events. Gas and liquid phase conductances are significant sources of variable ozone response. Genic expression and environmental stimuli affect ozone conductance and homeostasis and thereby the extent of injury. Based on conceptual model, gas phase conductance would be the decisive factor controlling injury only if it were the rate limiting step. Any physiologically significant intervening event between gas-phase conductance and injury would reduce the association between them. Either liquid phase conductance of homeostasis could reduce that association. DOE

N82-16702# Colorado State Univ., Fort Collins. Dept. of Microbiology.
MICROBIOLOGICALLY-MEDIATED MUTAGENIC ACTIVITY OF CRUDE OIL Final Report, 1976 - 1979
Bruce A. Cummings and Ronald C. Gordon Sep. 1981 302 p refs
(Grant EPA-R-805041)
(PB82-105131; EPA-600/3-81-053) Avail: NTIS HC A14/MF A01 CSCL 06T

Crude oil was incubated with raw and sterile river water samples and assayed for mutagenic activity for the Ames test to determine the ability of naturally occurring freshwater microorganisms to form mutagenic biodegradation products from crude oil. River water samples supplements with inorganic salts were incubated with one percent crude oil in Erlenmeyer flasks for 1-6 weeks and 4 and 20 C with shaking. Replicate flasks were extracted at various time intervals with 1,1-2 trichloro-1,2,2-trifluoroethane, the solvent evaporated and the residues taken up in dimethyl sulfoxide for mutagenicity testing. The extracts were assayed for mutagenic activity by the plate incorporation method of the Ames test with Salmonella tester strains TA 100, TA 1535, TA 1537, TA 1538 and TA 98. Mammalian liver microsomes were not used in the mutagenicity test system as the oil degrading microorganisms constituted the enzyme activation system in the study. GRA

N82-16703# Cincinnati Univ., Ohio. Inst. of Environmental Health.

MECHANISMS OF CADMIUM ABSORPTION IN RATS

Ernest. C. Foulkes, D. R. Johnson, Naoki Sugawara, Roland F. Bonewitz, and Cathleen Voner Sep. 1981 59 p refs
(Grant EPA-R-805840)
(PB82-108184; EPA-600/1-81-063) Avail: NTIS HC A04/MF A01 CSCL 06T

The study was undertaken in order to help clarify the factors which determine the fractional absorption of an oral load of cadmium (Cd) from the intestine of the rat. The experiments utilized intact segments of intestine, perfused or incubated in situ, with their blood supply intact. Absorption of Cd from the jejunal lumen can be ascribed to a saturable membrane system, that is after short periods of exposure essentially all the metal removed from the lumen was recovered in mucosal issue (Step 1). The second step in Cd absorption, i.e., transfer of the metal from mucosa into blood, proceeded at only 1-2% of the rate of uptake from the lumen (Step 1). No evidence was obtained for a role of metal lothionein in the mucosal retention of Cd. Step 1 of Cd absorption was inhibited by a variety of exogenous and endogenous factors. Thus, zinc was found to depress Cd transport in an apparently competitive manner. Addition of milk to the lumen also inhibited Cd uptake, an effect entirely due to the Ca content. Bile salts act as endogenous modulators of Cd absorption; their effect may be related to micelle formation. The research also included studies of duodenal and ileal Cd transport. GRA

N82-16704# Joint Publications Research Service, Arlington, Va.

USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 15, NO. 6, NOVEMBER - DECEMBER 1981

12 Jan. 1982 154 p refs Transl. into ENGLISH of Kosm. Biol. Aviakosm. Med (Moscow), v. 15, no. 6, Nov. - Dec. 1981 (JPRS-79849) Avail: NTIS HC A08/MF A01

Articles are presented which address life support systems; human and animal physiological responses to spacecraft environments, radiation and weightlessness; and flight fatigue in helicopter crews. For individual titles, see N82-16705 through N82-16730.

N82-16705# Joint Publications Research Service, Arlington, Va.

QUESTION OF REDISTRIBUTION OF BLOOD IN ORTHOSTATIC POSITION c52

G. S. Belkaniya *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 1-9 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 4-9 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

The concept of two interacting constituents involved in the redistribution of the circulating blood volume in orthostasis, redistribution along the vertical (hydrostatic) and functional (metabolic) gradients, is discussed. On this basis, the possible mechanism responsible for orthostatic circulatory intolerance following an exposure to bed rest or weightlessness is described. Author

N82-16706# Joint Publications Research Service, Arlington, Va.

WAYS AND MEANS OF MAINTAINING HEAT BALANCE IN PILOTS AND COSMONAUTS c52

A. S. Barer *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 10-18 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 9-15 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

Different principles used in systems ensuring thermal balance of pilots and cosmonauts are discussed. Physiological and hygienic characteristics of the passive thermal insulation, ventilation systems, and liquid cooling (heating) suits are presented. A classification of the means and methods is proposed. Author

N82-16707# Joint Publications Research Service, Arlington, Va.

SYSTEMIC AND CEREBRAL HEMODYNAMICS IN FLIGHT PERSONNEL EXPOSED TO MODERATE HYPOXIA c52

V. N. Denisov, S. F. Rayev, and I. I. Antufyev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 19-23 Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 16-19 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

For the purposes of medical expertise the state of systemic and cerebral hemodynamics was investigated in 66 pilots with autonomic-vascular instability and in 36 healthy subjects exposed to moderate hypoxia (in an altitude chamber). The pilots showed noticeable tachycardia or systolic hypertension, as well as certain changes in cardiac output and stroke volume. These alterations were accompanied by rheoencephalographic changes of two types one of which can be regarded as an adverse response of cerebral circulation to hypoxia. It is concluded that the study of systemic and cerebral circulation in hypoxia yields important diagnostic information that allows better estimates. M.G.

N82-16708# Joint Publications Research Service, Arlington, Va.

CAUSES OF FATIGUE AMONG CREWS OF CIVIL AVIATION HELICOPTERS c52

Yu. N. Kamenskiy *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 24-27 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 19-22 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

The role of vibration and noise in the development of fatigue in helicopter crews was assessed. The exposure to these factors during the flying shift results in an early and marked fatigue of pilots the level of which depends on the vibration effects to a larger extent than on the noise effects. The fatigue is followed by a decline of the psychophysiological parameters characterizing the visual and motor functions as well as the ratio of the basic processes in the central nervous system. M.G.

N82-16709# Joint Publications Research Service, Arlington, Va.

PHYSIOLOGICAL AND HYGIENIC EVALUATION OF VIBRATION IN THE COCKPIT OF A CARGO HELICOPTER c54

Yu. G. Matveyev and Yu. N. Kamenskiy *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 28-32 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 22-25 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

The correlations between statistical parameters of vibration in the work place, work schedules, and functional state of subjects when performing commercial flights were studied. In the cockpit of five helicopters the floor and the chair vibrated in a band of 8 Hz at a frequency of 112.5 and 114.0 dB, respectively. Before and after the flying shift 66 crewmembers were interviewed and examined. Vibration was referred to as the most unpleasant factor by 30.4% of them, noise was defined as the most unpleasant factor by 6.5% of them; 63.1% described both factors as similarly adverse. The level of psychophysiological changes was proportional to the flight time. The first signs of fatigue were seen after flights of up to 5 hours in duration, to increase drastically after flights of 6 and 7 hours. M.G.

N82-16710# Joint Publications Research Service, Arlington, Va.

EVALUATION OF MAN'S ENDURANCE OF LOCAL PRESSURE TO THE HEAD AND OBJECTIVE ASSESSMENT OF HYGIENIC SPECIFICATIONS FOR PROTECTIVE HELMETS c52

V. M. Sinigin, Yu. G. Konakhevich, L. N. Sholpo, and A. I. Uglanov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 33-37 Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 25-28 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

To obtain reference data for a statistically substantiated evaluation of man's tolerance to the local pressure on the head (as applied to protective helmets kept on for a long time), 86 experiments were carried out in which 11 test subjects participated. The local pressure of 0.05 to 0.5 kg/sq cm was applied to eight areas of the head. The tolerance time was measured as the time interval from the beginning of the exposure to the emergence of localized sensations of the type: unpleasant, painful, very painful, or intolerable. As a result, statistically significant relationships between the tolerance time and the level of the local pressure were obtained for the eight locations and four grades of subjective sensations. These data can be used in evaluating protective helmets to be worn for a long time as well as in developing hygienic requirements for the advanced helmet-like devices. Author

N82-16711# Joint Publications Research Service, Arlington, Va.

EFFECT OF TRANSMERIDIONAL FLIGHTS ON BIORHYTHM OF ZONE FORMATION BY STREPTOMYCES LEVORIS c52

A. P. Savelyev, A. Kh. Akhmadiyeva, and I. G. Akoyev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 38-41 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 28-31 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

The transmeridioneal transportation of the temperature controlled colonies of Streptomyces levoris exerted a marked effect on its biorhythms. This included changes in the growth and zone formation rates and differences in the vector of changes as related to the flight direction. The vector of changes during an east-oriented airborne flight coincided with that in orbital flight with a similar direction of transportation. These findings as well as the results of studies of seasonal and diurnal rhythms of the actinomycete zone formation suggest the synchronizing effect of the periodicity of geophysical factors. M.G.

N82-16712# Joint Publications Research Service, Arlington, Va.

SIMULATION OF SOME OF MAN'S MOVEMENTS IN DIFFERENT GRAVITY FIELDS c54

A. V. Zinkovskiy, I. A. Trofimova, and V. A. Chistyakov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 42-45 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 31-33 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

The control of man's movements during adaptation to an altered gravity field was modeled by mathematical methods. Two types of movements were investigated: forearm displacement with various loads and repulsions from a support in zero-G and at high G's. It was shown that movement coordination in altered gravity fields can be maintained due to a rearrangement of the control over muscle contraction which includes changes in the amplitude and pattern of joint momenta in harmony with the gravity changes. M.G.

N82-16713# Joint Publications Research Service, Arlington, Va.

POSITIONS, MOVEMENTS AND EQUILIBRIUM OF RATS AFTER FLIGHTS ABOARD BIOSATELLITES

G. S. Ayzikov and A. S. Markin *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 46-53 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 33-38 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

An examination of the Wistar-SPF rats flown onboard the biosatellites Cosmos-782, 936 and 1129 demonstrated significant changes in their postural, motor, and equilibrium reactions. The use of artificial gravity inflight produced a beneficial effect on the health state, motor activity, and simple reflex acts of the animals but worsened their movement coordination and equilibrium function. M.G.

N82-16714# Joint Publications Research Service, Arlington, Va.

CATHEPSIN ACTIVITY OF SKELETAL MUSCLE AND MYOCARDIA MYOFIBRILS AFTER EXPOSURE TO WEIGHTLESSNESS AND ACCELERATIONS

S. S. Oganesyan and M. A. Eloyan *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 54-59 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 38-42 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

The rats flown onboard Cosmos-605 and exposed to a synchronous experiment for 22 days showed an increased activity of myofibrillar cathepsins in skeletal muscles of different groups. In the flight rats the increase was greater than in the synchronous ground-based animals. This suggests a significant effect of weightlessness on the cathepsic activity. The parameter was partially normalized at R+ 25 or 26 days. The exposure of rats to accelerations of 4 and 5 G for 2 min daily during 2 weeks also increased the cathepsic activity of skeletal and myocardial myofibers. The parameter returned to normal a month after completion of acceleration exposures. Thus, changes in the proteolytic activity of myofibers of different muscles induced by weightlessness and acceleration are reversible. The significance of changes in the muscle tension as related to the mechanism of stimulation of proteolytic reactions is discussed. M.G.

N82-16715# Joint Publications Research Service, Arlington, Va.

CYTOKINETIC EVALUATION OF ERYTHROPOIESIS DURING LONG-TERM ORBITAL FLIGHTS c52

A. V. Ilyukhin and T. Ye. Vurkovskaya *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 60-64 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 42-46 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

The mechanisms of erythropoietic changes at the cellular level during a prolonged exposure to weightlessness were investigated. Following 96-, 140- and 175-day space flights cytokinetic and morphological changes in erythropoiesis were observed. The count of circulating erythrocytes decreased inflight and their life time reduced postflight. The shortening of the life time of erythrocytes postflight was paralleled by increased proliferative activity of erythroid cells. The erythrocytic balance was not reached as late as R+36 days. B.W.

N82-16716# Joint Publications Research Service, Arlington, Va.

NOREPINEPHRINE AND ENZYMES OF SYNTHESIS AND DEGRADATION THEREOF IN THE RAT HYPOTHALAMUS FOLLOWING FLIGHT ABOARD THE COSMOS-936 BIOSATELLITE

T. Torda, R. Kvetnyanski, R. A. Tigranyan, Yu. Chulman, and A. M. Genin *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 65-68 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 46-48 (For primary document see N82-16704 07-51)

Avail: NTIS HC A08/MF A01

In the hypothalamus of weightless and centrifuged rats flown for 18.5 days onboard the biosatellite Cosmos-936, the noradrenaline concentration and activity of the enzymes involved in the catecholamine synthesis and degradation were measured. It was found that under the space flight influence the noradrenaline concentration and tyrosine hydroxylase, dopamine-beta-hydroxylase, and monoamine oxidase activities remained unaltered. These findings indicate that a prolonged exposure to weightlessness was not a stressogenic agent that could activate the adrenergic system in the rat hypothalamus. B.W.

N82-16717# Joint Publications Research Service, Arlington, Va.

HYGIENIC PRINCIPLES OF ONGOING MONITORING OF QUALITY OF RECYCLED WATER DURING SPACE FLIGHTS c54

V. M. Skuratov, V. B. Gaydadymov, and S. V. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 69-72 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 181 p 48-51 (For primary document see N82-16704 07-51)

Avail: NTIS HC A08/MF A01

The hygienic principles used in the evaluation of the quality of reclaimed water onboard the spacecraft are presented. The parameter required for operational control and their hygienic significance are discussed. Author

N82-16718# Joint Publications Research Service, Arlington, Va.

TOXICOLOGICAL AND HYGIENIC ASPECTS OF IMPROVING ADDITIONAL PURIFICATION OF WATER RECLAIMED FROM URINE c54

Z. P. Pak, G. V. Lobacheva, M. M. Spiryayeva, Yu. Ye. Bezumova, T. P. Korotkova, V. P. Petina, and Ye. S. Yevdokimova *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 73-78 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 51-54 (For primary document see N82-16704 07-51)

Avail: NTIS HC A08/MF A01

Comparative toxicological and hygienic studies of samples of reclaimed water obtained from urine with the use of different final purification variants were conducted. The sorption-catalytic method of urine condensate repurification using a platinum-carbon catalyst proved to be the most promising since it can ensure the production of toxicologically safe potable water. It was shown experimentally that the quality of reclaimed water as related to its chemical and toxicological parameters depends on the efficiency of the repurification unit. B.W.

N82-16719# Joint Publications Research Service, Arlington, Va.

POSSIBLE USE OF HOUSE FLY LARVAE FOR UTILIZATION OF ORGANIC WASTE IN BIOLOGICAL LIFE-SUPPORT SYSTEMS c54

Ye. G. Golubeva and T. V. Yerofeyeva *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, v. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 79-83 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 54-57 (For primary document see N82-16704 07-51)

Avail: NTIS HC A08/MF A01

Musca domestica larvae were grown in organic substrates of three types. The larval density was shown to influence certain parameters characterizing the fly life cycle and the larval utilization of the substrate. The larval development led to a decrease of the substrate mass, humidity and the content of organic matter. Man's native excrements were found to be the best substrate for M. domestica larvae. Author

N82-16720# Joint Publications Research Service, Arlington, Va.

DISTINCTIONS OF REGENERATION OF CONFINED ATMOSPHERE BY MEANS OF PHOTOSYNTHESIS OF UNICELLULAR ALGAE c54

G. I. Meleshko, L. M. Krasotchenko, and Ye. K. Lebedeva *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 84-90 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 58-62 (For primary document see N82-16704 07-51)

Avail: NTIS HC A08/MF A01

Systems of biological air regeneration using photosynthesis of unicellular algae are examined. An oxygen-carbon dioxide mismatch associated with the difference in gas exchange coefficients of man and algae is shown. The value and vector of the mismatch depend on the degree of the above difference. In the system balanced with respect to oxygen consumption and carbon dioxide production, the rate of the mismatch equals to 1 per cent of either process per each unit of the difference of the gas exchange coefficients in the second decimal point. Methods for regulating the algal assimilation coefficient based on the use of various nitrogen forms for algal nutrition and controlled biosynthesis are discussed. Optimal variants of gas exchange balance in the semi-closed biological life support systems are described. B.W.

N82-16721# Joint Publications Research Service, Arlington, Va.

PHENOMENA OF FLUCTUATION OF HUMAN REACTION TO ANTIORTHOSTATIC POSITION c52

L. Lkhagva *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 91-94 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 63-65 (For primary document see N82-16704 07-51)

Avail: NTIS HC A08/MF A01

The biorhythmological analysis of the data obtained from seven healthy male test subjects in the head-down position at -8 deg revealed phemonena of sine-shaped reactions. This pattern was seen in the range (the difference between mean day-time and mean night-time values) of heart rate, amplitude (the difference between the maximum and minimum) of variations of body temperature and renal potassium excretion, and the evening-morning difference of body temperature variations. Author

N82-16722# Joint Publications Research Service, Arlington, Va.

RESULTS OF STUDY OF HEMODYNAMICS AND PHASE STRUCTURE OF THE CARDIAC CYCLE DURING FUNCTIONAL TEST WITH LOWER BODY NEGATIVE PRESSURE DURING 140-DAY SALYUT-6 STATION FLIGHT c52

A. D. Yegorov, O. G. Itsekhovskiy, I. I. Kasyan, A. P. Polyakova, V. F. Turchaninova, I. V. Alferova, V. G. Savelyeva, M. V. Domracheva, V. G. Doroshev, Ye. A. Kobzev et al *In its* USSR Rept.: Space Biol. and Aerospace Med. Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 95-100 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 65-69 (For primary document see N82-16704 07-51)

Avail: NTIS HC A08/MF A01

The two members of the 140-day permanent Salyut-6 space flight were exposed to five lower body negative pressure (LBNP) tests at -25 and -35 mm Hg for 2 and 3 min, respectively. Circulation responses to the LBNP tests were measured with respect to the heart rate, arterial pressure, chronocardiogram, and cardiac output. As compared to the preflight data, inflight responses were characterized by a greater tachycardia, preload insufficiency, and vascular tone in the absence of orthostatic intolerance. Possible mechanisms of the changes in the circulation responses are discussed. Author

N82-16723# Joint Publications Research Service, Arlington, Va.

SUCCINATE DEHYDROGENASE AND CYTOCHROME OXIDASE ACTIVITY IN TISSUES OF RATS SUBMITTED TO LONG-TERM HYPOKINESIA

V. V. Smirnov and P. P. Potapov *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 101-103 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 69-71 (For primary document see N82-16704 07-51)

Avail: NTIS HC A08/MF A01

The activity of cytochrome oxidase in the liver, skeletal muscles, kidneys, brain and lungs of 56 white rats decreased on days 15 and 60 of the hypokinetic study. The activity of succinate dehydrogenase significantly lowered in the brain and slightly diminished in the lungs and skeletal muscles on the same days. The activity of succinate dehydrogenase in the liver increased on the 90th hypokinetic day. Author

N82-16724# Joint Publications Research Service, Arlington, Va.

LIPID SPECTRUM OF THE MYOCARDIUM OF WHITE RATS EXPOSED TO HYPOXIC HYPOXIA

S. A. Sergeyev and G. A. Gribanov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 104-108 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 71-74 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

By a modified microthin-layer chromatography the total lipid spectrum of the cardiac muscle of white rats exposed to acute oxygen deficiency in an altitude chamber was investigated. It was found that the content of total lipids, phospholipids, free cholesterol, free fatty acids and triglycerides decreased during acute hypoxia. The exposure induced changes in the amount of glycerophosphatids, phosphatid acids and polyglycerophosphatids whose content diminished significantly. The concentration of phosphatidyl serines and phosphatidyl ethanol amines lowered to a lesser extent while that of sphyngomyelins increased. Acute oxygen deficiency accelerates the release of inorganic phosphate from the heart, thus, together with other factors, leading to disorders in the heart energetics. These findings indicate an important role of hypoxic hypoxia in the disturbances of lipid metabolism of the myocardium. This needs to be taken into consideration in the diagnostics and treatment of such states. Author

N82-16725# Joint Publications Research Service, Arlington, Va.

STATIONARY MAGNETIC FIELDS AND RETICULAR INFLUENCES ON ADRENERGIC AND CHOLINERGIC SYSTEMS

L. D. Klimovskaya and A. F. Maslova *In its* USSR Rept.: Space Biol. and Aerospace Med. Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 109-112 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 74-76 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

An exposure of rabbits to a constant magnetic field of 0.4 T for one hour caused increases in the blood content of adrenaline, noradrenaline, and acetylcholine, and in the adrenal content of adrenaline. Stimulation of the midbrain reticular formation led to a significant increase of the blood concentration of catecholamines and acetylcholine. After an exposure to the constant magnetic field the stimulatory effects of the reticular formation on the adrenergic systems diminished and on the cholinergic systems remained elevated. R.J.F.

N82-16726# Joint Publications Research Service, Arlington, Va.

CLINICAL DISTINCTIONS OF RADIATION SICKNESS WITH EXPOSURE OF DIFFERENT PARTS OF THE HUMAN BODY TO RADIATION c52

G. F. Nevskaya, G. M. Abramova, M. A. Volkova, Ye. V. Kavlycheva, A. S. Skorik, and V. V. Yurogov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 113-118 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 77-80 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

The clinical picture of radiation sickness of 139 radiological patients exposed to local irradition of the head, chest, and stomach with efficient doses of 210 rad was examined. It was found that at fractionated local irraditions the clinical symptom-complex of radiation sickness was identical to that seen as a result of total-body irradiation. During head irradiation the major symptom was headache and during stomach irradiation nausea. The severity level of radiation damage measured with respect to the clinical symptom-complex as a whole with the aid of the bioinformation model was similar during irradiations of the head and stomach, much higher during irradiation of the chest. During head and stomach irradiations the severity level of radiation damage was proportional to the efficient dose. During chest irradiation there was no correlation between the severity level and the exposure to doses of 210 rad. Author

N82-16727# Joint Publications Research Service, Arlington, Va.

METHOD OF RECORDING ROTATORY EYE REFLEXES c52

M. M. Levashov and A. V. Dmitriyev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 119-122 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec 1981 p 80-82 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

A method of recording rotatory eye reflexes in real time using polarized light is described. When a beam of light going to the photodetector is passed successively through two polarizers, illumination of the detector will depend on reciprocal orientation of polarization planes. Reciprocal rotation of polarization planes alters illumination proportionally to the cosine of angle of rotation. When the planes are parallel (0 degree angle), illumination is at a maximum, and when one of the planes is rotated 90 degrees in relation to the other, it is minimal. A miniature photoresistor is used as a detector, and it is covered with polarizing layer. The detector is placed on the anesthetized eyeball with suction cups. The light source and miniaturized amplifier unit were assembled on a mask worn over the subject's head. R.J.F.

N82-16728# Joint Publications Research Service, Arlington, Va.

ELECTRODE UNIT FOR TESTING HUMAN H REFLEX c52

V. I. Zborovskaya and E. A. Skiba *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 123-124 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 82-83 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

Use of a method of recording H reflexes that makes it possible to test the level of reflex activity of spinal motoneurons at rest and during movement, as well as to make qualitative and quantitative evaluations of various supraspinal and afferent factors is discussed. An electrode unit for electrostimulation of peripheral nerves or muscles was made. It has 6 electrodes 8-10 mm in diameter, which are mounted on an elastic dielectric plate. Rounded corners of the plate protect the skin from trauma when the electrode unit is secured firmly. The electrode unit is secured firmly to the region of the popliteal fossa, connected to the electrosimulator through a selector which connects the unit electrodes one after the other. The stimulation point is determined from the nature and magnitude of responses elicited in the muscle innervated by the stimulated nerve. R.J.F.

N82-16729# Joint Publications Research Service, Arlington, Va.

COMPARATIVE ANTIHYPOXIC EFFICACY OF PRESSURE CHAMBER CONDITIONING AND FASTING OF MAN c52

A. Yu. Katkov, Ye. A. Kovalenko, R. N. Chabdarova, G. A. Davydov, S. A. Vtoryy, and N. M. Utkina *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 125-128 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 84-86 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

Two theoretically possible means of enhancing man's resistance to rapidly increasing hypoxia, pressure chamber conditioning and fasting, are studied. Eleven essentially healthy men were divided into two groups. The first group of subjects was submitted to 10-day pulsed pressure chamber conditioning. The second group of subjects spent 14 days on a total fast, without limiting water intake. Endurance of hypoxia in the first group was determined before pressure chamber conditioning and immediately after it, and in the second group before the fast and on the 14th day of food deprivation. The subject was raised continuously in the chamber at the rate of 20 m/s at rest, to maximum tolerance of altitude. The subject was raised again at the same speed 30 minutes after descending to 'Earth', but with concurrent performance of exercise on a bicycle ergometer constituting 200 kg-m/minutes. In both cases, the subject had to report the current 'altitude when so instructed. In the course of the test, a continuous recording of oxygen tension in the skin of the left forearm was made by the polarographic method. At normal barometric pressure, body weight, gas exchange, morphological and gas composition, and acid-base equilibrium of capillary blood was determined. R.J.F.

N82-16730# Joint Publications Research Service, Arlington, Va.
CONDITION OF MENINGEAL NERVOUS SYSTEM DURING REPEATED EXPOSURE TO TRANSVERSE ACCELERATIONS
c52
G. A. Konstantinovskiy *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec 1981 (JPRS-79849) 12 Jan. 1982 p 129-132 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 86-88 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

The nerve elements of the dura and pia mater of the brain of 19 puberal cats weighing 2 to 3 kg were examined following repeated exposure to transverse accelerations (chest-back) for 20 minutes at 24-hour intervals, for 6 days. A force of 8 units with a gradient of acceleration build-up and decline of 0.5 to 0.4 unit/s was generated on a centrifuge with a 5 m arm, equipped with specially molded containers, in which the animals were immobilized in their physiological position. The cats were sacrificed using ether fumes at different times after the experiments: 1, 3, 7, 30 and 90 days, which enabled experimentors to track the dynamics of recovery processes. The meninges of five intact animals of the same ages and weight served as a control. Nervous elements were demonstrated by means of silver nitrate impregnation according to Bielschowsky, in various modifications, followed by gold-plating and additional staining with nuclear-plasma stains. R.J.F.

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-16731* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY. A CONTINUING BIBLIOGRAPHY (SUPPLEMENT 226)
Dec. 1981 48 p
(NASA-SP-7011(226)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 129 reports, articles, and other documents introduced into the NASA scientific and technical information system in November 1981. Author

N82-16732*# Electro-Optics Consultants, Inc., Huntsville, Ala.
DETECTION OF AMBLYOPIA UTILIZING GENERATED RETINAL REFLEXES Final Report
J. H. Kerr and S. H. Hay 13 Nov. 1981 52 p refs
(Contract NAS8-33619)
(NASA-CR-161944; Rept-5153-33819) Avail: NTIS HC A04/MF A01 CSCL 06E

Investigation confirmed that GRR images can be consistently obtained and that these images contain information required to detect the optical inequality of one eye compared to the fellow eye. Digital analyses, electro-optical analyses, and trained observers were used to evaluate the GRR images. Two and three dimensional plots were made from the digital analyses results. These plotted data greatly enhanced the GRR image content, and it was possible for nontrained observers to correctly identify normal vs abnormal ocular status by viewing the plots. Based upon the criteria of detecting equality or inequality of ocular status of a person's eyes, the trained observer correctly identified the ocular status of 90% of the 232 persons who participated in this program. T.M.

N82-16733# Civil Aeromedical Inst., Oklahoma City, Okla.
FATIGUE IN FLIGHT INSPECTION FIELD OFFICE (FIFO) FLIGHT CREWS
C. E. Melton, J. M. McKenzie, S. M. Wicks, and J. T. Saldivar Apr. 1981 51 p refs
(AD-A106791; FAA-AM-81-13) Avail: NTIS HC A04/MF A01 CSCL 06/19

Studies related to FIFO aircrew stress and fatigue were carried out at seven FIFO's in the Continental U.S. Forty-one men served as subjects and all crew positions were presented. Each crewmember was studied during flight activities and during office based activities. Generally, crews were in travel status during flight inspection activities and away from the office for 5 d. Crewmembers completed fatigue checklists before and after each duty on every workday. Urine specimens were collected that represented the night sleep period and the work period; they were analyzed for 17 ketogenic steroids, epinephrine, and norepinephrine, and values were expressed as weight per hundred milligrams of urinary creatinine. Ambulatory electrocardiograms were recorded for determination of heart rate (HR) during work. The data indicate that office work is distinctly less fatiguing than flight work. This finding is supported by the HR data that indicate a lower workload in the office than in flight. The statement is commonly made by crewmembers that office work is more fatiguing than flight work. It is probable that such statements are based on work preference rather than work level. Some crewmembers at Oklahoma City, Atlanta, Los Angeles, and Battle Creek show severe fatigue associated with flight work. GRA

N82-16734# Desmatics, Inc., State College, Pa.
ACCELERATION MEASURES AND MOTION SICKNESS INCIDENCE
Carl A. Mauro and Dennis E. Smith Nov. 1981 24 p refs Presented at the Intern. Workshop on Res. Methods in Human Motion and Vibration Studies, New Orleans 16-18 Sep. 1981
(Contract N00014-79-C-0128; NR Proj. 207-037)
(AD-A107996; TR-112-10) Avail: NTIS HC A02/MF A01 CSCL 06/19

An important aspect of motion sickness research is to establish quantitative relationships between sickness incidence and various parameters of the motions that induce sickness. At present, however, only wholebody vertical sinusoidal motion has been studied to any reasonable degree. The purpose of this report is to examine the predictive utility of six different characterizations of sinusoidal motion and to investigate their possible extension to dual frequency motion. Author (GRA)

N82-16735# Oak Ridge National Lab., Tenn. Chemical Effects Information Center.
CHEMICALS IDENTIFIED IN HUMAN BIOLOGICAL MEDIA
M. Virginia Cone and Cindy Stroup (EPA) 1981 6 p refs Presented at 2nd EPA/NCI Ann. Collaborative Workshop Environ. and Occupational Cancer Studies, Rockville, Md., 9-11 Sep. 1981
(Contract W-7405-eng-26)
(DE81-030813; CONF-810959-1) Avail: NTIS HC A02/MF A01

Sources of data are from the world literature, retrospective to 1974. Information from approximately 1500 documents is in the data base at the present time. The data base contains information on 750 chemicals. Approximately 10% of the total documents in the file concerned pesticides; 30% drugs; and 40% metals. The remaining 20% were about other substances, including industrial chemicals and organics which are of interest to NCI and EPA. T.M.

N82-16736# Michigan Univ., Ann Arbor. Highway Safety Research Inst.
REVIEW OF LITERATURE AND REGULATION RELATING TO THORACIC IMPACT TOLERANCE AND INJURY CRITERIA Final Report, Jul. 1980 - Jun. 1981

Robert L. Hess, Kathleen Weber, and John W. Melvin Jul. 1981 281 p refs Sponsored in part by Motor Vehicle Manufacturers Association
(PB82-108697; UM-HSRI-81-38) Avail: NTIS HC A13/MF A01 CSCL 06S

The technical and scientific literature dealing with thoracic injury to or within the rib cage, from blunt loading is reviewed. The history of the development of associated Federal Motor Vehicle Safety Standards is reviewed from the aspect of its relationship to the history of development of the research information. Field case data from car-to-car and car-to-tree/pole crashes has been examined and summarized. This study suggests that the laboratory research has not adequately covered the principal variables found to exist in actual injury cases. Specifically more research attention should be given to the shape of the impactor, to the loading location and directory, and to injuries in the contusion and/or laceration family. Correspondingly, the accident investigation process needs to be more sensitive to occupant/vehicle interior interaction variables so that laboratory research can be properly guided. GRA

N82-16737# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

HUMAN REACTIONS TO ELF ELECTRIC AND MAGNETIC FIELDS: AN ANNOTATED BIBLIOGRAPHY OF CURRENT LITERATURE

J. Patrick Reilly Jul. 1981 42 p
(PB82-102567; PPSP/JHU/PPSE-T-20) Avail: NTIS HC A03/MF A01 CSCL 06P

This annotated bibliography lists current literature (since 1960) which applies to human reactions to electric and magnetic fields from 10 Hz to 100 Hz, with an emphasis on power frequency fields. This includes direct experimental work with humans, epidemiological studies, work which uses animal studies to draw interferences about human reactions, studies concerning human dosimetry, and works which discuss means for human protection. GRA

N82-16738# Centro Informazioni Studi Esperienze, Milan (Italy).

IN VIVO RECORDING OF BLOOD VELOCITY PROFILES AND STUDIES IN VITRO OF PROFILE ALTERATIONS INDUCED BY KNOWN STENOSES

M. Bassini, E. Gatti (Politecnico di Milano), T. Longo (Milan Univ.), G. M. Martinis, P. Pignoli (Milan Univ.), and P. L. Pizzolati 1980 36 p refs Presented at the 4th Intern. Conf. of the Cardiovascular System Dyn. Soc. Peripheral Vascular Hemodyn.: Basic and Clinical Aspects, Miami, Fla., 12-15 Nov. 1980
(PB81-244139; CISE-1655) Avail: NTIS HC A03/MF A01 CSCL 06B

Measurements were obtained with a pulsed ultrasonic instrument based on the analysis of the cross-correlation function of blood diffused echoes. The alterations and velocity in the time domain were studied in vitro as function of the distance between stenosis and measuring point, and position of the sample volume along the diameter. These studies may be useful for a better comprehension of blood velocity measurements made with ultrasound equipments for clinical non-invasive diagnostic purposes. T.M.

N82-16705# Joint Publications Research Service, Arlington, Va.

QUESTION OF REDISTRIBUTION OF BLOOD IN ORTHOSTATIC POSITION

G. S. Belkaniya *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 1-9 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 4-9 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16706# Joint Publications Research Service, Arlington, Va.

WAYS AND MEANS OF MAINTAINING HEAT BALANCE IN PILOTS AND COSMONAUTS

A. S. Barer *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 10-18 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 9-15 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16707# Joint Publications Research Service, Arlington, Va.

SYSTEMIC AND CEREBRAL HEMODYNAMICS IN FLIGHT PERSONNEL EXPOSED TO MODERATE HYPOXIA

V. N. Denisov, S. F. Rayev, and I. I. Antufyev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 19-23 Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 16-19 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16708# Joint Publications Research Service, Arlington, Va.

CAUSES OF FATIGUE AMONG CREWS OF CIVIL AVIATION HELICOPTERS

Yu. N. Kamenskiy *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 24-27 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 19-22 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16710# Joint Publications Research Service, Arlington, Va.

EVALUATION OF MAN'S ENDURANCE OF LOCAL PRESSURE TO THE HEAD AND OBJECTIVE ASSESSMENT OF HYGIENIC SPECIFICATIONS FOR PROTECTIVE HELMETS

V. M. Sinigin, Yu. G. Konakhevich, L. N. Sholpo, and A. I. Uglanov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 33-37 Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 25-28 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16711# Joint Publications Research Service, Arlington, Va.

EFFECT OF TRANSMERIDIONAL FLIGHTS ON BIORHYTHM OF ZONE FORMATION BY STREPTOMYCES LEVORIS

A. P. Savelyev, A. Kh. Akhmadiyeva, and I. G. Akoyev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 38-41 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 28-31 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16715# Joint Publications Research Service, Arlington, Va.

CYTOKINETIC EVALUATION OF ERYTHROPOIESIS DURING LONG-TERM ORBITAL FLIGHTS

A. V. Ilyukhin and T. Ye. Vurkovskaya *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 60-64 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 42-46 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16721# Joint Publications Research Service, Arlington, Va.

PHENOMENA OF FLUCTUATION OF HUMAN REACTION TO ANTIORTHOSTATIC POSITION

L. Lkhagva *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 91-94 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 63-65 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16722# Joint Publications Research Service, Arlington, Va.

RESULTS OF STUDY OF HEMODYNAMICS AND PHASE STRUCTURE OF THE CARDIAC CYCLE DURING FUNC-

TIONAL TEST WITH LOWER BODY NEGATIVE PRESSURE DURING 140-DAY SALYUT-6 STATION FLIGHT
A. D. Yegorov, O. G. Itsekhovskiy, I. I. Kasyan, A. P. Polyakova, V. F. Turchaninova, I. V. Alferova, V. G. Savelyeva, M. V. Domracheva, V. G. Doroshev, Ye. A. Kobzev et al *In its* USSR Rept.: Space Biol. and Aerospace Med. Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 95-100 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 3, Nov. - Dec. 1981 p 65-69 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16726# Joint Publications Research Service, Arlington, Va.
CLINICAL DISTINCTIONS OF RADIATION SICKNESS WITH EXPOSURE OF DIFFERENT PARTS OF THE HUMAN BODY TO RADIATION
G. F. Nevskaya, G. M. Abramova, M. A. Volkova, Ye. V. Kavlycheva, A. S. Skorik, and V. V. Yurogov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 113-118 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 77-80 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16727# Joint Publications Research Service, Arlington, Va.
METHOD OF RECORDING ROTATORY EYE REFLEXES
M. M. Levashov and A. V. Dmitriyev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 119-122 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec 1981 p 80-82 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16728# Joint Publications Research Service, Arlington, Va.
ELECTRODE UNIT FOR TESTING HUMAN H REFLEX
V. I. Zborovskaya and E. A. Skiba *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 123-124 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 82-83 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16729# Joint Publications Research Service, Arlington, Va.
COMPARATIVE ANTIHYPOXIC EFFICACY OF PRESSURE CHAMBER CONDITIONING AND FASTING OF MAN
A. Yu. Katkov, Ye. A. Kovalenko, R. N. Chabdarova, G. A. Davydov, S. A. Vtoryy, and N. M. Utkina *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 125-128 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 84-86 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16730# Joint Publications Research Service, Arlington, Va.
CONDITION OF MENINGEAL NERVOUS SYSTEM DURING REPEATED EXPOSURE TO TRANSVERSE ACCELERATIONS
G. A. Konstantinovskiy *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec 1981 (JPRS-79849) 12 Jan. 1982 p 129-132 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 86-88 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-16739# Rice Univ., Houston, Tex. Dept. of Psychology.
CHOOSING AMONG ALTERNATIVES WITH UNCERTAIN OUTCOMES: EFFECT OF PRIOR CURING AND ESTIMATION REQUIREMENTS
Shanta P. Kerkar and William C. Howell Aug. 1981 45 p refs
(Contract N00014-78-C-0555; NR Proj. 197-050)
(AD-A106143; TR-81-2) Avail: NTIS HC A03/MF A01 CSCL 05/1

Previous investigations by the authors have shown that judgments of frequency or probability have a facilitatory influence on subsequent predictive choice performance. The present study examined both these judgement processes more closely in an attempt to understand how they affect choices. Five groups of subjects served as emergency vehicle dispatchers for a hypothetical city. The experimental design involved a 2 x 2 factorial combination of response set and estimation task. More specifically, response set, defined as expectation of a frequency or probability response requirement, was crossed with actual response requirement, either frequency or probability estimation, in a between-groups design.
Author (GRA)

N82-16740# RAND Corp., Santa Monica, Calif.
AN ANALYSIS OF COGNITIVE MAPPING SKILL Interim Report
Perry W. Thorndyke and Sarah E. Goldin Mar. 1981 66 p refs
(Contract MDA903-79-C-0549)
(AD-A106145; RAND/N-1664-ARMY) Avail: NTIS HC A04/MF A01 CSCL 08/2

Compares the performance of good and poor cognitive mappers on a variety of spatial knowledge acquisition and judgment tasks. Cognitive mapping skill was assessed by measuring subjects' knowledge of a highly overlearned environment, their home community. Subjects categorized as good or poor cognitive mappers participated in a series of experiments that examined learning a novel environment from navigation experience, map learning, map using and map interpretation, spatial judgments based on a memorized map, and navigation in a novel environment based on a memorized map. Good mappers performed more accurately than poor mappers in learning a novel environment, learning maps, and making spatial judgments based on a memorized map. Map using, map interpretation, and navigation tasks did not distinguish good from poor mappers. We conclude that, relative to poor mappers, good cognitive mappers are better able to encode and retain spatial information in memory and to mentally transform or manipulate spatial information in order to make spatial judgements, and we hypothesize that differences in spatial visualization and visual memory abilities may underlie these variations in task performance.
Author (GRA)

N82-16741# RAND Corp., Santa Monica, Calif.
ABILITY DIFFERENCES AND COGNITIVE MAPPING SKILL Interim Report
Perry W. Thorndyke and Sarah E. Goldin Mar. 1981 66 p refs
(Contract MDA903-79-C-0549)
(AD-A106389; RAND/N-1667-Army) Avail: NTIS HC A04/MF A01 CSCL 08/2

Compares good and poor cognitive mappers on a number of individual difference variables potentially related to cognitive mapping skill: spatial abilities, visual/verbal processing style, motivation, and experience. Good and poor mapper groups were given several assessment tests for each of these categories. Comparisons of good and poor mappers' performance on these tests indicated that only spatial abilities reliably distinguished good mappers from poor mappers. Good cognitive mappers showed greater visualization ability, spatial orientation ability, visual memory, and field independence. Other measures showed no between-group differences. It is concluded that spatial ability is a major determinant of cognitive mapping skill and that spatial ability tests can be used to select personnel for tasks requiring navigation, orientation, and spatial judgment skills. Author (GRA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-16742*# Minnesota Univ., St. Paul. Dept. of Food Science and Nutrition.
STORAGE STABILITY AND IMPROVEMENT OF INTERMEDIATE MOISTURE FOODS, PHASE 5 Final Report, 1 Oct. 1976 - 28 Feb. 1978
Theodore P. Labuza 28 Feb. 1978 399 p refs
(Contract NAS9-12560)
(NASA-CR-167503) Avail: NTIS HC A17/MF A01 CSCL 06H

A method for measuring water binding (a sub w) in gels which was developed and applied to various macromolecular geling agents in order to elucidate their mechanism of water binding was confirmed with concurrent studies using NMR, X-ray diffraction and dye diffusion. The vapor pressure manometric method for a sub w was further refined to give a sub w to + or - 0.0001 units, and a new fiber cup procedure was tested against it. The effectiveness of low a sub w on inhibiting potential toxin production by S. aureus was demonstrated. In addition, ethanol, was shown to be an effective antimicrobial agent at low concentration in lowered a sub w systems. The results of a study of vitamin C loss during processing at high temperature (60-150C) show a change to zero order kinetics due to poor oxygen solubility. Steady state temperature data can be used to predict losses during unsteady state processing. Non-enzymatic browning can be reduced at higher process temperature if residence time decreases. A shelf stable IMF processed cheese food was developed and shown to be acceptable in storage. A.R.H.

N82-16743*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A HYDRODYNAMIC MODEL OF AN OUTER HAIR CELL
Bo O. Jacobson 1982 14 p refs To be presented at the 19th Ann. Northeast Bioengr. Conf., Hanover, New Hampshire, 15-16 Mar. 1982; sponsored by the Thayer School of Engineering Dartmouth Med. School, IEEE, ASME, and the American Society for Engineering Education
(NASA-TM-82773; E-1098) Avail: NTIS HC A02/MF A01 CSCL 06P

On the model it is possible to measure the force and the force direction for each individual hair as a function of the flow direction and velocity. Measurements were made at the man flow velocity .01 m/s, which is equivalent to a flow velocity in the real ear of about 1 micrometer/s. The kinematic viscosity of the liquid used in the model was 10,000 times higher than the viscosity of perilymph to attain hydrodynamic equality. Two different geometries for the sterocilia pattern were tested. First the force distribution for a W-shaped sterocilia pattern was recorded. This is the sterocilia pattern found in all real ears. It is found that the forces acting on the hairs are very regular and perpendicular to the legs of the W when the flow is directed from the outside of the W. When the flow is reversed, the forces are not reversed, but are much more irregular. This can eventually explain the half wave rectification of the nerve signals. As a second experiment, the force distribution for a V-shaped sterocilia pattern was recorded. Here the forces were irregular both when the flow was directed into the V and when it was directed against the edge of the V. T.M.

N82-16744# Lincoln Lab., Mass. Inst. of Tech., Lexington.
THE EFFECTS OF MICROPHONES AND FACEMASKS ON LPC VOCODER PERFORMANCE
Elliot Singer 25 Sep. 1981 26 p refs
(Contract F19628-80-C-0002; AF Proj. 2283)
(AD-A107908; TR-584; ESD-TR-81-277) Avail: NTIS HC A03/MF A01 CSCL 05/8

The effects of oxygen facemasks and noise cancelling microphones on LPC vocoder performance were analyzed and evaluated. Likely sources of potential vocoder performance degradation included the non-ideal frequency response characteristics of the microphone, the acoustic alterations of the speech waveform due to the addition of the facemask cavity, and the presence of breath noise imposed by the close-talking requirement. It is shown that the presence of the facemask produces a vowel-dependent reduction in the bandwidths of the upper speech formants. In addition, the low frequency emphasis normally associated with small enclosures is shown to occur when a pressure microphone is employed for transduction. Noise cancelling microphones, which are sensitive to the pressure gradient, do not exhibit this effect. Finally, an acoustic tube model of the vocal tract and facemask is presented which predicts the absence of spurious resonances within the frequency band of typical narrowband vocoders. Evidence supporting these assertions is presented based on observed vowel spectra. Evaluations performed using Diagnostic Rhyme Tests indicate that the presence of the oxygen facemask and noise cancelling microphone does not result in a significant increase in the LPC vocoder processing loss. Author (GRA)

N82-16745# Bunker-Ramo Corp., Westlake Village, Calif. Electronics Systems Div.
PILOT WORKLOAD: A SURVEY OF OPERATIONAL PROBLEMS Final Technical Report, Apr. 1979 - Sep. 1980
Larry Butterbaugh, Debra Warner, Peter Lovering, and Sam Herron Wright-Patterson AFB AFWAL Aug. 1981 186 p refs
(Contract F33615-78-C-3614; AF Proj. 2403)
(AD-A107758; AFWAL-TR-81-3011) Avail: NTIS HC 09/MF A01 CSCL 01/3

Five hundred and seventy three USAF pilots responded to a survey which had as its objective the identification of operational, crew station design related causes of high pilot workloads. The survey consisted of mailed survey forms and personal interviews structured to conform with the critical incident technique of collecting user-provided data. The survey canvassed over 50 USAF organizations in collecting data for more than 30 currently flown USAF aircraft types. The role control/display design, crew station design, and equipment malfunctions play in contributing to cockpit workload is unique to each aircraft. Other factors, such as weather, flight schedules, and mission phase appear to contribute to cockpit workloads in most all the aircraft surveyed. Further, the reported situations, or critical incidents, indicate that high workloads result from the simultaneous occurrence or existence of several causes. For example, a high workload situation reported for the FB-111 consisted of an equipment failure while flying the low level penetration portion of a mission at night. All data collected has been catalogued for the establishment of an information base, and available for future use in conjunction with aircraft development programs or modernization/retrofit programs. Author (GRA)

N82-16709# Joint Publications Research Service, Arlington, Va.
PHYSIOLOGICAL AND HYGIENIC EVALUATION OF VIBRATION IN THE COCKPIT OF A CARGO HELICOPTER
Yu. G. Matveyev and Yu. N. Kamenskiy *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 28-32 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 22-25 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16712# Joint Publications Research Service, Arlington, Va.
SIMULATION OF SOME OF MAN'S MOVEMENTS IN DIFFERENT GRAVITY FIELDS
A. V. Zinkovskiy, I. A. Trofimova, and V. A. Chistyakov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 42-45 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 31-33 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16717# Joint Publications Research Service, Arlington, Va.

HYGIENIC PRINCIPLES OF ONGOING MONITORING OF QUALITY OF RECYCLED WATER DURING SPACE FLIGHTS

V. M. Skuratov, V. B. Gaydadymov, and S. V. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 69-72 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 181 p 48-51 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16718# Joint Publications Research Service, Arlington, Va.

TOXICOLOGICAL AND HYGIENIC ASPECTS OF IMPROVING ADDITIONAL PURIFICATION OF WATER RECLAIMED FROM URINE

Z. P. Pak, G. V. Lobacheva, M. M. Spiryayeva, Yu. Ye. Bezumova, T. P. Korotkova, V. P. Petina, and Ye. S. Yevdokimova *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 73-78 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 51-54 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16719# Joint Publications Research Service, Arlington, Va.

POSSIBLE USE OF HOUSE FLY LARVAE FOR UTILIZATION OF ORGANIC WASTE IN BIOLOGICAL LIFE-SUPPORT SYSTEMS

Ye. G. Golubeva and T. V. Yerofeyeva *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, v. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 p 79-83 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 54-57 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

N82-16720# Joint Publications Research Service, Arlington, Va.

DISTINCTIONS OF REGENERATION OF CONFINED ATMOSPHERE BY MEANS OF PHOTOSYNTHESIS OF UNICELLULAR ALGAE

G. I. Meleshko, L. M. Krasotchenko, and Ye. K. Lebedeva *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) 12 Jan. 1982 84-90 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 58-62 (For primary document see N82-16704 07-51)
Avail: NTIS HC A08/MF A01

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N82-16746*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif. Aeromechanics Lab.

PRODUCTS OF MULTIPLE FOURIER SERIES WITH APPLICATION TO THE MULTIBLADE TRANSFORMATION

Donald L. Kunz Dec. 1981 20 p refs Prepared in cooperation with Army Aviation Research and Development Command, St. Louis
(NASA-TM-81340; A-8796; USAAVRADCOM-TR-81-A-28)
Avail: NTIS HC A02/MF A01 CSCL 12A

A relatively simple and systematic method for forming the products of multiple Fourier series using tensor like operations is demonstrated. This symbolic multiplication can be performed for any arbitrary number of series, and the coefficients of a set of linear differential equations with periodic coefficients from a rotating coordinate system to a nonrotating system is also demonstrated. It is shown that using Fourier operations to perform this transformation make it easily understood, simple to apply, and generally applicable. S.L.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering.*

N82-16747* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MEMORY-BASED FRAME SYNCHRONIZER Patent

Raymond J. Stattel and James K. Niswander, inventors (to NASA) Issued 3 Nov. 1981 11 p Filed 12 Mar. 1980 Supersedes N80-20453 (18 - 11, p 1405)
(NASA-Case-GSC-12430-1; US-Patent-4,298,987; US-Patent-Appl-SN-129779; US-Patent-CLass-375-106; US-Patent-Class-375-114; US-Patent-Class-375-116; US-Patent-Class-370-100) Avail: US Patent and Trademark Office CSCL 09B

A frame synchronizer for use in digital communications systems wherein data formats can be easily and dynamically changed is described. The use of memory array elements provide increased flexibility in format selection and sync word selection in addition to real time reconfiguration ability. The frame synchronizer comprises a serial-to-parallel converter which converts a serial input data stream to a constantly changing parallel data output. This parallel data output is supplied to programmable sync word recognizers each consisting of a multiplexer and a random access memory (RAM). The multiplexer is connected to both the parallel data output and an address bus which may be connected to a microprocessor or computer for purposes of programming the sync word recognizer. The RAM is used as an associative memory or decorder and is programmed to identify a specific sync word. Additional programmable RAMs are used as counter decoders to define word bit length, frame word length, and paragraph frame length. M.G.

N82-16748*# Virginia Polytechnic Inst. and State Univ., Blacksburg.

MODELING AND ANALYSIS OF POWER PROCESSING SYSTEMS (MAPPS). VOLUME 2: APPENDICES Final Technical Report, Oct. 1977 - Aug. 1980

F. C. Lee, S. Radman, R. A. Carter, C. H. Wu, Yuan Yu (TRW Defense and Space Systems Group, Redondo Beach, Calif.), and R. Chang (TRW Defense and Space Systems Group, Redondo Beach, Calif.) Dec. 1980 210 p refs
(Contract NAS3-21051)
(NASA-CR-165539; TRW-32660-6001-RU-01) Avail: NTIS HC A10/MF A01 CSCL 09B

The computer programs and derivations generated in support of the modeling and design optimization program are presented. Programs for the buck regulator, boost regulator, and buck-boost regulator are described. The computer program for the design optimization calculations is presented. Constraints for the boost and buck-boost converter were derived. Derivations of state-space equations and transfer functions are presented. Computer lists for the converters are presented, and the input parameters justified. J.D.H.

N82-16749# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

SIMULATION OF A DIGITAL MODEM FOR COMMUNICATING AT 4,800 BITS/S
Mario Mammoli and Eduardo Whitaker Bergamini Jul. 1981 21 p refs In PORTUGUESE
(INPE-2178-RPE/391) Avail: NTIS HC A02/MF A01

A modem with phase modulator and coherent detection is modeled. The validation of the model by simulation in a B-6700 computer using FORTRAN programs is described. Data on the performance of both modulator and demodulator are analyzed. J.D.H.

N82-16750# Cornell Univ., Ithaca, N. Y. Dept. of Computer Science.
MERGING ON PARALLEL MODELS OF COMPUTATION
John E. Hopcroft and Allan Borodin (Toronto Univ., Ontario) Oct. 1981 19 p refs
(Contract N00014-76-C-0018)
(AD-A106189; CU-CSD-TR-81-472) Avail: NTIS HC A02/MF A01 CSCL 09/2

A variety of models have been proposed for the study of synchronous parallel computation. We review these models and study further some prototype problems. Within a spectrum of shared memory models, we show that loglog n is asymptotically optimal for n processors to merge two sorted lists containing n elements. Author (GRA)

N82-16751# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
TRANSIENT ERROR RELIABILITY MODELS BASED ON DATA ANALYSIS Interim Report
Stephen R. McConnel and Daniel P. Siewiorek Jun. 1981 66 p refs
(ONR Proj. 048-645)
(AD-A106554; CMU-CS-81-128) Avail: NTIS HC A04/MF A01 CSCL 09/2

Experimental data on transient errors from several digital computer systems is presented and analyzed. This is the first large scale public study on the statistical distribution of transient errors. The systems for which data has been collected are the DEC PDP-10 series computers, the CM (trademark) multiprocessor, and the C.vmp fault tolerant microprocessor. Statistical tests indicate that transient errors follow a decreasing hazard rate distribution. This is at variance with the standard assumption of constant hazard rates (exponential distribution) used in reliability modeling, and requires models of greater complexity for accurate results. Models of common fault tolerant redundant structures are developed using the Weibull distribution, which has a time-varying hazard rate. Both analytical and simulation models are used to analyze the differences between the reliabilities predicted by Weibull based transient error models and those predicted by exponential based models. The analysis indicates a significant difference between the models based on the exponential distribution and those based on the decreasing hazard rate Weibull distribution. Reliability differences ranging from -0.10 to +0.20 and factors greater than 2.0 in Mission Time Improvement for Weibull parameters equivalent to measured system behavior are seen in the model results. System designers should be aware of these differences. Author (GRA)

N82-16752# University of South Florida, Tampa. Dept. of Electrical Engineering.
MICROPROCESSOR DIGITAL FAULT Final Report, 13 Mar. - 12 Sep. 1981
H. A. Nienhaus 16 Sep. 1981 47 p refs
(Grant AF-AFOSR-0173-81; AF Proj. 2305)
(AD-A106707; AFOSR-81-0712TR) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report gives a complete set of fault diagnosis flow diagrams for detecting any fault and isolating any single chip fault in a text generator, which contains a large variety of LS1, MS1, and SS1 ports. The fault diagnosis procedures are designed to minimize test processor diagnostic time and internal test points. Author (GRA)

N82-16753# South Carolina Univ., Columbia. Dept. of Electrical and Computer Engineering.
MULTIPLE MICROCOMPUTER CONTROL ALGORITHM FEASIBILITY BREADBOARD Final Report, Jun. 1978 - Aug. 1981
R. O. Pettus, M. N. Huhns, L. M. Stephens, and M. J. Trask Aug. 1981 94 p
(Contract N61339-79-C-0096)
(AD-A107940; NAVTRAEQUIPC-79-C-0096-1) Avail: NTIS HC A05/MF A01 CSCL 14/2

The architecture of the breadboard is hierarchially structured and functionally modular. The control algorithm is vested in an efficient applications task manager that is a very compact operating system in each microcomputer, and an optional combination of hardware, firmware, and software. The control algorithm was demonstrated in this breadboard as applicable to real-time simulation of process control in which basic computational tasks do not change in time. T.M.

N82-16754# Delta Information Systems, Inc., Jenkintown, Pa.
USE OF A MICROPROCESSOR TO IMPLEMENT AN ADCCP PROTOCOL WITH REJECT AND SELECTIVE REJECT (FEDERAL STANDARD 1003) Final Report
Aug. 1981 79 p refs
(Contract DCA100-80-C-0221)
(AD-A107769; NCS-TIB-81-7) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report discusses the implementation of the reject and selective reject options of ADCCP (Advanced Data Communications Control Procedures) on an M6800 microprocessor. Flow charts and a portion of the code are included. GRA

N82-16755# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
USE OF EMBEDDED MICROCOMPUTERS IN SYSTEM DEBUGGING AND MAINTENANCE
John Meng and Dan Weaver Feb. 1981 6 p refs Presented at IEEE Conf. Appl. of Mini and Microcomputers, San Francisco, 9-12 Nov. 1981
(Contract W-7405-eng-48)
(DE81-029859; LBL-12313; CONF-811115-2) Avail: NTIS HC A02/MF A01

The microcomputers in systems which use embedded microcomputers to perform control functions can often double as flexible debugging and maintenance devices by switching in high level language read-only memory devices. Systems in which such benefits are successfully exploited are described. DOE

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-16756# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A CLASSIC EXAMPLE OF PRODUCER/CONSUMER IMPLEMENTED IN LANAC LANGUAGE
Francisco E. C. Viola and Sergio D. Fischer Jul. 1981 16 p refs In PORTUGUESE; ENGLISH summary Presented at the 33d Reuniao Anual da SBPC, Salvador, 8-15 Jul. 1981
(INPE-2185-RPE/396) Avail: NTIS HC A02/MF A01

The implementation written in LANAC programming language of the classic example of synchronization of parallel processes, the PRODUCER/CONSUMER system, consisting of two concurrent processes which communicate through a shared buffer, is described. The main results obtained in the programming of two versions are also presented. In both implementations, the usefulness of LANAC language is demonstrated. J.M.S.

N82-16757# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A TRANSLATOR FOR THE HIGH LEVEL LANGUAGE SEQUEL 2/QUERY STATEMENT [UM TRADUTOR PARA A LINGUAGEM DE CONSULTA SEQUEL 2/QUERY STATEMENT]
Olga Marie deOliviera, Paulo Cesar Pereira Guerra, Jose Oscar Machado Alexandre, Antonio Luz Furtado, and Flavio Roberto Dias Velasco Jul. 1981 19 p refs In PORTUGUESE; ENGLISH

summary Presented at the 33rd Reuniao Anual da SBPC, 8-15 Jul., 1981, Salvador, Brazil
(INPE-2184-RPE/395) Avail: NTIS HC A02/MF A01

The development and construction of a data interface for a Burroughs B6800 relational data base system, called Sistema Relacional, which has the purpose of simplifying data access are described. The system is supported by the Burroughs DMS-II package, a network oriented system. Information retrieval is accomplished with the high level Sequel 2/Query language. M.G.

N82-16758# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A HIGH LEVEL LANGUAGE FOR DATA ACQUISITION AND PROCESS CONTROL [LANAC - UMA LINGUAGEM DE ALTO NIVEL PARA AQUISICAO DE DADOS E CONTROLE DE PROCESSOS]
Francisco Edwardo deCarvalhoviola, Sergio Donizetti Fischer, and Celso deRennae Souza Jul. 1981 12 p refs In PORTUGUESE; ENGLISH summary Presented at the 1st Congr. da Soc. Braseleira de Computacao (VIII SEMISH) Florianopolis, Brazil, 27-31 Jul. 1981
(INPE-2173-RPE/389) Avail: NTIS HC A02/MF A01

An ALGOL like language, LANAC, with statements in Portuguese, without recursion, is described. It was developed at INPE/CNPq for minicomputers applied in real time systems; so it has available SEMAPORES for concurrent process synchronization. The LANAC compiler was written in B6800 EXTENDED ALGOL, producing assemly code, in its first version, for the Hewlett-Packard 2116B minicomputer. The usefulness of the LANAC language for real time systems programming was verified. Code generators for other minicomputers are implemented and more powerful data and control structures are introduced into the language. S.L.

N82-16759# Radio Technical Commission for Aeronautics, Washington, D. C.
SOFTWARE CONSIDERATIONS IN AIRBORNE SYSTEMS AND EQUIPMENT CERTIFICATION
18 Nov. 1981 67 p refs
(RTCA/DO-178) Avail: NTIS HC A04/MF A01 CSCL 09B

A disciplined approach to avionics software design, development, testing, configuration management, and documentation is presented. Guidance is provided for different levels of criticality of the functions for which the software is designed. The need for software modification by manufacturers and users is considered, together with its impact on pre- and post-certification configuration management and documents. Methods alternative to the techniques recommended here may be used if equivalence is shown. A glossary of terms is provided. J.D.H.

N82-16760*# Science Applications, Inc., Huntsville, Ala.
REEDS COMPUTER CODE Final Report
Charles Bjork 23 Dec. 1981 219 p
(Contract NAS8-31806)
(NASA-CR-161956, SAI-82-738-HU) Avail: NTIS HC A10/MF A01 CSCL 09B

The REEDS (rocket exhaust effluent diffusion single layer) computer code is used for the estimation of certain rocket exhaust effluent concentrations and dosages and their distributions near the Earth's surface following a rocket launch event. Output from REEDS is used in producing near real time air quality and environmental assessments of the effects of certain potentially harmful effluents, namely HCl, Al2O3, CO, and NO. S.L.

N82-16761# Rose-Hulman Inst. of Tech., Terre Haute, Ind.
DOCUMENTATION FOR PROGRAM SIMICE Final Report
Warren W. Bowden 23 Mar. 1981 44 p refs
(Grant AF-AFOSR-0180-80; AF Proj. 2308)
(AD-A106777; AFOSR-81-0616TR) Avail: NTIS HC A03/MF A01 CSCL 14/2

A computer code (SIMICE) has been developed to assist in establishing correct test conditions and in extrapolating icing test data to full scale. The code calculates the conditions under which a model should be tested to maintain similitude between it and a prototype. In particular the matched quantities are the collection efficiency, heat transfer flux, and the flux of liquid water approaching the body under test. The SIMICE code structure and operation are described and a listing of the code provided. Author (GRA)

N82-16762# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
ANAPHORA FOR LIMITED DOMAIN SYSTEMS
Philip J. Hayes 30 Jul. 1981 17 p refs Submitted for publication
(Contract F33615-78-C-1551; ARPA Order 3597)
(AD-A106559; CMU-CS-81-136) Avail: NTIS HC A02/MF A01 CSCL 05/8

This paper presents a simple mechanism for the resolution of anaphora in limited domain natural language systems. This mechanism provides functionality equivalent to the natural communication mechanism of anaphora as used and understood by people, but without the deep inferencing or cognitive modelling required for full simulation of human performance. The mechanism covers simple pronoun anaphora, and set selection anaphora (e.g., 'last one', 'one before', 'others'). It was developed to provide the most efficient and effective communication between system and user, even if this meant diverging significantly from human performance when this performance was impractical to reproduce. In cases of radical divergence, we were careful to make the behavior of the mechanism very simple and easy to predict. In this way, the user can either rely on his experience of human performance or his knowledge of the artificial, but simple, substitute to predict the behaviour of the system in response to his inputs, and thus construct his inputs to use the mechanism to best advantage. An algorithmic description of an implemented version of the mechanism is presented. A similar approach to other aspects of man-machine interfaces is recommended as a promising way to address the problem of habitability that still plagues all natural language computer interfaces. Author (GRA)

N82-16763# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
OPS5 USER'S MANUAL
Charles L. Forgy Jul. 1981 57 p refs
(Contract F33615-78-C-1551; ARPA Order 3597)
(AD-A106558; CMU-CS-81-135) Avail: NTIS HC A04/MF A01 CSCL 09/2

This is a combination introductory and reference manual for OPS5, a programming language for production systems. OPS5 is used primarily for applications in the areas of artificial intelligence, cognitive psychology, and expert systems. OPS5 interpreters have been implemented in LISP and BLISS. Author (GRA)

N82-16764# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
WRITING EFFICIENT CODE Interim Report
Jon Louis Bentley 27 Apr. 1981 72 p refs
(AD-A106553; CMU-CS-81-116) Copyright. Avail: Issuing Activity CSCL 09/2

The most important step in making a software system efficient is the proper selection of data structures and algorithms; many papers and textbooks have been devoted to these topics. Most discussions, however, neglect another important activity: that of writing machine-independent efficient code. This paper examines a set of techniques for accomplishing that step. We examine those techniques both in an abstract setting and in their application of a real program, where they led to a speedup of a factor of over six. Because these techniques should be employed rarely, an important part of this paper is describing exactly when one should (and should not) use them. Author (GRA)

N82-16765# Stanford Univ., Calif. Dept. of Computer Science.
TOWARD A UNIFIED LOGICAL BASIS FOR PROGRAMMING LANGUAGES
Chih-sung Tang Jun. 1981 22 p refs
(Contract N00014-76-C-0687; Grant AF-AFOSR-0014-81)
(AD-A106772; SU-STAN-CS-81-865) Avail: NTIS HC A02/MF A01 CSCL 09/2

In recent years, more and more computer scientists have been paying attention to temporal logic, since there are many properties of programs that can be described only be bringing the time parameter into consideration. But existing temporal logic languages, such as Lucid, in spite of their mathematical elegance, are still far from practical. I believe that a practical temporal-logic language, once it came into being, would have a wide spectrum of applications. XYZ/E is a temporal-logic language. Like other logic languages, it is a logic system as well as a programming language. But unlike them, it can express all conventional data structures and control structures, nondeterminate or concurrent programs, even programs with branching-time order. We find that the difficulties met in other logic languages often stem from the fact that they try to deal with these structures in a higher level. XYZ/E adopts another approach. We divide the language into two forms: the internal form and the external form. The former is lower level, while the latter is higher. Just as any logic system contains rules of abbreviation, so also in XYZ/E there are rules of abbreviation to transform the internal form into the external form, and vice versa. These two forms can be considered to be different representations of the same thing. We find that this approach can ameliorate many problems of formalization. Not only does XYZ/E have various practical applications, it also has a theoretical impact. GRA

N82-16766# Maryland Univ., College Park. Computer Vision Lab.
THREE-DIMENSIONAL DIGITAL LINE SEGMENTS
Chul E. Kim Aug. 1981 21 p refs
(Grant AF-AFOSR-3271-77; AF Proj. 2304)
(AD-A106813; TR-1087; AFOSR-81-0707TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Digital arcs in 3D digital pictures are defined. The digital image of an arc is also defined. A digital arc is defined to be a digital line segment if it is the digital image of a line segment. It is shown that a digital line segment may be characterized by the chord property holding for its projections onto the coordinate planes. It is also shown that a digital line segment may not be characterized by its own chord property. A linear time algorithm is presented that determines whether or not a digital arc is a digital line segment. Author (GRA)

N82-16767# Control Data Corp., Rockville, Md.
QUSER USER'S GUIDE
Mark D. Buck Sep. 1981 77 p refs
(Contract DE-AC01-80EI-11975)
(DE81-030681; DOE/EIA-11975/T1) Avail: NTIS HC A05/MF A01

The QUSER program functions as the controlling routine of the Midterm Energy Market Model (MEMM). In MEMM, a linear program (LP) is solved iteratively until QUSER determines that all convergence criteria have been met. After each iteration, QUSER is called to calculate new input prices and demands for the next iteration of the LP. The LP solution is considered to be a converged solution when the prices and demands input to the last iteration and the prices and demands from the LP solution differ by less than two percent. QUSER's other main function is to model energy pricing regulations for natural gas and electricity. These policies are based on average prices while the LP solution gives marginal prices. The program uses FORTRAN language. DOE

N82-16768# National Bureau of Standards, Washington, D.C. Center for Manufacturing Engineering.
A TECHNICAL BRIEFING ON THE INITIAL GRAPHICS EXCHANGE SPECIFICATION (IGES) Progress Report, Jan. 1980 - Jun. 1981
J. C. Kelly (Sandia Labs.), Robert Wolf (Xerox Corp.), Philip Kennicott (General Electric), Roger N. Nagel (International Harvester), and Joan Wellington, ed. Jul. 1981 136 p refs
(PB81-238719; NBSIR-81-2297) Avail: NTIS HC A07/MF A01 CSCL 13H

The Initial Graphics Exchange Specification, a communication file structure for data produced on and used by computer-aided design and computer-aided manufacturing systems is described. The structure provides a common basis for the automatic interchange of data between these systems, for the transfer of data to and from external application programs, and archiving. M.G.

N82-16105*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DSN PROGRAMMING SYSTEM
G. A. Madrid *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 19-23 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 09B

N82-16121*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
IMPLICATIONS OF THE PUTNAM SOFTWARE EQUATION ON CONFIDENCE LEVELS FOR PROJECT SUCCESS
R. C. Tausworthe *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 172-185 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 09B

N82-16126*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NEW S-BAND TRANSMITTER AUTOMATION SOFTWARE
W. Stahnke *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 214-218 (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 09B

N82-17049*# North Georgia Coll., Dahlonega. Dept. of Physics.
DEVELOPMENT OF PHOTOMULTIPLIER ELECTRONICS AND COMPUTER INTERFACING SOFTWARE FOR A HIGH SPEED PHOTOELECTRIC PHOTOMETER-STOKE'S METER
Terry R. Flesch *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 21 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 09B

N82-17069*# Alabama Univ., University. Dept. of Mathematics.
DIGITAL COMPENSATION TECHNIQUES FOR THE EFFECTS OF TIME LAG IN CLOSED-LOOP SIMULATION USING THE 6 DOF MOTION SYSTEM
Richard Brown *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 30 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 09B

62 COMPUTER SYSTEMS

Includes computer networks.

N82-16769# University of Southern California, Los Angeles. Dept. of Computer Science.
THREE PAPERS OF NETWORK PROGRAMS
Per Brinch Hansen Sep. 1981 86 p refs
(Contract N00014-77-C-0714; NR Proj. 048-647)
(AD-A106799) Copyright. Avail: Issuing Activity CSCL 09/2

This report contains three papers on distributed computing entitled: Basic concepts of network programs, Language notation for network programs, and Proof rules for network programs. Together these papers outline a systematic method for the programming of computer networks. Author (GRA)

N82-16770# Los Alamos Scientific Lab., N. Mex. Computing Div.
LONG-RANGE PREDICTION OF NETWORK TRAFFIC
William Alexander and Richard Brice 1981 9 p refs Presented at the Computer Performance Evaluation Users Group Meeting, San Antonio, 16 Nov. 1981
(Contract W-7405-eng-36)
(DE81-030241; LA-UR-81-2587; CONF-811118-1) Avail: NTIS HC A02/MF A01

A method of making long range computer system workload predictions is presented. The method quantifies the effect of qualitative changes in computing by identifying assumptions and by considering the effect of a change on individual users. The method is illustrated by an example involving message traffic in a large computer network. DOE

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N82-16771# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

THE HEURISTIC OF GEORGE POLYA AND ITS RELATION TO ARTIFICIAL INTELLIGENCE

Allen Newell Jul. 1981 56 p refs Presented at Intern. Symp. on the Methods of Heuristic, Bern, 15-18 Sep. 1980 Submitted for publication
(Contract F33615-78-C-1551; ARPA Order 3697)
(AD-A106557; CMU-CS-81-133) Avail: NTIS HC A04/MF A01 CSCL 09/2

Polya's fundamental work in heuristic is well known and well regarded in artificial intelligence. However, no one has built seriously on his work, e.g., by constructing programs that make use of his heuristic. This paper attempts to understand why this might be the case. First, an attempt is made to characterize the nature of Polya's heuristic. Then six theses are put forward that might account for the failure of his work to have a major impact. Three are easily discarded, but three are serious candidates: that the essential heuristic knowledge is not captured in Polya's work; that the emphasis on learning in Polya's heuristic is beyond the current art in artificial intelligence; and that the use of auxiliary problems is beyond the current art. This last thesis is explored in detail in the remainder of the paper. Some interesting concepts emerge, particularly the notion of object-centered problem space and the contrast between tame and wild subproblems. Author (GRA)

N82-16772# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

THE KNOWLEDGE LEVEL

Allen Newell Jul. 1981 51 p refs Presented at Am. Assoc. for Artificial Intelligence, Stanford, Calif. Submitted for publication
(Contract F33615-78-C-1551; ARPA Order 3597)
(AD-A106556; CMU-CS-81-131) Avail: NTIS HC A04/MF A01 CSCL 09/2

This paper focuses on a basic substantive problem: the nature of knowledge and representation. There are ample indications that artificial intelligence is in need of substantial work in this area. The paper proposes a theory of the nature of knowledge, namely, that there is another computer system level immediately above the symbol (or program) level. The nature of computer system levels is reviewed, the new level proposed, and its definition is treated in detail. Knowledge itself is the processing medium at this level and the principle of rationality plays a central role. Some consequences of the existence of the knowledge level and some relations to other fields are discussed. GRA

N82-16773# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

THE K-D-B-TREE: A SEARCH STRUCTURE FOR LARGE MULTIDIMENSIONAL DYNAMIC INDEXES Interim Report

John T. Robinson Feb. 1981 24 p refs
(Contract N00014-76-C-0370; Grant NSF MCS-78-23676)
(AD-A106550; CMU-CS-81-106) Avail: NTIS HC A02/MF A01 CSCL 12/1

The problem of retrieving multikey records via range queries from a large, dynamic index is considered. By 'large' it is meant that most of the index must be stored on secondary memory. By 'dynamic' it is meant that insertions and deletions are intermixed with queries, so that the index cannot be built beforehand. A new data structure, the K-D-B-tree, is presented as a solution to this problem. K-D-B-trees combine properties of K-D-trees and B-trees. It is expected that the multidimensional search efficiency of balanced K-D-trees and the I/O efficiency of B-trees should both be approximated in the K-D-B-tree. Preliminary experimental results that tend to support this are reported. Author (GRA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-16774# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

NON-LINEAR REGRESSION MODELS: A STUDY OF THE PRINCIPAL ESTIMATION METHODS

Luiz Antonio Nogueira Lorena Jul. 1981 20 p refs In PORTUGUESE; ENGLISH summary Presented at the 13th Coloquio de Mat., Pocos de Caldas, 12-24 Jul. 1981
(INPE-2183-RPE/394) Avail: NTIS HC A02/MF A01

A study of the main methods used for parameter estimation in nonlinear regression models is studied. The classical methods of Gauss-Newton, gradient, and Marquardt are presented, with their power and limitations discussed, and suggestions for computer implementation are given. The approach that uses the solution of the normal equations, where the coefficient matrix appear in the 'correlation' matrix form, is presented, using the Cholesky decomposition. Modern implementations, using orthogonal decompositions, are referenced as alternative to the use of normal equations. Finally, alternative methods to the linearization are presented, as well as study of the conditioning problem for the normal equations. S.L.

N82-16775# Yale Univ., New Haven, Conn. Dept. of Computer Science.

SPARSE MATRICES Final Report, 1 Jan. 1977 - 31 Dec. 1980

Martin H. Schultz Aug. 1981 8 p refs
(Contract F49620-77-C-0037; AF Proj. 2304)
(AD-A105187; AFOSR-81-0656TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The investigators associated with this contract produced 17 documents on the broad area of sparse matrices. They recorded research on algorithmic and software development of direct sparse linear equation solvers. Also, the examination of problems involving sparse matrices that arise in the numerical solution of partial differential equations is included. The development of the Yale Sparse Matrix Package, a computer software package to efficiently solve directly large sparse systems, is indeed one of the highlights of this research. It has been independently tested and found exceptional in solving symmetric problems. Author (GRA)

N82-16776# Texas Univ. at Arlington. Center for Cybernetic Studies.

NONPOLYNOMIAL AND INVERSE INTERPOLATION FOR LINE SEARCH: SYNTHESIS AND CONVERGENCE RATES

J. Barzilai and A. Ben-Tal (Technion - Israel Inst. of Technology) Jul. 1981 37 p refs
(Contracts N00014-75-C-0569; N00014-80-C-0242)
(AD-A106680; CCS-RR-409) Avail: NTIS HC A03/MF A01 CSCL 12/1

The rate of convergence of line search algorithms based on general interpolating functions is derived, and is shown to be independent of the particular interpolating function used. This result holds for the root finding problem $f(x) = 0$ as well. We show how inverse interpolation can be used in conjunction with the line search problem, and derive its rate of convergence. Our analysis suggests that one-point line search algorithms (in particular Newton's method) are inefficient in a sense. Two-point algorithms using rational interpolating functions are recommended. Author (GRA)

N82-16777# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

THE H-FUNCTION AND PROBABILITY DENSITY FUNCTIONS OF CERTAIN ALGEBRAIC COMBINATIONS OF INDEPENDENT RANDOM VARIABLES WITH H-FUNCTION PROBABILITY DISTRIBUTION Ph.D. Thesis

Ivy Dewey Cook, Jr. May 1981 243 p refs
(AD-A106768; AFIT-CI-81-47D) Avail: NTIS HC A11/MF A01 CSCL 12/1

A practical technique is presented for determining the exact probability density function and cumulative distribution function of a sum of any number of terms involving any combination of products, quotients, and powers of independent random variables with H-function distributions. The H-function is the most general named function, encompassing as special cases most of the other special functions of mathematics and many of the classical statistical distributions. Its unique properties make it a powerful tool for statistical analysis. In particular, the product, quotient, and powers of independent H-function variates are also H-function variates, and the Laplace and Fourier transforms and the derivatives of an H-function are readily-determined H-functions. This dissertation provides background material, including history on H-functions and the algebra of random variables and definition, properties and special cases of the H-function. For determining whether convergence of a general Mellin-Barnes integral or an H-function occurs with left-half-plane versus right-half-plane summation of residues, evaluation guidelines are formally established and applied to the known special cases, the Laplace transform, and the derivatives of the H-function. Then, a new, improved formulation for evaluation of an H-function by summing residues is derived. GRA

N82-16778# California Univ., Riverside. Dept. of Mathematics.

DOMINATION PROBLEM FOR VECTOR MEASURES AND APPLICATIONS TO NONSTATIONARY PROCESSES

M. M. Rao 23 Sep. 1981 22 p refs
(Contract N00014-79-C-0754)
(AD-A106375; TR-4) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this paper the question of finite p-variation and its representation (via the Radon-Nikodym theory) will not be considered beyond its comparison, even though it is useful in the integral representation of certain linear operations. On the other hand, the problem of finite p-semi-variation has immediate interest for certain stochastic process representations, and that will be treated in a reasonably detailed fashion for a class of vector measures. GRA

N82-16779# Harvard Univ., Cambridge, Mass. Dept. of Statistics.

DENSITY ESTIMATION AND PROJECTION PURSUIT METHODS

Peter J. Huber Sep. 1981 16 p refs
(Contract N00014-79-C-0512; Grant NSF MCS-79-08685)
(AD-A107816; PJH-7) Avail: NTIS HC A02/MF A01 CSCL 12/1

Recently, it has been proposed to use projection pursuit methods for multidimensional density estimation. This report discusses conceptual and technical issues in density estimation and describes several variant approaches to projection pursuit density approximation and estimation. A new measure of fit between multivariate densities is introduced (maximum marginal relative entropy), and some of its properties are derived; it seems to be particularly well adapted to projection pursuit density approximation. GRA

N82-16780# Texas Technological Univ., Lubbock. Dept. of Mathematics.

LIE GROUPS AND LIE ALGEBRAS IN VIDEO TRACKING Final Report, 1 Mar. 1980 - 28 Feb. 1981

Thomas G. Newman 26 Oct. 1981 58 p refs
(Contract DAAG29-80-C-0087)
(AD-A107858; ARO-17219.1-R-EL) Avail: NTIS HC A04/MF A01 CSCL 12/1

When a three-dimensional dynamic scene is projected to a two-dimensional image plane, a complex class of motions are observed, which may be approximated by translation and linear transformation. In this report, we show how such motion may be resolved into principal components and measured from 2 dimensional data. Lie theoretic techniques are used to obtain a motion model, and to incorporate generalized velocity measurements in a closed loop feedback tracker. Stability of numerical calculations is enhanced by a method based on an application of Stoke's Theorem to certain differential 2-forms. Author (GRA)

N82-16781# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Economics.

TESTING FOR GAUSSIANITY AND LINEARITY OF STATIONARY TIME SERIES

Melvin J. Hinich Oct. 1981 12 p refs
(Contract N00014-75-C-9494)
(AD-A017548; TR-23) Avail: NTIS HC A02/MF A01 CSCL 12/1

Stable autoregressive (AR) and autoregressive moving average (ARMA) processes belong to the class of stationary linear time series. A linear time series is Gaussian if the distribution of the independent innovations (sigma (t)) is normal. Assuming that E sigma (t) = 0, some of the third order cumulants sub C XXX (m,n) = Ex(t)X(t+n) will be non-zero if the sigma (t) are not normal and E sigma cube(t)=0. If the relationship between X(t) and sigma (t) is non-linear, then (X(t)) is non-Gaussian even if the sigma (t) are normal. This paper presents a simple estimator of the bispectrum, the Fourier transform of of (sub C XXX (m,n)). This sample bispectrum is used to construct a statistic to test whether the bispectrum of (x(t)) is non-zero. A rejection of the null hypothesis implies a rejection of the hypothesis that (x(t)) is Gaussian. A related test statistic is then presented for testing the hypothesis that (x(t)) is linear. The asymptotic proprties of the sample bispectrum are incoroprated in these test statistics. The tests are consistent as the sample size (N approaches infinity). GRA

N82-16782# Wayne State Univ., Detroit, Mich.

APPLICATIONS OF RANDOM DIFFERENTIAL EQUATIONS TO ENGINEERING SCIENCE. WAVE PROPAGATION IN TURBULENT MEDIA AND RANDOM LINEAR HYPERBOLIC SYSTEMS Final Report, 1 Mar. 1975 - 31 Aug. 1981

Pao-Liu Chow 10 Nov. 1981 7 p refs
(Grants DAHC04-75-G-0091; DAAG29-76-G-0141; DAAG29-78-G-0042)
(AD-A108020; ARO-12360.11-M; ARO-15452.8-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

Research has been conducted in two major problem areas: Applications of Random Differential Equations to Engineering Science. Wave Propagation in Turbulent Media and Random Linear Hyperbolic Systems. These two area are not disjoint. In fact the second problem area is a follow-up study on problems in the first one with emphasis on wave propagation in turbulent media. We have investigated several turbulence-related problems arising from engineering science. They include problems in wave propagation through turbulent media, turbulent transport theory, the surface roughness effect on hydrodynamic lubrication and wave scattering, and stability of elastic structures under random loading or with imperfections. In the theoretical aspect, the research is mainly concerned with the development of new methodology in solving differential equations with random coefficients, examination of the existing closure approximations with regards to their validity and possible improvements. Certain related mathematical questions are also studied. GRA

N82-16783# Naval Ship Research and Development Center, Bethesda, Md. Computation, Mathematics and Logistics Dept.

GENERATION OF ORTHOGONAL BOUNDARY FITTED COORDINATE SYSTEMS Final Report

Henry J. Haussling and Roderick M. Coleman Nov. 1981 37 p refs
(AD-A107851; DTNSRDC-81/079) Avail: NTIS HC A03/MF A01 CSCL 12/1

Various methods for numerically generating orthogonal boundary-fitted coordinate systems are discussed. Simple generating equations are used with coordinate distributions specified on all of the boundaries. Iterative determination of orthogonalizing source terms for Poisson generating system yields better results and is applied successfully to several geometries. GRA

N82-16784# California Univ., Livermore. Lawrence Livermore Lab.

INCOMPLETE BLOCK CYCLIC REDUCTION

Garry Rodrigue and Donald Wolitzer (Wellesley College) 17 Apr. 1981 18 p refs Presented at the 2nd IMACS Intern. Symp. on Parallel Computation, Newark, Del., 9-11 Nov. 1981
(Contract W-7405-eng-48)
(UCRL-85837; CONF-811102-1) Avail: NTIS HC A02/MF A01

An incomplete factorization using odd even shuffles is developed and compared to other methods on the CRAY-1. Multiprocessor considerations for these algorithms are discussed. DOE

N82-16785# Sandia Labs., Albuquerque, N. Mex.
TRANSIENT MAGNETIC-FIELD CALCULATIONS WITH TRIDIF
Marion L. Hodgdon and John R. Freeman 1981 10 p refs Presented at the COMPUMAG Conf., Argonne, Ill., 14 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030843; SAND-81-2001C; CONF-810954-1) Avail: NTIS HC A02/MF A01

TRIDIF is a time dependent diffusion version of the well known PANDIRA-POISSON-TRIM triangular mesh magnet code. Modifications which allow TRIDIF to treat field diffusion in materials with time varying permeabilities are described. A heuristic dipole alignment model which describes major and minor hysteresis loops and frequency dependence was included to provide the requisite permeabilities. Good agreement between the measured and computed magnetic fields was found for a simple test experiment. DOE

N82-17077*# Alabama A & M Univ., Huntsville. Dept. of Mathematics.
AN INVESTIGATION OF THE UNIFORM RANDOM NUMBER GENERATOR
Enoch C. Temple *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 9 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 12A

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-16786# California Univ., Berkeley. Operations Research Center.
STATISTICAL DATA ANALYSIS FOR RELIABILITY TESTS Final Report, 1 Feb. 1980 - 31 Jan. 1981
Richard E. Barlow 31 Jan. 1981 10 p refs
(Grant AF-AFOSR-3179-77)
(AD-A105188; AFOSR-81-0657TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper gives a brief abstract of statistical analysis research ongoing at the Air Force Office of Scientific Research. GRA

N82-16787# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
SYSTOLIC ALGORITHMS FOR RUNNING ORDER STATISTICS IN SIGNAL AND IMAGE PROCESSING
Allan L. Fisher Jul. 1981 18 p refs
(Contracts N00014-76-C-0370; N00014-80-C-0236; F33615-78-C-1551; Grant NSF MCS-78-23676)
(AD-A106555; CMU-CS-81-130) Avail: NTIS HC A02/MF A01 CSCL 12/1

Median smoothing, a filtering technique with wide application in digital signal and image processing, involves replacing each sample in a grid with the median of the samples within some local neighborhood. As implemented on conventional computers, this operation is extremely expensive in both computation and communication resources. This paper defines the running order statistics (ROS) problem, a generalization of median smoothing. It then summarizes some of the issues involved in the design of special purpose devices implemented with very large scale integration (VLSI) technology. Finally, it presents algorithms designed for VLSI implementation which solve the ROS problem and are efficient with respect to hardware resources, computation time, and communication bandwidth. Author (GRA)

N82-16788# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
ARMA SPECTRAL ESTIMATION: AN EFFICIENT CLOSED FORM PROCEDURE Final Report
James A. Cadzow Aug. 1981 13 p refs
(Grant AF-AFOSR-0069-80; AF Proj. 2305)
(AD-A106753; AFOSR-81-0727TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this report, an effective procedure for effecting on ARMA spectral model of a time series is described. This procedure is predicated on minimizing as set of 'basic error' terms as generated from an ARMA model that is hypothesized as characterizing the time series under analysis. The spectral estimation performance achieved in using this approach has been empirically found to be generally superior to that obtained using such contemporary methods as maximum entropy and the periodogram. Author (GRA)

N82-16789# Maryland Univ., College Park. Computer Vision Lab.
TEXTURE CLASSIFICATION WITH CHANGE POINT STATISTICS
Stanley M. Dunn Jul. 1981 19 p refs
(Grant AF-AFOSR-3271-77; AF Proj. 2304)
(AD-A106814; TR-1082; AFOSR-81-0708TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

Although the problem of texture classification has been thoroughly studied, it is still desirable to investigate whether or not we can model the random behavior of the imaging equipment and still achieve a reliable classification scheme. To this end, we introduce a statistical test previously used to determine whether or not a sequence of random variables has a change point. GRA

N82-16790# Naval Postgraduate School, Monterey, Calif.
QUANTILE ESTIMATION IN DEPENDENT SEQUENCES
P. Heidelberger (IBM Research Center, Yorktown Heights, N.Y.) and P. A. W. Lewis Sep. 1981 57 p refs
(RR140501)
(AD-A106132; NPS55-81-015) Avail: NTIS HC A04 A01 CSCL 12/1

Standard nonparametric estimators of quantiles based on order statistics can be used not only when the data are i.i.d., but also when the data are from a stationary, phi-mixing process of continuous random variables. However, when the random variables are highly positively correlated, sample sizes needed for acceptable precision in estimates of extreme quantiles are computationally unmanageable. A practical scheme is given, based on a maximum transformation in a two-way layout of the data, which reduces the sample size sufficiently to allow an experimenter to obtain a point estimate of an extreme quantile. Three schemes are then given which lead to confidence interval estimates for the quantile. One uses a spectral analysis of the reduced sample. The other two, averaged group quantiles and nested group quantiles, are extensions of the method of batched means to quantile estimation. None of the schemes requires that the process being simulated is regenerative. Author (GRA)

N82-16791# George Washington Univ., Washington, D.C. School of Engineering and Applied Science.
THE DESIGN OF MULTIACTIVITY MULTIFACILITY SYSTEMS
Richard M. Soland 15 Jun. 1981 32 p refs
(Contract N00014-75-C-0729; Grant NSF ECS-79-11909; NR Proj. 347-020)
(AD-A107670; SERIAL-T-444) Avail: NTIS HC A03/MF A01 CSCL 12/1

We consider a service/distribution system in which each of N activities is to be carried out at one or several facility locations according to one of a specified set of configurations; each configuration is a specific subset of the set of L facilities being considered, along with a specific strategy for their use. We call such a system a multiactivity multifacility system and present a mathematical formulation for its optimal design that includes capacity restrictions at the facilities and the treatment of multiple criteria. The design problem is simply to choose an appropriate configuration for each of the N activities. We discuss various criteria and we show that the multiactivity multifacility design problem includes many familiar discrete location problems as special cases. We introduce a 0-1 linear optimization model called the team generalized assignment problem (T-GAP) and show that parametric solution of a T-GAP will yield all efficient solutions of the multiactivity multifacility design problem with multiple criteria. Rather than attempting to find all efficient solutions, however, we advocate an interactive approach and describe an interactive branch-and-bound algorithm that solves the design problem as a finite sequence of T-GAPs. We also discuss efficient ways to solve T-GAPs. Author (GRA)

N82-16792# Analytic Sciences Corp., Reading, Mass.
RESEARCH IN MULTIRATE ESTIMATION AND CONTROL OPTIMAL SAMPLE RATE SELECTION Progress Report, 1 May 1980 - 20 Apr. 1981
Douglas P. Glasson and Jeffery Dowd 8 Oct. 1981 68 p refs
(Contract N00014-79-C-0431)
(AD-A108043; TASC-TR-1356-2) Avail: NTIS HC A04/MF A01 CSCL 01/3

A new algorithmic methodology for sample rate selection in multirate digital control design is developed. The methodology is based on optimizing the random disturbance rejection properties of a closed-loop multirate control structure under a computational constraint. The formulation and mathematical development of the multirate control design and sample rate selection procedure are presented; the sample rate selection technique and properties of the resulting controllers are demonstrated through aircraft control examples. GRA

N82-16793# Los Alamos Scientific Lab., N. Mex.
REGIONAL MONTE CARLO SOLUTION OF ELLIPTIC PARTIAL DIFFERENTIAL EQUATIONS
Thomas E. Booth 1981 8 p refs Presented at the ANS Winter Meeting, San Francisco, 29 Nov. 1981
(Contract W-7405-eng-36)
(DE81-028772; LA-UR-81-2138; CONF-811103-19) Avail: NTIS HC A02/MF A01

A continuous random walk procedure for solving some elliptic partial differential equations at a single point is generalized to estimate the solution everywhere. The Monte Carlo method described is exact (except at the boundary) in the sense that the only error is the statistical sampling error that tends to zero as the sample size increases. A method to estimate the error introduced at the boundary is provided so that the boundary error can always be made less than the statistical error. DOE

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-16794# RAND Corp., Santa Monica, Calif.
CONFLICT AMONG TESTING PROCEDURES IN A LINEAR REGRESSION MODEL
Daniel F. Kohler Oct. 1981 16 p refs
(RAND/P-6691) Avail: NTIS HC A02/MF A01

It is shown that for finite but large samples an inequality relation exists between the powers of the likelihood ratio test statistic, the Wald test statistic, and the Lagrange multiplier test statistic. The Wald test is uniformly more powerful than either of the other two tests, and the likelihood ratio test is more powerful than the Lagrange multiplier test for very large samples and for moderate to large differences between the null hypothesis and the true value of the tested parameters. The assumption of a scalar covariance matrix is made to simplify the exposition. The results can probably be generalized to hold for any disturbance vector which allow maximum likelihood estimation. M.G.

N82-16795# RAND Corp., Santa Monica, Calif.
MODELS IN THE POLICY PROCESS: PAST, PRESENT, AND FUTURE
Warren E. Walker Sep. 1981 30 p refs Presented at the Tenth IFIP Conf. on System Modeling and Optimization, New York, 31 Aug. - 4 Sep. 1981
(RAND/P-6654) Avail: NTIS HC A03/MF A01

The utilization and usefulness of computer models in policy making, primarily in the public sector, is reviewed. Increasing involvement of the policy analyst in policy implementation is shown, as is the flexibility and practicality of interlocking small models as opposed to a single large model. Reasons for predicting an increased use of computer modeling in government planning are presented. J.D.H.

N82-16796# North Carolina State Univ., Raleigh. Operations Research.
RANDOM NETWORK GENERATION
Bajis M. Dodin and Zaid M. Naman Jun. 1981 15 p
(Contract DAAG29-79-C-0211; Grant NSF ENG-78-17936)
(AD-A106360; NCSU-OR-179; ARO-16352.11-M) Avail: NTIS HC A02/MF A01 CSCL 12/2

This report is a documentation of the computer program that generates a network with specified numbers of nodes and arcs. It gives the logic of the program, a flowchart representation, and a printout of the program instructions (upon request). Also it gives an example. The program is written in FORTRAN. Author (GRA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

No abstracts in this category.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-16797# Messina Univ. (Italy). Ist. de Struttura della Materia.
MULTIPLE ELECTROMAGNETIC SCATTERING FROM A CLUSTER OF SPHERES. VOLUME 2: SYMMETRIZATION Special Publication, Sep. 1980 - Mar. 1981
O. I. Sindoni (Army Armanent Research and Development Command, Aberdeen Proving Ground, Md.), F. Borghese, P. Denti, and G. Toscano Sep. 1981 19 p refs
(Grant DE-ERO-78-G-106)
(AD-A106658; AD-E410444; ARCSL-SP-81009) Avail: NTIS HC A02/MF A01 CSCL 20/3

Group theory is used to put the system of equations for the expansion of coefficients of the electromagnetic field scattered by a cluster of spheres in factorized form. GRA

N82-16798# Wisconsin Univ., Madison. Dept. of Physics.
[OPTICALLY PUMPED POLARIZED ION SOURCES] Technical Progress Report, 1 Feb. - 30 May 1981
Jul. 1981 27 p refs
(Contract DE-AC02-81ER-40001)
(DE81-026306; DOE/ER-40001/1) Avail: NTIS HC A03/MF A01

Progress on the development of optically pumped polarized ion sources is reported. The production of polarized Li(+) or Na(+) ions is based on the production of Li or Na atoms by an atomic oven, polarization of the Li or Na atoms by optical pumping, ionization on a heated oxidized tungsten surface to form Li(+) or Na(+) ions, and converted to polarized Li(-) or Na(-) ions in a potassium or cesium vapor cell. The conversion of (3)He(+) ions into polarized (3)He(-) ions will be accomplished by the pickup in a low magnetic field of two electrons in two separate collisions in an optically pumped electron spin polarized Na vapor target. Polarized H(-) ions are produced by using an optically pumped electron spin polarized Na vapor target in a large magnetic field to partially convert H(+) ions into electron spin polarized HO atoms. The electron spin polarization is transferred to the proton by a Sona diabatic transition. The fast nuclear polarized HO atoms are then partially converted to polarized H(-) ions in a second unpolarized alkali vapor target. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution.*

N82-16799 Catholic Univ. of America, Washington, D.C.
HIGH FREQUENCY SCATTERING BY A SPHERE WITH COMPLEX SURFACE IMPEDANCE Ph.D. Thesis
Paul David Jackins 1981 184 p
Avail: Univ. Microfilms Order No. 8123263

The scattering of a plane scalar wave by an impedance sphere at high frequencies is treated by a modified Watson transformation. The location of the poles in the complex order plane is determined for spheres whose surface impedence is either large or small. The interpretation of the angular momentum poles in terms of surface waves is demonstrated and shown to be in agreement with Keller's geometrical theory of diffraction. The amplitude and phase velocities of these surface or creeping waves are shown to depend in part upon the surface impedance. Representations are obtained for the primary waves in the nearby lit region and backward half space of the near field. The diffraction effects in the neighborhood of the shadow boundary are investigated and compared with classical diffraction theory. Near field solutions are extended to the far field by using the large argument asymptotic expressions for the Hankel functions. Dissert. Abstr.

N82-16800* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
MULTIPLE PURE TONE ELIMINATION STRUT ASSEMBLY Patent
Frank W. Burcham, inventor (to NASA) Issued 17 Nov. 1981 4 p Filed 11 Sep. 1980 Supersedes N80-32393 (18 - 23, p 3094)
(NASA-Case-FRC-11062-1; US-Patent-4,300,656; US-Patent-Appl-SN-185869; US-Patent-Class-181-214) Avail: US Patent and Trademark Office CSCL 20A

An acoustic noise elimination assembly is disclosed which has a capability for disrupting the continuity of fields of sound pressures forwardly projected from fans or rotors of a type commonly found in the fan or compressor first stage for air-breathing engines, when operating at tip speeds in the supersonic range. The assembly includes a tubular cowl defining a duct for delivering an air stream axially into the intake for a jet engine. A sound barrier, defined by a number of intersecting flat plates or struts has a line of intersection coincident with a longitudinal axis of the tubular cowl, which serves to disrupt the continuity of rotating fields of multiple pure tonal components of noise.
Official Gazette of the U.S. Patent and Trademark Office

N82-16801*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING Annual Progress Report
Carl H. Gerhold Jan. 1982 39 p refs
(Grant NAG1-11)
(NASA-CR-165102; APR-2) Avail: NTIS HC A03/MF A01 CSCL 20A

Progress in the refinement and evaluation of an analytical jet shielding model are summarized. The model consists of a point noise source impinging on a cylinder of heated flow in which the temperature and velocity are uniform across the cross section of the jet. The shielding jet is infinite in extent along the jet axis and the radius of the jet is constant. The analytical model was compared to experimental data for a point noise source impinging on an ambient temperature, subsonic jet and on a subsonic simulated hot jet using helium as the flow medium. Results of these comparisons are discussed. M.D.K.

N82-16802*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING Semiannual Progress Report
Carl H. Gerhold 30 Jun. 1981 26 p refs
(Grant NAG1-11)
(NASA-CR-165103) Avail: NTIS HC A03/MF A01 CSCL 20A

Development of jet noise source model, and comparison to experiments with a point noise source are summarized. The refinement of the noise source is expected to resolve discrepancies noted between previous analytical results with a point noise source model and experimental results for twin-jet shielding. Comparison of the analytical model with experimental program which include shielding of a point noise source by a jet and twin jet shielding are also made. The comparisons should serve to define more completely the mechanisms of shielding M.D.K.

N82-16803*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING Annual Progress Report
Carl H. Gerhold 31 Dec. 1980 38 p refs
(Grant NAG1-11)
(NASA-CR-165104) Avail: NTIS HC A03/MF A01 CSCL 20A

An analytical model a three-dimensional model, of twin-jet shielding, consisting of a point noise source impinging on a cylinder of heated flow in which the temperature and flow velocity are uniform across the cross-section is discussed. Wave equations are given for the regions outside the flow and within the flow cylinder and solutions are matched at the jet boundary under the conditions of continuity of pressure and continuity of the vortex sheet. The model was analyzed to identify mechanisms of transmission and diffraction which control sheilding in the shadow of the shielding jet. It was found that in the zone of the shadow region dominates, shielding is relatively insensitive to variations of such parameters as Mach Number and spacing ratio, but in the zone in which diffraction dominates; shielding is more sensitive to variations in Mach Number, jet temperature and spacing ratio. M.D.K.

N82-16804*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING Semiannual Progress Report
Carl H. Gerhold 6 Jun. 1980 18 p refs
(Grant NAG1-11)
(NASA-CR-165105) Avail: NTIS HC A02/MF A01 CSCL 20A

The development of an analytical model, an aircraft noise prediction computer program, to estimate the shielding of one jet by an adjacent jet in a twin jet configuration, is discussed. Noise estimations included consideration not only of noise sources on the aircraft, but also of the propagation path between source and receiver. A three-dimensional case is considered in which noise source is a discrete frequency point source at rest with respect to the jet axis. The shielding jet is assumed to be a cylinder of heated flow in which the temperature and flow velocity profiles are constant across the jet. The effect on shielding of the orientation of the emitting jet with respect to the shielding jet was investigated. Forward and backward scattering phenomena as well as the influence of jet flow speed were also investigated. M.D.K.

N82-16805*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING DEVELOPMENT OF A 3-DIMENSIONAL MODEL Progress Report
Carl H. Gerhold 4 Nov. 1980 24 p refs Sponsored by NASA
(NASA-CR-165106) Avail: NTIS HC A02/MF A01 CSCL 20A

The solution for a point source impinging on a cylinder of heated flow is presented. The indefinite integral is solved approximately using a saddle of point method. Comparison of the three-dimensional model to a previously obtained two-dimensional model of twin jet noise indicate the the approximate solution of the integral is valid. The model was analyzed to differentiate among the mechanims of shielding. Zone in which diffraction and transmission dominate are identified. The model was found to compare to experimental shielding results. M.D.K.

N82-16806*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING TWO-DIMENSIONAL MODEL
Carl H. Gerhold 15 Aug. 1980 17 p refs
(Grant NAG1-11)
(NASA-CR-165107) Avail: NTIS HC A02/MF A01 CSCL 20A

The development of an analytical model to estimate the shielding of one jet by an adjacent jet in a twin jet configuration is discussed in relation to aircraft generated noise. The azimuthal redistribution of sound defining the shadow zone is investigated. Wave equations were solved in the plane normal to the jet axis to estimate the diffraction and reflection of sound by a heated, cylindrical jet. Thus, the noise source considered is essentially a line source assumed to emit at discrete frequency and at rest with respect to the shielding jet which is assumed to be a cylinder of heated flow in which the temperature is constant across the jet. Results show that the sound pressure decreases rapidly with frequency beyond the onset of the shielding to a minimum value. Results also show that increasing the spacing between the source and the jet shifts the curves toward higher frequencies. M.D.K.

N82-16807*# Bolt, Beranek, and Newman, Inc., Canoga Park, Calif.
COMMUNITY SENSITIVITY TO CHANGES IN AIRCRAFT NOISE EXPOSURE Final Report
S. Fidell, R. Horonjeff, S. Teffeteller, and K. Pearsons NASA Dec. 1981 122 p refs
(Contract NAS1-14611)
(NASA-CR-3490; BBN-4212) Avail: NTIS HC A06/MF A01 CSCL 20A

Interviews were conducted in the vicinity of Burbank Airport during a four month period during which a counterbalanced series of changes in aircraft noise exposure occurred due to runway repairs. Another interview was undertaken approximately one year after completion of the initial runway repairs. Noise measurements were made in conjunction with administration of a brief questionnaire to a near exhaustive sample of residents in four airport neighborhoods. The magnitude and direction of change of annoyance with aircraft noise exposure corresponded closely to the actual changes in physical exposure. Estimates were made of time constants for the rate of change of attitudes toward aircraft noise. S.L.

N82-16808*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NOISE OF THE SR-3 PROPELLER MODEL AT 2 DEG AND 4 DEG ANGLE OF ATTACK
James H. Dittmar and Robert J. Jeracki Dec. 1981 30 p refs
(NASA-TM-82738; E-1051) Avail: NTIS HC A03/MF A01 CSCL 20A

The noise effect of operating supersonic tip speed propellers at angle of attack with respect to the incoming flow was determined. Increases in the maximum blade passage noise were observed for the propeller operating at angle of attack. The noise increase was not symmetrical with one wall of the wind tunnel having significantly more noise increase than the other wall. This was apparently the result of the rotational direction of the propeller. The lack of symmetry of the noise at angle of attack to the use of oppositely rotating propellers on opposite sides of an airplane fuselage as a way of minimizing the noise due to operation at angle of attack. J.D.H.

N82-16809*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A SHOCK WAVE APPROACH TO THE NOISE OF SUPERSONIC PROPELLERS
James H. Dittmar and Edward J. Rice Dec. 1981 19 p refs
(NASA-TM-82752; E-1068) Avail: NTIS HC A02/MF A01 CSCL 20A

To model propeller noise expected for a turboprop aircraft, the pressure ratio across the shock at the propeller tip was calculated and compared with noise data from three propellers. At helical tip Mach numbers over 1.0, using only the tip shock wave, the model gave a fairly good prediction of the noise for a bladed propeller and for a propeller swept for aerodynamic purposes. However for another propeller, which was highly swept and designed to have noise cancellations from the inboard propeller sections, the shock strength from the tip over predicted the noise. In general the good agreement indicates that shock theory is a viable method for predicting the noise from these supersonic propellers but that the shock strengths from all of the blade sections need to be properly included. M.G.

N82-16810*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
PREDICTION OF SOUND RADIATION FROM DIFFERENT PRACTICAL JET ENGINE INLETS Semiannual Status Report, 1 Jun. 1981 - 1 Dec. 1981
Ben T. Zinn and William L. Meyer 1982 127 p refs
(Grant NAG3-67)
(NASA-CR-165120) Avail: NTIS HC A07/MF A01 CSCL 20A

The computer codes necessary for this study were developed and checked against exact solutions generated by the point source method using the NASA Lewis QCSEE inlet geometry. These computer codes were used to predict the acoustic properties of the following five inlet configurations: the NASA Langley Bellmouth, the NASA Lewis JT15D-1 Ground Test Nacelle, and three finite hyperbolic inlets of 50, 70 and 90 degrees. Thirty-five computer runs were done for the NASA Langley Bellmouth. For each of these computer runs, the reflection coefficient at the duct exit plane was calculated as was the far field radiation pattern. These results are presented in both graphical and tabular form with many of the results cross plotted so that trends in the results verses cut-off ratio (wave number) and tangential mode number may be easily identified. Author

N82-16811# Pennsylvania State Univ., University Park. Applied Research Lab.
NOISE GENERATION BY GAS JETS IN A TURBULENT WAKE Ph.D. Thesis
John J. Gavigan 9 Apr. 1981 124 p refs
(Contract N00024-79-C-6043)
(AD-A106223; ARL/PSU-TM-81-99) Avail: NTIS HC A06/MF A01 CSCL 20/1

Radiation noise is generated by the interaction of gas jets with turbulent liquid. Although this phenomenon has long been known, the mechanism of noise generation and its functional relationship to important parameters are not well understood. No experimental studies of gas jet-turbulence interaction noise under controlled conditions can be found in the literature. To remedy this paucity of experimental data, measurements of this phenomenon were made in the 1.22 m diameter test section of the Garfield Thomas Water Tunnel. Gas was exhausted from the aft end of the strut-mounted test body into the turbulent wake. A directional hydrophone mounted outside the flow in a water-filled tank on one side of the test section was used to make one-third-octave-band acoustic measurements in the frequency range 5 - 50 kHz. By varying the gas exhaust orifice diameters, gas flow rates, and water speeds, the interdependence of the important parameters to radiated noise was determined. For the range of variables used in these experiments, the radiated noise is primarily a function of the ratio of orifice diameter to turbulence length scale, and only secondarily, a function of gas flow rates. Analysis of the results indicate that noise generated by the formation, division, coalescence, and collapse of bubbles can be related to the critical Weber number of the flow. Author (GRA)

N82-16812# Naval Research Lab., Washington, D. C.
APPROXIMATE FLUID-STRUCTURE INTERACTION THEORIES FOR ACOUSTIC ECHO SIGNAL PREDICTIONS Final Report
H. Huang Oct. 1981 17 p refs
(RR0230301)
(AD-A106349; NRL-MR-4661) Avail: NTIS HC A02/MF A01 CSCL 17/1

An approximation scheme for predicting the acoustical echo signals from submerged elastic structures irradiated by incident pulses is proposed and investigated for its effectiveness. This scheme utilizes various approximate fluid-structure interaction theories to first determine the resultant pressure and normal acceleration on the fluid-structure interface and thereform calculates the far field echo signals by integrating the Helmholtz integral exactly. It is found that a theory termed the second order doubly asymptotic approximation is promising for this scheme. An optimum computation scheme could be a combination of the exact and various approximate theories depending on the wavelength of the incident pulse and the geometry and the dynamic characteristics of the structure. Author

N82-16813# Texas Univ. at Arlington. Applied Research Labs.
MEASUREMENTS AND ANALYSIS OF ACOUSTIC BOTTOM INTERACTION IN THE NORTHWESTERN MEXICAN BASIN
Michael W. Hooper, Gregory D. Ingram, and Stephen K. Mitchell 5 Oct. 1981 54 p refs
(Contract N00014-78-C-0329)
(AD-A107551; ARL-TR-81-37) Avail: NTIS HC A04/MF A01 CSCL 08/10

An engineering test of the Acoustic Data Capsule (ACODAC) was conducted in the Western Gulf of Mexico on 27 April 1979. In addition, bottom loss data were collected. These data were reduced using ARL:UT's multipath processing system. Calculated bottom loss increased with frequency and bottom grazing angle, ranging from approximately 1 dB to 6 dB. Using available geoacoustic data and a bottom loss model, theoretical bottom losses were generated. A good match between actual and theoretical values was obtained. Thus, a relatively accurate geoacoustic model of the Western Gulf of Mexico was derived. Author (GRA)

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-16814*# California Inst. of Tech., Pasadena. Radiation Lab.
ION-BEAM-ENHANCED ADHESION IN THE ELECTRONIC STOPPING REGION
J. E. Griffith (Bell Telephone Lab., Murray Hill, N.J.), Yuanxun Qiu (Lanzhou Univ., China), and T. A. Tombrello Dec. 1981 12 p refs Submitted for publication
(Grants NGR-05-002-333; NSF PHY-79-23638; Contract NGW-148)
(NASA-CR-163467; BAP-25) Avail: NTIS HC A02/MF A01 CSCL 20H

The use of ion beams in the electronic stopping region to improve the adhesion of insulators to other materials is described. In particular, the bonding of Au films to Teflon, ferrite, and SiO2 was improved by bombarding them with He and Cl, respectively. Improvements in bonding were also observed for Au on glass, Au and Cu on sapphire, and Si3N4 on Si. The mechanism is apparently associated with sputtering and track forming processes occurring in the electronic stopping region. Some applications are discussed. M.G.

N82-16815*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE TWO-PHOTON ABSORPTIVITY OF ROTATIONAL TRANSITIONS IN THE A2 SIGMA HYPERON + (V PRIME = O) - X-2 PION (V PRIME PRIME = O) GAMMA BAND OF NITRIC OXIDE
K. P. Gross (Stanford Univ., Calif.) and R. L. McKenzie Jan. 1982 28 p refs
(NASA-TM-81335; A-8758) Avail: NTIS HC A03/MF A01 CSCL 20H

A predominantly single-mode pulsed dye laser system giving a well characterized spatial and temporal output suitable for absolute two-photon absorptivity measurements was used to study the NO gamma(0,0) S11 + R21 (J double prime = 7-1/2) transition. Using a calibrated induced-fluorescence technique, an absorptivity parameter of 2.8 + or - 1.4 x 10 to the minus 51st power cm to the 6th power was obtained. Relative strengths of other rotational transitions in the gamma(0,0) band were also measured and shown to compare well with predicted values in all cases except the O12 (J double prime = 10-1/2) transition. Author

N82-16816# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATIONS OF NONREACTIVE VIBRATIONAL AND ROTATIONAL EXCITATION IN SMALL, POTENTIALLY REACTIVE ION MOLECULE SYSTEMS AT ENERGIES BELOW 6eV Ph.D. Thesis - Georg-August Univ. [UNTERSUCHUNGEN ZUR NICHTREAKTIVEN VIBRATIONS- UND ROTATIONSANREGUNG IN KLEINEN, POTENTIELL REAKTIVEN ION-MOLEKUELSYSTEMEN BEI ENERGIEN UNTERHALB VON 6eV]
Wolfgang Tepperwien Apr. 1981 93 p refs In GERMAN
(MPIS-4/1981; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16,50

The excitation of vibrational and rotational degree of freedom of molecules during ionic collision, a chemical elementary process related to chemical kinetics, is discussed. Molecular radiation experiments with single collisions were performed. Nonreactive vibrational and rotational excitation with small potential reactive ion molecule systems were investigated. Mostly higher vibrational changes take place. It is found that the hydrogen molecules are vibrationally excited by the collision, while the rotational degree of freedom remains relaxed. Transl. by E.A.K.

N82-16817# Physics International Co., San Leandro, Calif.
PHYSICS OF ELECTROSTATIC LENS Final Report
Sep. 1981 3 p
(Contract N00014-79-C-0749)
(AD-A105262) Avail: NTIS HC A02/MF A01 CSCL 20/7

The purpose of this program was to study the physics of the ion-energy boosting electrostatic lens for collective ion acceleration in the Luce diode. Extensive work was done in preparation for experiments on the PI Pulserad 1150. Analytic work was done on the orbit of protons in a mass spectrometer and a copper stack for nuclear activation analysis of proton energy spectrum has been designed. Unfortunately, a parallel program which would provide the Luce diode for the collective ion acceleration experiment never materialized. As a result no experiments were actually performed on the Pulserad 1150. GRA

N82-16818# JAYCOR, Alexandria, Va.
COMPUTATIONAL STUDY OF MAGNETIC DAM EFFECTS IN A HIGH IMPEDANCE DIODE
R. J. Barker, Shyke A. Goldstein, and A. T. Drobot (Science Applications, Inc., McLean, Va.) Washington NRL 14 Oct. 1981 41 p refs Sponsored by Navy
(AD-A106154; NRL-MR-4642) Avail: NTIS HC A03/MF A01 CSCL 02/7

Computer simulations have been conducted to test the 'magnetic dam' concept as a means for boosting the overall ion efficiency of high impedance diodes. The 'dam' consists of a cell located immediately behind the anode foil containing a wire along its central axis which carries a current flowing in a direction opposite to that in the diode gap. The azimuthal magnetic field generated by the wire current, I sub w, reflects the electrons crossing the foil back into the A-K gap at higher radii where their space charge can enhance ion emission over relatively large areas. Significant increases in the ion current were observed for several values of I sub w but a simultaneous increase in electron current prevented gains in overall ion efficiency. Instead, only decreased impedances were observed. The cause of this phenomenon is explained and indicates solutions which could benefit a wide range of future diode designs. Author (GRA)

N82-16819# Rockwell International Corp., Thousand Oaks, Calif. Electronics Research Center.
HIGH RESISTIVITY MOLECULAR BEAM EPITAXIAL AlGaAs FOR DEVICE APPLICATIONS Final Report, 1 May 1978 - 30 Apr. 1980
W. A. Hill, D. L. Miller, and D. R. Chen May 1981 53 p refs
(Contract N00014-78-C-0370; RF62581001)
(AD-A107597; ERC41006.4FR) Avail: NTIS HC A04/MF A01 CSCL 20/7

High resistivity epitaxial layers of AlxGa1-xAs have been produced by molecular beam epitaxy. These layers have been incorporated, as a buffer layer, in the fabrication of GaAs MESFETs and the results are discussed. Device analysis includes an assortment of low frequency and DC measurements as well as RF measurements. Author (GRA)

N82-16820# Texas Univ. at Arlington. Dept. of Computer Science.

THE STUDY OF ATOM-ATOM ELECTRON-MOLECULE AND PHOTON-MOLECULE PROCESSES Final Technical Report, 1 Apr. 1975 - 31 Mar. 1980

J. C. Browne and E. J. Shipsey 25 Oct. 1981 9 p refs
(Contract N00014-75-C-0498)
(AD-A107991) Avail: NTIS HC A02/MF A01 CSCL 12/1

This research program has had two principal streams of activity. The first, and the major consumer of effort, has been the computation of cross-sections and rate coefficients for significant collision processes between light atoms and ions. The other stream of activity has been development of computational methods in collision mechanics. The cross-section computations have on several occasions predicted experiments and/or corrected experimental errors. The prediction of the efficiency of the reaction Cs + H yields Cs(+) + H(-) was listed by the American Physical Society as a significant result for plasma physics in 1976. The first prediction of a process which could lead to a soft X-ray laser (Li + He(++) yields Li(+) + He(+*) yields Li(+) + He(+) + h(nu)) was made in 1978. The population inversion predicted has since been experimentally validated. Author (GRA)

N82-16821# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

MOLECULAR DYNAMICS CALCULATIONS FOR SODIUM USING PSEUDOPOTENTIAL THEORY Ph.D. Thesis - New Mexico Univ.

Richard E. Swanson Apr. 1981 193 p refs
(AD-A108014; AFIT-CI-81-11D) Avail: NTIS HC A09/MF A01 CSCL 20/8

We study the equation of state of sodium using the molecular dynamics technique whereby the classical motion of a system of ions is solved with the aid of computers. The interaction potential between pairs of sodium ions consists of Coulomb and Born-Mayer repulsion terms and an effective ion-ion interaction derived from pseudopotential theory. This theory includes the effects of electron gas screening, exchange, and correlation. We use a model pseudopotential with parameters fit to experimental low-temperature data. By using this technique, we are able to begin with an atomic description of a simple metal and proceed to calculate its macroscopic thermodynamic properties. We calculate equation-of-state points consisting of the total internal energy in volume and temperature space. We illustrate the unique capabilities of the molecular dynamics technique by inducing a dynamic bcc-to-hcp martensitic phase change. The results of this study demonstrate that the molecular dynamics technique, coupled with an interaction potential that adequately describes the ion-ion interaction in a simple metal, can be used to calculate the macroscopic properties of such systems. GRA

N82-16822# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.

RELATIVISTIC HEAVY-ION EXPERIMENTS

H. G. Pugh Aug. 1981 30 p refs Presented at the 12th Intern. Symp. on Multiparticle Dyn., South Bend, Ind., 21-26 Jun. 1981
(Contract W-7405-eng-48)
(DE81-030544; LBL-13029; CONF-8106157-1) Avail: NTIS HC A03/MF A01

Objectives of high energy nucleus-nucleus studies are outlined. Bevalac experiments on the formation of hot high-density equilibrated nuclear matter are discussed. Future programs are outlined, including research at the CERN ISR. DOE

N82-16823# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.

COLLISIONS OF FAST MULTICHARGED IONS IN GAS TARGETS: CHARGE TRANSFER AND IONIZATION

A. S. Schlachter May 1981 18 p refs Presented at the 2nd Workshop on EBIS and Related Topics, Paris, 11-15 May 1981
(Contract W-7405-eng-48)
(DE81-030541; LBL-13156; CONF-8105113-1) Avail: NTIS HC A02/MF A01

Measurements of cross sections for charge transfer and ionization of H2 and rare-gas targets were made with fast, highly stripped projectiles in charge states as high as 59+. An empirical scaling rule for electron-capture cross section in H2 valid at energies above 275 keV/amu was found. Similar scaling might exist for other target gases. Cross sections are generally in good agreement with theory. A scaling rule was found for electron loss from H in collisions with a fast highly stripped projectile, based on Olson's classical-trajectory Monte-Carlo calculations, and confirmed by measurements in an H2 target. A similar scaling rule was for net ionization of rare-gas targets, based on Olson's CTMC calculations and the independent-electron model. Measurements are essentially consistent with the scaled cross sections. Calculations and measurements of recoil-ion charge-state spectra show large cross sections for the production of highly charged slow recoil ions. DOE

N82-16824# Oak Ridge National Lab., Tenn. Engineering Physics Div.

CALCULATED NEUTRON AND GAMMA-RAY ENERGY SPECTRA FROM 14-MeV NEUTRONS STREAMING THROUGH AN IRON DUCT: COMPARISON WITH EXPERIMENT

R. T. Santoro, R. G. Alsmiller, Jr., J. M. Barnes, G. T. Chapman, and J. S. Tang Sep. 1981 64 p refs Submitted for publication
(Contract W-7405-eng-26)
(DE81-030626; ORNL/TM-7878) Avail: NTIS HC A04/MF A01

Integral experiments that measure the streaming of approximately 14 MeV neutrons through a 0.30 m diameter iron duct (L/D approximately 3) imbedded in a concrete shield were carried out. Calculated and measured neutron and gamma ray energy spectra are compared at sixteen detector locations on and off the cylindrical axis of the duct. The measured spectra were obtained using an NE-213 liquid scintillator detector with pulse shape discrimination to simultaneously resolve neutron and gamma ray events. The calculated spectra were obtained using a computer code network that incorporates discrete ordinates and Monte Carlo. These two radiation transport methodologies are required to properly account for neutrons that single scatter from the duct to the detector. The calculated and measured outgoing neutron energy spectra above 850 keV agree within 5 to 50% depending on detector location and neutron energy. The calculated and measured gamma ray spectra above 750 keV are also in favorable agreement, approximately 5 to 50%, depending on detector location and gamma ray energy. DOE

N82-16825# Oak Ridge National Lab., Tenn. Physics Div.

ELECTRON-IMPACT EXCITATION OF IONS

D. H. Crandall 1981 52 p refs Presented at the NATO Advanced Study Summer Inst., Baddeck, Nova Scotia, 13-26 Sep. 1981
(Contract W-7405-eng-26)
(DE81-030806; CONF-810958-1) Avail: NTIS HC A04/MF A01

Electron-ion beam experiments are reviewed. Techniques, difficulties, and present trends in this area are discussed. Measured cross sections are compared with theoretical results and the current level of agreement is assessed. DOE

N82-16826# European Organization for Nuclear Research, Geneva (Switzerland).

OASIS IN THE DESERT: WEAKLY BROKEN PARITY IN GRAND UNIFIED THEORIES

Goran Senjanovic Jul. 1981 21 p refs Presented at the 4th Warsaw Symp. on Elementary Particle Phys., Kazimierz, Poland, May 1981 Prepared jointly with Brookhaven National Lab.
(Contract DE-AC02-76CH-00016)
(DE81-031963; BNL-29987; CONF-8105114-1) Avail: NTIS HC A02/MF A01

Low energy parity restoration in simple grand unified theories, such as SO(10), is discussed. The consistency of phenomenological requirements and unification constraints is emphasized and various predictions of the theory are stressed, in particular substantially lighter W and Z bosons than in the stand model and increased stability of the proton with mu/sub p/ approximately one hundred undecillion. DOE

N82-16827# Sandia Labs., Albuquerque, N. Mex.
LOW-TEMPERATURE ELECTRON SPIN RESONANCE IN (TMTSF) 2PF6 IN THE HIGH PRESSURE METALLIC PHASE
L. J. Azevedo, J. E. Schirber, R. L. Greene, and E. M. Engler 1981 12 p refs Presented at the Intern. Conf. on Low Dimensional Conductors, Boulder, Colo., 10 Aug. 1981 Prepared in cooperation with IBM Corp., San Jose, Calif.
(Contract DE-AC04-76DP-00789)
(DE81-030233; SAND-81-1115C; CONF-810864-2) Avail: NTIS HC A02/MF A01

The electron spin resonance of (TMTSF) 2PF6 was observed at low fields (H0< 110 Oe) in the high pressure metallic phase (p > or = 6.5 kbar) in the temperature range 1 to 4K. The anisotropy in the g value is similar to that observed at ambient pressure above the metal insulator transition. Linewidth is very narrow and the spin susceptibility strongly decreases as the superconducting transition is approached from above. This is interpreted as evidence for single paired superconductivity. Superconductivity is observed at 1.1K and the critical field has angular dependence in the bc plane. These observations lead to the conclusions that (TMTSF) 2PF6 is a single paired superconductor. DOE

N82-16828# Brookhaven National Lab., Upton, N. Y. Dept. of Physics.
OBSERVING SOLITONS IN ONE DIMENSIONAL MAGNETIC SYSTEMS
George Reiter 1981 10 p refs Presented at the Symp. on Neutron Scattering, Argonne, Ill., 11-12 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-029919; BNL-29957; CONF-810840-5) Avail: NTIS HC A02/MF A01

Classical models of one dimensional magnetic systems show that in addition to the linear spin wave excitations, there should exist localized, large amplitude excitations that can move along the chains while retaining their integrity. It is expected that these excitations, solitons, exist in real materials. The progress made to date in observing solitons in one dimensional magnets by means of neutron scattering, and the difficulties that still remain in unambiguously identifying the soliton contributions to S(q, omega) are discussed. DOE

N82-16829# General Atomic Co., San Diego, Calif.
NEUTRAL DENSITY MEASUREMENTS IN DOUBLET 3
J. S. deGrassie, J. C. DeBoo, M. A. Mahdavi, N. Ohyabu, and M. Shimada (Japan Atomic Energy Research Inst.) Aug. 1981 16 p refs Presented at the Am. Vacuum Soc. Natl. Symp., Anaheim, Calif., 2-6 Nov. 1981
(Contracts DE-AT03-80SF-11512; DE-AT03-76ET-51011)
(DE82-000497; GA-A-16460; CONF-811113-14) Avail: NTIS HC A02/MF A01

In the Doublet III Tokamak a variety of cross sectionally shaped plasmas were investigated. Simple magnetically shielded ionization gauges monitoring the working gas pressure show a striking dependence upon plasma shape. Average neutral density varies over two orders of magnitude. In the extreme of the simplified poloidal divertor shapes the pressure exceeds 0.001 torr. DOE

N82-16830# Purdue Univ., Lafayette, Ind. School of Chemical Engineering.
MACROMOLECULAR STRUCTURAL CHANGES IN BITUMINOUS COALS DURING EXTRACTION AND SOLUBILIZATION Annual Technical Progress Report, 1 Sep. 1980 - 31 Aug. 1981
N. A. Peppas, Mary Elizabeth Hill-Lievense, Donald T. Hooker, II, and Lucy M. Lucht 1981 236 p refs
(Contract DE-FG22-89PC-30222)
(DE82-000687; DOE/PC-30222/T1) Avail: NTIS HC A11/MF A01

Seven coal samples ranging from a lignite with 69.95% carbon to an anthracite with 94.17% carbon on a dry mineral matter-free (dmmf) basis were extracted with pyridine at its reflux temperature for two weeks. The coal matrices obtained were subjected to two degradation techniques, the Sternberg reductive alkylation technique and the Miyake alkylation technique. Gel permeation chromatographic analysis of pyridine-extracted liquids of the alkylated coal showed average molecular weights smaller then those of the original coal extracts. Electron impact mass spectrometry was used to obtain the mass spectra of these alkylated coal samples. Based on investigation of the recurring pattern of the peaks of the mass spectra of these products it was concluded that a cluster size of 126 to 130 is characteristic of the crosslinked structure of the coal studied. In addition, several chemical compounds in the range of m/e 78-191 were identified. DOE

N82-17045*# Vanderbilt Univ., Nashville, Tenn. Dept. of Civil and Environmental Engineering.
A DETERMINATION OF THE CURRENT DENSITY IN ELECTRON BEAMS
Robert J. Beil *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 31 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20H

N82-17076*# Berry Coll., Mount Berry, Ga. Dept. of Physics.
A STUDY OF THE RELATIVISTIC RISE IN IONIZATION AS MEASURED BY ION CHAMBERS OF DIFFERENT DESIGN
Julian B. Shand, Jr. *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 7 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20H

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-16831# Sandia Labs., Albuquerque, N. Mex. Mechanical Metallurgy Div.
EVALUATION OF THREE PARTIALLY VOLATILE NEUTRON SHIELDS FOR HIGH-PERFORMANCE SHIPPING CASKS
H. J. Rack and H. S. Pearson (Applied Technical Services) Feb. 1981 41 p
(Contract DE-AC04-76DP-00789)
(DE82-000245; SAND-80-2303; TTC-0149) Avail: NTIS HC A03/MF A01

The thermal stability and mechanical behavior of three partially volatile candidate neutron shield materials were evaluated. The results indicate that silicone based rubbers, impregnated with elemental boron or boron carbide, Boro-silicone 236 and Bisco NS-I respectively are more thermally stable than are borated beechwoods, e.g., Permali JN. Mechanical property measurements indicated, however, that the compressive strength of the borated beechwood is 10 to 48 times higher than that of the silicone-based rubbers. The compressive strengths of the borated beechwood and boron carbide impregnated silicone rubber were substantially more sensitive to test temperature than was the compressive strength of the boron impregnated silicone rubber. The compressive strengths and energy absorbing capability of the boron impregnated silicone rubber is not affected by prior thermal exposure at 425 K for 1000h. DOE

N82-16832# California Univ., Livermore. Lawrence Livermore Lab.
NEUTRON CAPTURE GAMMA-RAY SPECTROSCOPIC MEASUREMENTS IN THE ACTINIDE REGION
R. W. Hoff, R. W. Lougheed, G. Barreau (Inst. Max vonLaue/Paul Langevin), H. Boerner (Inst. Max vonLaue/Paul Langevin), W. F. Davidson (Inst. Max vonLaue/Paul Langevin), K. Schreckenbach (Inst. Max vonLaue/Paul Langevin), D. D. Warner (Inst. Max vonLaue/Paul Langevin), T. vonEgidy (Inst. Max vonLaue/Paul Langevin), and D. H. White (Western Oregon State Coll.,

Monmouth) Sep. 1981 15 p refs Presented at the 4th Intern. Symp. on Neutron-Capture Gamma-Ray Spectry. and Related Topics, Grenoble, France, 7-11 Sep. 1981
(Contract W-7405-eng-48)
(DE81-030316; UCRL-85325; CONF-810920-14) Avail: NTIS HC A02/MF A01

From recent neutron capture gamma-ray measurements, experimental data for states involving quasiparticle-vibrational admixtures in Ra-227, Th-231, Th-233, U-235, U-237, and U-239 were compared with theoretical calculations by Soloviev's group. This analysis shows the experimental level structure is more complex than that calculated. In the levels of BK-250, four Gallagher-Moszkowski pairs are observed. The moment of inertia for each band with antiparallel alignment of odd-nucleon momenta is systematically larger than for its parallel-aligned mate. DOE

N82-16833# Sandia Labs., Albuquerque, N. Mex. Transportation Systems Development and Testing Div.

OPERATIONAL AND REGULATORY IMPACTS OF REGIONAL MANAGEMENT ON TRANSPORTATION OF COMMERCIAL LOW-LEVEL RADIOACTIVE WASTE

C. G. Shirley, E. L. Wilmot, and E. W. Shepherd Sep. 1981 36 p refs
(Contract DE-AC04-76DP-00789)
(DE82-000967; SAND-81-1509; TTC-0228) Avail: NTIS HC A03/MF A01

The current US low-level waste management situation and the conditions and requirements for management on a regional basis were examined. Using 1979 low-level waste volumes shipped to commercial burial grounds and six management regions, transportation requirements were estimated and compared for the two management scenarios in terms of cumulative shipping distance and transportation cost. Effects of these results on the demand for transportation services and equipment and on population risks were considered. Finally, current regulatory issues and the potential effects of regional management on regulation of low-level waste transportation were reviewed. DOE

N82-16834# Pacific Northwest Lab., Richland, Wash.

DEVELOPMENT OF IN-CAN MELTING PROCESS AND EQUIPMENT, 1979 AND 1980

L. L. Petkus, D. E. Larson, W. J. Bjorklund, and L. K. Holton Sep. 1981 46 p refs
(Contract DE-AC06-76RL-01830)
(DE82-001050; PNL-3957) Avail: NTIS HC A03/MF A01

Nonradioactive process testing continued with the in-can melter as part of an investigation into the applicability of this vitrification process to various calcined high level and incinerator ash radioactive wastes. How waste composition and canister fins affect in-can melter capacity and how waste composition affects glass quality were examined. Process performance proved to be generally satisfactory. Pilot scale in-can melter runs were performed with synthetic, nonradioactive, high level wastes to produce eight canisters of glass. The synthetic waste processed included high level wastes as well as transuranic ash waste. Full scale in-can melter runs using nonradioactive materials were also conducted, producing ten canisters of glass. In the full scale in-can melter furnace the baffles separating the six heating zones were removed because of baffle warping. A remotely operated section connecting the spray calciner to the canister was tested. Some problems were encountered with calcine plugging. DOE

N82-16835# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.

IMMOBILIZATION OF HIGH-LEVEL WASTE

T. H. Gould, Jr. 1981 32 p Presented at the Ann. Meeting of the Inst. of Chem. Eng., New Orleans, 8-12 Nov. 1981
(Contract DE-AC09-76SR-00001)
(DE81-025595; DP-MS-81-33; CONF-811108-1) Avail: NTIS HC A09/MF A01

The development of technology to immobilize high level radioactive waste into durable solid forms is addressed. Specifically, the immobilization of high level waste at Savannah River, the program to develop waste forms, and the waste form evaluation and selection process are discussed. DOE

N82-16836# Oak Ridge National Lab., Tenn. Office of the Integrated Data Base Program.

SPENT FUEL AND RADIOACTIVE WASTE INVENTORIES AND PROJECTIONS AS OF DECEMBER 31, 1980

Sep. 1981 293 p refs
(Contract W-7405-eng-26)
(DE82-000307; DOE/NE-0017) Avail: NTIS HC A13/MF A01

Current inventories and characteristics of commercial spent fuels and both commercial and US Department of Energy radioactive wastes were compiled, based on the most reliable information available from Government sources and the open literature, technical reports, and direct contacts. Future waste generation rates and characteristics of these materials to be accumulated over the remainder of this century are also presented, based on a present projection of US commercial nuclear power growth and expected defense-related and industrial and institutional activities. Materials considered are: spent fuel, high-level wastes, transuranic waste, low-level waste, remedial action waste, active uranium mill tailings, and airborne waste. For each category, current and projected inventories are given through the year 2000. The land usage requirements are given for storage/disposal of low-level and transuranic wastes, and for the present inventories of inactive uranium mill tailings. DOE

N82-16837# Sandia Labs., Albuquerque, N. Mex. Transportation Technology Center.

OPERATIONAL AND REGULATORY IMPACTS OF REGIONAL MANAGEMENT ON TRANSPORTATION OF COMMERCIAL LOW-LEVEL RADIOACTIVE WASTE

C. G. Shirley, E. L. Wilmot, and E. W. Shepherd 1981 4 p refs Presented at the ANS Winter Meeting, San Francisco, 29 Nov. - 4 Dec. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025399; SAND-81-1509C; CONF-811113-3) Avail: NTIS HC A02/MF A01

A factor of two reduction in total shipping distance and cost is possible on a national scale if regional disposal sites are employed. Likewise, population risks and the demand for transportation services and equipment would be proportionally reduced because of shorter shipment distances and trip durations. The fate of regionalization of low level waste management and achievement of the cost and risk benefits that it implies is dependent on solving technical problems and resolving the institutional issues which result in multiple levels of regulations. DOE

N82-16838# Hanford Engineering Development Lab., Richland, Wash.

STAFF-5, A TWO-DIMENSIONAL COMPUTER MODEL FOR SIMULATION OF THE PERFORMANCE OF SPENT FUEL IN STORAGE/DISPOSAL

S. R. Fields and J. F. Fletcher Aug. 1981 123 p refs
(Contract DE-AC14-76FF-02170)
(DE82-000043; HEDL-TC-1601-Rev-1) Avail: NTIS HC A06/MF A01

STAFF-5, (Spent Fuel Temperature and Cladding Failure Forecaster), a two-dimensional model of a light-water reactor fuel assembly in a canister, was developed to predict spent fuel temperature and study cladding performance during long-term storage and/or disposal. When symmetry of the storage configuration is considered, STAFF-5 provides three-dimensional simulation of the fuel assembly and canister. The heat transfer portion of STAFF was validated against experimental results from instrumented tests of fuel assemblies in selected disposal configurations. DOE

N82-16839# Brookhaven National Lab., Upton, N. Y.

KAON-INDUCED NUCLEAR REACTIONS

C. B. Dover 1981 12 p refs Presented at the TRIUMF Kaon Factory Phys. Workshop, Vancouver, Canada, 10-14 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030552; BNL-29984; CONF-810869-1) Avail: NTIS HC A02/MF A01

Some reactions which could be studied at a future kaon factory are discussed. These include elastic and inelastic regeneration of neutral kaons on nuclei, production of high spin lambda and sigma hypernuclear states via the (pi/sup +-/,K(+)) reaction, and the K(-),K(+) process as a means of exploring the spectroscopy of doubly strange hypernuclei. DOE

N82-16840# Washington Univ., Seattle.
QUARK-GLUON PLASMA AND THE LITTLE BANG
L. McLerran Jun. 1981 32 p refs Presented at Intern. Conf. on Phys. in Collision: High Energy ee/ep/pp Interactions, Blacksburg, Va., 28 May 1981
(Contract DE-AC06-76ER-01388)
(DE81-030320; DOE/ER-01388/861; CONF-8105109-2) Avail: NTIS HC A03/MF A01

A space time picture of the fragmentation and central regions is presented for extremely high energy head on heavy nucleus collisions. The energy densities of the matter produced in such collisions are estimated. Speculations concerning the possible formation of a quark gluon plasma are discussed, as are possible experimental signals for analyzing such a plasma. DOE

N82-16841# California Univ., Livermore. Lawrence Livermore Lab.
COPPER-COATED LASER-FUSION TARGETS USING MOLECULAR-BEAM LEVITATION
Michael J. Rocke 8 Sep. 1981 14 p refs Presented at the Am. Vacuum Soc. Natl. Symp., Anaheim, Calif., 2-6 Nov. 1981
(Contract W-7405-eng-48)
(DE82-000644; UCRL-86114; CONF-811113-11) Avail: NTIS HC A02/MF A01

A series of diagnostic experiments at the Shiva laser fusion facility required targets of glass microspheres coated with 1.5 to 3.0 micrometers of copper. Previous batch coating efforts using vibration techniques gave poor results due to microsphere sticking and vacuum welding. Molecular Beam Levitation (MBL) represented a noncontact method to produce a sputtered copper coating on a single glass microsphere. The coating specifications that were achieved resulted in a copper layer up to 3 micrometers thick with the allowance of a maximum variation of 10 nm in surface finish and thickness. These techniques developed with the MBL may be applied to sputter coat many soft metals for fusion target applications. DOE

N82-16842# California Univ., Livermore. Lawrence Livermore Lab.
TAPE EXTENSOMETER SENSITIVITY AND RELIABILITY
J. L. Yow, Jr. and Dale G. Wilder 21 Sep. 1981 33 p refs Presented at the 24th Ann. Meeting of the Assoc. of Eng. Geol., Portland, Oregon, 27 Sep. - 2 Oct. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE82-000064; UCRL-86100; CONF-810972-1) Avail: NTIS HC A03/MF A01

A test of retrievable storage in granite of spent nuclear reactor fuel was conducted. The rock was instrumented to measure temperatures, stress changes, and displacements. Periodic tape extensometer readings provide test drift convergence data. Vertical and horizontal tape readings are made at five locations in each of two 11 ft x 11 ft drifts and six locations in a 15 ft x 20.5 ft drift. The sensitivity of the readings to temperature effects, errors in temperature corrections, change of steel tape, and change of operator was examined. Calculated corrections for temperature-induced changes in distance range from 0.0001 in. to 0.003 in./C. A tape changeout evidenced both a systematic error apparently due to slight changes in tape registration during punching and to nonidentical location of punched holes in the two tapes and a random error due to variability of reading and punching operations. These errors were corrected by making duplicate measurements for the tapes. DOE

N82-16843# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
LEACHING OF NUCLEAR-WASTE FORMS
John A. Stone 1981 17 p refs Presented at 8th Ann. Meeting of the Federation of Anal. Chem. and Spectry. Soc., Philadelphia, 20-25 Sep. 1981
(DE81-030490; DP-MS-81-44; CONF-810956-1) Avail: NTIS HC A02/MF A01

An overview of leach test methods and factors that affect leaching of nuclear waste solids is presented. Some analytical requirements are discussed. DOE

N82-16844# California Univ., Livermore. Lawrence Livermore Lab.
DIAGNOSTIC DEVICE FOR BUNCHED ELECTRON BEAMS
J. C. Garrison and A. Szoke 19 Aug. 1981 20 p refs Presented at 1981 Workshop on Free Electron Lasers, Sun Valley, Idaho, 22 Jun. 1981
(Contract W-7405-eng-48)
(DE82-000639; UCRL-86617) Avail: NTIS HC A02/MF A01

It is noted that the operation of free electron lasers depends crucially on the bunching of the electron beam; it must be precisely modulated at the desired laser frequency, and it must occupy a narrow energy centered on a resonant electron energy. A method for measuring these properties directly by steering the e-beam through a properly designed wiggler magnet and observing the emitted radiation is proposed. This kind of device is closely related to the optical klystron, and it is expected that such devices will be important for understanding and improving the operation of free electron lasers, especially those with low gain. DOE

N82-16845# Battelle Pacific Northwest Labs., Richland, Wash.
NUCLEAR WASTE MANAGEMENT Quarterly Progress Report, Apr. - Jun. 1981
T. D. Chikalla and J. A. Powell Sep. 1981 136 p refs
(Contract DE-AC06-76RL-01830)
(DE82-001605; PNL-3000-10) Avail: NTIS HC A07/MF A01

Reports and summaries are presented for the following: high-level waste process development; alternative waste forms; TMI zeolite vitrification demonstration program; nuclear waste materials characterization center; TRU waste immobilization; TRU waste decontamination; krypton implantation; thermal outgassing; iodine-129 fixation; NWVP off-gas analysis; monitoring and physical characterization of unsaturated zone transport; well-logging instrumentation development; verification instrument development; mobility of organic complexes of radionuclides in soils; handbook of methods to decrease the generation of low-level waste; waste management system studies; waste management safety studies; assessment of effectiveness of geologic isolation systems; waste/rock interactions technology program; high-level waste form preparation; development of backfill materials; development of structural engineered barriers; disposal charge analysis; and analysis of spent fuel policy implementation. DOE

N82-16846# Piedmont Engineers, Greenville, S.C.
NUCLEAR ENERGY CENTER CONCEPTUAL STUDY. PHASE 3: SITE SPECIFIC EVALUATION - ENVIRONMENTAL. RECREATION USE AND PHYSICAL CHARACTERISTICS OF LAKE HARTWELL
Jan. 1981 265 p refs
(Contract DE-AS05-78CR-06074)
(DE81-027337; DOE/OR-06074/1-Vol-3) Avail: NTIS HC A12/MF A01

Socio-economic factors related to the proposed siting of a 15000 MW, twelve-unit nuclear energy center in Anderson County, South Carolina, are presented. Topics included recreational use of Lake Hartwell, terrestrial and aquatic ecology, and atmospheric studies. DOE

N82-16847# Florida State Univ., Tallahassee. Dept. of Chemistry.
RESEARCH IN NUCLEAR CHEMISTRY Progress Report, 1 Mar. 1981 - 28 Feb. 1982
G. R. Choppin 1981 23 p
(Contract DE-AS05-76ER-01797)
(DE81-030542; DOE/ER-01797/T1) Avail: NTIS HC A02/MF A01

Investigations of the properties of the actinide elements in aqueous solution are continued. Analogous and complementary studies of lanthanide cations were conducted also. Potentiometry, calorimetry, solvent extraction, and nuclear magnetic resonance were the principle techniques. Evaluation of the thermodynamic values of complexation with series of alkyl dicarboxylate ligands provided understanding of the ring size for chelated complexes of these metals. Five and six membered chelate rings form but unless other geometical features favor chelation, it does not seem to occur for ring sizes greater than seven. From a similar study of complexation with aromatic polycarboxylate ligands, transfer of negative charge through the pi system of the ligand enhanced the strength of complexation. Study of the PuO2(2)-bicarbonate system showed that two species formed in the solution. We assigned as these species PuO2(OH)

(HCO3)(+1) and PuO2(CO3)2(+2). In sea water, our results indicate that soluble Pu(VI) exists about equally as PuO2(OH)2 and PuO2 (OH)2(HCO3)(+1) with very little PuO2(CO3)2(+2). This reflects a substantial difference from U(VI), as the dominant form in sea water is UO2(CO3)(+2). A significant achievement was the automation of the titration calorimeter. This allows simpler, and more sensitive operation. Techniques for studying the redox behavior of Pu(VI) and Np(V) in the presence of organic complexing ligands were developed and initial studies begun.
GRA

74 OPTICS

Includes light phenomena.

N82-16848*# McDonnell-Douglas Research Labs., St. Louis, Mo. Solid State Sciences Dept.
ADVANCED METHODS FOR PREPARATION AND CHARACTERIZATION OF INFRARED DETECTOR MATERIALS Interim Report, 5 Jul. 1980 - 30 Sep. 1981
S. L. Lehoczky and F. R. Szofran 30 Sep. 1981 40 p refs
(Contract NAS8-33107)
(NASA-CR-161949; MDC-Q0744) Avail: NTIS
HC A03/MF A01 CSCL 20F

Differential thermal analysis data were obtained on mercury cadmium telluride alloys in order to establish the liquidus temperatures for the various alloy compositions. Preliminary theoretical analyses was performed to establish the ternary phase equilibrium parameters for the metal rich region of the phase diagram. Liquid-solid equilibrium parameters were determined for the pseudobinary alloy system. Phase equilibrium was calculated and Hg(l-x) Cd(x) Te alloys were directionally solidified from pseudobinary melts. Electrical resistivity and Hall coefficient measurements were obtained.
A.R.H.

N82-16849*# Ball Aerospace Systems Div., Boulder, Colo.
DESIGN STUDY OF IMAGING TECHNIQUES FOR THE STARPROBE MISSION Final Report
M. Bottema 4 Sep. 1981 87 p refs Prepared for JPL
(Contracts NAS7-100; JPL-955929)
(NASA-CR-168392; JPL-9950-602; F81-08) Avail: NTIS
HC A05/MF A01 CSCL 20F

A 10 cm aperture, off-axis aplanatic gregorian telescope is investigated as a candidate instrument for imaging from Starprobe in the 115 nm to 900 nm wavelength range. Focal lengths of 300 cm (f/30) and 150 cm (f/15) are compared in terms of optical performance, compatibility with the Starprobe spacecraft and response to the thermal environment in a 20-hour time interval, centered on perihelion. Ultraviolet/visible imaging from Starprobe concluded should be technically feasible. A 10 cm aperture telescope with focal length close to 300 cm is recommended for further study. This instrument should be capable of a detector-limited angular resoluton of about 2 arc sec. The estimated overall dimensions should not exceed 105 cm by 40 cm by 25 cm and its mass be less than 28 kg. The recommended concept assumes solid blank ULE mirrors, a graphite-epoxy optical bench, and an aluminum thermal enclosure, covered with multilayer insulation. These materials must be carefully selected to minimize the risk of UV photopolymerization of contaminants at the mirror surfaces during observtions.
N.W.

N82-16850# HTL Industries, Inc., Duarte, Calif. Advanced Technology Div.
TEST AND EVALUATION OF UV FIBER OPTICS FOR APPLICATION FOR AIRCRAFT FIRE DETECTOR SYSTEMS Final Report, 23 May 1980 - 23 Mar. 1981
Dayton, Ohio AFWAL Jun. 1981 58 p refs
(Contract F33615-80-C-2042; AF Proj. 3048)
(AD-A106129; AFWAL-TR-81-2049) Avail: NTIS
HC A04/MF A01 CSCL 17/5

It was found that in the U.V. solar blind region, there are severe limitations on the field of view obtainable in Fiber Optic coupled systems. These restrictions are such as to make further consideration of the wide angle system concept unprofitable. This effectively limits the use of such systems in fire detection to applications where the precise location of a flame can be predicted. It is concluded that the performance of optical fibers in the U.V. solar blind wavelengths is such that the trade-off gains proposed in AFAPL-TR-78-84 cannot be realized in practice.
Author (GRA)

N82-16851# Electromagnetic Systems Labs., Inc., Sunnyvale, Calif.
TIME INTEGRATING OPTICAL SIGNAL PROCESSING Final Report, 1 Aug. 1980 - 31 Jul. 1981
Todd R. Bader, Peter Kellman, and Harry N. Shaver Jul. 1981 97 p refs
(Contract F49620-78-C-0102; AF Proj. 2305)
(AD-A106778; AFOSR-81-0700TR) Avail: NTIS
HC A05/MF A01 CSCL 09/3

Optical signal processing architectures using time integration on the detector array provide a highly flexible, multipurpose, wideband, realtime processor. A key feature of the time integrating concept is the ability to perform very large time-bandwidth product processing operations on signals without having to store the entire time history of the signal as a spatial record. Further, these signal processing operations may be realized with either coherent or non-coherent optical systems. In the first phase of the program, a comprehensive treatment of time integrating acousto-optic signal processing was undertaken. This treatment includes a synthesis and evaluation of alternative architectures and a detailed statistical analysis of processor performance. New developments include the extension of one dimensional time integrating optical correlation to two dimensional processing, the concepts of interferometric signal processing techniques to complex computation. One and two dimensional complex signal processing algorithms have been developed for non-coherent optical realizations. Detailed analysis has been made for complex spectral analysis and ambiguity function processing. Complex computation using real correlation processing has been analyzed.
GRA

N82-16852# Oregon Graduate Center for Study and Research, Beaverton. Dept. of Applied Physics and Electronic Science.
EFFECTS OF STRONG TURBULENCE ON SHORT WAVELENGTH LASER: EXPERIMENTAL DETERMINATION OF MEAN SQUARE WANDER ANGLE Final Report
C. M. McIntyre 15 Sep. 1981 47 p refs
(AD-A106776; AFOSR-81-0726TR) Avail: NTIS
HC A03/MF A01 CSCL 20/6

The objective of this experimental study was to verify analytical work concerning some effects of strong turbulence on short wavelength lasers. In particular, the r.m.s. wander angle of a transmitted laser beam, as a function of integrated path turbulence has been shown to increase to a maximum and then to decrease towards a constant value that is the same order as the diffraction limited spot size of the aperture in very strong turbulence. This means that an active correction for wander angle, applied at the transmitter, although useful at low to moderate levels of turbulence, is ineffective in increasing power density on the target for high levels of integrated path turbulence. An experimental measurement of the r.m.s. wander angle of a transmitted laser beam vs. integrated path turbulence in a simulated atmospheric path has been completed and the results are in qualitative agreement with the theory.
GRA

N82-16853# Singer-Kearfott, Little Falls, N. J. Kearfott Div.
FIBER OPTIC TRANSLATOR UNIT (FOTU), VOLUME 1 Final Report, 16 Jul. 1979 - 19 Dec. 1980
Mario Vojvodich and Bob Naydan Wright-Patterson AFB, Ohio AFWAL May 1981 87 p refs
(Contract F33615-79-C-1812; AF Proj. 7662)
(AD-A106131; AFWAL-TR-81-1039-Vol-1) Avail: NTIS
HC A05/MF A01 CSCL 09/5

The Fiber Optic Translator Unit (FOTU) provides bi-directional translation of wide dynamic range optical signals to and from wire-bus signals, while maintaining MIL-STD-1553B protocol and format. Bipolar, electrical Manchester waveforms are converted to unipolar Manchester type signals, and vice/versa; the FOTU circuitry is essentially transparent in both directions.
GRA

N82-16854# T and E International, Inc., Bel Air, Md.
INFRARED EQUIPMENT, GENERAL Final Report

13 Oct. 1981 24 p refs Supersedes MTP-6-2-135
(Contract DAAD05-80-C-0128)
(AD-A106711; TECOM-TOP-6-2-135; MTP-6-2-135) Avail: NTIS HC A02/MF A01 CSCL 17/5

Outlines test procedures and methods for use in evaluating the performance of infrared equipment. Includes checklist and data collection sheets. Author (GRA)

N82-16855# Rome Air Development Center, Griffiss AFB, N.Y.
REDUCTION OF ANISOPLANATIC ERRORS
Donald W. Hanson Aug. 1981 78 p refs
(AD-A106689; RADC-TR-81-122) Avail: NTIS HC A05/MF A01 CSCL 20/6

The potential of reducing anisoplanatic errors in adaptive optical systems through the use of estimation theory is studied. Currently anisoplanatic errors place a fundamental limit on the performance of adaptive optical systems. Due to the ill behaved nature of the random processes involved, the estimation procedure is formulated in terms of the structure and hyperstructure functions. These functions are widely used in the literature dealing with turbulence and optical propagation through turbulence. A particular turbulence profile is chosen to evaluate the performance of the estimation procedure. A reasonable reduction in the anisoplanatic error is obtained through use of the estimation procedure. Only signals which are currently available in adaptive optical systems are required to implement the estimation procedure, no a priori knowledge is required. Author (GRA)

N82-16856# Hughes Research Labs., Malibu, Calif.
REAL-TIME IMPLEMENTATION OF NONLINEAR PROCESSING FUNCTIONS Final Technical Report, 15 Apr. 1977 - 14 Apr. 1981
Bernard H. Soffer Aug. 1981 61 p refs
(Contract F49620-77-C-0080; AF Proj. 2305)
(AD-A106773; AFOSR-81-0710TR) Avail: NTIS HC A04/MF A01 CSCL 20/6

Optical data processing has not achieved its potential of increased capacity and speed compared wth conventional electronic techniques primarily for lack of a practical real-time image modulator and because optical techniques have been almost exclusively limited to linear operations. The research outlined in this report of a four year research program attacks these issues by studying the implementation of real-time nonlinear parallel-processing techniques. The various implementations studied all employ real-time liquid-crystal light valves. These spatial light modulators were developed and specially modified for these tasks by Hughes Research Laboratories. One approach we have investigated was to modify and characterize the standard twisted-nematic liquid-crystal devices and then to use them in a coherent optical data-processing apparatus using halftone masks custom designed at the University of Southern California. With the halftone mask technique, we have demonstrated logarithmic nonlinear transformation, allowing us to separate multiplicative images and perform homomorphic filtering. In addition, a novel analog-to-digital converter, based on a modified purebirefringence liquid-crystal light valve, was developed and demonstrated. It can perform parallel processing using incoherent light, and it promises high data throughput rates. Furthermore, a novel device that converts local light variations to local liquid-crystal phase grating period variations has been fabricated and was evaluated and improved. GRA

N82-16857# RCA Labs., Princeton, N. J. Solid State Devices Lab.
FABRICATION OF HETEROJUNCTION LEDS FOR OPERATION AT 1.3 MICROMETERS Final Technical Report, 15 Jun. 1979 - 14 Jun. 1980
G. H. Olsen, F. Z. Hawrylo, D. J. Channin, D. Botez, and M. Ettenberg Sep. 1981 51 p refs
(Contract F19628-79-C-0115; AF Proj. 4600)
(AD-A107730; PRRL-80-CR-35; RADC-TR-81-199) Avail: NTIS HC A04/MF A01 CSCL 20/6

This report describes research undertaken to study and optimize the device properties of 1.3-micron InGaAsP edge-emitting LEDs fabricated by both vapor-phase epitaxy (VPE) and liquid-phase epitaxy (LPE). Edge-emitting LEDs have been prepared with both growth methods with a combination of properties rivaling the best reported to date. In the previous final report (RADC-TR-80-110) details of the VPE growth process were presented. Details of the LPE growth process are presented here. The LED efficiency of LPE devices was found to increase with decreasing cavity thickness. A value over 1% was measured with a 1000 lambda. Contact stripe width and coupling technique were also varied to achieve maximum power into an optical fiber. The best coupling was obtained with a 12-micron-wide contact stripe. Significantly better coupling was also achieved with a balled, rather than cleaved, end fiber. More than twice the power could be coupled into a 100-micron core diameter fiber, as compared to a 50-micron core fiber. The temperature dependence of LED emission was also measured for both VPE and LPE devices. LED efficiency dropped over 30% between 20 and 70 C, while an emission wavelength shift of 5 to 6 lambda/C was observed over the same temperature range. GRA

N82-16858# Lincoln Lab., Mass. Inst. of Tech., Lexington.
FABRICATION OF METAL MIRRORS FOR FAR-INFRARED WAVELENGTHS
Gerald F. Dionne 7 Oct. 1981 14 p refs
(Contract F19628-80-C-0002)
(AD-A107898; TR-588; ESD-TR-81-282) Avail: NTIS HC A02/MF A01 CSCL 20/6

A simple machining procedure has been applied successfully to produce metal mirrors suitable for far-infrared wavelengths. Ninety-degree off-axis paraboloidal or ellipsoidal mirror sections may be cut from brass or aluminum by means of a series of pre-determined increments on a conventional laboratory lathe. Paraboloidal mirrors with low f-numbers (f/2) have been used with good results as part of the collecting optics of a far-infrared heterodyne receiver. Author (GRA)

N82-16859# Geo-Atmospherics Corp., Lincoln, Mass.
MODELS OF WEATHER ENVIRONMENTS ADVERSE TO ELECTRO-OPTICAL SYSTEMS
Wayne D. Mount and B. Richard Fow White Sands Missile Range, N. Mex. Army Electronics Research and Development Command Sep. 1981 111 p refs
(Contract DAAD07-80-C-0047; DA Proj. 1L1-61102-B5-3A)
(AD-A107637; ERADCOM/ASL-CR-81-0047-1) Avail: NTIS HC A06/MF A01 CSCL 20/6

Weather models were developed to depict hour by hour variations of scattering media, the atmosphere, important to Army electro-optical system performance. Dynamic models are presented for specifying particle size distributions in horizontal and vertical directions for haze, fog, cloud, and rain conditions given only routinely available meteorological data. Case studies show that these models perform well individually and when used together. This effort should be viewed as the first step in developing dynamic models that are responsive to observed and forecast weather changes. The models needed to be applied, tested, modified, and improved. Author (GRA)

N82-16860# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
ANGULAR INTERFEROMETRY-RESOLUTION ENHANCEMENT USING HALF-WAVE PLATES M.S. Thesis - MIT
George B. Hept Feb. 1981 49 p refs
(AD-A107974; AFIT-CI-81-59T) Avail: NTIS HC A03/MF A01 CSCL 14/2

Draper Laboratory is using an interferometer to monitor the rotation of an actively-controlled test platform to .01 arcsec. The resolution of the interferometer needed to be doubled in order to achieve this accuracy goal. The resolution of an interferometer can be doubled by sending the beam back to its target a second time. A method for doing this, analogous to the quarter-wave plate/plane-mirror doubling scheme commonly used in linear interferometry, was designed to double the resolution of the angular interferometer. This method used a combination of half-wave plates and retroreflectors to produce the doubling effect. Some simple, small-scale tests proved that this alternate method worked and that the use of the plates caused no discernible error. A full-scale test on Draper Laboratory test platform showed that doubling the angular resolution was practical and that .01 arcsec accuracy could be achieved. Author (GRA)

N82-16861# Brookhaven National Lab., Upton, N. Y.
PROGRESS AND PROSPECTS AT THE NATIONAL

SYNCHROTRON LIGHT SOURCE (NSLS)
Malcolm R. Howells Jul. 1981 20 p refs Presented at the 2nd Natl. Conf. on Synchrotron Radiation Instrumentation, Ithaca, N.Y., 15-17 Jul. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030738; BNL-29985; CONF-810750-6) Avail: NTIS HC A02/MF A01

The National Synchrotron Light Source (NSLS) project is discussed from inception until the present. The commencement and motivation for the program are considered from the viewpoint of the needs of various experiments and the concepts of the Basic Source is introduced. The Basic Source has high brightness and tunability within the ranges 0 to 0.3 keV and 3 to 20 keV. The inclusion of tunability implies the use of monochromators and the role of these is discussed. The Basic Source is important because it satisfies a very large proportion of users. The strategy of NSLS in providing a good Basic Source and special devices (monochromators and wigglers) to allow coverage of the energy ranges outside those of the Basic Source is described. The NSLS facility will be completed within 2 to 3 months of its scheduled timescale and within its budget. DOE

N82-16111*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN M-ARY COHERENT OPTICAL RECEIVER FOR THE FREE-SPACE CHANNEL
V. A. Vilnrotter *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 60-66 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20F

N82-16117*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE 2.5-BIT/DETECTED PHOTON DEMONSTRATION PROGRAM: DESCRIPTION, ANALYSIS AND PHASE 1 RESULTS
J. R. Lesh, J. Katz, H. H. Tan, and D. Zwillinger *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 115-132 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 20F

N82-16998# Astronomische Gesellschaft, Hamburg (West Germany).
THE NEW OPTICAL (300 nm LESS THAN LAMBDA LAMBDA LESS THAN 1000 nm) ESO PHOTOMETER
G. F. O. Schnur *In its* Astron. Soc. Inform. No. 52 1981 p 128-130 (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-17048*# James Madison Univ., Harrisonburg, Va. Dept. of Mathematics and Computer Science.
TOLERANCE ANALYSIS OF OPTICAL TELESCOPES USING COHERENT ADDITION OF WAVEFRONT ERRORS
John W. Davenport *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Feb. 1982 19 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20F

N82-17060*# South Carolina State Coll., Orangeburg. Dept. of Natural Sciences.
A STUDY OF OPTICALLY CONTACTED QUARTZ AT CRYOGENIC TEMPERATURES
Linda L. Payne *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 9 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20F

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-16862# Mission Research Corp., Alexandria, Va.
EXPERIMENTS ON THE INTERACTION OF HIGHPOWER MICROWAVES WITH AIR Final Report, 4 Apr. 1980 - 4 Jun. 1981
W. M. Bollen, R. K. Parker, and W. M. Black Jul. 1981 37 p refs
(Contract N00173-80-C-0126)
(AD-A106390; MRC/WDC-R-015) Avail: NTIS HC A03/MF A01 CSCL 20/9

The physics of gas breakdown for large collision frequency, nu/omega > 1, is being pursued at the Naval Research Laboratory. The hybrid inverted coaxial magnetron, 500 MW, 3.2 Ghz, 30 ns pulse width, allows investigation of gas breakdown in the high nu/omega regime. The 35 Ghz gyrotron, 150 KW, 300 pps, allows investigation in a moderate nu/omega regime. Large gas breakdown plasma densities have been measured, n approx 100 n sub c. Spectral measurements have been made showing only excitation of molecular bands. Preliminary propagation experiments have also been performed. Author (GRA)

N82-16863# Air Force Weapons Lab., Kirtland AFB, N. Mex.
PARAMETRIC CONSIDERATIONS FOR INDUCTIVELY DRIVEN PLASMA IMPLOSIONS Final Report
Robert E. Reinovsky and D. L. Smith Jan. 1981 39 p
(AF Proj. 1209)
(AD-A106679; AFWL-TR-79-179) Avail: NTIS HC A03/MF A01 CSCL 20/9

This report explores the system aspects of driving implosion loads with inductive sources. High-speed plasma implosions represent an attractive approach to the production of an intense radiation source for use in an X-ray Effects Simulator. The nature of the implosion and the energy levels required for an X-ray Simulator make the use of inductive energy sources for driving the implosion attractive from the standpoints of both physics and economics. Parametric analysis and circuit calculations are employed to investigate the interrelation of circuit parameters (storage and load inductances), load parameters (mass, size, and speed), and switch parameters (resistance and rise time). The results show that 25 percent inductive to kinetic efficiency is attainable with only moderate requirements placed upon the switch performance. The status of current opening switch development is reviewed, and meets the minimum requirements predicted by the analysis. Author (GRA)

N82-16864# Naval Research Lab., Washington, D. C. Plasma Theory Branch.
TILT AND SHIFT MODE STABILITY WITH LINE TYING Interim Report
J. M. Finn (Maryland Univ., College Park) and A. Reiman 23 Oct. 1981 57 p refs Sponsored in part by DOE
(AD-A106228; NRL-MR-4610) Avail: NTIS HC A04/MF A01 CSCL 20/9

Magnetohydrodynamic stability of force free spheromak plasmas to n=1 free boundary tilt and radial shift modes is studied. The exterior region of open field lines is treated either as a conducting plasma or as a vacuum. In the former case the effect of line tying of the open field lines is present and is found to improve stability greatly. The equilibria which have optimum stability properties to the tilt and shift modes have a length to diameter ratio of 0.6, and can be stable with conducting walls at a relatively large distance. Author (GRA)

N82-16865# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.
ITERATIVE ABEL INVERSION OF OPTICALLY THICK, CYLINDRICALLY SYMMETRIC RADIATION SOURCES
Stephen J. Young 21 Aug. 1981 11 p refs
(Contract F04701-80-C-0081)
(AD-A106239; TR-0081(6623)-3; SD-TR-81-43) Avail: NTIS HC A02/MF A01 CSCL 20/9

An inversion algorithm for obtaining the radial emission and absorption coefficients of a cylindrically symmetric radiation source from transverse profiles of monochromatic radiance and absorptance is described and compared with the algorithm of Elder et al. It is shown that the present method converges to the correct solution, whereas the Elder et al method does not. Author (GRA)

N82-16866# Sandia Labs., Albuquerque, N. Mex. Nondestructive Testing Technology Div.
MEASUREMENT OF SURFACE SHAPE OF IMPLODING

HOLLOW PLASMA LINERS

B. D. Hansche 1981 6 p ref Presented at the Am. Vacuum Soc. Natl. Symp., Anaheim, Calif., 3 Nov. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030996; SAND-81-1503C; CONF-811113-12) Avail: NTIS HC A02/MF A01

It is noted that imploding hollow plasma liners tend to have imperfections such as wrinkles, and measurement of the size and shape of these imperfections is important both for prediction of the performance of a particular liner, and for quantitatively studying the fabrication process, in an attempt to minimize the imperfections. An optical technique which maps the surface shape of some of the liners is described. DOE

N82-16867# California Univ., Livermore. Lawrence Livermore Lab.

NUMERICAL SIMULATION OF THE BETA 2 EXPERIMENT

D. E. Shumaker, J. K. Boyd, B. McNamara, and W. C. Turner Oct. 1981 16 p refs Presented at the 23rd Ann. Phys. Soc. Meeting, New York, 12 Oct. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-030884; UCRL-85579) Avail: NTIS HC A02/MF A01

The transport code FRT which is a 1-1/2-D transport equilibrium code for an axisymmetric plasma was used to simulate the decay of the plasma and magnetic fields of the Beta II experiment. A comparison is made between the experimentally determined decay times for the magnetic fields and particle confinement times and the computed decay times. It is found that 1% oxygen impurity is enough to champ the electron temperature below the radiation barrier, which is in agreement with the experiment. DOE

N82-16868# General Atomic Co., San Diego, Calif.

EXPANDED BOUNDARY DIVERTOR EXPERIMENTS IN DOUBLET 3

J. C. Wesley, N. H. Brooks, J. C. DeBoo, J. S. deGrassie, R. J. Groebner, C. L. Hsieh, M. A. Mahdavi, N. Ohyabu, R. D. Stambaugh, and T. Taylor Jul. 1981 24 p refs Presented at the IAEA Tech. Comm. Meeting on Divertors and Impurity Control in Tokamaks, Garching, W. Germany, 6-10 Jul. 1981
(Contract DE-AT03-76ET-51011; GEN ATOMIC PROJ. 3344)
(DE81-030399; GA-A-16445; CONF-810745-2) Avail: NTIS HC A02/MF A01

The expanded boundary divertor configuration establishes a divertor plasma characterized by high density and low temperature and produces hydrogen pressures below the divertor region up to 0.001 Torr. The divertor density was found to rise nonlinearly with the main plasma density anti n/sub e/, scaling approximately as anti n/sub e/3. This behavior is described by a simple one dimensional parallel heat flow model that neglects radiation and particle transport except near the target plate (wall). The model further predicts that the divertor temperature scales as anti n/sub e/sub 2. DOE

N82-16869# Hanford Engineering Development Lab., Richland, Wash.

FUSION-REACTOR BLANKET AND COOLANT MATERIAL COMPATIBILITY

D. W. Jeppson and R. F. Keough 1981 7 p ref Presented at the Fusion Reactor Mater. Meeting, Seattle, 9-10 Aug. 1981
(Contract DE-AC14-76FF-02170)
(PB81-030018; HEDL-SA-2355-FP; CONF-810831-56) Avail: NTIS HC A02/MF A01

Fusion reactor blanket and coolant compatibility tests are conducted to aid in the selection and design of safe blanket and coolant systems for fusion reactors. Scoping compatibility tests to date are reported for blanket material and water interactions at near operating temperatures. These tests indicate the quantitative hydrogen release, the maximum temperature and pressures produced, and the rates of interactions for selected blanket materials. DOE

N82-16870# Sandia Labs., Albuquerque, N. Mex.

LIGHT ION BEAMS AS THE DRIVER FOR INERTIAL-CONFINEMENT FUSION

K. W. Bieg and G. W. Kuswa 1981 23 p refs Presented at the Am. Vacuum Soc. Natl. Symp., Anaheim, Calif. 2-6 Nov. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030116; SAND-81-1508C; CONF-811113-2) Avail: NTIS HC A02/MF A01

A brief description of and recent results in the areas of pulse power systems, ion generation and focusing, target irradiation experiments and light ion driven fusion reactor concepts are given. Several areas of development in which improved materials are either required, or could greatly influence progress toward fusion are described. DOE

N82-16871# Westinghouse Electric Corp., Pittsburgh, Pa. Fusion Power System Dept.

COMPACT COMMERCIAL TOKAMAK REACTOR (CCTR): A CONCEPT FOR A 500-MWe COMMERCIAL-TOKAMAK FUSION SYSTEM

Thomas J. Gillen (Pennsylvania State Univ., University Park) Nov. 1980 70 p refs
(Contract DE-AC02-77ET-51010)
(DE81-030406; WFPS-TME-81-015) Avail: NTIS HC A04/MF A01

A detailed set of self-consistent parameters and cost for the conceptual design of a compact commercial Tokamak reactor (CCTR) is given. Several of the basic design features include an ignited plasma with a major radius of 4.9 m and minor radius of 1.4 m; a net electrical output of 500 MW; a borated-water-cooled, stainless steel shield; and a toroidal field of 12 T at the coil. The design which utilizes a computer code for the costing and sizing of D-T burning Tokamaks mainly provides the sizes and geometries associated with the definition of the main component features for which a detailed engineering design can be effectively undertaken. Design study alternatives, including a neutral beam driven design, option, a design option with a toroidal field of 13 T at the coil, and a tungsten-shielded option are considered for the CCTR. Also included is the conceptual design of a computer fusion engineering device. DOE

N82-16872# Brookhaven National Lab., Upton, N. Y.

SEARCH FOR PROMETHIUM-LIKE GOLD LINES AND OTHER TRANSITIONS OF INTEREST TO FUSION RESEARCH

B. M. Johnson, K. W. Jones, T. H. Kruse (Rutgers Univ., Piscataway, N.J.), L. J. Curtis, and D. G. Ellis 1981 20 p refs Presented at the 6th Intern. Conf. on Fast Ion Beam Spectry., Quebec, Canada, 17-20 Aug. 1981 Prepared in cooperation with Toledo Univ.
(Contracts DE-AC02-76CH-00016; DE-AS05-80ER-10676)
(DE81-029917; BNL-29948; CONF-810868-2) Avail: NTIS HC A02/MF A01

Extreme ultraviolet spectra in the range lambda = 13 to 40 rm were measured for foil excited gold ions at 31 to 238 MeV. Data was recorded at the higher energies to extend and to complement previous measurements and at the lowest energy to see if the recently predicted 5s - 5p resonance lines in the Pm-like ion, Au XIX, could be seen in beam foil excitation. The experimental results are presented, previous beam foil measurements are reviewed, and the contributions and relations to fusion research are discussed. DOE

N82-16873# Brookhaven National Lab., Upton, N. Y.

FUSION PLASMA CONTROL USING TRAIL: A NONDAMAGEABLE LIMITER

W. S. Yu, James R. Powell, John A. Fillo, and John L. Usher 1981 6 p refs Presented at the ANS Winter Meeting, San Francisco, 29 Nov. 1981
(Contract DE-AC02-76CH-00016)
(DE81-030825; BNL-30002; CONF-811103-41) Avail: NTIS HC A02/MF A01

An attractive new limiter system is described, termed TRAIL (Tokamak Rail Gun Limiter), which can inject streams of pellets into the plasma to: (a) define the plasma boundary, (b) absorb plasma disruption energy, and (c) control plasma temperature profiles. Using EM (Electromagnetic) guns now being developed for military applications, particles can be injected at velocities in the range of meters to several kilometers per second. Transient heat transfer analyses are presented for various pellet sizes (0.5 to 1.5 cm diam), heat fluxes (5,000 to 200,000 W/sq cm), compositions (Al, Cu, C, Mo, and Li) and heat pulse length (2.5 to 50 ms). DOE

N82-16874# Oak Ridge National Lab., Tenn.
HIGH-BETA STUDIES WITH BEAM-HEATED, NON-CIRCULAR PLASMAS IN ISX-B
E. A. Lazarus, S. C. Bates, C. E. Bush, B. A. Carreras, J. L. Dunlap, G. R. Dyer, P. H. Edmonds, J. H. Harris, H. C. Howe, and D. Hutchinson 1981 5 p refs Presented at the 10th European Conf. on Controlled Fusion and Plasma Phys., Moscow, 14 Sep. 1981
(Contract W-7405-eng-26)
(DE81-032003; CONF-810906-10) Avail: NTIS HC A02/MF A01

Some preliminary results of high beta studies on ISX-B for mildly D shaped discharges are described. This modest size Tokamak is equipped with two tangentially aligned neutral beam injectors giving a total power up to 3 MW. The poloidal coil system allows choice of plasma boundary shapes from circular to elongated (kappa = or approximately 1.8), with D, elliptical, or inverse D cross sections. The noncircular work discussed here is for kappa = approximately 1.5. DOE

N82-16875# California Univ., Livermore. Lawrence Livermore Lab.
DESIGN OF FIRST WALLS AND BEAM DUMPS FOR TANDEM MIRROR EXPERIMENT UPGRADE
R. P. Drake, D. D. Lang, A. L. Hunt, W. L. Pickles, T. C. Simonen, T. P. Stack, K. L. Wilson, M. I. Baskes, L. G. Haggmark, and M. E. Malinowski 15 Sep. 1981 16 p refs Presented at the 28th Natl. Symp. of the Am. Vacuum Soc., Anaheim, Calif., 2-6 Nov. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-030888; UCRL-86195; CONF-811113-7) Avail: NTIS HC A02/MF A01

Neutral reflux from the first walls and beam dumps of the Tandem Mirror Experiment (TMX) Upgrade could erode the neutral-beam-fueled, end-cell plasma or cool the neutral-beam-heated, central-cell plasma. To allow the TMX Upgrade to meet its design parameters, the neutral reflux to the plasma must be much less than the fluxes of both charge-exchange neutral products to the first walls and transmitted neutral-beam atoms to the beam dumps. To achieve this, the intent is to evaporate titanium as a getter on the first wall and install vanadium-foil beam dumps. The vanadium beam dumps will be heated by the neutral beam during the shot, releasing most of the implanted hydrogen as they cool radiatively after the shot. The deposited titanium will be thick enough to retain the implanted charge-exchange neutral products. The design of these components, estimates of their performance, and comparisons of their performance to the needs of TMX Upgrade are described. DOE

N82-16876# California Univ., Livermore. Lawrence Livermore Lab.
NEUTRAL-BEAM SYSTEMS FOR MAGNETIC-FUSION REACTORS
Joel H. Fink (Westinghouse Electric Corp., Pittsburgh) 10 Aug. 1981 23 p refs Presented at the Am. Vacuum Soc. Natl. Symp., Anaheim, Calif., 3-6 Nov. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-027940; UCRL-86196; CONF-811113-1) Avail: NTIS HC A02/MF A01

Neutral beams for magnetic fusion reactors are investigated. To optimize their performance to establish specific goals for component development, systematic analysis of the beamlines is essential. Three ion source characteristics are discussed: arc-cathode life, gas efficiency, and beam divergence, and their significance in a high-energy neutral beam system is evaluated. DOE

N82-16877# Oak Ridge National Lab., Tenn. Fusion Energy Div.
AMBIPOLAR POTENTIAL FORMATION AND CONTROL IN BUMPY TORI AND MIRRORS: PROCEEDINGS OF WORKSHOP
Nermin A. Uckan, ed. Sep. 1981 459 p refs Proceedings of conf. held in Oak Ridge, Tenn., 11-12 May 1981
(CONF-810511) Avail: NTIS HC A20/MF A01

The status of experimental and theoretical understanding of the role played by the ambipolar potentials in tandem mirrors and bumpy toruses was evaluated, and critical processes influencing the formation and control of the ambipolar potentials in these devices identified. For individual titles, see N82-16878 through N82-16899.

N82-16878# Applied Microwave Plasma Concepts, Encinitas, Calif.
MULTI-SPECIES AMBIPOLAR PHENOMENA IN THE ELMO BUMPY TORUS
G. E. Guest *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 23-36 refs (For primary document see N82-16877 07-75)
Avail: NTIS HC A20/MF A01

An earlier, heuristic version of neoclassical transport theory suggested a plausible interpretation of empirical results from ELMO Bumpy Torus-I (EBT-I), such as the relation between electron temperature and density, the ambipolar electric field, and the distribution of ion energies in a two-species plasma consisting of equal concentrations of electrons and protons. This picture is easily generalized to include more than one species of ions, a situation which may arise experimentally by virtue of impurities or deliberate admixture of gases. The limiting case of a small relative concentration of a second species of ions is discussed and illustrated with plasma parameters typical of EBT-I/S. The dominant transport process for the trace ion group is assumed to be the rapid drift surface diffusion that results if the ion energy approaches the transitional energy, at which the net azimuthal drift velocity vanishes, W sub t approximately = qE sub r R sub c. Autor

N82-16879# Rensselaer Polytechnic Inst., Troy, N. Y. Plasma Diagnostic Group.
EXPERIMENTAL MEASUREMENT OF PLASMA SPACE POTENTIAL
R. L. Hickok *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 37-62 Sponsored by DOE (For primary document see N82-16877 07-75)
Avail: NTIS HC A20/MF A01

The use of heavy ion beam probes to measure the potential in the central cell of the Tandem Mirror Experiment (TMX) and the ELMO Bumpy Torus - I/S is described. Sources of error are described and the need for careful calibration stressed. The basic operation of the heavy ion beam probe is described. The determination of space resolution, secondary ion energy measurement, time resolution, sensitivity and maximization of the signal to noise ratio, uncertainties in beam trajectories, three dimensional effects and the need for careful alignment of the complete beam system, and perturbation of the plasma caused by beam probing are discussed. J.D.H.

N82-16880# California Univ., Livermore. Lawrence Livermore Lab.
AMBIPOLAR POTENTIAL FORMATION IN TMX
D. L. Correll, S. L. Allen, T. A. Casper, J. F. Clauser, P. Coakley (Iowa Univ., Iowa City), F. H. Coensgen, W. Condit, W. C. Cummins, J. C. Davis, R. P. Drake et al *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 63-83 refs Prepared in cooperation with Rensselaer Polytechnic Inst. and Johns Hopkins Univ., Baltimore, Md. (For primary document see N82-16877 07-75)
(Contract W-7405-eng-48)
Avail: NTIS HC A20/MF A01

Experimental data from the Tandem Mirror Experiment (TMX) on ambipolar potential control and on the accompanying electrostatic confinement are reported. Results on the radial dependence of the central cell confining potential are given. Radial and axial particle losses as well as scaling of the central cell axial confinement are discussed. Author

N82-16881# Rensselaer Polytechnic Inst., Troy, N. Y.
SPACE POTENTIAL MEASUREMENTS IN THE CENTRAL CELL OF TMX
G. A. Hallock, R. L. Hickok, R. S. Hornady (Lawrence Livermore National Lab.), W. C. Jennings, and K. Saadatmand *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 85-103 refs (For primary document see N82-16877 07-75)
(Contract W-7405-eng-48)

Avail: NTIS HC A20/MF A01

A heavy ion beam probe has provided detailed spatial and temporal measurements of the Tandem Mirror Experiment (TMX) central cell space potential (phi sub e). With gas box fueling of the plasma at typical feed rates (radius of the limiter = 38 cm), the potential is strongly parabolic to at least 25 cm with phi = phi sub mzx (1 - r/32 cm) sq providing a good fit and 300 < phi sub max < 450 volts depending on machine conditions such as neutral beam heating current. With puffer fueling the central cell potential remains relatively flat to at least 30 cm.
Author

N82-16882# Wisconsin Univ. - Madison. Dept. of Engineering.

POTENTIAL MEASUREMENTS IN PHAEDRUS - WISCONSIN'S TANDEM MIRROR

Robert A. Breun, Steve Golovato, Brian McVey, Art Molvik, Donna Smatlak, and Larry Yujiri *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 105-122 Prepared in cooperation with Lawrence Livermore National Lab. (For primary document see N82-16877 07-75)

Avail: NTIS HC A20/MF A01

First, axial, and radial potential measurements made on an afterglow plasma generated by on axis stream guns, plug ion cyclotron resonance heating (ICRH), and central cell gas puffing in the Phaedrus tandem mirror are described. For this mode, the radio frequency (RF) and stream guns are turned off at the same time. Initial potential and plasma parameter measurements on the RF sustained operation mode are illustrated. Here, the ICRH in the plugs is left on after gun turn-off and the plug density and diamagnetism are sustained for up to [illegible] ms (e - folding time). A near tandem mirror configuration is maintained without neutral beams. A computer plot of the magnetic field coil setting and the on axis magnetic field strength is presented. Plasma parameters are listed.
J.D.H.

N82-16883# Rensselaer Polytechnic Inst., Troy, N. Y. Plasma Dynamics Lab.

SPACE POTENTIAL MEASUREMENTS ON EBT

K. A. Connor, L. Solensten, F. M. Bieniosek, and R. L. Hickok *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 125-154 refs (For primary document see N82-16877 07-75)

(Contract W-7405-eng-48)

Avail: NTIS HC A20/MF A01

Heavy ion beam probe measurements of the ambipolar potential in the midplane of a single mirror section of the ELMO bumpy torus are analyzed. Measurements were made under all standard operating modes possible. The basic structure of the measured potential is presented. Particular emphasis is placed on the most pronounced features of the profiles and how they relate to operating conditions.
J.D.H.

N82-16884# Nagoya Univ. (Japan). Inst. of Plasma Physics.

POTENTIAL FORMATION IN NAGOYA BUMPY TORUS

H. Iguchi, F. M. Bieniosek (Rensselaer Polytechnic Inst.), and K. Takasugi *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 155-166 refs (For primary document see N82-16877 07-75)

Avail: NTIS HC A20/MF A01

Space potential profiles in the Nagoya Bumpy Torus were measured with a heavy ion beam probe. Potassium and rubidium ion beams over an energy range of 3 - 15 kV were used to measure the potential with a spatial resolution of about 1 cm. Experiments performed at several different magnetic fields, especially at 1.8 kG (SR mode) and 3.2 (FR mode) are described. Measurements in typical T mode operation show a positive potential in the core plasma of about 200 V in both SR and FR modes. Varying the field correction loop current changes the core potential by + or - 50 V but the potential remains positive. The difference between the space potential and the floating potential measured by a Langmuir probe is 100 - 150 V, which is a few times the electron temperature of the core plasma. The effect on space potential of additional heating at 10.5 GHz was also investigated. Measurements of the plasma potential in the M mode show that the potential oscillates on a time-scale of 8 - 10 msec over a range of several kilvolts and these oscillations are correlated with oscillations in < n sub e 1 >.
J.D.H.

N82-16885# Oak Ridge National Lab., Tenn.

ALUMINUM IMPURITY IONS AND THE AMBIPOLAR POTENTIAL IN EBT

R. K. Richards and E. F. Jaeger *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 167-182 ref (For primary document see N82-16877 07-75)

(Contract W-7405-eng-26)

Avail: NTIS HC A20/MF A01

Experimental evidence of a correlation between the electric potential and aluminum impurities in the ELMO bumpy torus (EBT) was investigated. This correlation is observed in the relation between the temperature of the highest aluminum charge state and the potential well depth. The aluminum temperature is determined for each charge state by measuring the Doppler broadening of a characteristic spectral line. Temperature as large as 650 eV have been found for Al(+3). Aluminum densities are derived by measuring the brightness of spectral lines with an absolutely calibrated spectrometer. The particle confinement time for the aluminum ions is determined by comparing the ratios of aluminum ion densities. Values for the aluminum confinement times are smaller than the electron confinement time by several orders of magnitude. Short lifetime suggests a large particle flux of aluminum and the formation of an ambipolar potential as a consequence.
Author

N82-16886# Oak Ridge National Lab., Tenn.

EBT TRANSPORT AND AMBIPOLAR POTENTIAL FORMATION WITH RAPID LOSS OF HIGH ENERGY IMPURITY IONS

E. F. Jaeger, R. K. Richards, and C. L. Hedrick *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 183-200 refs (For primary document see N82-16877 07-75)

(Contract W-7405-eng-26)

Avail: NTIS HC A20/MF A01

Density profiles for neutral impurity atoms and impurity ions of a single charge state are calculated as functions of radius in a 1 1/2 D transport calculation for the ELMO bumpy torus (EBT) toroidal plasma. Ad hoc energies and transport rates are assumed for the impurity ions consistent with spectroscopic measurement. Ambipolar transport rates are rederived to include impurity transport in the flux of positive particles, and the electric field is computed self-consistently. Steady state solutions show potential well depths on the order of the impurity ion temperature divided by its charge. Also, due to the large gyroradius of the impurity ions, viscosity limits shear in the poloidal drift velocity. Thus, potential profiles tend to be more parabolic, and the plasma rotates more nearly as a rigid body than would be expected from simple neoclassical theory with no impurities present.
J.D.H.

N82-16887# Oak Ridge National Lab., Tenn.

FIELD ERRORS IN EBT AND THEIR EFFECTS ON THE AMBIPOLAR POTENTIAL

T. Uckan, F. M. Bieniosek, and L. Solensten *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 205-232 refs (For primary document see N82-16877 07-75)

(Contract W-7405-eng-26)

Avail: NTIS HC A20/MF A01

Because the ELMO Bumpy Torus (EBT) is a closed field line device, it is very sensitive to small magnetic field asymmetries. If the inherent error field of the device is large enough, it causes: a distortion of the poloidal symmetry of the potential profile and even a total disappearance of the ambipolar potential well, leading in turn to a deterioration of the plasma confinement parameters; the establishment of a toroidal current and, therefore, enhancement of fluctuations; and an opening of the confined closed drift surfaces that increases particle diffusion. The critical error field is estimated. For EBT-I/S the critical error field is comparable to the inherent field error of the device. Externally, about the same order of magnetic field correction is applied by two pairs of current loops in order to cancel the error field and reduce the toroidal current. The cancellation of the toroidal current provides better confinement parameters and the density fluctuations are reduced.
J.D.H.

N82-16888# Oak Ridge National Lab., Tenn.
AMBIPOLAR POTENTIAL AND ITS EFFECTS ON THE CONFINEMENT PARAMETERS OF THE EBT PLASMA
T. Uckan, R. J. Colchin, W. A. Davis, G. R. Haste, D. L. Hillis, and L. Solensten (Rensselaer Polytechnic Inst.) *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 233-266 refs (For primary document see N82-16877 07-75)
(Contract W-7405-eng-26)
Avail: NTIS HC A20/MF A01

The microwave heating power the neutral gas pressure and the ambipolar potential well were used in transport modeling to predict the scaling of the density and of the electron and ion temperatures with these quantities. The scaling calculations are based on neoclassical theory of transport coefficients and experimental observations. A quadratic potential profile and almost flat density and electron temperature profiles were assumed. However, to satisfy the ambipolarity condition, the ion temperature profile was retained. Experimentally, the electrons are observed to be in the collisionless regime and the ions have a non-Maxwellian distribution, transport coefficients developed by Spong, are employed. The ambipolarity condition and the particle and energy balance equations can be satisfied by modeling the experimentally observed potential well and ion tail. The temperature and density scalings obtained show qualitative agreement between this calculation and experimental observations. Results of this model are presented for typical EBT-I/S operations.
A.R.H.

N82-16889# Oak Ridge National Lab., Tenn.
POWER REQUIREMENTS FOR ION TAIL FORMATION IN EBT
J. S. Tolliver, E. F. Jaeger, and C. L. Hedrick *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 267-276 refs (For primary document see N82-16877 07-75)
(Contract W-7405-eng-26)
Avail: NTIS HC A20/MF A01

Experimental evidence suggests the possible presence of an enhanced high energy tail on the ion distribution function, and a simple theoretical analysis indicates that an ion tail may be a major contributor to neoclassical losses which in turn influence the ambipolar potential. In order to study these effects, a kinetic model for neoclassical transport is developed using a Fokker-Planck collision operator and assuming isotropic electron and ion velocity distributions. Three coupled nonlinear integrodifferential equations are solved numerically. The solution shows a non-Maxwellian lowest order ion distribution function. This non-Maxwellian solution leads to higher core ion temperatures and larger ion diffusion rates than those obtained when a Maxwellian distribution is assumed. If the ion tail is further enhanced by a small amount of ad hoc heating, even higher core temperatures and loss rates are obtained.
Author

N82-16890# Oak Ridge National Lab., Tenn. Computer Sciences Dept.
EFFECTS OF FLUCTUATING ELECTRIC FIELDS ON HYDROGEN AND IMPURITY IONS IN EBT
L. W. Owen *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 277-292 refs (For primary document see N82-16877 07-75)
(Contract W-7405-eng-26)
Avail: NTIS HC A20/MF A01

The effects of fluctuating poloidal electric fields on the orbits and on the heating and loss rates of ions and impurities in EBT are examined. The equations of motion for particles confined to a sector midplane are numerically integrated to yield the temporal behavior of the velocity and position coordinates in the presence of the vacuum magnetic field, a realistic steady state ambipolar electric field, and the sinusoidally varying electric field of a wave propagating in the poloidal direction. It is shown that a wave of modest amplitude, and frequency comparable to typical fluctuation frequencies (10-150-KHz) measured in EBT, can lead to large excursions in the kinetic energy and radial position of the hydrogen or impurity ion. The possible relevance of the results of these calculations to the behavior of impurity ions as functions of the mass, charge state, fluctuation level, steady-state potential, etc., is discussed.
Author

N82-16891# JAYCOR, San Diego, Calif.
ANOMALOUS TRANSPORT AND THE AMBIPOLAR FIELD IN EBT
N. A. Krall and H. H. Klein *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 293-310 refs (For primary document see N82-16877 07-75)
Avail: NTIS HC A20/MF A01

Elmo bumpy torus equilibria in present experiments have negative ambipolar potential (electron rich). Results of earlier studies in negative potential - equilibria are being used in the consideration of two specific mechanisms for anomalous transport: the diffusion due to trapped ion instability, and ion tail formation. Ion tails may form: (1) in response to instability (lower hybrid or ion sound); (2) in response to the thermal level of ion waves in a plasma; and (3) directly by ion heating in ICRH experiments. Calculations using neoclassical transport and those using neoclassical transport and ion tail formation are discussed.
A.R.H.

N82-16892# Michigan Univ., Ann Arbor.
THE EFFECT OF TRANSITING ELECTRONS ON THE AMBIPOLAR POTENTIAL IN A TANDEM MIRROR PLASMA
D. L. Galbraith and T. Kammash *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 317-328 refs Sponsored by DOE (For primary document see N82-16877 07-75)
Avail: NTIS HC A20/MF A01

In a standard tandem mirror device, the electrons trapped in the plugs generally have a temperature which is distinct from that of the central cell electrons. The latter, however, are not restrained by the electrostatic forces from entering the plug region. These electrons which enter the plug are accelerated by the potential across this region to the end of the device where the potential drops below its value in the central cell. At that point most central cell electrons are reflected back across the plug into the central cell once more. These 'passing' electrons exchange energy with the plug electrons while transiting, and for reactor grade plasmas the energy transferred to the plug electrons by these particles can be as large as 60 percent of the energy flow from the plugs to the central cell. This can result in widening the electron temperature difference between the plug and the central cell which in turn may affect the confining potential.
A.R.H.

N82-16893# California Univ., Livermore. Lawrence Livermore Lab.
CENTRAL CELL CONFINEMENT IN MFTF-B
R. A. Jong *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 329-340 refs (For primary document see N82-16877 07-75)
(Contract W-7405-eng-48)
Avail: NTIS HC A20/MF A01

The point model code TANDEM was used to survey the range of plasma parameters which can be attained in MFTF-B. The code solves for the electron and ion densities and temperatures in the central cell, yin-yang, barrier, and A-cell regions as well as the plasma potential in each region. In these studies, the A-cell sloshing ion beams were fixed while the neutral beams in the yin-yang and central cell, the gas feed in the central cell, and the applied ECRH power in the barrier region were varied. The variations of the central cell beta, central cell ion density and temperature, and the confining potential are discussed. The calculations indicate that large changes in the central cell beta cannot be achieved by varying the central cell gas or neutral beams or the yin-yang beams. Changes in these beam and gas feeds have the greatest effect on the central cell ion temperature and generally degrade the central cell confinement. Increasing the ECRH power applied to the barrier region causes an improvement in the central cell confinement and a linear increase (with applied power) of the central cell beta.
Author

N82-16894# California Univ., Irvine.
INSTABILITIES IN A SMALL AXISYMMETRIC MIRROR
Michael Wickham *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 341-359 Sponsored by DOE (For primary document see N82-16877 07-75)
Avail: NTIS HC A20/MF A01

Both the interchange instability and a microinstability which is consistent with the drift cone mode were observed in an ICRH barium plasma in which T sub i was 3.5 ev and T sub e was .25 ev. The ICRH heating process was studied with the aid of laser induced fluorescence techniques, by measuring the ion velocity distribution in detail as a function of time that the ICRH was on and as a function of the mirror ratio. There is evidence that the heating process exhibits a very coherent coupling between the RF field and the ion motion. The interchange mode was consistent with a theory which included effects due to electric field, FLR, line tying and a radial conducting wall. A finite k parallel was observed in the mirror throat. The drift cone mode observed was restricted to a radial position of strong density gradient. The initial velocity distribution was measured and used in the linear stability analysis. The mode also exhibited an axial phase shift in the mirror throat. A.R.H.

N82-16895# California Univ., Livermore. Lawrence Livermore Lab.
EFFECTS DUE TO THE LARGE AMBIPOLAR POTENTIAL IN TMX
E. B. Hooper, Jr., S. L. Allen, P. Coakley (Iowa Univ., Iowa City), D. L. Correll, R. P. Drake, J. H. Foote, D. P. Grubb, G. A. Hallock (Rensselaer Polytechnic Inst.), G. D. Porter, and T. D. Rognlien *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 365-380 refs Prepared in cooperation with Johns Hopkins Univ. (For primary document see N82-16877 07-75)
(Contract W-7405-eng-48)
Avail: NTIS HC A20/MF A01

The large potentials and potential gradients in tandem mirrors have several effects. Some of these are discussed, together with supporting data from TMX. These include: aximuthal averaging by the E x B rotation, reduction of radial outward drifts (from high order multipoles) by the rapid E x B azimuthal velocity, neoclassical resonant diffusion, Joule heating of central cell ions due to nonambipolar transport in the radial electric field, low frequency instabilities, and differences between the details of the electron behavior and theory. Author

N82-16896# California Univ., Livermore. Lawrence Livermore Lab.
FORMATION AND CONTROL OF PLASMA POTENTIALS IN TMX UPGRADE
T. C. Simonen, T. J. Orzecnowski, M. Porkolab (MIT), and S. W. Stallard *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 381-406 (For primary document see N82-16877 07-75)
(Contract W-7405-eng-48)
Avail: NTIS HC A20/MF A01

The methods to be employed to form and control plasma potentials in the TMX upgrade tandem mirror with thermal barriers are described. Some ECRI generated mirror confined electron plasmas were used to establish a negative potential region to isolate the end plug and central cell electrons. This thermal isolation allows a higher end plug electron temperature and an increased central cell confining potential. Improved axial control cell ion confinement results because higher temperature central-cell ions can be confined. Calculations of the sensitivity of barrier formation to vacuum conditions and to the presence of impurities in the neutral beams, calculations of microwave penetration and absorption used to design the ECRI system, and techniques to limit electron runaway to high energies by localized microwave beams and by relativistic detuning are described. Author

N82-16897# TRW, Inc., Redondo Beach, Calif.
AMBIPOLAR POTENTIAL CONTROL BY FAST WAVE HEATING IN BUMPY TORI
R. B. Campbell, R. J. Kashuba (McDonnell Douglas Corp., St. Louis), and T. Kammash (Michigan Univ., Ann Arbor) *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 407-422 refs Sponsored in part by TRW and McDonnell Douglas (For primary document see N82-16877 07-75)
Avail: NTIS HC A20/MF A01

The ambipolarity condition in a bumpy torus heated by fast waves is modified because of the neoclassical ion flux produced by wave particle scatterings. The condition is applied to a case in which the bulk ion species is heated by the fast wave at omega = 2 omega (sub ci). It is found that the radial profile of ambipolar potential may be modified by introducing the effects of the wave energy deposition profile. Results are presented to support this claim. Author

N82-16898# Nagoya Univ. (Japan). Inst. of Plasma Physics.
EFFECT ON AMBIPOLAR POTENTIAL OF ION CYCLOTRON HEATING
T. Snoji and F. Tsuboi *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 423-439 refs (For primary document see N82-16877 07-75)
Avail: NTIS HC A20/MF A01

Variation of ambipolar potential accompanied with ion cyclotron heating was studied. The ion cyclotron heating was carried out in Nagoya bumpy torus by using a half turn antenna which is installed near the mirror throat. The frequency of the RF oscillator is chosen to excite a slow wave mode to heat ions. In typical T mode operation, an increase in ambipolar potential and forming a positive potential hill is observed by using heavy ion beam probe and Langmuir probe. Change in potential is found to be affected by error field and has its maximum value when the field correction current is adjusted so as to minimize the toroidal current. Author

N82-16899# Oak Ridge National Lab., Tenn.
INITIAL ICRH EXPERIMENTS ON EBT-S
F. W. Baity, O. C. Eldridge, T. L. Owens, J. H. Mullen, and A. L. Henderson *In* ORNL Ambipolar Potential Formation and Control in Bumpy Tori and Mirrors Sep. 1981 p 441-446 Prepared in cooperation with McDonnell Douglas Astronautics Co., St. Louis (For primary document see N82-16877 07-75)
Avail: NTIS HC A20/MF A01

Steady state, fast wave ion cyclotron resonant heating experiments were performed at power levels up to 10 kW on EBT-S using an all metal, double Faraday shielded 120 deg loop antenna located in a cavity midplane. A broadband matching circuit was used covering the frequency range of 10 MHz to 50 MHz. The experiments show (1) fairly high antenna loading for majority deuterium, minority hydrogen plasmas; (2) somewhat weaker coupling for pure hydrogen plasmas; (3) strongly damped but apparently propagating waves around the torus; and (4) production of substantial energetic ion tails (from charge exchange measurements). The effect of the ICRH power on other plasma parameters appear to be slight. No major problems are foreseen to the application of increased power levels in future experiments. A.R.H.

N82-16900# Argonne National Lab., Ill.
MHD HEAT AND SEED RECOVERY TECHNOLOGY PROJECT
Quarterly Report, Oct. - Dec. 1980
Michael Petrick and Terry R. Johnson Jul. 1981 45 p refs
(Contract W-31-109-eng-38)
(DE82-001608; ANL/MHD-81-1; QR-12) Avail: NTIS HC A03/MF A01

Experimental investigations are being conducted or planned in the following of critical problem areas: (1) corrosion and erosion of refractories, and metal alloys; (2) NO/sub x/ behavior in the radiant boiler and secondary combustor; (3) radiant boiler design to meet the multiple requirements of steam generation, NO/sub x/ decomposition, and seed-slag separation; (4) effects of solid or liquid seed deposits on heat transfer and gas flow in the steam and air heaters; (5) formation, growth, and deposition of seed-slag particles, and (6) character of the combustion gas effluents. DOE

N82-16901# Argonne National Lab., Ill. Engineering Div.
TECHNICAL SUPPORT FOR OPEN-CYCLE MHD PROGRAM
Progress Report, Jan. - Mar. 1980
G. F. Berry, ed. Jul. 1981 110 p refs
(Contract W-31-109-eng-38)
(DE82-001955; ANL/MHD-80-6) Avail: NTIS HC A06/MF A01

The development of analytical tools needed for investigating the performance of the major components in the combined cycle MHD/steam power system is described. The analytical effort is centered on the primary components of the system that are unique to MHD and, also, on the integration of these analytical models into a model for the entire power producing system. The present project activities include modeling of the secondary combustor, generator, radiant boiler, and formation and decomposition of NO. The results of preliminary off design studies and of system optimization studies are presented, and analysis of the U-25B generator performance, which was done in support of the proposed test plan, is included. Refinements and improvements in the MHD systems code and executive program are considered. DOE

N82-16902# California Univ., Livermore. Lawrence Livermore Lab.
PROGRESS IN THE TANDEM MIRROR PROGRAM
T. K. Fowler and R. R. Borchers 13 Sep. 1981 25 p refs
Presented at the 10th European Conf. on Controlled Fusion and Plasma Phys., Moscow, 13-19 Sep. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-030303; UCRL-86588; CONF-810906-9) Avail: NTIS HC A02/MF A01

Experimental results in TMX have confirmed the basic principles of the tandem mirror concept. A center cell particle confinement parameter eta tau approximately one hundred billion cu cm obtained at ion temperatures around 100 eV, which is a hundred fold improvement over single mirrors at the same temperatures. For TMX these results were obtained at peak beta values in the center cell in the range 10 to 40%, not yet limited by MHD activity, and ion cyclotron resonant heating in the Phaedrus tandem mirror experiment has produced beta values approximately 25%, which is several times the ideal MHD limit for that device. In addition, it was demonstrated that the end fan chambers of TMX simultaneously isolate the hot electrons from the end walls, provide adequate pumping and conveniently dispose of the exhaust plasma energy either by thermal deposition on the end wall or by direct conversion to electricity (at 48% efficiency in agreement with calculations). DOE

76 SOLID-STATE PHYSICS

Includes superconductivity.
For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N82-16903# Pacific-Sierra Research Corp., Santa Monica, Calif.
THEORY OF ELECTRON-AVALANCHE BREAKDOWN IN SOLIDS Final Report
M. Sparks, D. L. Mills, R. Warren, T. Holstein, and A. A. Maradudin Mar. 1981 71 p refs
(Contract F49620-79-C-0061)
(AD-A106751; PSR-1110) Avail: NTIS HC A04/MF A01 CSCL 09/3

Electron-avalanche breakdown in solids is explained by a theory that is predictive and agrees with experimental results for the magnitude of the breakdown field and its temperature dependence, pulse-duration dependence, material-to-material variation, and wavelength dependence for delta > or = 1 micron. The good agreement between experiment and theory with no parameters adjusted is obtained by using improved magnitudes and energy dependences of the electron-phonon relaxation frequencies. The contributions of both optical and acoustical phonons to electron loss and energy-space diffusion must be included. The breakdown field E(B) is calculated by solving an eigenvalue equation obtained from the diffusion transport equation. Simple models and interpretations of the diffusion equation afford physical insight into breakdown and render the breakdown conditions predictable. Preliminary results indicate that the diffusion approximation fails for wavelengths considerably shorter than 1 micron, where multiphoton absorption must also be considered. Author (GRA)

N82-16904# Advanced Research and Applications Corp., Sunnyvale, Calif.
METAL-SEMICONDUCTOR REACTION PHENOMENA AND MICROSTRUCTURAL INVESTIGATIONS OF LASER-INDUCED REGROWTH OF SILICON ON INSULATORS Annual Progress Report, Jan. - Dec. 1980
T. J. Magee, C. Leung, R. Ormond, and R. A. Armistead Jan. 1981 25 p
(Contract DAAG29-79-C-0014)
(AD-A106357; ARACOR-TR-81-37-1; ARO-15999.5-MS) Avail: NTIS HC A02/MF A01 CSCL 20/2

The defect structure in CVD Si layers on sapphire were investigated before and after scanning laser annealing. Prior to laser annealing, the films were characterized by the presence of stacking faults, twinning zones dislocation lines producing large regions of high disorder. Subsequent to laser annealing under conditions to produce total melting of the Si layers it was shown that liquid phase epitaxial regrowth occurred resulting in regions of defect-free Si and a total absence of twinning regions. Correlated Rutherford backscattering, channeling and transmission electron microscopic analyses showed a dramatic improvement in crystalline perfection relative to the results obtained from films grown by any other technique on sapphire substrates. In separate collaborative experiments with Stanford University, it was also shown that scanning CW laser irradiation could be used to produce diffusion and activation of Sn from a spin-on SnO2/SiO2 source. The formation of a Sn3As2 alloy has been shown to be related to the observed n+ activity. Author (GRA)

N82-16905# Oregon State Univ., Corvallis. Dept. of Electrical and Computer Engineering.
HETEROJUNCTIONS IN SEMICONDUCTORS Final Report, 15 Sep. 1977 - 31 Dec. 1979
S. J. T. Owen 1 Aug. 1981 105 p refs
(Contract N00014-77-C-0608; Grants NSF SER-78-14683; NSF ENG-78-11650)
(AD-A106546) Avail: NTIS HC A06/MF A01 CSCL 20/12

Liquid phase epitaxial growth of Ge onto single crystal GaAs substrates has resulted in the growth of p+Ga-n GaAs semiconductor heterojunctions. The structures have been examined by Auger spectroscopy and their current voltage characteristics are dominated by intra-band tunneling in the low voltage region. A qualitative model for the tunneling process is introduced. Heterojunctions of n ZnO with both p and n Si have been prepared by reactive R.F. sputtering.Both n-n and p-n diodes rectify and the low forward bias characteristics show large ideality factors. The results are interpreted by a model in which macroscopic mobility, controlled by intergranular barriers, is coupled with an interface state dominated band profile. Information is given concerning technical papers and conference presentations which have been partly supported by this contract. Reprints are included of two papers which deal with the evaluation of In(1-x)Ga(x)As(y)P(1-y)/InP heterostructures. Several electron and hole traps have been identified and the growth, transport properties, defects and heterostructure device performance has been evaluated. Author (GRA)

N82-16906# Hughes Research Labs., Malibu, Calif.
ESTER LIQUID CRYSTAL MIXTURES FOR DYNAMIC SCATTERING AT ELEVATED TEMPERATURES
J. David Margerum and Anna M. Lackner Oct. 1981 33 p refs
(Contract N00014-79-C-524)
(AD-A106790; TR-2) Avail: NTIS HC A03/MF A01 CSCL 07/4

Studies are made on the effect of elevated temperature on the properties, thermal stability, and dynamic scattering (DS) of liquid crystal, ester mixtures. Six eutectic nematic mixtures are formulated with clearpoints in the range of 72 to 81C; structural effects are evaluated by using different combinations of components from eight classes of esters, including phenyl benzoates, phenyl thiobenzoates, phenyl cyclohexanecarboxylates, phenyl acloxybenzoates, as well as a phenyl benzoyloxybenzoate and a phenyl biphenylcarboxylate structure. The mixtures are characterized at 25 C, and their viscosity, dielectric anisotropy, conductivity anisotropy, and dc-activated DS effects are studied as a function of temperature. Thermal instabilities are studied at 100 C, with and without redox conductivity dopants. The DS stability with 20 V dc is studied at 55C for three of the more stable mixtures, both in transparent cells and in cells with reflective metal electrodes. Author (GRA)

N82-16907# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.

DELIBERATE MODIFICATION OF THE BEHAVIOR OF N-TYPE CADMIUM TELLURIDE/ELECTROLYTE INTERFACES BY SURFACE ETCHING: REMOVAL OF FERMI LEVEL PINNING Interim Technical Report

Shinichi Tanaka, James A. Bruce, and Mark S. Wrighton 2 Sep. 1981 44 p refs Submitted for publication
(Contract N00014-75-C-0880; NR Proj. 051-579)
(AD-A106382; TR-29) Avail: NTIS HC A03/MF A01 CSCL 20/12

Single crystal, *n*-type CdTe (E sub g = 1.4 eV) has been studied with respect to barrier height, E sub B, when contacting a liquid electrolyte solution containing a fast, one-electron, outer-sphere redox reagent. We approximate E sub B as equal to the photovoltage measured by cyclic voltammetry of various redox couples at illuminated *n*-CdTe vs. a reversible electrode. N-CdTe surfaces pretreated with an oxidizing etch give an E sub B of approximately 0.5 V + or - 0.1 V in H2O/0.1 M NaClO4 or CH3CN/0.1 M (n-Bu4N)ClO4 that is independent of the E sub 1/2 of the added redox couple. A reducing etch pretreatment gives an E sub B in either of the electrolyte solutions that depends on E sub 1/2 of the redox couple in a manner consistent with a nearly ideal semiconductor. The reduced CdTe exhibits an E sub B of up to 0.9 V for a redox couple having E sub 1/2 near 0.0V vs. SCE, whereas couples having E sub 1/2 negative of approx. -1.0 V vs. SCE give zero photovoltage. Auger and X-ray photoelectron spectroscopy of the reduced and oxidized surfaces are qualitatively different. The reduced surface exhibits signals for Cd and Te in relative intensities that are consistent with a close to stoichiometric (1/1) surface. The oxidized surface exhibits little or no detectable Cd signal and the Te signal is consistent with a thick overlayer of elemental Te. GRA

N82-16908# Massachusetts Univ., Amherst. Dept. of Physics and Astronomy.

DEEP IMPURITY STATES IN GALLIUM ARSENIDE Final Report, 1 Jun. 1976 - 31 May 1980

Claude M. Penchina Oct. 1981 94 p refs
(Contract N00014-76-C-0890)
(AD-A106695; CMP811015) Avail: NTIS HC A05/MF A01 CSCL 07/4

We have studied opto-electronic properties of semi-insulating gallium arsenide, including oxygen doped, chromium doped, undoped, and ion-bombarded materials. We have found that the luminescence from chromium-doped samples has much find structure which had not been previously seen; this led to a better understanding of chromium complexing and of local lattice vibration and Fano anti-resonance at a substitutional Cr site. We have identified two other luminescence bands as related to oxygen and native defects respectively. Photoconductivity and photo-Hall studies have elucidated some of the optical transitions and showed evidence that much of the spectral shape is due to quenching effects. DLTS and thermally-stimulated current measurements were used to study oxygen doped and 'undoped' semi-insulating GaAs, revealing a variety of deep and medium-deep levels. A combination of theory and experiment has proved valuable to the understanding of the photoionization cross sections, Fano anti-resonance, and local mode coupling of the deep impurity states., Author (GRA)

N82-16909# Philips Labs., Briarcliff Manor, New York.

RESEARCH ON DEVELOPMENT OF LOW-RESISTANCE p-n JUNCTIONS IN ZnSe Final Report

B. Fitzpatrick Oct. 1981 19 p refs
(Contract N00173-80-C-0175)
(AD-A106008; PL-48-PN81-1014) Avail: NTIS HC A02/MF A01 CSCL 20/12

The doping problems associated with making a low-resistance p-n junction in ZnSe were investigated using modern epitaxial and implantation techniques. Substantial evidence for the role of nitrogen as a 'new' shallow acceptor with an ionization energy of 85 + or - 5 meV was found, and a number of other acceptors were characterized. The behavior of background donors was studied; silicon and aluminum were found to be especially harmful contaminants. A ZnSe layer with a p-type conductivity of 1.5 x 10,000 ohm-cm was made. This is the lowest p-type resistivity in ZnSe for the case where the p-type character was definitely established. Author (GRA)

N82-16910# University of Southern California, Los Angeles. Electronic Sciences Lab.

THE EFFECT OF SOLUTE-VACANCY PAIRS ON THE PHYSICAL PROPERTIES OF Si DOPED GaAs AND OTHER COMPOUND SEMICONDUCTOR SYSTEMS Final Report, 1 Jun. 1976 - 31 May 1981

W. G. Spitzer, J. M. Whelan, and S. M. Copley May 1981 116 p refs
(Grant AF-AFOSR-2990-76; AF Proj. 2306)
(AD-A107598; AFOSR-81-0746TR) Avail: NTIS HC A06/MF A01 CSCL 20/12

This is a report of a detailed and quantitative study of the influence of changes in specific defect concentrations on the microstructure and the electrical, optical and mechanical properties of Si-doped GaAs. Evidence for the GaAs: Si system demonstrates that quantitative correlations between Si-related defect concentrations and a diverse set of physical properties are observed. The measured changes in properties are large and have been employed to construct appropriate defect models. GaAs is a material of interest to the electronics community as it is used in a number of devices. The role of defects in affecting transport properties is of fundamental importance. The goal of this research is to obtain a more complete understanding of the defect structure of Si-doped GaAs through a quantitative correlation of various physical properties and concentrations of Si-related defects and also to track the effect of defect species such as solute vacancy pairs on several different physical properties. This final report summarizes the work of a 5 year study. Author (GRA)

N82-16911# Washington Univ., Seattle. Dept. of Electrical Engineering.

PHOTOACOUSTIC SPECTROSCOPY OF DIELECTRIC AND SEMICONDUCTING SOLIDS Final Scientific Report, 1 Oct. 1976 - 30 Sep. 1981

Sinclair S. Yee Sep. 1981 90 p refs
(Grant AF-AFOSR-3120-77; AF Proj. 2301)
(AD-A107613; AFOSR-81-0747TR) Avail: NTIS HC A05/MF A01 CSCL 20/12

The recently developed techniques of solid state photoacoustic spectroscopy have been applied to the study of absorption processes in dielectric and semiconducting solids which are of interest in high power laser or electronic applications. The photoacoustic effect involves the irradiation, using a modulated light source, of a material in a closed cell. Incident photons which convert to heat in the sample by nonradiative processes result in temperature and pressure fluctuations in the coupling gas in the cell synchronous with the modulated source. Through the use of appropriate pulsed and chopped cw infrared and visible wavelength sources, these investigations have provided new information about a wide range of absorption effects including optical absorption in highly transparent materials, nonlinear absorption, localized defect characterization, spectroscopy of absorbed surface impurities, and semiconductor absorption processes. The photoacoustic method has high sensitivity, good spatial and temporal resolution, and the ability to separately detect nonradiative processes, which have made it uniquely suited for these investigations. Author (GRA)

N82-16912# Varian Associates, Palo Alto, Calif. Solid State Lab.

RESEARCH ON LONG WAVELENGTH BIAS-ASSISTED PHOTOEMITTERS Final Report, Sep. 1978 - Sep. 1981

P. E. Gregory 1 Oct. 1981 40 p refs
(Contract DAAG29-78-C-0035)
(AD-A107815; ARO-15848.6-EL) Avail: NTIS HC A03/MF A01 CSCL 20/12

The infrared threshold for photoemission has been extended to 2.1 microns by use of a bias-assisted lattice-mismatched In.77Ga.23As/InAsP/InP photocathode. Quantum yield at 1.9 microns was .002 electrons/incident photon, for 2.4V bias and a temperature of approximately 125K. This photocathode structure was grown by vapor phase epitaxy. Molecular beam epitaxy (MBE) has also been used to grow In.77Ga.23As/buffer/InP structures. The effect of different buffer layer schemes, including a superlattice structure, on MBE-grown In.77Ga.23As

mobility and photoluminescence was investigated. Infrared imaging was demonstrated out to 1.65 microns using an In.53Ga.47As/InP bias-assisted photocathode operating in the transmission mode. Good reduction and sensitivity were obtained, indicating the potential usefulness of bias-assisted photocathodes for infrared imaging.
Author (GRA)

N82-16913# Crystal Specialties, Inc., Monrovia, Calif.
HIGH-PRESSURE GRADIENT-FREEZE GROWTH OF SINGLE CRYSTALS OF INDIUM PHOSPHIDE Final Technical Report, 1 Apr. 1979 - 31 Dec. 1980
Worth P. Allred Griffiss AFB, N.Y. RADC Oct. 1981 24 p refs
(Contract F19628-79-C-0096; AF Proj. 4600)
(AD-A107731; RADC-TR-81-277) Avail: NTIS HC A02/MF A01 CSCL 20/2

A gradient-freeze growth system for the growth of large single crystals of InP is described. The system synthesizes and grows InP without reloading. Large poly ingots weighing up to 2,000 gms can be compounded by this method in a few hours. Ingots grown in the system have an impurity level of about 2 x 10 to the 16th power atoms/cu cm. This technique promises to be a method by which large single crystals can be grown at a reasonable cost.
Author (GRA)

N82-16914# Institut Max von Laue/Paul Langevin, Grenoble (France).
LATTICE DYNAMICS OF GRAPHITE INTERCALATION COMPOUNDS: MODELLED BY THE PHONON DISPERSION OF LINEAR CHAINS
A. Magerl and H. Zabel (Illinois Univ., Urbana) 1981 4 p refs Presented at the Intern. Conf. on Phonon Phys., Bloomington, Ind., 30 Aug. 1981
(Contract DE-AC02-76ER-01198)
(PB82-000061; DOE/ER-01198/1366; CONF-810872-4) Avail: NTIS HC A02/MF A01

The characteristic features of the phonon dispersion of a monatomic linear chain in a Born-von Karman and a shell model formalism are outlined. Comparing model calculations with measurement of the /001/ phonon dispersion of intercalated graphite, that a shell model has to be used for an appropriate description.
DOE

N82-16915# Purdue Univ., Lafayette, Ind.
REACTIONS OF METAL IONS AND THEIR CLUSTERS IN THE GAS PHASE USING LASER IONIZATION: ION CYCLOTRON RESONANCE SPECTROSCOPY Progress Report, 1 Jul. 1980 - 30 Jun. 1981
Ben S. Freiser Apr. 1981 31 p refs Presented at 29th Ann. Conf. on Mass Spectry., Minneapolis,
(Contract DE-AC02-80ER-10689)
(DE81-029015; DOE/ER-10689/1; CONF-810548-8) Avail: NTIS HC A03/MF A01

Advances in proposed studies on metal ion chemistry and expansion of laboratory facilities are discussed. The development of a combined pulsed laser source-ion cyclotron resonance spectrometer proved to be a convenient and powerful method for generating metal ions and for studying their subsequent chemistry in the gas phase. The application of metal ions as a selective chemical ionization reagents and progress in this area are discussed. Mechanisms useful in interpreting the chemical ionization spectra of unknown compounds and tests for the functional group selectivity of the various metal ions are emphasized. Preliminary results on sulfur containing compounds and a metallic ions were obtained. Laboratory facilities were expanded from one ion cyclotron resonance spectrometer to two, plus a third instrument the Fourier Transform Ion Cyclotron Resonance spectrometer.
DOE

N82-16916# Illinois Univ., Urbana. Lab. of Physics.
PHONONS IN ALKALI GRAPHITE INTERCALATION COMPOUNDS
H. Zabel and A. Magerl (Inst. Max von Laue/Paul Langevin) 1981 4 p refs Presented at the Intern. Conf. on Phonon Phys., Bloomington, Ind., 30 Aug. 1981
(Contract DE-AC02-76ER-01198)
(DE82-000059; DOE/ER-01198/1365; CONF-810872-2) Avail: NTIS HC A02/MF A01

The (001)L phonon branches of alkali-graphite intercalation compounds C/sub x/M (x = 8, 24, 36; M = K, Rb, Cs) have been measured by means of inelastic neutron scattering experiments. In all cases the phonon branches show zone folding effects, due to the enlarged unit cell as compared to pristine graphite, along with opening of frequency gaps at the center and boundary of the Brillouin zone. All measured (001)L phonon dispersions are describable by one dimensional shell models with different masses and force constants to account for the graphite and alkali area-mass densities along the c-axis and their interplanar interactions.
DOE

N82-16917# California Univ., Livermore. Lawrence Livermore Lab.
STUDY OF SHOCK-INDUCED SIGNALS AND COHERENT EFFECTS IN SOLIDS BY MOLECULAR DYNAMICS
Arnold M. Karo, Franklin E. Walker, Warren G. Cunningham, and John R. Hardy (Nebraska Univ., Lincoln) 31 Aug. 1981 22 p Presented at the 8th Intern. Colloq. on Gasdyn. of Explosions and Reactive Systems, Minsk, 23-26 Aug. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-030412; UCRL-85576; CONF-810874-1) Avail: NTIS HC A02/MF A01

Molecular dynamics calculations are presented that address the extent of microscopic detail that can be deduced from macroscopic gauge measurements of shock propagation in condensed systems. Large asymmetrically shock-loaded lattices were simulated varying the initial temperature of both the loading plates and the lattice. Specifically: triple shock loading of a thin lattice; double shock loading of the same lattice; and triple shock loading of a thick lattice were studied. In all cases strong memory effects in that the spall pattern always mirrors the loading history were found. This is a direct consequence of two basic results: (a) the energy in finite width shocks is only weakly coupled to motions transverse to their direction of propagation; and (b) coupling between shock motion and random thermal motion is relatively weak, even in lattices that are near their melting temperatures.
DOE

N82-16918# Sandia Labs., Albuquerque, N. Mex.
EFFECT OF THERMOMECHANICAL PROPERTIES ON INITIAL CAVITY GROWTH
R. E. Glass 1981 21 p refs Presented at the 7th Underground Coal Conversion Symp., Fallen Leaf Lake, Calif., 8 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030839; SAND-81-1941C; CONF-810923-9) Avail: NTIS HC A02/MF A01

Recent field and laboratory studies in UCG have indicated that the thermomechanical properties of coals may be the controlling parameters in determining initial cavity growth. To examine this possibility laboratory and modeling efforts are being directed at determining these properties and incorporating them in a cavity growth model. The results of the work emphasize the critical role that anisotropic strengths play in determining the shape of the cavity.
DOE

N82-17073*# Alabama Univ. in Huntsville. Dept. of Mathematics.
SURFACE CONTROL TEMPERATURES FOR THE BRIDGMAN-STOCKBARGER AND FLOAT ZONE TECHNIQUES
Larry M. Foster *In its* the 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 14 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20L

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-16919# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

RANDOM ANISOTROPY EFFECTS IN ISING SPIN GLASS M.S. Thesis [EFEITOS DE ANISOTROPIA ALEATORIA EM UM SPIN GLASS DE ISING]
Maria Cristina Forti Aug. 1981 50 p refs In PORTUGUESE; ENGLISH abstract
(INPE-2194-TDL/061) Avail: NTIS HC A03/MF A01

The thermodynamic properties of an Ising model for a spin glass are studied by mean field theory. Crystal field effects are considered and the crystal field parameter fluctuates about a mean value. The exchange is random with finite range but has a mean value equal to zero. This model exhibits paramagnetic and spin glass phases. The free energy is calculated by means of replica procedure. Then, the order parameter, the parallel and perpendicular susceptibilities and the specific heat are obtained as functions of temperature; these curves show a phase transition at the critical temperature. Author

N82-16920# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
NATURE ABHORS AN EMPTY VACUUM
Marvin Minsky Aug. 1981 15 p refs
(Contract N00014-79-C-0260)
(AD-A106362; AI-M-647) Avail: NTIS HC A02/MF A01 CSCL 20/10

Imagine a crystalline world of tiny, discrete 'cells', each knowing only what its nearest neighbors do. Each volume of space contains only a finite amount of information, because space and time come in discrete units. In such a universe, we'll construct analogs of particles and fields, and ask what it would mean for these to satisfy constraints like conservation of momentum. In each case classical mechanics will break down, on scales both small and large, and strange phenomena emerge: a maximal velocity, a slowing of internal clocks, a bound on simultaneous measurement, and quantum-like effects in very weak, or intense fields. GRA

N82-17061*# Clemson Univ., S.C. Dept. of Physics and Astronomy.
MATTER IN GENERAL RELATIVITY
John R. Ray *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 13 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20J

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N82-17068*# Alabama Univ. in Huntsville. Dept. of Education.
ASSESSMENT OF MSFC'S SUPERVISORY TRAINING PROGRAMS AND COURSES
Thomas A. Brindley *In its* The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 13 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 05I

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-16921*# National Aeronautics and Space Administration, Washington, D. C.
PRINCIPLES OF PROJECT MANAGEMENT
Jan. 1982 8 p
(NASA-TM-84089; NHB-7120.2) Avail: NTIS HC A02/MF A01 CSCL 05A

The basic principles of project management as practiced by NASA management personnel are presented. These principles are given as ground rules and guidelines to be used in the performance of research, development, construction or operational assignments. J.M.S.

N82-16922# Illinois Univ., Urbana. Dept. of Architecture.
FORMAL TECHNIQUES FOR ANALYSIS AND DESIGN OF PURPOSIVE ORGANIZATIONS Final Report
E. L. Murphree, Jr., R. M. Dinnat, Patricia Clickener, and Richard Matthews Sep. 1981 93 p refs
(Grant AF-AFOSR-0090-80; AF Proj. 2313)
(AD-A106775; AFOSR-81-0711TR) Avail: NTIS HC A05/MF A01 CSCL 05/1

A framework for a generic model of purposive human organizations is presented. The static model is based on relationships between pairs of resources, pairs of tasks, and resource-task pairs. The heart of the approach is a relational matroid which allows notations of such basic organizational patterns as authority, groupings of resources, task precedence, assignment of resources to tasks, and information flow. Author (GRA)

N82-16923# National Bureau of Standards, Washington, D.C. Experimental Technology Incentives Program.
A MANUAL FOR DESIGNING AND IMPLEMENTING A PROCESS TO MONITOR COMPLEX SYSTEM DEVELOPMENTS Final Report
Stephen D. Garrity Sep. 1981 66 p ref
(PB82-104308; NBSIR-81-2328) Avail: NTIS HC A04/MF A01 CSCL 05A

A manual for designing and implementing a process to monitor key areas of a complex system development is presented. The manual is derived from an internal study of system developments in the National Bureau of Standards. The proposed monitoring proccess consists of a framework of thirty factors and a set of five functions which monitoring can serve. Author (GRA)

N82-16924# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
AN INTERACTIVE APPROACH TO MULTIPLE CRITERIA DECISION MAKING BASED ON STATISTICAL INFERENCE
Theodor J. Stewart Mar. 1981 31 p refs
(PB82-108747; TWISK-204) Avail: NTIS HC A03/MF A01 CSCL 05A

An interactive algorithm is proposed for the problem of selecting one of a finite number of alternatives, where each is evaluated in terms of a number of conflicting criteria. A simple form of utility function is assumed, and the possibility is modelled probabilistically that the decision maker may at any time indicate a preference between alternatives in conflict with his true utility. Author (GRA)

N82-16925# American Univ., Washington, D. C.
APPROPRIATION REIMBURSEMENTS Final Report
Robert E. Dorosz 1981 88 p refs Sponsored in part by Dept. of Defense
(PB81-245409; Rept-102-79-7) Avail: NTIS HC A05/MF A01 CSCL 05A

Appropriation reimbursements have been part of the Department of Defense's accounting, budgeting and reporting systems since the enactment of Sect. 601 of the 1932 Legislative Appropriations Act. An historical background on appropriation reimbursements is presented, current issues and problems, are discussed, and recommendations to improve the reimbursement process are introduced. GRA

N82-16128*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
OPTIMUM EQUIPMENT MAINTENANCE/REPLACEMENT POLICY. PART 1: DYNAMIC PROGRAMMING APPROACH
T. Charng *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 236-245 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 05A

N82-17075*# Baylor Univ., Waco, Tex. Dept. of Mathematics
MATHEMATICAL PROGRAMMING TECHNIQUES FOR

SCHEDULING SPACELAB CREW ACTIVITIES AND EXPERIMENT OPERATIONS
William C. Askew *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 19 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 05A

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N82-16926# RAND Corp., Santa Monica, Calif.
ELECTRONIC INFORMATION SYSTEMS AND USER CONTEXTS: EMERGING SOCIAL SCIENCE ISSUES
Tora K. Bikson Sep. 1981 13 p refs
(RAND/P-6690) Avail: NTIS HC A02/MF A01

The search for more rapid error-free communication as well as the growing need to link information processing systems to large or remote databases and other equipment is creating a burgeoning demand for local networks. A new eight-year forecast from International Resource Development, Inc. predicts local networks will represent a $3.2 billion market by 1990, even though only rudimentary short-range networks are presently available. The introduction of electronic information systems in myriad user settings, comprises a trend of long-term national significance. Clearly alternative choices in the management of that process can have substantially different economic and social impacts. With the technological barriers to such change being rapidly eliminated, a number of issues emerge for social research. The policy issues concern the kinds of choices that should be made during the implementation of electronic information systems in varied user settings. L.F.M.

N82-16927*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Management Services Office.
FISCAL YEAR 1981 SCIENTIFIC AND TECHNICAL REPORTS, ARTICLES, PAPERS, AND PRESENTATIONS
Sarah S. Thacker, comp. Oct. 1981 70 p
(NASA-TM-82445) Avail: NTIS HC A04/MF A01 CSCL 05B

This bibliography lists approximately 503 formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel in FY-1981. It also includes papers of MSFC contractors. Citations announced in the NASA scientific and technical information system are noted. N.W.

N82-16928# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Computer Science, Industrial Engineering and Operations Research.
USER CONSIDERATIONS IN COMPUTER-BASED INFORMATION SYSTEM
Beverly H. Williges and Robert C. Willings Sep. 1981 92 p refs
(Contract N00014-81-K-0143)
(AD-A106194; CSIE-81-2) Avail: NTIS HC A05/MF A01 CSCL 05/8

The purpose of this report is to compile in one document the variety of user considerations relating to software design of computer-based information systems. Approximately 500 such considerations that currently exist in a variety of thirteen source documents are included. For organizational purposes, the compilation was divided into seven major parts including data organization, dialogue modes, user input devices, command language and command processing, feedback and error management, security and disaster prevention, and multiple user communication. Author (GRA)

N82-16929# Mid-American Solar Energy Complex, Minneapolis, Minn.
REGIONAL NEEDS REGARDING TECHNICAL INFORMATION
Jul. 1981 16 p refs
(Contract DE-AC02-79CS-30150)
(DE82-001772; MASEC-R-81-057; A-104-4) Avail: NTIS HC A02/MF A01

Regional needs for technical information regarding solar systems and components are evaluated. The information requested from the MASEC Information Center can be separated into design, performance, and economic categories. The types of questions most frequently asked in each of these categories are listed. Comments by MASEC on the draft of the National Solar Data Network (NSDN) program are presented in the appendix. DOE

N82-16930# National Library of Medicine, Bethesda, Md.
PERMUTED MEDICAL SUBJECT HEADINGS, 1982
Jul. 1981 369 p
(PB81-227464; NLM-MED-81-04) Copyright. Avail: Issuing Activity CSCL 05B

A computer-generated display, of descriptors and cross references in the alphabetic list, Medical Subject Headings (MeSH) for 1982, and of all citation type, check tag, and geographic descriptors in the Annotated Alphabetic MeSH, 1982 is given. The Permuted MeSH lists all the MeSH terms in which each significant word appears. GRA

N82-16931# National Library of Medicine, Bethesda, Md.
MEDICAL SUBJECT HEADINGS: TREE STRUCTURES, 1982
Jul. 1981 454 p
(PB81-227472; NLM-MED-81-03) Copyright. Avail: Issuing Activity CSCL 05B

Medical subject headings currently used by indexers, catalogers, and searchers are arranged in a hierarchical manner showing relationships between broader and narrower terms. Included are minor and geographic descriptors. GRA

N82-16932# National Library of Medicine, Bethesda, Md. Medical Subject Headings Sect.
MEDICAL SUBJECT HEADINGS: ANNOTATED ALPHABETIC LIST, 1982
Jul. 1981 822 p
(PB81-227480; NLM-MED-81-02) Avail: NTIS HC A99/MF A01 CSCL 05B

An expanded version of Medical Subject Headings (MeSH) adapted to the needs of indexers, catalogers, and persons searching the National Library of Medicine computer database is given. The list includes cross references, geographic headings, non-MeSH terms, check tags, tree numbers, and notes for indexers, catalogers and online searchers. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N82-16933# Bureau of the Census, Washington, D. C.
THE 1977 CENSUS OF MINERAL INDUSTRIES. WEST NORTH CENTRAL DIVISION
Mar. 1981 51 p ref
(PB81-243081; MIC77-A-4) Avail: NTIS MF A01; SOD HC CSCL 05C

From a universe of approximately 29,000 mining establishments in the 1977 Census of Mineral Industries, approximately 11,000 small single-establishment companies were excused from filing reports. Selection of the single-establishment nonmail cases was done on an industry-by-industry basis. A variable cutoff was used to determine those establishments for which administrative records were to be used in place of a census report. The cutoffs were selected so that the administrative records cases would account for approximately 3 percent of the value of shipments for the industry. These cutoffs were then adjusted so that all single-establishment companies with fewer than 5 employees were excluded from the mail canvass, while all establishments with more than 20 employees were included. An abbreviated census form was used for the crushed stone

and construction sand and gravel industries, in which most establishments in the 5 to 20 employee size range were included.
N.W.

N82-16934# Bureau of the Census, Washington, D. C.
THE 1977 CENSUS OF MINERAL INDUSTRIES. SOUTH ATLANTIC DIVISION
Mar. 1981 52 p ref
(PB81-243099; MIC77-A-5) Avail: NTIS MF A01; SOD HC
CSCL 05C

Coverage includes all southern Atlantic establishments primarily engaged in mining as defined by the Standard Industrial Classification Manual. Mining operations are classified by industry on the basis of the prinicipal mineral produced or on the basis of the principal mineral for which exploration or development work is in progress. Each mining establishment of firms with one paid employee or more operating in the United States is covered. Every concern operating oil and gas wells, drilling wells, or exploring for oil and gas was required to submit a separate report for each state or offshore area adjacent to each state in which it conducted such activities.
GRA

N82-16123*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LIFE-CYCLE COST ANALYSIS OF PROJECTS USING A POLYNOMIAL CASH FLOW MODEL FOR NONUNIFORM MAINTENANCE AND OPERATIONS COSTS
D. S. Remer and G. Lorden (California Inst. of Technologv) *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 191-201 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 05C

N82-16130*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A COMPUTERIZED LIFE-CYCLE COST METHODOLOGY FOR ENGINEERING ANALYSIS
R. D. Hughes *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 268-287 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 05C

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-16935# Battelle Pacific Northwest Labs., Richland, Wash.
ANALYSIS OF FEDERAL INCENTIVES USED TO STIMULATE ENERGY CONSUMPTION
R. J. Cole, B. W. Cone, J. C Emery, M. Huelshoff, D. E. Lenerz, A. Marcus, F. A. Morris, W. J. Sheppard, and P. Sommers Aug. 1981 266 p refs
(Contract DE-AC06-76RL-01830)
(DE81-031928; PNL-3558) Avail: NTIS HC A12/MF A01

Federal incentives that have increased the consumption of coal, oil, natural gas and electricity are identified. The stimulus comes through changing values of variables included in energy demand functions, thereby inducing energy consumers to move along the function in the direction of greater quantity of energy demanded, or through inducing a shift of the function to a position where more energy will be demanded at a given price. The demand variables fall into one of six categories: price of the energy form, price of complements, price of substitutes, preferences, income, and technology. The government can provide such incentives using six different policy instruments: taxation, disbursements, requirements, nontraditional services, traditional services, and market activity. The four major energy forms were examined. Six energy consuming sectors were examined: residential, commercial, industrial, agricultural, transportation, and public.
DOE

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N82-16936# Committee on Science and Technology (U. S. House).
LONG-TERM PLANNING FOR NATIONAL SCIENCE POLICY
Wasington GPO 1981 320 p refs Hearings before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol., 96th Congr., 2nd Sess., No. 182, 28-31 Jul. 1980
(GPO-68-603) Avail: NTIS Avail: Subcommittee on Science, Research and Technology

The question of how to better identify science policy goals and planning processes for both Congressional and public understanding was addressed. The need to examine short-term national actions on budget policies and their integration into long term policy planning for the future was discussed. The main objective of the study is to identify ways to modify and improve current planning done by the Federal Government.
M.D.K.

N82-16937*# AiResearch Mfg. Co., Phoenix, Ariz.
ADVANCED GAS TURBINE (AGT) POWERTRAIN SYSTEM DEVELOPMENT FOR AUTOMOTIVE APPLICATIONS Progress Report, Oct. 1979 - Jun. 1980
Nov. 1980 431 p refs
(Contract DEN3-167)
(NASA-CR-165175; DOE/NASA/0167-80/1; AiResearch-31-3725; PR-1) Avail: NTIS HC A19/MF A01
CSCL 13F

Progress in the development of a gas turbine engine to improve fuel economy, reduce gaseous emissions and particulate levels, and compatible with a variety of alternate fuels is reported. The powertrain is designated AGT101 and consists of a regenerated single shaft gas turbine engine, a split differential gearbox and a Ford Automatic Overdrive production transmission. The powertrain is controlled by an electronic digital microprocessor and associated actuators, instrumentation, and sensors. Standard automotive accessories are driven by engine power provided by an accessory pad on the gearbox. Component/subsystem development progress is reported in the following areas: compressor, turbine, combustion system, regenerator, gearbox/transmission, structures, ceramic components, foil gas bearing, bearings and seals, rotor dynamics, and controls and accessories.
J.M.S.

N82-16938*# Boeing Computer Services Co., Tukwila, Wash.
HYBRID AND ELECTRIC ADVANCED VEHICLE SYSTEMS (HEAVY) SIMULATION Final Report
Ronald A. Hammond and Richard K. McGehee Nov. 1981 89 p refs
(Contract DEN3-151; DE-AI01-77CS-51044)
(NASA-CR-165536; DOE/NASA/0151-1; BCS-40357) Avail: NTIS HC A05/MF A01 CSCL 13F

A computer program to simulate hybrid and electric advanced vehicle systems (HEAVY) is described. It is intended for use early in the design process: concept evaluation, alternative comparison, preliminary design, control and management strategy development, component sizing, and sensitivity studies. It allows the designer to quickly, conveniently, and economically predict the performance of a proposed drive train. The user defines the system to be simulated using a library of predefined component models that may be connected to represent a wide variety of propulsion systems. The development of three models are discussed as examples.
M.G.

N82-16939# California Univ., Livermore. Lawrence Livermore Lab.
TECHNOLOGY TRANSFER OF COMPUTER-AIDED ENGINEERING TO THE UNIVERSITY COMMUNITY

W. J. Comfort, III, B. E. Brown, B. R. Bowman, and A. Harral, III Apr. 1981 17 p refs Presented at the Winter Ann. Meeting of the ASME Technol. and Soc. Div., Washington, D.C., 15-20 Nov. 1981
(Contract W-7405-eng-48)
(UCRL-85694; CONF-811101-1) Avail: NTIS
HC A02/MF A01

Computer aided engineering, which includes modeling, analysis, and design, with graphical representation for both input and output, is becoming an increasingly important contributor to national productivity. The demand for persons skilled in the field is growing rapidly. It is expected that the needs for such skills will far exceed the ability of the university community to supply them, unless something is done now. The Lawrence Livermore National Laboratory (LLNL) has initiated a new project, in cooperation with the university community, to increase the student's use of and familiarity with the computer in engineering schools. The ultimate objective is increasing the national productivity. DOE

N82-16940# California Univ., Livermore. Lawrence Livermore Lab.

TECHNOLOGY TRANSFER AND DEVELOPMENT OF COMPUTER-AIDED ENGINEERING WITH THE UNIVERSITY COMMUNITY

W. J. Comfort, III, R. E. Brown, B. R. Rowman, and A. Harral, III Jun. 1981 8 p refs Presented at the Winter Ann. Meeting of the ASME Technol. and Soc. Div., Washington, D.C., 15-20 Nov. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-022408; UCRL-85694-Rev-1; CONF-811101-1-Rev-1)
Avail: NTIS HC A02/MF A01

Computer-aided engineering (CAE), the process of using the computer interactivity for modeling, analysis, and design with graphical representation for both input and output, is becoming an increasingly important contributor to engineering productivity. The demand for persons skilled in this field is growing rapidly. The need for such skills will exceed the ability of the university community to supply them, unless something is done now. The Lawrence Livermore National Laboratory (LLNL) has initiated a new technology transfer project in cooperation with the university community. The objectives of this program are to increase the student's use of and familiarity with the computer in engineering schools and ultimately to assist in increasing engineering productivity. DOE

N82-16941# Sandia Labs., Albuquerque, N. Mex.

SYSTEMS STUDIES OF WASTE TRANSPORTATION

G. C. Allen, J. W. Cashwell, C. G. Shirley, and M. G. Vigil 1981 11 p refs Presented at the NWTS Program Inform. Meeting, Columbus, Ohio, 17-19 Nov. 1981 Sponsored by DOE
(DE81-030840; SAND-81-1966C; CONF-811119-2;
TTC-0244) Avail: NTIS HC A02/MF A01

The National Waste Terminal Storage transportation technology task is a combination of activities directed at both Test and Evaluation Facility (TEF) and future Full Scale Repositories (FSR), however, prime emphasis is being placed on TEF tasks. In response to the redirection of the NWTS program, TTC activities in FY 1982 will focus on transportation of commercial high level and transuranic waste, although spent fuel will still be considered. Consistent with the TEF and FSR design development schedules, the transportation system and receiving facility interface technology task will receive increased emphasis in FY 1983, while the logistics and NEPA compliance tasks will continue to be major program areas. DOE

N82-16942# San Bernardino Valley Municipal Water District, Calif.

FEASIBILITY OF GEOTHERMAL HEAT USE IN THE SAN BERNARDINO MUNICIPAL WASTEWATER TREATMENT PLANT Final Report, Sep. 1980 - Jun. 1981

W. C. Racine, T. C. Larson, C. A. Stewart, and H. B. Wessel 1981 115 p refs Prepared in cooperation with Science Applications, Inc., La Jolla, Calif., and Stewart (Coulter) and Associates, Inc., Davis, Calif.
(Contract DE-FG03-80SF-11442)
(DE81-030968; DOE/SF-11442/T2) Avail: NTIS
HC A06/MF A01

A system was developed for utilizing nearby low temperature geothermal energy to heat two high rate primary anaerobic digesters. The geothermal fluid would replace the methane currently burned to fuel the digesters. The design and operation of the facility are examined and potentially viable applications selected for additional study. Results of these investigations and system descriptions and equipment specifications for utilizing geothermal energy in the selected processes are presented. The economic analyses conducted on the six engineering design cases are discussed. The environmental setting of the project and an analysis of the environmental impacts that will result from construction and operation of the geothermal heating system are discussed. DOE

N82-16943# Oak Ridge National Lab., Tenn.

ELECTRIC CAR: IS IT STILL THE VEHICLE OF THE FUTURE

R. L. Graves, C. D. West, and E. C. Fox Aug. 1981 29 p refs
(Contract W-7405-eng-26)
(DE81-030437; ORNL/TM-7904) Avail: NTIS
HC A03/MF A01

An analysis of electric and internal combustion engine (ICE) cars of equivalent performance shows that, even with advanced batteries, the electric vehicle would be much more costly to run (23 cents/mile vs 16 cents/mile) than the ICE car. The electric vehicle, of course, would not use gasoline, thus reducing the nation's dependence on imported oil; however, the cost of oil saved in this way would be about $190/bbl. and the same result could be achieved at about one quarter the cost by manufacturing synfuels from domestic coal or oil shale. A similar analysis of some proposed hybrid electric vehicles indicates that they are also more costly to operate than an equivalent conventional vehicle, although by a smaller margin. The cost of oil saved by the use of hybrid vehicles is also lower, although it is still much more than the projected cost of synthetic fuels. The key to improving the economics of the electric vehicle is to increase battery life or lower battery costs. DOE

N82-16944# California Univ., Berkeley. Lawrence Berkeley Lab.

FUTURE TRENDS IN ADVANCED BATTERIES FOR AUTOMOBILE PROPULSION

Elton J. Cairns Oct. 1980 6 p Presented at the Intern. Symp. on Electrochem. in Ind.--New Direc. Panel Discussion on Future Trends in Major Electrochem. Ind. Case Inst. of Technol. Centennial Celebration, Cleveland, 20-22 Oct. 1980
(Contract W-7405-eng-48)
(DE81-030543; LBL-13109; CONF-801027-1) Avail: NTIS
HC A02/MF A01

The possible market for vehicle propulsion batteries is discussed, and the performance goals for a marketable electric vehicle are outlined. Some advanced batteries that have the best chance of finding application in electric automobiles are mentioned. DOE

N82-16945# California Univ., Livermore. Lawrence Livermore Lab.

COMPARISON OF ENERGY-STORAGE DEVICES FOR USE IN FUTURE AUTOMOBILES

L. G. Connell 20 Jun. 1981 11 p refs Presented at Winter Ann. Meeting of the ASME Technol. and Soc. Div., Washington, D.C., 15-20 Nov. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-026530; UCRL-85654; CONF-811101-6) Avail: NTIS
HC A02/MF A01

Energy storage devices and their associated propulsion systems which are likely to be capable of providing credible alternatives to current type automotive propulsion systems between now and the year 2000 were studied. It was found that a complete spectrum of automotive performance levels can be achieved by energy storage automobiles during this time period. These range from automobiles with general purpose performance equivalent to internal combustion engine performance to performance suitable for vehicles with specific missions. DOE

N82-16946# McElroy (Ralph) Co., Austin, Tex.
TRANSPORT AND ENERGY
Arturo Abriani Sep. 1981 17 p Transl. into ENGLISH from the Symp. on Evaluation and Reinforcement of Pavements and Energy in Transportation (Argentina), 1980 p 103-109 Symp. held in San Miguel de Tucuman, Argentina, 4-6 Sep. 1980; sponsored by the Argentine Congresses of Highway Administration and Traffic Prepared jointly with Argonne National Lab.
(DE81-030287; ANL-Trans-1198) Avail: NTIS
HC A02/MF A01

Energy sources used and the growth of energy consumption in the transportation sector in Argentina are discussed. Energy consumption by the transportation sector in some other major countries of the world are briefly noted. Optimizing transportation energy consumption by means of energy conservation is mentioned. Comparisons are made of energy consumed by rail and road vehicles in urban and interurban areas for freight and passenger transport. DOE

N82-16947# South Coast Technology, Inc., Dearborn, Mich.
AUGMENTATION OF RESEARCH AND ANALYSIS CAPABILITIES FOR TIMELY SUPPORT OF AUTOMOTIVE FUEL ECONOMY ACTIVITIES Final Report, Oct. 1977 - Jan. 1978
Harold M. Siegel, R. Schwarz, J. Andon, T. Gerstenberger, R. Renner, K. C. Kececioglu, W. Morgan, L. Mercer, and A. Cattaneo Mar. 1981 412 p refs
(Contract DOT-HS-7-01790)
(PB81-247553; DOT-HS-805956) Avail: NTIS
HC A18/MF A01 CSCL 13F

A series of studies was conducted in support of the Office of Research and Development of the NHTSA in areas of automotive design and technology that could affect fuel economy. Nine such studies were carried out and included assessments of spark ignition engine; fuel economy improvement potential; potential of changes in rolling resistance, aerodynamic drag, accessory load and lubricants. Other studies included a study of the potential of alternative engines, a compilation of literature, and a preliminary assessment of diesel particulates. In addition to conducting studies based on a literature review and analysis, there were two hardware studies conducted in the form of teardown studies of selected passenger car (Ford Fairmont) and light truck (Chevy Luv)z models. GRA

N82-16948# Market Facts, Inc., Arlington, Va. Public Sector Research Group.
CONSUMER BEHAVIOR TOWARDS FUEL EFFICIENT VEHICLES, VOLUME 2 Final Report, Oct. 1977 - Mar. 1981
James T. Heisler and Sid Groeneman Mar. 1981 127 p
(Contract DOT-HS-7-01781)
(PB81-246654; DOT-HS-805937-Vol-2) Avail: NTIS
HC A07/MF A01 CSCL 10A

Information on likely market response to various vehicle design and performance changes is studied to minimize the possibility of market rejection. The report is based on focus group discussions and consumer experiments with drivers in different vehicle size classes. Analysis focuses on the believability of the energy crisis and concern about its effects, the acceptability of possible fuel economy options, consumer preferences with respect to vehicles embodying selected design and engineering changes, and predicted purchase and usage patterns under different future scenarios. GRA

N82-16949# Naval Underwater Systems Center, Newport, R.I. Office of Special Programs Development.
ENHANCING TECHNOLOGY TRANSFER TO STATE AND LOCAL GOVERNMENT UTILIZING ON-LINE INFORMATION RETRIEVAL SERVICES AND ON-LINE COMMUNICATIONS SYSTEMS
Ronald G. Heroux May 1981 50 p
(Grant NSF ISP-79-08603)
(PB81-246241; NSF/ISP-81015) Avail: NTIS
HC A03/MF A01 CSCL 05A

Work accomplished in a study by the State of Rhode Island on the use of cable television (CATV) to serve public, educational, and government needs is reported. Development of on-line information services, electronics communication, and the use of CATV in Rhode Island is discussed. Some requirements include (1) the establishment of a separate institutional cable connecting most state municipal, educational, religious, and non profit buildings at no charge to these organizations; (2) a four-channel state-wide interconnect system; and (3) provision of portable and fixed television equipment to be used by community groups, educators, and the community-at-large for the preparation of local and state-wide programs at no cost to the user. On-line data bases and evaluation of information services are provided. GRA

N82-16950# Energy and Environmental Analysis, Inc., Arlington, Va.
DEVELOPMENT OF ADJUSTMENT FACTORS FOR ON ROAD FUEL ECONOMY Final Report
Robert Crawford, Peter Forshay, and Robert Dulla Mar. 1981 219 p refs
(Contract EPA-68-03-2888)
(PB81-241986; EPA-460/3-81-003) Avail: NTIS
HC A10/MF A01 CSCL 13F

The differences between EPA test-measured and actual on-road fuel economy were evaluated. It is expected that the methodology and the adjustment factors developed will form the basis for a labeling system that in future model years, will discount the EPA test measurements of new cars to estimate on road fuel economy. Because new cars employ a growing percentage of fuel efficient technologies having distinctly lower levels of shortfall than traditional ones, this analysis has carefully evaluated and to the extent that available data permit, quantified the shortfall of the alternative technologies. GRA

N82-16951# Mobility Systems Equipment Co., Los Angeles, Calif.
EVALUATION OF RETRO-REFLECTIVE MEASUREMENT DEVICES Final Report
A. G. Hoffman Jun. 1981 66 p refs
(Contract DOT-FH-11-9532)
(PB81-243594; PB102FR; FHWA/TS-81/213) Avail: NTIS
HC A04/MF A01 CSCL 13F

Four instruments capable of measuring the retro-reflectance of highway traffic stripes under daylight conditions in the field were identified and evaluated. Two of these instruments are manufactured in Europe. The others were developed in the United States but are not commercially available. Three of the instruments are conveniently usable by field crews for this purpose. GRA

N82-16952# Mobility Systems Equipment Co., Los Angeles, Calif.
EVALUATION OF RETRO-REFLECTIVE MEASUREMENT DEVICES Summary Report
A. G. Hoffman Washington Federal Highway Administration Jun. 1981 17 p
(Contract DOT-FH-11-9532)
(PB81-243602; PB102SR; FHWA/TS-81/212) Avail: NTIS
HC A02/MF A01 CSCL 13F

The project was conducted to identify and evaluate instruments capable of measuring the retro-reflectance of highway traffic stripes under daylight conditions in the field. Four instruments were identified and evaluated. Two of these instruments are manufactured in Europe. The others were developed in the United States but are not commercially available. All instruments evaluated have some capability for measuring retro-reflectance of highway traffic stripes in the field. Three of the instruments are conveniently usable by field crews for this purpose. A final report containing documentary photographs and detail test data is available from NTIS. GRA

N82-16953# Transportation Systems Center, Cambridge, Mass.
AN INVESTIGATION OF TRUCK SIZE AND WEIGHT LIMITS: TECHNICAL SUPPLEMENT. VOLUME 3: TRUCK AND RAIL FUEL EFFECTS OF TRUCK SIZE AND WEIGHT LIMITS Final Report, Oct. 1978 - Jun. 1981
David A. Knapton Jul. 1981 142 p refs
(PB82-100538; DOT-TSC-OST-81-2) Avail: NTIS
HC A07/MF A01 CSCL 13E

Data and analytical methods to estimate probable changes in direct and indirect fuel consumption for new truck size and weight limits are presented. These effects are examined in terms of changes in the competitive relationships between highway and rail services. The method for estimating fuel consumption includes line haul and access fuel and makes allowance for the system fuel requirements of empty backhaul and circuitry. Single unit trucks, conventional tractor-semi-trailer, Western Doubles, Turnpike Doubles, and Triple Trailer combination rigs as well as the competitive carload boxcar and TOFC rail services are considered. Truck service (i.e., van, reefer, household moving van, flat bed, tanker and dump), and the competitive rail services are disaggregated. Author

N82-16954# Informatics, Inc., Rockville, Md. Noise Information Program.
FOREIGN NOISE RESEARCH IN SURFACE TRANSPORTATION, 1978-1981
Dick Barber and Carl Modig May 1981 373 p
(PB82-100306; EPA-550/9-81-317) Avail: NTIS
HC A16/MF A01 CSCL 13F

Information on foreign research projects in surface transportation noise abatement was collected from both individuals and organizations. They were asked to respond with information about research projects that deal with: highway vehicle noise control (trucks, buses, cars, etc.); vehicle component noise control (engines, exhaust mufflers, cooling systems, power trains, tires, etc.); roadway surface materials, tire/road interaction; path control (barriers, insulation, highway planning and land management); highway noise analysis (prediction models, propagation theory, etc.); rail noise (guided mass transit, light rail, elevated structures, wheel/rail interaction); off road and recreational vehicle noise, measurement, monitoring and enforcement research. From these contacts, 294 surface transportation noise research projects were identified. GRA

N82-16955# Crain and Associates, Menlo Park, Calif.
PARATRANSIT, INC., SPECIAL TRANSPORTATION SERVICE IN SACRAMENTO Final Report, Nov. 1978 - Mar. 1980
Sydwell Flynn Cambridge, Mass. DOT Jul. 1981 159 p refs
(Contract DOT-TSC-1408)
(PB82-106204; DOT-TSC-UMTA-81-47; UMTA-MA-06-0049-81-6) Avail: NTIS HC A08/MF A01 CSCL 13B

Special transportation for handicapped and elderly persons in the Sacramento area is discussed. A vehicle maintenance center for the servicing and repair of paratransit vehicles operated by social service agencies themselves, project operations and developments, costs, impacts and workability are discussed.GRA

N82-16956# National Bureau of Standards, Washington, D.C.
DIMENSIONS, VOLUME 65, NUMBER 4, MAY/JUNE 1981 Monthly Report
Jun. 1981 33 p
(PB82-106006; NBS-DIM-65-4) Avail: NTIS
HC A03/MF A01 CSCL 05A

The monthly magazine features short summaries of major technical developments, highlights of work in progress, major speeches and statements by Bureau management, and a listing of NBS publications. The table of contents for the current issue is: Automation Research at NBS; Reducing the Risks of Failure; A New Twist on Dating; Results of Soft Aluminum Study Announced; Industry Gas Suppliers to Produce CRM's; New Standard Radiation Source Possible; New Mass Comparator is Quicker, Costs Less, and Data Converter Calibration Service Announced. GRA

N82-16957# Futures Group, Glastonbury, Conn.
RESEARCH INTO TECHNOLOGY OUTPUT MEASURES
Theodore J. Gordon and T. J. Munson Nov. 1980 274 p refs
(Grant NSF SRS-79-11221)
(PB81-245300; Rept-454-46-26R2; NSF-SIU-80-1) Avail: NTIS HC A12/MF A01 CSCL 05A

The problem of measuring state of the art of a technology is dealt with. Some conventions for describing the technological state of the art of essentially any technology are proposed. The rationale for the approach is provided. Two particular technologies: antibiotics and computers are emphasized. GRA

N82-16958# Environmental Protection Agency, Ann Arbor, Mich. Test and Evaluation Branch.
EVALUATION OF THE MOLECULETOR FUEL ENERGIZER UNDER SECTION 511 OF THE MOTOR VEHICLE INFORMATION AND COST SAVINGS ACT
Gary T. Jones May 1981 121 p refs
(PB81-247942; EPA-AA-TEB-511-81-11) Avail: NTIS
HC A06/MF A01 CSCL 13F

Results of an evaluation of a fuel saving device known as the Fuel Energizer Moleculetor are presented. The device is designed to be installed in the fuel line between the fuel tank and fuel pump. The applicant claims that as the fuel passes through the device, it becomes energized, burns more efficiently and therefore, provides improved fuel economy. GRA

N82-16959# Environmental Protection Agency, Ann Arbor, Mich. Office of Mobile Source Air Pollution Control.
EVALUATION OF THE IMPACT ON EMISSIONS AND FUEL ECONOMY OF CONVERTING TWO VEHICLES TO COMPRESSED NATURAL GAS FUEL
Thomas J. Penninga Jun. 1981 18 p
(PB81-245714; EPA-AA-TEB-81-19) Avail: NTIS
HC A02/MF A01 CSCL 13F

The EPA was requested by the Department of Energy to perform testing on two late model vehicles which were converted with on-the-market systems to run on compressed natural gas (CNG). The EPA was requested to measure vehicle emissions, fuel economy, and acceleration characteristics of the vehicles in stock configuration, modified running on gasoline, and modified-running on natural gas. The testing was run over a three week period with triplicate tests run in each condition. The results of the testing are reported. It does not attempt to analyze the feasibility of CNG powered vehicles in the market place. GRA

N82-16960# Environmental Protection Agency, Ann Arbor, Mich. Test and Evaluation Branch.
THE EFFECTS OF THE MOLECULETOR FUEL ENERGIZER ON EMISSIONS AND FUEL ECONOMY
Gary T. Jones May 1981 22 p refs
(PB81-244998; EPA-AA-TEB-81-18) Avail: NTIS
HC A02/MF A01 CSCL 13F

A program designed to evaluate the effects of the Moleculetor Fuel Energizer on exhaust emissions and fuel economy is described. Three late model passenger cars were subjected to a series of test sequences both before and after installation of the device. Each test sequence included the current Federal Test Procedure (for exhaust emissions only) and the Highway Fuel Economy test. Test vehicles were selected on the basis of high sales volume and were set to manufacturer's specifications before entering the program. Based on the results of this testing, there is no reason to believe that the Molculetor conclusively had an effect on the fuel economy and emission levels of the test vehicles. The changes that were shown were quite small and were not inconsistent with trends found by EPA on other fleets of test vehicles which were subjected to mileage accumulation. GRA

N82-16961# Environmental Protection Agency, Ann Arbor, Mich. Office of Mobil Source Air Pollution Control.
EMISSION AND FUEL ECONOMY OF FUEL-MAX, A RETROFIT DEVICE
F. Peter Hutchins and John T. White May 1981 13 p
(PB81-244162; EPA-AA-TEB-81-15) Avail: NTIS
HC A02/MF A01 CSCL 13F

Results of testing the 'FUEL-MAX' device are presented. The FUEL-MAX is an air-bleed device which replaces a vehicle's Exhaust Gas Recirculation (EGR) valve and is claimed to conserve fuel. The purpose of this project was to evaluate the effect of the FUEL-MAX on exhaust emissions and fuel economy. Testing of three typical 1979 model year passenger cars was conducted. The basic test sequence included the Federal Test Procedure (FTP) and the Highway Fuel Economy Test (HFET). Tests were performed before and after installation of the FUEL-MAX. Average hydrocarbon and carbon monoxide emissions decreased somewhat while oxides of nitrogen displayed substantial increases. Fuel economy increased approximately three percent on the FTP but exhibited no change over the HFET. EPA's Office of Enforcement has determined that the FUEL-MAX can violate the anti-tampering provisions of the Clean Air Act. GRA

N82-16962# Environmental Protection Agency, Ann Arbor, Mich. Control Technology Assessment and Characterization Branch.
CARBON MONOXIDE AND NON-FTP (FEDERAL TEST PROCEDURES) AMBIENT TEMPERATURE
Robert I. Bruetsch Feb. 1981 90 p refs
(PB81-243180; EPA/AA/CTAB/TA/81-7) Avail: NTIS HC A05/MF A01 CSCL 13F

The objectives of this report were to summarize the available information regarding motor vehicle emissions under non-FTP temperature conditions, investigate ambient air quality data to determine the extent to which CO emissions must be reduced to achieve ambient air quality standards, evaluate vehicle test data under non-FTP temperature conditions, estimate the difference between in-use vehicle emission levels and certification laboratory emission levels. Conclusions and recommendations based on these objectives were also considered to provide a baseline from which to assess the need for development of regulations or guidelines for motor vehicle operation under non-FTP temperature conditions and future testing procedure revisions.
GRA

N82-16963# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
COMPUTER SIMULATION OF THE EFFECT OF ROAD ROUGHNESS ON TIRE-PAVEMENT FORCES FOR AN ARTICULATED VEHICLE PERFORMING BRAKING AND CORNERING MANEUVERS Phase Report, Sep. 1977 - Apr. 1980
C. S. Kushne and P. F. Bohn Apr. 1981 95 p refs
(PB81-238461; BCE-V-270; FHWA/RD-80/029) Avail: NTIS HC A05/MF A01 CSCL 13F

An investigation of how road roughness affects the tire-pavement interface for an articulated vehicle was completed. A modified version of the three dimensional vehicle simulation was used to simulate braking and cornering maneuvers for an articulated vehicle on different road surfaces of varying severity. The results of this investigation show that the effects of road roughness are greatest when the vehicle is performing maneuvers near its performance limit. These extreme effects were not manifested for less severe cornering or braking maneuvers that would typically be encountered in nominal driving situations.
GRA

N82-16964# Transportation Systems Center, Cambridge, Mass.
LOS ANGELES DOWNTOWN PEOPLE MOVER (DPM) OPERATIONAL ANALYSIS Final Report, Jul. - Oct. 1979
Arthur S. Priver and Thomas M. Dooley Jun. 1981 40 p
(PB81-241416; DOT-TSC-UMTA-80-4; UMTA-MA-06-0081-81-1) Avail: NTIS HC A03/MF A01 CSCL 13B

The ability of the planned Los Angels Downtown People Mover (DPM) to handle the projected passenger demand for the year 2000 was studied. The question of whether the approximately 100,000 passengers per day in the year 2000 can be handled if the system headway is reduced to 60 seconds was addressed. Train capacities required at different headways to handle the demand with alternative passenger waiting time goals were examined. The approach used to analyze each issue is given, along with the underlying assumptions that were made. The results are then presented and conclusions drawn.
GRA

N82-16965# Booz-Allen and Hamilton, Inc., Philadelphia, Pa. National Analysis, Inc.
CONSUMER ORIENTATIONS TOWARD FUEL EFFICIENT VEHICLES: EXECUTIVE SUMMARY Final Report, Feb. 1978 - Nov. 1980
Robert Kernish Mar. 1981 25 p
(Contract DOT-HS-7-01782)
(PB81-245359; Rept-1-037-78-ES; DOT-HS-805939) Avail: NTIS HC A02/MF A01 CSCL 21G

Consumer reactions both to specific vehicle design changes, and more generally, to the Corporate Average Fuel Economy (CAFE) regulations were investigated. The energy supply situation which motivated their implementation is also discussed in terms of consumer reactions.
M.D.K.

N82-16966# Booz-Allen and Hamilton, Inc., Philadelphia, Pa. National Analysts, Inc.
CONSUMER ORIENTATIONS TOWARD FUEL EFFICIENT VEHICLES Final Report, Feb. 1978 - Nov. 1980
Robert Kernish Mar. 1981 118 p
(Contract DOT-HS-7-01782)
(PB81-245367; Rept-1-037-78-F; DOT-HS-805938) Avail: NTIS HC A06/MF A01 CSCL 21G

Consumer reactions to the energy supply situation and to the Corporate Average Fuel Economy (CAFE) regulations were considered. Reactions to specific vehicle design changes were also investigated and are summarized.
M.D.K.

88 SPACE SCIENCES (GENERAL)

N82-16967# Astronomische Gesellschaft, Hamburg (West Germany).
ASTRONOMICAL SOCIETY INFORMATION NO. 50. REPORTS OF THE SCIENTIFIC MEETINGS
1980 176 p refs Partly in GERMAN and ENGLISH Meetings held at Bochum, West Germany, 12-14 Mar. 1979 and Mainz, West Germany, 5-7 Mar. 1980
(Rept-50; ISSN-0374-1958) Avail: NTIS HC A09/MF A01

Topics considered include: (1) the dynamics of molecular gas in the galactic center, (2) the galactic center and Aquila regions near infrared, (3) a Fokker-Planck model for the stellar initial mass function, (4) far-infrared balloon-borne observatories, (5) the hydrostatic equilibrium of interstellar gas and magnetic fields in the 6 kpc region of the Galaxy, (6) solar rotation and activity in the past and their possible influence upon the evolution of life, and (7) the generation of spiral waves in galaxies. For individual titles, see N82-16968 through N82-16974.

N82-16968# Astronomische Gesellschaft, Hamburg (West Germany).
A FOKKER-PLANCK MODEL FOR THE STELLAR INITIAL MASS FUNCTION c90
H. Zinnecker, S. Drapatz, and R. Cowsik *In its* Astron. Soc. Inform. No. 50 1980 p 64-68 refs (For primary document see N82-16967 07-88)
Avail: NTIS HC A09/MF A01

A statistical model for distribution function for the masses of stars at birth, i.e., the Initial Mass Function, is presented. The interaction of an ensemble of quasistatic fragments (preprotostars) with their parent cloud is studied. The nuclei of fragmentation, being in magnetogravitational equilibrium, accrete material from their gaseous surroundings for an extended period until they start to collapse dynamically. A log-normal mass spectrum of fragments developed during this accretion period is shown.
N.W.

N82-16969# Astronomische Gesellschaft, Hamburg (West Germany).
THE GALACTIC CENTRE AND AQUILA REGIONS IN THE NEAR INFRARED c89
A. W. Harris, W. Hofmann, and D. Lemke *In its* Astron. Soc. Inform. No. 50 1980 p 75-76 refs (For primary document see N82-16967 07-88)
Avail: NTIS HC A09/MF A01

Observations at 2.4 microns in the near infrared with large field-of-view (approx. 1 deg) balloon-borne telescopes to provide insight to the large scale structures of the inner region of the Galaxy are summarized. Irregularities in the density of obscuring interstellar material in front of the bright Galactic center region are given in possible explanation of the 2.4 micron features. A mass to luminosity ratio for the central bulge of the Galaxy of 4.0 is estimated. Sharp decreases in 2.4 micron emission in the Galactic plane just beyond l = 30 deg and l = 50 deg are observed, suggesting sudden decreases in stellar density at these longitudes. A 5 GHz scan of this region was carried out, but no corresponding radio source was found. The nature of this source, therefore, remains unknown.
N.W.

N82-16970# Astronomische Gesellschaft, Hamburg (West Germany).

THE DYNAMICS OF MOLECULAR GAS IN THE GALACTIC CENTER c90

R. Guesten and D. Downes *In its* Astron. Soc. Inform. No. 50 1980 p 76-79 refs (For primary document see N82-16967 07-88)

Avail: NTIS HC A09/MF A01

Results of a 6 cm H2CO survey in the galactic center region are briefly summarized. Three giant molecular clouds at velocities of + 20, + 40, and + 25 km/s were seen in absorption against the continuum sources of the galactic center region. The high hydrogen-to-formaldehyde column density in the 20 km/s cloud yields 2.2 microns extinction of 5 < A sub 2.2 microns < 10 magnitudes. The H2CO maps and the submillimeter and HCN observations are compared, indicating that the + 40 km/s cloud lies on the far side of the galactic center between Sgr A West and Sgr A East. Stabilizing the clouds against tidal disruption is explained. N.W.

N82-16971# Observatorium Hoher List, Bonn (West Germany).

SOLAR ROTATION AND ACTIVITY IN THE PAST AND THEIR POSSIBLE INFLUENCE UPON THE EVOLUTION OF LIFE c92

E. H. Geyer *In* Astronomische Gesselschaft Astron. Soc. Inform. No. 50 1980 p 101-104 refs (For primary document see N82-16967 07-88)

Avail: NTIS HC A09/MF A01

Observations of enhanced spot active main sequence stars of solar type led to the formulation of the hypothesis which states that the rotational angular momentum, J sub r, of stars with spectral types later than F5 determines the intensity of their magnetic activity, bar A. Such very spot active stars are exclusively found as the components of fairly close binary stars, and show rotation periods smaller or more or less synchronous to the orbital period. Single stars of the lower main sequence are generally slow rotators, and do not show detectable activity in optical spectral regions, similar to the Sun if observed from stellar distances. Author

N82-16972# Astronomische Gesellschaft, Hamburg (West Germany).

FAR INFRARED BALLOON-BORNE OBSERVATIONS c89

S. Drapatz, L. Haser, R. Hofmann, and H. Rothermel *In its* Astron. Soc. Inform. No. 50 1980 p 109-115 refs (For primary document see N82-16967 07-88)

Avail: NTIS HC A09/MF A01

The Infrared Balloon Gondola developed at the institute was flown successfully (pointing stability achieved + or - 15 arcsec). Photometric observations (lambda > 50 microns) of the central region of the Milky Way (Sgr B2) and of another Galaxy (M 101) were carried through with high spatial resolution (beam width 1.4 arcmin obtained by the observation of Saturn). A three-axis stabilized balloon-gondola, developed for a 1-meter telescope to perform far infrared spectroscopy of astronomical sources, is discussed. In a first step this gondola was flown with a 40 cm telescope and a photometry-experiment. The main purpose of this flight (7 hrs at appox. 35 km float altitude) was to test the performance of the new balloon system with a payload which represents future experiments with the 1-m mirror in all essential details (mass distribution, power, etc). At the same time some photometry observations in the far infrared region were carried through. Author

N82-16973# Astronomische Gesellschaft, Hamburg (West Germany).

THE HYDROSTATIC EQUILIBRIUM OF INTERSTELLAR GAS AND MAGNETIC FIELDS IN THE 6kpc REGION OF THE GALAXY c90

B. Fuchs, H. Spreckels, and K. O. Thielheim *In its* Astron. Soc. Inform. No. 50 1980 p 156-160 refs (For primary document see N82-16967 07-88)

Avail: NTIS HC A09/MF A01

A two-component gas model is applied to the vertical hydrogen distribution in the 6 kpc region of the Galaxy. Galactic gravitational field and interstellar magnetic field determination of the dynamics of interstellar gas is reviewed. N.W.

N82-16974# Astronomische Gesellschaft, Hamburg (West Germany).

THE GENERATION OF SPIRAL WAVES IN GALAXIES c90

K. O. Thielheim *In its* Astron. Soc. Inform. No. 50 1980 p 161-164 refs (For primary document see N82-16967 07-88)

Avail: NTIS HC A02/MF A01

The literature of 'gravitational' density wave theory is reviewed. The theory's basic assumption, that the spiral pattern is generated by the mutual gravitational interaction of stars inside stellar disks, is examined. N-body simulations were performed. The gravitational field inside the fictitious galaxy was determined by a central oval mass distribution, which was allowed to increase slowly with time as by accretion of stars from the surrounding disk. The gravitational field was determined by an axial symmetric background, consistent with the initial mass distribution of stars inside the disk. Nevertheless, long-living spiral shaped trailing density waves were found again. It is conjectured that the oval shaped equilbrium configuration found in N-body simulation is what is otherwise observed as elliptical galaxies. N.W.

N82-16975# Astronomische Gesellschaft, Hamburg (West Germany).

ASTRONOMICAL SOCIETY INFORMATION NUMBER 51. REVIEW ARTICLES 2

1981 172 p refs Partly in GERMAN; partly in ENGLISH (Rept-51; ISSN-0374-1958) Avail: NTIS HC A08/MF A01

Evolutionary processes within the solar system are addressed. Evidence for these processes found in meteorite composition, gravitational collapse theory, tidal friction in the Earth-Moon system, and mass transfer in stars are among the topics discussed. For individual titles, see N82-16976 through N82-16985.

N82-16976# Max-Planck-Institut fuer Chemie, Mainz (West Germany).

ISOTOPIC ANOMALIES AND THE EARLY HISTORY OF THE SOLAR SYSTEM c90

Friedrich Begemann *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 49-62 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)

Avail: NTIS HC A08/MF A01

Isotopic heterogeneities found in carbonaceous chondrites are discussed in some detail. Specifically, three elements are considered: (1) inclusions from carbonaceous chondrites contain quite normal minerals where the oxygen is enriched by up to 5% in 16O; (2) the xenon in acid unsoluble residues from carbonaceous chondrites contains at least two distinct anomalous components; and (3) neon being more than 99% pure Ne is most convincingly accounted for by in situ decay of 2.6a Na which implies a condensation of Na bearing host phases within ten years or so of the production of Na. J.M.S.

N82-16977# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).

FORMATION OF THE PLANETARY SYSTEM c90

H. J. Volk *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 63-80 refs (For primary document see N82-16975 07-88)

Avail: NTIS HC A08/MF A01

The formation of planets by gravitational fragmentation of a flattened rotating solar nebula by collisional coagulation in a cool gas/dust mixture, or by recondensation and coagulation out of a hot vaporized state of the preplanetary material is discussed. The cool formation appears as the most attractive mechanism, whereas significant arguments from planetary observations and cosmochemistry can be brought forward against the two other possibilities, even if they are supported by very serious ideas. It is concluded that turbulent angular momentum and mass transport must play an important role in planet formation. Analytical estimates for the development of the dust component under these conditions suggest this cool formation to be possible within major constraints. At present the different processes are identified and reasonably carefully worked out individually, but they need to be put into a self consistent approximate model. J.M.S.

N82-16978# Bonn Univ. (West Germany).

TIDAL FRICTION IN THE EARTH-MOON SYSTEM c90

Peter Brosche *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 81-102 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

A deceleration of the Earth's rotation and also a deceleration in the mean orbital angular velocity of the moon is deduced. From ancient solar elipses, transits of Mercury, Lunar laser, Ranging and the growth rhythms of fossil animals is discussed. The corresponding decrease in the Earth's angular momentum and the increase in the angular momentum of the lunar orbit match each other. Therefore, both seem to be expressions of one and the same interaction. Of several possibilities, tidal friction connected with oceanic tides appears to be the most plausible candidate for this interaction process. Oceanographic computations reproduce the observed value of tidal friction. This provides a possible way out of the dilemma of schematic backward integrations - to reach a narrow situation between Earth and Moon. Characteristic numerical values of tidal friction are expressed by several parameters. J.M.S.

N82-16979# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Astrophysik
EARLY PHASES OF STELLAR FORMATION **c90**
Verner M. Tschermuter *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 103-116 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

Processes that promote gravitational collapse and star formation in interstellar clouds are discussed. For example, the increase of the external pressure by passing through the galactic shock, or by compression due to an expanding HII region, supernova shell, etc., may cause a cloud to become gravitationally unstable. Obstacles to star formation are mentioned: thermal pressure, angular momentum, magnetic fields. Processes are proposed to solve the angular momentum problem. In addition to magnetic braking of rotating clouds, magnetic fields are shown to stabilize clouds very effectively. From these properties some speculative conclusions concerning the initial conditions for the presolar nebula and the formation of the cometary cloud are drawn. Numerical examples carried out for self gravitating flows in two and three spatial dimensions are given. They indicate the possibility of converting a cloud's spin into orbital angular momentum by a special fragmentation process. Thus the angular momentum problem is solved by the formation of a binary (or multiple) stellar system. Models including angular momentum transport by turbulent friction and then application to the theoretical evolution of the solar nebula are also briefly mentioned. J.M.S.

N82-16980# Astronomical Inst., Utrecht (Netherlands). Space Research Lab.
MASS LOSS FROM EARLY TYPE STARS **c90**
Henny J. G. L. M. Lamers *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 117-122 refs (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

Early type stars are losing mass at a rate sufficiently large enough to affect their evolution. The determination of the mass loss rates, the dependence of mass loss on the stellar parameters, the structure of the stellar wind and the origin of the mass loss are discussed. J.M.S.

N82-16981# Amsterdam Univ. (Netherlands). Astronomical Inst.
THE FORMATION OF COMPACT OBJECTS IN BINARY SYSTEMS **c90**
E. P. J. vandenHeuvel *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 121-122 (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

The observational evidence on compact objects in binary systems is summarized. Apart from the massive and the low-mass X-ray binaries, three binary radio pulsars are now known, PSR 1913 + 16, PSR 0656 + 64, and PSR 0820 + 02. The various ways in which compact objects can be formed in interacting binary systems are outlined. Massive interacting binary systems are, after the first phase of mass transfer expected to leave either: (1) Wolf-Rayet binaries, with a wide range of orbital periods, as a result of quasi-conservative mass transfer; or (2) systems with short orbital periods as remnants of highly nonconservative evolution (spiral-in during the first phase of mass transfer). From the fact that over 2/3 of all mass stars are members of binaries with P < or = 10 yrs, it is argued that over 2/3 of all single pulsars are expected to have high runaway velocities, since they originate from disrupted post-spiral-in systems. J.M.S.

N82-16982# Observatorium Hoher List, Daun (West Germany).
WOLF-RAYET STARS WITH COMPACT COMPANIONS **c89**
Wilhelm Seggewiss *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 123-138 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

The spectral characteristics of the Wolf-Rayet (WR) stars are discussed. It is stressed that central hydrogen and helium absorption lines do not necessarily prove the binary nature of the WR star but might indicate the presence of intrinsic photospheric lines. A short summary of the main physical data of the WR stars is given. The consensus on the effective temperatures tends to stabilize at the lower limit of earlier determinations, i.e., near 30000 K corresponding to the temperature of O9 V stars. The luminosities are quite high, whereas the masses are normally in the range of only 10 solar masses. During its life a massive OB binary may undergo two Wolf-Rayet phases. The first phase will occur after Roche lobe overflow (or stellar wind mass loss) when the hydrogen rich layers are transported to the companion or lost from the stellar system and nuclear processed material is exposed. A second phase may occur when the primary star has already ended its life as a compact object (after supernova explosion) while the former secondary develops into WR star. A number of observational arguments are discussed which show that the six WR binaries with small mass functions are just in the second WR phase, i.e., are candidates for binaries with compact secondaries. J.M.S.

N82-16983# Astronomical Inst., Utrecht (Netherlands).
MAGNETIC ACTIVITY IN COOL STARS **c90**
Cornelis Zwaan *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 139-142 ref (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

The solar magnetic structure is discussed as a framework for stellar magnetism. Ways of observing magnetic structure in cool stars are outlined with emphasis on observations of Ca 2, H, and K emission in main sequence stars. It is inferred that the chromospheric, transition-region, and coronal emissions are correlated manifestations of magnetic activity in stars with convective envelopes, and that the main level of activity depends on the rotation rate. J.M.S.

N82-16984# Bonn Univ. (West Germany). Radioastronomisches Inst.
GALAXIES IN THE LIGHT OF THE 21 cm LINE **c90**
Ulrich Mebold and Klaus Reif *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 143-158 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

Correlations between the observable integral parameters of galaxies are investigated for a sample of 114 galaxies. A statistical component analysis is applied to integral parameters of galaxies. The results are discussed. J.M.S.

N82-16985# Ruhr Univ., Bochum (West Germany). Astronomisches Inst.
STRUCTURE AND DYNAMICS OF THE LARGE MAGELLANIC CLOUD **c90**
J. V. Feitzinger *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 159-174 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

The basic kinematics and dynamics of the Large Magellanic Cloud are deduced. Three main disturbances are found: a warp of the southern side of the Large Magellanic Cloud, streaming

motions in and around the bar, and streaming motions in the 30 Doradus region. By comparison of eight mass models, taking into account thickness effects and controlled by surface photometric data, the mass of the Large Magellanic Cloud is found to be (5 + or - 1) 10 to the 9th power solar mass. Dynamically the Large Magellanic Cloud is described by a dominating disk potential with an additional bar potential as a disturbance. The stochastic self-propagating star formation model is applied to the Large Magellanic Cloud. Numerical simulations produce large, irregular, and symmetric regions of massive stars which form partially ordered structures on the scale of the whole galaxy, including spiral arm filaments. The simulations also generate tremendous perturbations in the gaseous component of the Large Magellanic Cloud, the most dramatic being large holes and shells, for which there is observational evidence.
J.M.S.

N82-16986# Astronomische Gesellschaft, Hamburg (West Germany).

ASTRONOMICAL SOCIETY INFORMATION NO. 52. REPORT OF THE MEETING [MITTEILUNGEN DER ASTRONOMISCHEN GESELLSCHAFT NR. 52. BERICHT UEBER DIE VERSAMMLUNG]

1981 173 p refs Meeting held at Muenster, West Germany, 22-25 Sep. 1980
(ISSN-0374-1958) Avail: NTIS HC A08/MF A01

Observations of star clusters, quasars, and galaxies are presented. Topics include: stellar evolution, formation of disks of interstellar gases, nuclear activity in star clusters, analysis of stellar spectra, development of photometers, infrared excesses and ultraviolet excesses, and distribution of stars in the galactic halo. For individual titles, see N82-16987 through N82-17000.

N82-16987# Astronomische Gesellschaft, Hamburg (West Germany).

HIGH RESOLUTON IUE OBSERVATIONS OF THE MG II RESONANCE LINES IN THE T TAURI STAR S CrA c89

C. Bertout Appenzuller, R. Munt, and J. Krautter *In its* Astron. Soc. Inform. No. 52 1981 p 15-17 refs Sponsored in part by Deutsche Forscungsgemeinschaft (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

The star's visual brightness was recorded as m sub V = 12.13 and B-V = +0.99. A tube spectrogram shows somewhat stronger emission lines than normal in the blue spectral range (relative to the continuum). Pronounced YY Orionis profiles at all higher Balmer lines starting at H sub delta are reported. T.M.

N82-16988# Astronomische Gesellschaft, Hamburg (West Germany).

STAR POPULATIONS IN THE GALACTIC HALO c89

Roland Buser and Liang-Tai George Chiu *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 52 1981 p 40-45 refs Sponsored in part by the Swiss National Science Foundation and NSF (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

Proper motions and photographic RGUBV-photometry of faint field stars in SA 51 and SA 57 were used to investigate the stellar populations in the galactic halo. The individual stars were classified into populations according to two independent statistical methods: the reduced proper motion diagram, and the U-G, G-R two-color diagram of Becker's RGU system. The kinematically and photometrically determined populations are compared and the potentials and limitations of the RGU-photometric approach to the study of the galactic halo are discussed. T.M.

N82-16989# Astronomische Gesellschaft, Hamburg (West Germany).

TEMPERATURE CHANGE, PERIOD/AMPLITUDE RELATION FOR CLASSICAL CEPHEIDS c89

Eric W. Elst *In its* Astron. Soc. Inform. No. 52 1981 p 52-55 refs (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

Plots of color temperature change against ratio period/amplitude are presented. The plots show a linear relation for a set of stars from which it is assumed that they are pulsating in the first overtone. Higher modes of pulsation for several stars were determined. T.M.

N82-16990# Astronomische Gesellschaft, Hamburg (West Germany).

IUE OBSERVATIONS OF A NEW BL LAC OBJECT FROM THE S5 RADIO CATALOGUE c89

K. J. Fricke, W. Kollatschny, H. Schleicher, and H. W. Yorke *In its* Astron. Soc. Inform. No. 52 1981 p 61-62 ref (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

Low resolution UV spectra of Kuhr A were obtained in the wavelength regions 2000-3000 A and 2000-1100 A. The detection limit for emission lines was estimated to be approx. equally to 10 to the minus 13th power erg/sec/sq cm T.M.

N82-16991# Astronomische Gesellschaft, Hamburg (West Germany).

OPTICAL AND ULTRAVIOLET SPECTRA OF SEYFERT GALAXIES c89

K. J. Fricke, W. Kollatschny, H. Schleicher, and H. W. Yorke *In its* Astron. Soc. Inform. No. 52 1981 p 62-64 refs Sponsored in part by Deutsche Forschungsgemeinschaft (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

Using the IUE satellite, low resolution UV spectra from the Seyfert galaxies NGC 1566, NGC 7603, Akn 120, and Mkn 3 were obtained. The first two objects were observed only in the short wavelength region 1100 - 2000 A, the other two also in the long wavelength region 2000 - 300C A. The IDS spectra were reduced using the standard ESO software. Both the optical and UV spectra were corrected for interstellar extinction in our galaxy and E sub B-V values were derived from 21 cm maps. T.M.

N82-16992# Astronomische Gesellschaft, Hamburg (West Germany).

SIMULTANEOUS IUE AND OPTICAL OBSERVATIONS OF THE SHORT PERIOD SPOT ACTIVE BINARY XY URSAE MAJORIS c89

E. H. Geyer and M. Hoffmann *In its* Astron. Soc. Inform. No. 52 1981 p 70-71 refs Sponsored in part by Deutsche Forschungsgemeinschaft (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

A total of 6 UV spectra in the long wavelength range and the 6A resolution mode were obtained during the orbital phase interval 0.4 to 0.95. In addition to these IUE observations, ground based pe observations with a typical time resolution of 40s were carried out using a double beam photometer. Discussion of these two almost simultaneous observations is summarized.
T.M.

N82-16993# Astronomische Gesellschaft, Hamburg (West Germany).

THE MASS (STAR NUMBER)-RADIUS RELATIONS FOR THE CLUSTERS OF THE LARGE MAGELLANIC CLOUD c90

E. H. Geyer and U. Hopp *In its* Astron. Soc. Inform. No. 52 1981 p 71-74 refs (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

Effective cluster radii (stellar radii) and the total numbers of member stars (N sub a) within these radii were obtained from star counts on B- and V-Eso Schmidt plates for 12 open-, 5 blue-, and 4 red globular clusters of the large Magellanic Cloud. There exist two linear relations between log N sub a and log stellar radii seperately for the open- and the globular clusters, but with identical slopes. T.M.

N82-16994# Astronomische Gesellschaft, Hamburg (West Germany).

NON-STATIONARY VISCOUS GASEOUS DISKS IN NUCLEI OF DENSE STELLAR SYSTEMS c90

W. Glatzel and K. J. Fricke *In its* Astron. Soc. Inform. No. 52 1981 p 74-75 Sponsored in part by the German Science Foundation (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

Evolutionary mass loss from stars and the production of gas in stellar collisions within a rotating star cluster leads to the formation of a gaseous disk at the center if the cooling of the gas is sufficiently fast. It is concluded that due to the time scales involved the disk cannot have reached a stationary state during the Hubble time. The outer region of the disk is dominated by pure mass inflow. In the center the density grows exponentially with time. This growth is universal and it may be indicative for the formation of a compact object at the center. T.M.

N82-16995# Astronomische Gesellschaft, Hamburg (West Germany).
EQUILIBRIUM AND STABILITY OF ROTATING STELLAR CORES WITH FINITE ENTROPY **c90**
W. Glatzel, K. J. Fricke, and M. ElEid *In its* Astron. Soc. Inform. No. 52 1981 p 75-76 refs Sponsored in part by Deutsche Forschungsgemeinschaft (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

The thermodynamical and mechanical structure of fast spinning cores of evolved massive stars is important for the processes of supernova explosion, pulsar formation, and gravitational radiation emission during core collapse. Marginally unstable configurations were established according to the present knowledge on the thermodynamic structure of evolved stellar cores assuming Maclaurin spheroids for the description of the rotational state. T.M.

N82-16996# Astronomische Gesellschaft, Hamburg (West Germany).
INFRARED-EXCESS OF PECULIAR B- AND A-STARS **c89**
D. Groote and J. P. Kaufmann *In its* Astron. Soc. Inform. No. 52 1981 p 82-84 refs (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

Results show that the measured infrared-excess appears to be a common phenomena for all spectral types from at least B0 to F0. Excess always appears when there is a minimum in the u-brightness, so that at least part of the radiation absorbed in the u-band is remitted from circumstellar gas probably by free-free emission. T.M.

N82-16997# Astronomische Gesellschaft, Hamburg (West Germany).
EVOLUTION AND NUCELOSYNTHESIS OF MASSIVE POP 111 STARS **c90**
W. W. Ober, M. ElEid, and K. J. Fricke *In its* Astron. Soc. Inform. No. 52 1981 p 118-119 refs Sponsored in part by the German Science Foundation (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

Observations of the oldest stars in the galactic halo and in metal-deficient globular clusters show evidence of heavy elements in their atmospheres. The enrichment of primordial material with heavy elements in a pregalactic phase by massive stars was calculated. Results are presented which may be adduced for the interpretation of heavy element abundances in old stars, high redshift quasars, and intergalactic X-ray clusters. T.M.

N82-16998# Astronomische Gesellschaft, Hamburg (West Germany).
THE NEW OPTICAL (300 nm LESS THAN LAMBDA LAMBDA LESS THAN 1000 nm) ESO PHOTOMETER **c74**
G. F. O. Schnur *In its* Astron. Soc. Inform. No. 52 1981 p 128-130 (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

The photometer provides the following optical possibilities: large field viewing, necessary for acquisition of the objects; slit viewing, to be used in combination with the reflecting inclined slitjaws of spectrographs for guiding on the slit; and as main element, an integrating TV system. The disaphragm wheel of the photometer was placed on top of all other elements and inclined by the same amount as the slitjaws of the spectrographs are. T.M.

N82-16999# Astronomische Gesellschaft, Hamburg (West Germany).
NUCLEAR ACTIVITY IN SO, SBO - GALAXY NUCLEI **c90**
G. F. O. Schnur and W. A. Sherwood *In its* Astron. Soc. Inform. No. 52 1981 p 130-131 (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

Thirty-five galaxies were surveyed. Results show that 10 galaxies (29%) show pure-absorption line spectra. In 10 galaxies (29%) the Balmer Lines were detected indicating physical conditions that are difficult to be explained by H II-region like phenomena. T.M.

N82-17000# Astronomische Gesellschaft, Hamburg (West Germany).
THE 1 MM OBSERVATIONS OF OPTICALLY SELECTED QUASARS **c89**
W. A. Sherwood, E. Kreysa, and G. V. Schultz *In its* Astron. Soc. Inform. No. 52 1981 p 138-140 refs Sponsored in part by DFG/SFB (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

Using the prime focus of a 3.6 m telescope and a composite bolometer operating at a wavelength of 1 mm three samples of objects identified as quasars in optical surveys were observed and confirmed with slit spectra. The UV excess and/or emission lines, and redshift characteristics are discussed. T.M.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-17001*# Alabama Univ. in Huntsville.
X-RAY ASTRONOMY INSTRUMENTATION STUDIES Final Report
John C. Gregory Nov. 1981 6 p refs
(Contract NAS8-33977)
(NASA-CR-161948) Avail: NTIS HC A02/MF A01 CSCL 03A

Preliminary designs were made for a multiplane, multiwire position sensitive proportional counter for X-ray use. Anode spacing was 2 mm and cathode spacing 1 mm. Assistance was provided in setting up and operating two multiwire proportional counters, one with 5 mm anode spacing, and the other with 2 mm spacing. Argon-based counter gases were used for preliminary work in assembling a working experimental system to measure xenon fluorescence yields. The design and specification of a high purity gas filling system capable of supplying mixtures of xenon and other gases to proportional counters was also performed. The system is mounted on a cart, is fully operational, and is flexible enough to be easily used as a pumping station for other clean applications. When needed, assistance was given to put into operation various computer-related pieces of equipment. A.R.H.

N82-17002*# California Inst. of Tech., Pasadena.
FABRICATION OF X-RAY TELESCOPES FOR SOUNDING ROCKET FLIGHTS Final Report
11 Sep. 1981 21 p refs
(Grant NGR-05-002-284)
(NASA-CR-165112) Avail: NTIS HC A02/MF A01 CSCL 03A

Two X-ray telescopes and two detector systems were fabricated, and one of the telescopes (15 in. diameter, Wolter type I telescope) was flown on two sounding rocket flights. The telescopes were fabricated using the diamond point technique which provided the accurate figure of the mirrors to about a focal plane blur of 0.5 arc minutes. The 15 in. telescope mirrors were polished using standard polishing techniques to remove tooling marks from the diamond turning, then chemically polished to bring the X-ray reflectivity up to nearly the theoretical values. The optical image formed by the 15 in. telescope was found to produce a blur of about 40 arc seconds for a parallel beam of incoming laser light. The first flight of the telescope produced an X-ray image of Capella which indicated that the X-ray image was blurred to the extent of about 2 arc minutes. This additional image degradation was due to a slight error in focusing the X-ray image onto the detector. S.L.

N82-17003# California Univ., Santa Cruz. Board of Studies in Astronomy and Astrophysics.
THERMONUCLEAR MODEL FOR GAMMA-RAY BURSTS
Stanford E. Woosley 26 Aug. 1981 23 p refs Presented at the Workshop on Gamma Ray Transients and Related Astrophys.

Phenomena, La Jolla, Calif., 5-8 Aug. 1981 Submitted for publication Prepared in cooperation with Calif. Univ., Lawrence Livermore Lab.
(Contract W-7405-eng-48; Grants NSF AST-79-09102; NSF AST-81-08509)
(DE81-030835; UCRL-86611; CONF-810871-2) Avail: NTIS HC A02/MF A01

The evolution of magnetized neutron stars with field strengths of approx. 10 to the 12th power gauss that are accreting mass onto kilometer-sized polar regions at a rate of approx 10 to the 13th power solar mass/yr is examined. Based on the results of one dimensional calculations, one finds that stable hydrogen burning, mediated by the 'hot' CNO-cycle, will lead to a critical helium mass in the range 10 to the 20th to 22nd power g km(-2). Owing to the extreme degeneracy of the electron gas providing pressure support, helium burning occurs as a violent thermonuclear runaway which may propagate either as a convective deflagration or as a detonation wave. Complete combustion of helium into (56)Ni pushes hot plasma above the surface of the neutron star. Rapid expansion of the plasma channels a substantial fraction of the explosion energy into magnetic field stress. The hard gamma-outburst of several seconds softens as the event proceeds and is followed by a period, typically of several minutes duration, of softer X-ray emission as the subsurface ashes of the thermonuclear explosion cool. DOE

N82-17004# California Univ., Livermore. Lawrence Livermore Lab.
THE 3-D ON THE 7600-STAR-CRAY
V. Kransky 17 Sep. 1981 18 p Presented at the CRAY User Conf., Schliersee, West Germany, 28 Sep. - 1 Oct. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-030889; UCRL-86693; CONF-810960-1) Avail: NTIS HC A02/MF A01

COM3 is a large three dimensional Eulerian Program (over 2500 vector flops per cycle) which was formulated to make use of vectors entirely (> 99%). COM3 was programmed to make use of Class VI computers efficiently and achieves Class VI high performance execution rates on both the Star and Cray computers (28 to 32 megaflops net rate). A comparison of the COM3 performance on the 7600, Star and Cray computers is given with emphasis on how the program achieved its current execution rate on the Cray. DOE

N82-16102*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RADIO ASTRONOMY
R. D. Shaffer, G. S. Levy, H. C. Wilck, M. J. Grimm, S. Gulkis, T. B. Kuiper, and E. T. Olsen *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 1-3 (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 03A

N82-16969# Astronomische Gesellschaft, Hamburg (West Germany).
THE GALACTIC CENTRE AND AQUILA REGIONS IN THE NEAR INFRARED
A. W. Harris, W. Hofmann, and D. Lemke *In its* Astron. Soc. Inform. No. 50 1980 p 75-76 refs (For primary document see N82-16967 07-88)
Avail: NTIS HC A09/MF A01

N82-16972# Astronomische Gesellschaft, Hamburg (West Germany).
FAR INFRARED BALLOON-BORNE OBSERVATIONS
S. Drapatz, L. Haser, R. Hofmann, and H. Rothermel *In its* Astron. Soc. Inform. No. 50 1980 p 109-115 refs (For primary document see N82-16967 07-88)
Avail: NTIS HC A09/MF A01

N82-16982# Observatorium Hoher List, Daun (West Germany).
WOLF-RAYET STARS WITH COMPACT COMPANIONS
Wilhelm Seggewiss *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 123-138 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

N82-16987# Astronomische Gesellschaft, Hamburg (West Germany).
HIGH RESOLUTON IUE OBSERVATIONS OF THE MG II RESONANCE LINES IN THE T TAURI STAR S CrA
C. Bertout Appenzeller, R. Munt, and J. Krautter *In its* Astron. Soc. Inform. No. 52 1981 p 15-17 refs Sponsored in part by Deutsche Forscungsgemeinschaft (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-16988# Astronomische Gesellschaft, Hamburg (West Germany).
STAR POPULATIONS IN THE GALACTIC HALO
Roland Buser and Liang-Tai George Chiu *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 52 1981 p 40-45 refs Sponsored in part by the Swiss National Science Foundation and NSF (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-16989# Astronomische Gesellschaft, Hamburg (West Germany).
TEMPERATURE CHANGE, PERIOD/AMPLITUDE RELATION FOR CLASSICAL CEPHEIDS
Eric W. Elst *In its* Astron. Soc. Inform. No. 52 1981 p 52-55 refs (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-16990# Astronomische Gesellschaft, Hamburg (West Germany).
IUE OBSERVATIONS OF A NEW BL LAC OBJECT FROM THE S5 RADIO CATALOGUE
K. J. Fricke, W. Kollatschny, H. Schleicher, and H. W. Yorke *In its* Astron. Soc. Inform. No. 52 1981 p 61-62 ref (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-16991# Astronomische Gesellschaft, Hamburg (West Germany).
OPTICAL AND ULTRAVIOLET SPECTRA OF SEYFERT GALAXIES
K. J. Fricke, W. Kollatschny, H. Schleicher, and H. W. Yorke *In its* Astron. Soc. Inform. No. 52 1981 p 62-64 refs Sponsored in part by Deutsche Forschungsgemeinschaft (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-16992# Astronomische Gesellschaft, Hamburg (West Germany).
SIMULTANEOUS IUE AND OPTICAL OBSERVATIONS OF THE SHORT PERIOD SPOT ACTIVE BINARY XY URSAE MAJORIS
E. H. Geyer and M. Hoffmann *In its* Astron. Soc. Inform. No. 52 1981 p 70-71 refs Sponsored in part by Deutsche Forschungsgemeinschaft (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-16996# Astronomische Gesellschaft, Hamburg (West Germany).
INFRARED-EXCESS OF PECULIAR B- AND A-STARS
D. Groote and J. P. Kaufmann *In its* Astron. Soc. Inform. No. 52 1981 p 82-84 refs (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-17000# Astronomische Gesellschaft, Hamburg (West Germany).
THE 1 MM OBSERVATIONS OF OPTICALLY SELECTED QUASARS
W. A. Sherwood, E. Kreysa, and G. V. Schultz *In its* Astron. Soc. Inform. No. 52 1981 p 138-140 refs Sponsored in part by DFG/SFB (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-17005 Academy of Sciences (USSR), Moscow.
THE EVOLUTION OF DENSITY PERTURBATION IN AN OPEN UNIVERSE
I. K. Rozgacheva 1981 32 p refs Submitted for publication (Rept-670) Copyright. Avail: Issuing Activity

The evolution of density perturbations in an open Universe is considered. Numerical computations take into account the presence of the microwave background radiation and massless weakly interacting particles. It is shown that in the case of an open Universe omega H(2) < 0.3 observational data contradict modern theories of the formation of galaxies. M.G.

N82-17006# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SUBROUTINES FOR CELESTIAL MECHANICS AND ORBIT GENERATION [ROTINAS AUXILIARES DE MECANICA CELESTE E GERACAO DE ORBITA]
Helio Koiti Kuga, Valdemir Carrara, and Valder Matos DeMadeiros Jul. 1981 38 p refs In PORTUGUESE; ENGLISH summary (INPE-2180-RPE/392) Avail: NTIS HC A03/MF A01

Frequently calculated parameters in celestial mechanics and orbital dynamics are numerically treated. The subroutines are optimized in terms of the input-output parameters, methods used, and internal computations. The objectives of the subroutines and the input-output parameters are described. J.D.H.

N82-16968# Astronomische Gesellschaft, Hamburg (West Germany).
A FOKKER-PLANCK MODEL FOR THE STELLAR INITIAL MASS FUNCTION
H. Zinnecker, S. Drapatz, and R. Cowsik *In its* Astron. Soc. Inform. No. 50 1980 p 64-68 refs (For primary document see N82-16967 07-88)
Avail: NTIS HC A09/MF A01

N82-16970# Astronomische Gesellschaft, Hamburg (West Germany).
THE DYNAMICS OF MOLECULAR GAS IN THE GALACTIC CENTER
R. Guesten and D. Downes *In its* Astron. Soc. Inform. No. 50 1980 p 76-79 refs (For primary document see N82-16967 07-88)
Avail: NTIS HC A09/MF A01

N82-16973# Astronomische Gesellschaft, Hamburg (West Germany).
THE HYDROSTATIC EQUILIBRIUM OF INTERSTELLAR GAS AND MAGNETIC FIELDS IN THE 6kpc REGION OF THE GALAXY
B. Fuchs, H. Spreckels, and K. O. Thielheim *In its* Astron. Soc. Inform. No. 50 1980 p 156-160 refs (For primary document see N82-16967 07-88)
Avail: NTIS HC A09/MF A01

N82-16974# Astronomische Gesellschaft, Hamburg (West Germany).
THE GENERATION OF SPIRAL WAVES IN GALAXIES
K. O. Thielheim *In its* Astron. Soc. Inform. No. 50 1980 p 161-164 refs (For primary document see N82-16967 07-88)
Avail: NTIS HC A02/MF A01

N82-16976# Max-Planck-Institut fuer Chemie, Mainz (West Germany).
ISOTOPIC ANOMALIES AND THE EARLY HISTORY OF THE SOLAR SYSTEM
Friedrich Begemann *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 49-62 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

N82-16977# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).
FORMATION OF THE PLANETARY SYSTEM
H. J. Volk *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 63-80 refs (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

N82-16978# Bonn Univ. (West Germany).
TIDAL FRICTION IN THE EARTH-MOON SYSTEM
Peter Brosche *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 81-102 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

N82-16979# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Astrophysik.
EARLY PHASES OF STELLAR FORMATION
Werner M. Tscharnuter *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 103-116 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

N82-16980# Astronomical Inst., Utrecht (Netherlands). Space Research Lab.
MASS LOSS FROM EARLY TYPE STARS
Henny J. G. L. M. Lamers *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 117-122 refs (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

N82-16981# Amsterdam Univ. (Netherlands). Astronomical Inst.
THE FORMATION OF COMPACT OBJECTS IN BINARY SYSTEMS
E. P. J. vandenHeuvel *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 121-122 (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

N82-16983# Astronomical Inst., Utrecht (Netherlands).
MAGNETIC ACTIVITY IN COOL STARS
Cornelis Zwaan *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 139-142 ref (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

N82-16984# Bonn Univ. (West Germany). Radioastronomisches Inst.
GALAXIES IN THE LIGHT OF THE 21 cm LINE
Ulrich Mebold and Klaus Reif *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 143-158 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

N82-16985# Ruhr Univ., Bochum (West Germany). Astronomisches Inst.
STRUCTURE AND DYNAMICS OF THE LARGE MAGELLANIC CLOUD
J. V. Feitzinger *In* Astronomische Gesellschaft Astron. Soc. Inform. No. 51 1981 p 159-174 refs In GERMAN; ENGLISH summary (For primary document see N82-16975 07-88)
Avail: NTIS HC A08/MF A01

N82-16993# Astronomische Gesellschaft, Hamburg (West Germany).
THE MASS (STAR NUMBER)-RADIUS RELATIONS FOR THE CLUSTERS OF THE LARGE MAGELLANIC CLOUD
E. H. Geyer and U. Hopp *In its* Astron. Soc. Inform. No. 52 1981 p 71-74 refs (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-16994# Astronomische Gesellschaft, Hamburg (West Germany).
NON-STATIONARY VISCOUS GASEOUS DISKS IN NUCLEI OF DENSE STELLAR SYSTEMS
W. Glatzel and K. J. Fricke *In its* Astron. Soc. Inform. No. 52

1981 p 74-75 Sponsored in part by the German Science Foundation (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-16995# Astronomische Gesellschaft, Hamburg (West Germany).
EQUILIBRIUM AND STABILITY OF ROTATING STELLAR CORES WITH FINITE ENTROPY
W. Glatzel, K. J. Fricke, and M. ElEid *In its* Astron. Soc. Inform. No. 52 1981 p 75-76 refs Sponsored in part by Deutsche Forschungsgemeinschaft (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-16997# Astronomische Gesellschaft, Hamburg (West Germany).
EVOLUTION AND NUCELOSYNTHESIS OF MASSIVE POP 111 STARS
W. W. Ober, M. ElEid, and K. J. Fricke *In its* Astron. Soc. Inform. No. 52 1981 p 118-119 refs Sponsored in part by the German Science Foundation (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-16999# Astronomische Gesellschaft, Hamburg (West Germany).
NUCLEAR ACTIVITY IN SO, SBO - GALAXY NUCLEI
G. F. O. Schnur and W. A. Sherwood *In its* Astron. Soc. Inform. No. 52 1981 p 130-131 (For primary document see N82-16986 07-88)
Avail: NTIS HC A08/MF A01

N82-17062*# Clemson Univ., S.C. Dept. of Physics and Astronomy.
KINETIC THEORY IN ASTROPHYSICS AND COSMOLOGY
John R. Ray *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 21 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 03B

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N82-17007 Academy of Sciences (USSR), Moscow.
THE ROLE OF THE CRITICAL IONIZATION VELOCITY PHENOMENA IN THE PRODUCTION OF INNER COMA COMETARY PLASMA
V. Formisano (European Space Research and Technology Center, Noordwijk, Netherlands), A. A. Galeev, and R. Z. Sagdeev 1981 23 p refs
(Rept-626) Copyright. Avail: Issuing Activity

The critical velocity required to trigger the anomalous ionization of a neutral gas by plasma flow is theoretically calculated for a model based on lower hybrid instability. It depends strongly on the plasma and gas parameters, defining the instability development of the ionized atoms beam in the counter-streaming plasma. In particular, the possible role of a critical ionization mechanism for Halley's comet is examined. The fulfillment of both the Townsend condition for the self-sustained beam plasma discharge and the Alfven condition for the critical velocity mechanism indicates that this mechanism may work only within 10,000 km from the cometary nucleus and gives the ion production rate close to that observed for the Kohoutek comet. M.G.

N82-17008*# Indiana Univ., Bloomington.
RECONNAISSANCE AND RECOVERY OF THE BRIGHTER ASTEROIDS. BRIEF SUMMARY OF THE ENTIRE PROJECT Final Technical Report
Frank K. Edmonson and H. John Wood 26 Feb. 1982 17 p refs
(Grant NAGw-98)
(NASA-CR-165101) Avail: NTIS HC A02/MF A01 CSCL 03B

An inexpensive method of baking large (8- by 10-inch) IIIa-J plates in 2 percent forming gas was found and successfully tested. The large storage capacity and fine grain structure of the emulsion made the sky fog negligible on plates of one-hour exposure at Link. Plates were taken through the end of October 18, 1981 on various asteroids from the recent critical lists published in the Minor Planet Circulars and the Russian Ephemeris of Minor Planets. A.R.H.

N82-17009*# Planetary Science Inst., Pasadena, Calif.
VIKING ORBITER STEREO IMAGING CATALOG
Karl R. Blasius, Amelia V. Vertrone, Blake H. Lewis, and Michael D. Martin (JPL, Pasadena, Calif.) Washington NASA Feb. 1982 404 p refs
(Contracts NASw-3208; JPL-954149)
(NASA-CR-3501) Avail: NTIS HC A18/MF A01 CSCL 03B

The extremely long mission of the two Viking Orbiter spacecraft produced a wealth of photos of surface features. Many of these photos can be used to form stereo images allowing the student of Mars to examine a subject in three dimensional. This catalog is a technical guide to the use of stereo coverage within the complex Viking imaging data set. Author

N82-17010*# National Aeronautics and Space Administration, Washington, D. C.
ADVANCES IN PLANETARY GEOLOGY
Alex Woronow, ed. Nov. 1981 722 p refs
(NASA-TM-84412) Avail: NTIS HC A99/MF A01 CSCL 03B

Three dissertations are provided covering (1) the stochastic evolution of asteroidal regoliths and the origin of brecciated and gas-rich meteorites; (2) ridge systems on Mars; and (3) the morphology and evolution of Ganymede and Callisto. For individual titles, see N82-17011 through N82-17013.

N82-17011*# Arizona Univ., Tucson. Dept. of Planetary Sciences.
THE STOCHASTIC EVOLUTION OF ASTEROIDAL REGOLITHS AND THE ORIGIN OF BRECCIATED AND GAS-RICH METEORITES Ph.D. Thesis
Kevin Richard Housen *In* NASA. Washington Advan. in Planetary Geol. Nov. 1981 p 1-218 refs (For primary document see N82-17010 07-91)
Avail: NTIS HC A99/MF A01 CSCL 03B

A model is constructed which views regolith evolution on asteroids as a stochastic process. Average values are shown to be poor descriptors of regolith depth. The utility of the average depth is not significantly increased by avoiding large craters or thick ejecta deposits, a procedure adopted in previous regolith studies. The statistical uncertainty associated with regolith depth severely limits the power of regolith models in predicting parent-body size for brecciated meteorites. A Monte Carlo algorithm was used to simulate the random walks and corresponding charged-particle irradiation histories of grains in regoliths. On rocky asteroids, only about 20 percent of the grains was exposed to solar cosmic ray ions. Results based on present-day conditions in the asteroid belt agree well with irradiation features observed in gas-rich meteorites. An origin during epochs of early solar system evolution is not required. N.W.

N82-17012*# George Washington Univ., Washington, D.C. Graduate School of Arts and Sciences.
RIDGE SYSTEMS OF MARS M.S. Thesis
Ann Windslow Gifford *In* NASA. Washington Advan. in Planetary Geol. Nov. 1981 p 222-364 refs (For primary document see N82-17010 07-91)
Avail: NTIS HC A99/MF A01 CSCL 03B

Mare-type ridges on the Planet Mars were mapped and described based on Viking images. The ridges mapped range from 5 to 400 km long and 1 to 8 km wide. Most ridges on Mars are on plains and plateau units; 4,321 ridges with a total length of 153,835 km were mapped on these unit types. Ridges which resemble lunar mare ridges were also mapped in craters, basins, and several volcanic calderas on Mars. Mapping of ridges on a global scale reveals that they are preferentially developed in older, thinner plains units probably of flood basalt origin. Measuring the trends of ridges in plains units on Mars shows that there is a planetwide predominance of north, northwest and northeast trends. It is proposed that ridges are compressional tectonic features which have formed in response to changes in the planet's rotational equilibrium figure early in its history. In addition, the Tharsis uplift has created a regional stress system which accounts for the trends of ridges in areas near by. Ridges in craters and basins are similarly caused by shortening across the basin in response to regional stresses. N.W.

N82-17013*# Cornell Univ., Ithaca, N. Y.
THE MORPHOLOGY AND EVOLUTION OF GANYMEDE AND CALISTO Ph.D. Thesis
Steven Weldon Squyres *In* NASA. Washington Advan. in Planetary Geol. Nov. 1981 p 369-718 refs (For primary document see N82-17010 07-91)
Avail: NTIS HC A99/MF A01 CSCL 03B

Images of Ganymede and Callisto, Jupiter's two largest moons, among the largest known predominantly icy planetary objects, were obtained by the two Voyager spacecraft. Voyager images were used to investigate the surface characteristics, geologic processes, and internal evolution of Ganymede and Callisto. Ganymede shows two principal types of terrain: one dark, old, and heavily cratered; and another brighter, younger, and characterized by complex patterns of grooves. Voyager imagers were used to determine photometric properties of surface features on both bodies at phase angles up to 120 deg. Surface temperatures are calculated for the major terrain types. Callisto is found to be somewhat warmer than Ganymede. The temperature difference between grooved and cratered terrain on Ganymede is small. A model for the origin of grooved terrain is considered in which extension creates broad, downdropped rift zones in the crust that are filled with water or ice from below. N.W.

N82-17064*# University of Western Kentucky, Bowling Green. Dept. of Physics and Astronomy.
RAY TRACING STUDIES OF JUPITER'S MAGNETOSPHERE
N. Frank Six *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 16 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 03B

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-17014*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VARIATIONS OF THE SOLAR CONSTANT
Sabatino Sofia, ed. Dec. 1981 285 p refs Workshop held in Greenbelt, Md., 5-7 Nov. 1980
(NASA-CP-2191) Avail: NTIS HC A13/MF A01 CSCL 03B

The variations in data received from rocket-borne and balloon-borne instruments are discussed. Indirect techniques to measure and monitor the solar constant are presented. Emphasis is placed on the correlation of data from the Solar Maximum Mission and the Nimbus 7 satellites. For individual titles, see N82-17015 through N82-17041.

N82-17015*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SENSITIVITY OF THE EARTH'S CLIMATE TO CHANGES
Gerald R. North *In its* Variations of the Solar Constant Dec. 1981 p 1-10 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Climate modeling is discussed with emphasis on the control of major parameters in such modeling. Possible feedbacks which operate on long time scales and are therefore not testable directly, are also discussed. Examples of simplified models are presented. The accuracy of several models is assessed and suggestions for improvements for climatic modeling are given. T.M.

N82-17016*# San Diego State Univ., Calif. Dept. of Astronomy.
REVIEW OF GROUND-BASED MEASUREMENTS
Ronald J. Angione *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 11-30 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Early measurements of the solar constant are described and discussed with particular emphasis on the Smithsonian program. A brief description is given of the monitoring program currently operating at San Diego State. T.M.

N82-17017*# Denver Univ., Colo.
CHANGE IN THE SOLAR CONSTANT BETWEEN 1968 AND 1978
John J. Kosters and David G. Murcray *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 31-36 refs (For primary document see N82-17014 07-92)
(Grant NSF ATM-79-03677)
Avail: NTIS HC A13/MF A01 CSCL 03B

Solar irradiance measurements made from a balloon on January 27, 1978 and February 10, 1980 show a change of 0.4% over similar measurements made in 1968. This change is greater than the uncertainty of the measurement and is felt to be the result of a change in the solar constant. T.M.

N82-17018*# Physikalisch-Meteorologisches Observatorium, Davos (Switzerland).
THE VARIABILITY OF THE SOLAR OUTPUT
Claus Froehlich *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 37-44 refs Sponsored by the Swiss National Science Foundation (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

A review of solar constant determinations and measurements of its spectral distribution is presented. For the period from 1966 to 1980 a mean value of 1367 Wm-2 was determined. Within the corresponding uncertainty, no significant change of both the integral value and the spectral distribution can be detected. However, short term solar variations and their spectral dependence were deduced from measurements during four hours on June 20, 1980 from 34 km altitude with amplitudes of + or - 500 ppm at 368 nm, of 200 ppm at 500 nm and + or - 150 ppm at 778 nm. Comparison with simultaneous total irradiance data of the Solar Maximum Mission (SMM) shows a high correlation which indicates the solar origin. The power spectrum shows a weak peak at about 3.2 mHz, which corresponds to the frequency of the 5 minutes solar oscillation. T.M.

N82-17019*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A SUMMARY OF RESULTS FROM SOLAR MONITORING ROCKET FLIGHTS
Charles H. Duncan *In its* Variations of the Solar Constant Dec. 1981 p 45-58 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Three rocket flights to measure the solar constant and provide calibration data for sensors aboard Nimbus 6, 7, and Solar Maximum Mission (SMM) spacecraft were accomplished. The values obtained by the rocket instruments for the solar constant in SI units are: 1367 w/sq m on 29 June 1976; 1372 w/sq m on 16 November 1978; and 1374 w/sq m on 22 May 1980. The uncertainty of the rocket measurements is + or - 0.5%. The values obtained by the Hickey-Frieden sensor on Nimbus 7 during the second and third flights was 1376 w/sq m. The value obtained by the Active Cavity Radiometer Model IV (ACR IV) on SMM during the flight was 1368 w/sq m. T.M.

N82-17020*# Eppley Lab., Inc., Newport, R.I.
SOLAR VARIABILITY INDICATIONS FROM NIMBUS 7 SATELLITE DATA
J. R. Hickey, B. M. Alton, F. J. Griffin, H. Jacobowitz (NOAA), P. Pellegrino (NOAA), E. A. Smith (Colorado State Univ.), T. H. VonderHaar (Colorado State Univ.), and R. H. Maschhoff (Gulton Industries) *In* NASA. Goddard space Flight Center Variations of the Solar Constant Dec. 1981 p 59-72 refs (For primary

document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

The cavity pyrheliometer sensor of the Nimbus 7 Earth Radiation Experiment indicated low-level variability of the total solar irradiance. The variability appears to be inversely correlated with common solar activity indicators in an event sense. the limitations of the measuring system and available data sets are described. Author

N82-17021*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INDIRECT METHODS FOR MEASURING VARIATIONS OF THE SOLAR CONSTANT
Sabatino Sofia *In its* Variations of the Solar Constant Dec. 1981 p 73-79 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

The difference between the methods that measure delta S, and those that measure variations in the solar luminosity, delta L, is discussed. It is shown that the past practice of simply relating delta S to delta L by geometrical arguments is not valid because of anisotropy of the solar radiation. It is concluded that direct techniques prove the existence of short term variability that is fully explainable in terms of the passage of active regions (spots and faculae) on the face of the Sun. The observations of changes in the solar diameter support the existence of structurally induced variations of the solar luminosity on timescales of tens of years, which are significant in the understanding of climatic variations. T.M.

N82-17022*# Institute for Advanced Study, Princeton, N.J.
SOLAR NUTRINOS
John N. Bahcall *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 81-93 refs (For primary document see N82-17014 07-92)
(Grant NSF PHY-79-19884)
Avail: NTIS HC A13/MF A01 CSCL 03B

The topics covered include: an overview of the subject of solar neutrinos, a brief summary of the theory of stellar evolution, a description of the main sources of solar neutrinos, a brief summary of the results of the Brookhaven C1-37 experiment, an anaysis of the principal solar neutrino experiments, and a discussion of how solar neutrino experiments can be used to detect the collapse of stars in the Galaxy. A description of how the Ga-71 experiment can be used to decide whether the origin of the present discrepancy between theory and observation lies in conventional solar models or conventional physics is presented. T.M.

N82-17023*# Kitt Peak National Observatory, Tucson, Ariz.
OBSERVED VARIABILITY IN THE FRAUNHOFER LINE SPECTRUM OF SOLAR FLUX, 1975 - 1980
William Livingston, H. Holweger (Inst. fuer Theoretische Physik und Sternwarte, Kiel, West Germany), and O. R. White (National Center for Atmospheric Research) *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 95-109 refs Sponsored by NSF (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Over the five years double-pass spectrometer observations of the Sun-as-a-star revealed significant changes in line intensities. The photospheric component weakened linearly with time 0 to 2.3%. From a lack of correlation between these line weakenings and solar activity indicators like sunspots and plage, a global variation of surface properties is inferred. Model-atmosphere analysis suggests a slight reduction in the lower-photospheric temperature gradient corresponding to a 15% increase in the mixing length within the granulation layer. Chromospheric lines such as Ca II H and K, Ca II 8543 and the CN band head weaken synchronously with solar activity. Thus, the behavior of photospheric and chromospheric lines is markedly different, with the possibility of secular change for the former. T.M.

N82-17024*# Naval Observatory, Washington, D. C.
THE HORIZONTAL AND VERTICAL SEMI-DIAMETERS OF THE SUN OBSERVED AT THE CAPE OF GOOD HOPE (1834 - 1887) AND PARIS (1837 - 1906): A REPORT ON WORK IN PROGRESS
Clayton Smith and Dan Messina (Maryland Univ.) *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 111-116 refs Sponsored by NASA (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Cape and Paris meridian observations of the solar limbs which permit an estimate to be made of the solar semi-diameter were surveyed, sampled, and compared with Greenwich and U.S. Naval Observatory observations. Significant systematic errors were found in the Paris work and have been correlated with changes of instruments and observers. Results from the Cape series indicate that work should continue on the compilation of data from Cape observations of the Sun. T.M.

N82-17025*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ECLIPSE RADIUS MEASUREMENTS
David W. Dunham (Computer Sciences Corp.), Joan Bixby Dunham (Computer Sciences Corp.), Alan D. Fiala (Naval Observatory), and Sabatino Sofia *In its* Variations of the Solar Constant Dec. 1981 p 117-120 refs Sponsored in part by Naval Observatory (For primary document see N82-17014 07-92)
(Contract NAS5-24350; Grant NSF ATM-77-23757)
Avail: NTIS HC A13/MF A01 CSCL 03B

Methods for predicting the path edges and reducing observations of total solar eclipses for determining variations of the solar radius are described. Analyzed observations of the 1925 January eclipse show a 0.7 (arc second) decrease in the solar radius during the past fifty years. T.M.

N82-17026*# Arizona Univ., Tucson. Dept. of Physics.
SCLERA SOLAR DIAMETER OBSERVATIONS
Henry A. Hill, Thomas P. Caudell, and Randall J. Bos *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 123-128 refs Sponsored in part by NASA and DOE (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Focus is given to possible variations in solar luminosity and accurate methods of monitoring it. Aside from direct bolometry, one methodology for this type of research makes use of measurements of the solar diameter and limb darkening function as indirect indicators of the solar luminosity. This approach was reviewed. T.M.

N82-17027*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOLAR RADIUS MEASUREMENTS
T. L. Duvall, Jr. and H. P. Jones *In its* Variations of the Solar Constant Dec. 1981 p 129-130 refs Prepared in cooperation with Kitt Peak National Observatory, Tucson, Ariz. (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Preliminary results of measurements made during 1979-1980 are discussed. Variability in the radius measurements of 0.4 pi is found, of unknown origin. Author

N82-17028*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ESTIMATING SHORT-TERM SOLAR VARIATIONS BY A SIMPLE ENVELOPE MATCHING TECHNIQUE
Kwing L. Chan and Sabatino Sofia *In its* Variations of the Solar Constant Dec. 1981 p 131-136 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

A simple matching technique is explained which allows the computation of the response of the solar surface to perturbations which occur at any depth within the convective envelope of the Sun. This technique was applied to a perturbation of the convective efficiency (alpha-mechanism), and of the non-gas component of the pressure (beta-mechanism) in different regions of the convection zone. The results indicate that either perturbation affects the solar luminosity. However, the alpha-mechanism has little effect in the solar radius, regardless of the location of the perturbed region, whereas the beta-mechanism produces radius changes that become quite large if the location of the perturbed region is deep within the solar convection zone. Author

N82-17029*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.

THERMAL PERTURBATION OF THE SUN

L. W. Twigg and A. S. Endal *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 137-142 refs (For primary document see N82-17014 07-92)
(Grant NAG5-13)
Avail: NTIS HC A13/MF A01 CSCL 03B

An investigation of thermal perturbations of the solar convective zone via changes in the mixing length parameter were carried out, with a view toward understanding the possible solar radius and luminosity changes cited in the literature. The results show that: (a) a single perturbation of alpha is probably not the cause of the solar radius change and (b) the parameter W = d lambda nR./d lambda nL. can not be characterized by a single value, as implied in recent work. Author

N82-17030*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

EFFECTS OF CHANGES IN CONVECTIVE EFFICIENCY ON THE SOLAR RADIUS AND LUMINOSITY

A. V. Sweigart *In its* Variations of the Solar Constant Dec. 1981 p 143-164 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

A sequence of solar models has been constructed in order to investigate the sensitivity of the solar radius and luminosity to small changes in the ratio alpha of the mixing length lambda to the pressure-scale height Hp throughout the solar convective envelope. The basic procedure for determining this sensitivity was to impose a perturbation in alpha within the convective envelope and then to follow the resulting changes in the solar radius delta R and luminosity delta L for the next 10 to the 6th power yrs. These calculations gave the following results. (1) A perturbation in alpha produces immediate changes in the solar radius and luminosity. Initially delta L and delta alpha are related by delta L/L = 0.30 delta alpha/alpha. (2) The value of the ratio w = delta log R/delta log L is strongly time dependent. Its value just after the perturbation in alpha is 6.5 x 10 to the minus 4th power. (3) The ratio H = (delta log L) d delta log R/dt is much less time dependent and is a more suitable means for relating the changes in the solar radius and luminosity. (4) Both of these ratios imply that for any reasonable change in the solar luminosity the corresponding change in the solar radius is negligible. Author

N82-17031*# Centre National de la Recherche Scientifique, Paris (France).

AN INSTRUMENT TO MEASURE THE SOLAR SPECTRUM FROM 170 TO 3200 nm ON BOARD SPACELAB

G. Thuiller, P. C. Simon (Inst. d'Aeronomie Spatiale de Belgique), R. Pastiels (Inst. d'Aeronomie Spatiale de Belgique), D. Labs (Landessternwarte), and H. Meckel (Hamburger Sternwarte) *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 165-173 refs (For primary document see N82-17014 07-92)
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This instrument, at the present time in development, will fly on board Spacelab I in May 1983. Other flights are foreseen during the following missions. The instrument is composed of three double monochromators covering the range 170 to 3200 nm. The spectrometers have bandpasses of 1 nm up to 900 nm and 20 nm from 850 to 3200 nm with an accuracy 1/100 nm. Calibration lamps are included in the instrument to monitor any change of its sensitivity and wavelength scale. Author

N82-17032*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.

EVOLUTIONARY VARIATIONS OF SOLAR LUMINOSITY

Andrew S. Endal *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 175-183 refs (For primary document see N82-17014 07-92)
(Grants NAG5-13; NSF AST-79-19688)
Avail: NTIS HC A13/MF A01 CSCL 03B

Theoretical arguments for a 30% increase in the solar luminosity over the past 4.7 billion years are reviewed. A scaling argument shows that this increase can be predicted without detailed numerical calculations. The magnitude of the increase is independent of nuclear reaction rates, as long as conversion of hydrogen to helium provides the basic energy source of the Sun. The effect of the solar luminosity increase on the terrestrial climate is briefly considered. It appears unlikely that an enhanced greenhouse effect, due to reduced gases (NH3, CH4), can account for the long-term paleoclimatic trends. Author

N82-17033*# Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.

ON THE SEAT OF THE SOLAR CYCLE

Douglas Gough *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 185-206 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

A discussion of some of the issues raised in connection with the seat of the solar cycle are presented. Is the cycle controlled by a strictly periodic oscillator that operates in the core, or is it a turbulent dynamo confined to the convection zone and possibly a thin boundary layer beneath it? Sunspot statistics are discussed, with a view to ascertaining the length of the memory of the cycle, without drawing a definitive conclusion. Also discussed are some of the processes that might bring about variations delta L and delta R in the luminosity and the radius of the photosphere. It appears that the ratio W = delta lnR/delta lnL increases with the depth of the disturbance that produces the variations, so that imminent observations might determine whether or not the principal dynamical processes are confined to only the outer layers of the Sun. Author

N82-17034*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

SHORT AND LONG TERM VARIATIONS IN THE SOLAR CONSTANT

Kenneth H. Schatten *In its* Variations of the Solar Constant Dec. 1981 p 207-217 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Short and long term variations in the solar constant are examined theoretically. The variations observed by the Solar Maximum Mission, lasting several days and associated with the passage of sunspot groups, strikingly demonstrates the well known lack of a bright ring effect around sunspots. This suggests that sunspot magnetic fields do not simply block the heat flowing upward into the photosphere. Rather, it is suggested that gravitational draining occurs; this cools sunspots and transports downward the heat that would otherwise flow into the photosphere. A model of sunspot temperature with depth shows modest support when compared with the empirical model of Van't Veer. Secular trends in the solar constant may occur and be associated with the influence of the convection zone magnetic field upon convective heat transport. As a start to understanding this problem, the Schwarzschild criterion has been modified to include the effects of magnetic field. Author

N82-17035*# Lowell Observatory, Flagstaff, Ariz.

MONITORING SOLAR-TYPE STARS

G. Wesley Lockwood *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 219-227 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Old UBV and recent uvby photometry of solar-type dwarfs and other standard stars yield an upper limit of variability (determined by observational errors) of about 0.004 mag rms. A factor two improvement in this upper limit is achievable. Author

N82-17036*# Arizona Univ., Tucson. Dept. of Physics.

SOLAR PULSATIONS AND LONG-TERM SOLAR VARIABILITY

Philip R. Goode, Jerry D. Logan, and Harry A. Hill *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 229-233 refs Sponsored in part by NSF, AFOSR and DOE (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

The seismology of the solar atmosphere is important in relating changes in luminosity to variations in other observables. This approach has already led to the identification of properties which were not previously observed or recognized. Equally important results from solar seismology are expected in the future. Author

N82-17037*# Carnegie Institution of Washington, Pasadena, Calif.
OBSERVATIONS OF LARGE-SCALE MOTIONS OF THE SUN
Barry LaBonte *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 235-240 refs Sponsored in part by NASA, NSF and ONR (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Recent observations of large-scale mass motions on the Sun are discussed. The principal large-scale velocity flows are convection, rotation, meridional flow, and torsional and radial oscillations. Author

N82-17038*# Oak Ridge Associated Universities, Tenn. Inst for Energy Analysis.
THE COMBINED SOLAR AND TIDAL INFLUENCE IN CLIMATE
P. R. Bell *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 241-255 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

To provide an early warning indication of the CO2 warning signal, we are searching for periodic or projectable trends in climate. The strong 20.5 year oscillation in Eastern North American January temperature found by Mock and Hibler shows evidence of a beat between waves with periods of 22.36 (22.21 to 22.55) years and 18.64 (18.45 to 18.79) years with an opposition at about 1880. These are interpreted to be the 22.279 year solar Hale magnetic cycle and the 18.61 year lunar nodal tidal cycle. The lunar nodal cycle is known to produce changes in the sea surface temperature through increased mixing of the mixed layer of the ocean. This beat note is shown to be evident in the Western High Plains drought record of Mitchell, Stockton and Meko and to provide a better bit to the drought series, especially at the beat oppositions in 1880 and 1770. Author

N82-17039*# Oak Ridge Associated Universities, Tenn. Inst. for Energy Analysis.
PREDOMINANT PERIODS IN THE TIME SERIES OF DROUGHT AREA INDEX FOR THE WESTERN HIGH PLAINS AD 1700 TO 1962
P. R. Bell *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 257-264 refs (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

The detection of the combined presence of the Hale magnetic sunspot cycle (22.28 years) and the lunar nodal tidal cycle (18.61 years) in both the Eastern North American January air temperatures and the Western U.S. High Plains drought series led to an extended analysis of the Drought Area Index time series. This analysis indicated that the mean dominant period of the drought series should be 20.0 to 20.5 years and that the principal period should be resolvable into two components of about 22.28 and 18.61 years. This note details the successful accomplishment of this task. Author

N82-17040*# Kitt Peak National Observatory, Tucson, Ariz.
VARIATION OF THE SOLAR He I 1830 A LINE: 1977 - 1980
J. W. Harvey *In* NASA. Goddard Space Flight Center Variations of the Solar Constant Dec. 1981 p 265-272 refs Sponsored by NSF (For primary document see N82-17014 07-92)
Avail: NTIS HC A13/MF A01 CSCL 03B

Daily measurements of the equivalent width of the 10830 A He I line integrated over the visible disk show: (1) an increase from about 32 to about 74 mA in the monthly mean values from the minimum to the maximum of the current solar cycle; (2) the monthly mean values are more smoothly varying than most other indices of solar activity; (3) rotation modulates the daily values in a highly variable manner with amplitudes as large as plus or minus 20%; (4) the apparent synodic rotation period is 29 days rather than the expected 27 days associated with active regions; (5) despite great differences in the appearance of the sun in 3933 A Ca I and 10830 A He I, the central intensity of the former correlates with the equivalent width of the latter with a value r = 0.97. Author

N82-17041*# New York Univ., N. Y. Courant Inst. of Mathematical Sciences.
A PROSPECTUS FOR A THEORY OF VARIABLE VARIABILITY
S. Childress and E. A. Spiegel (Columbia Univ., New York) *In* NASA. Goddard Space Flight Center Variables of the Solar Constants Dec. 1981 p 273-291 refs (For primary document see N82-17014 07-92)
(Grants NSF PHY-77-27086; NSF MCS-79-02766)
Avail: NTIS HC A13/MF A01 CSCL 03B

It is proposed that the kind of stellar variability exhibited by the Sun in its magnetic activity cycle should be considered as a prototype of a class of stellar variability. The signature includes long 'periods' (compared to that of the radial fundamental model), erratic behavior, and intermittency. As other phenomena in the same variability class we nominate the liminosity fluctuations of ZZ Ceti stars and the solar 160 m oscillation. We discuss the possibility that analogous physical mechanisms are at work in all these cases, namely instabilities driven in a thin layer. These instabilities should be favorable to grave modes (in angle) and should arise in conditions that may allow more than one kind of instability to occur at once. The interaction of these competing instabilities produces complicated temporal variations. Given suitable idealizations, it is shown how to begin to compute solutions of small, but finite, amplitude. Author

N82-17042# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
EXPERIMENTAL COMPREHENSIVE SOLAR FLARE INDICES FOR MAJOR AND CERTAIN LESSER FLARES, 1975-1979
Helen W. Dodson, comp. and E. Ruth Hedeman, comp. Jul. 1981 42 p refs Prepared for NOAA, Boulder, Colo.
(PB82-109497; UAG-80; NOAA-81081103) Avail: NTIS HC A03/MF A01 CSCL 03B

Data for solar cycle 20 and information for the ascending branch of cycle 21 are presented. Five components comprise the 'profile' of the flare. The sum of the five gives the comprehensive flare index (CF). Values of the CFI are derived for flares that are considered to have been well above average in either ionizing, H alpha, or radio frequency radiation. GRA

N82-16971# Observatorium Hoher List, Bonn (West Germany).
SOLAR ROTATION AND ACTIVITY IN THE PAST AND THEIR POSSIBLE INFLUENCE UPON THE EVOLUTION OF LIFE
E. H. Geyer *In* Astronomische Gesselschaft Astron. Soc. Inform. No. 50 1980 p 101-104 refs (For primary document see N82-16967 07-88)
Avail: NTIS HC A09/MF A01

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-16109*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ARCSECOND POSITIONS FOR MILLIARSECOND VLBI NUCLEI OF EXTRAGALACTIC RADIO SOUCES. PART 1: 546 SOURCES
D. D. Morabito, R. A. Preston, M. A. Slade, and D. L. Jauncey (CSIRO, Sydney) *In its* The Telecommun. and Data Acquisition Rept. 15 Dec. 1981 p 37-48 refs (For primary document see N82-16101 07-12)
Avail: NTIS HC A16/MF A01 CSCL 03B

99 GENERAL

N82-17043*# Alabama Univ. in Huntsville.
THE 1981 NASA/ASEE SUMMER FACULTY FELLOWSHIP PROGRAM: RESEARCH REPORTS Final Report, 1 Jun. - 7 Aug. 1981
Gerald R. Karr, James B. Dozier, Marion I. Kent, and B. F. Barfield Jan. 1982 578 p refs Prepared in cooperation with NASA. Marshall Space Flight Center and Alabama Univ., University
(Grant NGT-01-008-021)
(NASA-CR-161855) Avail: NTIS HC A25/MF A01 CSCL 05I

Research reports related to spacecraft industry technological advances, requirements, and applications were considered. Some of the topic areas addressed were: (1) Fabrication, evaluation, and use of high performance composites and ceramics, (2) antenna designs, (3) electronics and microcomputer applications and mathematical modeling and programming techniques, (4) design, fabrication, and failure detection methods for structural materials, components, and total systems, and (5) chemical studies of bindary organic mixtures and polymer synthesis. Space environment parameters were also discussed. For individual titles, see N82-17044 through N82-17080.

N82-17044*# Tennessee Technological Univ., Cookeville. Dept. of Chemistry.
DEVELOPMENT OF TOUGHENED EPOXY POLYMERS FOR HIGH PERFORMANCE COMPOSITE AND ABLATIVE APPLICATIONS c27
Vernon R. Allen *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 17 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 07C

A survey of current procedures for the assessment of state of cure in epoxy polymers and for the evaluation of polymer toughness as related to nature of the crosslinking agent was made to facilitate a cause-effect study of the chemical modification of epoxy polymers. Various conformations of sample morphology were examined to identify testing variables and to establish optimum conditions for the selected physical test methods. Dynamic viscoelasticity testing was examined in conjunction with chemical analyses to allow observation of the extent of the curing reaction with size of the crosslinking agent the primary variable. Specifically the aims of the project were twofold: (1) to consider the experimental variables associated with development of 'extent of cure' analysis, and (2) to assess methodology of fracture energy determination and to prescribe a meaningful and reproducible procedure. The following is separated into two categories for ease of presentation. M.D.K.

N82-17045*# Vanderbilt Univ., Nashville, Tenn. Dept. of Civil and Environmental Engineering.
A DETERMINATION OF THE CURRENT DENSITY IN ELECTRON BEAMS c72
Robert J. Beil *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 31 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20H

Current gathering rotating probe techniques were used to examine the envelope shape and power density profile of electron beams used in electron beam welding devices. The electron power density contours which determine the shape of the weld vapor cavity, penetration, and local heat distribution were considered. A mathematical analysis consistent with a rotating probe technique necessary to determine the current density distribution (assumed symmetrically radial) in a cross-section of the beam is provided. An explanation of the experimental technique for obtaining data, a BASIC language computer program to determine the current density from the data, and a study indicating the level of confidence to be associated with results obtained are also provided. An example of the application of the analysis to some experimental electron beam data is included. M.D.K.

N82-17046*# Eastern Connecticut State College, Willimantic. Dept. of Mathematical Sciences.
FUEL OPTIMAL MANEUVERS FOR SPACECRAFT WITH FIXED THRUSTERS c18
Thomas C. Carter *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 21 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 22B

Several mathematical models, including a minimum integral square criterion problem, were used for the qualitative investigation of fuel optimal maneuvers for spacecraft with fixed thrusters. The solutions consist of intervals of 'full thrust' and 'coast' indicating that thrusters do not need to be designed as 'throttleable' for fuel optimal performance. For the primary model considered, singular solutions occur only if the optimal solution is 'pure translation'. 'Time optimal' singular solutions can be found which consist of intervals of 'coast' and 'full thrust'. The shape of the optimal fuel consumption curve as a function of flight time was found to depend on whether or not the initial state is in the region admitting singular solutions. Comparisons of fuel optimal maneuvers in deep space with those relative to a point in circular orbit indicate that qualitative differences in the solutions can occur. Computation of fuel consumption for certain 'pure translation' cases indicates that considerable savings in fuel can result from the fuel optimal maneuvers. M.D.K.

N82-17047*# Alabama A & M Univ., Huntsville. Dept. of Chemistry.
SOLIDIFICATION PHENOMENA OF BINARY ORGANIC MIXTURES c23
Kichoon Chang *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 20 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 07A

The coalescence rates and motion of liquid bubbles in binary organic mixtures were studied. Several factors such as temperature gradient, composition gradient, interfacial tension, and densities of the two phases play important roles in separation of phases of immiscible liquids. An attempt was made to study the effect of initial compositions on separation rates of well-dispersed organic mixtures at different temperatures and, ultimately, on the homogeneity of solidification of the immiscible binary organic liquids. These organic mixtures serve as models for metallic pseudo binary systems under study. Two specific systems were investigated: ethyl salicylate - diethyl glycol and succinonitrile - water. M.D.K.

N82-17048*# James Madison Univ., Harrisonburg, Va. Dept. of Mathematics and Computer Science.
TOLERANCE ANALYSIS OF OPTICAL TELESCOPES USING COHERENT ADDITION OF WAVEFRONT ERRORS c74
John W. Davenport *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Feb. 1982 19 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20F

A near diffraction-limited telescope requires that tolerance analysis be done on the basis of system wavefront error. One method of analyzing the wavefront error is to represent the wavefront error function in terms of its Zernike polynomial expansion. A Ramsey-Korsch ray trace package, a computer program that simulates the tracing of rays through an optical telescope system, was expanded to include the Zernike polynomial expansion up through the fifth-order spherical term. An option to determine a 3 dimensional plot of the wavefront error function was also included in the Ramsey-Korsch package. Several assimulation runs were analyzed to determine the particular set of coefficients in the Zernike expansion that are effected by various errors such as tilt, decenter and despace. A 3 dimensional plot of each error up through the fifth-order spherical term was also included in the study. Tolerance analysis data are presented. M.D.K.

N82-17049*# North Georgia Coll., Dahlonega. Dept. of Physics.
DEVELOPMENT OF PHOTOMULTIPLIER ELECTRONICS AND COMPUTER INTERFACING SOFTWARE FOR A HIGH SPEED PHOTOELECTRIC PHOTOMETER-STOKE'S METER c61

Terry R. Flesch *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 21 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 09B

Preliminary stages in the design, construction, and development of a photoelectric photometer system interfaced with an IMSAI 8080 microcomputer. The instrument will also include magnetic tape and magnetic disk storage capabilities to enable rapid data storage. The capability of the instrument to make observations with very high time resolution, as high as 10 msec, and measure the intensity and polarization of radiation emitted by objects which show very rapid light variations, pulsars and optical counterparts of X-ray sources was of concern. A better understanding of the magnetic fields and interstellar material which characterize the immediate environment of these stellar systems and an expansion of the observational capabilities of even modest-sized telescopes are expected. M.D.K.

N82-17050*# Mississippi State Univ., State College. Dept. of Chemical Engineering.
DEVELOPMENT OF HIGH STRENGTH, HIGH TEMPERATURE CERAMICS c27
William B. Hall *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 11 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 07C

Improvement in the high-pressure turbopumps, both fuel and oxidizer, in the Space Shuttle main engine were considered. The operation of these pumps is limited by temperature restrictions of the metallic components used in these pumps. Ceramic materials that retain strength at high temperatures and appear to be promising candidates for use as turbine blades and impellers are discussed. These high strength materials are sensitive to many related processing parameters such as impurities, sintering aids, reaction aids, particle size, processing temperature, and post thermal treatment. The specific objectives of the study were to: (1) identify and define the processing parameters that affect the properties of Si3N4 ceramic materials, (2) design and assembly equipment required for processing high strength ceramics, (3) design and assemble test apparatus for evaluating the high temperature properties of Si3N4, and (4) conduct a research program of manufacturing and evaluating Si3N4 materials as applicable to rocket engine applications. M.D.K.

N82-17051*# University of Central Florida, Orlando. Dept. of Physics.
A PRELIMINARY STUDY OF THE PARTICULATE FALLOUT FROM THE SPACE SHUTTLE (STS-1) c16
G. Martin Hudson *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 8 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 22B

Prediction of acid fallout and the dry deposition of Al2O3 was the objective of this investigation. Sampling was done at the Kennedy Space Center in Florida. The models available were not appropriate and the data available was negligible. Thus, a bimodal particle distribution was assumed normalized to the few existing data points and used as a foundation for a crude zeroth order approximation for the acid fallout. In addition, a settling spectrum for the Al2O3 particles was devised as a table look-up since the graphs in the literature at first pass could not be fitted with reasonable analytic functions. Consulting services were rendered to researchers. Special emphasis was placed on improving current techniques and adding LIDAR (Light Radar). Suggestions for future studies are made. M.D.K.

N82-17052*# Fort Valley State Coll., Ga. Dept. of Electronic Engineering Technology.
DETECTION AND ANALYSIS OF RADIO FREQUENCY LIGHTNING EMISSIONS c33
Fereydoun Jalali *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 20 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 09C

The feasibility study of detection of lightning discharges from a geosynchronous satellite requires adequate ground-based information regarding emission characteristics. In this investigation, a measurement system for collection of S-band emission data is set up and calibrated, and the operations procedures for rapid data collection during a storm activity developed. The system collects emission data in two modes: a digitized, high-resolution, short duration record stored in solid-state memory, and a continuous long-duration record on magnetic tape. Representative lightning flash data are shown. Preliminary results indicate appreciable RF emissions at 2 gHz from both the leader and return strokes portions of the cloud-to-ground discharge with strong peaks associated with the return strokes. Author

N82-17053*# Carroll Coll., Helena, Mont. Dept. of Mathematics and Physics.
A STUDY OF THE VENT PIPE FOR THE GRAVITY PROBE-B c15
Ronald N. Knoshaug *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 19 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 22B

The Gravity Probe B experiment to test Einstein's relativity theory is a possible Space Shuttle project. Cooling of the gyroscopes and thrusting of the Probe into a zero-drag environment is accomplished by vaporizing liquid helium and venting the gas from the Probe through a nozzle system. In order to avoid malfunctioning of this cooling-thruster system, the pressure difference across the vent pipe-thruster system must be maintained to be less than the vapor pressure of liquid helium at the given temperature. This study investigated helium gas flow through the vent pipe for various configurations, mass flow rates, and pipe diameters. In addition, pertinent properties of both liquid and gaseous helium were investigated. It was observed that helical coiling of the pipe about the Dewar caused less frictional drag and less pressure change than did sharp pipe bending. Also, for various flow rates and nozzle throat area sizes, the system would malfunction for a given bath temperature. Author

N82-17054*# Missouri Univ. -Rolla. Dept. of Metallurgical Engineering.
THE DETERMINATION OF THE STACKING FAULT ENERGY IN COPPER-NICKEL ALLOYS c26
H. P. Leighly, Jr. *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 9 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 11F

Methods for determining the stacking fault energies of a series of nickel-copper alloys to gain an insight into the embrittling effect of hydrogen are evaluated. Plans for employing weak beam dark field electron microscopy to determine stacking fault energies are outlined. J.D.H.

N82-17055*# Alabama Univ. in Huntsville. Dept. of Chemistry.
SYNTHESIS OF AMINOSILANE AND AROMATIC DIAMINE INTERMEDIATES FOR POLYMERIZATION c27
Samuel P. McManus *In its* The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 9 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 07C

The preparation of monomers for use in a study to improve properties of epoxy polymers and silicone elastomers is described. Various approaches to the solution of the synthesis of aminosilane and diamine curing agents were examined. Ortho-, meta-, and para-substituted diamines where X is CH2, C(CH3)2, O, S, NH, or SO2 and n = 0, 1, 2, and 3 were investigated. J.D.H.

N82-17056*# Alabama A & M Univ., Huntsville. Dept. of Civil Engineering.
A STUDY OF COMPONENT DESIGN LOADS DUE TO DYNAMIC ENVIRONMENT c39
Rajinder S. Mehta *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 12 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20K

The random vibration of the components of the space shuttle causing internal cargo bay acoustic impingement on the payload was investigated. The import factors to be considered in the design of acoustically loaded structures are the prediction of acoustic environment, prediction of structural response to this environment, and to determine the effect of the response on the structural strength requirements. Two basic responses were analyzed. The primary structure response due to random vibration is first analyzed. The output of primary structure response is used as an input to the secondary structure to calculate the component response. J.D.H.

N82-17057*# Clarkson Coll. of Technology, Potsdam, N.Y. Dept. of Electrical and Computer Engineering.

ATTITUDE CONTROL OF THE SPACE CONSTRUCTION BASE: A MODULAR APPROACH **c18**

Daniel A. OConnor *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 35 p (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 22B

A planar model of a space base and one module is considered. For this simplified system, a feedback controller which is compatible with the modular construction method is described. The systems dynamics are decomposed into two parts corresponding to base and module. The information structure of the problem is non-classical in that not all system information is supplied to each controller. The base controller is designed to accommodate structural changes that occur as the module is added and the module controller is designed to regulate its own states and follow commands from the base. Overall stability of the system is checked by Liapunov analysis and controller effectiveness is verified by computer simulation. J.D.H.

N82-17058*# Auburn Univ., Ala. Dept. of Mathematics.

A STUDY OF THE GEOGRAPHIC COVERAGE PROPERTIES OF A SATELLITE BORNE DOPPLER LIDAR WIND VELOCITY MEASURING SYSTEM **c47**

Thomas H. Pate *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 26 p (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 04B

Geographic coverage frequency and geographic shot density for a satellite borne Doppler lidar wind velocity measuring system are measured. The equations of motion of the light path on the ground were derived and a computer program devised to compute shot density and coverage frequency by latitude-longitude sections. The equations for the coverage boundaries were derived and a computer program developed to plot these boundaries, thus making it possible, after an application of a map coloring algorithm, to actually see the areas of multiple coverage. A theoretical cross-swath shot density function that gives close approximations in certain cases was also derived. This information should aid in the design of an efficient data-processing system for the Doppler lidar. J.D.H.

N82-17059*# South Carolina State Coll., Orangeburg. Dept. of Natural Sciences.

THE DESIGN AND EVALUATION OF SUPERCONDUCTING CONNECTORS **c33**

James E. Payne *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 10 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 09A

The development of a superconducting connector for superconducting circuits on space flights is described. It is proposed that such connectors be used between the superconducting readout loop and the SQUID magnetometer in the Gravity Probe B experiment. Two types of connectors were developed. One type employs gold plated niobium wires making pressure connections to gold plated niobium pads. Lead-plated beryllium-copper spring contacts can replace the niobium wires. The other type is a rigid solder or weld connection between the niobium wires and the niobium pads. A description of the methods used to produce these connectors is given and their performance analyzed. J.D.H.

N82-17060*# South Carolina State Coll., Orangeburg. Dept. of Natural Sciences.

A STUDY OF OPTICALLY CONTACTED QUARTZ AT CRYOGENIC TEMPERATURES **c74**

Linda L. Payne *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 9 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20F

Optical contacting as a method of joining the quartz components of the instruments for the Gravity Probe-B experiment is evaluated. The strength of the bond between optically contacted fused quartz surfaces at liquid helium temperature was investigated. A test apparatus which can be used for making measurements of the tensile strength of these bonds was designed. Results of the tensile pull tests are given and the reliability of such bonds analyzed. J.D.H.

N82-17061*# Clemson Univ., S.C. Dept. of Physics and Astronomy.

MATTER IN GENERAL RELATIVITY **c77**

John R. Ray *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 13 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20J

Two theories of matter in general relativity, the fluid theory and the kinetic theory, were studied. Results include: (1) a discussion of various methods of completing the fluid equations; (2) a method of constructing charged general relativistic solutions in kinetic theory; and (3) a proof and discussion of the incompatibility of perfect fluid solutions in anisotropic cosmologies. Interpretations of NASA gravitational experiments using the above mentioned results were started. Two papers were prepared for publications based on this work. N.W.

N82-17062*# Clemson Univ., S.C. Dept. of Physics and Astronomy.

KINETIC THEORY IN ASTROPHYSICS AND COSMOLOGY **c90**

John R. Ray *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 21 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 03B

Results associated with exact solution of the Einstein-Boltzmann and Einstein-Maxwell-Boltzmann equations are presented. The generalization of Ehler's killing vector approach for the distribution function to charged particles is considered. N.W.

N82-17063*# Alabama Univ. in Huntsville. Dept. of Mathematics.

SURFACE CONTOUR OF A BIAXIALLY STRAINED, DOUBLY CURVED ANTENNA REFLECTIVE MESH **c39**

Annie V. Saylor *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE summer Fac. Fellowship Program Jan. 1982 11 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20K

The elastic membrane equations which describe the deflection of a biaxially tensioned reflective mesh from an idealized surface were developed and solved. The conditions of equilibrium of the forces acting on a membrane element furnish equations which may be used to solve a variety of problems. Configurations considered include continuous, as well as incremental mesh attachment to structural members to form shapes which are approximately parabolic or spherical. N.W.

N82-17064*# University of Western Kentucky, Bowling Green. Dept. of Physics and Astronomy.

RAY TRACING STUDIES OF JUPITER'S MAGNETOSPHERE **c91**

N. Frank Six *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 16 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 03B

Raypaths for decametric wavelength radiation in Jupiter's magnetosphere were calculated. The model-dependent raypaths with the Voyager observations were compared. Characteristics of the source regions and the influence of propagation effects were deduced. A three dimensional ray tracing program was employed to calculate the raypaths. Families of rays were launched at particular angles with respect to the magnetic field lines to generate conical sheets of radiation for various frequencies and various source locations. As the planet's magnetic field rotates, these warped sheets of radiation sweep past the observer, producing signatures in frequency versus time plots. These signatures match some of those found in the Voyager data. The greatest propagation effects occur in and around the source regions in the Io auroral oval. N.W.

N82-17065*# Newberry Coll., S.C. Dept. of Mathematics and Physics.

THUNDERSTORM ELECTRIC FIELD MODELLING c47

Arjun Tan *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 10 p refs (For primary document see N82-17043 07-99)

Avail: NTIS HC A25/MF A01 CSCL 04B

Calculation of electric field vectors within and near an isolated thundercloud (which has a given volume charge distribution) is envisaged. The maximum field strength within the thundercloud is calculated. The effects of screening layers, both above and below the thundercloud may be investigated, as well time-dependent potential problem. The study can lead to a better understanding of the charge distributions in a thundercloud, which in turn may shed some light on the actual mechanism of charging of a thundercloud. N.W.

N82-17066*# Alabama A & M Univ., Huntsville. Dept. of Physics.

DETERMINATION OF THE EFFICIENCY OF A PROPORTIONAL COUNTER FOR DETECTING X-RAYS c35

Alton C. Williams *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 6 p (For primary document see N82-17043 07-99)

Avail: NTIS HC A25/MF A01 CSCL 14B

A parallel beam of X-rays (approximately monoenergetic) passing through a rectangular slit and scattering from two flat mirrors comprise the X-ray test. The two mirrors are arranged in a periscope geometry so that the final reflected beam is parallel to the incident beam but displaced laterally by given amount. One of the detectors used to intercept the reflected X-rays is a one dimensional gas-filled proportional counter which is sensitive to the position (in 1 dimension) at which the X-rays are incident within its detecting 'window'. The total length of the anode wire of the proportional counter is 120 mm and this length can be divided electronically into a maximum of 1,024 parts. Hence, the output of an experimental run would be the number of incident X-rays that registered on each of the 1,024 channels. Each channel would represent an X-ray at a different spatial location and, hence, at a different scattering angle. In order to look at a wider range of scattering angles, the detector is placed on an optical table which can be rotated. N.W.

N82-17067*# Tennessee Univ. Space Inst., Tullahoma. Dept. of Engineering Science and Mechanics.

SOLIDIFICATION OF A BINARY MIXTURE c26

Basil N. Antar *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 15 p refs (For primary document see N82-17043 07-99)

Avail: NTIS HC A25/MF A01 CSCL 11F

The time dependent concentration and temperature profiles of a finite layer of a binary mixture are investigated during solidification. The coupled time dependent Stefan problem is solved numerically using an implicit finite differencing algorithm with the method of lines. Specifically, the temporal operator is approximated via an implicit finite difference operator resulting in a coupled set of ordinary differential equations for the spatial distribution of the temperature and concentration for each time. Since the resulting differential equations set form a boundary value problem with matching conditions at an unknown spatial point, the method of invariant imbedding is used for its solution. N.W.

N82-17068*# Alabama Univ. in Huntsville. Dept. of Education.

ASSESSMENT OF MSFC'S SUPERVISORY TRAINING PROGRAMS AND COURSES c80

Thomas A. Brindley *In its* The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 13 p refs (For primary document see N82-17043 07-99)

Avail: NTIS HC A25/MF A01 CSCL 05I

Courses and special programs to train supervisors at Marshall Space Flight Center (MSFC) were to determine the adequacy of the present MSFC Supervisory Training Program and to recommend changes, if appropriate. The content, procedures, and student evaluations of the required Office of Personnel Management (OPM) 80 hours training for supervisors, the optional 120 hours, the MSFC Management Development Program (MDP), NASA's Management Education Program (MEP), various OPM and special contract programs, pertinent procedural guidelines, regulations, and letters, as well as various MSFC computer reports which indicate who took what training were analyzed. Various interviews with MSFC personnel involved in training are included. Recommendations consist of: (1) the choice of courses selected for the basic required OPM 80 hours be improved; (2) the optional 120 hours be discontinued and a shorter module be developed dealing with managerial decision making and human relations skills; (3) the MDP and MEP be continued as at present; and (4) that a broad array of developmental strategies be incorporated to provide a variety of opportunities for supervisory improvement. N.W.

N82-17069*# Alabama Univ., University. Dept. of Mathematics.

DIGITAL COMPENSATION TECHNIQUES FOR THE EFFECTS OF TIME LAG IN CLOSED-LOOP SIMULATION USING THE 6 DOF MOTION SYSTEM c61

Richard Brown *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 30 p refs (For primary document see N82-17043 07-99)

Avail: NTIS HC A25/MF A01 CSCL 09B

Efforts are continued to develop digital filter compensation schemes for the correction of momentum gains observed in the closed loop simulation of the docking of two satellites using the 6 DOF motion system. Several filters that work well for small delays (< .100ms) and a non-preloaded probe are discussed. N.W.

N82-17070*# Alabama Univ. in Huntsville. Dept. of Physics.

A NEW SPS ANTENNA DESIGN TO REDUCE GRATING LOBES c32

C. H. Chan *In its* The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 14 p refs (For primary document see N82-17043 07-99)

Avail: NTIS HC A25/MF A01 CSCL 20N

In the Solar Power Satellite system, the antenna's misalignment will produce well defined grating lobes. These gratings lobe peaks occur every 440 km and are potentially hazardous to the environment. One way to suppress these peaks is to phase control every power module. The cost due to the increase in receiving electronics and processors, however, could prove to be prohibitive. A new design of the antenna involving the addition of two broad gaps, one along the x axis and another along the y axis is proposed. The gap distance is exactly one half of the distance between the center of two neighboring subarrays. Calculation of far field radiation patterns shows that the design reduces grating lobe peaks without sacrificing power in the main lobe. N.W.

N82-17071*# Alabama Univ. in Huntsville. Dept. of Physics.

ALUMINUM AND CHROMIUM ION PARTICLE STUDIES FOR ENHANCEMENT OF SURFACE PROPERTIES c26

In its the 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 12 p refs (For primary document see N82-17043 07-99)

Avail: NTIS HC A25/MF A01 CSCL 11F

An experimental project was undertaken which produced ion plated coatings on steel substrates. About twenty tensile samples of 4340 steel were ion plated in the Denton system with aluminum using resistance heating evaporation boats. In the V.T.A. 7375 system, ten samples were chromium ion plated; four on 4340 steel disks and the other six onto 440-C stainless steel rods for roller bearing wear improvement testing. Each of the samples was plated on a separate run to correlate the film parameters with the run parameters. Some of the chromium literature was reviewed, and improvements to the vacuum system were made. Author

N82-17072*# Alabama Univ. in Huntsville. Dept. of Mathematics.

STATISTICAL ANALYSIS OF DAILY MEAN TEMPERATURES c47

Deva C. Ross *In its* The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1980 13 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 04B

Data of daily mean temperatures recorded at the Kennedy Center during the period of 1957-1977 were analyzed to forecast daily mean temperatures and their thirty-day moving averages for a period of ten to fifteen days in a given month. Since it is found that the standard deviation is linear in the mean, a logarithmic transformation of the data is used for finding an integrated moving average process IMA by the Box-Jenkins aproach. The first differences of the transformed data seem to fit a moving average model with parameter value 2, MA(2). The consideration of seasonality factor makes the fit worse. J.M.S.

N82-17073*# Alabama Univ. in Huntsville. Dept. of Mathematics.

SURFACE CONTROL TEMPERATURES FOR THE BRIDGMAN-STOCKBARGER AND FLOAT ZONE TECHNIQUES

c76

Larry M. Foster *In its* the 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 14 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20L

The surface control temperature required to properly pose the equations of state for the Bridgman-Stockbarger and float-zone techniques are investigated. Author

N82-17074*# Athens Coll., Ala. Dept. of Biology.

DESIGN CONSIDERATIONS OF A THERMALLY STABILIZED CONTINUOUS FLOW ELECTROPHORESIS CHAMBER 2

c25

Thomas S. Jandebeur *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 6 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 07D

The basic adjustable parameters of a Beckman Continuous Particle Electrophoresis (CPE) Apparatus are investigated to determine the optimum conditions for ground based operation for comparison with space experiments. The possible application of electrically insulated copper/aluminum chamber walls is evaluated as a means to thermally stabilize or equilibrate lateral temperature gradients which exist on the walls of conventional plastic chambers and which distort the rectilinear base flow of buffer through the chamber, significantly affecting sample resolution. J.M.S.

N82-17075*# Baylor Univ., Waco, Tex. Dept. of Mathematics.

MATHEMATICAL PROGRAMMING TECHNIQUES FOR SCHEDULING SPACELAB CREW ACTIVITIES AND EXPERIMENT OPERATIONS

c81

William C. Askew *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 19 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 05A

Several mathematical programming techniques which may be applied to the scheduling of experiments and crew activities for Spacelab missions are investigated. The use of currently known methods, in particular zero-one programming and heuristic dispatching is discussed. In addition, a scheduling algorithm and examples to illustrate and test its use are presented. J.M.S.

N82-17076*# Berry Coll., Mount Berry, Ga. Dept. of Physics.

A STUDY OF THE RELATIVISTIC RISE IN IONIZATION AS MEASURED BY ION CHAMBERS OF DIFFERENT DESIGN

c72

Julian B. Shand, Jr. *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 7 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20H

Techniques for scheduling with resource-constraints are investigated. In particular, the use of zero-one programming and dispatching methods are discussed. An algorithm which combines characteristics of both existing methods to generate a valid schedule to experiments is introduced. Examples and test results are presented to illustrate the feasibility of the use of this algorithm on data typical to Spacelab missions. J.M.S.

N82-17077*# Alabama A & M Univ., Huntsville. Dept. of Mathematics.

AN INVESTIGATION OF THE UNIFORM RANDOM NUMBER GENERATOR

c64

Enoch C. Temple *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 9 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 12A

Most random number generators that are in use today are of the congruential form $X(i+1) = AX(i) + C \bmod M$ where A, C, and M are nonnegative integers. If C=0, the generator is called the multiplicative type and those for which C/O are called mixed congruential generators. It is easy to see that congruential generators will repeat a sequence of numbers after a maximum of M values have been generated. The number of numbers that a procedure generates before restarting the sequence is called the length or the period of the generator. Generally, it is desirable to make the period as long as possible. A detailed discussion of congruential generators is given. Also, several promising procedures that differ from the multiplicative and mixed procedure are discussed. J.M.S.

N82-17078*# Clemson Univ., S.C. Materials Engineering Program.

ON RELATIONSHIP BETWEEN MICROFISSURING AND MICROSTRUCTURE IN THE HAZ OF INCONEL 718

c26

Raymond G. Thompson *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 24 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 11F

Inconel 718, as well as many other metals, is susceptible to intergranular hot cracking in the weld heat-affected-zone (HAZ). These cracks form near the solidus temperature of the metal during the welding process. This problem is of particular concern to NASA/MSFC because the SSME is primarily constructed of welded Inconel 718. The present program studied microfissuring in the weld HAZ of Inconel 718 by simulating HAZ thermal cycles with the Gleeble machine. Previous researchers have studied the instantaneous mechanical properties of the HAZ using the Gleeble. The present study examines the instantaneous microstructure of the HAZ. This approach showed that second phase structures, high in niobium, melt and wet the grain boundaries in the HAZ during welding. It is postulated that the resultant HAZ grain boundaries, enriched in niobium, act as preferred sites for microfissure nucleation as the weld zone cools. J.M.S.

N82-17079*# Alabama Univ. in Huntsville. Dept. of Mechanical Engineering.

HEAT LOSS AND DRAG OF SPHERICAL DROP TUBE SAMPLES

c34

Donald B. Wallace *In its* the 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 31 p refs (For primary document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 20D

Analysis techniques for three aspects of the performance of the NASA/MSFC 32 meter drop tube are considered. Heat loss through the support wire in a pendant drop sample, temperature history of a drop falling through the drop tube when the tube is filled with helium gas at various pressures, and drag and resulting g-levels experienced by a drop falling through the tube when the tube is filled with helium gas at various pressures are addressed. The developed methods apply to systems with sufficiently small Knudsen numbers for which continuum theory may be applied. Sample results are presented, using niobium drops, to indicate the magnitudes of the effects. Helium gas at one atmosphere pressure can approximately double the amount of possible undercooling but it results in an apparent gravity levels of up to 0.1 g. J.M.S.

N82-17080*# Wisconsin Univ. - Platteville. Dept. of Civil Engineering.

INCIPIENT FAILURE DETECTION (IFD) OF SSME BALL BEARINGS

c37

In Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program Jan. 1982 20 p refs (For primary

document see N82-17043 07-99)
Avail: NTIS HC A25/MF A01 CSCL 13H

Because of the immense noise background during the operation of a large engine such as the SSME, the relatively low level unique ball bearing signatures were often buried by the overall machine signal. As a result, the most commonly used bearing failure detection technique, pattern recognition using power spectral density (PSD) constructed from the extracted bearing signals, is rendered useless. Data enhancement techniques were carried out by using a HP5451C Fourier Analyzer. The signal was preprocessed by a Digital Audio Crop. DAC-1024I noise cancelling filter in order to estimate the desired signal corrupted by the backgound noise. Reference levels of good bearings were established. Any deviation of bearing signals from these reference levels indicate the incipient bearing failures.
J.M.S.

N82-17081*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
RESEARCH AND TECHNOLOGY ANNUAL REPORT, 1981 Annual Report, 1981
1981 44 p
(NASA-TM-81333; A-8744) Avail: NTIS HC A03/MF A01 CSCL 05A

Various research and technology activities at Ames Research Center are described. Highlights of these accomplishments indicate the Center's varied and highly productive research efforts for 1981.
Author

N82-17082# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
FLIGHT DYNAMICS TECHNOLOGY DEVELOPMENT: STRUCTURES AND DYNAMICS, VEHICLE EQUIPMENT/SUBSYSTEMS, FLIGHT CONTROL AND AEROMECHANICS
Dec. 1980 87 p Supersedes AFFDL-TR-79-3133
(AD-A096636; AFWAL-TR-80-3144; AFFDL-TR-79-3133)
Avail: NTIS HC A05/MF A01 CSCL 05/1

The document presents an overview of the four Technical Planning Objectives (TPO) and supporting data for each. These are extracted from the technical plan of the Flight Dynamics Laboratory (FDL). Information is largely based on FDL fiscal 1982 technology plan omitting specific funding and timing information of an 'Official Use Only' nature. Technical objectives are described for the technical areas of Structures and Dynamics, Vehicle Equipment/Subsystems, Flight Control and Aeromechanics. Points of contact for more information in each of the areas are identified.
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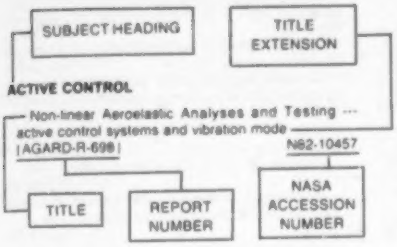
SUBJECT INDEX

Typical Subject Index Listing



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A

A STARS
Infrared-excess of peculiar B- and A-stars N82-16996

ABEL FUNCTION
Iterative abel inversion of optically thick, cylindrically symmetric radiation sources
[AD-A106239] N82-16865

ABERRATION
Reduction of anisoplanatic errors
[AD-A106689] N82-16855

ABILITIES
Ability differences and cognitive mapping skill
[AD-A106389] N82-16741

ABRASION RESISTANCE
Heat sealable, flame and abrasion resistant coated fabric --- clothing and containers for space exploration
[NASA-CASE-MSC-18382-1] N82-16238

ABSORBERS (MATERIALS)
Nanosecond and picosecond spectroscopy and kinetics of dynamic absorbing materials
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MESA (Marine Ecosystem Analysis) New York Bight project. Expanded water column characterization cruise (XWCC-20), NOAA ship George B. Kelez, July-August 1978
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MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-21), NOAA ship George B. Kelez, April 1979
[PB82-101023] N82-16580
MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-22), NOAA ship George B. Kelez, May-June 1979
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MESA (Marine Ecosystem Analysis) New York Bight project: Winkler oxygen data, expanded water column characterization cruises (XWCC-2 to SWCC-24), NOAA ships Researcher and George B. Kelez, 1975 - 1979 [PB82-100975] N82-16575

MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-17), NOAA ship George B. Kelez, April 1978 [PB82-100983] N82-16576

MESA (Marine Ecosystem Analysis) New York Bight projcet. Expanded water column characterization cruise (XWCC-18), NOAA ship George B. Kelez, Jun. 1978 [PB82-100991] N82-16577

MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-19), NOAA ship Georgn B. Kelez, July 1978 [PB82-101007] N82-16578

MESA (Marine Ecosystem Analysis) New York Bight project. Expanded water column characterization cruise (XWCC-20), NOAA ship George B. Kelez, July-August 1978 [PB82-101015] N82-16579

MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-21), NOAA ship George B. Kelez, April 1979 [PB82-101023] N82-16580

MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-22), NOAA ship George B. Kelez, May-June 1979 [PB82-101031] N82-16581

MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-23), NOAA ship George B. Kelez, July 1979 [PB82-101049] N82-16582

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BIBLIOGRAPHIES

Aeronautical Engineering. A continuing bibliography with indexes, supplement 141, November 1981 [NASA-SP-7037(141)] N82-16040

Aeronautical Engineering. A continuing bibliography with indexes, supplement 142 --- December 1981 [NASA-SP-7037(142)] N82-16041

Earth Resources: A continuing bibliography, with indexes, issue 31 [NASA-SP-7041(31)] N82-16436

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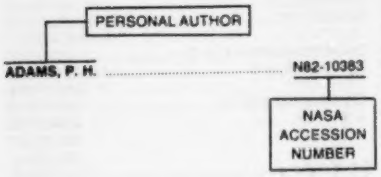

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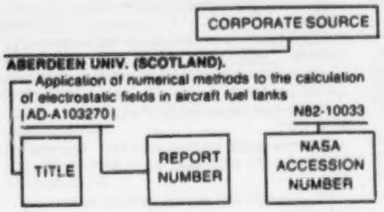

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Performance characteristics of automotive engines in the United States, third series, 1978 Buick 196 CID (3.2L), 2V
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Handbook of geophysical cavity-locating techniques with emphasis on electrical resistivity
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Exchange of national experience in the field of new energy sources: In particular, solar, wind, and geothermal energy: The 25 m experimental horizontal axis wind turbine (25 m HAT)
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Industrial steam supply system characteristics program. Phase 2: Low- and medium-Btu gas-fired boilers with associated gasification plants
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FULTON ENERGY CORP., TULSA, OKLA.

Assessment of the economic, technical, and environmental feasibility of developing, constructing, and operating a 25-million-gallon-per-year grain-ethanol-production facility. Volume 1: Executive summary
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Assessment of the economic, technical, and environmental feasibility of developing, constructing, and operating a 25-million-gallon-per-year grain-ethanol-production facility. Volume 2: Technical analysis
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GENERAL ELECTRIC CO., PHILADELPHIA, PA.

LANDSAT-2 and LANDSAT-3 flight evaluation report, 23 January to 23 July 1980
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GEO-ATMOSPHERICS CORP., LINCOLN, MASS.

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Lattice dynamics of graphite intercalation compounds: Modelled by the phonon dispersion of linear chains
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INSTITUTO DE PESQUISAS TECNOLOGICAS, SAO PAULO (BRAZIL).
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Energy exchanger performance and power cycle evaluation, experiments and analysis
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MAX-PLANCK-INSTITUT FUER AERONOMIE, LINDAU UBER NORTHEIM (WEST GERMANY).
High altitude atmospheric investigations. Part 2: Development of in-situ experiments for measurements in the D-region of the ionosphere and their results
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Isotopic anomalies and the early history of the solar system N82-16976

MAX-PLANCK-INSTITUT FUER EXTRATERRESTRISCHE PHYSIK, GARCHING (WEST GERMANY).
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MAX-PLANCK-INSTITUT FUER KERNPHYSIK, HEIDELBERG (WEST GERMANY).
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MAX-PLANCK-INSTITUT FUER PHYSIK UND ASTROPHYSIK, GARCHING (WEST GERMANY).
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MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).
Investigations of nonreactive vibrational and rotational excitation in small, potentially reactive ion molecule systems at energies below 6eV
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MCDONNELL-DOUGLAS ASTRONAUTICS CO., ST. LOUIS, MO.
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MCS, INC., BOULDER, COLO.
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MESSINA UNIV. (ITALY).
Multiple electromagnetic scattering from a cluster of spheres. Volume 2: Symmetrization
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MIAMI UNIV., CORAL GABLES, FLA.
Effects of environmental variables on the crack initiation stages of corrosion fatigue of high strength aluminum alloys
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MIAMI UNIV., FLA.
On the analysis of Seasat winds
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MICHIGAN UNIV., ANN ARBOR.
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Passive-solar multi-family concepts
[DE82-000456] N82-16499
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[DE82-001712] N82-16532
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[DE82-000454] N82-16533
Passive solar products catalog, 1981
[DE82-000292] N82-16540
Regional needs regarding technical information
[DE82-001772] N82-16929

MIDDLETON (DAVID), NEW YORK.
Performance of telecommunications systems in the spectral-use environment. 6: Analytical results for land-mobile scenarios in class B interference, with fading and multipath
[PB81-249344] N82-16337
Some canonical approaches to the evaluation of telecommunication system performance
[PB81-249310] N82-16336

MIDWEST RESEARCH INST., GOLDEN, COLO.
Simple predictive model for performance of desiccant beds for solar dehumidification
[DE81-023606] N82-16500

MINNESOTA UNIV., ST. PAUL.
Storage stability and improvement of intermediate moisture foods, phase 5
[NASA-CR-167503] N82-16742

MINNESOTA UNIV. - DULUTH.
Sea Grant program, University of Minnesota
[PB81-243958] N82-16667

MINNICK (L. JOHN), PLYMOUTH MEETING, PA.
Development of potential uses for the residue from fluidized-bed-combustion processes
[DE81-030157] N82-16211

MISSION RESEARCH CORP., ALEXANDRIA, VA.
Experiments on the interaction of highpower microwaves with air
[AD-A106390] N82-16662

MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
Discrimation of unique biological communities in the Mississippi lignite belt N82-16453

MISSISSIPPI STATE UNIV., STATE COLLEGE.
Development of high strength, high temperature ceramics N82-17050

MISSOURI UNIV. -ROLLA.
The determination of the stacking fault energy in copper-nickel alloys N82-17064

MITRE CORP., BEDFORD, MASS.
Coherent scatter of microwaves from moderately rough surfaces
[AD-A106133] N82-16331
Evaluation of pollution abatement alternatives: Picillo property, Coventry, Rhode Island
[PB82-103868] N82-16682
Use of remote sensing techniques in a systematic investigation of an uncontrolled hazardous waste site
[PB82-103696] N82-16593

MITRE CORP., MCLEAN, VA.
A survey of electric propulsion motors for automated guideway transit vehicles
[PB82-109307] N82-16360

MOBILITY SYSTEMS EQUIPMENT CO., LOS ANGELES, CALIF.
Evaluation of retro-reflective measurement devices
[PB81-243594] N82-16951
Evaluation of retro-reflective measurement devices
[PB81-243602] N82-16952

MONTANA STATE UNIV., BOZEMAN.

Catalytic hydrogenation of coal-derived liquids
[DE82-003250] N82-16212

MOTOROLA, INC., PHOENIX, ARIZ.

Processing experiments on non-Czochralski silicon sheet
[NASA-CR-163473] N82-16491

MOUND LAB., MIAMISBURG, OHIO.

Surface studies of plastic-bonded PETN and RDX by X-ray Photoelectron Spectroscopy (XPS) and Ion-Scattering Spectroscopy (ISS)
[DE81-030402] N82-16207

N

NAGOYA UNIV. (JAPAN).

Potential formation in Nagoya Bumpy Torus N82-16664

Effect on ambipolar potential of ion cyclotron heating N82-16666

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.

Synthesis of polyformals
[NASA-CASE-ARC-11244-1] N82-16174

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.

Aeronautical Engineering. A continuing bibliography with indexes, supplement 141, November 1981
[NASA-SP-7037(141)] N82-16040

Aeronautical Engineering. A continuing bibliography with indexes, supplement 142
[NASA-SP-7037(142)] N82-16041

Auxiliary subprograms for calculating the navigational parameters of artificial Earth satellites. FORTRAN IV
[NASA-TM-75684] N82-16140

Mission Operation Report: Space Shuttle program STS-2
[NASA-TM-84066] N82-16141

Report by the Aerospace Safety Advisory Panel
[NASA-TM-84094] N82-16142

Plasma chemistry and organic synthesis
[NASA-TM-75643] N82-16175

A process for the production of a scale-proof and corrosion-resistant coating on graphite and carbon bodies
[NASA-TM-76785] N82-16179

Method of preventing oxidation of graphite fireproof material
[NASA-TM-76786] N82-16180

Gunn diodes and devices (bibliography for 1978-1980)
[NASA-TM-76750] N82-16342

Earth Resources: A continuing bibliography, with indexes, issue 31
[NASA-SP-7041(31)] N82-16436

Relationships between soil moisture-holding properties and soil texture, organic matter content, and bulk density
[NASA-TM-76674] N82-16451

Aerospace Medicine and Biology. A continuing bibliography (Supplement 226)
[NASA-SP-7011(226)] N82-16731

Principles of project management
[NASA-TM-84069] N82-16921

Advances in planetary geology
[NASA-TM-84412] N82-17010

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.

Spectrally balanced chromatic landing approach lighting system
[NASA-CASE-ARC-10990-1] N82-16059

Threat perception while viewing single intruder conflicts on a cockpit display of traffic information
[NASA-TM-81341] N82-16076

Comparison of acoustic data from a 102 mm conic nozzle as measured in the RAE 24-foot wind tunnel and the NASA Ames 40- by 80-foot wind tunnel
[NASA-TM-81343] N82-16083

Automation of on-board flightpath management
[NASA-TM-84212] N82-16086

Calibration of the Ames Anechoic Facility. Phase 1: Short range plan
[NASA-TM-84081] N82-16091

Synthesis of polyformals
[NASA-CASE-ARC-11244-1] N82-16174

Products of multiple Fourier series with application to the multiblade transformation
[NASA-TM-81340] N82-16746

The two-photon absorptivity of rotational transitions in the A2 Sigma hyperon + (v prime = O) - X-2 pion (v prime prime = O) gamma band of nitric oxide
[NASA-TM-81335] N82-16815

Research and technology annual report, 1981
[NASA-TM-81333] N82-17061

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. HUGH L. DRYDEN FLIGHT RESEARCH CENTER, EDWARDS, CALIF.

System for providing an integrated display of instantaneous information relative to aircraft attitude, heading, altitude, and horizontal situation
[NASA-CASE-FRC-11005-1] N82-16075

Multiple pure tone elimination strut assembly
[NASA-CASE-FRC-11062-1] N82-16900

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

ATS-6 engineering performance report. Volume:Program and systems summaries: Mechanical and thermal details
[NASA-RP-1080-VOL-1] N82-16147

ATS-6 engineering performance report. Volume 2: Orbit and attitude controls
[NASA-RP-1080-VOL-2] N82-16148

ATS-6 engineering performance report. Volume 3: Telecommunications and power
[NASA-RP-1080-VOL-3] N82-16149

ATS-6 engineering performance report. Volume 4: Television experiments
[NASA-RP-1080-VOL-4] N82-16150

ATS-6 engineering performance report. Volume 5: Propagation experiments
[NASA-RP-1080-VOL-5] N82-16151

ATS-6 engineering performance report. Volume 6: Scientific experiments
[NASA-RP-1080-VOL-6] N82-16152

Microwave switching power divider
[NASA-CASE-GSC-12420-1] N82-16340

Laser measuring system for incremental assemblies
[NASA-CASE-GSC-12321-1] N82-16396

Memory-based frame synchronizer
[NASA-CASE-GSC-12430-1] N82-16747

Variations of the Solar Constant
[NASA-CP-2191] N82-17014

Sensitivity of the Earth's climate to changes N82-17015

A summary of results from solar monitoring rocket flights N82-17019

Indirect methods for measuring variations of the solar constant N82-17021

Eclipse radius measurements N82-17025

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Effects of changes in convective efficiency on the solar radius and luminosity N82-17030

Short and long term variations in the solar constant N82-17034

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.

Heat sealable, flame and abrasion resistant coated fabric
[NASA-CASE-MSC-18382-1] N82-16238

Surface conforming thermal/pressure seal
[NASA-CASE-MSC-18422-1] N82-16406

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.

Spin tests of a single-engine, high-wing light airplane
[NASA-TP-1927] N82-16068

Research through simulation
[NASA-FACTS-125] N82-16092

The microwave radiometer spacecraft: A design study
[NASA-RP-1079] N82-16153

The microwave radiometer spacecraft. A design study: Executive summary N82-16154

Mission definition for a large-aperture microwave radiometer spacecraft N82-16156

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.

Application of image processing techniques to fluid flow data analysis
[NASA-TM-82760] N82-16049

NASA research activities in aeropropulsion
[NASA-TM-82788] N82-16064

Prediction of composite hygral behavior made simple
[NASA-TM-82780] N82-16181

Tribological characteristics of a composite total-surface hip replacement
[NASA-TP-1953] N82-16239

Effect of seals on rotor systems
[NASA-TM-82786] N82-16411

Effects of artificially produced defects on film thickness distribution in sliding EHD point contacts
[NASA-TM-82732] N82-16412

Basic lubrication equations
[NASA-TM-81693] N82-16413

Elevated temperature fatigue testing of metals
[NASA-TM-82745] N82-16419

New features and applications of PRESTO, a computer code for the performance of regenerative, superheated steam turbine cycles
[NASA-TP-1954] N82-16477

Variable gain for a wind turbine pitch control
[NASA-TM-82751] N82-16478

Summary and evaluation of the conceptual design study of a potential early commercial MHD power plant (CSPEC)
[NASA-TM-82734] N82-16481

The NASA Lewis large wind turbine program
[NASA-TM-82761] N82-16495

A hydrodynamic model of an outer hair cell
[NASA-TM-82773] N82-16743

Noise of the SR-3 propeller model at 2 deg and 4 deg angle of attack
[NASA-TM-82738] N82-16808

A shock wave approach to the noise of supersonic propellers
[NASA-TM-82752] N82-16809

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

Multi-channel temperature measurement amplification system
[NASA-CASE-MFS-23775-1] N82-16474

NASA/MSFC FY-81 Atmospheric Processes Research Review
[NASA-CP-2204] N82-16660

Upper atmospheric section N82-16661

Severe storms and local weather research N82-16663

Fiscal year 1981 scientific and technical reports, articles, papers, and presentations
[NASA-TM-82445] N82-16927

The 1981 NASA/ASEE Summer Faculty Fellowship Program: Research reports
[NASA-CR-161855] N82-17043

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.

Solar heated fluidized bed gasification system
[NASA-CASE-NPO-15071-1] N82-16475

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WALLOPS FLIGHT CENTER, WALLOPS ISLAND, VA.

NOSS altimeter algorithm specifications
[NASA-RP-1083] N82-16683

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).
Some experimental investigations on transonic flutter characteristics of thin plate wing models with sweptback and tapered tips
[NAL-TR-682] N82-16050
Analysis of strain distribution for fiber reinforced composites by Moire method
[NAL-TR-681] N82-16420

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Smoldering combustion hazards of thermal insulation materials
[PB82-107046] N82-16215
Plating on aluminum
[PB81-239501] N82-16235
Building technology project summaries, 1980 - 1981
[PB82-106105] N82-16296
Factors affecting the soundness of blended cements
[PB82-104746] N82-16299
Precision measurements on fibrous glass insulation
[PB81-239634] N82-16308
Semiconductor measurement technology: The design, testing, and analysis of a comprehensive test pattern for measuring CMOS/SOS process performance and control
[PB81-245342] N82-16361
Cryogenic fluids density reference system: Provisional accuracy statement (1980)
[PB81-244865] N82-16386
NBS phase angle calibration standard
[PB81-244699] N82-16390
Technical activities 1980: Center for Materials Science
[PB81-245318] N82-16391
WR 10 millimeter wave microcalorimeter
[PB81-246639] N82-16392
Technical activities 1980 center for absolute physical quantities
[PB81-248478] N82-16393
Analysis of results of mini round robin reflectance test
[PB81-244873] N82-16394
A calibration service for analog-to-digital and digital-to-analog converters
[PB81-243404] N82-16395
Laser Induced Damage in Optical Materials
[AD-A106548] N82-16399
Energy conservation by multiple glazing on heavy masonry buildings
[PB81-246977] N82-16548
A technical briefing on the Initial Graphics Exchange Specification (IGES)
[PB81-236719] N82-16768
A manual for designing and implementing a process to monitor complex system developments
[PB82-104308] N82-16923
Dimensions, volume 65, number 4, May/June 1981
[PB82-106006] N82-16956

NATIONAL ENERGY INFORMATION CENTER, WASHINGTON, D. C.
NEIC manual for groundwater/subsurface investigations at hazardous waste sites
[PB82-103755] N82-16590

NATIONAL HURRICANE CENTER, CORAL GABLES, FLA.
Annual data and verification tabulation Atlantic tropical cyclones, 1980
[PB81-246050] N82-16681

NATIONAL LIBRARY OF MEDICINE, BETHESDA, MD.
Permuted Medical Subject Headings, 1982
[PB81-227464] N82-16930
Medical Subject Headings: Tree structures, 1982
[PB81-227472] N82-16931
Medical subject headings: Annotated alphabetic list, 1982
[PB81-227480] N82-16932

NATIONAL MECHANICAL ENGINEERING RESEARCH INST., PRETORIA (SOUTH AFRICA).
Developments in solar-powered air conditioning: State-of-the-art and prospects for South Africa
[PB81-246076] N82-16544

NATIONAL OCEAN SURVEY, ROCKVILLE, MD.
Cook inlet circulatory survey: 1973-75
[PB81-245235] N82-16688
Tide tables 1982 high and low water predictions. East Coast of North and South America including Greenland
[PB81-241622] N82-16698

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
MESA (Marine Ecosystem Analysis) New York Bight project: Winkler oxygen data, expanded water column characterization cruises (XWCC-2 to SWCC-24), NOAA ships Researcher and George B. Kelez, 1975 - 1979
[PB82-100975] N82-16575
MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-17), NOAA ship George B. Kelez, April 1978
[PB82-100983] N82-16576
MESA (Marine Ecosystem Analysis) New York Bight projcet. Expanded water column characterization cruise (XWCC-18), NOAA ship George B. Kelez, Jun. 1978
[PB82-100991] N82-16577
MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-19), NOAA ship George B. Kelez, July 1978
[PB82-101007] N82-16578
MESA (Marine Ecosystem Analysis) New York Bight project. Expanded water column characterization cruise (XWCC-20), NOAA ship George B. Kelez, July-August 1978
[PB82-101015] N82-16579
MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-21), NOAA ship George B. Kelez, April 1979
[PB82-101023] N82-16580
MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-22), NOAA ship George B. Kelez, May-June 1979
[PB82-101031] N82-16581
MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-23), NOAA ship George B. Kelez, July 1979
[PB82-101049] N82-16582
MESA (Marine Ecosystem Analysis) New York Bight project: Expanded water column characterization cruise (XWCC-24), NOAA ship George B. Kelez, August 1979
[PB82-101056] N82-16583
Ice crystal processes in Colorado, upslope snowstorms. Article 1: Case study of an upslope snowstorm
[PB82-109547] N82-16676
Experimental comprehensive solar flare indices for major and certain lesser flares, 1975-1979
[PB82-109497] N82-17042

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SILVER SPRING, MD.
Demonstration of a long-range atmospheric tracer system using perfluorocarbons
[PB82-106246] N82-16613

NATIONAL RESEARCH INST. FOR MATHEMATICAL SCIENCES, PRETORIA (SOUTH AFRICA).
An interactive approach to multiple criteria decision making based on statistical inference
[PB82-108747] N82-16924

NATIONAL TIMBER RESEARCH INST., PRETORIA (SOUTH AFRICA).
Fast-setting phenolic and tannin-based honeymoon adhesive systems for exterior grade finger joints
[PB81-245748] N82-16254

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.
Special investigation report. Search and rescue procedures and arming of emergency locator transmitter: Aircraft accident near Michigan City, Indiana, 7 December, 1980
[PB81-249427] N82-16058

NATIONAL WEATHER SERVICE, FORT WORTH, TEX.
Weather satellite interpretation: Introduction to weather satellite imagery
[PB82-107657] N82-16677

NATIONAL WEATHER SERVICE, SILVER SPRING, MD.
Frequency and motion of Atlantic tropical cyclones
[PB81-247256] N82-16682
An introduction to sea state forecasting
[PB81-242667] N82-16699

NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
A generalized escape system simulation computer program: A user's manual
[AD-A10[illegible]152] N82-16065

NAVAL OBSERVATORY, WASHINGTON, D. C.
The horizontal and vertical semi-diameters of the Sun observed at the Cape of Good Hope (1834 - 1887) and Paris (1837 - 1906): A report on work in progress N82-17024

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
Skywave communication techniques. Decision feedback equilization for serially modulated spread-spectrum signals in the HF band yields improved reliability
[AD-A106380] N82-16328

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Quantile estimation in dependent sequences
[AD-A106132] N82-16790

NAVAL RESEARCH LAB., WASHINGTON, D. C.
Construction of large reaction mechanisms
[AD-A106139] N82-16197
Non-linear analysis of the free electron lasers utilizing a linear wiggler field
[AD-A106229] N82-16398
Approximate fluid-structure interaction theories for acoustic echo signal predictions
[AD-A106349] N82-16812
Tilt and shift mode stability with line tying
[AD-A106228] N82-16864

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.
An experimental evaluation of tearing instability using the compact specimen
[AD-A107633] N82-16218
Generation of orthogonal boundary fitted coordinate systems
[AD-A107851] N82-16783

NAVAL SURFACE WEAPONS CENTER, DAHLGREN, VA.
Time correction of data from the NAVSTAR Geodetic Receiver System
[AD-A107643] N82-16066
Far field overpressure from TNT explosions: A survey of available models
[AD-A107952] N82-16370

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
Critical parameters for detonation propagation and initiation of solid explosives
[AD-A106485] N82-16365

NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
VLF/LF/MF Whispering gallery propagation studies
[AD-A106517] N82-16324

NAVAL UNDERWATER SYSTEMS CENTER, NEWPORT, R.I.
Enhancing technology transfer to state and local government utilizing on-line information retrieval services and on-line communications systems
[PB81-246241] N82-16949

NEBRASKA UNIV., LINCOLN.
Full wave analysis for scattering cross sections
[AD-A107704] N82-16333

NEW ENGLAND COASTAL ENGINEERS, BANGOR (MAINE).
Proceedings of the Gulf Circulation Studies Workshop
[PB81-248254] N82-16690

NEW JERSEY INST. OF TECH., NEWARK.
Heat transfer from impinging jets. A literature review
[AD-A106723] N82-16367

NEW MEXICO STATE UNIV., LAS CRUCES.
Enhanced oil recovery by CO2 foam flooding
[DE82-000949] N82-16464

NEW MEXICO UNIV., ALBUQUERQUE.
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-165081] N82-16479

NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION, ALBANY.
Polychlorinated biphenyl transport in the Hudson River, New York
[PB81-249757] N82-16573

Relationship of water quality of Hudson River, New York during peak discharges to geologic characteristics of contributing subbasins
[PB81-249740] N82-16627

NEW YORK STATE DEPT. OF TRANSPORTATION, ALBANY.

Experimental pavement delineation treatments
[PB81-249161] N82-16292

NEW YORK UNIV., N. Y.

A prospectus for a theory of variable variability
N82-17041

NEWBERRY COLL., S.C.

Thunderstorm electric field modelling N82-17065

NIELSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.

Integration of a code for aeroelastic design of conventional and composite wings into ACSYNT, an aircraft synthesis program
[NASA-CR-137805] N82-16069

NORTH CAROLINA STATE UNIV., RALEIGH.

Random network generation
[AD-A106360] N82-16796

NORTH CAROLINA WATER RESOURCES RESEARCH INST., RALEIGH.

On-site wastewater treatment problems and alternatives for western North Carolina
[PB81-240541] N82-16572

NORTH GEORGIA COLL., DAHLONEGA.

Development of photomultiplier electronics and computer interfacing software for a high speed photoelectric photometer-Stoke's meter N82-17049

NORTHEAST SOLAR ENERGY CENTER, BOSTON, MASS.

Solar consumer assurance: An assessment of mechanisms in the northeast
[DE81-030052] N82-16536

O

OAK RIDGE ASSOCIATED UNIVERSITIES, TENN.

Some employment and earnings implications of regional biomass energy utilization: New England and the Cornbelt States
[DE81-030689] N82-16520

The combined solar and tidal influence in climate
N82-17038

Predominant periods in the time series of drought area index for the Western High Plains AD 1700 to 1962
N82-17039

OAK RIDGE NATIONAL LAB., TENN.

Deposition and characterization of pyrocarbon coatings produced by use of CO2 dilution
[PB82-000900] N82-16190

Swelling and microstructure of HFIR irradiated austenitic stainless steels
[DE82-000158] N82-16219

Tensile properties and microstructure of helium-injected and reactor-irradiated V-20 Ti
[DE81-032005] N82-16220

Resistance of (Fe,Ni)sub3V long-range-ordered alloys to radiation damage
[DE81-032006] N82-16221

Influence of irradiation on the tensile properties of austenitic stainless steel weldments
[DE81-032002] N82-16222

Potential economic benefits from process control of coal preparation plants
[DE82-000881] N82-16263

Control of fractionation-area corrosion at SRC pilot plants
[DE82-001949] N82-16280

Foreign coal-liquefaction-technology survey and assessment
[DE82-0009555] N82-16281

Development of advanced building materials for the passive solar application
[DE81-032009] N82-16288

Environmental impacts associated with using peat for energy
[DE81-032000] N82-16483

Energy in the 1980s: A call for leadership. The Public Awareness Symposium
[DE81-027813] N82-16504

Development of a high-efficiency gas-fired water heater
[DE81-032028] N82-16506

Risk of producing energy, and conserving it
[DE81-030807] N82-16507

Gas-heat-pump development
[DE81-031991] N82-16508

Assessment of seasonal-efficiency models for natural-gas-fired residential furnaces
[DE82-000499] N82-16516

Industrial steam supply system characteristics program. Phase 2: Low- and medium-Btu gas-fired boilers with associated gasification plants
[DE82-000535] N82-16517

Materials testing for solar-thermal chemical process heat
[DE82-002009] N82-16530

Use of a phenolic-carboxylic acid cation resin in the treatment of low-level liquid waste at Oak Ridge National Laboratory
[DE82-000500] N82-16554

Acid rain and forest productivity
[DE81-030916] N82-16555

Atmospheric deposition of heavy metals and their interaction with acid precipitation in a North American deciduous forest
[DE81-032004] N82-16556

Possible mechanism for chemical induction of chromosome aberrations in male meiotic and postmeiotic germ cells of mice
[DE81-031999] N82-16700

Variation in plant response to ozone: A conceptual model of physiological events
[DE81-029692] N82-16701

Chemicals Identified in Human Biological Media
[DE81-030813] N82-16735

Calculated neutron and gamma-ray energy spectra from 14-MeV neutrons streaming through an iron duct: Comparison with experiment
[DE81-030626] N82-16824

Electron-impact excitation of ions
[DE81-030806] N82-16825

Spent fuel and radioactive waste inventories and projections as of December 31, 1980
[DE82-000307] N82-16836

High-beta studies with beam heated, non-circular plasmas in ISX-B
[DE81-032003] N82-16874

Ambipolar potential formation and control in bumpy tori and mirrors: Proceedings of workshop
[CONF-810511] N82-16877

Aluminum impurity ions and the ambipolar potential in EBT N82-16885

EBT transport and ambipolar potential formation with rapid loss of high energy impurity ions N82-16886

Field errors in EBT and their effects on the ambipolar potential N82-16887

Ambipolar potential and its effects on the confinement parameters of the EBT plasma N82-16888

Power requirements for ion tail formation in EBT N82-16889

Effects of fluctuating electric fields on hydrogen and impurity ions in EBT N82-16890

Initial ICRH experiments on EBT-S N82-16880

Electric car: Is it still the vehicle of the future
[DE81-030437] N82-16943

OAK RIDGE Y-12 PLANT, TENN.

Rotor testing in FY 1981
[DE81-028340] N82-16536

OBSERVATORIUM HOHER LIST, BONN (WEST GERMANY).

Solar rotation and activity in the past and their possible influence upon the evolution of life
N82-16971

OBSERVATORIUM HOHER LIST, DAUN (WEST GERMANY).

Wolf-Rayet stars with compact companions
N82-16982

OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, D. C.

Criteria for evaluating the implementation plan required by the Earthquake Hazards Reduction Act of 1977
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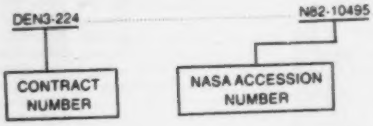

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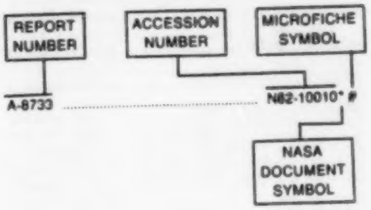

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NTSB-SIR-81-2 N82-16058 #

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POLICY-STUDY-1 N82-16339 #

POLY/M/AE-81-25 N82-16047* #

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RAND/N-1667-ARMY N82-16741 #

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REPT-77-522 N82-16301 #
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REPT-81F0034-VOL-2 N82-16148* #
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REPT-81F0034-VOL-5 N82-16151* #
REPT-81F0034-VOL-6 N82-16152* #
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REPT-320 N82-16637* #
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REPT-626 N82-17007
REPT-670 N82-17005
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RI/RD81-226 N82-16172* #

RR-81-67 N82-16292 #

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SAND-81-0572C N82-16505 #
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TR-23 N82-16781 #
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TRANSPORTATION-ENGR-SER-28 N82-16298 #
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UM-HSRI-81-38 N82-16736 #

UM-RSMAS-81001 N82-16675 #

UMICH-SG-81-900 N82-16025 #

UMTA-MA-06-0049-81-6 N82-16955 #
UMTA-MA-06-0081-81-1 N82-16964 #

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US-PATENT-CLASS-48-89 N82-16475*
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USAAVRADCOM-TR-81-D-27 N82-16056 #

USCG-D-22-81 N82-16065 #
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WES/TR/EL-81-6 N82-16455 #

WFPS-TME-81-015 N82-16871 #

WORKING-PAPER-3 N82-16625 #

W81-04658 N82-16471 #
W81-04661 N82-16572 #

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60 COMPUTER OPERATIONS AND HARDWARE 1132
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE 1133
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS 1135
Includes computer networks.

63 CYBERNETICS 1136
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS 1136
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY 1141
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS 1142
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS 1143
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) 1144
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS 1144
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS 1144
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS 1149
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS 1149
Includes light phenomena.

75 PLASMA PHYSICS 1150
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS 1153
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS 1157
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) 1157
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT 1157
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **1158**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **N.A.**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **1158**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **1159**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **1161**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **1162**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **1164**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **1165**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **1166**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL **1166**

Note: N.A. means that no abstracts were assigned to this category for this issue.

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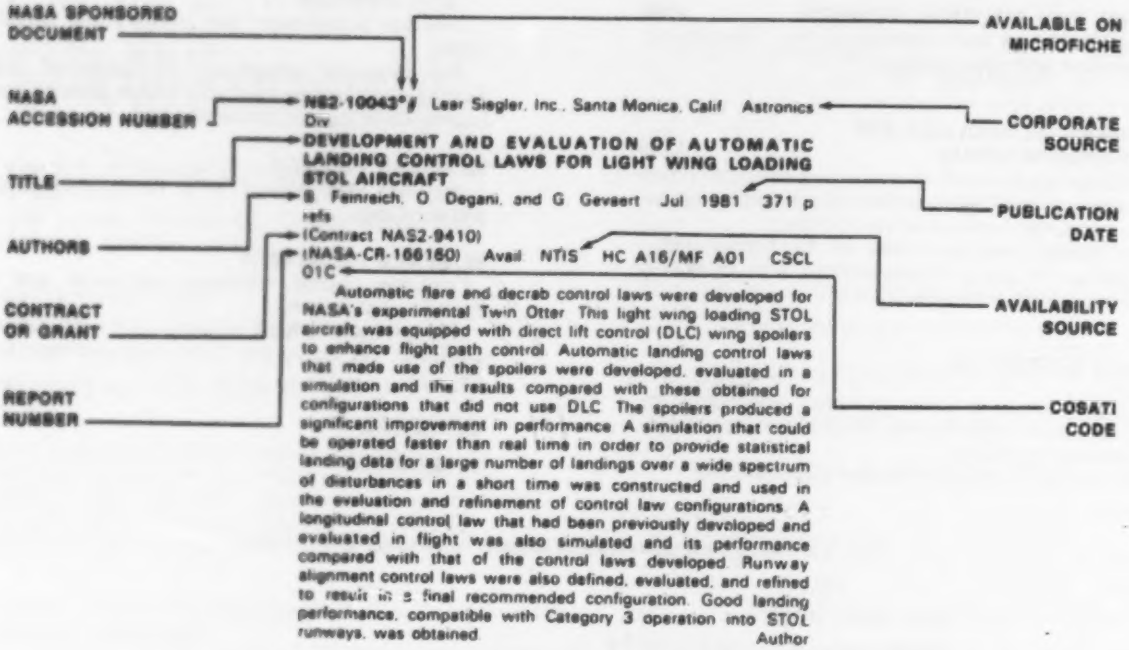
TYPICAL CITATION AND ABSTRACT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N82-10043*# Lear Siegler, Inc., Santa Monica, Calif Astronics Div

DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT

B Feinreich, O Degani, and G Gevaert Jul 1981 371 p refs

(Contract NAS2-9410)

(NASA-CR-166160) Avail NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC The spoilers produced a significant improvement in performance A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration Good landing performance, compatible with Category 3 operation into STOL runways, was obtained Author

VOLUME 20 NUMBER 8/APRIL 23, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-17083*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AN EXPERIMENTAL STUDY OF AIRFOIL ICING CHARACTERISTICS
Robert J. Shaw, Ray G. Sotos, and Frank R. Solano 1982 37 p refs Presented at Twentieth Aerospace Sci. Conf., Orlando, Fla., 11-14 Jan. 1982; sponsored by AIAA
(NASA-TM-82790; E-1114) Avail: NTIS HC A03/MF A01 CSCL 01B

A full scale general aviation wing with a NACA 63 sub 2 A415 airfoil section was tested to determine icing characteristics for representative rime and glaze icing conditions. Measurements were made of ice accretion shapes and resultant wing section drag coefficient levels. It was found that the NACA 63 sub 2 A415 wing section was less sensitive to rime and glaze icing encounters for climb conditions. E.A.K.

N82-17084# Federal Aviation Administration, Washington, D.C.
CENSUS OF US CIVIL AIRCRAFT, CALENDAR YEAR 1980 Annual Report, 31 Dec. 1980
31 Dec. 1980 275 p
(AD-A106675; AMS-220) Avail: NTIS HC A12/MF A01 CSCL 01/3

Information about the U.S. Civil aircraft fleet is presented. Tables of air carrier aircraft and an inventory of registered aircraft by manufacturer and model, and general aviation aircraft by state and county of the owner are included. GRA

N82-17085# Institute for Defense Analyses, Arlington, Va. Program Analysis Div.
BUILT-IN-TEST EQUIPMENT REQUIREMENTS WORKSHOP. WORKSHOP PRESENTATION Final Report, 1 Oct. 1980 - 28 Feb. 1981
Aug. 1981 235 p refs Workshop held at Arlington, Va., 11-13 Feb. 1981
(Contract MDA903-79-C-0320)
(AD-A107842; AD-E500460; IDA-P-1600) Avail: NTIS HC A11/MF A01 CSCL 09/3

A workshop was held for the purpose of assessing progress and problems in specifying and testing Built-In-Test (BIT) used in complex electronic equipment. The workshop's principal recommendation is that the current specification and test approach be broadened to include all capabilities associated with the detection and isolation of faults. Current practices generally address only a narrow subset of these capabilities, namely, BIT. The workshop participants defined this broad capability as '100 Percent Diagnostics.' The diagnostic capability is considered to have two components--'automatic' and 'manual.' The automatic component consists of BIT or semi-automatic BIT with technical manuals, while the manual component consists of personnel using logic, external test equipment and/or manual test procedures. Observations on current experience with BIT, recommendations to improve specification and testing of '100 Percent Diagnostics' that can be put into practice in the near term, and proposed research areas are presented. GRA

N82-17086# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
TACTICAL AIRBORNE DISTRIBUTED COMPUTING AND NETWORKS
Oct. 1981 415 p refs Partly in ENGLISH and FRENCH Meeting held in Roros, Norway, 22-25 Jun. 1981
(AGARD-CP-303; ISBN-92-835-0302-3) Avail: NTIS HC A18/MF A01

Distributed processing and its application to avionic systems are discussed. For individual titles, see N82-17087 through N82-17120.

N82-17087# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
DISTRIBUTED DATA PROCESSING: WHAT IS IT? c60
Philip H. Enslow, Jr. *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p refs (For primary document see N82-17086 08-01)
(Contract N00014-79-C-0873)
Avail: NTIS HC A18/MF A01

Distributed processing is presented as the means to obtain improvements in a number of areas of system performance. Utilizing a list of these desired improvements as the motivational factors, the key design characteristics of systems that delivers a major proportion of these improvements are presented. J.D.H.

N82-17088# Ferranti Ltd., Bracknell (England). Computer Systems Div.
THE EFFECT OF INCREASINGLY MORE COMPLEX AIRCRAFT AND AVIONICS ON THE METHOD OF SYSTEM DESIGN c06
J. T. Martin *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 5 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

The evolution of aircraft and their associated avionics is described. The evolutionary progress is considered as starting from a simple low speed aircraft with rudimentary flight instruments and sighting systems, through the interconnection of some of these systems and progressing to recent avionic systems with centralized digital computing. It is shown how the changes in aircraft systems, from the simple analog connection of a few systems, through the analog sensor/interface box/centralized digital system, to the sensor producing digital outputs/interface box/centralized digital system, have produced comparatively small changes in the methodology used for the design of these systems. The move to systems containing distributed processing interconnected by digital highways is shown to be revolutionary rather than evolutionary and to require a new approach to the system design problem so as to reap the maximum advantage from the available computing capability. Author

N82-17089# Naval Air Systems Command, Washington, D. C. Control and Guidance Research and Technology Group.

A TUTORIAL ON DISTRIBUTED PROCESSING IN AIRCRAFT/AVIONICS APPLICATIONS c06

Bernard A. Zempolich *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

An overview of the state of the art in real time distributed processing as applied to aircraft/avionics is presented. Definitions and concepts are presented starting with the total aircraft as a real time distributed computer-controlled system. The relationship of aircraft mission and avionic system architectures is discussed. Overall system architectural considerations are identified and their impact upon a real time distributed computer-controlled system is detailed. A top-down hierarchical, architectural structure is presented. This top-down structuring is described in terms of the logical functional decomposition of the system as follows: total aircraft/avionic system partitioning of aircraft/avionic subsystems, interconnect bus structure (network), system-wide processing architecture, subsystems definition, and computer systems.

Author

N82-17090# Rensselaer Polytechnic Inst., Troy, N. Y. Electrical, Computer, and Systems Engineering Dept.

PERFORMANCE STUDY OF A DISTRIBUTED MICROPROCESSOR ARCHITECTURE FOR USE ABOARD MILITARY AIRCRAFT c06

Kang G. Shin and C. M. Krishna *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 13 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

An analysis of the performance of the Distributed Microprocessor Airborne Computing System (DMACS) developed at Rensselaer Polytechnic Institute is presented. The DMACS consists of a number of quasi-independent computer subsystems loosely coupled in a highly decentralized structure that yet exhibits high cogency as a system. Some important parameters in the system such as job scheduling and starting delays, bus access delay, and system reliability are studied. In order to highlight the implications of the design options chosen, the structure of the DMACS and that of the Draper Laboratory's Fault-Tolerant Multiprocessor (FTMP) system are compared and the impact of structure on performance is discussed qualitatively.

Author

N82-17091# British Aerospace Aircraft Group, Brough (England).

THE DEVELOPMENT OF ASYNCHRONOUS MULTIPROCESSOR CONCEPTS FOR FLIGHT CONTROL SYSTEM APPLICATIONS c06

S. M. Wright and J. G. Brown *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs Sponsored in part by RAE (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The use of multiple microprocessors, each functionally dedicated and running asynchronously with a short program cycle time, is described. This approach promises benefits in a number of areas: ease of generating/proving high integrity software, reduced propagation delays, reduced hardware/software synchronization overheads, retention of classical feedback control design techniques, and extendable processing power. A flight dynamics research program using a RAE Hunter aircraft converted to fly-by-wire is discussed. This program has identified a need for a flexible digital flight control processor for such research and has provided a focus and stimulus for multiprocessor studies. The development of digital full authority flight control computer for this specific application, with a view to installation in the aircraft, is discussed.

J.D.H.

N82-17092# Elektronik-System G.m.b.H., Munich (West Germany).

FUNCTIONAL VERSUS COMMUNICATION STRUCTURES IN MODERN AVIONIC SYSTEMS c06

K. Brammer and A. Weimann *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF 01

The implications of the increase in functional and communication interfaces on avionic system structures are analyzed. Especially the passage from functional design to implemented communication structure of the airborne electronic system is scrutinized. The distributed organization of an avionic system, the realization of which is greatly simplified by bus type intrasystem signal transmission, is compared to the conventional hierarchical system organization. Advantages and drawbacks of both organizations are reviewed especially with respect to interface efficiency, cabling requirements, and the typical topology of avionic systems.

J.D.H.

N82-17093# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.

CONTINUOUS RECONFIGURATION IN A MULTI-MICROPROCESSOR FLIGHT CONTROL SYSTEM c06

Scott L. Maher and Stanley J. Larimer *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

A microprocessor based flight control system design is presented. This system is characterized by a collection of cooperatively autonomous distributed microcomputers interconnected by an arbitrary number of common serial multiplex busses. Each processor in the system independently determines its assignments using a simple algorithm that dynamically redistributes system functions from processor to processor in a never-ending process of reconfiguration. This approach offers several potential benefits in terms of system reliability, and the architecture in general incorporates many state of the art features which promise improved system throughput, expandability, and above all, ease of programming. The Continuously Reconfiguring Multi-Microprocessor Flight Control System (CRM2FCS) represents a significant data point in multiprocessor control system research. Promising ideas from a variety of references have been included and integrated in its design.

J.D.H.

N82-17094# FGAN, Wachtberg-Werthhoven (West Germany).

EXPERIENCES WITH THE EXPERIMENTAL FFM-MCS c60

Hermann von Issendorff *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The FFM-Multicomputer System (FFM-MCS), built up to investigate the utilization of microprocessor based computing networks for the various requirements of embedded data processing and control in military systems is described. Being designed as an adaptable building block system the FFM-MCS serves as a testbed for research on distributed data processing. A general method for the design of process networks followed by the adaption of adequate hardware networks is discussed. Several types of messages are introduced for efficient and safe communication between autonomous process modules. Some improvements of the hardware building block system are presented.

J.D.H.

N82-17095# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.

SAVANT: A DATABASE MANIPULATION TECHNIQUE FOR SYSTEM ARCHITECTURE DESIGN VERIFICATION AND ANALYSIS c60

A. A. Callaway *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The SAVANT (System Architecture Verification and Analysis Technique), a computer program developed to provide a tool for automatic system design verification and analysis is described. Its application is oriented towards loosely-coupled bus connected systems but is not exclusively confined to these. Flexibility has been built into the program to characterize aspects of the system architecture. The SAVANT program provides the facilities for interactively initiating, extending, modifying, filing, and retrieving the data base, which represents various facets of the system under investigation, and for configuring a system from the data base information. The system thus configured can be analyzed in a number of ways and the analyses performed suggest how the basic information should be modified in order to correct errors and inconsistencies or to improve efficiency. A consistent system can be further modified and tuned, although SAVANT still checks the validity of all operations performed. Finally, the user is able to 'firm up' the system when it has reached a satisfactory state, producing design requirements and a system description in a form which can input as a schedule to a bus control processor. Author

N82-17096# Research Triangle Inst., Research Triangle Park, N. C.

SIGNAL PROCESSING WITH SYSTOLIC ARRAYS c32

R. W. Priester, K. Bromley, H. J. Whitehouse, and J. B. Clary *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs (For primary document see N82-17086 08-01)
(Contract N66001-80-C-0118)
Avail: NTIS HC A18/MF A01

Systolic arrays are formed by providing nearest-neighbor interconnections between a large number of elemental processors to form either a one or two dimensional array. With the possible exception of boundary elements, each processing element performs identical computations in synchronism with other elements in the array. Important problems for which systolic arrays hold potential are mentioned and the systolic array processor definition, in a number of its forms, are reviewed. When applied to strongly band-limited matrices, systolic array processors can be characterized as highly efficient from the standpoint of both hardware utilization and algorithm time. However, as the bandwidth becomes large, this high performance is degraded. A data transformation which, when applied to an n x n dense matrix, results in an improved banded structure with attendant hardware savings is introduced and evaluated. Some efficient testability features of these processors which can be exploited concurrently are summarized. B.W.

N82-17097# Naval Air Systems Command, Washington, D. C. Control and Guidance Research and Technology Group.

ECONOMIC CONSIDERATIONS FOR REAL-TIME NAVAL AIRCRAFT/AVIONICS DISTRIBUTED COMPUTER CONTROL SYSTEMS c06

Bernard A. Zempolich *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

Economic considerations for Distributed Computer Control Systems (DCCS) are discussed. Centralized, distributed and federated processing architectures are used as the primary set of systems alternatives from which economic factors are developed. The economic impact of subsequent logistic support for standardized computer hardware and software versus non-standard products is identified. System considerations such as reliability, maintainability, availability, built-in-test, fault tolerance, and redundancy are examined from the standpoint of resources available to design and develop the DCCS, and also from the viewpoint of economic impact of failure of the DCCS to perform as expected. The economic impact of external factors such as the rate of technology advancement, technology independence, limited production runs, and the general lack of economic leverage upon the market are examined and related to the life-cycle support requirements of the DCCS. Author

N82-17098# Ferranti Ltd., Bracknell (England). Computer System Div.

FUNCTIONAL DOCUMENTATION. A PRACTICAL AID TO THE ORDERLY SOLUTION OF THE SYSTEM DESIGN PROBLEM c60

J. J. Martin *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

A method of breaking down a Customer Requirement in an orderly manner so as to produce progressively more detailed design levels such that at any one stage of the System Design the particular part of the design under consideration can firstly be easily understood and secondly comparatively isolated from the other parts of the design is described. The most important characteristic of the design methodology is that the Requirement is considered in purely Functional terms until a highly detailed level of the design is reached. An example of this design methodology and the technique of Functional Documentation is given and the advantages that can accrue from a sensible use of the design methodology are discussed. Author

N82-17099# British Aircraft Corp., Preston (England). Aircraft Group.

A CONSISTENT APPROACH TO THE DEVELOPMENT OF SYSTEM REQUIREMENTS AND SOFTWARE DESIGN c61

A. O. Ward *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 16 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

Some of the problems encountered in the development of system and software requirements are discussed and generalized solutions suggested. A specific approach is described, the SAFRA Project, including extensions into the area of software design. This approach embraces the use of a methodology, Controlled Requirements Expression (CORE) interfaced with a computer based System Description Language for storage and automatic analysis. Software design assumes the use of a MASCOT rationalized executive and CORAL as the implementation language. Experimental procedures for the automatic extraction of CORAL programmes from detailed requirements held on a data base are discussed. Author

N82-17100# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).

A PEARL SOFTWARE SYSTEM FOR MULTI-PROCESSOR SYSTEMS c61

P. Elzer and H.-J. Schneider *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 6 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

A High-Order-Language-System based on PEARL to program Multi-Processor-Systems in an airborne or similar environment was developed. It was necessary to minimize the overhead produced by the operating system. The generated code was optimized to a very high efficiency with respect to time and memory. Originally the aim of PEARL was process-control. Due to the application area here, subsetting of PEARL was possible. This was done with high efficiency of code and a smaller modular operating system in mind. On the other hand extensions to allow distributed processing were implemented. It exists on a host-computer and is written in FORTRAN for portability. The system was successfully used in several applications. Author

N82-17101# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.

DISTRIBUTED AND DECENTRALIZED CONTROL IN FULLY DISTRIBUTED PROCESSING SYSTEMS c60

Philip H. Enslow, Jr. *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 p 16 refs (For primary document see N82-17086 08-01)
(Contract F30602-78-C-0120)
Avail: NTIS HC A18/MF A01

A number of the characteristics of a distributed and decentralized control system and some of its operational features are identified and discussed. Extremely loose coupling, both physical and logical, is an essential characteristic of an FDPS. This mode of organization and operation is quite different from the control of centralized systems. Various models of control that may provide these features and the operational characteristics of those models are described. B.W.

N82-17102# INRIA, Rocquencourt (France).

RECOVERY IN DISTRIBUTED PROCESSING SYSTEMS c62

Liba Svobodova *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

A powerful control abstraction called an atomic action was developed as a general mechanism for controlling access to shared distributed data. In order to preserve consistency of the system, if an atomic action fails, all of its effects are undone; thus if a long complex computation is reprsented as an atomic action, an important amount of possibly useful work might be lost. The proposed scheme which facilitates selective internal recovery from detected errors, mode failures, and communication failures

employes nested atomic action. When an atomic action terminates, its results are not made permanent until the outermost atomic action is committed, but they survive local model failures. Each subtree of nested atomic actions is recoverable (undoable) individually, thus making it possible to switch to an alternative algorithm, service, or physical mode upon a failure. Finally, a recovery point is established in stable storage as part of a remote request, so that work done outside of the requesting node is not lost if this node fails.
Author

N82-17103# Massachusetts Univ., Amherst. Dept. of Electrical and Computer Engineering.
GENERALIZED POLLING ALGORITHMS FOR DISTRIBUTED SYSTEMS **c62**
Jack Keil Wolf *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)
(Grant NSF ESC-79-21140)
Avail: NTIS HC A18/MF A01

A polling algorithm for a distributed system is an algorithm which can be simultaneously run at all terminals in a network and which has as its aim the determination of which terminals have a positive response to a specific query. Of particular interest is the situation where one expects very few of the terminals to respond positively and where a terminal signifies a negative response by not transmitting at all. In such a case it is inefficient to poll the terminals in a round robin manner. A more efficient procedure is to group the terminals into subsets in which all terminals in a subset are queried simultaneously. Then if all respond negatively no further queries need be addressed to that subset. If the responses from the terminals in the subset are mixed than this subset is further subdivided into smaller subsets until the responses of all the terminals are determined. Two distinct algorithms for polling are considered. In both algorithms, the terminals of the network are represented by leaves in a binary tree and the subsets are subtrees in the overall tree. The two systems differ in the assumptions made regarding the types of responses sent and how the responses are interpreted. The performance of these two schemes are compared with each other and with ordinary round robin polling.
Author

N82-17104# Boeing Military Airplane Development, Seattle, Wash. Digital Flight Controls Research Dept.
STAGE-STATE RELIABILITY ANALYSIS TECHNIQUE **c38**
Alan D. Stern *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 7 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

An advanced flight control system reliability analysis technique must properly account for the defined success criteria, redundancy level, redundancy management, technique, system dependencies, and failure detection coverage. The stage state reliability analysis technique properly accounts for these factors. It is also computationally simple such that triplex redundant systems have been analyzed using an early 1970's desktop computer. This method is well suited for analysis by the system architect. The process begins with a system block diagram showing all element connections. A success logic diagram is then written reflecting all possible success states. The probability of success equation is written directly from the logic diagram and evaluated by substituting the probability expression for each system element. Multiple success criteria can be applied to one problem formulation simply by deleting those states which do not satisfy the success criterion.
Author

N82-17105*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
METHODOLOGY FOR MEASUREMENT OF FAULT LATENCY IN A DIGITAL AVIONIC MINIPROCESSOR **c06**
John C. McGough, Fred Swern, and Salvatore J. Bavuso *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p refs Prepared in cooperation with Bendix Corp., Teterboro, N.J. (For primary document see N82-17086 08-01)
(Contract NAS1-15946)
Avail: NTIS HC A18/MF A01 CSCL 01D

Using a gate level emulation of a typical avionics miniprocessor, fault injection experiments were performed to (1) determine the time to detect a fault by comparison monitoring, (2) forecast a program's ability to detect faults and (3) validate the fault detection coverage of a typical self test program. To estimate time to detect, six programs ranging in complexity from 6 to 147 instructions, were emulated. Each program was executed repetitively in the presence of a single stuck at fault at a gate node or device pin. Detection was assumed to occur whenever the computed outputs differed from the corresponding outputs of the same program executed in a nonfaulted processor. Histograms of faults detected versus number of repetitions to detection were tabulated. Using a simple model of fault detection, which was based in an analog with the selection of balls in an urn, distributions of time to detect were computed and compared with those obtained empirically. A self test program of 2,000 executable instructions was designed expressly for the study. The only requirement imposed on the design was that it should achieve 95% coverage. The program was executed in the presence of a single stuck-at fault at a gate node on device pin. The proportion of detected faults are tabulated. In all experiments faults were selected at random over gate nodes or device pins.
Author

N82-17106*# SRI International Corp., Menlo Park, Calif. Computer Science Lab.
HIERARCHICAL SPECIFICATION OF THE SIFT FAULT TOLERANT FLIGHT CONTROL SYSTEM **c08**
P. M. Melliar-Smith and Richard L. Schwartz *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 15 p refs (For primary document see N82-17086 08-01)
(Contract NAS1-15428)
Avail: NTIS HC A18/MF A01 CSCL 01B

The specification and mechanical verification of the Software Implemented Fault Tolerance (SIFT) flight control system is described. The methodology employed in the verification effort is discussed, and a description of the hierarchical models of the SIFT system is given. To meet the objective of NASA for the reliability of safety critical flight control systems, the SIFT computer must achieve a reliability well beyond the levels at which reliability can be actually measured. The methodology employed to demonstrate rigorously that the SIFT computer meets as reliability requirements is described. The hierarchy of design specifications from very abstract descriptions of system function down to the actual implementation is explained. The most abstract design specifications can be used to verify that the system functions correctly and with the desired reliability since almost all details of the realization were abstracted out. A succession of lower level models refine these specifications to the level of the actual implementation, and can be used to demonstrate that the implementation has the properties claimed of the abstract design specifications.
Author

N82-17107# Litton Technische Werke, Freiburg (West Germany).
RECONFIGURATION: A METHOD TO IMPROVE SYSTEMS REALIABILITY **c60**
J. Szlachta *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

A system with hardware and software reconfiguration capabilities was developed to improve the reliability of a flight-augmentation computer. The system consists of a network of n redundant computers, linked via m serial buses. A two computer processing units and two or more input/output drivers. A fault in one of the components of the redundant computers causes a hardware reconfiguration which replaces the faulty component by its still functioning twin. If a redundant computer fails altogether, all tasks allocated to it are transferred to one of the still working computers of the network. This is made possible by loading dormant copies of the tasks into at least one other computer of the initial system. These dormant copies are periodically supplied with the program status of the active copy.
Author

N82-17108# Societe d'Applications Generales d'Electricite et de Mecanique, Paris (France).
A RECONFIGURABLE CHANGE NETWORK FOR DISTRIBUTED PROCESS CONTROL [RESEAU D'ECHANGE RECONFIGURABLE POUR CONTROLE DE PROCESSUS REPARTI] **c60**

Ch. Meraud and B. Maurel (Societe. Anonyme de Telecommunications) *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p refs In FRENCH (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

A highly reliable, high output system of change is described which permits decentralized exchange between the diverse equipment onboard an aircraft or other type of vehicle in order to integrate and reconfigure the functions, no matter how critical. Very large scale integration and fiber optics which are insensitive to electromagnetic perturbations made possible a performing decentralized solution by incorporating intelligence in a universal type linking module called the subsystem interface. For the traditionally programmed mechanism for generating change, a dynamic mechanism immediately adapted to modification, is substituted which permits a great degree of synchronization.
Transl. by A.R.H.

N82-17109# Norwegian Defence Research Establishment, Kjeller.
PROTOCOL LEVEL MODULES FOR COST EFFECTIVE STANDARD COMPUTER COMMUNICATION c60
Oyvind Hvinden, Yngvar Lundh, and Oystein Sandholt *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

A set of microcomputer modules for implementation of network front-end, gateway and specilized host computers are being developed. A highly modular design approach is taken. One or more of these protocol modules may be interconnected to constitute the units referred to. A 'library' of tested hardware sub modules is established, new modules may quickly be developed using these sub modules. A framework for unified protocol implementation and protocol interconnection is defined. This includes a real time operating system kernel with functions for buffer management, timing, pseudo parallel process execution and process communication. Author

N82-17110# Centre National de la Recherche Scientifique, Toulouse (France). Lab. d'Automatique et d'Analyse des Systemes.
RETRANSMISSION STRATEGIES FOR ERROR CONTROL IN PACKET TRANSMISSION PROTOCOLS [LES STRATEGIES DE RETRANSMISSION POUR LE CONTROLE D'ERREUR DANS LES PROTOCOLES DE TRANSFERT DE DONNEES] c32
Guy Juanole *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs In FRENCH (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

Packet transmission is based on a hierarchial model in which each of several levels uses the services of a lower level. This approach, which is essential for good visualization of the different functions necessary for transmission, also allows for the distinction of two levels in error control. A higher level is related to control on packet arrial (implemented by mechanisms of numbered packets, of responses to numbered packets, and to retransmission of nondischarged numbered packets). The lower level is related to the contents of numbered packets to responses (implemented by error detecting codes). These two levels clearly and precisely define different retransmission strategies. Two classes of strategies are defined: when the retransmission is due uniquely to a temporization which is implemented in the higher level, or when the retransmission is equally implemented following errors detected by the inferior level. In each class, different strategies are defined which result from different possible modalities.
Transl. by A.R.H.

N82-17111# British Aerospace Aircraft Group, Brough (England). Avionics Systems Div.
PRACTICAL ASPECTS WHICH APPLY TO MIL-STD-1553B DATA NETWORKS c06
I. Moir (Smiths Industries Aerospace and Defense Systems Co., Cheltenham, England) and P. A. Duke *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

The data bus offers many potential advantages over hardwired or dedicated data transmission systems in the design of Avionic Systems. Systems are interconnected by a single or redundant twisted pair of wires via standard interfaces, so reducing inter-system wiring and the types and numbers of interfaces. The quantity of data transferred no longer has a direct influence on the inter system wiring and distributed computing becomes feasible. However in spite of the obvious advantages of a data bus system there are certain limitations which could be the source of much heartache to the system designer. Problems may result from transmission delays, digital sampling noise and the fundamental upper limit on data item-data rate product. Also, since interconnection between systems is via a common path, faults in the communication medium can have serious consequences, and therefore the use of redundancy and error correction techniques need to be employed. A stores management and weapon aiming system is discussed. Author

N82-17112# Fraunhofer-Inst. fuer Informations- und Datenverarbeitung, Karlsruhe (West Germany).
THE TRAFFIC FLOW IN A DISTRIBUTED REAL TIME COMPUTING SYSTEM (RDC-SYSTEM) WITH A FIBER-OPTIC RINGBUS SYSTEM c60
Dirk Heger and Reinhard Baehre *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

The new generation of automatic systems is essentially characterized by distributed multi-computer systems. The architecture is based on distributed microcomputer stations linked together by a bus system. These systems give much more design alternatives than conventional single or multicomputer systems, the danger of obtaining bottle necks of system performance is considerably greater than it was by using functional modules operating independently and simultaneously. Therefore, mathematical modeling of bus-linked multicomputer systems and the experimental evaluation of these models is online operation by means of measurements is of increasing importance. The 'really distributed control computer' system, and the traffic flow on its fiber optic ringbus system are described. Author

N82-17113# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
DISPERSED SENSOR PROCESSING MESH PROJECT c32
Vincent A. Megna *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

The F-8 dispersed sensor processing mesh project is an exploratory program involved in the development and test of the concept of a network communication structure. The elements of the structure are a bus controller and a number of nodes all of which are interconnected by multiple data flow paths. This structure is proposed as the communication medium between the subsystems of a distributed avionic system. In order to test and establish a data base for this proposed communication structure, the elements that comprise it must be designed and built. These elements are not just the hardware that is inherent to the structure, they also include the algorithms mechanized in the bus controller's software, the operating characteristic of the network, and the communication protocol used. The design and associated decisions made during the development of the network hardware and software are considered. A.R.H.

N82-17114# Hughes Aircraft Co., Fullerton, Calif.
NEXT GENERATION MILITARY AIRCRAFT WILL REQUIRE HIERARCHICAL/MULTILEVEL INFORMATION TRANSFER SYSTEMS c06
James W. McCuen *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

Changes in avionic subsystems and mission roles of next generation aircraft require new concepts in data transfer. New aircraft need total airframe/weapon system integration which means new approaches must be developed for the interconnection of avionic subsystems. Effort has begun to develop a Military Standard (MIL-STD) which will define the requirements for a high speed data bus network. The standard shall characterize a higher order information transfer system (ITS) that will interconnect avionic systems, that contain their own multiplex ITS, into a fully integrated data complex. The higher order ITS shall employ an operational protocol that will provide subsystems and common sensors, independence and fault isolation by distributed control of the common data bus. Author

N82-17115# Bendix Corp., Teterboro, N. J. Flight Systems Div.

SIFT: AN ULTRA-RELIABLE AVIONIC COMPUTING SYSTEM **c06**

Kurt Moses *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

Software implemented fault tolerance (SIFT) is an ultra-reliable computing system which is based on a multiprocessor architecture that achieves fault tolerance by replicating computing tasks among processing units. Error detection and system configuration are performed by software to maintain the operational integrity of the computing system. The high speed inter-computer communication system required for operation realized by dedicated serial links arrayed in a star connection. Software algorithms are used for failure detection by means of voting, failure isolation to the faulty processor, and reconfiguration after fault detection. Frame synchronization between processors is employed to reduce data skew and minimize false alarms. The architecture of SIFT, its hardware implementation, and the test stand used for evaluation. Potential applications of this technique to current and anticipated ultra-reliable electrical flight control systems are given. A.R.H

N82-17116# Naval Weapons Center, China Lake, Calif. Facility Engineering Branch.

STATE-OF-THE-ART COMPUTER MONITORING EQUIPMENT **c60**

Harvey G. Nelson *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 6 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

In any tactical airborne computing system, it is crucial for developers and maintenance personnel to know in considerable detail what is happening inside the computer on a real-time basis. This is especially true for a distributed system. A hardware monitor, called SOVAC (software validation and control), that provides a high-capacity, real-time, user-selective 'window' that gives visibility into the internal workings of the tactical computer is described. Author

N82-17117# Royal Aircraft Establishment, Farnborough (England).

INTEGRATED CONTROL OF MECHANICAL SYSTEM FOR FUTURE COMBAT AIRCRAFT **c06**

G. W. Wilcock, P. A. Lancaster, and C. Moxey *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 16 p refs Prepared in cooperation with British Aerospace, Warton Sponsored in part by Procurement Executive MOD (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

Various techniques for the application of digital control to aircraft utility systems were investigated. It is shown that the prefered appoach utilizes a number of distributed processors and terminals that interface with the utility components. Analysis performed to data shows a weight saving of approximately 100 Kg (i.e., 50%), and a pilot workload reduction of the order of 4:1, may be achieved in a twin engine combat aircraft.A.R.H.

N82-17118# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).

MIRAGE 2000 WEAPONS SYSTEMS ARCHITECTURE [ARCHITECTURE DU SYSTEME D'ARMES DU MIRAGE 2000] **c05**

S. Croce-Spinelli, B. Vandecasteele, and J. F. Ferreri *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p In FRENCH (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The architecture for the Mirage 2000 weapon system, which represents an advanced generation digital system, is described from the following viewpoints: (1) the digital equipment; (2) the distribution of among the equipment; (3) the digital links; and (4) the inflight monitoring of the system. The principal on which the design is based, the methods of development, and the tests required are analyzed. The inherent flexibility of the system permits its adaptation to different operational requirements, and to different possible versions. Transl. by A.R.H.

N82-17119# McDonnell Aircraft Co., St. Louis, Mo.

F/A-18A TACTICAL AIRBORNE COMPUTATIONAL SUBSYSTEM **c06**

T. V. McTigue *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The F/A-18A Hornet tactical computer subsystem consists of two central mission computers and a number of distributed processors embedded in various sensor and display subsystems. This distributed processing system is interconnected by and communicates over a MIL-STD-1553A serial 1 MHz command/response multiplex network. The distributed processing system architecture is discussed and the rationale is presented for the partitioning of the computational tasks between the central mission computers and the distributed processors embedded in the sensor subsystems. The salient features of the central mission computer and the distributed processors are discussed along with a description of the functional operation of the interconnecting MIL-STD-1553A multiplex communications system. The development process for the Operational Flight Program (OFP) for the Central mission computers is described and the support facilities which were used for the software integration and validation are discussed. A.R.H.

N82-17120# Naval Weapons Center, China Lake, Calif. F-18 Facility Branch.

F/A-18 WEAPONS SYSTEM SUPPORT FACILITIES **c05**

Thomas F. O'Neill *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 7 p (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The U.S. Navy is currently acceptance-testing the McDonnell Douglas F/A-18 aircraft. Since the F/A-18 is so much more complex than any aircraft current deployed, more sophisticated support tools will be required. The main support tool is to be a weapons system support facility including all of the hardware and software necessary to test, modify, and validate all of the avionics hardware, software, and firmware. A distributed processing approach is used in the facility, which contains several minicomputers and super minicomputers. Author

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-17121*# Hughes Helicopters, Culver City, Calif.

BLADE PLANFORM FOR A QUIET HELICOPTER Final Report

D. S. Janaki Ram Sep. 1980 31 p refs

(NASA Order A-65550B)

(NASA-CR-166256; T-35584) Avail: NTIS HC A03/MF A01 CSCL 01C

The effects of blade planform and tip speed on noise and performance for a Hughes 500 C rotor system were studied. A cursory examination of the effects of such planform shapes as regular, inverse, and no taper on the noise and performance of the rotor was conducted. It was found that a constant width wide chord planform at tower tip speed provided the best performance and lowest noise. The tapered planforms had lower performance figures due to the reduced solidity. However, some noise reductions were achieved. R.J.F.

N82-17122*# McDonnell-Douglas Corp., St. Louis, Mo.

TESTS OF A D VENTED THRUST DEFLECTING NOZZLE

BEHIND A SIMULATED TURBOFAN ENGINE Final Report
T. L. Watson Washington NASA Jan. 1982 139 p refs
(Contract NAS3-21733)
(NASA-CR-3508; MDC-A6930) Avail: NTIS HC A07/MF A01 CSCL 01A

A D vented thrust deflecting nozzle applicable to subsonic V/STOL aircraft was tested behind a simulated turbofan engine in the verticle thrust stand. Nozzle thrust, fan operating characteristics, nozzle entrance conditions, and static pressures were measured. Nozzle performance was measured for variations in exit area and thrust deflection angle. Six core nozzle configurations, the effect of core exit axial location, mismatched core and fan stream nozzle pressure ratios, and yaw vane presence were evaluated. Core nozzle configuration affected performance at normal and engine out operating conditions. Highest vectored nozzle performance resulted for a given exit area when core and fan stream pressure were equal. Its is concluded that high nozzle performance can be maintained at both normal and engine out conditions through control of the nozzle entrance Mach number with a variable exit area. E.A.K.

N82-17123# National Aerospace Lab., Tokyo (Japan).
A NEW METHOD OF ESTIMATING THE LATERAL WALL EFFECT ON THE AIRFOIL INCIDENCE DUE TO THE SUCTION AT SIDE WALLS
Hideo Sawada, Seizo Sakakibara, Mamoru Sato, Hiroshi Kanda, and Toshio Karasawa Aug. 1981 20 p refs In JAPANESE; ENGLISH summary
(NAL-TR-680; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

The velocity component is approximated from the pressure difference across the plates by the aid of an experimental equation which states that the normal velocity component to a porous plate induced by the pressure difference across the plate is proportional to the square root of the pressure difference. In this method, the proportional constant number need not be known. An experiment was carried out in which the pressure in a suction box, one side of which consisted of a porous plate, was set at various values in this experiment. The lift coefficient of an airfoil model changed with the variation of the pressure in the suction box even at the same uniform flow speed and the same incidence. The unique value of the lift coefficient was determined from several such lift coefficients at the same incidence. The corrected lift coefficient curve obtained is very close to one obtained in a test section with fully solid side walls. T.M.

N82-17124# National Aerospace Lab., Tokyo (Japan). STOL Aircraft Project Group.
SURVEYS OF FLOW-FIELD AROUND EMPENNAGE OF THE NAL STOL-RESEARCH-AIRCRAFT MODEL
Jul. 1981 80 p refs In JAPANESE; ENGLISH summary
(NAL-TR-677; ISSN-0389-4010) Avail: NTIS HC A05/MF A01

The flow field around the empennage for the STOL landing were measured. The down wash angle, the side wash angle, and the dynamic pressure at the aerodynamic center of the empennage were obtained by linear interpolation at the two sections perpendicular to the free steam. Effects of the engine thrust coefficient and the two types of vortex generator on the flow field, and the directional stability in the case of an inner engine becoming inoperative, were studied. E.A.K.

N82-17125# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering.
EXPERIMENTAL STUDY OF DELTA WING LEADING-EDGE DEVICES FOR DRAG REDUCTION AT HIGH LIFT M.S. Thesis
Thomas Dwight Johnson, Jr. Dec. 1980 139 p refs
Avail: NTIS HC A07/MF A01

Future fighter aircraft requirements specify efficient supersonic cruise and high-g maneuverability at high lift. The slender delta wing meets the first requirement but has large lift induced drag increments at high lift. One method to alleviate the drag is to control the flow at the wind leading edge (LE) by means of small LE devices, so as to maintain locally attached flow to higher angles of attack and thus increase the level of aerodynamic thrust. The devices selected for evaluation were the fence, slot, pylon-type vortex generator (VG), and sharp leading-edge extension (SLEE). These devices were tested on a 60 deg flatplate delta (with blunt LE) in the Langley Research Center (NASA) 7- by 10-foot high-speed tunnel at low-speed and to angles of attack of 28 degrees. Balance and static pressure measurements were taken. The results indicate that all the devices have significant drag reduction capability and improved longitudinal stability while a slight loss of lift and increased cruise drag occurred. T.M.

N82-17126*# George Washington Univ., Washington, D.C. School of Engineering and Applied Science.
EXPERIMENTAL TRIM DRAG VALUES FOR CONVENTIONAL AND SUPERCRITICAL WINGS M.S. Thesis
Peter Fredric Jacobs Dec. 1981 165 p refs Sponsored by NASA
(NASA-CR-168500) Avail: NTIS HC A08/MF A01 CSCL 01A

Supercritical wings were studied to determine whether they incur higher trim drag values at cruise conditions than wide body technology wings. Relative trim drag increments were measured in an experimental wind tunnel investigation. The tests utilized high aspect ratio supercritical wing and a wide body wing in conjunction with five different horizontal tail configurations, mounted on a representative wide body fuselage. The three low tail configurations and two T tail configurations were chosen to measure the effects on horizontal tail size, location, and camber on the trim drag increments for the two wings. The increase in performance (lift to drag ratio) for supercritical wing over the wide body wing was 11 percent for both the optimum low tail and T tail configurations. S.L.

N82-17127# Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
ROLL UP MODEL FOR ROTOR WAKE VORTICES, PART 5
Maarten Landahl Stockholm Aeronautical Research Inst. of Sweden 13 Nov. 1981 28 p refs
(Contract NE-5061-014)
(ASRL-TR-194-4; FFA-HU-2262-Pt-5) Avail: NTIS HC A03/MF a01

Conservation of momentum and energy is used to estimate the core size of a rolled-up vortex from a propeller or rotor blade tip. A simplified planar model due to Prandtl is employed to determine the strength, position, and vore size of the rolled-up vortices. This model is valid when the number of blades is large such that the distance between the wake vortex sheets is much less than the diameter of the rolled-up vortex spirals. The vortex is assumed to have a core of constant vorticity (Rankine vortex). Three dimensionality is then accounted for by modeling the actual spiral wake vortex as a row of regularly spaced vortex rings. The core diameter is found to be about 40 percent of this distance, with a slight decrease with increase in spacing-to-diameter ratio. The core velocity is found to increase with increased spacing from 0.5 of the wake velocity at zero spacing to about 0.7 of the wake velocity at a spacing of three times the wake radius. Author

N82-17128# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
THEORY AND EXPERIMENT IN UNSTEADY AERODYNAMICS
H. Bergh, H. Tijdemann, and R. J. Zwaan 11 Dec. 1980 26 p refs Presented at Aeroelastic Colloq., Goettingen, West Germany, 24 Sep. 1980
(NLR-MP-80046-U) Avail: NTIS HC A03/MF A01

A historical review is given of the role of theory and experiment in investigations of unsteady aerodynamics. Author

N82-17129# National Aerospace Lab., Amsterdam (Netherlands). Dept. of Aeroelasticity.
A WIND TUNNEL STUDY OF THE FLUTTER CHARACTERISTICS OF A SUPERCRITICAL WING
R. Houwink, A. N. Kraan, and R. J. Zwaan 28 Jan. 1981 10 p refs Presented at 22nd SDM/Dyn. Specialists Conf., Atlanta, 6-10 Apr. 1981 Sponsored by Netherlands Agency for Aerospace Programs Prepared in cooperation with Royal Netherlands Aircraft Factories Fokker, Amsterdam
(NLR-MP-81002-U) Avail: NTIS HC A02/MF a01

A wind-tunnel flutter test on a supercritical wing model is described. Objectives of the test were to investigate the transonic dip and to enable comparison with calculated flutter characteristics in which a quasi-three dimensional transonic theory was used. The beginning of a transonic dip was measured and a satisfactory agreement with theory could be found. An additional flutter instability in the bottom of the transonic dip could be correlated with the loose of transition strip effectivity at low Reynolds numbers. Author

N82-17130# Ohio State Univ., Columbus. Dept. of Electrical Engineering.
ANALYSIS OF THE CURVED JUNCTION EDGE BETWEEN A FLAT PLATE AND A PROLATE SPHEROID
H. Chung, W. D. Burnside, and N. Wang May 1981 12 p refs
(Contract N00019-80-C-0593)
(AD-A106543; ESL-713321-1) Avail: NTIS HC A02/MF A01 CSCL 01/2

The process of attaching the flat plate to the prolate spheroid (aircraft fuselage) and finding the curved junction edge was studied. The approach to this problem is first to find the intersection point between a line (i.e., one edge of the plate) and the prolate spheroid. The same idea is used to find the curved junction edge between a flat plate and the prolate spheroid. GRA

N82-17131# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.
DEVELOPMENT OF A COMPUTER BASED PRESENTATION OF NON-STEADY HELICOPTER ROTOR FLOWS Interim Report, 1 Jul. 1979 - 30 Apr. 1981
Henry R. Velkoff and Richard R. Navarro Sep. 1981 121 p refs
(Contract DAAG29-79-C-0074)
(AD-A108107; ARO-14142.6-EX; OSURF-761646/711999) Avail: NTIS HC A06/MF A01 CSCL 01/3

A system to measure the non-steady velocities in the model rotor wake was modified to provide velocity data in a form more useful to the user of the data. Hot wire angle parameters were modified so as to provide better correlations by using cosine law in place of the usual K-squared technique common in hot-wire anemometry. The results of the non-steady measurements were presented in the form of motion pictures of the non-steady computer generated vector plots. Author (GRA)

N82-17132# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.
ROTOR FLOW RESEARCH IN LOW SPEED HELICOPTER FLIGHT Final Report, 1 Jul. 1979 - 30 Apr. 1981
Henry R. Velkoff Sep. 1981 24 p refs
(Contract DAAG29-79-C-0074)
(AD-A107873; ARO-14142.7-EX) Avail: NTIS HC A02/MF A01 CSCL 20/4

Measurements of helicopter rotor wake flow were made at low advance ratio. Both steady and non-steady data were taken in the wake using 3-D hot-film anemometry. Emphasis was placed on the presentation of the data. Motion pictures were obtained from the computer plots of the experimental velocity data. Author (GRA)

N82-17133# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.
NON-STEADY VELOCITY MEASUREMENT OF THE WAKE OF A HELICOPTER ROTOR AT LOW ADVANCE RATIOS Interim Report, 1 Jul. 1979 - 30 Apr. 1981
H. R. Velkoff and H. Terkel Sep. 1981 127 p refs
(Contract DAAG29-79-C-0074)
(AD-A107722; ARO-14142.5-EX; OSURF-761646/711999) Avail: NTIS HC A07/MF A01 CSCL 20/4

A system was developed which could measure the instantaneous velocities in the wake of a model helicopter rotor operating at low advance ratios. A three-wire hot film probe was mounted on a traverse and placed at many positions in the wake. The output of the probe was fed into an on-line computer operating in an interactive mode. Computer generated vector plots were made of both time averaged velocities and instantaneous velocities for the case of mu = 0.06. Author (GRA)

N82-17134# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
EXPERIMENTAL VERIFICATION OF AN AERODYNAMIC PARAMETER OPTIMIZATION PROGRAM FOR WIND TUNNEL TESTING Final Report, Oct. 1980 - Sep. 1981
Richard L. Palko and Margaret Anne Crawford AEDC Nov. 1981 32 p refs
(AD-A107727; AEDC-TR-81-23) Avail: NTIS HC A03/MF A01 CSCL 20/4

The optimization algorithm developed for the SOFT wing program has been revised to make it more applicable for use in routine wind tunnel testing. The algorithm modification removed some unused routines and simplified the control input requirements. The modified optimization algorithm was demonstrated in the 1-ft transonic Aerodynamic Wind Tunnel (1T) using a 3-degree-of-freedom model. The test Mach number was 0.8. The algorithm was successfully demonstrated for all three optimization runs attempted. These included minimization of drag coefficient for a specified coefficient of lift, maximization of lift coefficient for a specified coefficient of drag, and maximization of lift-to-drag ratio for a specified coefficient of drag. Author (GRA)

N82-17135# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium). Aeronautics and Aerospace Dept.
FINITE DIFFERENCE COMPUTATION OF THE CONICAL FLOW FIELD OVER A DELTA WING
L. Vigevano Aug. 1981 55 p refs
(VKI-TN-140) Avail: NTIS HC A04/MF A01

A numerical approach using finite differences applied to a nonlinear governing equation was adopted in order to introduce compressibility effects in a model of the vertical flow past a sharp leading edge on a delta wing. A conical line vortices model was adapted to a through field computation. From numerical experiments, criteria for the representation of a mathematical vortex in a finite difference scheme are derived Comparison of the numercial results with the Brown and Michael analytical solution shows that the first order scheme employed preserves satisfactory accuracy in the prediction of the wing loads. Author (ESA)

N82-17136# European Space Agency, Paris (France).
INVESTIGATION OF A LAMINAR TWO-COMPONENT BOUNDARY LAYER ALONG AN EVAPORATION LIQUID FILM BY MEANS OF A FINITE DIFFERENCE METHOD
Heinrich Eickhoff, Joerg Schroeppel, and Frank Thiele Nov. 1981 43 p refs Transl. into ENGLISH of "Untersuchung der Laminaren Zweistoffgrenzschicht Laengs eines Verdunstenden Fluessigkeitsfilms mit Hilfe eines Differenzenverfahrens" Rept. DFVLR-FB-80-34 Cologne, Sep. 1980 Original report in GERMAN previously announced as N81-22330
(ESA-TT-711; DFVLR-FB-80-34) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 11,10

A flat liquid film of constant thickness, at rest, unilaterally wetting a plate is described as it evaporates into a stream of hot air. The two component boundary layer flow which is generated by this system as well as the coupled mass and heat transfer at the liquid film surface is calculated by means of an implicit finite difference method of Hermitian type, taking into account temperature and concentration dependent properties. The solutions of the coupled partial differential equations for mass, momentum, and energy are compared with other investigations with respect to accuracy, required iterations and grid points. The results underline the precision and the reliability of the numerical method used. Author (ESA)

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N82-17137*# Textron Bell Helicopter, Fort Worth, Tex.
ASSESSMENT OF HISTORICAL AND PROJECTED SEG-

MENTS OF US AND WORLD CIVIL AND MILITARY ROTORCRAFT MARKETS 1960 - 1990 Contractor Report, 2 Aug. 1981
William J. Yates 2 Aug. 1981 203 p
(Contract NAS2-10404)
(NASA-CR-166151) Avail: NTIS HC A10/MF A01 CSCL 05C

The future military and civil worldwide market potential for current and future rotorcraft configurations was assessed. Comparisons by region, mission, civil or military, etc., are made for both historial and forecast data. A comprehensive historical data base was utilized to determine historical and future trends. Consideration was given to socio-political, economic, and technological factors in determining future trends. Author

N82-17138# National Transportation Safety Board, Washington, D. C. Bureau of Accident Investigation.
AIRCRAFT ACCIDENT REPORT - UNIVERSAL AIRWAYS, INC., BEECH 65-A80/EXCALIBUR CONVERSION, N100UV, NEAR MADISONVILLE, TEXAS, JULY 2, 1981
17 Dec. 1981 25 p
(NTSB-AAR-81-17) Avail: NTIS HC A02/MF A01

About 1230 Central Daylight Time, on July 2, 1981, a Universal Airways, Inc. Beech 65-A80, N100UV, crashed into an open, level field about 7 nautical miles east southeast of Madisonville, Texas. Witnesses heard a small explosion and saw the aircraft descend from a dark cloud; the wings and the empennage were not attached during the observed portion of the aircraft's descent. The pilot and the two passengers were killed. The aircraft was destroyed. The National Transportation Safety Board determines that the probable cause of the accident was a pilot induced airframe overload following loss of aircraft control which resulted in the structural breakup of the aircraft. The reason(s) for the loss of aircraft control could not be determined. Contributing to the loss of control was the pilot's lack of instrument proficiency in multiengine aircraft. R.J.F.

N82-17139# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
AIRCRAFT ICING AVOIDANCE AND PROTECTION
9 Sep. 1981 16 p
(PB82-108135; NTSB-SR-81-1) Avail: NTIS HC A02/MF A01 CSCL 01C

The problems of aircraft icing from the standpoint of icing statistics, the meteorological factors which cause icing, the certification of aircraft by the FAA for the flight into known icing conditions, and the forecasting of icing conditions are investigated. It is noted that icing accidents are a problem primarily for general aviation aircraft and that in addition to the accidental losses due to icing, there are significant operational losses due to inadequacies in the weather forecasting system. The problems revealed can be alleviated, but in order to do so new technology will have to be developed based upon a better understanding of ice formation and improvements in the quality of icing forecasts. GRA

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications*.

N82-17140*# Ohio Univ., Athens. Avionics Engineering Center.
COMMUTATED AUTOMATIC GAIN CONTROL SYSTEM
Stephen R. Yost [1982] 25 p refs
(Grant NGR-36-009-017)
(NASA-CR-168440; TM-81) Avail: NTIS HC A02/MF A01 CSCL 17G

A commutated automatic gain control (AGC) system was designed and built for a prototype Loran C receiver. The receiver uses a microcomputer to control a memory aided phase-locked loop (MAPLL). The microcomputer also controls the input/output, latitude/longitude conversion, and the recently added AGC system. The circuit designed for the AGC is described, and bench and flight test results are presented. The AGC circuit described actually samples starting at a point 40 microseconds after a zero crossing determined by the software lock pulse ultimately generated by a 30 microsecond delay and add network in the receiver front end envelope detector. S.L.

N82-17141*# Ohio Univ., Athens. Avionics Engineering Center.
A PROTOTYPE INTERFACE UNIT FOR MICROPROCESSOR-BASED LORAN-C RECEIVER
Stanley M. Novacki, III Nov. 1981 11 p refs
(Grant NGR-36-009-017)
(NASA-CR-168441; TM-82) Avail: NTIS HC A02/MF A01 CSCL 17G

An inexpensive data/command entry and display system is documented. This system is designed to operate in place of a separate ASC2 terminal. The software to interface this unit to the 6502 based navigation receiver is also described. S.L.

N82-17142*# Analytical Mechanics Associates, Inc., Hampton, Va.
TERMINAL AREA AUTOMATIC NAVIGATION, GUIDANCE, AND CONTROL RESEARCH USING THE MICROWAVE LANDING SYSTEM (MLS). PART 2: RNAV/MLS TRANSITION PROBLEMS FOR AIRCRAFT Final Report
Samuel Pines Washington, D.C. NASA Jan. 1982 139 p refs
(Contract NAS1-15116)
(NASA-CR-3511; AMA-80-12-Pt-2) Avail: NTIS HC A07/MF A01 CSCL 17G

The problems in navigation and guidance encountered by aircraft in the initial transition period in changing from distance measuring equipment, VORTAC, and barometric instruments to the more precise microwave landing system data type navaids in the terminal area are investigated. The effects of the resulting discontinuities on the estimates of position and velocity for both optimal (Kalman type navigation schemes) and fixed gain (complimentary type) navigation filters, and the effects of the errors in cross track, track angle, and altitude on the guidance equation and control commands during the critical landing phase are discussed. A method is presented to remove the discontinuities from the navigation loop and to reconstruct an RNAV path designed to land the aircraft with minimal turns and altitude changes. B.W.

N82-17143# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
DOT SHOULD TERMINATE FURTHER LORAN-C DEVELOPMENT AND MODERNIZATION AND EXPLOIT THE POTENTIAL OF THE NAVSTAR/GLOBAL POSITIONING SYSTEM
18 Sep. 1981 16 p
(AD-A107768; GAO/MASAD-81-42) Avail: NTIS HC A02/MF A01 CSCL 17/7

The U.S. Coast Guard is planning to modernize its existing LORAN-C navigation system, even though LORAN-C can potentially be replaced by the Department of Defense's NAVSTAR/Global Positioning System (GPS) in the early 1990s. The Coast Guard and the Research and Special Programs Administration have also devoted little effort to evaluating and developing GPS' capability as a civil marine and land navigation system. Because LORAN-C can be effectively maintained and reliably operated at least until the early 1990s and because the Coast Guard has not been able to validly demonstrate the cost effectiveness of the replacement program on a station-by-station basis, GAO recommends that the Coast Guard terminate its planned replacement of existing LORAN-C equipment. GAO also recommends that the Coast Guard discontinue developing new LORAN-C applications and focus efforts and resources on demonstrating GPS' potential as a marine and land navigation system. Author (GRA)

N82-17144# Mitre Corp., McLean, Va. Metrek Div.
REQUIREMENTS FOR INSTRUMENT APPROACHES TO CONVERGING RUNWAYS
L. C. Newman, W. J. Swedish, and T. N. Shimi Sep. 1981 116 p refs
(Contract DTFA01-81-C-10001)
(AD-A108075; MTR-81W230; FAA-EM-82-4) Avail: NTIS HC A06/MF A01 CSCL 01/2

This document discusses the technical issues relevant to converging approaches and examines the feasibility of conducting instrument approaches as a means of increasing airport capacity. The main considerations in the analysis were: runaway geometry; missed approach paths; and pilot acceptance. A safety analysis was conducted to determine requirements and control procedures to provide protection against: random lateral variation from the missed approach path; Heading blunder; and rare and unexpected events. Requirements for final and missed approach are presented as are strategies for applying these requirements to airports with a wide variety of converging runway geometries. Preliminary recommended procedures are presented for conducting independent instrument approaches to Category I minima. GRA

N82-17145# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Electrical Engineering.
OPTICAL DATA PROCESSING FOR MISSILE GUIDANCE Annual Report, 1 Oct. 1980 - 31 Sep. 1981
David Casasent 1 Oct. 1981 70 p refs
(Grant AF-AFOSR-0091-79; AF Proj. 2305)
(AD-A107592; AFOSR-81-0730TR) Avail: NTIS HC A04/MF A01 CSCL 17/7

The initial phase of our synthetic discriminant function optical pattern recognition research has been completed. This hyperspace description allows the use of off-line synthesis of a filter function that provides both intra-class recognition (of a key object independent of geometrical distortions) and inter-class discrimination (of a key object from candidate false targets). A new theoretical model for multi-sensor data, a description of a general multi-sensor processor and a statistical analysis of both have also been completed. Initial experimental correlations were obtained and found to be in agreement with our model and theoretical analysis. A new parameter, the correlation measure, was found to be of use in determining the multi-sensor nature of input imagery and a (GRAD) digital preprocessing operator was found to be quite adequate for the cases considered. Our initial optical correlations on the autonomous terminal homing data base were also completed. In this research, aperture correlation effects were overcome by a new technique, optical and digital correlations on the same data base were obtained and compared (with a high pass filter model for the optical matched filter found to be adequate and appropriate for many applications), and sensed/synthetic optical image correlations were obtained (with the help of photoreduced imagery and advanced preprocessing operations). Author (GRA)

N82-17146# Systems Control, Inc., Palo Alto, Calif.
DIFFERENTIAL OMEGA SYSTEM DEVELOPMENT AND EVALUATION Final Report, 27 Aug. 1977 - 15 Aug. 1981
T. M. Watt, L. E. Abrams, and F. G. Karkalik Washington FAA Aug. 1981 105 p refs
(Contract DOT-FA75WA-3662)
(AD-A107857; FAARD-81-69) Avail: NTIS HC A06/MF A01 CSCL 17/7

This report describes a development and evaluation program for Differential Omega in general aviation. The program was a cooperative venture between the FAA and Transport Canada. SCT performed system design, program management, and flight test on behalf of the FAA. Tracor, Inc. provided modified Omega airborne receivers under subcontract to SCT. Flight tests took place in Alaska aboard a Convair 580 provided by the FAA. Monitor stations were located in Anchorage and at Deadhorse. The most definitive results were obtained from flight tests conducted in October 1980 and February 1981. Important results included: (a) data-link range varied from 44 nm to 198 nm, (b) random component of navigation error was 0.25 nm, 2-D RMS, (c) range decorrelation error was about 2 nm over a distance of 550 nm, (d) transient response of the system-following aircraft procedure turns was characterized by a positional overshoot of about 1.5 nm, followed by a monotonically decreasing error with a two-minute time constant. Recommendations are made for improving system performance. Author (GRA)

N82-17147# Test Group (6585th), Holloman AFB, N. Mexico
PROCEEDINGS OF THE TENTH BIENNIAL GUIDANCE TEST SYMPOSIUM, VOLUME 1
Robert G. Brown, Harold D. Morris, Philip D. Flanner, Robert T. Callahan, and B. Katz Oct. 1981 282 p refs Meeting held at Holloman AFB, N. Mex., 7-9 Oct. 1981
(AD-A107612; AD-TR-81-38-Vol-1) Avail: NTIS HC A13/MF A01 CSCL 17/7

These proceedings contain papers included in the Tenth Biennial Guidance Test Symposium. This symposium, hosted by the Central Inertial Guidance Test Facility, is directed toward the exchange of information, stimulation of new ideas, and discussion of recent developments in the field of guidance testing. The papers presented include such topics as the use of the Global Positioning System, Aircraft Inertial Navigators, Component Evaluation, Advanced Guidance Methodology, Missile Guidance Systems, and Analysis Techniques. The included papers are those presented in the unclassified sessions of the symposium. Papers presented in the classified portions of the meeting are being published as Volume II. Author (GRA)

N82-17148# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
ACTIVE BEACON COLLISION AVOIDANCE LOGIC EVALUATION. VOLUME 2: COLLISION AVOIDANCE (BCAS) THREAT PHASE Final Report, Apr. 1979 - Jun. 1980
A. Adkins, J. Thomas, B. Billmann, and J. Windle Sep. 1981 59 p refs
(FAA Proj. 052-241-320)
(AD-A107805; FAA-CT-80-51-2-Vol-2; FAA-RD-80-125-2) Avail: NTIS HC A04/MF A01 CSCL 01/2

The purpose of this project was to evaluate and refine the April 1979 version of the Beacon Collision Avoidance System (BCAS) logic prior to Active BCAS prototype flight testing. The April 1979 version of the BCAS logic added changes to support multiple aircraft conflict resolution, Conflict Indicator Register (CIR) interfacing and new surveillance logic interfacing. The results of the first phase of the Active BCAS logic, evaluating the Air Traffic Control Radar Beacon System (ATCRBS) threat phase, identified several improvements that should be made to the BCAS logic. These improvements were incorporated into the logic prior to beginning the second phase, the BCAS equipped threat phase. The second phase was conducted from September to November 1979 and was designed to evaluate the BCAS performance against BCAS equipped threats. The results are presented in this report. Several logic improvements have been identified. These changes have been implemented in both the threat logic and the BCAS command coordination logic (CIR logic). In general, BCAS performance for equipped threats was not as sensitive to vertical rate tracker noise as in the ATCRBS threat case. Resolution performance has been improved through a reduction in undesirable BCAS alarms and by reducing excessive separation with the inclusion of a projected vertical miss distance (VMD) filter for equipped threats. A better method of selecting threat volume parameters has been incorporated. GRA

N82-17149# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
INVESTIGATION OF WILCOX MODEL 585B VERY HIGH FREQUENCY OMNIDIRECTIONAL RADIO RANGE (VOR) SYSTEM, PART 3 Final Report, Mar. 1980 - Feb. 1981
Wayne E. Bell Oct. 1981 53 p refs
(FAA Proj. 041-305-830)
(AD-A107855; FAA-CT-81-46; FAA-RD-81-52; ACT-100) Avail: NTIS HC A04/MF A01 CSCL 17/7

A three-part investigation of the Wilcox 585B Very High Frequency Omnidirectional Radio Range (VOR) System was conducted. In Part 1, the magnitude of the ground error was reduced by modification and suitable adjustment of antenna element lengths of the field detector. In Part 2, investigation developed an acceptable calibration procedure for system 30 hertz (Hz) modulation. Obtaining compatible 30 Hz modulation reading between aircraft (far-field) and edge of counterpoise (near-field) measurements was an additional requirement. In Part 3, tests resolved any discrepancies in the tuning adjustments prescribed by the manufacturer's equipment manuals. This report, which is the last in a series of three, contains an outline of the tests and procedures for setting the lengths of the adjustable field detector elements, a recommended procedure for obtaining compatible near-field and airborne 30 Hz modulation readings, and recommended changes to the manufacturer antenna tuning procedures in order that the system meet required operational tolerances. Author (GRA)

N82-17150# Air Navigation Services, Inc., Westerngrund (West Germany).
AERONAUTICAL INFORMATION DATA SUBSYSTEM (AIDS): A GROUND-BASED COMPONENT OF AIR NAVIGATION SERVICES SYSTEMS
Frank W. Fischer 1981 5 p Presented at 11th AIDS Symp., Cologne, 22-24 Sep. 1981 Sponsored by DFVLR
Avail: NTIS HC A02/MF A01

The construction of an air navigation services information data base for internal and external use (airspace users before and during flight) of internally and externally produced information data is advocated. A data bank, which holds all current operational information data, controls the data switching and processing machine which constitutes the data communication subsystem. Benefits of AIDS include costs in data compiling and the provision of precise data for air traffic control, flight planning or rescue operations. Apart from the airlines, AIDS is of most use to general aviation operators. Author (ESA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-17151*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
USE OF OPTIMIZATION TO PREDICT THE EFFECT OF SELECTED PARAMETERS ON COMMUTER AIRCRAFT PERFORMANCE Progress Report
Valana L. Wells and Richard S. Shevell Feb. 1982 45 p refs
(Grant NAG1-202)
(NASA-CR-168439) Avail: NTIS HC A03/MF A01 CSCL 01C

The relationships between field length and cruise speed and aircraft direct operating cost were determined. A gradient optimizing computer program was developed to minimize direct operating cost (DOC) as a function of airplane geometry. In this way, the best airplane operating under one set of constraints can be compared with the best operating under another. A constant 30-passenger fuselage and rubberized engines based on the General Electric CT-7 were used as a baseline. All aircraft had to have a 600 nautical mile maximum range and were designed to FAR part 25 structural integrity and climb gradient regulations. Direct operating cost was minimized for a typical design mission of 150 nautical miles. For purposes of C sub L sub max calculation, all aircraft had double-slotted flaps but with no Fowler action. T.M.

N82-17152*# Goodyear Aerospace Corp., Akron, Ohio.
PRELIMINARY DESIGN STUDY OF A HYBRID AIRSHIP FOR FLIGHT RESEARCH
Ronald G. E. Browning Jul. 1981 286 p refs
(Contract NAS2-10777)
(NASA-CR-166246; GER-17016) Avail: NTIS HC A13/MF A01 CSCL 01C

The feasibility of using components from four small helicopters and an airship envelope as the basis for a quad-rotor research aircraft was studied. Preliminary investigations included a review of candidate hardware and various combinations of rotor craft/airship configurations. A selected vehicle was analyzed to assess its structural and performance characteristics. Author

N82-17153*# Lockheed-California Co., Burbank.
SYSTEMS STUDY OF TRANSPORT AIRCRAFT INCORPORATING ADVANCED ALUMINUM ALLOYS Final Report
I. Frank Sakata Jan. 1982 187 p refs
(Contract NAS1-16434)
(NASA-CR-165820; LR-29984) Avail: NTIS HC A09/MF A01 CSCL 01C

A study was performed to quantify the potential benefits of utilizing advanced aluminum alloys in commercial transport aircraft and to define the effort necessary to develop fully the alloys to a viable commercial production capability. The comprehensive investigation (1) established realistic advanced aluminum alloy property goals to maximize aircraft systems effectiveness (2) identified performance and economic benefits of incorporating the advanced alloy in future advanced technology commercial aircraft designs (3) provided a recommended plan for development and integration of the alloys into commercial aircraft production (4) provided an indication of the timing and investigation required by the metal producing industry to support the projected market and (5) evaluate application of advanced aluminum alloys to other aerospace and transit systems as a secondary objective. The results of the investigation provided a roadmap and identified key issues requiring attention in an advanced aluminum alloy and applications technology development program. Author

N82-17154* Textron Bell Helicopter, Fort Worth, Tex.
CORRELATING MEASURED AND PREDICTED INPLANE STABILITY CHARACTERISTICS FOR AN ADVANCED BEARINGLESS ROTOR Final Report
William H. Weller Jan. 1982 72 p refs
(Contract NAS2-10772)
(NASA-CR-166280; Rept-699-099-046) Avail: NTIS HC A04/MF A01 CSCL 01C

The experimental data were obtained from hover tests for a scaled model of an advanced bearingless main rotor. Both isolated rotor and ground resonance conditions were tested. Test parameters included blade built-in cone and sweep angles, rotor inplane structural damping, pitch link location and fuselage structural damping. Analytical results for the conditions tested were obtained using current Bell Helicopter analyses. In addition, variations in the analytical models were made to assess their impact on the correlation between computed and measured results. Results are presented in tabular and graphical form. T.M.

N82-17155# Arinc Research Corp., Santa Ana, Calif.
TECHNOLOGY OVERVIEW FOR ADVANCED AIRCRAFT ARMAMENT SYSTEM PROGRAM
H. Rosenberg, R. Brooks, J. Alderman, K. Braman, G. OBryan, and G. Wright May 1981 284 p refs
(Contract N60530-80-C-0270)
(AD-A107680; Rept-1789-01-1-2406) Avail: NTIS HC A13/MF A01 CSCL 01/3

Presented herein are overviews of state-of-the-art technologies applicable to the Stores Management System and Suspension and Release Equipment of the Advanced Aircraft Armament System. Technology briefs are presented for selected areas, and references are made to detailed sources of desired information. Author (GRA)

N82-17156# Arinc Research Corp., Santa Ana, Calif.
STANDARDIZATION STUDY FOR ADVANCED AIRCRAFT ARMAMENT SYSTEM PROGRAM
Larry J. Graham and William G. Schulz May 1981 103 p refs
(Contract N60530-80-C-0339)
(AD-A107681; Rept-1783-01-1-2405) Avail: NTIS HC A06/MF A01 CSCL 01/3

Results of a 6-month study of standardization criteria and characteristics are presented that may be effectively applied to the Advanced Aircraft Armament System (AAAS) Program. System elements feasibly for standardization are identified. Standardization characteristics for those feasible elements are developed for various levels of standardization (subsystem, module, piece part) and standardization approaches (horizontal, vertical, area, functional, logistical, and cooperative). Alternative standardization characteristics are also postulated and recommendations are formulated for application to the AAAS Program. Author (GRA)

N82-17157# Hochschule der Bundeswehr, Munich (West Germany). Fachbereich Luft- und Raumfahrttechnik.

OPTIMAL DOLPHIN HANG GLIDER FLIGHT [OPTIMALER DELPHIN-SEGELFLUG]
E. D. Dickmanns Mar. 1981 71 p refs In GERMAN
Avail: NTIS HC A04/MF A01

Time minimal gliding flight in vertical air currents is discussed. If the vertical current wavelength is large as opposed to the trajectory oscillation taken by an airplane, an optimal flight with approximately n sub z = 1 can be obtained. In short vertical currents the dynamic warming up maneuver in the downwind gives great advantages. During the transition local conditions may interfere. Two fundamentally different control maneuvers of equal value to the sail functions are described. Transl. by E.A.K.

N82-17158# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
THE ARMED HELICOPTER IN AIR TO AIR MISSIONS
Emil Weiland 1981 18 p Presented at Royal Aeronautical Soc. Rotorcraft Section Symp., London, 4 Feb. 1981
(MBB-UD-317-81-O) Avail: NTIS HC A02/MF A01

The antihelicopter-helicopter must be superior in performance and agility. The basic vehicle must be supplemented by a specialized armament demonstrating a combination of guns and fire and forget air to air missiles. In order to ensure a system superior to the possible enemy gunship, the helicopter needs to be designed to take full advantage of the inherent performance and agility potential of the basic helicopter elements. The agility aspect of the rotorcraft inherent characteristics of the major rotorcraft components are discussed and a possibility for a practical solution is indicated. Author

N82-17159# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Hauptabt. Aeromechanik.
APPLICATIONS OF STOCHASTIC DIFFERENTIAL EQUATIONS IN FLIGHT MECHANICS
Karl-Heinz Keil 15 May 1981 53 p refs Sponsored by Bundesministerium fuer Forschung und Technologie
(MBB-UA-589-81-O; LFF-8002-5) Avail: NTIS HC A04/MF A01

The behavior of the mean values and covariances of states of stochastically influenced systems in flight mechanics can be analyzed using the covariance theory of linear systems and statistical linearization if the models are not too complex. The necessary mathematical tools (random processes and stochastics differential equations, white and colored noise) are explained. These analytical methods are applied to a simplified model of the automatic landing approach influenced by turbulence. The limitation of the elevator acts as a nonlinearity. Author

N82-17160# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.
DESIGN MANUAL FOR IMPACT DAMAGE TOLERANT AIRCRAFT STRUCTURE
John G. Avery (Boeing Military Airplane Co., Seattle) Oct. 1981 230 p refs Sponsored in part by Dept. of Defense
(AGARD-AG-238; ISBN-92-835-1403-3) Avail: NTIS HC A11/MF A01

The structural design information is grouped into three major sections: description of projectile threats; analysis methods for predicting structural response to projectile impact; and design guidelines for impact tolerance. The hydrodynamic ram effect and aircraft engine disintegration are highlighted. For individual titles, see N82-17161 through N82-17170.

N82-17161# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
DESCRIPTION OF PROJECTILE THREATS
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 1-24 refs (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Evaluating the degradation of aircraft structure resulting from projectile impact requires a knowledge of the threat and encounter conditions. This is necessary in understanding the failure mechanisms and structure response modes induced by the various types of threats. Projectile types, important encounter parameters, and typical terminal effects are discussed. Information that is helpful in understanding the analysis of structural response to impact and the design guidelines for impact damage tolerance is presented. T.M.

N82-17162# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ANALYSIS METHODS FOR PREDICTING STRUCTURAL RESPONSE TO PROJECTILE IMPACT
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 27-44 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Analysis methods and data available for predicting the response of metal and fiber composite structure to projectile impact are presented. The analysis methods discussed are applicable to impacts from small arms projectiles, missile warhead fragments, and the fragmentation and blast effects of high-explosive projectiles. The responses addressed include penetration capability, damage size and type, strength degradation of damaged structure, and internal load redistribution. T.M.

N82-17163# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ANALYSIS METHODS FOR BALLISTIC DAMAGE SIZE AND TYPE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 45-78 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

The parameters which influence the size and character of projectile impact damage are described. Predicting damage size is the first step is assessing the structural capability of impacted structure, since damage size determines net section strength loss, stiffness loss, and the flaw size for failure analysis. The discussion is organized according to projectile type as follows: non-exploding projectiles; high explosive projectiles; and engine debris projectiles. Within each projectile category the responses of both metallic and fiber composite structure are discussed. The effects of fluid pressure in causing damage, a phenomenon known as hydrodynamic ram, are discussed. T.M.

N82-17164# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
DAMAGE FROM HIGH EXPLOSIVE (HE) PROJECTILES
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 79-135 refs (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

The structural damage done by HE projectiles (20- to 30-mm, for example) is the result of multiple fragment penetrations and internal blast pressures, acting separately and in combination. The fragments are created as the metal casing surrounding the explosive bursts due to the intense pressures generated by the detonation. Fragment damage degrades structural strength and stiffness, and blast pressures added to the existing flight loads can cause excessive deformations and element failures. The nature and extent of structural damage from HE projectile fragments and blast pressure depend upon these variables: material type and thickness; projectile size and delay characteristics; striking velocity and obliquity; distance from detonation to impacted structure (standoff); and internal volume of structural cell and extent of venting. The significance of each of these variables is discussed. Qualitative descriptions of HE projectile damage in metallic and fiber composite structure are presented followed by a discussion of damage prediction analysis techniques for blast and fragments. T.M.

N82-17165# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
DAMAGE FROM ENGINE DEBRIS PROJECTILES
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 136-139 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

The effects of uncontained projectile emanating from an engine and subsequently striking an adjacent portion of the airframe are assessed. The effects are treated the same as for effects resulting from nonexploding military projectiles. There is an important distinction, however, in that the engine debris projectile is typically an irregular fragment (as opposed to a bullet), behaving more like a warhead fragment or the fragments generated from a high-explosive projectile. T.M.

N82-17166# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HYDRODYNAMIC RAM DAMAGE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 140-152 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Hydrodynamic ram is a phenomenon that may cause extensive structural failure of aircraft fuel cells when they are subjected to ballistic impact. During impact and penetration of the fuel cell, intense pressure waves are generated within the liquid by the projectile. The response of the fuel cell to this pressure loading varies according to its construction. For example, the walls of an integral fuel cell are formed by the aicraft skin, which is usually constructed of high-strength metal designed to withstand normal flight loads. This type of structure can fail catastrophically in response to hydrodynamic ram pressure loading due to fracturing of the walls of the cell. Self-sealing fuel cells can also be defeated due tc hydrodynamic ram by gross tearing of the material or by misalignment of the wound edges, thereby defeating the self-sealing process. Both of these effects become increasingly severe as fuel cells become smaller, or projectile kinetic energies increase. An analysis method to predict hydrodynamic ram pressures generated by small arms ammunition was developed. The analysis method is based on the conversion of projectile kinetic energy to pressure field energy and includes the effects of reflections from the tank walls. T.M.

N82-17167# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
EFFECTS OF CYCLIC LOADING ON PROJECTILE IMPACT DAMAGE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 153-157 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

The cyclic loading induced during flight can influence the severity of existing impact damage by initiating fatigue cracks at the damage site, subsequent crack sharpening or blunting and crack growth. There can be significant time dependent changes in the residual strength of the structure due to these alterations in the size and character of the impact damage. Projectile produce a wide variety of damage types, including cracks, holes, tears, large determination, even totally severed structural elements. The response of the damaged structure when exposed to cyclic loads reflects this wide variety of structural damage. For example, the cyclic loading can result in immediate growth when the projectile damage is a crack. There may be, however, a time (number of cycles) devoted to crack nucleation. Several important aspects of the fatigue response of impact damaged structure are described in terms of crack initiation and extension. An approach which basically consists of assuming immediate fatigue crack initiation at the damage site, and then applying conventional crack growth analysis is suggested. T.M.

N82-17168# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
STIFFNESS DEGRADATION OF IMPACT DAMAGED STRUCTURE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 159-160 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Stiffness reduction in impact damaged structural elements can be important from two standpoints. The first is the alteration of load distribution within the structure, potentially causing overloading and failure of undamaged elements. The second area of potential concern is the residual stiffness of major structural components, since stiffness degradation may lead to instability and control inadequacy. These two topics are discussed, however, there are few verified analysis methods for predicting stiffness degradation associated with ballistic damage. Both of these stiffness degradation effects, but particularly the latter, become increasingly significant as the extent of the inflicted damage becomes larger. Stiffness degradation may well be a problem for HE projectile impacts, but it is generally insignificant with small arms. T.M.

N82-17169# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
STRENGTH DEGRADATION OF IMPACT DAMAGED STRUCTURE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 161-194 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Projectile damage destroys a portion of the load carrying capability of the structure, alters the distribution of internal loads, and introduces a flaw which may cause failure by locally disturbing the stress field. The latter effect is most significant with regard to the relatively small damage induced by small arms projectile and dispersed warhead or engine debris fragments. High explosive projectiles can often create damage of sufficient size to substantially degrade structural performance by all three effects. Estimating the residual strength of structure damaged by projectile impact is a major step in predicting structural capability. The analysis methods presented for evaluating strength capability are organized according to structural complexity: analysis of monolithic panels; analysis of multiple load path panels; and analysis of multielement structure. The application of conventional and modified fracture mechanics analysis to ballistic damaged panels is discussed. The extension of these approaches to the requirements of panels having discrete stiffening members are discussed. T.M.

N82-17170# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ANALYSIS OF MULTIPLE LOAD PATH PANELS CONTAINING IMPACT DAMAGE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 195-209 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Many structural configurations cannot be represented as monolithic panels in assessing strength degradation from impact damage. The wings of transport aircraft, for example, often consist of skin with riveted stiffeners. The stiffeners can provide damage containment or crack assessment capability that is not considered in element residual strength analysis. Since the crack arrestment capability can significantly improve the residual strength of damaged structure, the stiffening must be included in the analysis. The response of stiffened panels to projectile damage, and available analytical techniques for residual strength prediction, are discussed. T.M.

N82-17118# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
MIRAGE 2000 WEAPONS SYSTEMS ARCHITECTURE [ARCHITECTURE DU SYSTEME D'ARMES DU MIRAGE 2000]
S. Croce-Spinelli, B. Vandecasteele, and J. F. Ferreri *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p In FRENCH (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17120# Naval Weapons Center, China Lake, Calif. F-18 Facility Branch.
F/A-18 WEAPONS SYSTEM SUPPORT FACILITIES
Thomas F. O'Neill *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 7 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N82-17171# McDonnell Aircraft Co., St. Louis, Mo.
CORROSION CONTROL TEST METHOD FOR AVIONIC

COMPONENTS Final Report, 27 Sep. 1979 - 27 May 1981
A. W. Morris 25 Sep. 1981 60 p refs
(AD-A108061; NADC-81174-60) Avail: NTIS HC A04/MF A01 CSCL 01/3

The program objective was to develop an accelerated laboratory corrosion test capable of simulating the severe corrosive effects of an aircraft carrier deployment environment. The current standard 5% salt fog test is not severe enough to simulate the carrier environment, thus limiting its usefulness in forecasting corrosion failures. To provide test standards, representative electrical and electronic units were exposed on an oil burning carrier during a 9 month tropical cruise and on a nuclear carrier during a 10 month tropical cruise. A series of laboratory tests were run to identify corrosion environments which provide good correlation with actual carrier results. The tests were also judged on their ability to promote moisture related electrical failures. During the final phase of the program, 25 electronic and electrical components were exposed to the two most promising test methods. The selected test method is a modification of the NADC sulfur dioxide salt fog test. It utilizes a much higher exposure temperature and a dilute substitute ocean water solution for fog generation. In one week this test method produces both corrosion damage and electrial failures that correlate with the condition of the test articles exposed for nine to ten months on an aircraft carrier. Author (GRA)

N82-17172# Systran Corp., Dayton, Ohio.
DIGITAL AVIONICS INFORMATION SYSTEM (DAIS) DOCUMENTATION Final Report, Aug. 1979 - Jun. 1981
F. Forster and R. Gregory Wright-Patterson AFB, Ohio AFWAL Sep. 1981 97 p
(Contract F33615-79-C-1818; AF Proj. 2052)
(AD-A108000; AFWAL-TR-81-1162) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report covers the work performed by SYSTRAN Corporation in providing Configuration control, technical editing and generation of documentation for the DAIS Program Branch. This effort encompassed the following functions: (1) maintaining the DAIS library, (2) generating certain specifications, plans, drawings and/or test reports, (3) performing configuration audits per MIL-STD-1521, (4) assuring that DAIS documents conformed to MIL-STD-490 and 483, (5) technical editing and configuration control over all DAIS documentation. The DAIS documentation effort was highly successful and could set an example for other R&D programs on how to properly document their efforts in MIL-STD format. Author (GRA)

N82-17173# Naval Research Lab., Washington, D. C.
FUNCTION SPECIFICATIONS FOR THE A-7E FUNCTION DRIVER MODULE Interim Report
P. C. Clements 27 Nov. 1981 177 p refs
(XF21242101)
(AD-A107922) Avail: NTIS HC A09/MF A01 CSCL 09/2

As part of the experimental redesign of the flight software for the Navy's A-7E aircraft, software modules were designed to encapsulate the characteristics of the behavioral requirements of the system. The purpose of these Function Driver modules is to allow the remainder of the software to remain unchanged when the required system behavior is modified without associated hardware changes. This document specifies the behavior of the system without regard to specific hardware devices. This report contains an explanation of the standard organization of each functional description, a description of the review procedures, specifications for all of the functional aspects of the A-7E software, and a set of indices and cross-references to help integrate this module with the rest of the system. As well as serving as development and maintenance documentation for the A-7E redesign, this document is intended to serve as a model for other people interested in applying our documentation and structuring techniques to other software projects. Author (GRA)

N82-17088# Ferranti Ltd., Bracknell (England). Computer Systems Div.
THE EFFECT OF INCREASINGLY MORE COMPLEX AIRCRAFT AND AVIONICS ON THE METHOD OF SYSTEM DESIGN
J. T. Martin *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 5 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17089# Naval Air Systems Command, Washington, D. C. Control and Guidance Research and Technology Group.
A TUTORIAL ON DISTRIBUTED PROCESSING IN AIRCRAFT/AVIONICS APPLICATIONS
Bernard A. Zempolich *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17090# Rensselaer Polytechnic Inst., Troy, N. Y. Electrical, Computer, and Systems Engineering Dept.
PERFORMANCE STUDY OF A DISTRIBUTED MICROPROCESSOR ARCHITECTURE FOR USE ABOARD MILITARY AIRCRAFT
Kang G. Shin and C. M. Krishna *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 13 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17092# Elektronik-System G.m.b.H., Munich (West Germany).
FUNCTIONAL VERSUS COMMUNICATION STRUCTURES IN MODERN AVIONIC SYSTEMS
K. Brammer and A. Weimann *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF 01

N82-17097# Naval Air Systems Command, Washington, D. C. Control and Guidance Research and Technology Group.
ECONOMIC CONSIDERATIONS FOR REAL-TIME NAVAL AIRCRAFT/AVIONICS DISTRIBUTED COMPUTER CONTROL SYSTEMS
Bernard A. Zempolich *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17105*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
METHODOLOGY FOR MEASUREMENT OF FAULT LATENCY IN A DIGITAL AVIONIC MINIPROCESSOR
John C. McGough, Fred Swern, and Salvatore J. Bavuso *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p refs Prepared in cooperation with Bendix Corp., Teterboro, N.J. (For primary document see N82-17086 08-01)
(Contract NAS1-15946)
Avail: NTIS HC A18/MF A01 CSCL 01D

N82-17111# British Aerospace Aircraft Group, Brough (England). Avionics Systems Div.
PRACTICAL ASPECTS WHICH APPLY TO MIL-STD-1553B DATA NETWORKS
I. Moir (Smiths Industries Aerospace and Defense Systems Co., Cheltenham, England) and P. A. Duke *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17114# Hughes Aircraft Co., Fullerton, Calif.
NEXT GENERATION MILITARY AIRCRAFT WILL REQUIRE HIERARCHICAL/MULTILEVEL INFORMATION TRANSFER SYSTEMS
James W. McCuen *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17115# Bendix Corp., Teterboro, N. J. Flight Systems Div.
SIFT: AN ULTRA-RELIABLE AVIONIC COMPUTING SYSTEM

Kurt Moses *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17117# Royal Aircraft Establishment, Farnborough (England).
INTEGRATED CONTROL OF MECHANICAL SYSTEM FOR FUTURE COMBAT AIRCRAFT
G. W. Wilcock, P. A. Lancaster, and C. Moxey *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 16 p refs Prepared in cooperation with British Aerospace, Warton Sponsored in part by Procurement Executive MOD (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17119# McDonnell Aircraft Co., St. Louis, Mo.
F/A-18A TACTICAL AIRBORNE COMPUTATIONAL SUBSYSTEM
T. V. McTigue *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-17174*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
CF6 JET ENGINE PERFORMANCE IMPROVEMENT: HIGH PRESSURE TURBINE ROUNDNESS
W. D. Howard and W. A Fasching Jan. 1982 136 p refs
(Contract NAS3-20629)
(NASA-CR-165555; R82AEB115) Avail: NTIS HC A07/MF A01 CSCL 21E

An improved high pressure turbine stator reducing fuel consumption in current CF6-50 turbofan engines was developed. The feasibility of the roundness and clearance response improvements was demonstrated. Application of these improvements will result in a cruise SFC reduction of 0.22 percent for new engines. For high time engines, the improved roundness and response characteristics results in an 0.5 percent reduction in cruise SFC. A basic life capability of the improved HP turbine stator in over 800 simulated flight cycles without any sign of significant distress is shown. E.A.K.

N82-17175*# Pennsylvania State Univ., University Park. Turbomachinery Lab.
THREE DIMENSIONAL FLOW FIELD INSIDE COMPRESSOR ROTOR, INCLUDING BLADE BOUNDARY LAYERS Semiannual Progress Report
M. Pouagare, J. M. Galmes, B. Lakshminarayana, and K. N. Sachidananda Murthy Jan. 1982 87 p refs
(Grant NsG-3266)
(NASA-CR-168410; PSU/TURBO-82-1) Avail: NTIS HC A05/MF A01 CSCL 21E

The flow in a turbomachinery blade passage has a predominant flow direction. The viscous diffusion in the streamwise direction is usually small and the elliptic influence is transmitted upstream through the pressure field. Starting with a guessed pressure field, it is possible to converge on the full elliptic solution by iterating between a parabolic solution and an iteration of the pressure field. The main steps of the calculation are given. The blade boundary layers which are three dimensional with laminar, transitional, turbulent, and separation zones are investigated. The kinetic energy is analyzed, and the dissipation equation is presented. Measurements were made of the three dimensional flow inside an axial flow compressor passage. S.L.

N82-17176# Pratt and Whitney Aircraft Group, West Palm Beach, Fla.
DAMAGE TOLERANT DESIGN FOR COLD-SECTION TURBINE ENGINE DISKS Final Report, Aug. 1977 - Feb. 1981
C. H. Cook, H. E. Johnson, and C. E. Spaeth Wright-Patterson AFB, Ohio AFWAL Jun. 1981 243 p
(Contract F33615-77-C-2064; AF Proj. 3066)
(AD-A107863; PWA-FR-14442; AFWAL-TR-81-2045) Avail: NTIS HC A11/MF A01 CSCL 21/5

This report describes the development, test evaluation, and refinement of a Damage Tolerant Design System for cold-section turbine engine disks. To substantiate the Design System the 42-month effort included the design and test of a functional replacement 2nd-stage fan disk for the F100 engine. This disk would be able to support a 0.030-inch crack for three maintenance intervals without a rapid fracture failure. The program was totally successful and resulted in a disk design that was three pounds heavier than the Bill of Material (B/M) disk but had over ten times the B/M life even with a 0.030-inch crack in the bolthole and a 0.020 inch elox crack starter in the rim slot. Included in this report are the design criteria and rationale used in creation of the damage tolerant configuration, the testing and analysis methodology, and results as well as recommendations for application and improvements. GRA

N82-17177# Strategic Air Command, Offutt AFB, Nebr. Aircraft Engineering Div.
MAINTENANCE POSTURE FOR QUICK START Final Report
John M. Connolly 12 Aug. 1981 46 p
(AD-A107553; SAC/LGME-ER-P-328) Avail: NTIS HC A03/MF A01 CSCL 12/5

Quick start is an aircraft modification which installed cartridge starters on all engines of the B-52G/H and non-fan KC-135 aircraft. Routine peacetime use of the modification was suspended due to an excessive amount of smoke and toxic gases created by the cartridge exhaust. The SAC Aircraft Engineering Division then investigated respiratory and eye protection for ground crew personnel. As an interim solution, they found that an aircraft firefighter's smoke mask connected to a Mine Safety Appliance Corp Type N model SW as filter canister adequately protects the user. To minimize the crew chief's exposure to the smoke cloud, the Division designed and tested a roll-over chock, evaluated a wireless interphone communication system, and implemented alert B-52 battery engine starts. With these new concepts, response timing is only limited to aircrew checklist items and engine start time. GRA

N82-17178# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THROUGH FLOW CALCULATIONS IN AXIAL TURBOMACHINES
C. Hirsch, ed. (Vrije Universiteit, Brussels) and J. D. Denton, ed. (Cambridge Univ.) Oct. 1981 330 p refs
(AGARD-AR-175) Avail: NTIS HC A15/MF A01

The objectives were to review the existing information on blade performance and wall effect prediction, and to extend this information by systematic application of numerical methods to representative geometries. Only axial turbomachines were examined and they were split into a turbine sub-group and a compressor sub-group. Axial turbine performance predicted included an examination of the influence of correlations and computational procedures on the prediction of overall efficiency. A comprehensive survey of the various loss and deviation mechanisms was conducted for the compressor sub-group. For individual titles, see N82-17179 through N82-17202.

N82-17179# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
REVIEW OF PERFORMANCE PREDICTION METHODS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 13-28 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The methods are split into two major categories. The first category groups together the so-called overall stage methods. The use of such methods does not in general require any details of the blading and the complex flow patterns in the turbine are deliberately ignored. Turbines are treated more or less as black boxes. These methods are in general derived from overall performance measurements of a large number of turbines with similar characteristics. Their use is justified in the initial design phase for the selection of the turbine design parameters. The optimization of a turbine for a given duty requires, however, a deep understanding of the flow, and only very refined performance prediction methods, which take into account details of the blading and of the meridional flow channel, can be of real help. This is attempted by the second category of performance estimation methods which evaluate the total losses as the sum of a great number of individual loss components, each of which is influenced by a large number of geometric and aerodynamic parameters. T.M.

N82-17180# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
INFLUENCE OF CORRELATIONS AND COMPUTATIONAL METHODS ON THE PREDICTION OF OVERALL EFFICIENCY
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 29-31 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The process of designing a gas turbine or a steam turbine begins with an evaluation of the influence of component design parameters on the overall cost. For both the steam turbine and the gas turbine, energy costs are rapidly increasing and component efficiency is therefore a primary design objective. For the aircraft gas turbine, the weight of the component influences the fuel consumption and is therefore also an important energy cost consideration. Turbine efficiency predictions, together with information which influence the weight and cost, were obtained from flow field calculations which define the thermodynamic properties and velocity triangles throughout the turbine. These computational methods may be full span through flow calculations which predict the fluid properties from the hub to the tip between each blade row or they may be mean line calculations. In either case they are dependent upon loss and deviation models for their effectiveness in the efficiency optimization stage of the design process. The loss and deviation correlations which are in common use by steam turbine and gas turbine manufacturers are frequently developed internally and are maintained as proprietary information. The overall efficiency predictions which are discussed are therefore limited to results obtained using the correlations built into the methods which are described. T.M.

N82-17181# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
INFLUENCE OF CORRELATIONS AND COMPUTATIONAL PROCEDURES ON FLOW FIELD PREDICTIONS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 33-56 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

In order to understand the influence of the empirical input on the results of through flow calculations it is necessary to examine the relative magnitudes of the terms in the radial equilibrium equation. This equation is effectively the momentum equation applied along quasi-orthogonal lines which are roughly perpendicular to the streamlines through the machine. The influences of the streamline slope and curvature, the blade exit, and the loss estimate were examined. The distribution of secondary deviation is discussed. Three dimensional calculations are presented for a two stage gas turbine. T.M.

N82-17182# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CAMBRIDGE TURBINE: GEOMETRY, TEST DATA AND SAMPLE CALCULATION
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 59-68 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The turbine is a free vortex design with hub:tip ratio 0.7 and with incompressible flow. Hence in the absence of viscous and secondary flow effects the axial velocity profiles would be everywhere uniform and constant. At design conditions there should be no absolute swirl at exit from the rotor and the experimental flow rate was set to satisfy this condition at mid-height. The turbine was tested with various values of rotor-stator spacing but only results for a single build were used for comparison with calculations. This build has a larger stator-rotor gap than is usual in axial turbine design practice. Details of the machine and blading are given and all geometrical details are based on design rather than on measured data. T.M.

N82-17183# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE TWO STAGE AERO ENGINE TURBINE
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 69-83 ref (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The turbine was a model of the H.P. and I.P. stages of an aircraft gas turbine with the two rotors running at different speeds. It was 'cold flow' tested using air at 420 K and 2.95 bar. Both hot wire and pressure probe instrumentation was used with radial and circumferential traverses after each blade row. The through-flow program used to provide sample results is based on a method of solution for axisymmetric and steady flow in axial turbomachines; it solves the complete radial equilibrium equation - acounting for enthalpy and entropy gradients and streamline curvature effects - in a specified number of stations ahead of and after the blade rows. An orthogonal curvilinear system of coordinates, having the meridional coordinates coincident with the generatrices of the flow stream surfaces, is used in the solution. Overall predicted efficiency is 89.1% of the measured results. T.M.

N82-17184# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ANSALDO STEAM TURBINE. GEOMETRY, TEST DATA AND SAMPLE CALCULATION
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 85-98 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The turbine geometry is fairly typical of large low pressure 3000 RPM machines, having 6 stages with a very high casing flare to accommodate the large increase of volume flow. This results in very high blade speeds and pressure ratios for the last stage. The Ansaldo machine has a last stage pressure ratio of over 6:1 which, coupled with a low hub:tip radius ratio, results in very high relative Mach numbers at nozzle root and rotor tip. The layout of the turbine is shown and full geometric details of stage 3-6 are given. Details of steam conditions, bleed flow rates and blade clearances are also given. A complete set of all measurements necessary to obtain a heat balance for the turbine were performed in parallel with the traverse measurements. These consisted of 42 pressure, 67 temperature and 6 mass flow measuring devices. The overall electrical output was also monitored and the LP cylinder output was measured by means of a shaft torquemeter and telemetry. These measurements enabled the LP cylinder efficiency to be evaluated separately from that of the whole turbine. Comparisons of measured and computed results are shown. The agreement is good and similar results were obtained from other calculation methods on this machine. T.M.

N82-17185# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HANNOVER TURBINE. GEOMETRY, TEST DATA AND SAMPLE CALCULATION
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 99-107 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The facility was basically laid out for a four-stage turbine which was designed to have the same blade sections in all stages at a given radius. The blading is of the free vortex type and the nominal mass flow of the turbines is m=7.8kg/s and the nominal rotational speed is 7500 RPM. The set up allows each stage of the four-stage turbine to be tested separately. The tests referred to are concerned only with stage No. 4 which was tested in the single-stage mode. Details of the meridional flow path are presented. The turbine has a constant hub diameter of DH=270 mm. The outer casing is cylindrical except across the blading where it is conical. The rotor has extremely small radial clearances: S=0.24. mm at nominal RPM. The stator is shrouded and the leakage flow across the stator hub is minimized by multiple seals. Predicted efficiency is compared with the measured results. T.M.

N82-17186# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
SURVEY ON DIFFUSION FACTORS AND PROFILE LOSSES
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 115-126 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

Emphasis is placed upon the development of stage and blade design procedure that will replace the simple loss prediction techniques in use today. These techniques are difficult to apply to real machine design because extensive iterative hub-to-tip, blade-to-blade, and boundary-layer flow calculation is needed. Parametric studies with blade-to-blade flow and boundary layer calculation codes were examined which attempt to refine the diffusion factor concept and loss correlation at design as well as off-design compressor operation. The codes begin to demonstrate how the flow parameters (including Mach- and Re-number) and the details of blade geometry interact to produce performance characteristics. T.M.

N82-17187# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
SURVEY OF MODELS FOR SHOCK AND SHOCK/ BOUNDARY LAYER INTERACTION LOSS PREDICTION
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 127-136 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The calculation of the shock losses has to take into account the losses due to normal shocks as well as the additional losses caused by the shock/boundary layer interaction. Due to the very complex flow behavior, at present this is only possible by empirical correlations for very simplified assumptions. Therefore, additional effort has to be directed to the practical application of analytical methods and to better understanding of the shock/ boundary layer interaction. Basically, transonic cascades have to be designed in such a way that the shocks are not present or occur at minimum shock Mach number. It seems to be possible that for high subsonic inlet Mach numbers the use of new blading design concepts (i.e., supercritical profiles) can meet the first condition, whereas the second condition of minimal shock Mach numbers was successfully verified by the use of wedge type profiles. T.M.

N82-17188# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
END-WALL BOUNDARY LAYER CALCULATION METHODS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 137-150 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The end-wall boundary layer (EWBL) approach to secondary losses is based on the integration of the pitch-averaged three-dimensional boundary layers along the hub and tip walls, with extra assumptions for the blade force defect terms. From there an efficiency drop is calculated including secondary flow effects, as well as blockage. The method allows in principle for the influence of inlet blockage, clearance, axial gap, aspect ratio and other parameters to be included through their effect on the end-wall boundary layers. From the knowledge of the velocity profiles inside the boundary layers, the full radial variations of incidence and turning can be predicted by coupling a radial equilibrium calculation to the EWBL calculation. T.M.

N82-17189# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CORRELATION FOR SECONDARY FLOWS AND CLEARANCE EFFECTS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 151-165 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

It is concluded that correlations obtained from straight cascade data will at least provide correct trends for the effect of clearance in compressors. With cascade data, the effect of variation of blade circulation with span is not known. This will cause problems if spanwise distributed correction for losses and angle are to be considered. For turbine, it is well known that for secondary flow effect the loss level as obtained from cascade data may differ of an order of magnitude from the machine losses. This is linked most probably to the effect of relative motion when passing from nozzle to rotor or vice-versa. In compressors this effect tends to bring back the end-wall boundary layer to a more collateral state, and the difference might be somewhat less. T.M.

N82-17190# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
EFFECTS OF REYNOLDS NUMBER AND TURBULENCE LEVEL ON AXIAL CASCADE PERFORMANCE
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 164-170 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

A semiempirical theory was developed which will predict the behavior of the shear layer across a laminar separation bubble. The method is proposed for two dimensional incompressible flow and is applicable down to short bubble bursting. The method can be used to predict the length of the laminar bubble, the bursting Reynolds number, and the development of the shear layer through the separated region. As such, it is a practical method for calculating the profile losses of axial compressor and turbine cascade in the presence of laminar separation bubbles. It can also be used to predict the abrupt leading edge stall associated with thin airfoil sections. The predictions made by the method are compared with the available experimental data. T.M.

N82-17191# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
SURVEY ON THE EFFECT OF BLADE SURFACE ROUGHNESS ON COMPRESSOR PERFORMANCE
In its Through Flow Calculation in Axial Turbomachines Oct. 1981 p 171-180 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

Analysis of limited experimental data reveals that critical roughness Reynolds number of compressor blades manufactured with typical present day methods as forging/etching and electrochemical machining are around 90 and therefore very close to sand type roughness if roughness height is based on the largest peaks. Modern high pressure ratio engines suffer from blade surface roughness in the back stages of the compression system. Surface quality needed to keep the flow hydrodynamically smooth exceeds considerably the best present day quality achievable, thus limiting the potential efficiency gain at high Reynolds number flight conditions, i.e., essentially low level flight conditions. L.F.M.

N82-17192# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
PART SPAN DAMPER LOSS PREDICTION FOR TRANSONIC AXIAL FAN ROTORS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 181-183 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

For off design conditions, the maximum loss due to the damper and region of influence at design point are calculated and these values are used as reference quantities for all off design calculations. The point of intersection of a constant throttle or area operating line through the design point with a speed line defines the reference point where the PSD loss is minimum.

From this point the suction surface incidence at the damper location is determined from experimental data or off design analysis code. Then the damper maximum loss region of influence is calculated for any point on the speed line by taking the difference in suction surface incidence at that point and the reference incidence. To minimize damper loss, several things should be taken into consideration. Both approaches agree on the following: the damper should be as thin as possible so as to minimize the area influenced; the damper should be located as near to the hub as possible; work input should be minimized at the PSD location. Correlation of experimental results shows further that damper trailing and leading edge thickness should be as sharp as possible. L.F.M.

N82-17193# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

DEVIATION/TURNING ANGLE CORRELATIONS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 184-211 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

In the past, compressor through flow solutions used substantial input from experimental measurements made in actual fan and compressor flow messages or in flows simulating real compressor conditions. For example, almost total reliance was placed on experimentally supported methods for estimation of fluid turning angles in individual blade rows. Compressor design is, as a result, heavily dependent on the quality of the experiment and data correlations associated with these methods. The three principal currently used prediction methods for flow turning angle were developed during the period 1945 to 1960. One of these methods directly predicts fluid turning angles in terms of cascade geometry and aerodynamic parameters. The others predict the exit flow deviation angle, defined as the angle between the average exit flow direction and the direction of a line tangent to the blade section camber line at the trailing edge. There has been no substantial modernization of these deviation/turning angle procedures since 1960, while during this time the methods have been widely applied to airfoil section profiles and in aerodynamic regimes far outside the limits suggested by the original derivations and data correlations. A discussion of these problems is presented. L.F.M.

N82-17194# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

AXIAL COMPRESSOR STALL AND SURGE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 212-213 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

The so called surge line evaluation is an extremely complex area, which deserves in itself full attention. The intention here was only to define the problem. The existing methods of prediction do not take the real physics of the flow into account, and cannot explain or consider or identify all the parameters of importance. They are however quick and useful for the range in which they have been calibrated, but are mostly not available in public literature. A more generalized use of the pseudoend wall boundary layer approach seems interesting. Satisfactory solutions will come however only from the logical approach of instability detection, second flow regime and system response characterization, for which solid elements are now in hand but require further development. L.F.M.

N82-17195# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

SUMMARY OF ANSWERS TO THE QUESTIONNAIRE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 214-218 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

To ascertain better the state of the art, a questionnaire bearing on particular points raised by the general survey paper of Hirsch was prepared and distributed to industry and research groups. Questions concerning compressor loss correlations, flow turning correlations, and secondary and clearance effects were asked. Answers were received from six countries and a summary is presented. L.F.M.

N82-17196# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

SINGLE STAGE TRANSONIC COMPRESSOR AND EQUIVALENT PLANE CASCADE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 221-228 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

The working group 12 activities cover primarily turbomachinery off design performance prediction, however include also blade to blade calculation on relevant test cases to get more information on those basic flow phenomena that affect flow losses and turning in blade rows. One of the test cases selected is the DFVLR single stage transonic compressor that was tested in great detail with the results well documented, particularly intrablade velocity data of the rotor are available from extensive flow studies with laser velocimetry. The data allow to compare blade to blade calculations to actual transonic compressor flow. Additionally to the rotor tests the rotor blade section at 45% span was investigated in the DFVLR transonic cascade windtunnel. L.F.

N82-17197# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

BBC/SULZER. 4 STAGE TRANSONIC COMPRESSOR

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 229-244 (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

Tests were performed on the BBC/SULZER 4 stage Transonic Compressor. The overall performance map and some traverse of stagnation pressure and temperature at compressor outlet are presented. L.F.M.

N82-17198# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

RESULTS OF CALCULATIONS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 245-246 ref (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

The types of calculations were performed by various participants, each using his own method for through flow calculations and blade to blade calculations. The Working Group's task was to demonstrate that the use of systematic blade to blade calculations could provide a support for the confirmation of an existing correlation or the development of a new one. It is believed that the present development and state of the numerical tools available in order to compute complex flow structures, should be used more and more extensively in order to develop a deeper understanding of the flow mechanism of loss production and of turning. L.F.M.

N82-17199# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

THE THROUGH FLOW CALCULATIONS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 247-268 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

Through flow calculations of three test cases were performed by various authors belonging to industrial or research organizations. The four-stage transonic compressor, the two-stage compressor, and the single stage compressor are discussed. L.F.M.

N82-17200# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

EVALUATION OF PROFILE LOSS PREDICTIONS BASED ON DIFFUSION FACTORS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 269-280 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

A comparison between theoretically predicted and measured profile losses was made, in order to evaluate the precision of the different prediction methods. These prediction methods are based on the relation between suction side diffusion and profile losses. The evaluation concerns as well the prediction of diffusion factor as predicted values of profile losses. It is further shown

that these correlations are not universally valid for all blade shapes and that some correlations perform as well at design as at off design if the suction side diffusion is correctly predicted.
Author

N82-17201# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AXIAL-FLOW TURBOMACHINE THROUGH FLOW CALCULATION METHODS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 285-305 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

Through flow calculation methods are considered to be computational techniques for prediction of fluid velocities and thermodynamic properties at designated locations in the internal flow path of a turbomachine. The objectives are to trace the development of several classes of through flow calculation, to suggest the importance of understanding the assumptions underlying representative examples of each class, and to outline the principal problems in application of through flow methods to current axial-flow compressors and turbines. L.F.M.

N82-17202# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
BLADE-TO-BLADE COMPUTATIONS AND BOUNDARY LAYER CORRECTIONS IN AXIAL COMPRESSORS AND TURBINES
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 307-326 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The number of inviscid calculation methods available today is quite impressive, and they allow an accurate prediction of inviscid incompressible, subsonic compressible and transonic flow. Recent progress has also resulted in a remarkable decrease of required computational effort, which makes them even more attractive to industrial applications. However, as these methods do not account for viscosity, the field of application is quite restricted, and good predictions can be obtained only for flow configurations where viscous effects can be neglected (e.g., turbines and low loaded compressor cascades). A similar conclusion can be drawn about boundary layer methods, with a limitation on shock boundary layer interaction, where complete solutions still require a large amount of computational effort. The combination of these two types of calculations started quite recently, and a lot of progress can be expected in the near future. Improvements which can be expected from a better combination of these two types of calculations will be more important than an improvement in the inviscid calculations. Based on the present state of the art concerning shock boundary layer interaction calculations, it appears that integral or inverse methods are the best suited to industrial calculations. However, in view of the considerable efforts currently made towards the development of the Navier-Stokes equation solution, it is more likely that, in the near future, this method will lead to more reasonable computation times and permit practical applications. L.F.M.

N82-17203# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HELICOPTER PROPULSION SYSTEMS
Sep. 1981 277 p refs Partly in ENGLISH, partly in FRENCH Meeting held in Toulouse, 11-14 May 1981
(AGARD-CP-302; ISBN-92-835-0299-X) Avail: NTIS HC A13/MF A01

Component technology for turboshaft engines and transmissions, inlet protection systems, engine-airframe dynamic compatibility, and future requirements are described. For individual titles, see N82-17204 through N82-17225.

N82-17204# Textron Bell Helicopter, Fort Worth, Tex.
HELICOPTER PROPULSION SYSTEMS: PAST, PRESENT AND FUTURE
Robert R. Lynn and Gordon E. Holbrook *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Helicopter propulsion systems are reviewed, and it is noted that helicopter development is paced to a major extent by the power plant. Power available, reliability, fuel consumption, power-to-weight ratio, and life cycle costs are key parameters. The application of emerging technologies such as microelectronics, ceramics and other new materials and approaches, and the continuing refinement of the aerodynamics and dynamics of gas turbine power plants are discussed and noted to result in a significant benefit to the helicopter and its operator. Important airframe-propulsion system interface requirements are given, and the need is discussed for new innovative certification procedures that provide for emergency operation with acceptable economics. Finally, future propulsion system capabilities are projected and their dramatic benefit for the helicopter noted. Author

N82-17205# Societe Turbomeca, Bordes (France).
DEVELOPMENT TEST PROGRAMS ADAPTED TO HELICOPTER ENGINES [PROGRAMMES D'ESSAIS DE DEVELOPMENT ADAPTES AUX MOTEURS D'HELICOPTERES]
J. Fresco *In* AGARD Helicopter Propulsion Systems Sep. 1981 9 p In FRENCH (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The path to follow in a general program of engine development is shown with constraints of various kinds. There are regulatory requirements established by laws of navigability for civil aviation engines, and particular technical specifications for military aviation engines. Requirements of an operational order happen to be juxtaposed to precedents which are set by the different types of usages envisioned: flight profiles of various missions, and the environmental conditions likely to be encountered. This second factor is particularly important for a helicopter turbine because of the different utilizations and environmental conditions compared to a jet or turboprop engine. To address all these requirements, a test program must be built which, among others, takes into consideration this group of sometimes contradictory constraints in order to obtain certification and as well as to bring about development and operation without major risk. Specific tests for a helicopter turbine are examined with emphasis on the MAKILA program turbine which is on the AS-332 super PUMA. Transl. by A.R.H.

N82-17206# Army Aviation Research and Development Command, St. Louis, Mo.
AIRCRAFT TURBINE ENGINE DEVELOPMENT: CURRENT PRACTICES AND NEW PRIORITIES
Charles C. Crawford, Jr. and William J. Crawford, III (GE, Lynn, Mass.) *In* AGARD Helicopter Propulsion Systems Sep. 1981 8 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The T700 engine program was conducted during the 1970's and is representative of recent practices employed in the development of turboshaft engines for U.S. military application. The engine, which is in the 1,600 horsepower class, recently entered service in the twin engine U.S. Army UH-60A Black Hawk helicopter. The T700's field introduction follows an extensive program of technology demonstration, development, qualification and maturity. Requirements applied in the T700 program and associated benefits, challenges and penalties are surveyed. Suggested improvements for future programs are offered, and technology needs revealed during T700 development are identified. Post-qualification maturity testing, which was conducted to provide early exposure of high time failure modes, is described. Program features which are important for development costs payback are summarized. J.D.H.

N82-17207# Ministry of Defence, London (England). Directorate of Engine Technology.
FUTURE TECHNOLOGY AND REQUIREMENTS FOR HELICOPTER ENGINES
M. D. Paramour and M. J. Sapsard *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The design considerations and technology needed to meet possible future operational requirements are discussed and the relevant technological work being carried out or supported by the UK Ministry of Defence (Procurement Executive) is described. Also considered are the tradeoffs which become necessary in seeking a suitable solution to conflicting needs. Finally the sizes of engines required to meet likely aircraft applications are examined. J.D.H.

N82-17208# Rolls-Royce Ltd., Leavesden (England).
MECHANICAL ADVANCES IN THE DESIGN OF SMALL TURBOSHAFT ENGINES
J. Dominy and K. J. Hart *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Mechanical components have a significant influence on the efficiency of a small gas turbine engine. Some of the performance losses associated with the design of the power transmission and internal air system are defined and discussed. Improvements in engine efficiency must be considered in conjunction with cost, reliability and size or weight. Many of the problems considered are applicable to gas turbines in general but become acute in small engines due to the adverse effects of scale on many components design parameters. To meet the increasing demand for more efficient powerplants the mechanical research engineer must improve the analysis of mechanical component behavior to produce optimized engine designs. Author

N82-17209# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
ADVANCED COMPONENT DEVELOPMENT DESIGN BASIS FOR NEXT GENERATION MEDIUM POWER HELICOPTER ENGINES
Jean Hourouziadis and Horst B. Kreiner *In* AGARD Helicopter Propulsion Systems Sep. 1981 13 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Assuming an optimized thermodynamic cycle, engine components requiring intensive research and development efforts to produce a mature and reliable production engine are identified. Aerodynamic and structural data from rig and demonstrator test programs are presented. J.D.H.

N82-17210# Societe Turbomeca, Bordes (France).
THE INFLUENCE OF NEW TURBINE TECHNOLOGIES ON THEIR COMPONENTS [INFLUENCE DES NOUVELLES TECHNOLOGIES DES TURBINES SUR LEURS COMPOSANTS]
M. Giraud and H. Loustalet *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p In FRENCH (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The interdependence of the turbine engine with that of its components is considered as well as the objectives for developing future helicopter engines with average power. The classic design of an engine is used to show that a new architecture is required in order to reduce costs and increase reliability. The engine architecture has a strong impact on the technology and performance of its components and this places imposes on the designer new technologies for construction. High pressure turbines, reverse flow combustion chambers, and axial and centrifugal compressors are discussed. Transl. by A.R.H.

N82-17211# Avco Lycoming Div., Stratford, Conn. Preliminary Design and Advanced Programs.
AERODYNAMIC COMPONENTS FOR SMALL TURBOSHAFT ENGINES
J. W. Schrader and W. F. Schneider *In* AGARD Helicopter Propulsion Systems Sep. 1981 15 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Future developments of advanced helicopter engines are projected from an aerothermodynamic viewpoint. Cycles for engines aiming at lower specific fuel consumption, improved power lapse rates, and implementation of contingency ratings are discussed. These cycles include nonregenerative and regenerative cycles. Design trends are presented for the major engine aerodynamic components. Author

N82-17212# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
REGENERATIVE HELICOPTER ENGINES: ADVANCES IN PERFORMANCE AND EXPECTED DEVELOPMENT PROBLEMS
H. Grieb and W. Klussmann *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p ref Sponsored by Ministry of Defence of the Federal Republic of Germany (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

On the basis of modern engine component technology, including and emphasizing recent progress in high temperature heat exchanger technology, a conventional and a regenerative helicopter engine in the 900 kW power class are compared in design, performance and life cycle costs. The comparison shows that the installation properties of the two engines are roughly the same. The variable power turbine, being an indispensable part of a regenerative engine, leads to an extremely favorable transient behaviour with a moderate influence of severe cyclic loading on hot-part lifetime. No significant difference exists in infrared (IR) emission at part load, due to the design of the IR suppressor for the same exhaust temperature at maximum power. The life-cycle costs of a future fleet of attack helicopters equipped with regeneratived engines can be lower than with conventional engines. J.D.H.

N82-17213# Westland Helicopters Ltd., Hayes (England).
LUBRICATION BREAKDOWN BETWEEN GEAR TEETH
B. A. Shotter *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Damage to gear teeth attributable to lubrication failure is an important failure mode. Detailed observations of the early stages of breakdown suggest that one may not be dealing with a single process: hence great care is necessary when drawing conclusions from observing a damaged pair of gears. A study of a number of these critical areas and discussion about others highlights the complexity of the problem. J.D.H.

N82-17214# Sikorsky Aircraft, Stratford, Conn.
ADVANCED TRANSMISSION COMPONENT DEVELOPMENT
Kenneth M. Rosen and Harold K. Frint *In* AGARD Helicopter Propulsion Systems Sep. 1981 17 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Design innovations in helicopter gearbox development which permit high temperature operation at increased speeds without degrading strength or weight goals are discussed. One avenue of investigation, which shows promising strength or weight advantages, is high contact ratio gearing. The means taken to obtain a high contact ratio tends to produce an inherently weaker tooth and reliance must be placed on the multiple load-sharing feature of this design to achieve an advantage over low contact ratio gears. The appropriate consideration which must be addressed in the design stage to achieve optimum results is described. To provide high temperature capability, two UH-60A helicopter main transmission housings were fabricated from a stainless steel alloy to replace the conventional magnesium alloy casing. Design details and fabrication procedures are discussed. J.D.H.

N82-17215# Costruzioni Aeronautiche Giovanni Agusta S.p.A., Gallarate (Italy).
DESIGN CRITERIA OF THE A 129 HELICOPTER DRIVE SYSTEM
A. Garavaglia and G. Gattinoni *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The design philosophy of the Agusta-A 129 drive system which is developed to meet the modern requirements for a light helicopter in the antitank role with night and day fighting capability are discussed. The stringent requirements of system layout and achieving low weight, high life, maximum reliability, survivability and ballistic tolerance, through integrated system design, modular concepts, use of redundant system and dry run capability are outlined. E.A.K.

N82-17216# Service Techniques des Programmes Aeronautiques, Paris (France).

HELICOPTER DEVELOPMENT IN FRANCE [LE DEVELOPPEMENT DES HELICOPTERES EN FRANCE]

Daniel Berthault *In* AGARD Helicopter Propulsion Systems Sep. 1981 9 p In FRENCH (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

For the French helicopter industry, the last two decades correspond to a period of rapid growth. The national armed forces were supplied with significant quantities of good quality military equipment well adapted to their operational objectives. Considerable successes were met in the sale for exploration of military helicopters as well as other machines for civilian use, which were developed by taking account of market requirements. These were often classed in a very favorable manner in relation to the products of competitors. The essential characteristics of helicopter development in France during this period are traced. The lines of direction and the modality of action taken by various public services in this regard are analyzed. By defining future needs and the centers of action, perspectives for the future are outlined. Transl. by A.R.H.

N82-17217# Societe Nationale Industrielle Aerospatiale, Marignane (France.)

HELICOPTER AIR INLETS [ENTREES D'AIR D'HELICOPTERES]

A. Vuillet *In* AGARD Helicopter Propulsion Systems Sep. 1981 9 p refs In FRENCH (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Because of engine architecture, air inlets on low and medium tonnage helicopters are located behind the rotor head, which makes feeding very difficult. This is particularly the case of the Ecureuil AS 350 and the Dauphin SA 365 which are equipped with new generation engines. These turbines have axial or annular intakes behind which the reductor is located beside either the blast pipe or the compressor. An indepth study of the air intakes from the project stage can permit their design with a minimum of unlucky repercussions on the power supplied by the engine, on the layer of the device, and on risks to pumping. For this reason, such a study is needed to reduce the delays and costs of operating such an intake in flight. Methods used at Aerospatial and results obtained on different devices are described. Transl. by A.R.H.

N82-17218# Westland Helicopters Ltd., Yeovil (England).

INTAKE DESIGN WITH PARTICULAR REFERENCE TO ICE PROTECTION AND PARTICLE SEPARATORS

P. A. H. Brammer and D. J. Rabone *In* AGARD Helicopter Propulsion Systems Sep. 1981 13 p ref (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Total environmental protection for helicopter engines is discussed. The problems associated with different environments and intake systems which are used to give protection against particular environments are outlined. Three intake systems for evaluation in natural environments are proposed. E.A.K.

N82-17219# Societe Nationale Industrielle Aerospatiale, Marignane (France.)

THE DISTRESS REGIME ON THE BIMOTORED HELICOPTER [REGIME DE DETRESSE SUR HELICOPTERE BIMOTEUR]

J. P. Dedieu, M. Russier, and H. Dabbadie (Societe Turbomeca, Bordes, France) *In* AGARD Helicopter Propulsion Systems Sep. 1981 8 p refs In FRENCH (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The trend toward bimotorization of civil and military helicopters raises the question of choice of power level for each engine in order to obtain acceptable performance in case of engine trouble, particularly at very low speed. The use of a distress regime to obtain a very high power level, for a short time, once in the life of an engine seems to be an interesting and promising approach. The relation between the levels of distress power and parameters related to the use of the helicopter, takeoff, mass, ceiling, and operating cost are considered for the case of a bimotored helicopter of average weight. The perspectives of homologization and the civil certification of such a regime on real technology engines are examined. Transl. by A.R.H.

N82-17220# Boeing Vertol Co., Philadelphia, Pa.

ENGINE/DRIVE/AIRFRAME COMPATIBILITY: A WAY OF LIFE

Carl Albrecht *In* AGARD Helicopter Propulsion Systems Sep. 1981 7 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Engine/drive/airframe compatibility in development stages or during production of a new design were studied. Various compatibility encounters on Boeing Vertol helicopters, analyses, solutions as effected by current technology and engine/airframe manufacturer relationships and dynamic interface items are discussed. E.A.K.

N82-17221# Pisa Univ. (Italy). Ist. di Macchine.

PROBLEMS OF ENGINE RESPONSE DURING TRANSIENT MANEUVERS

Dino Dini *In* AGARD Helicopter Propulsion Systems Sep. 1981 14 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Helicopter transition flight regime and extreme flight maneuvers which determine abrupt variation of the rotor drag torque during each revolution, and the corresponding effects on the engine are discussed. Repeated surging and the attendant transient torsional loads from the engine cause damage to the airframe components. The angular rotor acceleration, cyclically variable, influences the turbine gas producer rotor speed, introducing flow distortions and aeromechanical effects in all the engine. It is found that periodic and inertial blade loading has serious consequences to discs and shaft to which the blades are attached. The higher harmonics of the excitation over the discs provokes relevant flexural modes of forced vibration. Operation in transient rating with pitch increase or decrease has the greatest effect on the helicopter flight performance, owing to the power application capability and the fuel control system adaptability. It is shown that to obtain sufficient engine/airframe dynamic compatibility, aircraft developments have to incorporate technical advances, which include harmonic integrated controls for propulsion and flight systems. E.A.K.

N82-17222# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.

HELICOPTER PROPULSIONS SYSTEMS. 1: VIBRATION PREVENTION SYSTEMS ON HELICOPTERS 2: PROBLEM OF NOISE IN THE CABIN

Gerard Genoux and Henri-James Marze *In* AGARD Helicopter Propulsion Systems Sep. 1981 19 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Two different facets of the propulsion system/structure interaction are presented. The first interaction deals with low frequency vibration associated with the operation of the main rotor. These problems are either mechanical material fatigue and stressing or related to comfort. Implementation for reduction excitations and filtration of their transfer from the source to the cabin are described. The second interaction type is cabin noise associated with the operation of the reduction gear box. The vibratory energy generated at the gears propagates all the way to the passengers via the air and the structure. Cutting the intensity of transmission noise sources, the energy transfer between such sources and the structure and the energy radiation from the structure to the passengers is discussed. E.A.K.

N82-17223# Rolls-Royce Ltd., Leavesden (England).

AN ALTERNATIVE APPROACH TO ENGINEERING STRUCTURES USING MONITORING SYSTEMS

D. Lewis *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The micro processor based engine monitoring system (EMS) which reevaluates the rating structure and presents limitations to the pilots is discussed. The EMS system allows the achievement of a better relationship between the demonstrated capability of the engine and the authorized release for in service use. This is a first step to be followed later by a change of the qualification test to a more representative form in which the EMS gives a more tangible link between bench test and customer operation. This allows better use of the engine to be made for the short time/high power requirements giving a more efficient engine performance at cruise conditions. E.A.K.

N82-17224*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMPONENT RESEARCH FOR FUTURE PROPULSION SYSTEMS
C. L. Walker (Army Propulsion Lab., Cleveland, Ohio), G. J. Weden (Army Propulsion Lab., Cleveland, Ohio), and J. Zuk *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01 CSCL 21E

The factors affecting the helicopter market for the past, present, and future are reviewed. Acquisition cost, mission reliability, life cycle cost and civil and military aspects are reviewed. The potential for advanced vehicle configurations with substantial improvements in energy efficiency, operating economics, and characteristics to satisfy the demands of the future market are identified. Advanced propulsion systems required to support these vehicle configurations and the component technology for the engine systems are discussed. The selection of components in areas of economics and efficiency is considered. E.A.K.

N82-17225# Ministry of Defence, Bonn (West Germany).
FUTURE REQUIREMENTS FOR HELICOPTER PROPULSION SYSTEMS
H.-G. Bree and G. Backmann *In* AGARD Helicopter Propulsion Systems Sep. 1981 13 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The measurements for single or twin engine systems are discussed. The trend to more sophisticated engines is reviewed in the light of diminishing resources of materials and fuel. Expected future economic conditions make it mandatory to counteract the increase of life cycle cost experienced in most of today's military systems. Means to reduce LCC are discussed. E.A.K.

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-17226# National Aeronautical Establishment, Ottawa (Ontario). Flight Research Lab.
AN INVESTIGATION OF MULTI-AXIS ISOMETRIC SIDE-ARM CONTROLLERS IN A VARIABLE STABILITY HELICOPTER
M. Sinclair and M. Morgan Aug. 1981 25 p ref
(AD-A106759; NAE-LR-606; NRC-19629) HC A02/MF A01 CSCL 01/4

The test aircraft was the NAE Airborne Simulator, an extensively modified Bell Model 205A-1, and the evaluation flights encompassed a wide range of demanding tasks from hover maneuvering and transitions to cruising flight, to nap-of-the-earth flight and precision IFR tracking. The isometric control systems included several two-handed and one-handed configurations with force-pedals for directional control, and one fully-integrated system which provided full control of the helicopter with either hand. T.M.

N82-17227# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Electrical Computer and Systems Engineering.
PARALLEL COMPUTATION FOR DEVELOPING NONLINEAR CONTROL PROCEDURES Final Report, 1 Sep. 1977 - 30 Sep. 1979
Howard Kaufman and Richard Travassos Jul. 1981 238 p refs
(Grant AF-AFOSR-3418-77; AF Proj. 2307)
(AD-A107914; AFWAL-TR-81-3016) Avail: NTIS HC A11/MF A01 CSCL 09/2

Efforts since 1 October 1978 have been concerned with the application of the developed parallel optimization procedures to the design of non-linear flight control systems. Consideration has been given to the advantages to be gained from the direct use of the non-linear equations of motion and to the potential for rapid on-line optimization in response to tracked parameter changes and/or changes in the mission objectives. To date, based upon the non-linear longitudinal equations for the F-8, it has been shown that parallel optimization procedures alone can reduce the time required for optimization by at least 30% and that the direct use of the nonlinear (rather than the linearized) equations of motion does indeed improve attitude control. A study of further incorporation of parallelism into the basic utility routines such as integration and matrix manipulation has shown that the convergence time for a representative optimal control computation can be reduced by a factor of 20. Thus, it was concluded that incorporation of parallel computers might indeed permit online control computation and/or adaptation. To this effect possible architectural structures for such computers have also been studied. GRA

N82-17091# British Aerospace Aircraft Group, Brough (England).
THE DEVELOPMENT OF ASYNCHRONOUS MULTIPROCESSOR CONCEPTS FOR FLIGHT CONTROL SYSTEM APPLICATIONS
S. M. Wright and J. G. Brown *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs Sponsored in part by RAE (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17093# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
CONTINUOUS RECONFIGURATION IN A MULTI-MICROPROCESSOR FLIGHT CONTROL SYSTEM
Scott L. Maher and Stanley J. Larimer *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17106*# SRI International Corp., Menlo Park, Calif. Computer Science Lab.
HIERARCHICAL SPECIFICATION OF THE SIFT FAULT TOLERANT FLIGHT CONTROL SYSTEM
P. M. Melliar-Smith and Richard L. Schwartz *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 15 p refs (For primary document see N82-17086 08-01)
(Contract NAS1-15428)
Avail: NTIS HC A18/MF A01 CSCL 01B

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-17228*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
SCALE-MODEL STUDIES FOR THE IMPROVEMENT OF FLOW PATTERNS OF A LOW-SPEED TUNNEL Final Report, 1 Mar. - 31 May 1981
P. Stephen Barna Jan. 1982 46 p refs
(Grant NsG-1563)
(NASA-CR-169413) Avail: NTIS HC A03/MF A01 CSCL 14B

Parameters affecting the performance of a scale model V/STOL wind tunnel were measured. These included: (1) static pressure variation around the closed tunnel circuit as affected by the application of various screens; (2) pressure rise and radial distribution of flow through the fan; (3) variation of screen parameters and screen location affecting the flow; and (4) effects of multiple screens on the velocity distribution in the fourth diffuser. In these tests the fan was driven through a long shaft by an externally situated 11,190-W (15-HP) motor equipped to turn at 4 speeds. B.W.

N82-17229# Mitre Corp., McLean, Va.
SURVEY OF 101 US AIRPORTS FOR NEW MULTIPLE INSTRUMENT APPROACH CONCEPTS
L. C. Newman, T. N. Shimi, and W. J. Swedish Sep. 1981 85 p refs
(Contract DOT-FA01-81-C-10001)
(AD-A107812; MTR-81W234; FAA-EM-82-3) Avail: NTIS HC A05/MF A01 CSCL 01/5

Several new concepts for multiple instrument approaches have been proposed to improve capacity and reduce delays at U.S. airports. The concepts include: dependent parallel approaches at reduced runway spacing; independent parallel approaches at reduced runway spacing; converging approaches; and triple approaches. One of the runways involved may be a separate short runway for general aviation and commuter traffic. A survey of 101 top U.S. airports was performed to determine the potential for applying the concepts to the existing runways. Specific applications of each relevant concept are provided. Calculations were performed for the top 30 U.S. air carrier airports to determine the actual delay improvement which could be expected to result from application of the multiple-approach concepts. Additionally, some general results are obtained for the remaining 71 airports. Author (GRA)

N82-17230# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
MODEL SIZE AND HUMIDITY EFFECTS ON SELECTED CALIBRATION PARAMETERS FOR THE 16-FT TRANSONIC WIND TUNNEL AT AEDC Final Report, 1 Oct. 1978 - 31 Dec. 1980
Ernest J. Lucas AEDC Nov. 1981 50 p refs
(AD-A107728; AEDC-TR-81-17) Avail: NTIS HC A04/MF A01 CSCL 14/2

Analyses of wind tunnel wall surface pressure data and model force data from tests conducted in the Propulsion Wind Tunnel (16T) with 1/9- and 1/4-scale fighter models were conducted to determine the effect of model size, location, and attitude, and tunnel flow humidity and Reynolds number on the test section calibration. The tests were conducted at Mach numbers from 0.6 to 1.4 at Reynolds numbers from 1,800,000/ft to 4,800,000/ft, depending on model structural limits and Mach number. The model influence was localized and did not affect the set conditions of the flow entering the test section. The currently used Reynolds number calibration is valid within the uncertainty of the instrumentation installed in the Tunnel 16T system. Analysis of the data indicates that the test section dewpoint should be below the free-stream static temperature to prevent humidity effects on model force data. Author (GRA)

N82-17231# Oxford Univ. (England). Engineering Lab.
TUBING SYSTEMS FOR THE MEASUREMENT OF FLUCTUATING PRESSURES IN WIND ENGINEERING
Stephen J. Gumley 1981 266 p refs Sponsored in cooperation with Ministry of Agriculture, Fisheries and Food and a Rhodes Scholarship
(Contracts F3/2/219; SRC-GR/B/6442.0)
(OUEL-1370/81) Avail: NTIS HC A12/MF A01

The computer aided design of pneumatic tubing networks incorporated in systems for the measurement of fluctuating pressures, which satisfy the dual requirements of unity amplitude transfer function and linear phase transfer function between the pressure at the surface being tested and a remote pressure transducer, was analyzed. Single tube systems, using restrictors to damp resonant peaks, and pneumatic averaging systems, using manifolds and restrictors, were studied. Calibration of networks, calculation of settling time of pneumatic systems after transients, design of surface tappings, effects of bends in tubing, effects of nonsymmetry of averaging manifolds, and the higher frequency behavior of tubing systems were included in the analysis. Results confirm that such devices can be used to control acoustic resonances, while the computer program enables tube dimensions to be chosen for optimum performance. Experiments performed in a 4 m x 2 m low speed wind tunnel. Author (ESA)

N82-17232# European Space Agency, Paris (France).
A SIMPLE HYBRID VISUAL SIMULATION FOR RESEARCH FLIGHT SIMULATORS
Friedrich Erdmann and Eckhard Biertuempel Nov. 1981 46 p refs Transl. into ENGLISH of "Eine einfache hybride Sichtsimulation fuer Forschungsflugsimulatoren" Rept. DFVLR-Mitt-80-13 Brunswick, Jul. 1980
(ESA-TT-690; DFVLR-Mitt-80-13) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 14,40

The basic theory of the system is described together with its realization with general purpose computers (digital-analog). The images generated consist of contour lines of the object. A contour line brightness control (depth screwing) is employed to produce a stereoscopic effect. The applicability of the method is demonstrated using runway, target and horizon symbols and combinations of these symbols. Different scenarios can be simulated in this way. Author (ESA)

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-17233*# KMS Fusion, Inc., Ann Arbor, Mich. Dept. of Materials Sciences.
GLASS SHELL MANUFACTURING IN SPACE Final Report, Dec. 1978 - Dec. 1981
Raymond L. Downs, Matthias A. Ebner, and Robert L. Nolen, Jr. 21 Dec. 1981 104 p refs
(Contract NAS8-33103)
(NASA-CR-161972) Avail: NTIS HC A06/MF A01 CSCL 22A

Highly-uniform, hollow glass spheres (shells), which are used for inertial confinement fusion targets, were formed from metal-organic gel powder feedstock in a vertical furnace. As a result of the rapid pyrolysis caused by the furnace, the gel is transformed to a shell in five distinct stages: (a) surface closure of the porous gel; (b) generation of a closed-cell foam structure in the gel; (c) spheridization of the gel and further expansion of the foam; (d) coalescence of the closed-cell foam to a single-void shell; and (e) fining of the glass shell. The heat transfer from the furnace to the falling gel particle was modeled to determine the effective heating rate of the gel. The model predicts the temperature history for a particle as a function of mass, dimensions, specific heat, and absorptance as well as furnace temperature profile and thermal conductivity of the furnace gas. A model was developed that predicts the gravity-induced degradation of shell concentricity in falling molten shells as a function of shell characteristics and time. T.M.

N82-17234# European Space Operations Center, Darmstadt (West Germany). Operations Dept.
METEOSAT-2: TO/NSO PHASE OPERATIONS
Paris ESA Oct. 1981 71 p
Avail: NTIS HC A04/MF A01

The orbital operations in the METEOSAT-2 satellite being placed on planned geostationary position are reported. The activities necessary to perform commissioning of the METEOSAT-2 satellite are also described. On 28 July 1981, the first visible image was received from METEOSAT-2. J.M.S.

N82-17235# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE, NO. 14
22 Dec. 1981 79 p Transl. into ENGLISH from various Russian articles
(JPRS-79711) Avail: NTIS HC A05/MF A01

Soviet-French and Soviet-Bulgarian cooperative space efforts are discussed. Summations of space surveys to obtain geophysical and astrophysical data, specifically ionospheric and magnetospheric observations, are reported. The status of completed biomedical programs is summarized. Descriptions of and specifications for space antennas and gamma-ray instrumentation, utilized and proposed, are given. Utilization of Earth-Moon libration points for future explorations and observations is also discussed. For individual titles, see N82-17236 through N82-17242.

N82-17236# Joint Publications Research Service, Arlington, Va.

COMMENTARY ON SOVIET-FRENCH AUREOLE-3 SATELLITE

B. Konovalov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 1-3 Transl. into ENGLISH from Izv. (Moscow), 24 Sep. 1981 p 3 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

The 'Aureole-3' satellite developed by Soviet and French specialists, designed to study processes of energy transfer from Sun to Earth and investigate interrelationships of phenomena in the magnetosphere and ionosphere of our planet is discussed. The satellite's elliptical orbit from from 400 to 2000 kilometers high observes Earth's geoactive polar 'caps'. It was developed on the basis of the Soviet AUOS (automatic universal orbital station) series of satellites. It carries instruments, half Soviet half French, including those which register magnetic and electrical fields, detect and measure fluxes of low, medium and high energy particles in near-Earth space and measure fluxes of energy in the X-ray, ultraviolet, visible and near infrared ranges. The instruments will obtain data characterizing the state of matter at every point on the satellite's orbit. An on-board microcomputer (French) collects information from sensors, does preliminary processing, and distributes it in digital form. The value of the project and USSR-French cooperation in the study of space is also discussed.
M.D.K.

N82-17237# Joint Publications Research Service, Arlington, Va.

COMMENTARY ON INTERCOSMOS-BULGARIA 1300 SATELLITE c15

Kirill Serafimov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 4-6 Transl. into ENGLISH from Izv. (Moscow), 12 Aug. 1981 p 5 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

A Bulgaria-Soviet satellite 'Intercosmo-Bulgaria 1300', designed to obtain data on the interaction between processes taking place in the magnetosphere and ionosphere is discussed. The mechanism whereby solar disturbances are transmitted to the Earth, and investigations of near-Earth plasma were studied. Systems for energy supply, stabilization, orientation, telemetry and telecommunication were designed and incorporated. The satellite's complex of instrumentation and equipment was divided into four groups: (1) systems and instruments for studying electrons and ions, determining their concentration, temperature, and distribution, and for detecting flows of ionospheric plasma; (2) a system for determining permanent and varying electric fields and a magnetometer; (3) an electro-photometer and a device for detecting and recording ultraviolet radiation; and (4) the angular laser reflector.
M.D.K.

N82-17238# Joint Publications Research Service, Arlington, Va.

FURTHER COMMENTARY ON INTERCOSMOS-BULGARIA 1300 SATELLITE c15

In its USSR Rept.: Space No. 14 (JPRS-79711) 22 Dec. 1981 p 7-8 Transl. into ENGLISH from Kommunist (Yerevan, USSR), 13 Sep. 1981 p 2 (For primary document see N82-17235 08-12)'
Avail: NTIS HC A05/MF A01

'Intercosmos-Bulgaria 1300', the second satellite to carry Bulgarian geophysical instruments, was designed to provide information about physical phenomena occurring in near-Earth space. Electron-ion processes which exert an energetic effect on the lower layers of the atmosphere and influence meteorological conditions were of concern. Study of convection movements of ionospheric plasma and their relation to phenomena in other zones of the Earth's magnetosphere and in planetary space, investigations of turbulence phenomena in the near-Earth plasma, detection and study of inhomogeneities in the ionospheric plasma and of dynamic links between the ionosphere and the magnetosphere and measurements during heightened solar activity were made. Total electromagnetic compatibility of all of the scientific satellite apparatus and high experiment fidelity was accomplished. Soviet specialists devised a technical solution by developing a system of multiple-joint boom devices so that instruments could be positioned up to 5 meters away from the body of the satellite. Special coatings were developed and used for the body, the instruments, and solar batteries. The problem of heat elimination from instruments operating in open space was also solved.
M.D.K.

N82-17239# Joint Publications Research Service, Arlington, Va.

STATUS OF SPACE BIOMEDICAL PROGRAMS c52

Avadalik Ignatyevich Burnazyan *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 29-33 Transl. into ENGLISH from Pravda (Moscow), 15 Jun. 1981 p 3 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

Four specialized biological satellites in the 'Cosmos series conducted research to study the mechanisms of the effect of weightlessness, the combined effect of weightlessness and ionizing radiation, and the biological effect of artificial gravity on living systems. Devices developed included: a centrifuge for the creation of artificial gravity, an irradiator, instruments for rowing and fixing plant organisms. The cardiovascular system as studied during the so-called period of acute adaptation to weightlessness (the first 7 days of a flight). Special features of central and peripheral blood circulation and blood circulation in the brain were studied. A ballistic cardiography method judged the contractive function of the evaluated dynamics of blood flow, and detected functional disruptions in the cardiovascular system. A densiotography method was also used. An 'Oxygen' physiological experiment was performed utilizing a portable 'Oxymeter' instrument to determine oxygen pressure level changes and its consumption by body tissues. Radiation safety tests were also conducted using thermoluminescent dosimeters. Results of these tests are given. A center for processing of the data and hygienic and biophysical information that serves as a consultative-prognostic group is also described.
M.D.K.

N82-17240# Joint Publications Research Service, Arlington, Va.

INSTITUTE DIRECTOR DISCUSSES KRT-10 AND OTHER SPACE ANTENNAS c32

I. Zagura *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 38-41 Transl. into ENGLISH from Stroitelnaya Gazeta (Moscow), 12 Apr. 1981 p 3 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

The KRT-10 radiotelescope space antenna is described. It has a 10 meter umbrella, collapsible support radiators, four megaphones for the 12 centimeter band and a spiral for the 72 centimeter band attached to its body, high frequency radiation meter amplifiers, and a heat regulation system located in the hermetically sealed compartment. The antenna mirror has a reflective surface made from a specially knitted grid bed, woven from 50 micrometer thick metallic fibers. Onboard astrophysical studies using the antenna were conducted for the development of radioastronomical methods in space in two modes: circular rotation of the craft around a transverse axis for mapping of the Milky Way and constant orientation of the craft for observation of a pulsar, together with a 70 meter radiotelescope in the Crimea. Geophysical studies produced high resolution in measurements from space of the radio temperature brightness of the Earth and the world's oceans. Evaluations were conducted of the actual resolution of the antenna and data were taken on the quality of its opening. Signal reception capability was found dependent on the 'mirror' surface. Antennas of large ground radiotelescopes with diameters of approximately 100 meters are being constructed and design of folding antennas with diameters of 30 and 10 meters using the same principle as the 'KRT-10' is being implemented.
M.D.K.

N82-17241# Joint Publications Research Service, Arlington, Va.

GAMMA-RAY INSTRUMENTATION AND ITS USES IN SPACE c93

V. G. Kirillov-Ugryumov, R. Z. Sagdeyev, and Yu. P. Semenov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 42-50 Transl. into ENGLISH from Zemlya i Vselennaya (Moscow), no. 4, Jul. - Aug. 1981 p 4-8 (For primary document see N82-17235 08-12)

Avail: NTIS HC A05/MF A01

Studies to examine astrophysical objects in various ranges of the electromagnetic spectrum using gamma ray instrumentation are described. Particular features of gamma-ray telescopes and orbital space observatories are discussed. Structural design criteria and specifics of instrumentation are described in detail for both American and U.S.S.R. programs. Equipment diagrams, specifically for gamma-ray telescopes spark chambers and scintillation counters are presented. Similar diagrams and descriptions are given for gamma-ray telescopes for soft gamma radiation and for medium-energy telescopes. M.D.K.

N82-17242# Joint Publications Research Service, Arlington, Va.

ADVANTAGES OF SPACE STATIONS AT THE EARTH-MOON LIBRATION POINTS

A. Brykov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 51-54 Transl. into ENGLISH from Aviats. Kosmonavt. (Moscow), no. 7, Jul. 1981 p 42-43 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

The utilization of space near the libration points in the Earth-Moon system for the effective solution of scientific and national economic problems is considered and discussed. The distinct advantages of locating space stations at these libration points is of specific concern. Control of spacecraft motion is simplified and the volume of required navigational information is reduced in these locations. Diagrams and descriptions of parameters in libration points in the Earth-Moon system are given. Utilization of these spaces, with long-base interferometers and other equipmentation, will provide opportunities for studying galactic nuclei, stars, intergalactic gases, and other basic research. The significance and application of Euler and Lagrange theoretical constructs in determining and using libration points is also discussed. The potential for using the libration points for creation of global communication systems is considered. M.D.K.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N82-17243*# Howard Univ., Washington, D. C. Dept. of Mechanical Engineering.

ON THE SHAPE AND ORIENTATION CONTROL OF AN ORBITING SHALLOW SPHERICAL SHELL STRUCTURE

P. M. Bainum and A. S. S. R. Reddy 9 Jul. 1982 11 p refs Proposed for presentation at the Joint IFAC/ESA Symp. on Automatic Control in Space, Noordwijkerhout, Netherlands, 5-9 Jul. 1982
(Grant NsG-1414)
(NASA-CR-168420) Avail: NTIS HC A02/MF A01 CSCL 22A

The dynamics of orbiting shallow flexible spherical shell structures under the influence of control actuators was studied. Control laws are developed to provide both attitude and shape control of the structure. The elastic modal frequencies for the fundamental and lower modes are closely grouped due to the effect of the shell curvature. The shell is gravity stabilized by a spring loaded dumbbell type damper attached at its apex. Control laws are developed based on the pole clustering techniques. Savings in fuel consumption can be realized by using the hybrid shell dumbbell system together with point actuators. It is indicated that instability may result by not including the orbital and first order gravity gradient effects in the plant prior to control law design. E.A.K.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N82-17244# Minnesota Univ., Minneapolis.

THE CONSTRUCTION OF A NEUTRAL MOLECULAR BEAM FACILITY AND ITS APPLICATION TO MASS SPECTROMETERS CARRIED ON SPACE VEHICLES Ph.D. Thesis

John Otto Ballenthin 1981 149 p
Avail: Univ. Microfilms Order No. 8125932

The design and implementation of a beam system intended for the simulation of the motion of planetary probes is discussed. The beam system employed the technique of isentropic expansion of gas through a free jet. Beam velocites of up to 6.3 Km/sec were obtained raising the temperature of the gas behind the nozzle orifice to 2400 K and by 'seeding' a small percentage of the gas of interest into a light mass carrier gas, i.e., hydrogen. This molecular beam was used as a tool to investigate the response of open source mass spectrometers to neutral gas beams. A method of calibrating the response of open source mass spectrometers against an idealized closed source was demonstrated. Measurements of this calibration constant for mass spectrometers similar to those employed on several Earth satellites and on several planetary entry probes show that correction factors of up to 30% are required for some instruments. Dissert. Abstr.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-17245# Air Force Armament Lab., Eglin AFB, Fla.

OPTIMAL CONTROL AND ESTIMATION FOR STRAPDOWN SEEKER GUIDANCE OF TACTICAL MISSILES

P. L. Vergez and J. R. McClendon Feb. 1982 25 p refs Backup document for AIAA Synoptic scheduled for publication in Journal of Guidance, Control and Dynamics in May/Jun. 1982
Avail: NTIS HC A02/MF A01

Recent advances in seeker technology have increased the fields-of-view significantly, such that future missiles could have the seeker fixed to its body (eliminating the gimbals) with fields-of-view in excess of 90 degrees. These body-fixed (strap-down) seekers introduce large measurement errors caused by their optics and electronics. Conventional guidance and filtering techniques do not work well with strapdown seeker measurements. Recent dither adaptive approaches to generate inertial measurements from the body fixed measurements in order to use conventional guidance have failed to work in higher engagements. However, guidance and estimation algorithms derived from optical control theory can function well with strapdown seeker measurements in high g engagements, resulting in greatly improved missile performance. L.F.M.

N82-17246# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

A RAPID ESTIMATION OF THE LIFETIME OF NEAR EARTH SATELLITES FOR MISSION ANALYSIS

Nellore S. Venkataraman and Kondapalli Rama Rao Jul. 1981 28 p refs Presented at the 33rd Ann. Meeting of the SBPC, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2158-RPE/377) Avail: NTIS HC A03/MF A01

The prediction of the lifetime of satellites in mission planning, programming, and planning of onboard scientific experiments, and the design of satellite equipment like batteries is discussed. In the initial stages of mission planning, the lifetime estimates are required for various launch conditions. Lagrange's orbit equations are used with the air drag as the chief perturbation force. It is shown that by making a proper choice of the exospheric temperature, the CIRA-1972 model gives very good results when compared with more detailed atmospheric description where the density is calculated as a function of the altitude, latitude and other geophysical parameters. The lifetime is calculated for several satellites assuming constant drag coefficient. E.A.K.

N82-17247# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
ECONOMY OF SMALL REUSABLE LEO SATELLITE PLATFORMS
Dietrich E. Koelle 1981 13 p Presented at 32nd Intern. Astronautical Federation, Rome, 6-12 Sep. 1981 Submitted for publication
(MBB-UR-498-81-O) Avail: NTIS HC A02/MF A01

A concept for future small Shuttle launched reusable platforms, considered as a means of cost reduction for LEO missions is described. The first platform of this type of spacecraft is SPAS-01 to be launched in 1982. Follow on concepts are presented for astronomy missions (ASTRO-PLATFORM) and space processing activities (SP-PLATFORM) which have quite different requirements. Further, a 'standard platform' is discussed which could be equipped with payload modules of different nature. The operational and management aspects of this new approach are considered. Author

N82-17248# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
APPLICATION TO MISSILE DYNAMICS
C. P. Schneider 1980 16 p refs
(MBB-UA-553-80-O; AGARD-LS-18-1) Avail: NTIS HC A02/MF A01

In theoretical dynamics, missile motion is described in six degrees of freedom. The corresponding system of equations of motion contains external forces lift, drag and side force besides motor thrust and gravity, and as external moments the moments of pitch, yaw and roll. Forces and moments - which are dependent on flight conditions such as angles of attack, yaw, and roll, flight speed, acceleration and the angular velocities of pitch, yaw and roll - may be given as partial derivatives of these variables. The connection between aerodynamic modelling and the equation of motions is explained. Simple missile motions are chosen to explain steady and dynamic stability. The influence of steady and dynamic (quasisteady) derivatives is estimated. From literature, examples for the simulation of complicated flight motions caused by non-linear unsteady forces and moments are selected and shown in diagrams. Author

N82-17237# Joint Publications Research Service, Arlington, Va.
COMMENTARY ON INTERCOSMOS-BULGARIA 1300 SATELLITE
Kirill Serafimov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 4-6 Transl. into ENGLISH from Izv. (Moscow), 12 Aug. 1981 p 5 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

N82-17238# Joint Publications Research Service, Arlington, Va.
FURTHER COMMENTARY ON INTERCOSMOS-BULGARIA 1300 SATELLITE
In its USSR Rept.: Space No. 14 (JPRS-79711) 22 Dec. 1981 p 7-8 Transl. into ENGLISH from Kommunist (Yerevan, USSR), 13 Sep. 1981 p 2 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N82-17249# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Raumflugdynamik.
STUDY ON THE ACCOMMODATION POTENTIALS OF NADIR-ORIENTED PAYLOADS ON SPACE SHUTTLE
J. Puls, A. Drescher, H. vanderPiepen, and A. Rossbach Jul. 1981 63 p refs
(DFVLR-FB-81-27) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 11,70

Experiments of Earth observation were selected for a NADIR-oriented space shuttle mission. The application fields are Earth observation over land and water, cartography, and climate research. Accommodation of the different experiments on the Spacelab pallet was investigated. It is demonstrated that the pallet is unnecessary when an experiment support structure configurated by standard elements is used. Moreover the mission costs can be reduced by approximately 25 percent. J.M.S.

N82-17250# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
WIND TUNNEL TESTS OF THE SPACE SHUTTLE FOAM INSULATION WITH SIMULATED DEBONDED REGIONS Final Report
D. W. Stallings and A. S. Hartman AEDC Apr. 1981 36 p refs
(AF Proj. 921E)
(AD-A108079; AEDC-TSR-81-V13) Avail: NTIS HC A03/MF A01 CSCL 22/2

The tests were conducted to investigate the survivability of the external tank protection system with a hole in the insulation caused by area debonding and insulation tear-out. The material samples were tested using the wedge technique. The tests were run at a free-stream Mach No. 10 and a free stream total temperature of 1900 R. The wedge angle was varied to provide test conditions which were representatives of those expected during launch. Selected results are presented to illustrate the test techniques and typical data obtained. GRA

N82-17251# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
NASA/ROCKWELL INTERNATIONAL SPACE SHUTTLE ORBITER YAW HEATING TEST (OH-109) Final Report, 26 Oct. - 24 Nov. 1980
K. W. Nutt and L. A. Ticatch Jan. 1981 56 p refs Prepared in cooperation with AEDC
(AD-A107703; AEDC-TSR-81-V6) Avail: NTIS HC A04/MF A01 CSCL 20/4

Thin-skin thermocouple heat transfer tests were conducted on two 0.0175 scale and one 0.04 scale model of the space shuttle orbiter. In addition, a phase-change paint heat transfer test was conducted on a 0.0175 scale SILTS Pod tail of the orbiter. Oil flow data were also obtained on the orbiter's upper surface. The primary objective of the thin skin thermocouple entry was to obtain better identification of regions of peak heating on the upper surface of the orbiter with attention to the Orbiter Maneuvering System (OMS) pods. The objective of the phase-change paint entry was to establish the peak heating location on the orbiter SILTS tail configuration. Data were recorded at Mach 8 in the AEDC-VKF Hypersonic Wind Tunnel B at free stream Reynolds numbers ranging from 500,000 to 3,700,000. The model angle of attack ranged from 20 to 40 degrees with yaw angle varying from -2 to 2 degrees. Author (GRA)

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N82-17252*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

QUEUEING ANALYSIS OF SYNCHRONOUS TIME DIVISION MULTIPLEXING WITH INDIVIDUAL SOURCE BUFFERING
L. Clare 1 Feb. 1982 68 p refs
(Contract NAS7-100)
(NASA-CR-168443; JPL-Pub-81-107) Avail: NTIS HC A04/MF A01 CSCL 17B

Synchronous time division multiplexing is analyzed. Packets of information arrive at the system as a compound Poisson process, and are transmitted only during individual periodic intervals. Packet arrivals are blocked (lost) if the system has a finite capacity and is congested. Using the theory of semiregenerative processes, the distribution of the number of packets in the system (system size) is found. This nonstationary distribution is used to determine the complete system behavior, including the delay distributions, the blocking probability, and the density of the system size at arrival instants. Numerical examples illustrate applications of the results given. S.L.

N82-17253*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SATELLITE APPLICATIONS TO ELECTRIC-UTILITY COMMUNICATIONS NEEDS
M. Horstein and R. Barnett 1 Dec. 1981 111 p refs
(Contract NAS7-100)
(NASA-CR-168430; JPL-Pub-81-104) Avail: NTIS HC A06/MF A01 CSCL 17B

Significant changes in the Nation's electric power systems are expected to result from the integration of new technology, possible during the next decade. Digital communications for monitor and control, exclusive of protective relaying, are expected to double or triple current traffic. A nationwide estimate of 13 Mb/s traffic is projected. Of this total, 8 Mb/s is attributed to the bulk-power system as it is now being operated (4 Mb/s). This traffic could be accommodated by current communications satellites using 3- to 4.5-m-diameter ground terminals costing $35,000 to $70,000 each. The remaining 5-Mb/s traffic is attributed to new technology concepts integrated into the distribution system. Such traffic is not compatible with current satellite technology because it requires small, low-cost ground terminals. Therefore, a high effective isotropic radiated power satellite, such as the one being planned by NASA for the Land Mobile Satellite Service, is required. A.R.H.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-17254*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TOTAL-DOSE RADIATION EFFECTS DATA FOR SEMICONDUCTOR DEVICES, VOLUME 2
William E. Price, Keith E. Martin, Donald K. Nichols, Michael K. Gauthier, and S. Frederick Brown 1 Dec. 1981 323 p
(Contract NAS7-100)
(NASA-CR-168428; JPL-Pub-81-66-Vol-2) Avail: NTIS HC A14/MF A01 CSCL 22B

Total ionizing dose radiation test data on integrated circuits are analyzed. Tests were performed with the electron accelerator (Dynamitron) that provides a steady state 2.5 MeV electron beam. Some radiation exposures were made with a Cobalt-60 gamma ray source. The results obtained with the Cobalt-60 source are considered an approximate measure of the radiation damage that would be incurred by an equivalent dose of electrons. E.A.K.

N82-17255*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONTROL SYSTEM DESIGN FOR THE LARGE SPACE SYSTEMS TECHNOLOGY REFERENCE PLATFORM
Rance S. Edmunds 15 Jan. 1982 112 p refs
(Contract NAS7-100)
(NASA-CR-168426; JPL-Pub-81-77) Avail: NTIS HC A06/MF A01 CSCL 22B

Structural models and classical frequency domain control system designs were developed for the large space systems technology (LSST) reference platform which consists of a central bus structure, solar panels, and platform arms on which a variety of experiments may be mounted. It is shown that operation of multiple independently articulated payloads on a single platform presents major problems when subarc second pointing stability is required. Experiment compatibility will be an important operational consideration for systems of this type. A.R.H.

N82-17256*# Martin Marietta Aerospace, Denver, Colo.
ADVANCED SPACE SYSTEM ANALYSIS SOFTWARE. TECHNICAL, USER, AND PROGRAMMER GUIDE Final Report, Sep. 1980 - Sep. 1981
C. E. Farrell and H. F. Zimbelman Sep. 1981 168 p refs
(Contract NAS1-16447)
(NASA-CR-165798; MCR-81-1334) Avail: NTIS HC A08/MF A01 CSCL 22B

The LASS computer program provides a tool for interactive preliminary and conceptual design of LSS. Eight program modules were developed, including four automated model geometry generators, an associated mass properties module, an appendage synthesizer module, an rf analysis module, and an orbital transfer analysis module. The existing rigid body controls analysis module was modified to permit analysis of effects of solar pressure on orbital performance. A description of each module, user instructions, and programmer information are included. T.M.

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

N82-17257 Institut d'Aeronomie Spatiale de Belgique, Brussels.
ROCKET-BORNE INSTRUMENTATION FOR THE MEASUREMENT OF ATOMIC OXYGEN BASED ON CHEMICAL RELEASE IN THE LOWER THERMOSPHERE
E. vanHemelrijk and E. vanRansbeek 1981 33 p refs Submitted for publication
(Contract NFWO-10.089)
(Aeronomica-Acta-A-231-1981) Avail: Issuing Activity

Rocket-borne instrumentation, which determines atomic oxygen density as a function of altitude, was tested. A technique where NO gas is ejected in the backward direction of the flight is outlined. A 6.8 g explosive charge punches a 40 mm hole in the gas bottles. At 80 to 105 km altitude 99% of the gas is ejected within 0.07 sec over a 60 m release interval, assuming rocket velocity = 100 m/sec. The initial Gaussian radius of the cloud is 60 to 70 m, satisfying the point release principle. Cloud altitudes, and wind speeds are derived from ground based photographs. Oxygen concentration is determined by analyzing the chemiluminescence of the point releases. Rocket flights confirm the usefulness of the system. Author (ESA)

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-17258*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

AUTOMATED POWER SYSTEMS MANAGEMENT (APSM) Final Report
A. O. Bridgeforth 15 Nov. 1981 65 p refs
(Contract NAS7-100)
(NASA-CR-168423; JPL-Pub-81-106) Avail: NTIS HC A04/MF A01 CSCL 22B

A breadboard power system incorporating autonomous functions of monitoring, fault detection and recovery, command and control was developed, tested and evaluated to demonstrate technology feasibility. Autonomous functions including switching of redundant power processing elements, individual load fault removal, and battery charge/discharge control were implemented by means of a distributed microcomputer system within the power subsystem. Three local microcomputers provide the monitoring, control and command function interfaces between the central power subsystem microcomputer and the power sources, power processing and power distribution elements. The central microcomputer is the interface between the local microcomputers and the spacecraft central computer or ground test equipment.
Author

N82-17259*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A STUDY OF THE SELECTION OF MICROCOMPUTER ARCHITECTURES TO AUTOMATE PLANETARY SPACECRAFT POWER SYSTEMS
A. Nauda (Bucknell Univ.) 1 Jan. 1982 36 p refs
(Contract NAS7-100)
(NASA-CR-168412; JPL-Pub-82-1) Avail: NTIS HC A03/MF A01 CSCL 22B

Performance and reliability models of alternate microcomputer architectures as a methodology for optimizing system design were examined. A methodology for selecting an optimum microcomputer architecture for autonomous operation of planetary spacecraft power systems was developed. Various microcomputer system architectures are analyzed to determine their application to spacecraft power systems. It is suggested that no standardization formula or common set of guidelines exists which provides an optimum configuration for a given set of specifications. E.A.K.

N82-17260# PDA Engineering, Santa Ana, Calif.
PATCHES-3. USER'S GUIDE FOR INVOLUTE COMPOSITES Final Report, Oct. 1978 - Jan. 1981
E. L. Stanton and T. E. Kipp Edwards AFB, Calif. AFRPL Aug. 1981 69 p refs
(Contract F04611-78-C-0082; AF Proj. 3059)
(AD-A107750; PDA-1437-00-02; AFRPL-TR-81-43) Avail: NTIS HC A04/MF A01 CSCL 21/8

A user's guide is provided for the nozzle analyst who needs to use the computer program PATCHES-III to model an involute component, but who does not want to become expert in all the modeling capabilities of the program. The analyst is expected to have a finite element background and should be familiar with how an involute is constructed. Models of test cylinders, involute billets and beam specimens excised from involute rings are described in detail. The bulk data input for these models are annotated and the output is illustrated with computer plots.
Author (GRA)

N82-17261# Marquardt Corp., Van Nuys, Calif.
SLD REACTION CONTROL AND PROPULSION SYSTEM. PRELIMINARY DESIGN STUDY Final Report
F. Coss 11 Nov. 1980 28 p
(Contract N00173-79--0342)
(AD-A107560; S-1525) Avail: NTIS HC A03/MF A01 CSCL 21/8

The Reaction Control and Propulsion System has been established on a preliminary basis. The overall system has been conceived using one TMC R-40B thruster, operating at 900 pounds thrust and ten TMC R-6C 5 pound thrust attitude control thrusters. The R-40B bipropellant thruster is a modified Space Shuttle Orbiter Attitude Control Engine (the R-40A). The R-40A has been modified only slightly with resized nozzle and chamber assembly optimized for the available space in the SLD. The R-6C bipropellant attitude control thrusters qualified for commercial and DoD spacecraft are packaged in two five thruster modules attached externally to the stage structure. Author (GRA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-17262 Princeton Univ., N. J.
ONE-ELECTRON MECHANISMS IN ORGANOMETALLIC CHEMISTRY Ph.D. Thesis
Gregory Maxwell Williams 1981 156 p
Avail: Univ. Microfilms Order No. 8127757

The oxidation of zirconocene bis(phosphine) by alkyl halides is considered. The oxidative adduct, Cp2ZrRX, as well as zirconocene dihalide, are formed by competitive processes which partition a Zr(II) monophosphine species. The dihalide is formed by successive halogen atom transfers resulting in two equivalents of aklyl radical in addition to the Zr(IV) product. The intermediacy of organic radicals was established by conventional product analysis, while EPR spectroscopy was used to chracterize the Zr(III) intermediates. Attempts to activate carbon-carbon bond-forming reactions or organonickel(II) complexes are described. The reaction between Cr(acac)2 and methallylnickel bromide dimer in the presence of aryl halides was examined. The reduction with Cr(II) appears to produce a highly reactive reduced nickel species which can be trapped by aryl halide. The formation of methallyl benzene competes with aggregation of the reduced nickel complex.
Dissert. Abstr.

N82-17263*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PERFORMANCE OF PTFE-LINED COMPOSITE JOURNAL BEARINGS
Harold E. Sliney and Frank J. Williams (North American Aviation, Inc., Los Angeles) 1982 18 p refs Presented at Ann. Meeting of the Am. Soc. of Lubrication Engr., Cincinnati, 10-13 May 1982
(NASA-TM-82779; E-1110) Avail: NTIS HC A02/MF A01 CSCL 13I

Plain cylindrical journal bearings consisting of aramid fiber reinforced epoxy outer shells and glass fiber reinforced PTFE lubricating liners were evaluated. All materials in these bearings are electrically nonconductive; thus eliminating the problem of galvanic corrosion sometimes encountered with metal bearings installed in dissimilar metal mountings. Friction and wear characteristics were determined for loads, temperatures, and oscillating conditions that are typical of current airframe bearing applications. Friction and wear characteristics were found to be compatible with most airframe bearing requirements from -23 C to 121 C. Contamination with MIL H-5606 hydraulic fluid increased wear of the PTFE liners at 121 C, but did not affect the structural integrity of the aramid/epoxy composite. Author

N82-17264# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
THE REPRESENTATION OF IMAGE TEXTURE
Michael Dennis Riley Sep. 1981 70 p refs
(Contract N00014-80-C-0505; Grant NSF MCS-79-23110)
(AD-A107636; AI-TR-649) Avail: NTIS HC A04/MF A01 CSCL 20/11

This thesis explores how to represent image texture in order to obtain information about the geometry and structure of surfaces, with particular emphasis on locating surface discontinuities. Theoretical and psychophysical results lead to the following conclusions for the representation of image texture: (1) A texture edge primitive is needed to identify texture change contours, which are formed by an abrupt change in the 2-D organization of similar items in an image. The texture edge can be used for locating discontinuities in surface structure and surface geometry and for establishing motion correspondence; (2) Abrupt changes in attributes that vary with changing surface geometry -- orientation, density, length, and width -- should be used to identify discontinuities in surface geometry and surface structure; (3) Texture tokens are needed to separate the effects of different physical processes operating on a surface. They represent the local structure of the image texture. Their spatial variation can be used in the detection of texture discontinuities and texture gradients, and their temporal variation may be used for establishing motion correspondence. What precisely constitutes the texture tokens is unknown; it appears, however, that the intensity changes alone will not suffice, but local groupings of them may; and (4) The above primitives need to be assigned rapidly over a large range in an image. Author (GRA)

N82-17265# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
ORGANIC GRAINS AND THE SPECTRUM OF THE GALATIC CENTRE SOURCE IRS 7
D. T. Wickramasinghe, F. Hoyle, and N. C. Wickramasinghe May 1980 11 p refs Submitted for publication Prepared in cooperation with Royal Observatory, Edinburgh
(Preprint-58) Avail: NTIS HC A02/MF A01

A dry polysaccharide model for interstellar grains is proposed based on absorption in IRS 7. The excess optical depth of absorbing material in the line of sight to IRS 7, estimated from observational data by fitting a reddened 3500 K black body continum at 3.6 microns, was compared with the mass absorption coefficient for dry cellulose, estimated from laboratory data. Results show good agreement. Author (ESA)

24 COMPOSITE MATERIALS

Includes laminates.

N82-17266*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Materials Engineering.
CONTROL OF INTERFACE REACTIONS IN SIC/TI COMPOSITES Final Progress Report, Nov. 1977 - Jun. 1981
C. R. Houska and V. Rao Feb. 1982 61 p refs
(Grant NsG-1470)
(NASA-CR-168416) Avail: NTIS HC A04/MF A01 CSCL 11D

The reaction between a 0.5 to 1.0 Al film and a thick Ti substrate to form TiAl3 occurs very rapidly on heating to 635 C and causes the Al to be confined to the surface region. After heating to 900 C Ti3Al is formed with little release of Al into alpha Ti. Further annealing at 900 C eventually causes the Ti3Al phase to decompose and a substantial amount of Al is released into alpha Ti. The interdiffusion coefficient for Al in alpha Ti at 900 C increases by less than one order of magnitude as Al is varied from 0 to 20 at %. These data were obtained from the (101) X-ray diffraction intensity band using polycrystalline samples. Improvements in the analysis of X-ray diffraction data for the determination of composition profiles are discussed. S.L.

N82-17267*# North Carolina State Univ., Raleigh.
EFFECTS OF HIGH ENERGY RADIATION ON THE MECHANICAL PROPERTIES OF EPOXY/GRAPHITE FIBER COMPOSITES Status Report, 1 Jan. - 31 Dec. 1981
R. E. Fornes and J. D. Memory 31 Dec. 1981 121 p refs
(Grant NsG-1562-S4)
(NASA-CR-168421) Avail: NTIS HC A06/MF A01 CSCL 11D

Studies on the effects of high energy radiation on graphite fiber reinforced composites are summarized. Studies of T300/5208 and C6000/PMR15 composites, T300 fibers and the resin system MY720/DDS (tetraglycidyl-4,4'-diaminodiphenyl methane cured with diaminodiphenyl sulfone) are included. Radiation dose levels up to 8000 Mrads were obtained with no deleterious effects on the breaking stress or modulus. The effects on the structure and morphology were investigated using mechanical tests, electron spin resonance, X-ray diffraction, and electron spectroscopy for chemical analysis (ESCA or X-ray photoelectron spectroscopy). Details of the experiments and results are given. Studies of the fracture surfaces of irradiated samples were studied with scanning electron microscopy; current results indicate no differences in the morphology of irradiated and control samples. M.D.K.

N82-17268# Royal Aircraft Establishment, Bedford (England).
THE STRUCTURAL FORMATION AND PHYSICAL BEHAVIOUR OF CROSS-LINKED EPOXY RESINS
M. Fisher, F. Lohse, and R. Schmid Apr. 1981 43 p refs Transl. into ENGLISH from Makromol. Chem. (Basle), no. 181, 1980 p 1251-1287
(RAE-LIB-Trans-2067; BR81270) Avail: NTIS HC A03/MF A01

Network structures and physical properties of products obtained either by crosslinking polyepoxides with polyphenols, and by dicyandiamide or by catalytic polymerization are discussed and compared with those obtained by amine or anhydride curing. The highest crosslinking density was achieved by the polymerization of epoxy compounds. Amine and phenol curing resulted in similarly structured networks with mobile aliphatic segments and comparatively low crosslinking densities. Impact resistance, increased as network density decreased, a maximum being achieved with a medium chain length of 25-35 atom intervals between crosslinking points. The mechanical stability of polymers is limited by the cohesive strength KF which corresponds to the maximum shear strength of bonds. The cohesive strength and fracture toughness have a dual relationship. The model discussed for cohesive strength explains the relationship between chemical structure and the physical behavior of an epoxy resin over a wide range of temperature. M.D.K.

N82-17269# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
FATIGUE BEHAVIOR OF FIBER-RESIN COMPOSITES
J. F. Mandell Apr. 1981 58 p refs Submitted for publication Sponsored by Goodrich (B. F.) Co., Lord Corp. and Dow Chemical Co.
(MIT-RR-R81-2) Avail: NTIS HC A04/MF A01

The process of fatigue breakdown in fiber composites usually involves the progressive accumulation of matrix/interface cracking, with an associated loss in residual strength and modulus. This may continue until the residual strength is reduced to the cyclic stress, resulting in failure. However, tensile fatigue failure in many glass dominated composites appears to be a fiber or strand property, independent of the matrix or interface. This is true both of cyclic and static fatigue, and the S-N properties also translate into resistance to crack initiation and propagation from notches in notch-sensitive cases. Exceptions to the fiber dominated behavior occur when a more severe fatigue mechanism operates, as with short fibers in very ductile matrices, or woven fabric reinforcement. The general characteristics of the fatigue of composites is reviewed with emphasis on recent developments in glass fiber dominated behavior. Author

N82-17270# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Werkstoffe-Forschung.
THE INFLUENCE OF NOTCH LENGTH AND LIGAMENT LENGTH ON THE TOUGHNESS OF BORON FIBER REINFORCED ALUMINUM Ph.D. Thesis - Tech. Hochschule, Aachen
Petrus W. M. Peters Jan. 1981 123 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-81-22) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 23,80

The applicability of linear elastic fracture mechanics (LEFM, material parameter: toughness K sub o, K sub max) and of the point-stress criterion (material parameter: characteristic length d sub o) was investigated on several B/Al laminates. On DEN-specimens the load at the beginning of crack extension and at specimen fracture was measured and in some cases the resulting plastic zone and notch (tip) opening displacement or specimen extension. From these experiments the influence of notch length and ligament length on the respective material parameter was determined. It was found that the investigated parameters are notch-length-dependent and below a critical ligament length ligament-length-dependent. The notch length dependency at larger notch lengths is probably caused by the extension of the plastic zone, which cannot be described by a stress intensity factor. Author

N82-17271# McDonnell Aircraft Co., St. Louis, Mo.
EFFECTS OF BEARING/BYPASS LOAD INTERACTION ON

LAMINATE STRENGTH Final Report, 15 Feb. - 15 Sep. 1981
Samuel P. Garbo Wright-Patterson AFB, Ohio AFWAL Sep. 1981 31 p ref
(Contract F33615-77-C-3140; AF Proj. 3114)
(AD-A108006; AFWAL-TR-81-3114) Avail: NTIS HC A03/MF A01 CSCL 13/5

The subject of this program was structural evaluation of mechanically fastened composite joints. An add-on contract effort was performed to further evaluate the effects of bearing/bypass interaction on laminate strength. The results of the add-on contract are the subject of this report. The work performed under the original contract indicated additional studies were needed to further verify bolted composite joint strength methodology. The objective of this add on effort was evaluation of bearing versus bypass load interactions on laminate strength. Three laminates from the family of 0 deg, + or - 45 deg, and 90 deg ply orientations were tested to failure under a range of tension bypass to bearing load ratios. Predictions of laminate strength were obtained using the Bolted Joint Stress Field Model (BJSFM) described in Volumes 1 and 3 of AFWAL-TR-81-3041. Failure behavior of laminates was documented using ultrasonic C-scan techniques, and failure zones about the fastener hole were correlated with predictions. This report documents test procedures, test data, and theory/test correlations. GRA

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-17272 Florida State Univ., Tallahassee.
A STATIC SCREENED POTENTIAL METHOD FOR THE CALCULATION OF ELECTRONIC TRANSITION PROPERTIES OF AZABENZENES Ph.D. Thesis
Kurt Delmas Donaldson 1981 192 p
Avail: Univ. Microfilms Order No. 8125764

A method based on using the static screened potential within the combined formalism of Green function theory and density response theory was developed. This method is applied to the calculation of electronic transition properties of a series of azabenzenes. This method consists of three basic stages of calculation. The first consists of a Pariser-Parr-Pople calculation using the Mataga-Nishimoto approximation for the potential producing set of zero order molecular orbitals and energies which serve as input into the second state. The first step in this stage is calculation of the free propagator from which the dressed polarization propagator is obtained. Using this, the static screened potential is calculated in three different ways. The first based on free propagator, the other two based on two different dressed propagators calculated. Once these potentials are obtained, the entire process is then repeated until the static screened potentials become self-consistent and self-consistent potentials, molecular orbitals, energies, and generalized bond orders are obtained. These serve as input into the equations of stage 3 in which transition energies and oscillator strengths are calculated. Dissert. Abstr.

N82-17273 Michigan State Univ., East Lansing.
AN AUTOMATED REAGENT PREPARATION SYSTEM FOR FAST REACTION-RATE ANALYSES Ph.D. Thesis
Rytis Tomas Balciunas 1981 182 p
Avail: Univ. Microfilms Order No. 8126467

The design, operation, and evaluation of an automated system for fast reaction rate measurements that utilizes a microcomputer controlled reagent preparation device is described. The modular, stepper motor driven syringe based reagent preparation system features a dilution range of up to five orders of magnitude from a single stock solution, with 0.1% RSD or better. Reagents are prepared from up to three different stock solutions and a diluent. Reproducibility of the delivered stock solutions and of the dilution process is better than Class A glassware in all cases tested. The operational hardware and software descriptions are presented, with detailed circuitry and timing of the microcomputer operations. The results of several chemical complexation studies are presented as a demonstration of the precision and utility of the system. Dissert. Abstr.

N82-17274 North Carolina Univ. at Chapel Hill.
SOME ANALYTICAL ASPECTS OF FIELD DESORPTION MASS SPECTROMETRY Ph.D. Thesis
David Fuller Fraley 1981 341 p
Avail: Univ. Microfilms Order No. 8125575

Field desorption mass spectrometry (FDMS) is used for the analysis of thermally labile, nonvolatile compounds. Current trends in FDMS including ion formation, experimental methods involving emitter production and ion current recording are investigated. The FDMS behavior of the anticancer drug analogs of 2-(methoxystyrl)-quinolines is investigated. The FDMS method gave superior signal intensity, ease of analysis, and molecular weight information, but little structural information. Thirty protected amino acids and oligopeptides containing the most common synthetic protecting groups were analyzed by FDMS. Even cystine derivatives and peptides with as many as 6 labile protecting groups gave the molecular ion as the base peak. Various techniques to modify carbon FD emitter surfaces are studied. Modifications to reduce surface interaction met with limited success. Dissert. Abstr.

N82-17275 Michigan State Univ., East Lansing.
ZEEMAN BACKGROUND CORRECTION WITH AN ELECTROTHERMAL GRAPHITE BRAID ATOMIZER Ph.D. Thesis
James Thorburn Gano 1981 189 p
Avail: Univ. Microfilms Order No. 8126502

The characterization of an electrothermal atomic absorption spectrometer employing an analyte-shifted Zeeman background correction technique is described. The spectrometer utilizes a microcomputer for data acquisition and to control the heating levels of the graphite braid electrothermal atomizer. In this Zeeman background correction technique, a constant magnetic field is applied to the atomizer in a direction perpendicular to the incident hollow cathode light. The absorption-time profile of the hollow cathode light polarized parallel and perpendicular to the magnetic field is recorded and the difference in these absorptions is proportional to the atomic density. Transmittance vs. magnetic field strength studies were performed on several elements to determine the optimum conditions for analysis. The background correction capabilities of the spectrometer were also tested by analyzing cadmium in the presence of a NaCl matrix. Dissert. Abstr.

N82-17276 Washington Univ., Seattle.
IN SITU ANALYSIS OF THIN LAYER CHROMATOGRAPHY PLATES USING AN IMAGING DETECTOR Ph.D. Thesis
Mary Lucille Gianelli 1981 147 p
Avail: Univ. Microfilms Order No. 8126103

Thin layer chromatography (TLC) plates were imaged onto a SIT vidicon camera to obtain both normal two dimensional images and spectral images of components by emission and absorption. Fluorescent fingerprinting of components on thin layer plates was accomplished by imaging the spots on the entrance slit of a monochromator and removing the exit slit, preserving both the emission spectra and the retention profile of the components. Absorption spectra were obtained by scanning the plate over the wavelength region of interest while simultaneously storing the images. The data is in the form a two dimensional matrix (fluorescence), or a series of two dimensional matrices (absorption), allowing the use of complex mathematical analysis methods to obtain qualitative and quantitative information of the compounds. In the normal image modes of both fluorescence and absorption, the instrument was found to be reproducible to within a half percent. Dissert. Abstr.

N82-17277 Michigan State Univ., East Lansing.
FORMATION CONSTANT AND PHOTOLABELING OF GRAMICIDIN CHANNELS IN LIPID BILAYER MEMBRANES Ph.D. Thesis
Hsiao Yung Guh 1981 161 p
Avail: Univ. Microfilms Order No. 8126505

Gramicidin, a polypeptide of 15 alternating D and L amino acids, increases the cation permeability of biological membranes. Ion transport across the membrane is mediated by gramicidin via the pore mechanism and the gramicidin channel consists of two molecules. By use of the charge injection technique, the formation constants of gramicidin channels in lipid membranes are obtained as well as the partition coefficients of gramicidin between the bilayer and torus phases. Both of the parameters depend greatly on the membrane thickness. A correlation was discovered between the dimerization constant and partition coefficient between the membrane and torus regions. Although relaxation experiments were performed on the membranes, the resulting physical parameters represent the equilibrium values for the same parameters prior to the charge perturbation.

Dissert. Abstr.

N82-17278 Michigan Univ., Ann Arbor.
THE CHEMISTRY AND DETECTION OF NICKEL CARBONYL Ph.D. Thesis
David Alan Hikade 1981 210 p
Avail: Univ. Microfilms Order No. 8125127

Nickel carbonyl has important industrial applications. However, relatively low concentrations of gaseous nickel carbonyl can have devastating effects on man. The ability to analyze the presence of low levels of nickel carbonyl is important. Development of a chemiluminescent method for metal carbonyl analysis culminated in the portable instrument built for the present study. It contains a heated charcoal CO source and a thermal differentiator which can distinguish among the three known chemiluminescing species: Ni(CO)4, Fe(CO)5, and NO. With good sensitivity, selectivity, monitoring ability, portable qualities, and low operating cost, the detector proved able to analyze both iron and nickel carbonyl. A study of homogeneous oxidation of Ni(CO)4, resulted in determination of activation parameters for the unimolecular decay rate constant. The energy and entropy of activation for the reaction were determined to be 23.8 kcal/mole and + 12.4 eu, respectively. Other studies found the presence of one or both metal carbonyls in pressurized CO cylinders, a CO stream passed over Ni powder, cigarette smoke, and in the portable instrument's CO source. Field studies demonstrated potential for metal carbonyl formation under some industrial situations.

Dissert. Abstr.

N82-17279 Florida Univ., Gainesville.
A COMPARISON OF METHODS TO ENHANCE SENSITIVITY IN ANALYTICAL MOLECULAR LUMINESCENCE AND PHOTOACOUSTIC CONDENSED PHASE SPECTROMETRY Ph.D. Thesis
Arthur Robert Jurgensen 1981 217 p
Avail: Univ. Microfilms Order No. 8127437

The room temperature fluorescence analytical figures of merit for 60 polynuclear aromatic hydrocarbons (PAHs) are presented. The limits of detection for most of the compounds are below 50 ng/mL and the average % relative standard deviation is 1.4%. The fluorescence excitation and emission peak wavelengths are listed. The low temperature phosphorescence and fluorescence analytical figures of merit for 60 PAHs are presented. In addition, the low temperature phosphorescence heavy atom enhancements factors of several PAHs in heptane and in ethanol/water in the red region are presented. Iodoethane, dimethymercury, I(-), Ag(+), Tl(+), and Pb(2+) were used as heavy atom perturbers with iodoethane, dimethymercury and Ag(+) giving the largest enhancement factors. Low temperature phosphorescence and fluorescence for most of the compounds are below 100 ng/mL and the average % relative standard deviation is 6%. The phosphorescence and low temperature fluorescence peak wavelengths are listed.

Dissert. Abstr.

N82-17280 Virginia Polytechnic Inst. and State Univ., Blacksburg.
MULTICOMPONENT CONTINUOUS FLOW KINETIC ANALYSIS Ph.D. Thesis
David John Hooley 1981 320 p
Avail: Univ. Microfilms Order No. 8126262

An instrumentation system for Multicomponent Continuous Flow Kinetic Analysis was designed and constructed. It is useful for performing dilutions, flow injection analysis and continuous flow kinetics with relative standard deviations of less than 10 percent. The flow controller was able to regulate the flow of a conducting liquid and the light emitting diode colorimeter was able to detect KMnO4 linearly at concentrations of 10 to 600 micro M. The reaction of KMnO4 with KI was employed as a single component continuous flow test reaction. The feasibility of using the instrument for multicomponent continuous flow kinetic analysis was demonstrated. The flowmeter and flow controller are potential alternatives to the relatively expensive pumps used for flow injection analysis. Evaluation of the instrument's operation in flow injection mode indicates that it is useful as a convenient continuous flow kinetic detector for flow injection analysis and for testing developments in flow injection theory.

Dissert. Abstr.

N82-17281 Northwestern Univ., Evanston, Ill.
RESONANCE RAMAN SPECTROELECTROCHEMISTRY OF THE TETRACYANOQUINODIMETHANE DIANION, PART 1. DOUBLE POTENTIAL STEP CHRONOCOULOMETRY STUDIES OF ABSORPTION ON A SILVER ELECTRODE, PART 2 Ph.D. Thesis
Joseph Michael Lakovits 1981 186 p
Avail: Univ. Microfilms Order No. 8124935

The resonance Raman spectrum of electrogenerated tetracyanoquinodimethane dianion and the frequency shifts which accompany its formation from the radial anion were measured. A reasonable, qualitative correlation between these shifts and the weighted bond order and the weighted bond length changes was obtained for all of the observed modes except one. This Raman data was used to determine that the TCNQ in the coordination complex (Co(acacen)(py)2)2 TCNQ is, in fact, TCNQ=. The utility of double potential step chronocoulometry (DPSCC) for measuring surface excesses of adsorbed electroactive species was used on the solid silver electrode. It was possible to measure the amount of adsorbed 4-acetylpyridine and to put an upper limit on the amount of adsorbed 4-cyanopyridine. By an extension of the standard DPSCC method to form composite DPSCC plots, the anion-induced adsorbtion of Cd(II) on a silver electrode from thiocyanate and from chloride media was measured.

Dissert. Abstr.

N82-17282 Minnesota Univ., Minneapolis.
SECONDARY ION MASS SPECTROMETRY OF CHEMICALLY BOUND ORGANOSILANE FILMS AND PLASMA POLYMERIZED VINYLFERROCENE FILMS ON CONDUCTIVE AND SEMICONDUCTIVE SUBSTRATES Ph.D. Thesis
Michael Roy Ross 1981 259 p
Avail: Univ. Microfilms Order No. 8126010

The use of secondary ion mass spectrometry (SIMS) as a means of mass analyzing simple chemically bound organic films was demonstrated. Ion fragments (fragmentation patterns) for the bound en-silane and Pr-silane films are very similar to those found for gas phase ionization of ethylene-diamine and propylamine. Ion fragments formed give a means of suggesting fragmentation mechanisms as well as possible structural information about the bound films. The use of SIMS in the analysis of more complex film structures was not as successful at assigning actual molecular ion fragments to observed ions present in the SIMS spectrum. Cationized fragments of Cu(II) containing en-silane films were not observed. Where the auger electron spectrometry (AES) technique does not differentiate ultrathin films from monolayer films, SIMS detection shows substantial differences in film thicknesses. Both the damage to the film and the scrambling of the substrate-film region affect the SIMS ion yields in different ways. Evidence that thin film thickness determinations can be achieved from films which sputter in a non-ideal fashion is provided.

Dissert. Abstr.

N82-17283 Houston Univ., Tex.
MODELING CHEMICAL SYSTEMS TO IMPROVE ANALYTICAL RESPONSE Ph.D. Thesis
Bohdan Sachok 1980 215 p
Avail: Univ. Microfilms Order No. 8126942

Modeling, it is demonstrated, can be a significant aid to the understanding and improvement of analytical responses from chemical systems. Two different divalent electrodes, a liquid ion-exchange type and a solid matrix type, were studied to determine their sensitivities to monovalent sodium interference in the determination of calcium. The combined effects of two mobile phase factors were determined by fitting a mechanistic

model to experimental data obtained at nine factor combinations. The multifactor strategy is extended to the reversed phase liquid chromatographic separation of a nine-component mixture. Discussions of other response criteria, such as retention time and elution order, are also presented. Amplification of detector response by means of detector-sensitive ion-pairing reagents is shown to be feasible in reversed phase liquid chromatographic systems.
Dissert. Abstr.

N82-17284 Michigan State Univ., East Lansing.
ELECTROCHEMICAL INVESTIGATION OF SOLVENT EFFECTS ON THE ELECTRODE KINETICS AND THERMODYNAMICS OF SOME TRANSITION-METAL REDOX COUPLES Ph.D. Thesis
Saeed Sahami 1981 218 p
Avail: Univ. Microfilms Order No. 8126549

Electrochemical methods were used in order to explore the influences of the solvent upon the electrode kinetics and thermodynamics of some transition metal redox couples. For the following redox couples: (1) couples containing aromatic ligands, (2) couples containing ammine and ethylenediamine ligands, (3) anionic redox couples, formal potential E sub f were evaluated using cyclic voltammetry as a function of temperature in eight solvents. The reaction entropies for each redox couple in each solvent were obtained from the temperature dependence of E sub f using a nonisothermal cell arrangement. The values of the reaction entropies for all redox couples investigated, it was found, are substantially larger in nonaqueous solvents compared with water. Normal pulse and d.c. polarography were employed to investigate the one-electron reduction kinetics in various solvents at mercury electrodes.
Dissert. Abstr.

N82-17285 Illinois Univ. at Urbana-Champaign.
SINGLET-DELTA MOLECULAR OXYGEN AS A TOOL FOR SELECTIVE CHEMILUMINESCENT DETECTION IN CHROMATOGRAPHY Ph.D. Thesis
Brian Shoemaker 1981 146 p
Avail: Univ. Microfilms Order No. 8127689

Chemiluminescence induced by the single delta state of molecular oxygen has potential as a tool for selective detection in high performance liquid chromatography. Luminescence occurs in a three liquid confined spray aspirator cell. This unit displays dead volume behavior dependent on gas and liquid flow rates. The cell represents a straightforward add-on to any chromatography setup. Signal processing can occur by either digital or analog means, mounting the cell by the entrance slit to the polychromator of a diode array spectrometer permits accumulation of luminescence spectra. Results to date have demonstrated the unique selectivity, and potential practical utility, of detection by single oxygen induced luminescence in the spray cell. The current technique can provide information of interest in the environmental, medical, and textile fields. Gas phase single oxygen reactions should provide a new method for selective gas chromatography detection; other luminescence systems are available for use in the spray cell.
Dissert. Abstr.

N82-17286 North Carolina Univ. at Chapel Hill.
CORRELATION AND INTERFEROMETRIC DATA ANALYSIS APPLIED TO GAS CHROMATOGRAPHY FOURIER TRANSFORM INFRARED SPECTROSCOPY Ph.D. Thesis
Richard Claburn Wieboldt 1981 140 p
Avail: Univ. Microfilms Order No. 8125636

Gas chromatography Fourier transform infrared spectroscopy provides the chemist with the ability to separate and identify, simultaneously, mixture components. Effective analysis of data generated requires algorithms that rapidly identify portions of data which contain useful information and provide assistance in identification. The development of such algorithms and their application to the analysis of shale oil mixtures is reported. The optical design for a gas chromatograph FTIR interface is described along with its limitations. A correlation technique which allows the FTIR to be used as a specific detector for the gas chromatograph is also discussed. The use of fast Fourier transform subroutines is described in detail as part of the method for generating the synthetic interferograms. With this approach, the key absorption features for nine functional groups were determined.
Dissert. Abstr.

N82-17287 Illinois Univ. at Urbana-Champaign.
APPLICATIONS OF NUCLEAR QUADRUPOLE DOUBLE RESONANCE SPECTROSCOPY Ph.D. Thesis
Leslie Gordon Butler 1981 294 p
Avail: Univ. Microfilms Order No. 8127558

Nuclear quadrupole double resonance techniques have been developed to facilitate observation of NQR spectra of the light elements. A new instrument was constructed which employs the established technique of nuclear quadrupole double resonance by adiabatic demagnetization in the laboratory frame. NQR spectra in zero applied magnetic field can be obtained from 500 mg or less of polycrystalline material. NQR spectroscopy provides information about the electric field gradient about a quadrupolar nuclei and details of chemical bonding. D and 17O NQR spectra were obtained on a wide variety of inter- and intramolecular hydrogen bonds and electric field gradient parameters were interpreted by a theoretical analysis of the formaldehyde-water hydrogen bonding interaction. Large changes in the electric field gradient parameters were observed at the deuterium and oxygen sites. The first complete NQR spectrum for an S = 3 spin system, B, was obtained from a study of boric acid. Techniques developed were applied to the study of the 10B and 11B NQR of decaborane(14) and ortho-carborane.
Dissert. Abstr.

N82-17288 Michigan State Univ., East Lansing.
EXCITED-STATE PHENOMENA ASSOCIATED WITH SOLVATION SITE HETEROGENEITY Ph.D. Thesis
Khader Ahmad Al-Hassan 1981 190 p
Avail: Univ. Microfilms Order No. 8126463

The role of microenvironmental heterogeneity in electronic spectra is examined by studying the effects of medium polarity, rigidity, temperature, concentration and excitation wavelength dependence of the spectra of pyridine merocyanine dye, 2-amino 7-nitrofluorene (ANF), 4,4'-amino nitro diphenyl (AND) and methyl- and tertbutyl-esters of 9-anthroic acid (9MA and 9TBA respectively). The absence of excitation wavelength dependence of the fluorescence at room temperature in fluid polar media is explained in terms of orientational and translational relaxations of various 'solute-solvent conformations' that occur prior to fluorescence. The fluctuations in the interaction of solutes with different solvation sites are dynamic in fluid media. Once the solution is made rigid (glass, polymer matrix, etc.) the dynamic character is lost.
Dissert. Abstr.

N82-17289 Illinois Univ. at Urbana-Champaign.
HIGH PRESSURE NUCLEAR MAGNETIC RESONANCE STUDIES OF VISCOUS FLUIDS Ph.D. Thesis
Edward Rolf Arndt 1981 164 p
Avail: Univ. Microfilms Order No. 8127545

The technique of pulsed NMR is applied to the detailed study of molecular motions in a number of viscous liquids (eta > or approximately 1 poise). Pressure studies are performed in order to examine explicitly the effect of volume on the motional characteristics. Where appropriate, C-13 and D-2 NMR are employed to obtain exclusively reorientational information, and to observe specific portions of the molecule. The validity range of the common hydrodynamic relationships at high viscosity are determined. A foundation for the systematic investigation of high viscosity fluid dynamics is provided. Cumene, since it is the simplest of high viscosity, nonassociative liquids is studied. A number of experiments show that cumene displays rather remarkable properties, which are explained using models that coincidently are applied to glass transition phenomena.
Dissert. Abstr.

N82-17290 Pennsylvania Univ., Philadelphia.
PICOSECOND STUDIES OF SOLVENT-SOLUTE INTERACTIONS Ph.D. Thesis
Leslie Ann DiVerdi 1981 158 p
Avail: Univ. Microfilms Order No. 8127015

Two types of solvent-solute interactions were studied with emphasis on measuring their dynamics. Using the solute ANF (2-amino, 7-nitrofluorene), the relaxation process caused by the interaction of the solute dipole and the solvent dielectric was investigated. Studies of the solute acridine were performed to demonstrate how hydrogen bond formation between solvent and solute can cause inversion of solute energy levels. A method for picosecond time resolution of fluorescence was developed.

Fluorescence decay times and radiative lifetimes were measured for acridine. For the hydrogen bonding solvents, the radiative lifetimes were constant while the florescence decay times varied with solvent hydrogen bonding strength and temperature. The radiative lifetimes of the non-hydrogen bonding solvents were seen to vary with solvent polarizability and polarity, while the decay times were temperature independent and varied little with solvent. Dissert. Abstr.

N82-17291 Columbia Univ., New York.
UNIMOLECULAR ISOMERIZATION DYNAMICS AND INSTABILITIES: RRKM THEORY Ph.D. Thesis
Nelson Hugo DeLeon 1981 194 p
Avail: Univ. Microfilms Order No. 8125271

A classical two degree of freedom Hamiltonian system capable of exhibiting an isomerization reaction was studied. An ensemble of trajectories, distributed microcanonically, are computed numerically. The application of a phenomenological rate equation to describe the reaction is considered. The prediction of the rate constant using statistical theories such as RRKM is described. The concepts of nonlinear dynamics are introduced in order to explain the observed results. Correlations between the critical energy and phenomenological behavior are introduced. Chirikov's overlapping resonance criterion for the theoretical prediction of the critical energy is investigated and interpreted into a phase space picture. The concept of the resonant torus in phase space is introduced. A reinterpretation of the overlapping resonance scheme is applied to the Ford-Walker Hamiltonian system. It is found to give an excellent prediction of the critical energy for small coupling constants. The reasons for failure of the scheme at large coupling constants are analyzed. Dissert. Abstr.

N82-17292 Virginia Polytechnic Inst. and State Univ., Blacksburg.
THE ELECTROCHEMICAL AND SPECTROPHOTOMETRIC DETERMINATION OF FREE AND COMBINED CHLORINE Ph.D. Thesis
Paul David Given 1981 125 p
Avail: Univ. Microfilms Order No. 8126258

The electrochemical reduction of hypochlorite and monochloramine at several electrodes was investigated by cyclic voltammetry, linear scan voltammetry, and differential pulse polarography. The electrochemical oxidation of N,N-diethyl-p-phenylenediamine (DPD) was investigated as a function of pH, scan rate, and electrode material. On the basis of the electrochemical studies, a modified amperometric titration for both free and combined chlorine was developed. Standard addition methods were shown to be possible. The indicator, bromothymol blue (BTB) was used to determine both free chlorine and monochloramine in mixtures by spectrophotometry. The method developed requires Bi as a catalyst for the determination of monochloramine in mixtures.
Dissert. Abstr.

N82-17293 Yale Univ., New Haven, Conn.
LASER SPECTROSCOPY OF MOLECULAR BEAMS Ph.D. Thesis
James Henry Glownia 1981 217 p
Avail: Univ. Microfilms Order No. 8125680

Multiphoton ionization spectroscopy and photofragment spectroscopy of molecular beams are used to elucidate excited molecular electronic state structure and dynamics. The apparatus and techniques developed to combine multiphoton ionization and supersonic-expansion beams is described. Also described are experimental methods involving mass spectroscopic and photoelectron energy analyses following the multiphoton ionization process. The multiphoton ionization spectrum of ammonia and sulfur dioxide are analyzed in detail. The three-photon static gas line strength theory for two laser polarizations is tested, and band contour simulation performed. Deviations from the theoretical predictions can be attributed to dynamic effects. Features due to transitions to eleven electronic states are assigned in the 5.7 to 9.3 eV energy range, where only five band systems were previously assigned. Spectra of sulfur dioxide are recorded using transient lensing detection in a cell and multiphoton ionization in both a cell and a nozzle beam. Ultraviolet and visible photodissociation of collision-free-tetrazine show asymmetric dynamics with production of one translationally cool and one translationally hot hydrogen cyanide molecule. Dissert. Abstr.

N82-17294 Minnesota Univ., Minneapolis.
VIBRATIONAL CIRCULAR DICHROISM STUDIES IN THE CARBON-HYDROGEN AND CARBON-DEUTERIUM STRETCHING REGIONS Ph.D. Thesis
Henry Acken Havel 1981 256 p
Avail: Univ. Microfilms Order No. 8125965

Vibrational circular dichroism (VCD) spectroscopy is implemented in experimental and theoretical investigations of vibrational optical activity in two series of compounds: optically active deuterated phenylethanes and sugars. Vibrational circular dichroism instrumentation and theoretical methods are discussed, in addition to structural and dynamical interpretations of the solution phase VCD spectra of these molecules. The phenylethanes, (+)-(S)-Ph-C(=)HD-X(X=CH3, CH2D, CD2H, CD3), are studied in their C-H and C-D stretching regions as first tests of a charge flow model for vibrational rotational strengths. A vibrational assignment in these two regions is accomplished by analyzing their infrared absorption, Raman scattering and VCD spectra; the latter is particularly useful in identifying Fermi resonant vibrational bands. Normal coordinate calculations are made by constructing an initial force field and adjusting it to fit the observed frequencies in the phenylethanes. Dissert. Abstr.

N82-17295 Yale Univ., New Haven, Conn.
ELECTRONIC ABSORPTION SPECTROSCOPY OF MOLECULAR CATIONS IN ARGON MATRICES Ph.D. Thesis
Anabela Cristina Puiu 1981 144 p
Avail: Univ. Microfilms Order No. 8125695

Absorption spectra of argon matrix isolated hexafluorobenzene, para-difluorobenzene, biphenyl, diphenyl acetylene and cis- and trans-stilbene positive ions are presented and interpreted. Negative results for benzene and monofluorobenzene cations are discussed, as well as some new spectral features that appear upon the vacuum uv irradiation of benzene-h6 and benzene-d6 trapped in solid argon. In the course of this work, several techniques of detecting weak optical absorptions were developed or adapted for the spectroscopic investigation of unstable species in inert gas matrices and data comparing them are presented. Different sample preparation methods are also described.
Dissert. Abstr.

N82-17296 Michigan State Univ., East Lansing.
THEORETICAL CALCULATIONS OF POWER-BROADENED MICROWAVE LINESHAPES Ph.D. Thesis
Keith L. Peterson 1981 223 p
Avail: Univ. Microfilms Order No. 8126542

The traditional method of analyzing high power microwave transitions is to assume the lineshape is a sum of Lorentzians--one for each m component pair connected by the microwave radiation. This assumption is tested by using extended Anderson Theory and infinite order energy sudden approximations to calculate relaxation cross sections. These cross sections appear in the power broadening term of an expression for high power line shapes which correctly takes into account the degeneracy of the rotational levels. The theoretical lineshape obtained with the relaxation coefficients is fit to a sum of Lorentzians using a computer program developed for fitting experimental lineshapes. The goodness of fit is a measure of the validity of the sum of Lorentzians approximation. The results for the J = 2 yields 1 transition in OCS and the (J,K) = (3,3) inversion transition of NH3 show that in both modified Anderson Theory and energy sudden approximations the value of T sub 1/T sub 2 obtained by fitting to a sum of Lorentzians is a good approximation to the calculated values of T sub 1/T sub 2. Dissert. Abstr.

N82-17297 Brandeis Univ., Waltham, Mass.
PHOTOPHYSICS AND PHOTOCHEMISTRY OF MOLECULAR GASES IRRADIATED BY MEGAWATT CO2 LASER RADIATION Ph.D. Thesis
Vladimir Starov 1981 218 p
Avail: Univ. Microfilms Order No. 8126897

Energy absorption measurements were carried out in ammonia and silicon tetrafluoride over a wide range of pressures, 0.4-250 Torr. Both gases were irradiated by a TEA CO2 laser at fluences 0.01-1 J/sq cm. Chemical reactions induced by the laser-excited sensitizers in mixtures SiF4 - cyclopropane (CP) and NH3 - cyclobutanone (CB) were characterized. A phenomenological kinetic model was developed for applications to

absorption and dissociation results obtained in the collisional regime. From the energy absorption data, it was found that the results can be fitted by an empirical law (generalized Beer's law) for all systems studied under similarity conditions. Using the proposed absorption law, variation in the slopes of the Grunwald-dever plots for the SiF4 CP system studied at 5-30 Torr is explained. Analysis of the high pressure sensitized systems also indicated that the data are consistent with a model where laser energy absorbed by the sensitizer is mostly thermalized.
Dissert. Abstr.

N82-17298 Defence Research Information Centre, Orpington (England).

THE APPLICATION OF ELECTROCHEMICAL DETECTION IN HIGH PERFORMANCE LIQUID CHROMATOGRAPH (HPLC): SELECTIVE DETERMINATION OF READILY OXIDISABLE COMPOUNDS AT TRACE LEVEL

J. Frank Oct. 1981 30 p refs Transl. into ENGLISH from Chimia (West Germany), v. 35, 1981 p 24-31
(DRIC-T-6461; BR80786) Copyright. Avail: Issuing Activity

The electrochemical conversion of a substance at an electrode produces a faradic current which is recorded in a chromatogram as current strength in function of time. Chromatograms are given for compounds suited for oxidative detection at solid state electrodes as antioxidants, aromatic amines, catecholamines, estrogens, indoles, mercaptions, phenols, phenothiazines and vitamins, showing which compounds can be successfully detected at nano and picogram levels. The principle and selectivity of the detection, cell types, electrodes and practical aspects are described.
Author (ESA)

N82-17299*# California Univ., Los Angeles.

ZERO-GRAVITY GROWTH OF A SODIUM CHLORIDE-LITHIUM FLUORIDE EUTECTIC MIXTURE Final Report

A. S. Yue, C. W. Yeh, and B. K. Yue [1982] 27 p refs
(Contract NAS8-30579)
(NASA-CR-161966) Avail: NTIS HC A03/MF A01 CSCL 07D

Continuous and discontinuous lithium fluoride fibers embedded in a sodium chloride matrix were produced in space and on Earth, respectively. The production of continuous fibers in a eutectic mixture was attributed to the absence of convective current in the liquid during solidification in space. Image transmission and optical transmittance measurements of transverse sections of the space-grown and Earth-grown ingots were made with a light microscope and a spectrometer. It was found that better optical properties were obtained from samples grown in space. This was attributed to a better alignment of lithium fluoride fibers along the growth direction. Author

N82-17300*# Squibb (E. R.) and Sons, Princeton, N.J.

DEVELOPMENT OF W-Ta GENERATOR Interim Report

Dec. 1981 14 p refs
(Contract NAS9-16225)
(NASA-CR-167477) Avail: NTIS HC A02/MF A01 CSCL 07D

This research program was used to further develop the existing W-Ta generator and to evaluate alternative adsorbents, preferably inorganic materials, as supports for the generator. During the first half year, combinations of non-complexing eluents and a variety of adsorbents, both inorganic and organic, were evaluated. Some of these adsorbents were synthetic, such as chelate resins that could be specific for tungsten. In the second half of the year, the stress was mainly on the use of complexing eluents because of the high affinity of hydrous oxides for tantalum, on the synthesis of chelate resins and on the use novel techniques (electrolytic) to solve the tantalum-adsorption problem. L.F.M.

N82-17301# Helsinki Univ. of Technology, Espoo (Finland). Dept. of Technical Physics.

COMPUTERIZED GAMMA SPECTRUM ANALYSIS WITH APPLICATION TO MULTICOMPONENT ACTIVATION DETECTORS Ph.D. Thesis

Markku Koskelo 1981 14 p refs
Avail: NTIS HC A02/MF A01

Computerized gamma spectrum analysis and multicomponent activation detectors are discussed. The optimization of the multicomponent activation detectors using methods from the gamma spectrum analysis program is studied. A method for the determination of goodness-of-fit in gamma spectroscopy is a study which checks that peak area fitting. It is more sensitive than the chi squared test. The SAMPO80 code was developed. The basic ideas and equations used in the program are presented. Statistical methods show that the peak search algorithm and the peak fitting of the code are both precise and accurate. The considerations needed in developing the multicomponent activation detector concept are presented with emphasis on the material selection criteria and the general process of actually designing a feasible detector for reactor neutron spectroscopy. S.L.

N82-17302# Aerospace Corp., Los Angeles, Calif. Chemistry and Physics Lab.

MULTIPHOTON GAS PHASE SPECTROSCOPY Final Report

John E. Wessel 8 Jun. 1981 67 p refs Prepared for Univ. of Southern Calif., Los Angeles
(Grant AF-AFOSR-3438-77; AF Proj. 2302)
(AD-A107671; AFOSR-81-0749TR) Avail: NTIS HC A04/MF A01 CSCL 07/4

Multiphoton laser spectroscopy was investigated as a potential method to improve optical detection for large molecular species. Studies were conducted to establish the photophysics and spectroscopy relevant to molecular detection by multiphoton processes. Detection procedures were optimized on the basis of information derived from the spectroscopic investigations. Detection limits of less than 10 to the 5th power molecules/cubic centimeters were established for naphthalene, a representative aromatic species. This is a one-thousandfold improvement with respect to the most sensitive prior techniques. The new method was applied to gas chromatography, for which spectrally selective detection was demonstrated. In addition a new method of ultrahigh resolution two-wavelength multiphoton photoionization spectroscopy was proposed, and a preliminary demonstration was made for the iodine molecule. Author (GRA)

N82-17303*# Howard Univ., Washington, D. C. Laser Chemistry Div.

ENERGY PARTITIONING IN THE DISSOCIATION OF CYANOGEN AT 193nm

William M. Jackson and Joshua B. Halpern 19 Nov. 1981 25 p refs Submitted for publication
(Grant NSG-5017; Contract N00014-80-C-0305; Grants NSF CHE-78-05375; E-40-1-5056; NR Proj. 051-733)
NASA-CR-164809; AD-A107773; TR-7-ONR Avail: NTIS HC A02/MF A01 CSCL 07/5

The quantum state distributions of CN radicals produced in the photodissociation of C2N2 at 193nm were measured. It was found that the rotational distribution is the same for radicals formed in the $v'' = 0$ and $v'' = 1$ level. This means, that the rotational motion is decoupled during the dissociation, from the vibrational and translational motion of the fragments. The partitioning of the 6795/cm of available energy between vibrational and translational motion in turn has been found to be consistent with a simple statistical model. The observed rotational distribution was reproduced by assuming that there is no contribution to the angular momentum of CN other than the original angular momentum of the parent.
Author (GRA)

N82-17304# Pennsylvania Univ., Philadelphia.

ANGLE-RESOLVED PHOTOEMISSION STUDY OF Co-Co (0001)

D. Heskett, F. Greuter, H.-J. Freund, and E. W. Plummer 4 Nov. 1981 8 p refs Submitted for publication
(Contract N00014-79-C-0991; NR Proj. SRO-013)
(AD-A107575; TR-8) Avail: NTIS HC A02/MF A01 CSCL 07/5

In this study the techniques of LEED and angle and energy resolved photoemission were used to investigate some of the properties of CO/Co(0001). The orientation of the CO molecules was determined using well established symmetry selection rules. The CO - CO direct interaction was measured by mapping out the E vs. k4 dispersion of the 4 sigma and combined 5 sigma/1 pi levels of CO in several directions in the Surface Brillouin Zone (SBZ) at two coverages of CO, corresponding to the saturated room and low (170 K) temperature phases. The dispersion can be related to the size and shape of the SBZ and correspondingly to the geometry of the CO overlayer in real shape. After preliminary LEED work, a photoemission study was performed at the Synchrotron Radiation Lab of the University of Wisconsin. Two distinct peaks were seen in the UPS spectra of CO/Co(0001) with p-polarization of the incident light, as is generally observed on other transition metals. The consensus is that the level with the higher binding energy (at approx. 11 eV) corresponds to the 4 sigma level of the isolated CO molecule, while the level at approx. 8 eV is a superposition of the molecular 5 sigma and I pi levels, with the 5 sigma level having undergone a bonding shift of approx. 3 eV with respect to the free molecule. Author (GRA)

N82-17305# Southwest Research Inst., San Antonio, Tex. Energy Systems Research Div.

MECHANISMS OF SMOKE REDUCTION IN THE HIGH PRESSURE COMBUSTION OF EMULSIFIED FUELS. VOLUME 1: CONSTRUCTION OF APPARATUS AND PRELIMINARY EXPERIMENTS Progress Report, 29 Sep. 1980 - 29 Sep. 1981

Lee G. Dodge and Clifford Moses Oct. 1981 36 p refs
(Contract N00014-80-K-0460)
(AD-A108018; SwRI-MED 130-Vol-1; PR-1) Avail: NTIS HC A03/MF A01 CSCL 21/2

Progress made to date in study of the atomization and evaporation characteristics of emulsified and alternative fuels in model gas turbine engines is reported. The development of spray drop-size diagnostics suitable for use in a combustion environment was studied. A disc-in-duct combustor with a pipe I.D. of 15.04 cm and a disc O.D. of 7.19 cm was constructed and operated. Optical access was available through 3 x 4 in. quartz windows. A delavan 5.0 gallon per hour 45 deg cone angle hollow-cone nozzle was completely characterized at atmospheric conditions on calibration fluid, Jet-A, a Jet-A/20% water macroemulsion, and a Jet-A/20% water microemulsion. Variations of drop size along the nozzle axis and radially outward were documented. Modifications to the drop-sizing laser diffraction equipment to permit combustor measurements are described. Preliminary data for a comparison of atomization of a neat fuel and a macroemulsion fuel are presented. Measurements in high temperature/pressure noncombusting air and measurements in an operating combustor are presented. Author

N82-17306# Wisconsin Univ. - Madison. Dept. of Chemistry.

EFFECTS OF TEMPERATURE ON EXCITED-STATE DESCRIPTION OF LUMINESCENT PHOTOELECTROCHEMICAL CELLS EMPLOYING TELLURIUM-DOPED CADMIUM SULFIDE ELECTRODES

Arthur B. Ellis and Bradley R. Karas 6 Oct. 1981 15 p refs
(Contract N00014-78-C-0633; NR Proj. 051-690)
(AD-A107840; TR-7) Avail: NTIS HC A02/MF A01 CSCL 07/4

The need for alternate energy sources has led to the rapid development of photoelectrochemical cells (PECs). A PEC consisting of an n-type semiconductor, a counterelectrode, and a suitably chosen electrolyte can convert optical energy directly into chemical fuels and/or electricity (1,2,3,4). We recently reported that tellurium-doped CdS (CdS:Te) mimics undoped CdS in its ability to sustain the conversion of monochromatic ultraband gap light (> or about = 2.4 eV; lambda < or about = 500 nm (5)) into electricity at about 7% efficiency in PECs employing aqueous polychalcogenide electrolytes (6,7,8,9). A novel feature of the CdS:Te photoanodes is that they emit lambda sub max about 600 nm for 100 ppm CdS:Te) with about 0.1% efficiency while effecting the oxidation of polychalcogenide species. GRA

N82-17307# California Univ., Los Angeles. Dept. of Chemistry.

TEMPORAL AND TEMPERATURE DEPENDENCE OF THE ENERGY TRANSFER PROCESS AMONG Eu-3(+) IN AN AMORPHOUS SOLID

Jack R. Morgan and Mostafa A. El-Sayed 20 Nov. 1981 22 p refs Submitted for publication
(Contract N00014-75-C-0602; NR Proj. 056-498)
(AD-A107951; TR-40) Avail: NTIS HC A02/MF A01 CSCL 20/5

The time dependence of the 5DO-7FO excitation energy transfer between Eu3+ ions in different sites within the inhomogeneous profile for 30 mole percent Eu3+ in Ca (PO3)2 glass is studied at different temperatures. Fluorescence laser narrowing techniques are used and the decay curve of the resonant (donor) fluorescence was analyzed. The temporal fit to the Inokuti-Hirayama equation shows that while dipole-dipole, dipole-quadrupole-quadrupole mechanisms may describe the transfer at short time, the dipole-dipole mechanism describes the transfer at short time, the dipole-dipole mechanism describes the transfer until approx. Ninety percent of the excitation has been transferred. Only after 95% of the excitation is transferred in the concentrated samples and at T greater than or equal to 298 K was a fit to diffusion type behavior observed. GRA

N82-17308# Cornell Univ., Ithaca, N. Y.

ASYMPTOTIC METHODS ESPECIALLY IN COMBUSTION Final Report, 15 Sep. 1977 - 14 Jun. 1981

G. S. S. Ludford Nov. 1981 8 p refs
(Contract DAAG29-79-C-0121; Grants DAAG29-77-G-0210; DAAG29-78-G-0134)
(AD-A108023; ARO-14933.9-M; ARO-15882.31-M) Avail: NTIS HC A02/MF A01 CSCL 21/2

Modern asymptotic methods have been applied to a wide range of problems in combustion science as well as a few in magnetohydrodynamic and fluid mechanical questions. Details are contained in the 39 Technical Reports, 6 Ph.D. Thesis, and 1 Master's Thesis listed. A list of participating scientists is given. Author (GRA)

N82-17309# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.

DECONVOLUTION OF CHROMATOGRAMS Final Report, 1981

Dorn W. Carlson and E. Gordon Powell 14 Sep. 1981 25 p refs Submitted for publication
(ZR0000101)
(AD-A107608; NSWC/TR-81-307) Avail: NTIS HC A02/MF A01 CSCL 07/4

A simple deconvolution algorithm based on a special case of the Scofield iterative technique was developed for use in deconvolving gas and liquid chromatograms. This algorithm required the use of only very limited computer equipment, such as a BASIC programmable integrator. This technique can in certain cases sharpen chromatographic peaks mathematically to the extent that nonresolved shoulders or doublets can be resolved and quantified. GRA

N82-17310# Wisconsin Univ. - Madison. Dept. of Chemistry.

LUMINESCENT PHOTOELECTROCHEMICAL CELLS. 6: SPATIAL ASPECTS OF THE PHOTOLUMINESCENCE AND OF CADMIUM SELENIDE ELECTRODES

Holger H. Streckert, Jiu-ru Tong, and Arthur B. Ellis 6 Oct. 1981 41 p refs Submitted for publication
(Contract N00014-78-C-0633; NR Proj. 051-690)
(AD-A107580; TR-8) Avail: NTIS HC A03/MF A01 CSCL 07/5

Interfacial charge-transfer processes at semiconductor electrodes is under active investigation, as befits the semiconductor's role as the key element of photoelectrochemical cells (PECs). The use of luminescence as a tool for examining charge-transfer events occurring at n-type CdS and CdS:Te (Te-doped CdS) electrodes was reported. Photoluminescence was studied while these electrodes served as photoanodes in PECs employing polychalcogenide electrolytes. Photoluminescence could be initiated by using the semiconductors as dark cathodes in alkaline, peroxydisulfate media. Photoluminescence (PL) and electroluminescence (EL) represent two methods for populating the excited-state manifold of CdSe. PL studies were conducted in air and in a PEC. These experiments aid in the assignment of the emissive transition and detail its spectral distribution, efficiency, and perturbation by the passage of current in a PEC. The analogous EL charactristics of spectral distribution, efficiency and potential dependence, implications of comparisons of PL and EL properties are discussed. The effects of various surface treatments on the PL properties of CdSe are also discussed. GRA

N82-17311# Wisconsin Univ. - Madison. Dept. of Chemistry.

LUMINESCENT PHOTOELECTROCHEMICAL CELLS. 7: PHOTOLUMINESCENT AND ELECTROLUMINESCENT

PROPERTIES OF CADMIUM SULFO-SELENIDE ELECTRODES

Holger H. Streckert, Jiu-ru Tong, Michael K. Carpenter, and Arthur B. Ellis 6 Oct. 1981 39 p refs Submitted for publication
(Contract N00014-78-C-0633; NR Proj. 051-690)
(AD-A107581; TR-9) Avail: NTIS HC A03/MF A01 CSCL 07/5

Photoelectrochemical cells (PECs) are being widely studied as devices for optical energy conversion. The excited-state properties of the semiconductors around which PECs are constructed are crucial to efficient energy conversion. We have employed luminescence as a probe of these excited-state-properties, generally using materials such as n-type CdS:Te(Te-doped CdS) which exhibit subband gap emission. Recently we examined emission of band gap energy from n-type CdS and CdSe, two materials which have been used extensively in PEC studies. Since these two compounds form solid solutions over the entire composition range, the mixed compounds represent a natural extension of our emissive studies. We report herein that luminescence from samples of n-type, single-crystal CdSXSe1-X can be used to probe interfacial charge-transfer events relevant to PECs. Specifically, we demonstrate that photoluminescence (PL) can be perturbed and electroluminescence (EL) initiated by interfacial charge-transfer processes. GRA

N82-17312# Duquesne Univ., Pittsburgh, Pa. Dept. of Chemistry.

HYDROGEN BONDING IN ASPHALTENES AND COAL LIQUIDS Quarterly Report, 1 Aug. - 31 Oct. 1981

N. C. Li 1981 30 p refs
(Contract DE-AC22-80PC-30252)
(DE82-001131; DOE/PC-30252/T5) Avail: NTIS HC A03/MF A01

The middle distillate from Illinois No. 6 solvent-refined coal (SRC II) was studied and found relatively stable to aging by direct oxygenation at 335 K. Metallic copper accelerates oxygen aging as evidenced by an increase in viscosity and formation of pentane-insoluble components. Infrared spectra after aging showed a significant reduction in the intensity of the free hydroxyl band. FTIR spectra showed that oxygen-containing compounds of the coal liquid were concentrated in the pentane-insoluble fraction, and that the oxygen bubbled into the coal liquid was incorporated into the structure of this fraction. Gel permeation chromatograms also showed the formation of large molecular size aggregates during aging. 600 MHz NMR spectra of the aged pentane-soluble fraction were similar to those of the unaged acid-free fraction. GC-MS analysis of the aged pentane-soluble fraction showed that the phenol, cresol, xylenol and indanol peaks are much smaller in intensity, compared to the original middle distillate. DOE

N82-17313# Physical Sciences, Inc., Woburn, Mass.

EFFECTS OF PREIGNITION ON PULVERIZED-COAL COMBUSTION Quarterly Report, 1 Jul. - 30 Sep. 1981

G. A. Simons and G. Kothandaraman Nov. 1981 39 p refs
(Contract DE-AC22-80PC-30293)
(DE82-002565; DOE/PC-30293/4; PSI-TR-290) Avail: NTIS HC A03/MF A01

Pore structure optimization study results predict that high reactivity chars require high porosities and a higher concentration of large pores. The dependence of these quantities on heating rate and final temperature was noted. Data for Texas Lignite suggest that heating rate does not affect pore structure to the extent that the pore structure will significantly affect reactivity but a tendency for higher heating rates to increase the relative number of large pores was observed. Increased final temperatures do tend to increase char porosities. Pyrolysis experiments at heating rates of 1 to 150 K/s and final temperatures of 800 to 13000 K were performed on PSOC 140 coal. Resulting chars were analyzed. It was found that the porosity increased from 0.15 for the coal to 0.40 for the 13000 K char. Mercury intrusion data suggest that a significant portion of this increased porosity lies in the micropores. This finding, however, is preliminary. The porosity, distribution of porosity with pore size, and the total mass loss are only weakly dependent on heating rate. Refinements in the theory of pore evolution, particularly in the generation of small pores, are depicted by the data generated. DOE

N82-17314# Amoco Oil Co., Naperville, Ill. Research and Development Dept.

COAL-LIQUEFACTION CATALYST DEVELOPMENT Quarterly Progress Report, 1 Oct. - 30 Dec. 1980

J. A. Mahoney and J. J. Helstrom Mar. 1981 54 p
(Contract DE-AC22-79ET-14803)
(DE82-000137; DOE/ET-14803/T6; QPR-5) Avail: NTIS HC A04/MF A01

The materials initially deposited onto the catalyst were determined. A large amount of coke with an H/C ratio of 1.13 was deposited. The deposition of trace metals was also quite severe, and high levels of iron and titanium were found. At the same time there was a substantial corresponding reduction in surface area and pore volume. The sulfur is already at the usual level found in used catalysts, reflecting the condition that the major portion of the sulfur is probably combined with the sulfided cobalt and molybdenum; it would appear that only a minor part of the sulfur is combined with the coke. These results might indicate that, although a considerable amount of coke has been deposited, it is quite permeable in the early part of the experiment and becomes less permeable with time. DOE

N82-17315# Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.

CHEMISTRY AND CATALYSIS OF COAL LIQUEFACTION: CATALYTIC AND THERMAL UPGRADING OF COAL LIQUID AND HYDROGENATION OF CO TO PRODUCE FUELS Quarterly Progress Report, Apr. - Jun. 1981

Wendell H. Wiser Aug. 1981 56 p refs
(Contract DE-AC22-79ET-14700)
(DE82-000762; DOE/ET-14700/7) Avail: NTIS HC A04/MF A01

A technique was developed to measure active sites on a sulfided CoMo/Al2O3 catalyst by gravimetric measurements of O2 chemisorbed at -780 C in a dilute air/He stream. It was found that neither polarity nor concentration affected effective diffusivity of solutes in a porous catalyst support, which confirmed earlier results that surface diffusion is not operative in these systems, and that the dominant factor which determines diffusivity appears to be a drag coefficient. Reports of the following task groups with summaries are presented: chemical-catalytic studies; carbon-13 NMR investigation of CDL and coal; catalysis and mechanism of coal liquefaction; fundamental chemistry and mechanism of pyrolysis of bituminous coal; catalytic hydrogenation of CD liquids and related polycyclic aromatic hydrocarbons; denitrogenation and deoxygenation of CD liquids and related N- and O-compounds; and catalytic cracking of hydrogenated CD liquids. DOE

N82-17316# Strasbourg Univ. (France). Centre de Recherches Nucleaires.

INDUCED LUMINESCENCE BY CHARGED PARTICLES ON GASEOUS, LIQUID AND SOLID ARGON Ph.D. Thesis

M. J. CarvalhoTorres 1980 286 p refs In FRENCH
(CRN-CPR-80-10) Avail: NTIS (US Sales Only) HC A13/MF A01; DOE Depository Libraries

A spectral and a kinetic study of the scintillation induced by (ALPHA) and (-) particles in gaseous, liquid and solid argon have been made in the wavelength region comprised between 1100 and 3000A. The radiative lifetimes and some spectroscopic parameters of the lowest dimer states have been determined: By applying an electric field the contribution of the electron-ion recombination mechanism to the gaseous argon scintillation is studied. For condensed argon, the dependence of the ratio between the fluorescence and the phosphorescence intensities on the ionization power of the impinging particle is verified. The continuum which extends from 1600 to 2900A and that is present only in the gas phase spectra, is ascribed to the radiative de-excitation of molecular ions. A time resolved study of the luminescence of high pressure (1-15atm) argon excited by a pulsed electric discharge has also been performed and is compared with that of the scintillation induced by nuclear particles. DOE

N82-17317# Argonne National Lab., Ill. Chemical Engineering Div.

SAMPLING AND ANALYSIS OF HYDROCARBONS IN COMBUSTION GASES Quarterly Report, Jan. - Mar. 1981

I. Johnson, D. C. Fee, and K. M. Myles Aug. 1981 24 p refs

(Contract W-31-109-eng-38)
(DE82-002511; ANL-CEN-FE-81-7) Avail: NTIS
HC A02/MF A01

Real-time on-line methods for the chemical analysis of ultratrace levels of polycyclic organic compounds in the flue gases from fluidized-bed coal combustors were evaluated. The technique that currently shows the most promise for on-line monitoring is atmospheric-pressure-ionization triple quadrupole mass spectrometry. DOE

N82-17318# Aerospace Corp., Los Angeles, Calif. Energy and Resources Div.
DEVELOP SOLAR FUELS AND CHEMICALS TECHNOLOGY AND PERFORM SUPPORTING SYSTEMS ANALYSIS Final Report
30 Apr. 1981 36 p ref
(Contracts DE-AI01-79ET-21036; F-04701-80-C-0081)
(DE81-023960; ATR-81(6822)-1ND) Avail: NTIS
HC A03/MF A01

Theoretical chemical thermodynamics studies related to carbon cycles for the production of fuel and chemicals are described. Experimental validation of potential rate-limited reactions are directed at verifying the reduction of CO2 or CO to carbon with metallic cadmium. The apparatus, procedures and results are presented for reduction of carbon dioxide by various carbonaceous materials. DOE

N82-17319# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATIONS OF ELEMENTARY REACTIONS OF THE NHZ RADICAL WITH A CHEMICAL RADICAL SOURCE Ph.D. Thesis - Georg-Auguste Univ. [UNTERSUCHUNGEN VON ELEMENTARREAKTIONEN DES NH2-RADIKALS MIT EINER CHEMISCHEN RADIKALQUELLE]
Michael R. Schroeter Feb. 1981 107 p refs In GERMAN
(MPIS-2/1981; ISSN-0436-1199) Avail: NTIS
HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19, 05

An isothermal flow system reaction of NH2 radicals with harmful materials and fuels over a wide temperature and pressure range was investigated. The reactions with nitrous oxides enable the coversion of these compounds into stable harmless products like molecular nitrogen. The importants of data on the conversion reaction rate of NH2 radicals with hydrocarbons is emphasized. Transl. by E.A.K.

N82-17320# California Analytical Lab., Sacramento.
DETERMINATION OF VOLATILE ORGANICS IN INDUSTRIAL AND MUNICIPAL WASTEWATERS Final Report
Jerry L. Wilson Aug. 1981 81 p refs Prepared in cooperation with Carborundum Co.
(Contract EPA-68-03-2635)
(PB82-119090; EPA-600/4-81-071) Avail: NTIS
HC A05/MF A01 CSCL 07D

The systematic evaluation of a series of parameters leading to the development of a test procedure for 36 volatile priority pollutants in wastewaters is described. A study of the effect of pH, temperature, and residual chlorine on the aqueous stability of the compounds leads to recommended preservation techniques. Solvent extraction and purge and trap techniques are examined, with special emphasis on trap material, GC packings and detectors. The resulting test procedures were applied to selected wastewaters to develop accuracy and precision data. GRA

N82-17321# Atlanta Univ., Ga.
DEVELOPMENT OF METHODS FOR THE STABILIZATION OF PYROLYTIC OILS Final Report
Malcolm B. Polk and M. Phingbodhippakkiya Sep. 1981 86 p refs
(Grant EPA-R-804440)
(PB82-108150; EPA-600/2-81-201) Avail: NTIS
HC A05/MF A01 CSCL 07D

Capillary gas chromatographic, liquid chromatographic and coupled gas/mass spectrometric analysis procedures were developed to analyze pyrolytic oils produced from cellulosic waste residues. Some of the major components identified were: ethanol, 1-butanol; acetaldehyde; furfuryl alcohol; 5-methylfurfural; and 4-hydroxy-3-methoxystyrene. The pyrolytic oils contained a number of valuable chemicals. Further investigations on the isolation of these valuable chemicals from pyrolytic oils are recommended. GRA

N82-17322# Cambridge Univ. (England). Dept. of Engineering.
INFLUENCE OF STRAIN ON FLAME PROPAGATION IN LAMINAR FLOW
H. Daneshyar and J. M. C. Mendes-Lopes 1981 19 p refs
(PB82-114588; CUED/A-THERMO/TR-14-1981;
ISSN-0309-6513) Avail: NTIS HC A02/MF A01 CSCL 21B

The influence of velocity gradients, in a laminar approach flow, on the local burning velocity was investigated, to supplement and verify recent theoretical work. Different velocity profiles were obtained at the exit from a circular burner, using pipes of different lengths between the exit and a settling chamber, and these profiles were measured using hot wire anemometry. The burning velocity and the velocity component parallel to the flame front were obtained by means of the 'angle method' using direct photographs of the flame. The results, presented as burning velocity versus velocity gradient along the flame front, show that the local laminar burning velocity decreases as the rate of 'stretching' of the flame is increased. GRA

N82-17323# Battelle Columbus Labs., Ohio.
MODELING OF SO2 OXIDATION IN SMOG Final Report
David F. Miller Jun. 1981 150 p refs
(Grant EPA-R-805335)
(PB82-101932; EPA-600/3-81-040) Avail: NTIS
HC A07/MF A01 CSCL 07D

Smog chamber experiments were conducted to investigate the: (1) kinetics of free radical reactions of SO2 in smog and (2) SO2 transformation to sulfate for atmospheric simulations. Rate constants were derived for the following reactions: SO2+HO+M yields sulfate (60), SO2 + HO2 yields sulfate (61), SO2 + CH3O2 yields sulfate (64); k(60) = 1600 k(61 less than 0.2, k(64) less than 0.8 ppm min. Oxidation of SO2 by HO led exclusively to particulate sulfate. Even under favorable NOx conditions, particulate nitrate was not a product. Hydrocarbon mixtures typical of urban environments promoted SO2 oxidation faster than hydrocarbons selected to represent rural conditions. Maximum rates of SO2 oxidation occurred during periods of peak NO2 formation. SO2 oxidation rates for aged smog were 25-35% of the maximum values. Model calculations indicated that reaction 60 dominates sulfate production from SO2 in polluted air. Models that adequately estimate (HO) in smog should suffice to approximate the conversion rates. The model used in this study indicated that SO2 oxidation depends strongly on solar radiation intensity and pollutant conditions. GRA

N82-17324# Texas A&M Univ., College Station.
SEPARATION OF GAS MIXTURES BY SELECTIVE EXTRACTION Final Report, 25 Feb. 1980 - 24 May 1981
D. A. Nelson May 1981 87 p refs Prepared for Battelle Pacific Northwest Lab.
(Contract GRI-5014-361-0282)
(PB82-103839; GRI-80/0071) Avail: NTIS
HC A05/MF A01 CSCL 07D

The chemical separation of oxygen from air by the use of coordination complexes were identified and demonstrated. The formation and equilibrium constants of six Co(II) complexes, prepared from benzylated ligands, were determined. Benzylated bis(salicylidene)dipropylenetriamine (benzyl saldpt) provided the most encouraging results. Thus, saldpt was attached through its 5-imino position to polystyrene. This material was complexed with Co(II) to give polymer-attached Co(saldpt). The polymer-attached complex reversibly sorbed oxygen at -70 and 23C. An induction period of about 65 minutes was observed during oxygen sorption at 23 C. The maximum oxygen uptake during sorption-desorption cycling was 46% of theoretical assuming superoxide formation. Kinetic measurements were performed in dioxane solution with Co(saldpt) attached to uncross-linked polystyrene. A preliminary economic assessment suggested that capital and energy costs for a commercial oxygen separation process based on polymer-attached Co(saldpt) would be competitive with the cryogenic distillation and pressure-swing processes. GRA

N82-17325# National Bureau of Standards, Washington, D.C. Thermophysical Properties Div.
AN EQUATION OF STATE FOR FLUID ETHYLENE
R. D. McCarty and R. T. Jacobsen Jul. 1981 164 p refs
(PB82-107673; NBS-TN-1045) Avail: NTIS
HC A08/MF A01 CSCL 07D

A thermodynamic property formulation for ethylene, is presented. The formulation includes an equation of state, vapor pressure equation, and equation for the ideal gas heat capacity. The coefficients were determined by a least squares fit of selected experimental data. Comparisons of property values calculated using the equation of state with measured values are given. The equation of state is not valid in the critical region rho(c) + or - 0.3 rho(c) for temperatures of T(c) + or - 0.05 T(c). Errors on the order of 20 percent for derived properties and 10 percent for density are encountered near the critical point. Tables of the thermodynamic properties of ethylene for the liquid and vapor phases for temperatures from the freezing line to 450 K with pressure to 40 MPa are presented.
GRA

N82-17326 Arizona Univ., Tucson.
INVESTIGATION OF SPECTROSCOPIC PROPERTIES OF FLAMES AND PLASMAS VIA COMPUTER CONTROLLED INSTRUMENTATION Ph.D. Thesis
John Donald Algeo 1981 248 p
Avail: Univ. Microfilms Order No. 8125750

Data showing the sensitivities observed with a Babington type nebulizer and a flame emission spectrophotometer at varying flow rates of both the nebulizing gas and the sample solution are presented, along with an evaluation of several nebulizer configurations and tip styles. This nebulizer was used to develop a method for the analysis of wear metals in oil which does not require sample pretreatment. The effect of polymeric viscosity index improving additives commonly added to motor oils on the sensitivity of the method was explored. A new method is described for numerically evaluating the inverted Abel integral equation, used to extract information about interior regions of flames and plasmas from spatially resolved data obtained from side-on measurements. The method is based upon cubic spline approximations. Results give a basis for selecting the best method for transforming experimental data of varying quality, and also for estimating the reliability of the results of the computation.
Dissert. Abstr.

N82-17327 Arizona Univ., Tucson.
MECHANISTIC STUDIES ON THE EXTRACTION OF COPPER(11) BY HYDROPHOBIC REAGENTS Ph.D. Thesis
Stephen Paul Carter 1981 89 p
Avail: Univ. Microfilms Order No. 8126171

A high speed stirring apparatus for following the kinetics of very rapid solvent extractions was used to determine the rate law for the extraction of copper by 2-hydroxyl-5-nonyl benzophenone oxime (I) and 5-dodecyl-2-hydroxyl benzophenone oxime (II). The rate law for the extraction of copper by I catalyzed by 5,8-diethyl-7-hydroxy-6-dodecanone oxime (III) was also determined. Equilibrium data are used to characterize the stoichiometry of the extracted complexes. Distribution constants between chloroform and water were determined for each ligand. The rate equations for the extraction of copper by I and II, and for the extraction of copper by I catalyzed by III, are all first order in metal ion, second order in ligand, and inverse first order in hydrogen ion. The catalytic rate law is first order in each ligand. In the case of the reactions which are second order in ligand, the rate determining step is proposed to be the aqueous phase reaction of a 1:1 intermediate complex with the second ligand molecule. Second order reaction rate constants for I and II are calculated. In the case of the catalytic mechanism, the rate law cannot be used to discern which ligand reacts in the rate determining step. The homogeneous phase mechanism is found to be the better mechanistic interpretation of these reaction systems.
Dissert. Abstr.

N82-17328 Carnegie-Mellon Univ., Pittsburgh, Pa.
A RADIO-FREQUENCY MOVING-BOUNDARY DETECTOR AND ITS APPLICATION Ph.D. Thesis
Kuo-Shin Lee 1981 130 p
Avail: Univ. Microfilms Order No. 8127353

A radio frequency moving boundary detector for the measurement of transference numbers. The velocity of the boundary is determined by its passage past wire electrodes fixed to the external surface of the moving boundary tube. Cation transference numbers for magnesium chloride in water at 25 C, sodium and potassium dodecylsulfate in water at 25 and 40 C, respectively, and potassium and tetraethylammonium perchlorate in propylene carbonate at 25 C were measured and extrapolated to infinite dilution. The limiting cation constituent transference number was combined with the known limiting conductance for the chloride ion to give equivalent conductances. Transference numbers for aqueous sodium dodecylsulfate at 25 C were measured between 0.003 and 0.025 M, beyond which concentration the boundary movement became so slow that precise measurements were not possible. No evidence for premicellar association into dimers was produced. The effect of adding 1-heptanol to sodium dodecylsulfate were studied by both conductance and transference number experiments. In propylene carbonate, transference numbers of two strong electrolytes with a common anion were measured, and used to construct a table of the best estimated limiting ionic conductances for the calculation of partial molal ionic volumes from density and ultrasonic vibration measurements.
Dissert. Abstr.

N82-17838# Joint Publications Research Service, Arlington, Va.
ASSAY OF DISSOLVED CARBON IN RECLAIMED WATER PRODUCED IN SPACECRAFT WATER SUPPLY SYSTEMS
Yu. S. Koloskova, Z. P. Pak, and S. V. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 126-129 refs
Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 87-89 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-17329 Illinois Univ. at Urbana-Champaign.
CHARACTERIZATION OF THE ELECTRONIC AND MOLECULAR STRUCTURES OF TRANSITION METAL SEMIQUINONE AND CATECHOLATE COMPLEXES Ph.D. Thesis
Michael William Lynch 1981 252 p
Avail: Univ. Microfilms Order No. 8127633

Several metal/quinone complexes were synthesized utilizing manganese, iron, cobalt, and nickel and the following two ligands: 9,10-phenanthrene quinone, (PhenQ, PhenSQ, and PhenCAT), and 3,5-di-tert-butyl-1,2-benzoquinone, (DBQ, DBSQ, and DBCAT). These complexes were studied by a variety of physical techniques. It was concluded that the semiquinone is a paramagnetic radical which can be stabilized by coordination to a metal. The electron distribution within these complexes is very sensitive to the specifies of the metal, quinone, and other ligands, to temperature, and to solvent media. An X-ray crystal structure was solved for one of the nickel complexes. The X-ray crystal structures of two manganese complexes are presented. Several other ion complexes were studied.
Dissert. Abstr.

N82-17330 Ohio State Univ., Columbus.
PLANAR, SQUARE-PYRAMIDAL AND MACROCYCLIC TRANSITION METAL COMPLEXES PREPARED FROM LINEAR TETRADENTATE DIAMINEDIPHOSPHINE LIGANDS Ph.D. Thesis
Lawrence George Scanlon, Jr. 1981 205 p
Avail: Univ. Microfilms Order No. 8121851

Planar Ni(II), Co(II), and PD(II) complexes were prepared with trimethylene-bis [2-aminoethyl)phenylphosphine] (2,3,2-N2P2) and trimethylene-bis [(3-aminopropyl)phenylphosphine] (3,3,3-N2P2). Square-pyramidal cobalt(II) and nickel(II) complexes also were prepared with 3,3,3-N2P2. Macrocyclic complexes were synthesized by cid-catalyzed rearrangement of sexadentate phosphinamino Schiff-base Ni(II) complexes prepared from one equivalent of Ni(OAc)2 x 1 4H2O and bis(acetylacetone) trimethylene-bis [2-aminoethyl)phenylphosphine]. The metal complexes were characterized by elemental analyses, by magnetic and conductivity data, and by electronic, infrared, and nmr spectra. The crystal structures of [NiCl(3,3,3-N2P2)] PF6, [CoCl (3,3,3-N2P2]] BF4 x 0.8H2O, and [Ni(Me2 16] diene N2P2)] (PF6) 2 x 0.5H2O were also obtained. Dissert. Abstr.

N82-17331 North Carolina Univ. at Chapel Hill.
SUBSTITUTION AND EXCITED STATE ELECTRON TRANSFER REACTIONS OF TRANSITION METAL COMPLEXES IN ORGANIZED MEDIA Ph.D. Thesis
Russell Hunter Schmehl 1981 246 p
Avail: Univ. Microfilms Order No. 8125617

The organization and reactivity of molecules incorporated into organized environments including monolayer films and assemblies and micelles is investigated. Two specific topics are addressed. The orientation and reactivity of free base porphyrins in monolayer films is discussed. The effect of aqueous micelles on excited state electron transfer reactions of transition metal complexes is also discussed. Monolayer films and assemblies were examined as probes of biological membranes and as model organized molecular systems for the study of energy and electron transfer. The photosynthetic chromophore, chlorophyll a, was examined in monolayer films and assemblies. Aqueous solutions of ionic surfactants forming micelles were proposed as possible microheterogeneous environments for the separation of the products of light induced electron transfer reactions. The quenching of a ruthenium bipyridyl complex, incorporated into the micelle, by both methyl and benzyl viologen adsorbed to the micelle is analyzed. Dissert. Abstr.

N82-17332 State Univ. of New York at Stony Brook.
THE STRUCTURAL CONSEQUENCES OF TRANSITION METAL BASICITY: INVESTIGATION OF VARIOUS GOLD COMPLEXES Ph.D. Thesis
Frederick E. Simon 1981 181 p
Avail: Univ. Microfilms Order No. 8126237

Bimetallic compounds with polar metal-metal bonds often have unusual molecular structures with acute angles between the acceptor metal and the adjacent ligands of the donor metal. In the past these unusual geometries were either ignored or explained in terms of semibridging ligands. The molecular structures of a series of compounds which contain metal-metal bonds between gold atoms and various first-row transition metal atoms were prepared. The metal-metal bonds in these compounds are among the most polar of known bonds and the resulting acute angle structures are due to the hybridization requirements of the transition metals which are acting as Lewis bases in these compounds. The results of experimental and theoretical studies have shown that the electrons of the polar bond are located primarily in d orbitals of the donor atom and thus have little stereochemical activity. These ideas can easily be extended to other known examples of bimetallic compounds with polar metal-metal bonds between atoms of the same or similar elements. Dissert. Abstr.

N82-17333 North Carolina Univ. at Chapel Hill.
THE CLUSTER APPROACH TO THE MAGNETIC SUSCEPTIBILITIES OF LOW-DIMENSIONAL COPPER CLUSTERS Ph.D. Thesis
Robert Reynolds Weller 1981 249 p
Avail: Univ. Microfilms Order No. 8125631

Theoretical calculations on the magnetic susceptibilities of 0, 1, and 2-dimensional copper complexes were made. A new computational method which eliminates failures was developed. Algorithms based on numerical methods are used in computer programs CAMS and CAMSFIT which are capable of handling ten spin centers and any isotropic Heisenberg spin exchange Hamiltonian. The magnetic susceptibilities of copper cluster compounds and infinite chains and sheets were examined. Finite clusters (Cu-pen) were examined using Hamiltonians and infinite systems were approximated. Infinite chains examined were the alternating Heisenberg linear chain (Cu-OTS, Cu-HTS, (N-MeIz) 2CuCl2, and (4-pic)2CuCl2) and the linear chain with nearest neighbor and next-nearest neighbor interactions ((HzH)CuCl3 and [Me3en]CuBr2). A closed form rational expression was developed. A two dimensional sheet polymer ((NH3)2CuCO3) was examined using arrays of spins which contain the spin interactions present in the sheet. Dissert. Abstr.

N82-17334 Princeton Univ., N. J.
INVESTIGATION OF OXIDE BOUND TRANSITION METAL COMPLEXES Ph.D. Thesis
Michael David Ward 1981 314 p
Avail: Univ. Microfilms Order No. 8127756

The preparation, characterization and reactivity of metal-oxide (silica, titania) bound transition metal (M = Zr,Rh) complexes (prepared by interaction of a homoleptic transition metal alkyl and oxide hydroxyl groups) were investigated. In particular, hydride complexes were studied and were discovered to exhibit catalytic activity towards a number of transformations. The behavior of these systems suggested the presence of high valent electrophilic metal centers, which may have been more favorable compared to lower valent species due to the strong metal-oxygen (oxide) bond of the former. The support was best described as a sterically large 'ligand' in these complexes, which possessed basic oxygen sites capable of stabilizing protron released from heterolytic H2 activation processes effected by these species. Since the identity of these complexes was preserved by the [M-O] bond, they could be considered as well defined species and the reactivity described along lines similar to those used for soluble systems. Dissert. Abstr.

N82-17335*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
REVIEW OF NASA PROGRESS IN THERMAL BARRIER COATINGS FOR STATIONARY GAS TURBINES
Philip E. Hodge, Robert A. Miller, Michael A. Gedwill, and Isidor Zaplatynsky 1981 16 p refs Presented at the Intern. Gas Turbine Conf., Houston, Tex., 9-12 Mar. 1981
(Contract EF-77-A-01-2593)
(NASA-TM-81716; DOE/NASA/2593-25; E-749) Avail: NTIS HC A02/MF A01 CSCL 11F

Ceramic thermal barrier coatings for industrial/utility gas turbines were investigated. In burner rig tests of a zirconia yttria/nickel chromium aluminum yttrium ZrO2-12w/0Y2O3/NiCrAlY coating system on air cooled superalloy specimens, ceramic coating life (spallation) was sensitive to Na and V concentration in the fuel. The locations of coating spallation correspond to areas where combustion products were predicted to condense. Three new thermal barrier coating systems were identified. These are based on calcium silicate, ZrO2-8w/0Y2O3, and a MgO-NiCrAlY cermet. The spall resistance can be increased by reducing the ceramic layer thickness from 0.038 to 0.013 cm and by the use of more oxidation/corrosion resistant bond coats. S.L.

N82-17336# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
DEVELOPMENT STATUS OF THE 'ADHESION OF METALS' EXPERIMENT AND OF THE UHV CHAMBER FACILITY
N. Adorni, A. Ceserani, G. Cortellazzi (Control Systems, Cremona, Italy), G. Ghersini, G. Grugni, A. Oriani, T. Rossini, F. Rossitto (Politecnico di Milan), P. G. Sona, A. Squilloni et al 1981 13 p ref Presented at 21st Intern. Sci. Meeting on Space, Rome, 25-26 Mar. 1981
(CISE-1700) Avail: NTIS HC A02/MF A01

The goal of the experiment 'Adhesion of Metals' is the characterization of surface forces and interface energies at the contact between real Metal surfaces, and the impulse probing of transient phenomena associated to the adhesion mechanism. In the experiment, a small metallic sphere impacts against a metal target, and restitution coefficients, contact times and time behavior of contact forces are measured as a function of incoming sphere velocity. Computer simulation indicates that, in microgravity environment and under ultrahigh vacuum, such data can give useful information on the characteristics of the surface forces and interface energies involved in the adhesion mechanisms between colliding bodies. The development status is reported of the physical model developed to design the experiment and to interpret its results, and of the facility 'UHV Chamber', expecially designed and constructed to perform the experiment on board the first Spacelab mission. J.M.S.

N82-17337# Arizona State Univ., Tempe. Center for Solid State Science.
SULFUR IN THE CORROSION OF SUPERALLOYS Final Report, 10 Dec. 1977 - 15 Jul. 1981

J. Bruce Wagner, Jr. 6 Nov. 1981 39 p refs
(Contract DAAG29-70-C-0049; Grants DAAG29-78-G-0032; DAAG29-78-G-0060)
(AD-A107867; - ARO-14925.2-MS) Avail: NTIS HC A03/MF A01 CSCL 11/6

Three interrelated sections of a study are reported. These were: (1) corrosion of nickel in SO2-O2-Ar gas mixtures at 800 C; (2) defect structure of calcia and of yttria-stabilized zirconia; and (3) diffusion of radio-tracer sulfur-35 and of tellurium 127m in calcia-stabilized zirconia. The corrosion study resulted in a confirmation of linear kinetics for corrosion of nickel in SO2-Argon gas mixtures at 800 C and an agreement of a self-consistent mechanism involving the migration of SO2 as a gas molecule through the outer NiO layer and dissociation at the inner sulfide layer as a rate determining step. The corrosion kinetics in 20 percent O2-variable SO2-balance argon and in 30 percent SO2 variable O2-balance argon were extremely rapid. These data did not show that interconnected stringers of sulfide through the outer NiO layer was responsible for the observed kinetics.
GRA

N82-17338# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
SUPERPLASTIC ALUMINUM EVALUATION Final Report, 16 Apr. 1979 - 31 Dec. 1980
M. W. Mahoney and C. W. Hamilton Wright-Patterson AFB, Ohio AFWAL Jun. 1981 203 p refs Sponsored in part by Delaware Univ.
(Contract F33615-79-C-3218; AF Proj. 2401)
(AD-A107760; SC5214.34FR; AFWAL-TR-81-3051) Avail: NTIS HC A10/MF A01 CSCL 11/6

With the development of a process to produce fine grain aluminum alloys, it is now possible to superplastically form (SPF) structural aircraft components. This document presents results from several important areas which are considered to be critical to providing a realistic assessment of the technical and economic potential for superplastic forming structures using a high strength 7475 aluminum alloy. Areas of study included (1) the evaluation of structural applications; (2) the determination of superplastic forming limits; (3) a microstructural study of cavities formed during superplastic deformation; (4) the application of hydrostatic gas pressures to suppress cavitation, and (5) the effect of superplastic deformation on subsequent service properties.
Author (GRA)

N82-17339# Notre Dame Univ., Ind. Dept. of Metallurgical Engineering and Materials Science.
MICROSTRUCTURAL EFFECTS IN ABRASIVE WEAR Quarterly Progress Report, Dec. 1980 - 1 Jun. 1981
T. H. Kosel, M. C. Rao, H. R. Shetty, M. T. Fernandes, and N. F. Fiore 29 Oct. 1981 71 p refs
(Contract DE-AS02-77ET-10460)
(DE82-003653; DOE/ET-10460/18/17) Avail: NTIS HC A04/MF A01

This report describes research aimed at establishing quantitative relationships between microstructure and wear resistance of highly alloyed materials, including high-Cr white irons and experimental Co-base and Ni-base powder metallurgy (PM) alloys now used or potentially to be used in coal mining, handling, and gasification. The specific types of wear under study are low-stress abrasion and gouging wear encountered in mining, coal conversion, and transfer applications. During this period, work was concentrated on analysis of results. The many detailed observations obtained in the work on scratch test simulations of abrasive wear mechanisms have been summarized in drafts of three papers. The first, A Study of Abrasive Wear Mechanisms Using Diamond and Alumina Scratch Tests, is included as an appendix to this report and is being submitted for publication. Revision of the other papers is in progress.
DOE

N82-17340# Technical Research Centre of Finland, Espoo. Metals Lab.
EFFECT OF SENSITIZATION AND COLD WORK ON STRESS CORROSION SUSCEPTIBILITY OF AUSTENITIC STAINLESS STEELS IN BOILING WATER REACTOR (BWR) AND PRESSURIZED WATER REACTOR (PWR) CONDITIONS
Hannu Haenninen and Irina Aho-Mantila May 1981 67 p refs
(VTT-88; ISBN-951-38-1246-0; ISSN-0355-6395) Avail: NTIS HC A04/MF A01

The influence of metallurgical variables on stress corrosion cracking of austenitic stainless steels, in particular AISI 304 and OX18H10T, was examined in O2 enriched BWR conditions (8 ppm O2) and in typical PWR conditions. Cracking susceptibility in BWR conditions is especially sensitive to alpha martensite content and sensitization. Cracking in alpha martensite compounds is intergranular and transgranular; it can not be related to sensitization. Sensitization induces cracking only in creviced conditions (double U-bend specimens) in AISI 304 steels. In creviced conditions OX18H10T steel exhibits cracking in solution annealed, stabilized and sensitized conditions. The sensitized material is most susceptible. Cracking in solution annealed and stabilized OX18H10T steel is intergranular and transgranular. In PWR conditions (O2 content < 2 ppb) no cracking is observed.
Author (ESA)

N82-17341# Centre Technique des Industries Mecaniques, St. Etienne (France).
STUDY OF THE INDUSTRIAL USE OF ORGANIC ADDITIVES FOR TEMPERING Final Report [ETUDE DE L'EMPLOI INDUSTRIEL DES ADDITIFS ORGANIQUES POUR LA TREMPE]
J. Mansion and C. Bournicon May 1981 133 p In FRENCH
(CETIM-1-2G-15-0) Avail: NTIS HC A07/MF A01

Polymer base additives, used in an aqueous milieu in order to extend its cooling properties, were studied. An inventory of these products was made and their characteristics were determined in the laboratory. Industrial experiments were reviewed and the results were analyzed. An industrial shop, making use of these additives, was also observed. The application domain of this technique, additive selection criteria, and in-service behavior are defined.
Author (ESA)

N82-17342# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CORROSION FATIGUE
Oct. 1981 92 p refs Presented at the 52nd Meeting of the AGARD Struct. and Mater. Panel, Cesme, Turkey, 5-10 Apr. 1981
(AGARD-CP-316; ISBN-92-835-1402-5) Avail: NTIS HC A05/MF A01

The objectives, scope, and technical requirements of a cooperative program for corrosion fatigue testing and prevention/aircraft environment simulation fatigue testing are presented. An overview of current and supplemental programs designed to assess current protection systems for aircraft structures is also given. For individual titles, see N82-17343 through N82-17348.

N82-17343# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
MECHANISMS OF CORROSION FATIGUE
D. J. Duquette *In* AGARD Corrosion Fatigue Oct. 1981 12 p refs Sponsored in part by Office of Naval Research (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

An overview of experimental variables which are considered critical to understanding the mechanisms of corrosion fatigue of high strength aluminum alloys is presented. Based on this overview, an examination of previously proposed mechanisms is attempted. These models include anodic dissolution, surface energy reduction, and hydrogen embrittlement. It is concluded that hydrogen embrittlement of process zones at alloy surfaces (for crack initiation) and at crack tips (for crack propagation) best explains observed results. A general model of corrosion fatigue of these alloys is proposed. This model suggests that the nature of the naturally formed oxide film on aluminum alloys may be a critical factor. Chemical or mechanical damage of the film allows hydrogen ingress. The presence of second phase particles which may act as sinks for dislocation transported hydrogen, may also be a necessary prerequisite to significant amounts of reduction in fatigue resistance associated with corrosion.
Author

N82-17344# Toronto Univ. (Ontario). Dept. of Mechanical Engineering.
FRACTURE MECHANICS BASED MODELLING OF THE

CORROSION FATIGUE PROCESS

David W. Hoeppner, Douglas Mann, and J. Weeks *In* AGARD Corrosion Fatigue Oct. 1982 17 p refs Sponsored in part by NSERC and Dept. of Energy, Mines and Resources of Canada (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

Corrosion fatigue of structural elements involves a synergism between cyclic load and a chemical environment involving both time and temperature as rate-controlling parameters. The development of rational life prediction methods is hampered by both the lack of mechanistic understanding, the large number of corrosion-fatigue synergisms, and the inadequacies of fracture mechanics based models in both pre mode I fatigue cracking and initial mode I cracking. Aspects of mechanisms related to the formulation of corrosion fatigue life prediction models are discussed in relation to micromechanical modelling based on fracture mechanics. Emphasis was placed on the formation of mode I fatigue cracks from pits, and fretting surface damage. A discussion of the needs in this area is presented. It is believed that with further analytical and experimental information the models presented can be verified and provide useful guidance to engineers and scientists attempting to deal with corrosion and fretting fatigue. Author

N82-17345# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Central Lab.

CORROSION FATIGUE BEHAVIOUR OF SOME ALUMINIUM ALLOYS

D. Aliaga and E. Budillon *In* AGARD Corrosion Fatigue Oct. 1981 12 p (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

An evaluation of corrosion fatigue strength of aluminum alloys currently used in the aeronautical industry was made. Crack propagation was evaluated in various different environments (dry argon, wet air, salt water). The effect of frequency, of test specimen thickness, and of ratio R (R = Kmin/Kmax) were investigated. And the effect of these various environments on the endurance limit of 10 to the 7th power cycles was likewise studied and some surface protections evaluated. The intent of the survey was to compare the response in fatigue of various aluminum alloys used in the aeronautical construction. The environments studied were the following: dry argon, wet air and salt-water. They were retained so as to simulate and amplify the more or less aggressive nature of these environments in which aircraft can find themselves both on the ground or in the air. The two major aspects of corrosion fatigue namely crack initiation and crack propagation were studied with an emphasis on in-service behaviour. As far as crack initiation is concerned some surface treatments and protections currently used in aeronautics were examined in various environmental conditions. M.D.K.

N82-17346# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).

CORROSION FATIGUE OF OFFSHORE AND SHIP-BUILDING STEELS

Walter Schuetz *In* AGARD Corrosion Fatigue Oct. 1981 17 p refs (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

The results of several test programs on various steels are discussed where in addition to realistic variable loads a corrosive environment was simulated. For comparison, constant amplitude tests were also carried out as well as testing in air. It was shown that under constant amplitude loading the damaging effect of corrosion was always greater than under realistic loading. In addition, test frequency appears to be not so important as in constant amplitude test; this means that tests under variable amplitude can be carried out at normal test frequencies of the order of 10 Hz, saving time and costs. Finally the results of a research program on welded tubular joints in seawater are described in which the above conclusions were incorporated. Author

N82-17347# Middle East Technical Univ., Ankara (Turkey).

VARIABLE AMPLITUDE CORROSION FATIGUE BEHAVIOR OF A LOW CARBON STEEL

R. Guerbuez and M. Doruk *In* AGARD Corrosion Fatigue Oct. 1982 14 p refs (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

The results of an experimental study designed to determine the general characteristics of salt water-enhanced fatigue crack growth under conditions of variable amplitude loading are presented. The material used was a sheet of 0.22 percent carbon steel. The tests were done on 13 mm thick CT specimens in L-orientation. The crack mouth opening displacement on the loading line (C(M)OD) was varied at a constant rate, whereby the stress intensity factor varied between zero and the maximum value of C(M)OD. Negative stress ratios were eliminated by means of a special control. Comparison crack growth data were obtained by the more conventional constant load amplitude or K-increasing method and also under decreasing load amplitude. The crack growth rates were compared with reference data measured in the laboratory air. It was found that the rates of crack-growth measured at three different rates of displacement do not agree. However from the shift of curves on decreasing the rate, it is concluded that the growth rate curves would tend to become stationary. Author

N82-17348# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).

FLIGHT-BY-FLIGHT CORROSION FATIGUE TESTS

Walter Schuetz *In* AGARD Corrosion Fatigue Oct. 1981 10 p refs (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

Corrosion fatigue tests should be conducted under realistic load sequences especially for tests with riveted specimens because the rare high loads of the spectrum may loosen the fasteners, damaging the corrosion protection system and therefore rendering it ineffective. Possibly this does not happen in constant amplitude tests because the loads may not be high enough to crack the protection system. This was the reasoning behind the test program carried out with flight-by-flight tests. Tests were carried out with two aluminum alloys typical for use in modern and in faying aircraft respectively, namely 7475-T 761 and 7075-T6. The sheet materials were exchanged between two laboratories so that both would use materials of the same heats. The specimens used differed, however, in the corrosion protection systems and in the manufacturing of the specimens by different firms. A project status report is made. M.D.K.

N82-17349# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

AIRCRAFT CORROSION

Aug. 1981 194 p refs Partly in ENGLISH, partly in FRENCH Meeting held in Cesme, Turkey, 5-10 Apr. 1981
(AGARD-CP-315; ISBN-92-835-0298-1) Avail: NTIS HC A09/MF A01

Corrosion resistant materials and protection systems for aircraft are addressed. The incidence of corrosion of aircraft structures under varying environmental conditions is discussed. Maintenance, cost factors, education and retraining, and the communication link among the designers, manufacturers and the research community are among the topics covered. For individual titles, see N82-17350 through N82-17364.

N82-17350# Atlantic Fleet, Norfolk, Va.

US NAVAL FLEET AIRCRAFT CORROSION

G. T. Browne *In* AGARD Aircraft Corrosion Aug. 1981 15 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Water entry and its associated corrosion problems were minimized. A method for sealing environmental connectors without degrading wire quick disconnect capability was incorporated by sealing the back connector shell rubber grommet with clear room temperature vulcanizing silicone type sealant. The screw holes and equipment lids were also sealed in a similar manner. Drain holes were located and drilled in nonstructural areas at low points to remove trapped water and eliminate the corrosive agents. Hidden corrosion was detected by nondestructive inspection methods during rework. These include ultrasonic, X-ray and eddy current inspection and neutron radiography on double skin areas and on areas behind stringers, etc., where corrosion is caused by moisture entrapment. Stress corrosion cracking in high strength components was discovered occasionally. Standard fleet corrosion maintenance is accomplished in accordance with procedures provided in technical manuals. Paint and corrosion removal procedures and tools are discussed. N.W.

N82-17351# Royal Air Force, Dereham (England). Central Servicing and Development Establishment.

DETECTION AND PREVENTION OF CORROSION IN ROYAL AIR FORCE AIRCRAFT

C. R. Pye *In* AGARD Aircraft Corrosion Aug. 1981 10 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

The problems that sometimes are created by corrosion in Royal Air Force aircraft are outlined. The problem of the harsh environment facing some military aircraft is described, and some of the materials used in aircraft construction are considered. Corrosion prevention and rectification is also discussed briefly. Some typical examples of corrosion damage found during service are illustrated, and the nondestructive testing methods used for detecting corrosion are described. These methods include visual inspection, eddy current techniques, ultrasonic techniques and X-radiography. The use of neutron radiography and other future developments is also considered. Service methods of removing corrosion and re-protecting the aircraft are mentioned. Finally the need for the manufacturer to consider corrosion at the aircraft design stage is considered. N.W.

N82-17352# British Airways, Middlesex (England). Aircraft Engineering (Structures).

AN AIRLINE VIEW OF THE CORROSION PROBLEM

R. G. Mitchell *In* AGARD Aircraft Corrosion Aug. 1981 11 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Although the corrosion phenomenon is well understood by aircraft manufacturers and operators alike, most current aircraft types continue to exhibit many of the fundamental corrosion defects shown by earlier designs. It is estimated that the total annual cost to IATA member airlines is around $100 million based on 1976 operations. Environmental and maintenance effects are important and should be fully understood in their importance in minimizing corrosive attack. In addition to the more common forms, filiform corrosion and microbiological contamination present hazards to aircraft operating in certain areas of the world. Temporary water displacing fluids are becoming common in their use, and subject to certain limitations are providing valuable short term protection. The FAA design rules require the effects of corrosion to be considered at the design stage which should result in an improved product for the operator. In addition the IATA document Guidance Material on Design and Maintenance Against Corrosion of Aircraft Structures specifies practices which should also improve the overall product. Author

N82-17353# Middle East Technical Univ., Ankara (Turkey).

SOME OBSERVATIONS ON THE CORROSION OF AIRCRAFT AT THE AIR FORCE BASE IN BANDIRMA, TURKEY

M. Doruk *In* AGARD Aircraft Corrosion Aug. 1981 8 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

The types and the causes of corrosion which have been observed primarily on aircraft of Type F-5A in Turkey are studied. Visual inspection showed many locations of concentration of corrosion. The vertical stabilizer attach angle (alloy 7075-T6) fails through exfoliation corrosion and galvanic attack in the bolt holes. Galvanic corrosion has also been observed around the jaw bolts under the main wings. Another case of exfoliation attack has been found on the uplock support rib (Alloy 7075-T6 or 7079-T6) in the main landing gear well. Damage in the honeycomb assembly which appears as a debonding between the honeycomb structure and the top plate has been regarded as a serious problem. Corrosion damage is attributed to the high corrosiveness of the atmosphere of Air Force Base laden with sea salt and polluted from industries in the neighborhood. Author

N82-17354# Technical Univ. of Istanbul (Turkey).

ON THE CORROSION PROBLEMS OF THE TAF F-5 AIRCRAFT

A. Inalhan *In* AGARD Aircraft Corrosion Aug. 1981 1 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Corrosion problems of the F-5 aircraft in Turkey are examined. The importance of atmospheric effects are disputed. The investigation and conclusions are recounted. N.W.

N82-17355# Service Techniques des Programmes Aeronautiques, Paris (France).

THE EXPERIENCE OF CORROSION ON FRENCH MILITARY AERODYNES [L'EXPERIENCE DE LA CORROSION SUR AERODYNES MILITAIRES FRANCAIS]

Melle M. Huret *In* AGARD Aircraft Corrosion Aug. 1981 9 p In FRENCH (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Several examples of corrosion occurring in French military aircraft in detail, e.g., honeycomb sections and metal-to-metal adhesively bonded structures were described. Information about the various measures which were taken to diminish the problem was given. The manufacturing specifications do not take care of all protection requirements. Furthermore, the paint systems which are applied are not the best available, or they have been applied in the wrong way. Bad sealing also occurs frequently. Other preventive measures, e.g., water displacing fluids, can given additional, short term, protection. N.W.

N82-17356# KLM Royal Dutch Airlines, Amsterdam (Netherlands).

DESIGN AND MAINTENANCE AGAINST CORROSION OF AIRCRAFT STRUCTURES

H. J. Versteegen and M. J. M. Versteeg *In* AGARD Aircraft Corrosion Aug. 1981 7 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

The publication 'Guidance Material on Design and Maintenance against Corrosion of Aircraft Structures' is reviewed. A greater understanding among manufacturers and airline managements of the magnitude of the corrosion problems and the need for measures to be taken at the design stage is considered. The best available anti-corrosion design knowledge in critical areas as a basic standard is addressed. The guidelines cover basic requirements, including material choice, design principles and manufacturing procedures. Furthermore, they cover the critical areas including origin of problems, design objectives and protective requirements. They are supplemented by an appendix giving a detailed acceptable means of compliance. N.W.

N82-17357# Michigan State Univ., East Lansing. Dept. of Metallurgy, Mechanics, and Materials Science.

FORECASTING CORROSION DAMAGE AND MAINTENANCE COSTS FOR LARGE AIRCRAFT

R. Summitt and F. Fink *In* AGARD Aircraft Corrosion Aug. 1981 11 p refs Sponsored by AF (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Studies relating environmental and operational factors of large aircraft to corrosion damage were conducted. They provide a basis for predicting maintenance costs and for logistics decisions. The studies included: (1) an Environmental corrosion severity index, based on pollutant and weather factors; (2) an atmospheric testing program to determine environmental corrosiveness; and (3) analysis of corrosion maintenance experience in aircraft systems. Results are discussed. M.D.K.

N82-17358# Royal Aircraft Establishment, Farnborough (England). Materials Dept.

CORROSION CONTROL MEASURES FOR MILITARY AIRCRAFT: PRESENT UK REQUIREMENTS AND FUTURE DEVELOPMENTS

V. C. R. McLoughlin *In* AGARD Aircraft Corrosion Aug. 1981 15 p refs (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

The philosophy behind selection of aircraft metallic materials based on resistance to corrosion and behind mandatory requirements for processes and materials used in the protection of aircraft structures is discussed. The impact of legislation, current and future, aimed at protecting the environment is reported. The necessity for finding replacements for cadmium, chromates, and various metal finishing operations used in aircraft construction is discussed in terms of both protecting the environment and corrosion control methods used in the aircraft industry. M.D.K.

N82-17359# Aeritalia S.p.A., Torino (Italy). G.V.C. Labs.
CORROSION PREVENTION METHODS DEVELOPED FROM DIRECT EXPERIENCE WITH AEROSPACE STRUCTURES
M. Scolaris *In* AGARD Aircraft Corrosion Aug. 1981 18 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Some examples of various types of corrosion experienced during hardware service are reviewed and the significant remedial action adopted first to repair and then to eliminate the problem are presented. The changes in design incorporated during design development as a function of the experience and technical knowledge acquired are also presented. Examples of effective protection validated through service life and present trends for effective corrosion prevention are also illustrated. Author

N82-17360# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
CORROSION PREVENTION MEASURES USED IN THE CONSTRUCTION OF AN AIRCRAFT AIRFRAME: THE CASE OF 2014 AND 2214 ALLOYS [SOLUTIONS PREVENTIVES UTILISEES CONTRE LA CORROSION LORS DE LA CONSTRUCTION D'UNE CELLULE D'AVION. CAS DES ALLIAGES 2014 ET 2214]
J. Bevalot *In* AGARD Aircraft Corrosion Aug. 1981 14 p In FRENCH (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Discussions of practical aircraft corrosion problems are presented. Aluminum alloy 2214 is evaluated in terms of its resistance to stress corrosion and its excellent fatigue properties. Heat treatment, aging at 178 C instead of 153 C, and the use of wet sandblasting techniques are discussed in terms of maintaining fatigue resistance while increasing resistance to stress corrosion. M.D.K.

N82-17361# Naval Air Development Center, Warminster, Pa.
RECENT DEVELOPMENTS IN MATERIALS AND PROCESSES FOR AIRCRAFT CORROSION CONTROL
Sara J. Ketcham and John J. DeLuccia *In* AGARD Aircraft Corrosion Aug. 1981 9 p refs (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Advances in materials and processes for aircraft corrosion control currently in use and those under development in the laboratory for future use are described. Areas covered are corrosion preventive compounds, organic and inorganic coatings, alloy selection and heat treatments. Available materials highlighted are water displacing compounds, sealant primers, aluminum alloys 7050 and 7010 including a state-of-the-art report on the use of exfoliation and stress corrosion resistant tempers. Materials under development that offer promise of contributing to future advances include water displacing paints, flexible primer, crack arrestment compounds, powder metallurgy, aluminum alloys and substitutes for cadmium plating. Author

N82-17362# Systems Research Labs., Inc., Dayton, Ohio.
NEW CONCEPTS IN MULTIFUNCTIONAL CORROSION FOR AIRCRAFT AND OTHER SYSTEMS
M. Khobaib and F. W. Vahldiek *In* AGARD Aircraft Corrosion Aug. 1981 13 p refs (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Multifunctional nonchromate inhibitors were developed for a Rinse Facility to reduce corrosion maintenance costs by removing corrosive contaminants from aircraft which operate in aggressive environments such as marine environments. These inhibitor systems are low cost, water soluble, nontoxic formulations which are effective against general corrosion, localized corrosion, and environmentally assisted crack growth under conditions of stress corrosion and corrosion fatigue. Extensive polarization, immersion, and galvanic-coupling experiments were conducted to determine effectiveness. A borax-nitrite-based inhibitor containing small additions of nitrate, silicate, phosphate, and mercaptobenzothiazole was found to provide excellent corrosion protection for high strength aluminum and steel alloys used in aerospace applications and for copper-bearing alloys used in electronic components and in parts of the Rinse Facility. Envionmental effects upon crack-growth rates of aluminum and high strength steel alloys were eliminated, reducing the rates in corrosion fatigue as compared to those obtained in air. A test program using these inhibitors is described. Tracking of maintenance costs and corrosion damage in being conducted to determine the effectiveness of the inhibited rinse in reducing corrosion costs. M.D.K.

N82-17363# Naval Air Development Center, Warminster, Pa.
CORROSION IN NAVAL AIRCRAFT ELECTRONIC SYSTEMS
Irving S. Shaffer *In* AGARD Aircraft Corrosion Aug. 1981 12 p refs (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Naval aircraft electronic equipment suffer frequently from the effects of moisture and corrosion. The critical design features which have led to excessive susceptibility to these failure modes are described. Several examples are cited of inadequately protected equipment located in aircraft installations where they were subjected to repeated moisture intrusion during rainstorms, low level flights over water and high pressure fresh water washdowns. The specific deterioration effects that occurred on the various components that make up the avionic systems are presented. Maintenance data summaries are included to denote further the corrosion problem severity. Corrective measures in design, testing and maintenance are also discussed. Author

N82-17364# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).
CORROSION PROTECTION SCHEMES FOR AIRCRAFT STRUCTURES: SOME EXAMPLES FOR THE CORROSION BEHAVIOUR OF Al ALLOYS
Henri Lajain *In* AGARD Aircraft Corrosion Aug. 1981 16 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

A summary of the main groups of aircraft surface protection procedures frequently applied is presented. In addition, some examples are given on the corrosive behavior of aluminum alloys. Information is also given on novel nondestructive test methods serving to recognize corrosion within the scope of aircraft maintenance. The following requirements which must be imposed with regard to the performance and quality of the surface protection are considered and discussed: (1) the potential differences of the materials used are to be kept as low as possible, i.e., constructive measures must be taken; (2) prevention of any local element activity by providing insulating protective coatings, i.e., by preventing a current; (3) inhibition by providing cover layers (e.g., chromate passivation); and (4) introducing layers which act as so-called sacrificial anodes. M.D.K.

N82-17365 Carnegie-Mellon Univ., Pittsburgh, Pa.
PERTURBED ANGULAR CORRELATION STUDIES OF ELECTRIC FIELD GRADIENTS IN METALLOPORPHYRINS Ph.D. Thesis
Oliver Clinton Mullins 1981 168 p
Avail: Univ. Microfilms Order No. 8127358

Electric field gradients (EFG) at the metal center were studied in seven chloroindium porphyrin complexes and in chloroindium phthalocyanine by the technique of perturbed angular correlation of gamma rays. These complexes were synthesized with the probe nucleus -111 In for use in polycrystalline and solution sources. The magnitudes of the EFG's of the metalloporphyrins span a wide range and are shown to correlate with the electron donating properties of the peripheral substituents. Electron withdrawing properties were observed in the phthalocyanine ring. This large EFG is attributed to the diminished cavity size of the phthalocyanine. All porphyrin complexes were characterized by the large chemical inhomogeneities. The deformable nature of the porphyrin macrocycle in contrast to the relatively planar, inflexible structure of the phthalocyanine was observed. The PCA spectra of metalloporphyrins dissolved in organic solvents were characterized and analyzed. Dissert. Abstr.

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-17366 Illinois Univ. at Urbana-Champaign.
POLYMER COATED ELECTRODES AS MICROELECTRO-

CHEMICAL MEDIA Ph.D. Thesis
Nancy Linden Good 1981 121 p
Avail: Univ. Microfilms Order No. 8127598

Gold film electrodes were coated with polymer films less than 1000 A thick; then electrochemistry was done on samples absorbed into the film from solution. Detailed studies of potassium ferricyanide in a poly(4-vinyl pyridine) film showed that cyclic voltammetry can be done successfully with this system. The performance of the electrode was measured. The cationic polyelectrolyte is selective favoring multiply charged anions. Very roughly, 10% of the pyridine groups of the polymer are associated with a ferricyanide ion. Monitoring the cyclic voltammograms as the pH of the solution is varied from 7 to 1 lead to some knowledge of the environment within the film. At low pH near-theoretical peak shapes for reactants and products bound to electrode surfaces were observed. The structure of the film did not appear to retard mass transport on the timescale of the experiments, with 50 mV/sec scan rates. Preliminary work with providing multiple identical electrodes on a single glass slide was done, and future applications to analytical chemistry are discussed.
Dissert. Abstr.

N82-17367*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
IMPROVED TACK PMR
R. A. Buyny Oct. 1981 108 p refs
(Contract NAS3-22026)
(NASA-CR-165432; TRW-36805-6016-UT-00) Avail: NTIS HC A06/MF A01 CSCL 07C

One reactive diluent and several high boiling solvents were investigated for providing long shelf life tack and drape to PMR polyimide prepreg materials. The most promising approach was to introduce dimethoxy ethyl ether (diglyme) to the normal methanol solvent. Compression and autoclave molding cycles were developed for the improved tack prepreg which provided up to 15% higher thermomechanical properties than conventional PMR-15 composites. Near the conclusion of this investigation, it was discovered that diglyme constituted a potential hazard because its auto ignition temperature is 464 K. Consequently, it was recommended that diglyme should not be used as a tackifier for PMR prepregs.
Author

N82-17368# National Aerospace Lab., Tokyo (Japan).
STRENGTH EVALUATION TEST OF PRESSURELESS-SINTERED SiC AND REACTION-SINTERED SiSUB3NSUB4 AT ROOM TEMPERATURE
Katsutoshi Matsusue, Kitao Takahara, and Ryosaku Hashimoto Aug. 1981 19 p refs In JAPANESE; ENGLISH summary
(NAL-TR-678; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Strength characteristics were studied at room temperature. The strength evaluating-method of ceramic materials, bending-tests of bars, tensile tests of rectangular plates, spin-tests of inner-peripherally notched disks, and diametrical compression tests of centrally holed disks were conducted on pressureless-sintered silicon carbide and reaction-sintered silicon nitride specimens. The relationship between the mean strength of specimens and effective volume or effective area of specimens was examined using Weibull's theory.
Author

N82-17369# Reluxtrol Co., San Francisco, Calif.
DEFECT DETECTION AND IDENTIFICATION IN Si3N4 AND SiC USING CONTROLLED RELUCTANCE ELECTROMAGNETIC TEST METHODS Final Report, Dec. 1980 - Sep. 1981
Duane P. Johnson and E Kim Kietzman Watertown, Mass. AMMRC Oct. 1981 56 p
(Contract DAAG46-80-C-0095)
(AD-A107726; Rept-440-159; AMMRC-TR-81-52) Avail: NTIS HC A04/MF A01 CSCL 11/2

This test studied the feasibility of defect detection in Si3N4 and SiC using high frequency (32 MHz) electromagnetic techniques and focused field CREG test probes. Examined were test specimens which contained near surface defects - hardness indentation induced cracks, scratches, pits, and inclusions. While unable to detect cracks in the test pieces, it successfully demonstrated the ability to detect certain other defects - 19 microns high scratches in SiC, for example. Also observed were variations in electromagnetic signals which seemed to reflect variations in electrical and dielectrical properties of the test pieces, possibly due to variation in specimen microstructures and/or chemistry.
GRA

N82-17370# Massachusetts Univ., Amherst. Dept. of Polymer Science and Engineering.
ELECTRON PARAMAGNETIC RESONANCE SATURATION CHARACTERISTICS OF PRISTINE AND DOPED POLYACETYLENES Interim Technical Report
James C. W. Chien, Gary E. Wnek, Frank E. Karasz, John M. Warakomski, L. Charles Dickinson, A. C. MacDiarmid (Pennsylvania Univ.), and A. J. Heeger (Pennsylvania Univ.) 11 Nov. 1981 55 p refs
(Contract N00014-81-K-0648)
(AD-A107716; TR-81-14; NR-356-602-4-13-91) Avail: NTIS HC A04/MF A01 CSCL 20/3

Electron paramagnetic resonance saturation experiments have been carried out on undoped polyacetylene and in the doped polymer as a function of dopant concentration. The relaxation times of undoped trans- (CH)x show considerable variability from sample. T1 = (2.7 + or - 1.7) x 10 to the -5 sec and T2 = (7.8 + or - 1.0) x 10 to the -8 sec suggesting sensitivity to trace impurities. Exposure to air reduces T1 to 8.1 x 10 to the -6 sec and T2 to 6.6 x 10 to the -8 sec; this effect is reversible. Using radio-assay techniques with 125 sub I, it was possible to prepare and characterize samples of known dopant concentration at the level of parts per million (ppm). There are three distinct regimes which characterize the effect of iodine concentration on the EPR characteristics of trans-(CHIy)x.
GRA

N82-17371# Southwest Research Inst., San Antonio, Tex.
COMPRESSIVE STRENGTH AND DAMAGE MECHANISMS IN CERAMIC MATERIALS. 1: THE ROLE OF SUBCRITICAL TENSILE MICROFRACTURE PROCESSES IN COMPRESSION FAILURE OF CERAMICS. 2: ELECTRON CHANNELING STUDY OF FRACTURE IN ALUMINA - EVIDENCE FOR CRACK TIP PLASTICITY Interim Technical Report, 1 Sep. 1980 - 30 Sep. 1981
James Lankford and David L. Davidson Sep. 1981 35 p refs
(Contract N00014-75-C-0668; NR Proj. 032-553; SwRI Proj. 02-4231)
(AD-A107617) Avail: NTIS HC A03/MF A01 CSCL 11/2

The compressive strength of SiC, Si3N4, and Al2O3 was investigated over wide ranges in temperature and loading rate. Several distinct damage regimes were identified, all based upon tensile microfracture processes. Two aspects of the work are of special interest. The first is the identification of a high strain rate regime in which material inertial effects are responsible for unusually rapid strengthening; the basis for the effect is increased difficulty in either crack nucleation or extension. Secondly, it is found that at low loading rates, subcritical tensile microcrack growth is responsible for a thermally activated strength dependence. Selected area electron channeling experiments lead to the conclusion that the thermal activation process may involve crack tip plasticity.
Author (GRA)

N82-17372# Materials Research Labs., Ascot Vale (Australia).
SYNTHESIS OF FUNGICIDAL VINYL AND ACRYLIC LATICES BY EMULSION POLYMERIZATION
L. V. Wake Jul. 1981 19 p refs
(AD-A107848; MRL-R-822; AR-002-424) Avail: NTIS HC A02/MF A01 CSCL 11/3

Latex emulsions were prepared in which experimental fungicidal compounds were copolymerized into the resin matrix. The latices were laboratory tested for antifungal activity and subsequently formulated as internal/external paints. The paints were exposed under tropical conditions for evaluation of long-term growth-free performance. The monomers pentachlorophenyl acrylate (PPA) and pentachlorophenyl methacrylate (PPMA) were synthesized and incorporated into latices by emulsion polymerization at various levels in the general vicinity of 2% w/w and 3% w/w. Emulsion copolymers were prepared by combining various mixtures of vinyl acetate, methyl methacrylate, methacrylic acid, ethyl and butyl acrylates with the experimental monomers. By appropriate formulation, stable fine-particle emulsions were prepared exhibiting both antifungal activity and suitable film-forming properties. Author (GRA)

N82-17373# Martin Marietta Corp., Baltimore, Md.

EFFECTS OF SURFACE MORPHOLOGY AND CHEMICAL COMPOSITION ON THE DURABILITY OF ADHESIVELY BONDED ALUMINUM STRUCTURES **Final Report**

Tsishung Sun, Guy D. Davis, John D. Venables, and Jar-Mo Chen Oct. 1981 35 p refs
(Contract F49620-78-C-0097; AF Proj. 2303)
(AD-A107664; MML-TR-81-45C; AFOSR-81-0725TR) Avail: NTIS HC A03/MF A01 CSCL 11/3

The hydration of aluminum surfaces prepared for adhesive bonding by anodization in phosphoric acid was studied using surface behavior diagrams which trace the evolution of the aluminum adherend surface composition, obtained by X-ray photoelectron spectroscopy. When supplemented with high resolution scanning electron micrographs and Auger depth profiles, the surface behavior diagrams show that hydration proceeds in three steps. The first is reversible and consists of the adsorption of water by the monolayer of A/PO4 initially present on the surface with no change in the oxide morphology. The second, which appears to be rate controlling, involves slow dissolution of the phosphate followed by rapid hydration of the exposed aluminae to the oxyhydroxide, boehmite. Extensive morphological changes occur as the boehmite fills the pore cells and bridges the whiskers of the original surface. The final step consists of the nucleation and growth of the trihydroxide, bayerite, on top of the boehmite. The surface behavior diagram approach is proposed as a new tool for the study of surface reactions in general. GRA

N82-17374# California Univ., Berkeley. Electronics Research Lab.

DEVELOPMENT OF HIGH SENSITIVITY X-RAY AND ELECTRON-BEAM RESIST PROCESSES **Final Report, 15 Dec. 1979 - 14 Jun. 1981**

D. W. Hess 20 Jul. 1981 15 p refs
(Grant AF-AFOSR-0078-80; AF Proj. 2306)
(AD-A107833; AFOSR-81-0729TR) Avail: NTIS HC A02/MF A01 CSCL 20/7

Plasma-initiated polymerization was used to form ultrahigh molecular weight (greater than ten million grams per mole) poly (methylmethacrylate) (UHMW PMMA) from liquid methyl methacrylate (MMA). The PMMA thus obtained was exposed to beams of 10 KV electrons ranging in dose from 0.1 - 10 micro-coulombs per square centimeter. For comparison, identical exposures were carried out using commercial PMMA resist (KTI) with a molecular weight of about 0.7 million grams/mole. Using 1:1 methyl ethyl ketone and isopropanol to develop the exposed resist, 0.5 micron pattern sizes were formed in both resist materials. Pattern fidelity in the UHMW PMMA was virtually identical to that obtained with KTI PMMA, but a factor of three lower dose could be used with the UHMW material. This lowered dose arose because the dissolution rate of the unexposed resist was a factor of 30 lower for UHMA than for KTI PMMA. A new spinner was designed and built to allow improved control of spin-cast films. Modeling studies based upon non-Newtonian behavior were initiated to enable prediction of film thickness as a function of position on a wafer, solution viscosity, and spin speed. In an attempt to further improve the sensitivity of UHMW materials, synthetic studies were undertaken to introduce halogen atoms into the MMA molecule. Chlorinated MMA was synthesized and is currently being investigated for its plasma-initiation susceptability. Author (GRA)

N82-17375# California Univ., Los Angeles. Dept. of Chemistry.

TEMPERATURE DEPENDENCE OF THE HOMOGENEOUS LINEWIDTH OF THE (D SUB 0)-5 - (F SUB 0)-7 TRANSITION OF Eu-3(+) IN AMORPHOUS HOSTS AT HIGH TEMPERATURES **Interim Technical Report**

Jack R. Morgan and Moftafa A. El-Sayed 20 Nov. 1981 16 p refs Submitted for publication
(Contract N00014-75-C-0602; NR Proj. 056-498)
(AD-A107900; TR-38) Avail: NTIS HC A02/MF A01 CSCL 11/2

The temperature dependence of the homogeneous linewidth of the 5D sub 0 - 7F sub 0 transition of Eu(3+) in different amorphous solids is determined in the 295 K to 800 K temperature range. The nearly quadratic temperature dependence observed is discussed in terms of Raman broadening and mechanisms based on two-level systems known to exist in disordered systems. Author (GRA)

N82-17376# Northrop Corp., Hawthorne, Calif. Aircraft Div.

ADHESIVES FOR FIELD REPAIR OF GRAPHITE/EPOXY COMPOSITE STRUCTURES **Final Report, Sep. 1980 - Aug. 1981**

David J. Crabtree Nov. 1981 61 p
(Contract N62269-80-C-0250)
(AD-A107870; NOR-81-161; NADC-79286-60) Avail: NTIS HC A04/MF A01 CSCL 11/4

Adhesive formulations were developed for the repair of damaged graphite/epoxy structures on board ship. These adhesives are two-part paste adhesives which can be cured at contact pressure at temperatures as high as 149C (300F). The adhesives were formulated from epoxy resins toughened by prereaction with carboxyl terminated butadiene acrylonitrile rubbers. Amine curing agents were used. An adhesive formulated from the reaction product of Epon 828 epoxy resin (Shell Chemical Co.) and CTBN 1300X8 (B. F. Goodrich) using PACM-20 amine curing agent (Du Pont) had lap shear strengths at -55C (-67F) and room temperature of approximately 5000 psi. At 115C (220F) the lap shear strength was approximately 2800 psi. These values are competitive with the highest quality film adhesives. The environmental durability was impressive. Lap shear specimens after exposure to 140F, 95% RH under a constant tensile stress of 1000 psi for 21 days and for 60 days under a stress of 500 psi showed only a 2 percent and an 11 percent reduction, respectively, in ultimate tensile shear strength compared to unexposed control specimens when tested to failure at 115C (220F). Author (GRA)

N82-17377# Swedlow, Inc., Garden Grove, Calif.

TRANSPARENT POLYOLEFIN FILM ARMOR **Final Report, 30 Mar. 1976 - 28 Feb. 1981**

Ralph Shelton Watertown, Mass. AMMRC Aug. 1981 264 p refs
(Contract DAAG46-76-C-0034)
(AD-A107562; SI-ER-1001; AMMRC-TR-81-41) Avail: NTIS HC A12/MF A01 CSCL 19/4

The general objective of this project was to determine the optimum processing conditions for the large scale conversion, by molding and laminating of oriented polyolefin film into fragment resistant transparent armor suitable for Army aircraft glazing applications. The manufacturing process must produce a laminate with sufficient adhesion to resist debonding during thermal cycling and yet react as a laminar structure during ballistic impact. Author (GRA)

N82-17378# National Bureau of Standards, Washington, D.C. Polymer Science and Standards Div.

CRYSTALLINE FORMS IN A COPOLYMER OF VINYLIDENE FLUORIDE AND TRIFLUOROETHYLENE (52/48 MOL %)

Andrew J. Lovinger, G. T. Davis, T. Furukawa, and M. G. Broadhurst Nov. 1981 31 p refs Submitted for publication
(Contract N00014-79-F-0012)
(AD-A107809; TR-16) Avail: NTIS HC A03/MF A01 CSCL 20/2

The structure of 52/48 mol % copolymer of vinylidene fluoride and trifluoroethylene has been investigated at various temperatures by X-ray diffraction. Melt-solidified samples consist of a mixture of two disordered crystalline phases, one trans-planar, the other 3/1-helical. Samples may be transformed to either phase by appropriate means to reveal a hexagonal (or pseudo-hexagonal) molecular packing. The all-trans phase may be obtained by drawing or poling at low temperatures; both treatments cause a transformation of the disordered mixture of phases into a well-ordered planar zig-zag phase. Isolation of the disordered 3/1-helical phase is achieved by heating to high temperatures, where-upon all samples, irrespective of orientation or polarization, undergo transformation to a poorly ordered helical structure analogous to that of trifluoroethylene homopolymer; upon cooling,

the original, disordered mixture of phases is recovered.
Author (GRA)

N82-17379# National Bureau of Standards, Washington, D.C. Polymer Science and Standards Div.

STRUCTURAL AND DIELECTRIC INVESTIGATION ON THE NATURE OF THE TRANSITION IN A COPOLYMER OF VINYLIDENE FLOURIDE AND TRIFLUOROETHYLENE (54/46 MOL %)

G. T. Davis, T. Furukawa, A. J. Lovinger, and M. G. Broadhurst Nov. 1981 32 p refs Submitted for publication
(Contract N00014-79-F-0012)
(AD-A107846; TR-17) Avail: NTIS HC A03/MF A01 CSCL 11/9

The effect of temperature on the structure and dielectric properties of a copolymer of vinylidene chluoride and trifluoroethylene was investigated at temperatures up to 140 C. Undrawn or unpoled specimens contain an intimate mixture of two disordered crystalline phases, both of which undergo a large increase in d-spacing at 65-70 C, with eventual transformation to a single phase in which the chains assume a disordered 3/1-helical conformation above 90 C. The 70 C transition is accompanied by a dielectric anomaly. The changes in crystal phase and dipole orientation upon poling result in a reduction of the dielectric constant at room temperature, a shift of the dielectric anomaly to about 80 C, stability of the all-trans crystal phase to somewhat higher temperatures, and a discrete change in d-spacing at the transition region. Loss of polarization at this ferroelectric-to-paraelectric transition is attributable primarily to the molecular change from the polar all-trans conformation to its non-polar, disordered 3/1-helical counterpart. Rotational dipolar motions also lead to the dielectric anomaly. GRA

N82-17380# National Bureau of Standards, Washington, D.C. Fracture and Deformation Div.

STRESS CORROSION OF CERAMIC MATERIALS Annual Report, 1 Oct. 1980 - 30 Sep. 1981

Stephen W. Freiman, Terry A. Michalske, R. C. Pohanka, K. Okazaki, S. Tashiro, C. J. Simmons, P. N. Krishnan, and G. E. Walrafen Oct. 1981 56 p refs
(Contract N00014-79-F-0030; RR0220201)
(AD-A108045) Avail: NTIS HC A04/MF A01 CSCL 11/2

The results of an experimental program to investigate mechanisms of stress corrosion in glasses and ceramics and to determine effects of composition and microstructure on the fracture of piezoelectric materials. One of the main reasons for strength degradation of structural ceramic materials is stress corrosion cracking. Caused mainly by water in the environment, stress corrosion cracking results in subcritical crack growth that leads to delayed failure of ceramic materials. As a consequence of this crack growth, ceramic components that are subjected to external stresses are liable to fail after an indeterminate period of time, leading to a considerable uncertainty in the safe design stress. One of the objectives of modern ceramics technology is to reduce the uncertainty associated with structural design, and hence, to improve our capabilities of designing ceramic components that exhibit reliable mechanical behavior. This objective can be accomplished in part through a better understanding of the fundamental processes that occur during stress corrosion cracking. GRA

N82-17381# National Bureau of Standards, Washington, D.C. Lab. for the Structure of Matter.

NEW ENERGETIC MATERIALS. STRUCTURAL CHARACTERIZATION Annual Report, 1 Oct. 1980 - 30 Sep. 1981

Richard Gilardi, Clifford F. George, and Jerome Karle 15 Oct. 1981 38 p refs
(AD-A107714; LSM-81-1) Avail: NTIS HC A03/MF A01 CSCL 07/4

The molecular structures of five new materials developed in ONR-sponsored explosive/propellant research are reported. The material 3,3-bis-azidomethyl oxetane (BAMO) was studied in three different forms. Using gas electron diffraction analysis, the molecular structure of the monomer of BAMO in the vapor phase was determined. A cyclic tetramer of BAMO was characterized with X-ray single-crystal diffraction analysis. Finally, a linear polymer of BAMO was studied as a semi-crystalline fiber using X-rays. Most of the features of the polymer molecular structure were determined from the fiber diffraction pattern. The crystal and molecular structure of a tetra-nitro compound, 4,7-bis-dinitrofluoromethyl-1,3-dioxepane, is reported; this compound is a newly synthesized monomer developed during research on the synthesis of nitro-polymers. The crystal and molecular structure of bis(5-amino-1,2,4-oxadiazole) is also reported. It is an unusually stable synthetic intermediate obtained in research aimed at producing new types of high-density nitro-explosives.
Author (GRA)

N82-17382# Centre Technique des Industries Mecaniques, Nantes (France).

PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS): VOLUME 1: PLASTIC MATERIALS (APPENDIX 1, PLASTIFICATION SYSTEMS) [PROSPECTIVE MATIERES PLASTIQUES - ELASTOMERES - PEINTURES. ANNEXE 1: SYSTEMES DE PLASTIFICATION]

C. Bord 1 Jul. 1981 67 p refs In FRENCH 6 Vol.
(CETIM-12-B-194-Vol-1) Avail: NTIS HC A04/MF A01

Plastification systems were studied bibliographically and possible developments in the geometrical and mechanical design of the systems were researched. Rheology of screw in sleeve feed systems for plastic and elastomer materials is explained. Metallurgical research is necessary in order to improve corrosion and abrasion resistance of screw and sleeve machine parts. The rheology of injection plastification systems is of special importance since this process dominates the industry. Author (ESA)

N82-17383# Centre Technique des Industries Mecaniques, Nantes (France).

PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS). VOLUME 2: PLASTIC MATERIALS (ASSESSMENT AND EVOLUTION OF APPLICATIONS OF PLASTIC MATERIALS FOR MECHANICAL CONSTRUCTIONS) [PROSPECTIVES MATIERES PLASTIQUES - ELASTOMERES-PEINTURES. ETAT ET EVOLUTION DES APPLICATIONS DES MATIERES PLASTIQUES AUX PRODUITS MECANIQUES]

C. Bord 1 Jul. 1981 272 p In FRENCH 6 Vol.
(CETIM-12-B-194-Vol-2) Avail: NTIS HC A12/MF A01

The use of thermoplastics and thermosetting composites in a wide variety of manufacturing processes is reviewed. Different materials and methods of forming are covered. Characteristics of the various plastic materials are illustrated by the functional design of the products of which they are a part. Prospective applications are cited while innovations and development trends are identified. Author (ESA)

N82-17384# Centre Technique des Industries Mecaniques, Nantes (France).

PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS). VOLUME 3: PLASTIC MATERIALS (APPENDIX 3, COMPUTER ASSISTED DESIGN APPROACH TO INJECTION MOLDS) [PROSPECTIVES MATIERES PLASTIQUES - ELASTOMERES-PEINTURES. ANNEXE 3: APPROCHE DE LA CAO DES MOULES D'INJECTION]

C. Bord and M. Brierre 1 Jul. 1981 181 p refs Partly in FRENCH, GERMAN and ENGLISH 6 Vol.
(CETIM-12-B-194-Vol-3) Avail: NTIS HC A09/MF A01

Five different calculation methods, either for laboratory analysis or industrial application, which permit the modeling of plastic materials flow conditions in injection molding equipment are presented. Two of the methods are sufficiently developed to allow for computerized application in tooling design. The methods cover (1) optimization of molds, (2) description of a computer aided injection molding system, (3) better economy in injection molding through optimum equipment design, (4) the Moldflow system, and (5) calculation of the cavity wall thickness in molds for injection molding of plastomers. Author (ESA)

N82-17385# Centre Technique des Industries Mecaniques, Nantes (France).

PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS). VOLUME 4: PLASTIC MATERIALS (APPENDIX 2, AUTOMATION AND EVOLUTION OF EQUIPMENT FOR FORMING PLASTIC MATERIALS) [PROSPECTIVE MATIERES PLASTIQUES - ELASTOMERES-PEINTURES. ANNEXE 2: AUTOMISATION ET EVOLUTION

DES EQUIPMENTS DE MISE EN OEUVRE DES MP]
M. Brierre 1 Jul. 1981 44 p refs In FRENCH 6 Vol.
(CETIM-12-B-194-Vol-4) Avail: NTIS HC A03/MF A01

The impact of numerical control on plastics forming techniques is assessed. The automation of injection presses, mainly through application of microprocessors and digital techniques, is discussed. With hydraulic presses, considerable energy savings are realized through automation. The use of industrial robots is also mentioned and illustrated. Other equipment whose design and operation are influenced by the use of electronics are thermoplastic injection molds, screw in sleeve feeders, and extrusion machines. Author (ESA)

N82-17386# Centre Technique des Industries Mecaniques, Nantes (France).
PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS). VOLUME 5: PAINTS [PROSPECTIVE MATIERES PLASTIQUES ELASTOMERES. VOLUME 5: PEINTURES]
D. Jahier 1 Jul. 1981 23 p In FRENCH 6 Vol.
(CETIM-12-B-194-Vol-5) Avail: NTIS HC A02/MF A01

Four different kinds of paint are discussed: (1) solvent base, (2) high solids, (3) powder, and (4) water base. The relative frequency of use of each paint type in industry is considered and trends due to environmental (pollution control legislation) and economic factors are shown. The four paint types are characterized and their properties are listed. Painting processes are also considered and the applicability of the different paints is determined. Author (ESA)

N82-17387# Centre Technique des Industries Mecaniques, Nantes (France).
PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS). VOLUME 6: ELASTOMERS [PROSPECTIVE MATIERES PLASTIQUES ELASTOMERES PEINTURES. VOLUME 6: ELASTOMERES]
D. Jahier 10 Jul. 1981 17 p refs In FRENCH 6 Vol.
(CETIM-12-B-194-Vol-6) Avail: NTIS HC A02/MF A01

Development of elastomer materials, production processes, and applications are forecast for the short-term. Thermoplastic elastomers are of particular interest due to good mechanical properties. The processing of thermosetting rubber is described. A continuing tendency to substitute elastomers where natural rubber has been used (tires, insulation, seals, etc.) is foreseen. Author (ESA)

N82-17388# Sandia Labs., Albuquerque, N. Mex.
LOW TEMPERATURE BEHAVIOR OF EPOXY-RUBBER PARTICULATE COMPOSITES
S. C. Kunz and P. W. R. Beaumont 1981 36 p refs Prepared in cooperation with Cambridge Univ., England
(Contract DE-AC04-76DP-00789)
(PB82-113499; CUED/C-MATS/TR-75-1981; ISSN-0309-6505) Avail: NTIS HC A03/MF A01 CSCL 11J

Toughness and mechanical property data are presented for a CTBN-rubber modified epoxy resin in the temperature range 20 C to -110 C. A toughening model based on the ultimate strain capability and tear energy dissipation of the rubber, present as dispersed microscopic particles in an epoxy matrix, is used to explain the suppression of composite toughness observed below -20 C. The toughness loss is attributed to a glass transition near -40 C in the epoxy resin which forms not only the primary matrix phase but also occlusions in the rubber particles themselves. On this basis a severe loss in ductility of the particles is anticipated which, along with reduced molecular mobility in the epoxy matrix, can account for an overall decrease in composite toughness. The low temperature data, used to test the particle stretching-tearing model for toughening, are found to be consistent with the proposed theory. GRA

N82-17389# Brown Univ., Providence, R. I.
BASIC RESEARCH ON MACROMOLECULAR DYNAMICS Annual Report, Jun. 1980 - May 1981
J. H. Weiner Jul. 1981 15 p refs
(Contract GRI-5080-363-0309)
(PB82-115502; GRI-80/0075) Avail: NTIS HC A02/MF A01 CSCL 07D

A computer program is used to simulate the thermal motion of long chain molecules in solution, and the role of coordination effects in this process is investigated. The computer simulation results agree qualitatively with experiments using fluorescence spectroscopy and show that the activation energy of the process is insensitive to the degree of coordination. Theoretical analysis and computer simulation also show remarkable differences in the thermomechanical behavior of rigid and flexible models for the stretched two bond, freely jointed chain. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-17390 Defence Research Information Centre, Orpington (England).
EFFECTS ON SOLID-STATE REACTIONS DURING THERMAL DECOMPOSITION OF NITROCELLULOSE
K. M. Bucerius, N. Eisenreich, and A. Pfeil Oct. 1981 16 p refs Transl. into ENGLISH from Int. Jahrestag - Fraunhofer-Inst. fuer Trieb- und Explosivstoffe (ICT) (W. Germany), no. 7-29, 1979 p 331-344
(DRIC-T-6460; BR80787) Copyright. Avail: Issuing Activity

The influence of solid state reactions on the burning rate of modified double base solid rocket propellants was investigated. Solid phase pyrolosis was observed in an optical bomb. The decomposition reaction was thermoanalyzed and pyrolosis residues were analyzed. Carbonaceous fibers are produced by modifier effects in the solid material below the burn off surface. The thermal decomposition of nitrocellulose is accelerated by close contact with combustion modifiers, which also oxidize charcoal-like products formed during this decomposition. A direct bond of modifiers to nitrocellulose withstands solvents. The bond produces a good degree of distribution at smaller outlay than other methods. Author (ESA)

N82-17391# Buderus A.G., Wetzlar (West Germany).
PROMOTION OF UTILIZING PRIMARY ENERGY AND REDUCTION OF EMISSION WITH GRATE-EQUIPPED HEAT GENERATORS FIRED COMPLETELY AUTOMATIC WITH SOLID FUELS Final Report, Dec. 1980
Eberhard Nickel and Guenter Hoefeld Bonn Bundesministerium fuer Forschung und Technologie Dec. 1981 181 p refs Sponsored by Bundesministerium fuer Forschung un Technologie
(BMFT-FB-T-81-222; ISSN-0340-7608) Avail: NTIS HC A09/MF A01

The development of two automatic boiler systems for the combustion of anthracite and crushed coke is described. The systems differ in their output range and in the type of grate used. Both systems allow the substitution of coke or coal for fuel oil. Maintenance facilities and boiler efficiency are considered. J.D.H.

N82-17392# General Accounting Office, Washington, D. C.
DOE'S ALCOHOL FUELS AWARDS PROCESS RESULTED IN QUESTIONABLE AWARD SELECTIONS AND LIMITED SMALL BUSINESS SUCCESS
21 Aug. 1981 32 p refs
(AD-A106665; GAO/EMD-81-125) Avail: NTIS HC A03/MF A01 CSCL 21/4

The selection process used to make alcohol fuels feasibility study grants and cooperative agreement awards is reviewed. The criteria and process used to evaluate proposals and make award selections and the extent to which awards were made to large and small businesses are evaluated. Recommendations for improving the awards process are presented. DOE

N82-17393# SRI International Corp., Menlo Park, Calif.
STUDY OF FUNDAMENTAL CHEMICAL PROCESSES IN EXPLOSIVE DECOMPOSITION BY LASER-POWERED HOMOGENEOUS PYROLYSIS Final Report, 1 Jul. 1978 - 31 Aug. 1981
Donald F. McMillen and David M. Golden 12 Nov. 1981 64 p refs

(Contract DAAG29-78-C-0026; SRI Proj. PYU-7399)
(AD-A108022; SRI-7399; ARO-15591.2-C) Avail: NTIS HC A06/MF A01 CSCL 19/1

Very Low-Pressure Pyrolysis studies of 2,4-dinitrotoluene decomposition resulted in decomposition rates consistent with log (ks) = 12.1 43.9/2.3 RT. These results support the conclusion that previously reported 'anomalously' low Arrhenius parameters for the homogeneous gas-phase decomposition of ortho-nitrotoluene actually represent surface-catalyzed reactions. Preliminary qualitative results for pyrolysis of ortho-nitrotouene in the absence of hot reactor walls, using the Laser-Powered Homogeneous Pyrolysis technique (LPHP), provide further support for this conclusion: only products resulting from Ph-NO2 bond scission were observed; no products indicating complex intramolecular oxidation-reduction or elimination processes could be detected. The LPHP technique was successfully modified to use a pulsed laser and a heated flow system, so that the technique becomes suitable for study of surface-sensitive, low vapor pressure substrates such as TNT. The validity and accuracy of the technique was demonstrated by applying it to the decomposition of substances whose Arrhenius parameters for decomposition were already well known. IR-fluorescence measurements show that the temperature-space-time behavior under the present LPHP conditions is in agreement with expectations and with requirements which must be met if the method is to have quantitative validity. LPHP studies of azoisopropane decomposition, chosen as a radical-forming test reaction, show the accepted literature parameters to be substantially in error and indicate that the correct values are in all probability much closer to those measured in this work: log (k/s) = 13.9 - 41.2/2.3 RT. GRA

N82-17394# Pittsburg Energy Technology Center, Pa.
TRANSPORT CHARACTERISTICS OF ALTERNATE SLURRY FUELS Quarterly Technical Progress Report, Jul. - Sep. 1981
1981 9 p refs
(DE82-003019; DOE/TIC-2003019) Avail: NTIS HC A02/MF A01

Flow data for various alternate fuels, such as coal/water mixtures is obtained, in a pump loop which accurately simulates fuel feed systems found in boiler and furnace applications. Measurement and correlation of pressure loss as a function of slurry characteristics and system design is emphasized. Construction of a one inch loop was completed. Pressure transducers, thermocouples and a mass flow meter were installed and linked to a data acquisition system. A series of preliminary tests was conducted with flowing water, 60%, 63%, and 65% coal water mixtures. The bulk of the CWM's contained and additive, Lomar-D, at a dosage of approximately .5% by total mix weight. These tests were conducted primarily to evaluate the design of the loop, the adequacy of the instrumentation and the reproducibility of the CWM preparation method. The design of the loop is sound. DOE

N82-17395# Kimball (L. Robert) and Associates, Ebensburg, Pa.
BRIQUETTING OF FINE COAL USING A SODIUM CHLORIDE BINDER Final Report
E. Y. Crossmore, Jr., R. J. Kimball, and S. M. Kimball Oct. 1981 41 p refs
(Contract DE-AC01-79ET-14303)
(DE82-000632; DOE/ET-14303/T1) Avail: NTIS HC A03/MF A01

The economic and technological feasibility of producing dense, weather resistant briquettes from fine particulate bituminous coal was demonstrated. The binder consists of a sodium chloride dendritic crystalline matrix. The proclivity for liberation of pyritic sulfur and ash from fine coal particles for precombustion Deep Cleaning was investigated, in efforts to comply with clean air standards. Process technology as to coal beneficiation produces fine sized particles and handling the material after treatment is problematic. Reconstitution of this fine particulate was studied. Briquettes were produced which are equivalent to lump natural coal. Their heat value is greater as they contain less moisture and subjective burn tests for the product show a fouling index increase range. DOE

N82-17396# Spectron Development Labs., Inc., Costa Mesa, Calif.
EXPERIMENTAL INVESTIGATION OF SYNFUEL SPRAY CHARACTERISTICS AND COMBUSTION DYNAMICS Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
Jul. 1981 80 p refs
(Contract DE-AC22-80PC-30299)
(DE82-000412; DOE/PC-30299/T4; SDL-81-2176-180) Avail: NTIS HC A05/MF A01

Fundamental information on the characteristics and behavior of both petroleum based oils and synthetic fuels in spray combustion was sought by applying advanced optical diagnostic techniques to study the processes of fuel injection and atomization, droplet ignition, and spray combustion. The program was conducted in three phases: cold flow spray experiments; monodispersed droplet combustion; and spray combustion experiments. Parametric testing of all candidate injectors with number 2 fuel oil was completed. Efforts on spray characterization study were limited to completion of the final design of the traverse system for the droplet sizing interferometry (DSI). Detailed design of the monodisperse droplet combustion was completed. M.D.K.

N82-17397# American Farmers' Marketing Cooperative, Mayfield, Ky. Ethanol Div.
FEASIBILITY STUDY FOR ALTERNATIVE FUELS PRODUCTION: BIOMASS TECHNOLOGY. VOLUME 2: ADDENDUM, ECONOMIC AND FINANCIAL ANALYSIS
15 Dec. 1980 198 p refs
(Contract DE-FG07-80RA-50333)
(DE82-000030; DOE/RA-50333/T1-Vol-2) Avail: NTIS HC A9/MF A01

The feasibility of constructing and operating a motor-fuel ethanol plant is investigated. Detailed results are presented. The results of site surveys and area surveys are presented. Site preparation plans are outlined. Energy and material balances and equipment requirements are established as a part of the overall procedure to validate costs. Process flow sheets are included. Detailed diagrams of the plant design are also included. The management plan for the operation of the plant is discussed. DOE

N82-17398# Fluor Engineers and Constructors, Inc., Irvine, Calif.
COAL-TO-METHANOL: AN ENGINEERING EVALUATION OF TEXACO GASIFICATION AND ICI METHANOL-SYNTHESIS ROUTE Final Report
P. A. Buckingham, D. D. Cobb, A. A. Leavitt, and W. G. Snyder Aug. 1981 126 p refs
(DE81-904235; EPRI-AP-1962) Avail: NTIS HC A07/MF A01

Results of a technical and economic evaluation of producing methanol from bituminous coal using Texaco coal gasification and ICI methanol synthesis is reported. The scope of work included: development of an overall configuration for a large plant comprising coal preparation, air separation, coal gasification, shift conversion, COS hydrolysis, acid gas removal, methanol synthesis, methanol refining, and all required utility systems and off-site facilities. Design data were received from both Texaco and ICI while a design and cost estimate were received from Lotepro covering the Rectisol acid gas removal unit. The plant processes 14,448 tons per day (dry basis) of Illinois No. 6 bituminous coal and produces 10,927 tons per day of fuel-grade methanol. An overall thermal efficiency of 57.86 percent was calculated on an HHV basis and 52.64 percent based on LHV. Total plant investment at an Illinois plant site was estimated to be $1159 million dollars in terms of 1979 investment. Using EPRI's economic premises, the first-year product costs were calculated to $4.74 per million Btu (HHV) which is equivalent to $30.3 cents per gallon and $5.37 per million Btu. DOE

N82-17399# Hydrocarbon Research, Inc., Lawrenceville, N. J.
H-COAL PROCESS IMPROVEMENT STUDY: BENCH-UNIT BASELINE RUN WITH PREHEATER/REACTOR
May 1981 57 p
(Contract DE-AC05-77ET-10152)
(DE82-002572; DOE/ET-10152/T2) Avail: NTIS HC A04/MF A01

The thermal dissolution of coal and its effects on the mechanism of coal liquefaction in an H-Coal system were

investigated. The two-state coal liquefaction system consists of a coal slurry preheater and a liquefaction reactor, a catalytic-hydrogenation-reactor. The preheater design and unit modifications are discussed. The objective of the run reported was to obtain baseline data with the preheater integrated in the bench unit system. Operating conditions and results are summarized and compared with those of previous bench runs without a preheater. The effect a preheater has on product yields and product quality was determined. Based on comparison data it is concluded that a preheater tends to increase heavy liquid yields with more residual oil and a higher proportion of heavy distillates in the distillate product. However, more experimental data at comparable operating conditions, with and without a preheater, are needed to confirm this observation. The experimental run closely simulated the conditions of another run which also included a preheater; however, product yields differed by as much as 6 w %. The higher slurry space velocities in the preheater for this run correspond to lower slurry residence times, which resulted in lower yields of lighter fractions than obtained in PDU Run 5.
DOE

N82-17400# Cummins Engine Co., Inc., Columbus, Ohio.
SYNFUEL MODIFIED DIESEL Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
1981 16 p
(Contract DE-AC03-79ET-15450)
(DE82-002298; DOE/ET-15450/T18) Avail: NTIS HC A02/MF A01

A two-year program was proposed to test three diesel engines operating on coal-derived liquid fuels and compare the results with standard diesel fuel oil No. 2; namely: (1) prechamber diesel; (2) dual fuel diesel (direct injection); and (3) spark-assisted diesel engines. The three types of diesel engines tested were to be modified in three forms; (1) conventional water-cooled; (2) waterless-uncooled; and (3) adiabatic (uncooled). Only the conventional water-cooled prechamber diesel engine and the spark assisted prechamber diesel engine were studied. Subcontracts were let to test the prechamber diesel engine and the spark-assisted prechamber. The direct injection dual fuel engine test will be delayed until the second year of the contract. No engine modifications for waterless-uncooled and adiabatic uncooled are scheduled for the first year. The selected engine models were installed in the laboratory. Preliminary operation was made. Both subcontractors began to construct a particulate measuring system according to recommendations.
DOE

N82-17401# Chevron Research Co., Richmond, Calif.
REFINING AND UPGRADING OF SYNFUELS FROM COAL AND OIL SHALES BY ADVANCED CATALYTIC PROCESSES Interim Report
R. F. Sullivan, D. J. ORear, and H. A. Frumkin Sep. 1981 319 p refs
(Contracts DE-AC22-76ET-10532; EF-76-C-01-2315)
(DE82-001127; DOE/ET-10532/T3; FE-2315-61; IR-5) Avail: NTIS HC A14/MF A01

Two coal syncrudes derived from Illinois No. 6 and Wyodak coals were refined in a extensive program which included pilot plant and laboratory studies. These studies demonstrated that advanced, commercial petroleum technology can be used to refine these syncrudes to gasoline, jet, diesel and heating fuels. The coal syncrudes have a low hydrogen content, compared to petroleum, and high concentrations of oxygen and nitrogen impurities. These syncrudes are a blend of two coal distillates boiling between C sub 5 and 680 F. Consequently, they contain no residual and have about 95% boiling in the gasoline or diesel fuel ranges. With these properties, an appropriate way to refine the syncrudes is by hydroprocessing. Hydroprocessing yields a volume of finished products which is almost equivalent to the original volume of syncrude. In addition, the heteroatoms are ultimately removed as sulfur and salable ammonia. The engineering studies provided estimates of the refining costs.
DOE

N82-17402# Chevron Research Co., Richmond, Calif.
REFINING AND UPGRADING OF SYNFUELS FROM COAL AND OIL SHALES BY ADVANCED CATALYTIC PROCESSES Quarterly Report, Apr. - Jun. 1981
R. F. Sullivan and D. J. ORear Sep. 1981 35 p
(Contracts DE-AC22-76ET-10532; EF-76-C-01-2315)
(DE81-030849; DOE/ET-10532/T2) Avail: NTIS HC A03/MF A01

Samples of solvent refined coal 2 middle and heavy distillates were water-washed and blended for use in a study of the potential biological hazards of synthetic crudes. A pilot plant screening was started on the blended distillate. Syncrude derived from Big Brown Texas lignite was analyzed and hydrotreated in a pilot plant. Early results show that properties and response to hydrotreating of the syncrude are similar to the results found on H-coal and solvent refined coal 2 syncrudes.
DOE

N82-17403# European Space Agency, Paris (France).
EVALUATION OF A PYROTECHNIC ACTUATOR CONCEPT BY MEANS OF THE PROBIT STATISTICAL METHOD. JUSTIFICATION OF THE CHOICE OF THIS METHOD; APPLICATION; EXAMPLES OF APPLICATION
C. Tarrieu Nov. 1981 47 p Transl. into ENGLISH of "Evaluation d'un Mecanisme Pyrotech. au Moyen de la Methode Statistique 'Des Probits'. Justification du Choix de Cette Methode. Mise en Oeuvre. Exemples d'Application" Rept. CNES-78/CT/PRT/SST/SE/72 CNES, Toulouse Original report in FRENCH previously announced as N81-20310
(ESA-TT-694; CNES-78/CT/PRT/SST/SE/72) Avail: NTIS HC A03/MF A01

An aging model and ignition tests are evaluated using the probits method. Results show that experimental reliability of pyrotechnic valves, a cable cutter, or any other pyromechanism can be determined to within a 90% confidence limit, given a minimum sampling of 25 units.
Author (ESA)

N82-17404# Institute of Gas Technology, Chicago, Ill.
RAPID-RATE BITUMINOUS COAL GASIFICATION Final Report, Sep. 1978 - Dec. 1980
D. Q. Tran Aug. 1981 71 p refs
(Contract GRI-5011-322-0082)
(PB82-115478; GRI-79/0104) Avail: NTIS HC A04/MF A01 CSCL 21D

A free-fall, laminar-flow reactor capable of studying the devolatilization of caking coals was constructed. The unit can provide kinetic data as a function of several process variables, including temperature, pressure, residence time and reactive gas composition at temperatures to 1600 F and pressures to 1500 psig. The reactor system was used successfully to obtain devolatilization data for two caking coals, Illinois No. 6 and Pittsburgh No. 8. Limiting (maximum) yields of CO, CO2, H2O, and CH4 were obtained for these two coals, and correlations were developd to predict the yield of these species from the H/C and O/C ratio of the raw coal.
Author (GRA)

N82-17405# General Electric Co., Philadelphia, Pa. Reentry Systems Div.
LAND BIOMASS PROGRAM Annual Report, Jan. - Dec. 1980
K. Jain Mar. 1981 132 p refs
(Contract GRI-5011-323-0159)
(PB82-117391; GRI-80/0030) Avail: NTIS HC A07/MF A01 CSCL 21D

Integrated processes including production, harvesting, and conversion, to produce methane from land based crops that are cost competitive on a commercial basis with alternative sources of energy were developed. Sixteen candidate species of woody and herbaceous biomass were selected based on their superior productivity, adaptability to varying conditions, digestibility, and other selection criteria. Field samples of these species grown under relatively managed or monitored conditions were collected and analyzed for chemical composition. The composition analyses were completed, and on selected species anaerobic digestion and thermal gasification tests were conducted to obtain methane yield data. A regional program plan was also developed on production of methane from biomass for the state of Florida.
GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-17406# Eureka Labs., Inc., Sacramento, Calif.
THERMALLY-INDUCED VENTILATION APPLICATIONS IN

ATRIA: A STATE-OF-THE-ART REPORT

S. K. Leung, D. B. Kazama, R. E. Pierson, H. Sobin, T. M. Tam, D. Trenschel, and M. F. Young 15 Oct. 1981 205 p refs
(Contract DE-AC03-80SF-11511)
(DE82-001086; DOE/SF-11511/T3) Avail: NTIS HC A10/MF A01

The state of the art of an overall passive cooling project is reported. The project of selecting atrium sites to investigate thermally induced heat transfer and ventilative cooling to collect experimental data from which to develop design guidelines, and to establish heat transfer and ventilation algorithms. Interest is in passive cooling of commercial buildings but passive cooling of residential structures is also considered. Passive heating functions are addressed. The information consists of five parts: (1) review of historical and world wide atria; (2) technical considerations of atria; (3) existing heat transfer and ventilation algorithms and computer programs to analyze the energy functions of an atrium; (4) identification of existing atria in the U.S.; and (5) information pertinent to atria. DOE

N82-17407# Michigan Univ., Ann Arbor. Architectural Research Lab.

SOLARIZATION/CONSERVATION TECHNOLOGY DEVELOPMENT FOR EXISTING HOUSING Progress Report

W. Oberdick 1 Jun. 1981 34 p
(Contract DE-FG02-80R5-10227)
(DE82-002175; DOE/R5-10227/2) Avail: NTIS HC A03/MF A01

The project objectives were to develop a method for evaluating existing residences for their energy solarization/conservation potential as well as carrying out the solarization/conservation work within context of the Community Development program; and to demonstrate appropriate methods of utilizing solar energy in existing Ann Arbor residences beyond that obtainable in a good conservation program. A general progress update is presented covering tasks related to community solarization/conservation characteristics and community system analysis and development. The process of selection and technical evaluation of houses for solarization/conservation project directed retrofit is described. A detailed report on the survey of utility data and a report on the solarization/conservation site audits are included. A detailed comparison of the audit data for both the audit and control group are appended. DOE

N82-17408# Virginia Highway and Transportation Research Council, Charlottesville.

ILLINOIS METHOD FOR THE DESIGN OF DENSE-GRADED EMULSION BASE MIXES Final Report

C. S. Hughes Jun. 1981 30 p refs
(PB82-103235; VHTRC-81-R53; FHWA/VA-81/R53) Avail: NTIS HC A03/MF A01 CSCL 13B

The practicality of the use of a basic test method was evaluated. The use of the Illinois equation for predicting trial asphalt content is described and the results of resilient modulus tests are given. A cure and soak procedure that can be used to expedite designs by the Illinois method is also described. GRA

N82-17409# Energy and Environmental Engineering, Inc., Cambridge, Mass.

INVESTIGATION OF IN-SITU GELATION TO CONTROL EMISSIONS FROM ABANDONED HAZARDOUS WASTE SITES Final Report

J. F. Porter 29 May 1981 97 p refs
(Grant NSF DAR-80-09895)
(PB82-103508; NSF/CEE-81032) Avail: NTIS HC A05/MF A01 CSCL 13B

Solutions containing nickel, cyanide, and phenol at concentrations normally expected in leachates from dump sites were permeated through soil, soil-polymer, and soil polymer ion exchange resins. The reduction in total mass flow of toxic species and the retention of toxic ions by the ion exchange resin of the soil polymer ion exchange matrix resin was determined. Results indicate that the leachate flows are reduced by an order of magnitude at approximately 10 percent polymer in soil by weight and to near zero flow at approximately 80 percent polymer in soil by weight. A continuous phase of the polymer in the soil polymer or soil polymer exchange resins matrix confirms a significant reduction in the mass flow of toxic ions dissolved in leachates. GRA

N82-17410# Upper Plains States Innovation Group, Bismarck, N. Dak.

UPGRADING UNPAVED ROADS: ROAD BASE STABILIZATION USING LIME AND FLY ASH

Jack Howley and Chris Wohlers Sep. 1981 54 p
(Grant NSF ISP-80-07661)
(PB82-103524) Avail: NTIS HC A04/MF A01 CSCL 13B

A cost-effective alternative to upgrading unpaved roads using asphalt which may cost $100,000 per mile is proposed. In lime-fly ash stabilization, road aggregate is thoroughly mixed with lime, fly ash and water to form a new road base to a depth of five or more inches; this new road base is then compacted and covered with a minimum asphaltic surface layer such as a double chip seal. Guidelines are given for evaluating whether road base stabilization using lime and fly ash (an in-expensive waste product of coal-burning power plants) is an economical alternative to asphalt in upgrading a particular road. Detailed guidelines are presented for estimating the cost of materials for a lime-flyash project as well as a description of the necessary construction and maintenance procedures. GRA

N82-17411# Midwest Research Inst., Raleigh, N.C. Emission Standards and Engineering Div.

ASSESSMENT AND CONTROL OF CHRYSOTILE ASBESTOS EMISSIONS FROM UNPAVED ROADS Final Report

Robert K. Serra and Michael A. Connor, Jr. May 1981 150 p refs
(Contract EPA-68-02-3059; ESED Proj. 7776)
(PB82-102526; EPA-450/3-81-006) Avail: NTIS HC A06/MF A01 CSCL 13C

The findings of field surveys and a test program to assess chrysotile asbestos emissions generated by vehicular use of unpaved roads surfaced with crushed serpentinite rock are presented. Included are discussions of Federal asbestos regulations, sampling and analysis procedures, human health effects, and various emission control techniques. The Enviromental Protection Agency believes that asbestos emissions which occur from unpaved roads and other dusty sources surfaced with serpentinite should be reduced to the greatest extent practical. Local, State, and Federal agencies responsible for road maintenance in the limited areas where asbestos emissions occur are in the best position to assess local conditions and implement the most appropriate control measures. GRA

N82-17412# New England River Basins Commission, Boston, Mass.

DREDGING MANAGEMENT: DATA AND ANALYSIS FOR THE NEW ENGLAND/LONG ISLAND SOUND REGION

A. Gowen Sep. 1981 150 p Sponsored in part by Water Resources Council
(PB82-111626) Avail: NTIS HC A07/MF A01 CSCL 13B

This technical assistance report is one product of the New England River Basins Commission's Long Range Dredging Study funded by the Water Resources Council, and was directed primarily to state and local officials involved in dredging management. Part 1 summarizes past dredging and future dredging projections for the New England/Long Island Sound Region. In the past decade, approximately 33 million cu yd of sediment have been dredged from New England/Long Island Sound (NE/LIS) waters. In the next decade, 1.7 million yards per year can be expected annually from Non-Corps of Engineers (CE) projects in the region. Maintenance dredging of 9.5 million cu yd is projected for the next decade. GRA

N82-17413# New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.

GROOVE DEPTH REQUIREMENTS FOR TINE-TEXTURED RIGID PAVEMENT 5: DURABILITY OF TINE TEXTURING ON PCC PAVEMENTS Interim Report

John E. Grady and William P. Chamberlin Jun. 1981 41 p refs Sponsored by Federal Highway Administration
(PB82-104951; RR-86; FHWA/NY/RR-81/86) Avail: NTIS HC A03/MF A01 CSCL 13B

The required depth for grooves on new tine textured concrete pavements in order to assure an adequate skid resistance over their entire design life is discussed. Measurements of texture depth and skid resistance, with both ribbed and smooth tires were made on 0 to 5 year-old New York pavements. Initial groove depth needs of 3/16 in. minimum were calculated from two values estimated from the study data: the minimum depth (0.050 in.) to assure adequate skid resistance with a minimally legal treaded tire, and the mean groove wear rate (0.013 in./million vehicle passes). Groove depth measurements on new concrete pavements and bridge decks indicated 21 an 14 percent compliance, respectively, with the proposed new standard of 3/16 in. minimum, and 60 and 44 percent compliance with the current standard of 2/16 in. minimum. GRA

N82-17414# Austin Research Engineers, Inc., Tex.
MATERIAL PROPERTIES TO MINIMIZE DISTRESS IN ZERO-MAINTENANCE PAVEMENTS. VOLUME 1: MODELS Final Report
J. Brent Rauhut, Freddy L. Roberts, and Thomas W. Kennedy Mar. 1981 170 p refs 2 Vol.
(Contract DOT-FH-11-9349)
(PB82-112905; FHWA/RD-80/155) Avail: NTIS HC A08/MF A01 CSCL 13B

This first volume provides results of a detailed study to: (1) identify distresses that cause significant loss of serviceability and/or maintenance in pavements; (2) identify material properties that significantly influence the occurrence of distress; (3) select the best theoretical or empirical models for predicting distress using material properties and other engineering parameters; and (4) develop a detailed research plan for utilizing the models selected to study the effects of the significant distresses and to optimize material properties for zero-maintenance pavements. The research resulting in the accomplishment of the goals described above also produced other separate and specific results that are reported and should prove useful in future research. GRA

N82-17415# Austin Research Engineers, Inc., Tex.
MATERIAL PROPERTIES TO MINIMIZE DISTRESS IN ZERO-MAINTENANCE PAVEMENTS. VOLUME 2: PARAMETER STUDY Final Report
Freddy L. Roberts, Thomas W. Kennedy, and Gary E. Elkins Mar. 1981 183 p refs 2 Vol.
(Contract DOT-FH-11-9349)
(PB82-112913; FHWA/RD-80/156) Avail: NTIS HC A09/MF A01 CSCL 13B

This second volume provides a summary of a detailed study to: (1) identify distresses that cause significant loss of serviceability and/or maintenance in pavements; (2) identify material properties that significantly influence the occurrence of distress; (3) select the best theoretical or empirical models for predicting distress using material properties and other engineering parameters; and (4) utilize the selected models to study the effects of the significant distresses and to optimize material properties for zero maintenance pavements. The emphasis of this second volume was a discussion of the results of a parameter study with selected models using a range of material properties available in conventional and nonconventional pavement materials. The effects of varying these material properties on various distresses were evaluated and the tradeoffs required were discussed. GRA

N82-17416# National Bureau of Standards, Washington, D.C. Center for Electronics and Electrical Engineering.
NEW TECHNOLOGY CHALLENGES METROLOGY
Judson C. French Jul. 1981 93 p Presented at the InterAm. Metrology Conf., Buenos Aires, 4-7 Sep. 1979 Sponsored in part by Organization of American States, Washington, D.C.
(PB82-105974; NBS-SP-611; LC-81-600063) Avail: NTIS HC A05/MF A01 CSCL 14B

Assurance of measurement quality to meet requirements for regulatory agencies, marketplace equity, and productivity and quality control in manufacturing and research is challenged by unprecedented demands for sensitivity, speed, precision, and accuracy over wide ranges of properties and signal characteristics. New approaches are needed. Examples of NBS response, principally in electrical and electronic engineering are described. GRA

N82-17417# Cambridge Univ. (England). Earthquake Engineering Research Center.
THE SEISMIC RESISTANT DESIGN OF R/C COUPLED STRUCTURAL WALLS
A. E. Aktan and V. V. Bertero Jun. 1981 240 p refs
(Grant NSF PFR-79-0894)
(PB82-113358; UCB/EERC-81/07; NSF/CEE-81040) Avail: NTIS HC A11/MF A01 CSCL 13M

Integrated analytical and experimental research on the seismic response of R/C structural wall-frame structures was conducted at U.C. Berkeley for the past decade. Recently considerable efforts were devoted to the study of the seismic behavior of coupled structural walls and their behavior in wall-frame structural systems. A survey of existing analytical and experimental work regarding the seismic response of R/C wall and coupled wall-frame systems, as well as relevant documented post-earthquake studies on these systems, are presented. An assessment of the states of the art and practice regarding the design of building structures incorporating these systems is included. Studies and design and fabrication of the required testing facility necessary for conducting the experimental investigation of seismic behavior of a 1/3-scale model of a 4 1/2-story coupled wall subassemblage belonging to a 15-story prototype structure, are described. Analytical studies of the seismic responses of the prototype buildings are summarized briefly. GRA

N82-17418# Cambridge Univ. (England). Dept. of Engineering.
LIMIT STATE DESIGN IN GEOTECHNICAL ENGINEERING
M. D. Bolton 1981 35 p refs
(PB82-113440; CUED/D-SOILS/TR-103-1981;
ISSN-0309-7439) Avail: NTIS HC A03/MF A01 CSCL 13M

The development of design procedures are summarized. Uncertainty factors in design and problems in interpreting geotechnical data are discussed. Construction concerns were studied and they include: permeability, compressibility, angle of shearing, water pressures, and the selection of limit state models. T.M.

N82-17419# Bureau of Mines, Albany, Oreg. Metallurgy Research Center.
AN INVESTMENT MOLD FOR TITANIUM CASTING
Eugene D. Calvert Jul. 1981 41 p refs
(PB82-104662; BM-RI-8541) Avail: NTIS HC A03/MF A01 CSCL 13I

The Bureau of Mines, in its effort to promote greater utilization of domestically abundant materials, conducted research on an alternate mold material that has commercial potential for titanium investment casting. Using variations of the conventional lost wax molding process, investment shell molds were formed entirely of fused, calcia-stabilized ZrO2-forming binder. Optimization of binder/slurry properties, stucco grain size and distribution, and curing practices resulted in a structurally sound investment shell that was distortion free and thermally stable. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-17420*# Future Systems, Inc., Gaithersburg, Md.
CROSS-IMPACT STUDY OF FOREIGN SATELLITE COMMUNICATIONS ON NASA'S 30/20 GHz PROGRAM
Aug. 1980 244 p refs
(Contract NAS3-21500)
(NASA-CR-165154; FSI-251) Avail: NTIS HC A11/MF A01 CSCL 17B

A comprehensive traffic demand forecast and a scenario for the transition process from current satellite systems to more advanced systems of the 1990's are presented. Systems configurations with and without the use of 30/20 GHz are described and these two alternatives are compared. It is concluded that: (1) the use of 30/20 GHz will result in increased satellite capacity, which will be needed to satisfy demand; (2) the use of 30/20 GHz will decrease the transmission cost, especially for broadband communications; (3) in some areas, particularly Europe and Japan but also the U.S., 30/20 GHz is the only available frequency band for customer premise Earth stations because of the dense terrestrial microwave networks; and (4) the development of 30/20 GHz technology will improve U.S. markets for equipment and satellites in many world regions. A.R.H.

N82-17421# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MULTIPLE-ACCESS CHANNELS WITH DIFFERENT GENERALIZED FEEDBACK SIGNALS
Aydano Barreto Carleial Sep. 1981 39 p refs Presented at the IEEE Intern. Symp. on Inform. Theory, Grignano, Italy, 25-29 Jun. 1979
(INPE-2221-PRE/017) Avail: NTIS HC A03/MF A01

A communication channel with two senders and one receiver, in which each sender observes a private feedback signal is considered. The two feedback signals are not necessarily equivalent to, or derived from the signal observed by the receivers. An achievable rate region is demonstrated for this multiple-access channel by means of a superposition coding scheme. It is shown that a rate region, previously obtained for the multiple-access channel with 'perfect' feedback to both senders, remains achievable when the feedback connection to one of the senders is eliminated. Author

N82-17422# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AN OVERVIEW ON INCOHERENT SCATTER OBSERVATIONS OF MID-LATITUDE SPORADIC E AND FURTHER COMMENTS FOR IMPROVED DATA ANALYSIS
Carlos Jose Zamlutti Oct. 1981 23 p refs Submitted for publication
(INPE-2247-PRE/031) Avail: NTIS HC A02/MF A01

Incoherent scatter observations of sporadic E were reported from measurements at Arecibo (18.3 N) in the last decade. Some important results achieved are examined as a source for improving sporadic E study referred to the stage at the beginning of the decade. Critical aspects of design and analysis are also considered for improving further experiments. Author

N82-17423# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.
CAVITY LIFETIME PHASE-SHIFT METHOD FOR SENSITIVE REFLECTANCE MEASUREMENTS AT MID-INFRARED WAVELENGTHS
M. A. Kwok, J. M. Herbelin, and R. H. Ueunten 14 Dec. 1981 27 p refs
(ATR-82(8448)-1) Avail: NTIS HC A03/MF A01

The cavity phase shift method measures high reflectances on spherical surfaces with good spatial resolution. Successful demonstration at 2.9 micron wavelength is described. S.L.

N82-17424*# Axiomatix, Los Angeles, Calif.
PRELIMINARY CENTAUR SYSTEMS ANALYSIS Final Report
Robert G. Maronde, Jack K. Holmes, and Richard S. Iwasaki 10 Dec. 1981 150 p refs
(Contract NAS9-16067)
(NASA-CR-167499; R8112-2) Avail: NTIS HC A07/MF A01 CSCL 17B

The Centaur is stored in the Orbiter payload bay on the Centaur Integrated Support System (CISS). The CISS not only cradles the Centaur prior to deployment but also provides any signal conditioning required to make the Centaur/Orbiter hardwire interfaces compatible. In addition, the CISS provides other Centaur functions such as controlling all the avionics safety features and providing all the helium supplies for tank pressurizations. Problems associated with a Centaur design concept using a transponder and two switchable antennas are defined. Solutions to these problems are presented. S.L.

N82-17425# Sheffield Univ. (England). Antennas, Propagation and Digital Image-Processing Group.
[ACTIVITIES REPORT OF THE ANTENNAS, PROPAGATION AND DIGITAL IMAGE-PROCESSING GROUP: RESEARCH IN PROGRESS] Annual Report
1981 57 p refs
Avail: NTIS HC A04/MF A01

Progress is reported in the following: (1) digital processing techniques for the in-line hologram, with an application to ultrasonic imaging; (2) antenna near-field/far-field transformation based on plane wave synthesis from a cylindrical surface; (3) microwave array systems for hyperthermia in the treatment of tumors; (4) ultrasonic quad array imaging system; (5) application of superresolution techniques to time domain reflectometry systems; (6) nondestructive measurement of complex permittivity of dielectric materials at Q-band frequencies; (7) synthetic aperture sonar; (8) refractivity profile inversion using satellite tracking data; and (9) improving the performance of microwave anechoic chambers by space diversity data acquisition and processing; (10) tomography from multiview ultrasonic and microwave diffraction data; (11) synthetic aperture ultrasonic imaging system with digital image reconstruction; (12) microwave diagnostics of the Chilbolton 25 m antenna using the OTS satellite; (13) supersupression of side lobes in linear arrays; (14) nondestructive measurements of complex permittivity of dielectric materials at X-band frequencies; and (15) the development of a subsurface microwave system. Author

N82-17426# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. d'Informatique.
A VERY HIGH THROUGHPUT NETWORK: THE ESCALIBUR PROJECT
Jean-Alain Hernandez, Eric Horlatt, Rene Joly, and Guy Pujolle Sep. 1981 7 p refs
(ENST-D-81004) Avail: NTIS HC A02/MF A01

The analysis and construction of a communication network with a very high bandwidth (approximately 1 Giga-bit per second using fiber optics) are discussed. Two applications being considered for this multipurpose network are a high quality multiservice telephone, and a documentary system which creates digital archives. The topology adopted is a ring. The communication medium and the frame structure are described, as well as access to the channel. A functional diagram of the communicator is included. A.R.H.

N82-17427# Laboratory for Electronic Development of the Armed Forces, Oegstgeest (Netherlands).
POSITIONING OF MULTI STOPBAND NOTCHES IN STAGGERED-PRF MTI FILTERS
G. A. Breems 3 Sep. 1979 35 p refs Original contains color illustrations
(LEOK-TR-1979-11; TDCK-73395) Avail: NTIS HC A03/MF A01

Positioning of multi stopband notches in staggered pulse repetition frequency moving target indicator (MTI) filters is presented as a means to control the total stopbandwidth. The MTI filter weighting factors are derived from the notch positions and the pulse period staggering by means of a well-ordered calculation method. The feasibility of this MTI technique is demonstrated by comparison of computer calculations and practical results. Author

N82-17428# Messina Univ. (Italy). Ist. di Struttura Della Materia.
SYMMETRY AND MULTIPLE ELECTROMAGNETIC SCATTERING BY A CLUSTER OF SPHERES Technical Report, Jun. 1979 - Mar. 1981
F. Borghese, P. Denti, G. Toscano, and O. I. Sindoni Aberdeen, Md. Army Armament Research and Development Command Nov. 1981 25 p refs
(Grant DA-ERO-78-G-106)
(AD-A108118; ARCSL-TR-81048) Avail: NTIS HC A02/MF A01 CSCL 20/3

A method to calculate the electromagnetic scattering properties of a cluster of spheres of arbitrary radii and (complex) refractive indexes is proposed. The approach takes proper account of multiple scattering effects and makes full use of the symmetry properties of the cluster. No approximation is required except for the truncation of the multipolar expansion describing the scattered field. Author (GRA)

N82-17429# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ANTENNA DIRECTION-FINDING CHARACTERISTIC

V. G. Peshekhonov 21 Sep. 1981 22 p refs Transl. into ENGLISH from Antenny (USSR), no. 14, 1972 p 52-60
(AD-A108110; FTD-ID(RS)T-0961-81) Avail: NTIS HC A02/MF A01 CSCL 17/3

The side lobes of the direction finding characteristic of a scanning antenna were studied. The connection between the statistical parameters of the directivity pattern and the direction finding characteristic during a monochromatic and uncorrelated wide band signal was determined. An integral parameter, the coefficient of scattering of the direction finding characteristic, was introduced, and its values were estimated. GRA

N82-17430# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

DEFENSE OF RADIO-ELECTRONIC EQUIPMENT

V. Grankin 25 Sep. 1981 20 p Transl. into ENGLISH from Voyennyy Vestn. (USSR), no. 5, 1971 p 88-92
(AD-A108114; FTD-ID(RS)T-1057-81) Avail: NTIS HC A02/MF A01 CSCL 17/4

The problems of defense and protection of radio-electronic facilities used in troop command and control systems and weaponry are addressed. Countermeasures, methods of suppression, such as jammings/interferences are discussed. The possibility of damage to sites housing the equipment from artillery, rockets/missiles, and homing devices is also discussed. M.D.K.

N82-17431# Rochester Univ., N. Y. Dept. of Electrical Engineering.

IMPULSE RESPONSE DETERMINATION IN THE TIME DOMAIN

Tapan K. Sarkar, Donald D. Weiner (Syracuse Univ.), Vijay K. Jain (Univ. of South Florida), and Soheil A. Dianat Nov. 1981 23 p refs
(Contract N00014-79-C-0598; RR0210101)
(AD-A107828; TR-81-10) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this paper two methods are presented for determining the impulse response of an object in the time domain when both the input and output time domain waveforms are specified. Pole extraction features can then be applied to the nonimpulsive portion of the impulse response to determine the SEM parameters of the object. The first method involves synthetic division and is comparatively straightforward. The second technique is a least squares method which is computationally more stable. The effect of measurement errors in the input and output waveforms is evaluated for each method. An investigation is made as to what form of the input minimizes the noise variances in the computation. Finally a generalized least squares technique is presented which yields a minimum variance unbiased estimate for the impulse response when the noise covariance matrix is known. Author (GRA)

N82-17432# Rochester Inst. of Tech., N. Y. Dept. of Electrical Engineering.

ENHANCEMENT OF POLES IN SPECTRAL ANALYSIS

Fung I. Tseng and Tapan K. Sakar Nov. 1981 33 p refs
(Contract N00014-79-C-0598; NR Proj. 371-014)
(AD-A107739; TR-81-5) Avail: NTIS HC A03/MF A01 CSCL 17/9

This paper presents a new technique for detecting a small pole in the presence of a nearby strong pole. By simultaneously applying the chirp z-transform (CZT) and a recently developed window, the new technique is shown to be able to detect and resolve a small pole. The CZT is efficient since it employs the Fast Fourier Transform (FFT) to evaluate a convolution. But unlike the FFT which is limited to the evaluation of the spectrum on the jw axis, the CZT can evaluate the z-transform on the whole complex plane. And with the use of the new window, which is designed to have a near-sidelobe level of any specified value, the CZT is shown to be able to resolve two closely spaced poles with a large difference in amplitudes. Unlike the Prony's Method, the new technique does not require predetermining the system order. No matrix inversion or solution of polynomial roots is required. Further, the new technique is a linear operation, thus even under noisy environments it yields accurate, stable results for extraction of poles from transient response data. Author (GRA)

N82-17433# Mission Research Corp., La Jolla, Calif.

ANALYTICAL REPRESENTATION OF ATLAS I (TRESTLE) Final Report

F. C. Yang and K. S. H. Lee Kirtland AFB, N. Mex. AFWL Jun. 1981 34 p refs
(Contract F29601-78-C-0082; AF Proj. 3763)
(AD-A107674; AFWL-TR-81-27) Avail: NTIS HC A03/MF A01 CSCL 20/14

Simple engineering analytical formulas are obtained for the ATLAS I fields. These formulas are derived by fitting the first TE surface wave of the ATLAS I wood platform to the field mapping data. An ad hoc term of the form te(-alpha t) is added to the analytical formulas to account for the notch in the ATLAS I field. Author (GRA)

N82-17434# Defense Communications Engineering Center, Reston, Va. Systems Engineering Div.

A MEASURE OF EFFECTIVENESS: ANALYSIS AND APPLICATION

Robert Podell Jun. 1981 39 p refs
(AD-A107886; DCEC-TN-12-81) Avail: NTIS HC A03/MF A01 CSCL 17/2

A measure of effectiveness (M.O.E.) for communications is formulated, in general, and applied to a digital path assuming; no queueing; independent Poisson (long and/or short) failures and exponentially distributed repairs. The M.O.E., the probability of reliable information completion within a tolerable delay given an environment, is evaluated for cases without and with dynamic restoral of failures via repeat transmission. Response time vs. packet length is also modelled. Without dynamic restoral, shown are: reliability is a limiting factor; relative robustness of higher bit rates for voice. With dynamic restoral, the M.O.E. approaches 1 as delay approaches infinity. Author (GRA)

N82-17435# Naval Ocean Systems Center, San Diego, Calif. EM Propagation Div.

WKB MODE SUMMING PROGRAM FOR DIPOLE ANTENNAS OF ARBITRARY ORIENTATION AND ELEVATION FOR VLF/LF PROPAGATION. CALCULATION OF VLF/LF FIELD STRENGTHS IN THE EARTH-IONOSPHERE WAVEGUIDE Interim Report, Oct. 1980 - May 1981

J. A. Ferguson and D. G. Morfitt 1 Oct. 1981 65 p refs
(Grant DNA-MIPR-81-504)
(AD-A107683; NOSC/TR-697) Avail: NTIS HC A04/MF A01 CSCL 20/14

A computer program was developed for calculating VLF/LF field strengths in the earth-ionosphere waveguide whose characteristics may vary along the direction of propagation. The computer program described in this report is a modified version of that described in NELC Interim Report 713, WKB Mode Summing Program for VLF/LF Antennas of Arbitrary Length, Shape, and Elevation. Changes consist of an increase in the number of waveguide slabs from 25 to essentially an unlimited number, more convenient formatting of the input data, especially in the reduction from three to two cards per waveguide mode, an increase in the number of allowable modes from 15 to 30, and the addition of two new output options. This program is referred to as WKBFLDS or FLD4. Use of this program is recommended in instances where the characteristics of the Earth or ionosphere vary slowly along the propagation path. GRA

N82-17436# Naval Research Lab., Washington, D. C.

HF PROPAGATION ASSESSMENT STUDIES OVER PATHS IN THE ATLANTIC Interim Report

D. R. Uffelman 26 Oct. 1981 22 p refs
(AF Proj. X0746CC)
(AD-A107599; NRL-MR-4599) Avail: NTIS HC A02/MF A01 CSCL 20/14

In September, 1980, NRL utilized Barry AN/TRQ-35 oblique sounding equipment which was deployed on board a ship operating in the Atlantic Ocean in order to test a concept to provide a real-time model update with the oblique sounder as a data source. The purpose of this work was to show that very accurate HF channel assessment was possible over paths in the local vicinity of the sounded path. Presented are initial results of an exercise encompassing two short paths (less than 900 km) in the North Atlantic. These initial results indicate that by utilizing the oblique sounder to update the MINIMUF 3.5 model developed by NOSC, a significant increase in the accuracy of short term forecasting of the Maximum Usable Frequency (MUF) can be obtained. Over a 24-hr period, RMS errors from a model driven by the 5-day running average of 10.7 cm flux were approximately 4 MHz. Utilizing the oblique sounder as an update tool, this RMS error dropped to below 1 MHz. Further results are required, however, to validate the technique over longer periods of time, different geographies, and larger operational areas. Author (GRA)

N82-17437# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Uebertragungstechnik.

AMPLITUDE DENSITY DISTRIBUTION OF A SUM OF SPEECH SIGNALS [AMPLITUDENDICHTEVERTEILUNG EINER SUMME VON VON SPRACHSIGNALEN]

Karl-Heinz Georgi Feb. 1981 17 p refs In GERMAN
(IND-FB-106) Avail: NTIS HC A02/MF A01

Signal transmission by narrow bandwidth with existing criteria of control effectiveness was investigated. Transformation to precode the coefficients is discussed. Speech is not describable as a determining time function and is interpreted as a stochastic process. The coding of the original signal by its coding value while considering its statistical characteristics is described. E.A.K.

N82-17438# National Bureau of Standards, Washington, D.C. Electromagnetic Technology Div.

SHIELDED BALANCED AND COAXIAL TRANSMISSION LINES. PARAMETRIC MEASUREMENTS AND INSTRUMENTATION RELEVANT TO SIGNAL WAVEFORM TRANSMISSION IN DIGITAL SERVICE Final Report

W. L. Gans and N. S. Nahman Jun. 1981 260 p refs Sponsored in part by Army Communications-Electronics Engineering Installation Agency, Ft. Huachuca, Ariz.
(PB82-105297; NBS-TN-1042) Avail: NTIS HC A12/MF A01 CSCL 17B

The impulse and step responses of a shielded cable using time domain terminal measurements and a physically based mathematical model for the transmission line properties of the cable are determined. A computer controlled time domain measurement system was implemented using the automatic pulse measurement system. Data are also developed for the frequency domain complex propagation function (attenuation and its related minimum phase shift). The method is applied to 12 shielded paired conductor (balanced) cables and 5 coaxial cables. Time domain responses are presented for three nominal cable lengths, 60 m (200 ft), 150 m (500 ft), and 300 m (1000 ft). GRA

N82-17240# Joint Publications Research Service, Arlington, Va.

INSTITUTE DIRECTOR DISCUSSES KRT-10 AND OTHER SPACE ANTENNAS

I. Zagura *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 38-41 Transl. into ENGLISH from Stroitelnaya Gazeta (Moscow), 12 Apr. 1981 p 3 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

N82-17096# Research Triangle Inst., Research Triangle Park, N. C.

SIGNAL PROCESSING WITH SYSTOLIC ARRAYS

R. W. Priester, K. Bromley, H. J. Whitehouse, and J. B. Clary *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs (For primary document see N82-17086 08-01)
(Contract N66001-80-C-0118)
Avail: NTIS HC A18/MF A01

N82-17110# Centre National de la Recherche Scientifique, Toulouse (France). Lab. d'Automatique et d'Analyse des Systemes.

RETRANSMISSION STRATEGIES FOR ERROR CONTROL IN PACKET TRANSMISSION PROTOCOLS [LES STRATEGIES DE RETRANSMISSION POUR LE CONTROLE D'ERREUR DANS LES PROTOCOLES DE TRANSFERT DE DONNEES]

Guy Juanole *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs In FRENCH (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17113# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.

DISPERSED SENSOR PROCESSING MESH PROJECT

Vincent A. Megna *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-17439*# Hughes Research Labs., Malibu, Calif.

A 10KW SERIES RESONANT CONVERTER DESIGN, TRANSISTOR CHARACTERIZATION, AND BASE-DRIVE OPTIMIZATION Final Report, 6 May 1980 - 15 Sep. 1981

R. Robson and D. Hancock Nov. 1981 152 p
(Contract NAS3-22471)
(NASA-CR-165546) Avail: NTIS HC A08/MF A01 CSCL 09A

Transistors are characterized for use as switches in resonant circuit applications. A base drive circuit to provide the optimal base drive to these transistors under resonant circuit conditions is developed and then used in the design, fabrication and testing of a breadboard, spaceborne type 10 kW series resonant converter. S.L.

N82-17440*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

STATE-VARIABLE ANALYSIS OF NON-LINEAR CIRCUITS WITH A DESK COMPUTER

Edwin Cohen Jul. 1981 37 p refs Submitted for publication
(NASA-TM-83876) Avail: NTIS HC A03/MF A01 CSCL 09C

State variable analysis was used to analyze the transient performance of non-linear circuits on a desk top computer. The non-linearities considered were not restricted to any circuit element. All that is required for analysis is the relationship defining each non-linearity be known in terms of points on a curve. Author

N82-17441# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.

PHASE DEMODULATOR WITH HIGH TEMPORAL AND ANGULAR RESOLUTION FOR THE MEASUREMENT OF FARADAY ROTATION BY MEANS OF A CARRIER FREQUENCY [PHASENDEMODULATOR MIT HOHER ZEIT- UND WINKELAUFLOESUNG ZUR MESSUNG DER FARADAY-DREHUNG MIT EINEM TRAEGERFREQUENZ-POLARIMETER]

Thomas Vogel Jan. 1981 88 p refs In GERMAN
(IPF-81-4) Avail: NTIS HC A05/MF A01

The relative merits of ringmixers and phase locked loops as phase demodulators in a carrier frequency polarimeter designed to measure the poloidal field intensity in a Tokamak discharge through the induced Faraday rotation are reviewed. Test results on two commercially available demodulators indicate that phase locked loops have a larger linear range and yield much smaller phase errors in the presence of amplitude modulation. A carrier frequency polarimeter, using the selected demodulators, a CO2 laser and an acoustooptical modulator, was built and tested on a solid state InSb semiconductor plasma. A phase resolution of 0.001 radian at a carrier frequency of 40 MHz was achieved. Further improvements are expected in plasma experiments using lower carrier frequencies and increased integration times. Applications to interferometry are also discussed. Author (ESA)

N82-17442# Honeywell Power Sources Center, Horsham, Pa.
HIGH EFFICIENCY LITHIUM-THIONYL CHLORIDE CELL Quarterly Report, 9 Apr. - 8 Jul. 1981
N. Doddapaneni Fort Monmouth, N.J. Army Electronics Research and Development Command Oct. 1981 48 p refs
(Contract DAAK20-81-C-0381; DA Proj. 1L1-62705-AH-94)
(AD-A107949; DELET-TR-81-0381-1; QR-1) Avail: NTIS HC A03/MF A01 CSCL 09/1

The main objectives are to evaluate the polarization characteristics of Teflon bonded carbon electrodes in the $Li/SOCl_2$ system and to improve cathode performance at high discharge rates and low operating temperatures (-40 F to 32 F). During the report period, we have studied the half-cell polarization and discharge performance characteristics of $Li/SOCl_2$ cells with and without improved cathodes. In addition, the effect of catalysts on cyclic volt-ammograms and electrolyte viscosity and conductivity relationships with operating temperature have been examined. Electrolyte properties in $Li/SOCl_2$ systems are found to contribute significantly towards the cathode overpotential. Cathodes doped with catalysts greatly minimized the activation polarization throughout the operating temperatures. Author (GRA)

N82-17443# Defence Research Establishment, Ottawa. (Ontario). Energy Systems Section.
AN OXYGEN ELECTRODE BASED ON NICKEL/COBALT SPINEL
William A. Armstrong Jul. 1981 23 p refs
(AD-A107602; DREO-R-845) Avail: NTIS HC A02/MF A01 CSCL 09/1

It has been demonstrated that nickel/cobalt spinel, $NiCo_2O_4$, can be prepared simply and inexpensively by the thermal decomposition of cobalt nitrate on sintered nickel plaque. Electrodes suitable for use in metal/air batteries and fuel cells have been developed which will reduce oxygen from the air at room temperature and a current density of 50mA/sq cm for more than a year. A modification of this electrode will perform satisfactorily for more than 200 cycles of oxygen reduction/oxygen evolution at 50mA/sq cm. Author (GRA)

N82-17444# Naval Coastal Systems Center, Panama City, Fla.
IMPEDANCE MATCHING FOR LONG CABLES CARRYING ULTRASONIC SIGNALS
John Mittleman Oct. 1981 37 p
(AD-A107935; AD-E200015; NCSC-TM-325-81) Avail: NTIS HC A03/MF A01 CSCL 09/1

Long coaxial cables, when used for ultrasonic inspection, have been known to produce extraneous signals and attenuate valid signals. In this report, the theory of transmission lines is applied to such cables and is shown to predict the unwanted phenomena. The theory is then applied to the design of matching networks composed of one resistive and one inductive component. A series R-L network placed in parallel with the transducer is shown to produce a satisfactory impedance match, and its performance is demonstrated through experiments on a 1000-foot length of coaxial cable terminated by the network and an ultrasonic transducer. GRA

N82-17445# Bendix Corp., Kansas City, Mo.
HIGH FREQUENCY SEMICONDUCTOR TESTING Final Report
L. A. Robinson Sep. 1981 16 p
(Contract DE-AC04-76DP-00613)
(DE82-000926; BDX-613-2685) Avail: NTIS HC A02/MF A01

High-frequency hybrids were tested on fixtures that used stripline techniques for matching and interconnection. A number of problems with proper grounding were encountered, along with hybrid breakage that occurred when increased force was used to improve ground reliability. The approach used in this effort generally overcame these problems. An adapter scheme was developed that permitted testing a wide variety of hybrid physical configurations on a single tester. DOE

N82-17446# Bendix Corp., Kansas City, Mo.
SOLDERABILITY IMPROVEMENTS FOR DRAG SOLDERED PWBs Final Report
M. A. Trent Sep. 1981 12 p refs
(Contract DE-AC04-76DP-00613)
(DE82-000961; BDX-613-2640) Avail: NTIS HC A02/MF A01

The causes of solderability problems on drag soldered printed wiring boards (PWBs) were investigated. Excessive removal of tin-lead from the PWB surface was found to be the major cause. A solder leveling method was incorporated to control the consistency of the tin-lead removal process. DOE

N82-17447# Bendix Corp., Kansas City, Mo.
THICK-FILM ANALYSIS: LITERATURE SEARCH AND BIBLIOGRAPHY
R. W. Gehman Sep. 1981 27 p
(Contract DE-AC04-76DP-00613)
(DE82-000960; BDX-613-2689) Avail: NTIS HC A03/MF A01

A literature search was conducted to support development of in-house diagnostic testing of thick film materials for hybrid microcircuits. A background literature review covered thick film formulation, processing, structure, and performance. Important material properties and tests were identified and several test procedures were obtained. Several tests were selected for thick film diagnosis at Bendix Kansas City. DOE

N82-17448# Westinghouse Research and Development Center, Pittsburgh, Pa.
MATERIALS RESEARCH FOR HYDROGEN-COOLED SUPERCONDUCTING POWER TRANSMISSION LINES Quarterly Report, 1 Apr. - 30 Jun. 1981
A. M. Sletten, A. I. Braginski, M. Rosado, J. R. Gavaler, J. Greggi, J. Schreurs, R. H. Hammond, J. R. Kwo, M. Perez, J. Talvacchio et al 1981 42 p refs Prepared in cooperation with Stanford Univ., Calif.
(Contract DE-AC02-89ET-29354)
(DE82-002171; DOE/ET-29354/T1; QR-7) Avail: NTIS HC A03/MF A01

Dielectric breakdown and loss measurements in liquid hydrogen and liquid hydrogen impregnated synthetic dielectrics are investigated at temperatures between 14 and 200K and at hydrostatic pressures up to five atmospheres. The effects of dissolved impurities/additives in the liquid are determined, and the self field and low field superconducting properties of high critical temperature materials at temperatures between approximately 14 and 200K are characterized. The construction of the dielectric test apparatus continued and the system of small electrodes was completed. Difficulties were encountered in the construction of the LH_2 vessels and the junction box, which have retarded their completion. DOE

N82-17449# National Bureau of Standards, Washington, D.C. National Measurement Lab.
SIXTH INTERNATIONAL CONFERENCE ON NOISE IN PHYSICAL SYSTEMS Final Report
P. H. E. Meijer, R. D. Mountain, and R. J. Soulen, Jr. Sep. 1981 429 p refs Conf. held at Gaithersburg, Md., 6-10 Apr. 1981 Sponsored in part by NBS and The Catholic Univ. of America, and NSF
(PB82-105305; NBS-SP-614; LC-81-600084) Avail: NTIS HC A19/MF A01 CSCL 09C

The full text of papers submitted to the Sixth International Conference on Noise in Physical Systems is reported. There are six categories of papers: theory; devices; 1/f noise; applications and measurement techniques; quantum noise; hot carrier noise. GRA

N82-17450# Westinghouse Electric Corp., East Pittsburgh, Pa.
EVALUATION OF CONTROL AND PROTECTION CIRCUITS Open File Report, 13 Nov. 1979 - 31 Mar. 1981
E. C. Strycula and D. A. Paice Apr. 1981 50 p refs
(Contract DI-BM-JO-308035)
(PB82-105065; BM-OFR-126-81) Avail: NTIS HC A03/MF A01 CSCL 08I

Solid state equipment offers a number of potential advantages in the coal mining industry. These advantages can only be realized, however, through careful and judicious design of the control and protection circuitry. Problems relating to the interaction of solid state equipment on the electrical system and the special design considerations that apply to solid-state circuitry are examined. Design guidelines are provided for solid-state applications in the areas of: (1) equipment operated from a dc trolley wire, (2) drive systems for surface mining equipment, (3) ac motor starters, and (4) electromagnetic interference. GRA

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

N82-17451 Yale Univ., New Haven, Conn.
BROAD-BAND ROTATIONAL CARS THERMOMETRY IN NITROGEN GAS Ph.D. Thesis
Daniel Vincent Murphy 1981 120 p
Avail: Univ. Microfilms Order No. 8126362

Coherent anti-Stokes Raman scattering (CARS) from the pure rotational Raman lines of N2 is employed to measure the instantaneous rotational temperature of N2 gas at room temperature and below with good spatial resolution. A broad bandwidth dye laser is used to obtain the entire rotational spectrum from a single laser pulse; the CARS signal is then dispersed by a spectrograph and recorded on an optical multichannel analyzer. A best fit temperature is found in several seconds with the aid of a computer for each experimental spectrum by a least squares comparison with calculated spectra. The model used to calculate the theoretical spectra incorporates the temperature and pressure dependence of the pressure-broadened rotational Raman lines, includes the nonresonant background susceptibility, and assumes that the pump laser has a finite linewidth. Temperatures are fit to experimental spectra recorded over the temperature range of 135 to 296 K, and over the pressure range of 0.13 to 15.3 atm. Emphasis is placed on the quantitative evaluation of single pulse rotational CARS as a temperature measurement technique. Dissert. Abstr.

N82-17452# Bettis Atomic Power Lab., West Mifflin, Pa.
COMPARISON OF REZONE ALGORITHMS FOR INCOMPRESSIBLE FLUID FLOW CALCULATIONS
M. M. Sussman Mar. 1981 25 p refs Backup document for AIAA Synoptic scheduled for publication in the AIAA Journal in Jul. 1982
(LOG-J12823) Avail: NTIS HC A02/MF A01

The state of the art in computational fluid dynamics has progressed to the point that the computations are performed using mesh grids which conform with temporally changing features of the flow solution itself. A comparison of two rezone algorithms designed to account for the effects of temporally changing mesh grids are presented in order to determine the one with the lesser adverse effect on the fluid flow solution. Of the two algorithms tested, the one based on interpolation is preferred over the one based on conservation of momentum. S.L.

N82-17453*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECTS OF ARC CURRENT ON THE LIFE IN BURNER RIG THERMAL CYCLING OF PLASMA SPRAYED ZrOSUB2-YSUB2OSUB3
R. C. Hendricks and G. McDonald 1982 9 p refs Presented at the 6th Ann. Conf. on Composites, Cocoa Beach, Fla., 17-21 Jan. 1982; sponsored by the American Ceramic Society
(NASA-TM-82795; E-1129) Avail: NTIS HC A02/MF A01
CSCL 20D

An analysis of thermal cycle life data for four sets of eight thermal barrier coated specimens representing arc currents (plasma gun power) of 525, 600, 800, or 950 amps is presented. The ZrO2-8Y2O3/NiCrAlY plasma spray coated Rene 41 rods were thermal cycled to 1040 C in a Mach 0.3-Jet A/air burner flame. The experimental results indicate the existance of a minimum or threshold power level which coating life expectancy is less than 500 cycles. Above the threshold power level, coating life expectancy more than doubles and increases with arc current. T.M.

N82-17454# Stiebel Eltron G.m.b.H. und Co. K.G., Holtzminden (West Germany).
DEVELOPMENT OF AN ABSORPTION HEAT PUMP SYSTEM OPERATING WITH PRIMARY ENERGY TO HEAT APARTMENT BUILDINGS. DUAL COMPONENTS MIXTURE R 22-E 181 Final Report, Jun. 1980
Karl-Heinz Schrader Bonn Bundesministerium fuer Forschung und Technologie Dec. 1981 56 p refs Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-208; Rept-1; ISSN-0340-7608) Avail: NTIS HC A04/MF A01

Tests have shown that the mixture stays stable even in extreme situations, and reproducable measurements were obtained. Deviations from the theoretical heat ratio to the measured one are only due to under-dimensioned components. The planning, development and construction of the first proto type as well as its operation, computing of data and evaluation are described. T.M.

N82-17455# Technische Univ., Aachen (West Germany). Inst. of Ferrous Metallurgy.
PRELIMINARY INVESTIGATIONS ON THE INJECTION OF A COAL-OIL-SLURRY INTO THE BLAST FURNACE Final Report
Ulrich Rejek and Friedrich Hermann Franke Bonn Bundesministerium fuer Forschung und Technologie Dec. 1981 83 p refs Sponsored by the Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-221; ISSN-0340-7608) Avail: NTIS HC A05/MF A01

The flow and pumping behaviour and sedimentation of coal-oil-slurries as a function of concentration, temperature, coal and oil type, grain size, size distribution, pipe geometry etc. were determined. The results are intended to facilitate the planning of an injection plant and to enable an assessment of the economic feasibility of such a plant. The results show that for trouble-free transportation, (without undue increase in viscosity) the maximum coal concentration is 50 percent by weight with lignite coal-oil-slurries and 65 percent by weight with bituminous low volatile coal-oil-slurries at 80 C. A fine grinding of the coals leads to high viscosity in the slurries. The utilization of coarse particles leads to a rapid sedimentation at low velocities. T.M.

N82-17456*# Stanford Univ., Calif. Dept. of Mechanical Engineering.
TURBULENT BOUNDARY LAYER HEAT TRANSFER EXPERIMENTS: CONVEX CURVATURE EFFECTS INCLUDING INTRODUCTION AND RECOVERY Final Report
T. W. Simon, R. J. Moffat, J. P. Johnston, and W. M. Kays Washington NASA Feb. 1982 217 p refs
(Grants NsG-3124; NAG3-3)
(NASA-CR-3510; HMT-32) Avail: NTIS HC A10/MF A01
CSCL 20D

Measurements were made of the heat transfer rate through turbulent and transitional boundary layers on an isothermal, convexly curved wall and downstream flat plate. The effect of convex curvature on the fully turbulent boundary layer was a reduction of the local Stanton numbers 20% to 50% below those predicted for a flat wall under the same circumstances. The recovery of the heat transfer rates on the downstream flat wall was extremely slow. After 60 cm of recovery length, the Stanton number was still typically 15% to 20% below the flat wall predicted value. Various effects important in the modeling of curved flows were studied separately. These are: the effect of initial boundary layer thickness, the effect of freestream velocity, the effect of freestream acceleration, the effect of unheated starting length, and the effect of the maturity of the boundary layer. An existing curvature prediction model was tested against this broad heat transfer data base to determine where it could appropriately be used for heat transfer predictions. S.L.

N82-17457# Helsinki Univ. of Technology, Espoo (Finland). Dept. of Chemistry.
FLUID FLOW AND GAS DISPERSION IN STIRRED TANK REACTORS Ph.D. Thesis
Jouko Laine 1981 40 p refs
Avail: NTIS HC A03/MF A01

Fluid flows, heat transfer, and dispersion of gas in stirred tank reactors was studied. Dead zone formation of the used pseudoplastic slurries was examined theoretically and experimentally to discover a suitable scale up method for these reactors. The theoretical calculations are based on theories of maximum gas flow in stirred tank reactors, and on Kolmogoroff's theories on length and velocity scales of turbulence. A method was developed for estimation of the reactor response by means of matrices. With this model the response of $\delta(t)$-pulse or step response for both batch and continuous system can be calculated. M.D.K.

N82-17458# Imperial Coll. of Science and Technology, London (England). Centre for Computational Fluid Mechanics, Heat Transfer and Combustion.

A GENERAL PURPOSE COMPUTER PROGRAM FOR MULTIDIMENSIONAL ONE AND TWO PHASE FLOW

D. B. Spalding Jun. 1981 33 p refs Presented at IMACS Meeting, Bethlehem, Penn., 1981
(NTS/81/11) Avail: NTIS HC A03/MF A01

A reliable and economical standard computer program, incorporating the well established balance laws of fluid mechanics, heat transfer and mass transfer, and structured so that particular material properties, geometries and boundary conditions could be easily incorporated is described. Its nature, current capabilities, and development possibilities are included. J.M.S.

N82-17459# Open Univ., Milton (England). Energy Research Group.

EVALUATION OF THE DESIGN, CONSTRUCTION AND OPERATION OF A GAS FUELED ENGINE DRIVEN HEAT PUMP

C. A. Phillips Jan. 1981 76 p refs
(ERG-034) Avail: NTIS HC A05/MF A01

The design, construction, testing, and evaluation of a gas fueled engine driven heat pump are considered. The heat pump, using air as its source of heat is driven by a 360 cc single cylinder marine engine converted to run on natural gas. The unit was built, installed in a laboratory, and underwent intensive performance testing. The heat pump works well and justifies the design assumptions made, having allowed for a poor performance from the particular engine used. At 6 C (ambient) an output of 14 kW with an overall efficiency or C.O.P. (total heat output/gas input) of 1.1 was achieved. Results compare favorably with a seasonal efficiency of a gas boiler of around 0.65 to 0.70. J.M.S.

N82-17460# Commission of the European Communities, Ispra (Italy). Joint Research Centre.

CONVEC: A COMPUTER PROGRAM FOR TRANSIENT INCOMPRESSIBLE FLUID FLOW BASED ON QUADRATIC FINITE ELEMENTS. PART 1: THEORETICAL ASPECTS

H. Laval 1981 54 p refs Submitted for publication 2 Vol.
(EUR-7427/I-EN-Vol-1) Avail: NTIS HC A04/MF A01

The theoretical and numerical aspects of the finite element computer code CONVEC designed for the transient analysis of two-dimensional plane or three-dimensional axisymmetric incompressible flows including the effects of heat transfer are described. The governing equations are the time-dependent incompressible Navier-Stokes equations and the thermal energy equation. The finite element method (FEM) is employed as a basic spatial discretization technique. The elements included in CONVEC are the isoparametric and subparametric quadrilaterals and triangles with quadratic local temperature and velocity fields. The pressure is given by a linear approximation and is discontinuous from one element to the other. A finite difference explicit integration scheme is used to advance the solution in time. J.M.S.

N82-17461# Commission of the European Communities, Ispra (Italy). Joint Research Centre.

CONVEC: A COMPUTER PROGRAM FOR TRANSIENT INCOMPRESSIBLE FLUID FLOW BASED ON QUADRATIC FINITE ELEMENTS. PART 2: USER'S MANUAL

H. Laval 1981 69 p ref Submitted for publication 2 Vol.
(EUR-7427/II-EN-Vol-2) Avail: NTIS HC A04/MF A01

The computer code CONVEC is a general computer program designed for the solution of transient two-dimensional incompressible fluid flow problems. The solution procedure is based on the finite element method. The class of problems treated by the present version of CONVEC are those described by the time-dependent, two-dimensional (plane or axisymmetric) form of the Navier-Stokes equations. The flow field is assumed to be laminar and the fluid Newtonian and incompressible within the Boussinesq approximation. An energy equation is also included in the formulation for problems in which heat transfer affects are important. The specific types of flow problems for which CONVEC is suitable include: isothermal flow problems; free or forced convection problems; and convective-conductive heat transfer problems including solid body heat conduction. The input data necessary to access and execute the code is described. J.M.S.

N82-17462# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.

UNIAXIAL MODEL FOR A GAS LOADED VARIABLE CONDUCTANCE HEAT PIPE

J. vanderVooren, A. A. H. Delil, and A. Sanderse 16 Jun. 1980 56 p refs
(Contract NIVR-1833)
(NLR-TR-80048-U) Avail: NTIS HC A04/MF A01

A uniaxial model for a gas loaded variable conductance heat pipe (VCHP) is developed. This model takes into account the diffusion at the vapor gas interface as well as the inertial effects of the moving vapor. Only steady state conditions are considered. The generally accepted Edwards/Marcus model is shown to be a first order approximation of this model. Also a criterion derived to identify the conditions under which the Edwards/Marcus model is feasible. Numerical examples will show that there are substantial discrepancies between the results of the Edwards/Marcus model and the present model for high values of the equivalent radial thermal conductivity of the condenser wall and wick and operating temperatures not too far from the freezing point of the working fluid. Author

N82-17463# National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.

AN IMPROVED FLAT FRONT MODEL FOR A GAS LOADED VARIABLE CONDUCTANCE HEAT PIPE

J. vanderVooren and A. Sanderse 16 Jun. 1980 26 p refs
(Contract NIVR-1833)
(NLR-TR-80049-U) Avail: NTIS HC A03/MF A01

A uniaxial flat front theory is presented for a gas loaded variable conductance heat pipe. The theory takes into account the inertial effects of the moving vapor, which can grow large under certain circumstances, but neglects the axial heat conduction of the wall and wick. A limited number of numerical examples indicates excellent agreement with the corresponding diffuse front theory. The differences with a similar flat front theory, which neglects the inertial effects of the moving vapor, can become substantial. In comparison with diffuse front based calculations, the computation times are very short. Author

N82-17464# Pennsylvania State Univ., University Park. Applied Research Lab.

INVERSE AXISYMMETRIC BODY STUDY

J. J. Eisenhuth and G. H. Hoffman 19 Aug. 1981 284 p refs
(Contract N00024-79-C-6043)
(AD-A107662; ARL/PSU/TM-81-177) Avail: NTIS HC A13/MF A01 CSCL 20/4

A potential flow inverse body method was used to generate a family of underwater bodies that would generally possess extensive laminar flow by the use of surface heat addition. Parameters specifying the pressure coefficient distribution were varied in order to find the limits of these parameters beyond which a body could not physically be generated. Length-to-diameter ratios and prismatic coefficients were computed as a function of the parameters. Specific cases representing the limits of parameters are used as examples in the graphical presentation of body contours and pressure coefficient distributions. Curves of temperature and heat flux distributions showing limits for the effective use of heat in suppressing boundary layer transition are also presented for these cases. Author (GRA)

N82-17465# California Inst. of Tech., Pasadena. Graduate Aeronautical Labs.

THE COHERENT STRUCTURE OF TURBULENT MIXING LAYERS. 1: SIMILARITY OF THE PRIMARY VORTEX STRUCTURE. 2: SECONDARY STREAMWISE VORTEX STRUCTURE
Luis P. Bernal Jun. 1981 108 p refs
(Contracts N00014-76-C-76-C-0260; N00014-C-0365; NR Proj. 062-431)
(AD-A108049) Avail: NTIS HC A06/MF A01 CSCL 20/4

The primary spanwise organized vortex structure and the secondary streamwise vortex structure of turbulent mixing layers have been investigated. Flow visualization motion pictures of a constant density mixing layer were used to measure the properties of the large scale vortices. It was found that after an initial transition region mean properties of the large scale vortices reach the expected linear growth with downstream distance required by similarity. In the self-similar region, the vortex core area and visual thickness increase continuously during its life-span. A theoretical model of probability distribution function for the large-scale vortex circulation was developed. This distribution is found to be lognormal and to have a standard deviation, normalized with the mean of 0.28. From this model the mean life-span of the vortices could also be obtained and was found to be 0.67 times the mean life-span position. The streamwise streak pattern observed by Konrad (1976) and Breidenthal (1978) in plan-view pictures of the mixing layer was investigated, using flow visualization and spanwise concentration measurements. It was confirmed that this pattern is the results of a secondary vortex structure dominated by streamwise, counter-rotating vortices. A detailed description of its spatial relation to the primary, spanwise vortex structure is presented. From time average flow pictures, the onset position and initial scale of the secondary structures were determined. GRA

N82-17466# Ballistic Research Labs., Aberdeen Proving Ground, Md.
STREAMWISE VORTICITY DECAY DOWNSTREAM OF A THREE DIMENSIONAL PROTUBERANCE Final Report
C. W. Kitchens, Jr., N. Gerber, R. Sedney, and J. M. Bartos Oct. 1981 48 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A108080; ARBRL-TR-02375) Avail: NTIS HC A03/MF A01 CSCL 20/4

Streamwise vortices generated in bounary layers are known to persist for hundreds of boundary-layer thicknesses. This remarkable property is the main topic of this report. The particular case of the flow field generated by a three-dimensional protuberance immersed in a flat plate boundary layer is studied using numerical modeling. Experimental measurements in a downstream crossflow plane are used to construct initial data for a marching calculation using the boundary-layer and boundary-region approximations; the latter includes crossflow diffusion terms. The former fails to predict the flow field, but results from the latter agree qualitatively in aspects of the flow field determined from the measurements of Tani, et al., and are also in fair quantitative agreement. Author (GRA)

N82-17467# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
METHOD FOR CALCULATING THREE-DIMENSIONAL FLOW IN BLADED TURBOMACHINE BY USING ARBITARY QUASI PERPENDICULAR INTERSECTING PLANES
Xin Xiaokang and Jiang Jinliang 9 Oct. 1981 20 p refs
Transl. into ENGLISH from Li-Hsueh(Mechanics) (China), n. 2, 1977 p 106-113
(AD-A106475; FTD-ID(RS)T-0928-81) Avail: NTIS HC A02/MF A01 CSCL 20/4

The mutual influence between two groups of flow surfaces is simultaneously considered, so that no correction need to be made from each other by successive substitution between these two groups of flow surfaces. The theory of a variable curve sample is applied. After appropriate successive substitutions of spatial streamlines, the three dimensional solution of the entire blade channel can be directly calculated, including shapes of arbitrary S sub 1 and S sub 2 flow surfaces, shapes of spatial streamlines, and the distribution of flow parameters, such as velocity and pressure. As the first step in solving the real three dimensional flow field, the approximate hypothesis that the S sub 1 flow surface is a surface of revolution is applied. The solution obtained is basically still the quasi three dimensional solution. The next step is to eliminate the hypothesis that the S sub 1 surface is a surface of revolution in order to obtain the solution of a real three dimensional flow field. Then the curvature of S sub 1 flow surface can be calculated. Author

N82-17468# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
EXPERIMENTAL INVESTIGATIONS OF GAS TRANSPORT SYSTEMS [EXPERIMENTELLE UNTERSUCHUNGEN AN GAS-TRANSPORT-SYSTEMEN]
A. J. Hautojaervi (Helsinki Univ.) and W. J. Hiller Dec. 1980 31 p refs In GERMAN
(MPIS-30/1980; ISSN-0436-1199) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,65

The supply of single radioactive atoms or molecules (with gas as a carrying agent) to measuring instruments is discussed. Gas transport systems are of simple construction. When half life of the product is shorter, the transport time from reaction chamber to collection film has to be decreased. The carrying particles often get stuck in the tube wall because of its turbulent oscillation motion. The fast gas transport system and the current path for compressible and viscous medium and transport time measurements with electrically charged aerosols is pointed out. It is shown that the expected transport efficiency of radioactive particles and the strong yield changes in the relationships of transport time with half life time is an interesting method for calculating the separation process in two phase flow. E.A.K.

N82-17469# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
[SCIENTIFIC REPORT OF THE FLUID MECHANICS RESEARCH DEPARTMENT] Annual Report, 1980
1980 105 p refs
Avail: NTIS HC A06/MF A01

Research in theoretical and experimental fluid mechanics, propulsion technology, acoustics, and aerodynamic design is reported. Boundary layer flow, high speed train aerodynamics, cryogenic wind tunnels, compressors, helicopter interior noise, and aircraft design are among the topics described. Test facilities computational methods and experimental procedures are outlined. Author (ESA)

N82-17470# Imperial Coll. of Science and Technology, London (England). Heat Transfer Section.
APPLICATION OF THE ESCIMO THEORY TO THE OXIDATION OF METHANE IN A STIRRED REACTOR M.S. Thesis - London Univ.
M. E. Sherrington Sep. 1979 243 p refs
(HTS/79/14) Avail: NTIS HC A11/MF A01

An investigation into the reaction between methane and air under turbulent conditions in a stirred reactor is proposed. Problems arising in the modeling of turbulent flows involving exothermic chemical reaction are outlined and different approaches to a solution are reviewed. The ESCIMO theory is described. A computer code which applies the ESCIMO theory to the biographic features of the multistep hydrogen-oxygen reaction is outlined and the changes necessary for program adaption to methane-air reaction are discussed. Experimental studies on the chemical kinetics and flame propagation of the methane-air system are reviewed. Results from computer simulations on near stoichiometric methane-air mixtures reflect the existence of laminar flame speed control, stretching control, and chemical kinetics control burning regimes. Grid independence tests and step size control tests carried out on stretching regime indicate a cross stream grid of 40 nodes is acceptable. Author (ESA)

N82-17471# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
DENSITY MEASUREMENTS IN GAS PARTICLE FLOWS
L. Lourenco and M. L. Riethmuller May 1981 30 p refs
(VKI-TM-32) Avail: NTIS HC A03/MF A01

Concentration distribution measurement of the particulate phase in suspension of solid particles, having diameters > 100 microns, is discussed. An analog method which uses the linear proportionality law existing between the attenuation of a narrow light beam when crossing a particle cloud and particle density is compared with a digital method which counts particles crossing a control surface (a narrow light beam) per unit time. The digital method is best for a low particle density, the analog for high density. Neither method can measure local concentration values. An automatic gain amplifier improves the digital method accuracy. Author (ESA)

N82-17472# Cambridge Univ. (England). Dept. of Engineering.

PROGRAM FINSUP: STEADY AND UNSTEADY SUPERSONIC FLOW IN CASCADES BY A FINITE ELEMENT METHOD

D. S. Whitehead 1981 27 p
(PB82-114612; CUED/A-TURBO/TR-105-1981;
ISSN-0309-6521) Avail: NTIS HC A03/MF A01 CSCL 20D

The program runs in three sections. The first section generates the mesh, the second section calculates the steady flow through the cascade, and the third section calculates unsteady pressure distributions, force coefficients and moment coefficients due to translational and torsional motion of the blades. These sections are linked by a control program. Since the program assumes potential flow it cannot deal with wakes coming from upstream and shock waves are smeared. Flow round the leading edges of thick blades is correctly handled, and the program also allows for acoustic waves propagated upstream and downstream. GRA

N82-17473 Colorado State Univ., Fort Collins.

BIFURCATING INSTABILITY OF THE FREE SURFACE OF A FERROFLUID Ph.D. Thesis

Evan Eugene Twombly 1981 73 p
Avail: Univ. Microfilms Order No. 8126459

A slab of ferro-fluid bounded below by a fixed boundary and above a vacuum was considered. If the fluid was subjected to a vertically directed magnetic field of sufficient strength, surface waves appeared. Equations which descibe this phenomena were derived. In the physical space no natural Banach space structure was available due to the free surface. A transformation of coordinates was made, mapping the surface flat. In the new coordinate system the equations define an operator between Banach spaces. The minimum eigenvalue of the linearized operator is the critical magnetic field strength where the planar surface loses stability. Using a generalized inverse of the Frechet derivative of the operator and the Implicit Function Theorem, the existence of a nontrivial branch of solutions was proved. A local stability criterion was also obtained and applied to three periodic structures: rolls, squares and hexagons. Dissert. Abstr.

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-17474 British Broadcasting Corp., Kingswood (England). Research Dept.

A DIGITAL FIELD STRENGTH MEASURING RECEIVER FOR L. F. AND M. F.

A. P. Robinson and J. H. Causebrook Nov. 1981 12 p refs
(BBC-RD-1981/7) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

The measuring receiver gives a direct reading of field strength in decibels relative to 1 micro V/m for both the electric and the magnetic field components in the l.f. and m.f. broadcast bands. Digital techniques are used extensively to give simple and reliable operation. The receiver is suitable for making measurements on the move in a car, and an omni-directional magnetic field detector is provided. T.M.

N82-17475*# Michigan Univ., Ann Arbor. Interferometry Lab.

HOLOGRAPHIC INTERFEROMETRY OF TRANSPARENT MEDIA WITH REFLECTION FROM IMBEDDED TEST OBJECTS

I. Prikryl and C. M. Vest Oct. 1981 26 p refs
(Grant NAG2-118)
(NASA-CR-168395; INTFL-8103) Avail: NTIS HC A03/MF A01 CSCL 14E

In applying holographic interferometry, opaque objects blocking a portion of the optical beam used to form the interferogram give rise to incomplete data for standard computer tomography algorithms. An experimental technique for circumventing the problem of data blocked by opaque objects is presented. The missing data are completed by forming an interferogram using light backscattered from the opaque object, which is assumed to be diffuse. The problem of fringe localization is considered. J.D.H.

N82-17476*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ACOUSTIC GROUND IMPEDANCE METER

Allan J. Zuckerwar Dec. 1981 16 p refs Presented at the 102nd Meeting of the Acoustical Soc. of Am., 3 Dec. 1981
(NASA-TM-83227) Avail: NTIS HC A02/MF A01 CSCL 14B

A compact, portable instrument was developed to measure the acoustic impedance of the ground, or other surfaces, by direct pressure-volume velocity measurement. A Helmholtz resonator, constructed of heavy-walled stainless steel but open at the bottom, is positioned over the surface having the unknown impedance. The sound source, a cam-driven piston of known stroke and thus known volume velocity, is located in the neck of the resonator. The cam speed is a variable up to a maximum 3600 rpm. The sound pressure at the test surface is measured by means of a microphone flush-mounted in the wall of the chamber. An optical monitor of the piston displacement permits measurement of the phase angle between the volume velocity and the sound pressure, from which the real and imaginary parts of the impedance can be evaluated. Measurements using a 5-lobed cam can be made up to 300 Hz. Detailed design criteria and results on a soil sample are presented. T.M.

N82-17477# National Aerospace Lab., Tokyo (Japan).

A VELOCITY VECTOR MEASURING SYSTEM WITH 13 ASYMMETRIC WEDGE TYPE YAWMETERS

Teruomi Nakaya, Hideo Hoshio, and Masayoshi Noguchi Jun. 1981 20 p refs In JAPANESE; ENGLISH summary
(NAL-TR-674; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

In order to survey the flow field around the empennage of the NAL STOL research aircraft model in the 6m low speed wind tunnel, a velocity vector measuring system with 13 asymmetric wedge type yawmeters was developed. The rotational angle of the 13 probes and the setting angle of this system are automatically controlled following the sequence previously programmed into a minicomputer system. The hardware, control modes, data reduction, and data processing are described. The accuracy of the flow angle measurement turned out to be satisfactory, but measurements of dynamic pressure and static pressure were less accurate. An example of measurements taken of the flow field around the empennage of the STOL research aircraft model is included. A.R.H.

N82-17478*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.

DEVELOPMENT OF A SIMPLE, SELF-CONTAINED FLIGHT TEST DATA ACQUISITION SYSTEM Progress Report

Ronald R. L. Renz Feb. 1981 208 p refs
(Grant NsG-4019)
(NASA-CR-168438; KU-FRL-407-6) Avail: NTIS HC A10/MF A01 CSCL 14B

A low cost flight test data acquisition system, applicable to general aviation airplanes, was developed which meets criteria for doing longitudinal and lateral stability analysis. Th package consists of (1) a microprocessor controller and data acquisition module; (2) a transducer module; and (3) a power supply module. The system is easy to install and occupies space in the cabin or baggage compartment of the airplane. All transducers are contained in these modules except the total pressure tube, static pressure air temperature transducer, and control position transducers. The NASA-developed MMLE program was placed on a microcomputer on which all data reduction is done. The flight testing program undertaken proved both the flight testing hardware and the data reduction method to be applicable to the current field of general aviation airplanes. A.R.H.

N82-17479# Danish Meteorological Inst., Copenhagen.
QD: A QUARTZ DECLINOMETER OF CLASSIC TYPE
E. Kring Lauridsen 1981 29 p refs
(DMI-Geophys-Papers-R-65; ISBN-87-7478-180-8) Avail: NTIS HC A03/MF A01

A declinometer with quartz fibre suspension is described. The magnet is a bar with the mirror fixed on the plane face and the magnet is firmly attached to the stirrup which can be clamped during transport. The theory of the suspended system is described in three dimensions and all details of measurement are given. Author

N82-17480# Pennsylvania Univ., Philadelphia. Electro-Optics and Microwave-Optics Lab.
HIGH RESOLUTION 3-D WAVELENGTH DIVERSITY IMAGING Final Report, 1 Aug. 1980 - 31 Jul. 1981
N. H. Farhat 25 Sep. 1981 62 p refs
(Grant AF-AFOSR-0281-80; AF Proj. 2305)
(AD-A107832; EO/MO-4; AFOSR-81-0731TR) Avail: NTIS HC A04/MF A01 CSCL 20/3

A physical optics, vector formulation of microwave imaging of perfectly conducting objects by wavelength and polarization diversity is presented. The results provide the theoretical basis for optimal data acquisition and three-dimensional tomographic image retrieval procedures. These include: (a) the selection of highly thinned (sparse) receiving array arrangements capable of collecting large amounts of information about remote scattering objects in a cost effective manner and (b) techniques for 3-D tomographic image reconstruction and display in which polarization diversity data is fully accounted for. Data acquisition employing a highly attractive AMTDR (Amplitude Modulated Target Derived Reference) technique is discussed and demonstrated by computer simulation. Equipment configuration for the implementation of the AMTDR technique is also given together with a measurement configuration for the implementation of wavelength diversity imaging in a roof experiment aimed at imaging a passing aircraft. Extension of the theory presented to 3-D tomographic imaging of passive noise emitting objects by spectrally selective far field cross-correlation measurements is also given. Finally several refinements made in our anechoic-chamber measurement system are shown to yield drastic improvement in performance and retrieved image quality. Author (GRA)

N82-17481# Naval Weapons Support Center, Crane, Ind. Applied Sciences Dept.
CALIBRATION OF PYROELECTRIC RADIOMETERS FOR INFRARED FLARE MEASUREMENTS Final Report, Mar. 1978 - Sep. 1979
William E. Parish and Carl E. Dinerman 1 Aug. 1981 41 p refs
(AD-A107648; NWSC/CR/RDTR-144) Avail: NTIS HC A03/MF A01 CSCL 14/2

This report describes a set of pyroelectric radiometers which have recently been set up, successfully checked out, and are now ,in use for infrared flare plume radiation measurements. These radiometers meet the criteria of system linearity, fast rise time, complete commercial availability (no modification of electronics required, for example), ambient temperature operation, and reasonably flat spectral response from the visible to mid-infrared (about 15 micrometers). The instruments are presently being used (with the addition of bandpass filters) in the 3.0-4.0, 3.0-5.0 and 4.3-5.0 micrometer regions. Calibration procedures for these radiometers are described. The basis of the calibration procedure is an Electrically Calibrated Pyroelectric Radiometer (ECPR) which is traceable to the National Bureau of Standards. The ECPR is used only as a laboratory calibration device, and is a different instrument than the set of pyroelectric radiometers used for measurement of flare radiation. The ECPR is used to calibrate a blackbody. The ECPR is fitted with the band filter identical to the filters to be used with each pyroelectric radiometer. The blackbody is then used to calibrate each pyroelectric radiometer. These measurements are plotted to obtain a voltage versus irradiance calibration curve for each band being used with the pyroelectric radiometer system. Author (GRA)

N82-17482# Spectron Development Labs., Inc., Costa Mesa, Calif.
DEVELOPMENT AND LABORATORY TESTING OF A THERMAL EMISSION VELOCIMETER FOR APPLICATION TO AN EROSION NOSE TIP TEST FACILITY Final Report, Jul. 1979 - Nov. 1980
James D. Trolinger and M. J. Houser Wright-Patterson AFB, Ohio AFWAL Aug. 1981 23 p refs
(Contracts F33615-76-C-3145; F33615-79-C-3030; AF Proj. 2404)
(AD-A107713; SDL-80-6526; AFWAL-TR-81-3080) Avail: NTIS HC A02/MF A01 CSCL 14/2

A thermal emission velocimeter concept was explored and a system was developed for use in measuring particle velocities up to 5,000 meters per second in a reentry erosion facility. The particles, ranging from 10 to 100 micrometers in diameter, are generated to study reentry nose tip erosion and ablation. The approach passively utilizes optical components of a laser transit anemometer coupled to a microprocessor data management system. The system was laboratory tested and has inherent characteristics which should produce quality data in the severe and noisy environment of a reentry test facility. The system sensitivity has been calculated to measure velocity of micrometer sized particles whose temperature are minimally 1700 K. Author (GRA)

N82-17483# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
A DURABLE, INTERMEDIATE TEMPERATURE, DIRECT READING HEAT FLUX TRANSDUCER FOR MEASUREMENTS IN CONTINUOUS WIND TUNNELS Final Report, 1 Oct. 1980 - 30 Jun. 1981
C. T. Kidd AEDC Nov. 1981 66 p refs
(AD-A107729; AEDC-TR-81-19) Avail: NTIS HC A04/MF A01 CSCL 14/2

The design and development of a high durability, intermediate service temperature (< or = 600 F), direct reading transducer for the measurement of aerodynamic heating in the continuous wind tunnels of the von Karman Gas Dynamics Facility is described. This transducer operates on the axial temperature gradient or Schmidt-Boelter measurement concept. Considerable emphasis is placed upon the practical use of finite-element, two-dimensional heat conduction code for analysis of gage behavior rather than the indiscriminate use of invalid exact mathematical solutions. Laboratory evaluation and calibration of prototype transducers at ambient temperature levels varying from 70 to 500 F are discussed. Results of wind tunnel aerodynamic heating measurements using limited numbers of prototype Schmidt-Boelter gages are presented. Recommendations for future work efforts with regard to further development and testing of this measurement concept are discussed. Author (GRA)

N82-17484# ARO, Inc., Arnold Air Force Station, Tenn.
HYPERVELOCITY IMPACT INSTRUMENTATION DEVELOPMENT Final Report, 1 Oct. 1978 - 30 Sep. 1979
P. H. Dugger and R. E. Hendrix AEDC Nov. 1981 29 p refs
(AD-A107852; AEDC-TR-81-33) Avail: NTIS HC A03/MF A01 CSCL 19/4

The instrumentation capabilities of the Arnold Engineering Development Center (AEDC) von Karman Gas Dynamics Facility's (VKF) aeroballistic ranges have been expanded to facilitate studies of hypervelocity impact-related phenomena. Two instrumentation systems for characterizing clouds of debris resulting from impact have been developed and put to use: (1) An extremely high-speed sequential laser photography system provides photographic data describing debris cloud growth characteristics at framing rates from 10,000/sec to 10 to the 7th power/sec. This system can resolve debris particles as small as 0.0001 in. (2) X-ray shadowgraph systems with exposure times of 30 nsec can record debris velocity and mass data and can discern aluminum particles as small as 0.063 in. and steel particles as small as 0.031 in. Electromagnetic radiation generated by hypervelocity impact can be explored in a variety of ways. GRA

N82-17485# Los Alamos Scientific Lab., N. Mex.
SMALL SAMPLE ASSAY STATION USERS GUIDE
E. L. Adams, S. Bourret, and M. M. Meier Mar. 1981 26 p refs
(Contract W-7405-eng-36)
(LA-8731-M) Avail: NTIS HC A03/MF A01

A system for acquisition of delayed neutron data, based on an LSI-11 with 28 K words of memory, is described. Hardware features are a six channel scaler and level sensor to determine the state of the experiment; and normal peripherals include dual floppy disk drive, line printer, and CRT terminal. The software for experiment control and for the analysis of data is presented. The protocol for assays that optimally utilize the system is suggested. S.L.

N82-17486# Fraunhofer-Inst. fuer Informations- und Datenverarbeitung, Karlsruhe (West Germany).
LEGIBILITY OF CHARACTERS WITH DIFFERENT SEGMENTATIONS AND COLORS
Hans-Joachim Reinig 1981 5 p refs Presented at 1st European Display Res. Conf. Eurodisplay 81, Munich, 16-18 Sep. 1981 Sponsored by Deutsche Forschungsgeimschaft
Avail. NTIS HC A02/MF A01

The legibility of electronically presented information, e.g., public transport timetables, was tested. The minimal and the optimal legibility conditions of short words in 5X7 dot matrix and 14 line segment characters were compared with the legibility of continuous characters. The words were presented by screen projection with decreasing size of characters with fixed distance to the subject (minimum legibility). Optimal legibility was determined subjectively. The size of characters of negative contrast has to be increased by 20 compared with positive contrast. The 5X7 dot matrix characters are as legible as continuous letters. The 14 line segment characters must be presented 1.3 times higher for the same legibility. White characters on blue background were preferred by most subjects. Author (ESA)

N82-17487# National Bureau of Standards, Washington, D.C. Office of Weights and Measures.
SPECIFICATIONS, TOLERANCES, AND OTHER TECHNICAL REQUIREMENTS FOR WEIGHING AND MEASURING DEVICES, 1982 EDITION
Sep. 1981 224 p
(PB82-113952; NBS-HB-44-1982) Avail: NTIS HC A10/MF A01 CSCL 14B

The specifications, tolerances and other technical requirements published herein comprise, in their latest form, all of the current codes as adopted by the National Conference on Weights and Measures. The Conference Committee on Specifications and Tolerances, acting at the request of the Conference or upon its own initiative, prepares from time to time, with the cooperation of the National Bureau of Standards, proposed revisions, amendments, or additions to the material previously adopted by the Conference. Such revisions, amendments or additions are then presented to the Conference as a whole, where they are discussed by weights and measures officials and representatives of interested manufacturers and industries. Eventually the proposals of the Committee are voted upon by the weights and measures officials. All of the specifications, tolerances, and other technical requirements given herein are recommended by the National Conference on Weights and Measures for official promulgation in and use by the several states in exercising their control of commercial weighing amd measuring apparatus. A similar recommendation is made with respect to the local jurisdictions within a state in the absence of the promulgation of specifications, tolerance, and other technical requirements by a state agency. GRA

N82-17488# IIT Research Inst., Chicago, Ill.
DEVELOPMENT AND EVALUATION OF AN AMBIENT VIABLE MICROBIAL AIR SAMPLER
Kerby F. Fannin and Stanley C. Vana Sep. 1981 102 p refs
Prepared in cooperation with Inst. of Gas Technology
(Grant EPA-R-805864)
(PB82-113689; EPA-600/1-81-069) Avail: NTIS HC A06/MF A01 CSCL 14B

Studies were performed to evaluate the suitability of cyclone scrubber samplers and a continuously wetted substate for detection of several types of microorganisms. The samples were evaluated in a dynamic aerosol chamber using all glass impingers as referance samplers. Comparison of a stainless steel and a glass cyclone scrubber samples for detecting Bacilius subtilis var. niger spore aerosols of about 1.1 to 3 micrometers count median diameter showed no significant differences in their relative collection efficiencies. Based upon ease of construction, present usage, and potential availability, the glass cyclone scrubber was selected for further evaluation. This sampler showed geometric mean relative collection efficiencies, for B. subtilis var. niger spore aerosols, of 52% and 68%, depending upon the composition of the disseminating fluid. Author

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-17489# Ballistic Research Labs., Aberdeen Proving Ground, Md.
APPLICATION OF A HIGH POWER LASER TO DEMILITARIZATION PROBLEMS Final Report
Ona R. Lyman Sep. 1981 34 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A106659; AD-E430684; ARBRL-TR-02360) Avail: NTIS HC A03/MF A01 CSCL 20/5

Attempts to experimentally cut rocket motors, puncture agent cavities, and perform other operations associated with demilitarization of munitions with a high power CO2 laser are discussed. Laser requirements are outlined and problems associated with laser operations contiguous with hazardous materials are highlighted. It is concluded that while the use of a CO2 laser of about 10 kilowatts output has advantages for some demilitarization operations, it is not practical for many. Author

N82-17490# Missouri Univ. -Rolla. Dept. of Physics.
KINETIC PROCESSES IN HIGH PRESSURE GASES: EXCITED STATE COLLISIONS Technical Report, Dec. 1980 - Dec. 1981
Laird D. Schearer 1 Dec. 1981 35 p refs
(Contract N00014-75-C-0477; NR Proj. 343-011)
(AD-A108128; TR-14) Avail: NTIS HC A03/MF A01 CSCL 20/5

A dense sodium vapor in a high pressure buffer of argon has been simultaneously excited by short (4 ns) laser pulses from two lasers: the first tuned to one of the D line transitions at 589 nm and the second tuned to the photoionization threshold of the 3p states near 406 nm. The temporal evolution of the system was studied with and without the photoionizing laser pulses. At early times (about 100 ns) excited state populations are determined by energy transfer collisions between two laser-excited 3p atoms while the ion/electron density is controlled by superelastic heating of seed electrons followed by electron impact ionization of excited state atoms. At late times (about 1 microsecond) excited state populations are controlled by collisional-radiative recombination processes. Excitation transfer rates into the 4d, 5d, 6d, and 6s levels are measured. The optical emission spectra of a recombining Na plasma is observed. The shift and broadening of the spectral line emission due to electron collisions is observed and the electron density calculated from shift measurements. The results agree well with electron densities obtained in the same system from Saha plots of excited state densities. Author (GRA)

N82-17491# Heriott-Watt Univ., Edinburgh (Scotland). Dept. of Physics.
SUBMILLIMETER LASER AND FABRY-PEROT SPECTROSCOPY USING METALLIC MESH Final Technical Report, Jun. 1978 - Jun. 1981
C. R. Pidgeon and B. W. Davis May 1981 79 p refs
(Contract DA-ERO-78-G-074; DA Proj. 1T1-61102-BH-57)
(AD-A107939) Avail: NTIS HC A05/MF A01 CSCL 20/5

An optically pumped submillimeter laser was constructed and investigated. Optical pumping with C-12O2-16 and isotopic C-13O2-16 were demonstrated. Using the isotopic (C-13)O2 laser 17 new submillimeter emissions were reported between 78.5 microns and 917 microns. The mode properties, stability,

and tuning characteristics of the CO2 laser were discussed. Such measurements were taken with heterodyne techniques. Cooling effects on the isotopic (C-13)O2 laser were described and resulted in increases in both the number of observed lines and output power from the laser. A high power CW CO2 laser was also described and used in the search for new submillimeter emissions. The submillimeter waveguide laser designed gave powers in excess of 1 mW throughout the submillimeter region. The design was flexible to permit a choice of coupling and waveguides of various sizes.
Author

N82-17492# Connecticut Univ., Storrs. Inst. of Materials Science.
ELECTRON BEAM/LASER GLAZING OF IRON-BASE MATERIALS Annual Progress Report
Peter R. Strutt, B. G. Lewis, and M. Kurup Jul. 1981 100 p refs
(Contract N00014-78-C-0580)
(AD-A107559) Avail: NTIS HC A05/MF A01 CSCL 20/5

Research on directed energy source processing of hard-iron base materials demonstrates the effect of environment, alloy chemistry and processing parameters on the nature of the crystal structure, distribution, and compositional variation of phases. In molybdenum high speed steels, for example, it is found that segregation resulting from convective and turbulent flow during glazing may either result in large scale phase separation or compositional variation within a phase. Another example of the importance of processing conditions is a clear demonstration of the effect of small oxide particles in inducing martensite during laser processing. A detailed analysis has been made to determine the effect of deflection coil parameters on the distortion of surface area glazing patterns. This is particularly important in developing techniques for preparing uniform rapidly solidified layers. In studying molybdenum base high speed steels the value of the carbon content is found to be important in determining delta ferrite formation and the peritectic reaction of this phase to uniform austenite and carbide phases. In contrast to M2 (where the carbon concentration is 0.85wt%) a homogeneous gamma/alpha phase mixture forms in materials with a carbon content of > or = 1wt%, i.e. the alloys M7, and M42. However in these two materials combined convective and turbulent flow during glazing results in a significant composition variation of the refractory elements. Tempering largely removes this inhomogeneity and results in the formation of a homogeneous tempered martensite structure. A most important effect observed in M2, M7, and M42 was the shift to longer tempering times of material glazed at moderate to high beam velocities.
GRA

N82-17493# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
NOTE ON PLANAR UNDULATOR WIGGLER SINGLE ELECTRON MOTION Final Report
Robert Cawley 15 Jun. 1981 26 p refs
(ZR00001)
(AD-A108051; NSWC/TR-81-227) Avail: NTIS HC A03/MF A01 CSCL 20/5

Single particle motion in a planar undulator wiggler free electron laser magnetic field configuration is set up and examined for the construction of invariants, preparatory to specifying beam equilibria for input to a Maxwell-Vlasov analysis. Two invariants are immediately available, the energy gamma and one component of transverse canonical momentum P sub y. In an effort to find a third invariant, or a basis of determination for an advantageous approximate third invariant, which can be associated with the axial periodicity of the field, a variable change having some interesting features is reported here. The axial motion between Z = + or infinity is converted to the oscillations of a particle in an infinitely long, axially reflecting box. The transit of a half-cycle of wiggler oscillation, absolute value of Delta Z = Pi/k sub 0, corresponds to a single bounce between Z = + or - infinity, where Z is the new coordinate. Transverse coordinates and velocities are continuous at each axial reflection from infinity.
Author (GRA)

N82-17494# Battelle Columbus Labs., Ohio.
MOLECULAR INTERACTIONS WITH MANY-BODY PERTURBATION THEORY Final Report
Rodney J. Bartlett 11 Sep. 1981 82 p refs
(Grant AF-AFOSR-3661-78; AF Proj. 2301)
(AD-A107616; AFOSR-81-0694TR) Avail: NTIS HC A05/MF A01 CSCL 20/5

Very efficient computer codes to perform many body perturbation theory (MBPT) and coupled cluster method (CCM) calculations were written and employed for the first time in large scale ab initio calculations of potential energy surfaces.
Author (GRA)

N82-17495# Aerodyne Research, Inc., Bedford, Mass. Center for Chemical Environmental Physics.
MEASUREMENT OF FLUORINE ATOM CONCENTRATIONS AND REACTION RATES IN CHEMICAL LASER SYSTEMS Annual Report, 23 Jul. 1980 - 23 Jul. 1981
Alan C. Stanton Sep. 1981 18 p refs
(Contract F49620-80-C-0100; AF Proj. 2301)
(AD-A108072; ARI-RR-272; AFOSR-81-0772TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

The line positions of two components of the fluorine atom ground state fine structure transition were measured with diode laser absorption spectroscopy, using a water vapor pure rotational line at 404.077/cm as a wavelength reference. These results imply a spin orbit splitting for fluorine of 404.142 + or - 0.01/cm. Further experiments planned in the program will provide data on the temperature dependent line broadening parameters for foreign gas broadening of the F atom transitions. In addition, F atom recombination rates will be studied using the diode laser measurements technique. It is anticipated that the results of this program will provide all data required for implementation of this technique as an in-situ F atom diagnostic in chemical laser systems.
GRA

N82-17496# Kigre, Inc., Toledo, Ohio.
THE DEVELOPMENT OF A HIGH AVERAGE POWER GLASS LASER SOURCE Progress Report
30 Sep. 1981 4 p ref
(Contract N00014-81-C-2376)
(AD-A107582) Avail: NTIS HC A02/MF A01 CSCL 20/5

During September, 1981, the majority of the effort expended was concerned with the tailoring of the pump-window filter and the acquisition of the necessary re-draw equipment. We are also submitting a special report on the fluorescent pumping aspects of the filter development. The specific activities occurring are delineated per their respective task as follows: Q-100 Property Measurement; The Cladding of Q-100; Selective Filtering and/or Energy Transfer to Reduce Thermal Loading; Glass Strengthening, and Alternate Pump Sources.
GRA

N82-17497# Kigre, Inc., Toledo, Ohio.
THE DEVELOPMENT OF A HIGH AVERAGE POWER GLASS LASER SOURCE Progress Report
John D. Myers 31 Aug. 1981 3 p
(Contract N00014-81-C-2376)
(AD-A107583) Avail: NTIS HC A02/MF A01 CSCL 20/5

During August, 1981, work was concentrated primarily in the area of selective filtering. Dr. Rapp has been retained as a consultant. His credentials are impeccable; he is the inventor of ED-2 and other silicate and phosphate laser glass. He also has extensive research experience in rare-earth doped glasses, sensitization schemes, and other such areas of quantum electronics and glass science. The same format dealing with the following efforts: (1) Q-100 Property Measurements; (2) the Cladding of Q-100; (3) Selective Filtering and/or Energy Transfer to reduce Thermal Loading; (4) Glass Strengthening; and (5) Alternate Pump Sources.
GRA

N82-17498# Union Carbide Corp., Oak Ridge, Tenn. Nuclear Div.
A 16 MUON CO2 BENDING MODE LASER SYSTEM
W. H. Kasner (Westinghouse Research and Development Center, Pittsburgh, Pa.), V. A. Toth (Westinghouse Research and Development Center, Pittsburgh, Pa.), and M. A. Akerman 2 Jun. 1981 19 p ref Presented at the Conf. on Lasers and Electro-Optics, Washington, D.C., 10 Jun. 1981
(Contract W-7405-eng-26)
(DE81-030123; K/ET-5023; CONF-810613-11) Avail: NTIS HC A02/MF A01

A 16 bending mode laser system yielding output energies of 40 to 50 mJ/pulse is described. This system uses resistor ballasted pin-pin electrodes and transverse pulsed electrical discharge excitation of cold C2:N2:He gas mixtures. DOE

N82-17499# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
SOME RESULTS OF NUMERICAL EXPERIMENTS ON THE COMPUTATION OF THE KOOTWIJK AND WETTZELL SATELLITE LASER RANGING STATION COORDINATES
K. F. Wakker and B. A. C. Ambrosius Sep. 1981 11 p refs Presented at 4th LAGEOS Working Group Meeting, Greenbelt, Maryland, Sep. 1981
(VTH-M-409) Avail: NTIS HC A02/MF A01

Results from a study of the effects on orbital and parameter solution of spatial, temporal, and geographical distribution of laser ranging data are presented. Data arcs from LAGEOS, Starlette and GEOS 3 are summarized. The LAGEOS solution for the Wettzell coordinates is unaffected by the selection of gravity models. The Starlette estimate varies by several meters. The best GEOS 3 result is obtained using GEM 10 B. Wettzell is placed 17m eastward of the Modified New Orleans coordinate estimate. The LAGEOS solution for the Kootwijk-Wettzell baseline agrees well with other solutions. Author (ESA)

N82-17500# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
PRELIMINARY RESULTS OF SEASAT ORBIT DETERMINATIONS FROM LASER RANGE AND EUROPEAN DOPPLER RANGE-RATE OBSERVATIONS
K. F. Wakker, B. A. C. Ambrosius, and T. vanderPloeg Sep. 1981 19 p Presented at 4th LAGEOS Working Group Meeting, Greenbelt, Md., Sep. 1981
(VTH-M-411) Avail: NTIS HC A02/MF A01

A Seasat data arc is analyzed in order to: gain experience in computing accurate orbits from laser ranging data; assess gravity and surface force model accuracy; determine the positions of five European Doppler stations relative to a global NASA ground station coordinate solution; and study the effects of European Doppler range-rate data on the orbital solution. The PGS S3 and S4 models yield better results than GEM 9 or GEM 10B. More data must be analyzed since one arc is not representative, especially considering that orbital coverage in that arc is not good. Author (ESA)

N82-17501# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
KALMAN FILTER SATELLITE ORBIT IMPROVEMENT USING LASER RANGING MEASUREMENTS FROM A SINGLE TRACKING STATION
K. F. Wakker and B. A. C. Ambrosius Sep. 1981 18 p refs Submitted for publication Sponsored by Ministry of Education and Delfts Hogenshoolfonds
(VTH-M-414) Avail: NTIS HC A02/MF A01

The accuracy of a computer program (SORKA) which uses the laser range observations acquired at one tracking station in order to provide real time position prediction updates during a pass is assessed. The program is compared with a GEODYN GEOS 1 orbit solution. State vector differences are interpreted as SORKA estimate errors and are transformed into errors in the classical orbital elements as well as into radial, cross track and along track errors. The program was also applied to simulated GEOS 3 data. Results are presented for three GEOS 1 passes. Total position errors before the processing of the first observation of the second and third pass, (primarily errors in cross track and along track direction) are so small that at the first laser firings during the second and third pass the satellite is within the laser beam. Author (ESA)

N82-17502# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
INVESTIGATION OF D2O LASER EMISSION AT 50, 66, 83, 111, AND 116 MICRONS
G. Dodel and N. G. Douglas Aug. 1981 37 p refs Submitted for publication Sponsored in part by German Academic Exchange Service
(IPF-81-8) Avail: NTIS HC A03/MF A01

The far IR laser transitions in D2O, pumped by the 9P(32) line of a multimode CO2 TEA laser, were investigated. A line at 111 microns is reported. The spectral properties of the strongest lines (66, 111, 116 microns) were studied. Strong frequency pulling at 66 microns was observed. Suppression of axial modes was below that required, e.g., by a heterodyne Thomson scattering experiment. The 50 micron transition exhibits an unexplained afterpulsing at low pressures. At 111 microns a double pulse seen at certain pressures is attributed to the double nature of the transition. The dominant component displays a smooth pulse shape, making it suitable for Thomson scattering applications if it can be scaled to the necessary power level. Author (ESA)

N82-17503 American Univ., Washington, D. C.
INVESTIGATION OF A CASCADE LASER SYSTEM: THE EXCITATIONS AND INTERACTIONS OF N SUB 2 IN THE ULTRAVIOLET AND THE NEAR INFRARED Ph.D. Thesis
John Slaven Kruger 1981 276 p
Avail: Univ. Microfilms Order No. 8125428

Optical Interactions between electronic vibrational states of the diatomic N2 molecule are studied. Laser oscillation in N2 occurs quite readily in electrical discharges on an ultraviolet and a near infrared (IR) system of emission bands, among others. While the mechanisms that produce population inversions for the uv oscillation have previously been established for the most part, the dominant mechanisms for the IR bands were not at all certain. Specific information about N2 as a lasing material was sought. It was determined that the IR laser transitions are excited partly through a cascade involving UV laser transitions. A concise theory of cascade interactions and excitations was developed to predict both spontaneous and stimulated emission strengths. A more sophisticated theory which took the electron energy distribution of the laser's excitation into account was used to predict spectra. The typical 3 level rate equation theory was extended for a pulsed laser application to a 4 level system including cascade. This research concluded that the Frank-Condon Principle is a powerful quantitative tool for analyzing interactions. Dissert. Abstr.

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-17504# National Aerospace Lab., Tokyo (Japan).
AN INVESTIGATION OF THE EARLY DETECTION OF DEFECTS IN BALL BEARINGS BY THE VIBRATION MONITORING
Shoji Hoshiya, Katsumi Seki, Kenji Nishio, and Toshio Miyachi Jul. 1981 21 p refs In JAPANESE; ENGLISH summary
(NAL-TR-675; Rept-2; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Utilizing a life test rig for rolling element bearings, the time histories of the vibration of grease lubricated test ball bearings were monitored. Vibration was detected by a piezoelectric accelerometer mounted on the bearing housing and was recorded by a magnetic tape recorder which was controlled by a microcomputer. In total, twenty-seven bearings were tested, and flaking failures were generated in twenty-six of them; nineteen on the outer races, five on the inner races and two on the balls. In most cases, flakings grew gradually with obvious changes of vibration, thus enabling the early detection of the defects in the bearings. However, in some bearings, flakings were generated very rapidly, limiting the usefulness of the condition monitoring. Author

N82-17505# Texas Research Inst., Inc., Austin.
THE APPLICATION OF MECHANICAL CLAMPS TO PORTSMOUTH CONNECTORS Final Report
D. E. Glowe and S. L. Arnett 23 Nov. 1981 73 p
(Contract N00173-79-C-0129)
(AD-A107632; NRL-MR-4602) Avail: NTIS HC A04/MF A01 CSCL 13/9

The efficiency of mechanical clamps applied to the molded boot of the MIL-C-24231 (Portsmouth) underwater connector was investigated. A mission profile for underwater connectors was prepared and used to design laboratory test sequences to evaluate connector leakage. A test connector was designed that

incorporated the important features of the Portsmouth connector with the addition of leakage monitors in the construction so that leakage paths in the connector could be identified during test. Construction variables of polyurethane or neoprene boots, both bonded and unbonded, clamp design and shielded or unshielded cable were investigated using factorial experimental design and analysis. A preferred clamped connector configuration was determined. Preferred test connectors were manufactured using bonded neoprene boots, shielded cable and Band-It Preform clamps and compared to a standard non-clamped polyurethane connector in accelerated life testing. It was determined that a mechanical clamp inhibits leakage in a connector. Although applying a clamp to a connector does not insure water-tight integrity, it was found that after 32 weeks of accelerated life testing, 78% fewer clamped connectors leaked than the control unclamped connectors. The data also indicated that neoprene and polyurethane bonds degrade with time but connectors made with neoprene molded boots were less likely to leak through a bond interface than those made with polyurethane molded boots.
GRA

N82-17506# Systems Control, Inc., Anaheim, Calif.
INITIAL ASSESSMENT OF SELECTED ADVANCED LUBRICATING OIL FILTERS
D. Hilyard Sep. 1981 31 p refs
(Contract DE-AC19-80BC-10256)
(DE82-002420; DOE/BC-10256/1) Avail: NTIS HC A03/MF A01

The potential effectiveness of advanced oil filters that claim to re-refine the oil on-board a vehicle or claim either never-drain or extended drain benefits is discussed. It was concluded that so-called re-refining filters do not actually re-refine in-service motor oil nor do they prevent depletion of additives. It was also concluded that these advanced filters may remove particles smaller than a standard oil filters removes, but the benefits are questionable.
DOE

N82-17507# CLD Group, Inc., Ventura, Calif.
FIELD DEMONSTRATION OF THE CONVENTIONAL STEAM DRIVE PROCESS WITH ANCILLARY MATERIALS Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Ron Bowman Oct. 1981 133 p refs
(Contract DE-FC03-79SF-10761)
(DE82-003040; DOE/SF-10761/1; AR-1) Avail: NTIS HC A07/MF A01

The applicability of foams to achieve mobility control and/or permeability reduction of injected steam in steam drive operations was tested. Foam chemicals were screened for thermal stability and the foam systems in porous media were emplaced. The compatibility of the emplacement techniques and the capacity of the chemical system to achieve a significant measure of mobility control over injected steam was verified. The two major reservoir problems in steam drive operations are addressed: the flow of steam through thief zones or other channels that exist at the outset of initiating operations, and the progressive increase in channelling of steam through the oil depleted, steam swept zone.
DOE

N82-17508# Consolidated Controls Corp., El Segundo, Calif.
DESIGN, FABRICATION, AND EVALUATION OF A SPIRAL-FLOW LETDOWN VALVE Final Report
H. J. Balhouse Sep. 1981 68 p refs
(DE82-900863; EPRI-AP-2044) Avail: NTIS HC A04/MF A01

A letdown valve with spiral-flow trim designed for coal liquefaction plant service was designed and tested. Letdown valves in these plants have tended to fail in a very short time due to rapid erosion of the valve trim. In the spiral-flow design, erosion is reduced by keeping velocity at a low, constant level through friction loss in a long spiraling flow path. In a field test at the SRC-1 pilot plant, the valve controlled the processes flow for over 34 hours before it became inoperative as a result of plugging due to accumulation of solids in operational areas. It is concluded that in order to realize the potential advantages of the spiral-flow concept, more development effort is needed in the areas of prevention of plugging and the application of erosion-resistant materials and coatings. Directions for future work in these areas, plus application of the concept to a non-cavitating liquid letdown valve and other pressure reduction devices, are discussed.
DOE

N82-17509# California Univ., Livermore. Lawrence Livermore Lab.
MECHANICAL ENGINEERING DEPARTMENT TECHNICAL REVIEW
R. B. Carr, ed. and R. M. Denney, ed. 1 Jan. 1981 109 p refs
(DE82-000303; UCRL-50016-81-1) Avail: NTIS HC A06/MF A01

Mechanical engineering and technical expertise are provided to prepare and field nuclear tests and to conduct analytical and experimental studies involving nuclear safety in general and seismic response of reactors in particular. Mechanical engineering services are also provided for spill effects testing at China Lake and NTS under liquified gaseous fuels program.
S.L.

N82-17510# Technische Hogeschool, Delft (Netherlands). Lab. for Machine Elements and Tribology.
FLING-OFF COOLING OF STRAIGHT SPUR GEARS
G. J. J. vanHeijningen Nov. 1981 47 p refs In DUTCH; ENGLISH summary
(WTHD-136) Avail: NTIS HC A20/MF A01

For straight spur gear teeth, withdrawal of friction generated heat from the meshing zone was investigated. Fling-off cooling techniques include conventional intermittent cooling where oil is supplied to each tooth face once per revolution of the gear. This involves a sequence of intermittent, transient forced heat convection processes. Fling-off cooling through continuous supply of oil at the roots of the gear teeth faces, e.g., through holes connecting with a manifold inside the wheel rim, also exists in contrast to continuous fling-off cooling where root supply occurs naturally through impingement of comparatively cool droplets from oil mist in the gear casing. Theory and experiment show that in intermittent cooling even moderate supply rates of gear oil to the teeth faces suffice for attaining the limiting cooling capacity inherent in the conventional centrifugal fling-off process, except for heavy-duty gears. The cooling potential of both continuous methods is examined and compared with intermittent cooling.
Author (ESA)

N82-17511# European Space Agency, Paris (France).
MAGNETIC BEARING REACTION WHEEL TESTS
L. Torres Nov. 1981 25 p Transl. into ENGLISH of "Essais d'une Roue a Reaction a Paliers Magnetiques" Rept. CNES-80/CT/PRT/SST/162 Brunswick Original report in FRENCH previously announced as N81-20444
(ESA-TT-699; CNES-80/CT/PRT/SST/SS/162) Avail: NTIS HC A02/MF A01

Torque measurements on a scale model of a SPOT satellite type, three axis stabilization reaction wheel were made. The sensing scheme of the command electronics and calibration of the tachometer are described. Counter-rotation torque is measured off the wheel axis of rotation. Characterization of the wheel bearings is emphasized. The magnetic bearing field configuration is shown, and transversal stiffness measurement of the rotor, high speed (2700 r.p.m.) friction torque measurement around the wheel axis of rotation, and measurement of the magnetic bearing torque at very low spin rate are depicted. Measurement results are presented.
Author (ESA)

N82-17512# Environmental Protection Agency, Ann Arbor, Mich. Standards Development and Support Branch.
ROLLING RESISTANCE MEASUREMENTS 106 PASSENGER CAR TIRES
Gayle Klemer Aug. 1981 44 p refs
(PB82-116625; EPA-AA-SDSB-81-3) Avail: NTIS HC A03/MF A01 CSCL 13F

A diverse range of tires currently available on the replacement passenger car tire market is investigated. One hundred-six tires from fifty different lines were tested. The rolling resistance of these tires are analyzed against other tire characteristics (tire construction, new versus retread, etc.) to gain insight as to the effects of these characteristics on vehicle fuel economy. GRA

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-17513 British Aerospace Aircraft Group, Warton (England). Materials and Development Dept.
THE ULTRASONIC INSPECTION OF C.F.C.
R. Wilson 7 Jul. 1981 12 p
(MDR-0465) Avail: Issuing Activity

Four carbon fiber composite sine wave spars, produced using various manufacturing techniques, were inspected ultrasonically. Procedures used for examining the web and the flanges are described. A quality representative test piece must be produced containing artificial defects of a known size in order to further NDI development work on these spars. A.R.H.

N82-17514*# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
ULTRASONIC AND MECHANICAL CHARACTERIZATIONS OF FATIGUE STATES OF GRAPHITE EPOXY COMPOSITE LAMINATES Final Report
James H. Williams, Jr., Hursit Yuce, and Samson S. Lee Washington NASA Jan. 1982 26 p refs
(Grant NsG-3210)
(NASA-CR-3504) Avail: NTIS HC A03/MF A01 CSCL 20K

Eight-ply (0, + or - 45, 0)s laminates of Hercules AS/3501-6 graphite epoxy composite are fabricated using various cure pressures ranging from 0.52 to 0.86 MPa and cure temperatures ranging from 150 C to 200 C. In general, the minimum composite void volume fraction is obtained at a cure temperature of 175 C and a cure pressure of 0.86 MPa, or at 200 C and 0.86 MPa. The ultrasonic attenuation at 4 MHz was found to correlate with the composite void volume fraction. Composite specimens were tested in flexural fatigue. Beyond 10,000 fatigue cycles, the ultrasonic attenuation at 4 MHz was found to increase and the flexural stiffness was found to decrease. The ultrasonic attenuation at 4 MHz of the as-fabricated composite can be correlated with the number of fatigue cycles to failure. Author

N82-17515# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
COMPARISON BETWEEN RELIABILITY, SENSITIVITY AND ACCURACY OF NONDESTRUCTIVE INSPECTION METHODS
Eric A. B. deGraaf and Paul deRijk 31 Mar. 1981 15 p refs Presented at 13th Symp. on Nondestructive Evaluation, San Antonio, 21-23 Apr. 1981
(NLR-MP-81009-U) Avail: NTIS HC A02/MF A01

A number of inspection methods in frequent use were applied to one hundred aluminium specimens fabricated purposely by the NLR, as well as to more than 220 rejected steel components of real aircraft undercarriages. It is shown that there exists a fair amount of scatter between the results of different techniques and inspectors and also between subsequent inspections by one inspector. Corrosion has a significant influence on reliability, sensitivity, and accuracy. The results of the ultrasonic inspections turn out to be rather disappointing, whereas the results of penetrant inspections tend to depend rather heavily on the specimen configuration. Fluorescent penetrant performs far better than red penetrant. Eddy current gives good moderate results. On the steel components fluorescent magnetic ink as well as magnetic rubber achieve by far the best results, at the penalty of a fair amount of spurious indications. A.R.H.

N82-17516# Missouri Univ. -Columbia. Dept. of Statistics.
ACCELERATED LIFE TESTING UNDER COMPETING EXPONENTIAL FAILURE DISTRIBUTIONS
John P. Klein and Asit P. Basu Jul. 1981 29 p Prepared in cooperation with Ohio State Univ., Columbus
(Contract N00014-78-C-0655)
(AD-A107626; TR-108) Avail: NTIS HC A03/MF A01 CSCL 12/1

Accelerated life testing of a product is commonly used to estimate parameters of devices with extremely long lifelines. The problem of analyzing accelerated life tests when the product can fail from any one of p independent causes is considered. For each component it is assumed that the time to failure distribution is exponential with a hazard rate which follows a 'power rule.' The method of maximum likelihood is used to obtain estimators of the power rule parameters when the life test is either type I, type II, or progressively censored. Estimators of each component's mean failure time and survival function are obtained. Estimators of system or subsystem survival functions are also obtained. Results of a simulation study are presented. Author (GRA)

N82-17517# Florida State Univ., Tallahassee. Dept. of Statistics.
STATISTICAL ASPECTS OF RELIABILITY, MAINTAINABILITY AND AVAILABILITY Final Report, 1 Sep. 1980 - 31 Aug. 1981
Myles Hollander and Frank Proschan Oct. 1981 8 p refs
(Grant AF-AFOSR-0038-81; AF Proj. 2304)
(AD-A107618; AFOSR-81-0728TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The main thrust of the research was in the development of methods and concepts in reliability, availability, and maintainability, presently applicable and potentially applicable to the programs of the Air Force in particular and the Department of Defense in general. In addition, because of the general nature of the mathematical and statistical research performed, the results obtained are of value in a variety of other applied areas, and in mathematical and statistical theory. Author (GRA)

N82-17104# Boeing Military Airplane Development, Seattle, Wash. Digital Flight Controls Research Dept.
STAGE-STATE RELIABILITY ANALYSIS TECHNIQUE
Alan D. Stern *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 7 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N82-17518 British Aerospace Aircraft Group, Warton (England). Materials and Development Dept.
AN ELECTRICAL METHOD FOR THE MONITORING OF FATIGUE CRACK GROWTH
M. J. Sanders 8 Jul. 1981 9 p
(BAe-MDR-044) Copyright. Avail: Issuing Activity

Due to increasing demand for crack propagation data an electrical potential method for crack growth monitoring was developed for constant amplitude and Falstaff loaded specimens. The use and limitations are discussed. Author

N82-17519*# Boeing Aerospace Co., Seattle, Wash.
DESIGN, FABRICATION AND TEST OF GRAPHITE/POLYIMIDE COMPOSITE JOINTS AND ATTACHMENTS FOR ADVANCED AEROSPACE VEHICLES Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
Hampton, Va. NASA. Langley Research Center Jul. 1981 62 p refs
(Contract NAS1-15644)
(NASA-CR-159115; QTPR-8) Avail: NTIS HC A03/MF A01 CSCL 20K

The development of several types of graphite/polyimide (GR/PI) bonded and bolted joints is reported. The program consists of two concurrent tasks: (1) design and test of specific built up attachments; and (2) evaluation of standard advanced bonded joint concepts. A data base for the design and analysis of advanced composite joints for use at elevated temperatures (561K (550 deg F)) to design concepts for specific joining applications, and the fundamental parameters controlling the static strength characteristics of such joints are evaluated. Data for design and build GR/PI of lightly loaded flight components for advanced space transporta-

tion systems and high speed aircraft are presented. Results for compression and interlaminar shear strengths of Celion 6000/PMR-15 laminates are given. Static discriminator test results for type 3 and type 4 bonded and bolted joints and final joint designs for TASK 1.4 scale up fabrication and testing are presented.
E.A.K.

N82-17520*# Engineering Information Systems, Inc., San Jose, Calif.
SPAR REFERENCE MANUAL UPDATE SPAR LEVEL 15 Final Report
W. D. Whetstone Mar. 1980 233 p refs
(Contract NAS8-32664)
(NASA-CR-161967; EISI/A2200-Rev-4) Avail: NTIS HC A11/MF A01 CSCL 20K

Command runstream elements are presented for analyzing structural systems that are composed of a number of cyclically symmetrical sectors. Provisions are included for systems in which each cyclically symmetrical sector also possesses a plane of reflective symmetry. The following types of analysis may be performed: static analysis with and without preload, vibrational analysis with and without preload, and buckling analysis with and without preload.
S.L.

N82-17521*# Battelle Columbus Labs., Ohio.
STRESS EVALUATIONS UNDER ROLLING/SLIDING CONTACTS Final Report
J. W. Kannel and J. L. Tevaarwerk 30 Oct. 1981 54 p refs
(Contract NAS3-22808)
(NASA-CR-165561; G7782) Avail: NTIS HC A04/MF A01 CSCL 20K

The state of stress beneath traction drive type of contacts were analyzed. Computing stresses and stress reversals on various planes for points beneath the surface were examined. The effect of tangential and axial friction under gross slip conditions is evaluated with the models. Evaluations were performed on an RC (rolling contact) tester configuration and it is indicated that the classical fatigue stresses are not altered by friction forces typical of lubricated contact. Higher values of friction can result in surface shear reversal that exceeds the stresses at the depth of maximum shear reversal under rolling contact.
E.A.K.

N82-17522*# Grumman Aerospace Corp., Bethpage, N.Y.
AN INVESTIGATION OF DYNAMIC-ANALYSIS METHODS FOR VARIABLE-GEOMETRY STRUCTURES Final Report
Fred Austin Dec. 1980 280 p refs
(Contract NAS9-15895)
(NASA-CR-167498; CSS-SSS-RP002) Avail: NTIS HC A13/MF A01 CSCL 20K

Selected space structure configurations were reviewed in order to define dynamic analysis problems associated with variable geometry. The dynamics of a beam being constructed from a flexible base and the relocation of the completed beam by rotating the remote manipulator system about the shoulder joint were selected. Equations of motion were formulated in physical coordinates for both of these problems, and FORTRAN programs were developed to generate solutions by numerically integrating the equations. These solutions served as a standard of comparison to gauge the accuracy of approximate solution techniques that were developed and studied. Good control was achieved in both problems. Unstable control system coupling with the system flexibility did not occur. An approximate method was developed for each problem to enable the analyst to investigate variable geometry effects during a short time span using standard fixed geometry programs such as NASTRAN. The average angle and average length techniques are discussed.
A.R.H.

N82-17523# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
APPLICABILITY OF LINEAR ELASTIC FRACTURE MECHANICS TO RIGID PVC PIPE MATERIALS
A. Y. Darwish, J. F. Mandell, and F. J. McGarry Feb. 1981 22 p refs
(MIT-RR-R81-1) Avail: NTIS HC A02/MF A01

The results presented support the use of linear elastic fracture mechanics when validity criteria similar to those used for metals are applied. Failure to consider test validity may yield meaningless results in many cases. Razor blade precracking produces acceptable crack tips under these test conditions. The room temperature behavior of polyvinyl chloride (PVC) specimens in the size range tested varies from notch insensitive to K sub Ic controlled when the displacement rate is varied by 2 to 3 orders of magnitude.
L.F.M.

N82-17524# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
APPLICABILITY OF PLANE STRAIN FRACTURE TOUGHNESS TESTING TECHNIQUES TO POLYETHYLENE PIPE MATERIALS
D. R. Roberts, J. F. Mandell, and F. J. McGarry Apr. 1981 28 p refs
(MIT-RR-R81-3) Avail: NTIS HC A03/MF A01

Medium density polyethylene samples were tested to determine the applicability of plane strain fracture toughness testing techniques. Variables such as notch shape, notch root radius, and specimen thickness was studied to determine empirically what requirements exist for each. Temperature and loading rate were also varied. Higher temperatures and slower loading rates fracture is controlled by the yield strength of the material. At lower temperatures and faster loading rates fracture is toughness controlled. In this latter regime valid fracture toughness measurements can be made. Predictions from these tests of burst pressure of notched, 250 mm diameter pipe were verified in large scale burst tests.
S.L.

N82-17525# Helsinki Univ. of Technology, Espoo (Finland). Lab. of Metal Working and Heat Treatment.
NECKING, FRACTURE AND LOCALIZATION OF PLASTIC FLOW IN METALS Ph.D. Thesis
A. S. Korhonen 1981 51 p refs
Avail: NTIS HC A04/MF A01

The basic equations of the mechanics of matter are reviewed, and examples of different constitutive equations presented. The application of the basic equations in plasticity is then discussed in more detail with special reference to the problem of localization of plastic flow. The criteria for diffuse and localized necking are presented and the possibility of delaying the necking and obtaining large uniform and limit strains is then discussed. The possibilities of applying the necking criteria in hydraulic bulging and in deep drawing are also considered. The possibility of explaining the observed ductile fracture patterns in plan stress, plane strain and under axial symmetry is studied and a qualitative agreement is found in all cases.
N.W.

N82-17526# Southampton Univ. (England). Inst. of Sound and Vibration Research.
SOME ASPECTS OF THE NONLINEAR VIBRATIONS OF A CLAMPED-CLAMPED ALUMINIUM BEAM AND COMPARISON WITH A CARBON FIBER REINFORCED PLASTIC BEAM
M. M. K. Bennouna Mar. 1980 250 p refs
(ISVR-TR-108) Avail: NTIS HC A11/MF A01

The nonlinear vibration of a carbon fiber reinforced plastic beam and a clamped-clamped aluminium beam, due to large deflections of the order of double the beams thickness is examined and compared. The frequency response approach is used to study the damping and stiffness at large amplitudes. The fundamental mode shape is examined and curve fitting via polynomial approximation is used to determine the effect of large amplitude vibrations on the mode shape and its first and second derivatives. The effect of vibration amplitude is investigated via numerical integration. The harmonic distortion of flexural deflection and its effect on the mode shape estimation is examined. The bending strain, axial strain and total strain due to static loading at large deflections are examined at several stations along the length of the beam. Their harmonic distortion is also investigated as a function of position along the beam and at large deflections. A comparison between measured dynamic strains and those predicted from a simple theoretical model showed reasonable agreement between the two cases.
R.J.F.

N82-17527# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
OXIDE FORMATION INSIDE A CYCLICALLY LOADED CRACK AND ITS EFFECT ON ENVIRONMENTAL ENHANCED CRACK GROWTH RATE IN 93 C WATER

G. Gabetta and C. Fossati 1981 27 p refs Presented at IAEA Specialists' Meeting on Subcritical Crack Growth, Freiburg, West Germany, 13-15 May, 1981
(Contract ISMAT-900)
(CISE-1705) Avail: NTIS HC A03/MF A01

Tests were performed in demineralized water at 93 C on pressure vessel steel with the purpose of obtaining crack growth rate data and information on the environmental mechanisms at two different temperatures. The effect of the oxygen content in water was studied; two oxygen concentrations were chosen, deoxygenated water and oxygen saturated water. Results show that an oxide layer forms inside the crack at the higher oxygen concentration and that the oxide layer causes a kind of 'crack closure'. A few thousand cycles are necessary for the formation of a detectable oxide layer. The oxide formation is probably related to the deformation rate at the crack tip. R.J.F.

N82-17528# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
DYNAMIC ELASTIC-PLASTIC CHARACTERIZATION OF NUCLEAR PRESSURE VESSEL MATERIAL
G. Angelino and C. Fossati 1981 12 p refs Presented at 5th Intern. Conf. on Fracture, Cannes, France, 29 Mar. - 3 Apr. 1981
(Contract ISMAT-900)
(CISE-1693) Avail: NTIS HC A02/MF A01

A test and instrumentation, which both extend the Charpy specimen performances, are introduced. Ability of the test to predict material parameters is demonstrated. J.M.S.

N82-17529# Pacifica Technology, Del Mar, Calif.
IMPLEMENTATION OF ANISOTROPIC AND NONLINEAR THERMAL STRESS MODELS IN ADINA 78 Final Report, Aug. 1980 - Feb. 1981
Robert S. Dunham and Dale E. Ranta Aug. 1981 78 p refs
(Contract N00173-80-C-0385)
(AD-A108085; PT-U81-0489-Rev-1) Avail: NTIS HC A05/MF A01 CSCL 13/13

This report describes the improvements made to the ADINA 78 finite element computer codes in order to permit the solution of structural response problems involving very rapid heating. A material model was added to the two- and three-dimensional continuum element types which permits the modeling of temperature dependent thermoelastic anisotropic material properties. A different material model was also added for these same continuum element types which permits the modeling of strain and temperature dependent thermoelastic anisotropic material properties. A major goal of this work was to render ADINA 78 operational on the ASC computer at the Naval Research Laboratories as well as to improve the computational efficiency of the code by vectorizing the most important loops. This work and various benchmark test cases are also described. Author (GRA)

N82-17530# PDA Engineering, Santa Ana, Calif.
PATCHES-3. USER'S MANUAL Technical Report, Oct. 1978 - Apr. 1981
E. L. Stanton and L. M. Crain Edwards AFB, Calif. AFRPL Aug. 1981 219 p refs
(Contract F04711-78-C-0082; AF Proj. 3059)
(AD-A107709; PDA-TR-1437-00-01; AFRPL-TR-81-42) Avail: NTIS HC A10/MF A01 CSCL 13/13

PATCHES-III is a computer program for the analysis of general three-dimensional composite structures and materials. The program constructs solid geometry models and material distribution models using parametric cubic basis functions. Available finite elements range from the 64 node CCC element to the 4 node LLX element for axisymmetric models. The User's Manual is the dictionary or archive source for definitions of all available program options. The program determines the linear elastic response of fully anisotropic composites to thermal loads, mechanical loads and imposed displacements. Author (GRA)

N82-17531# George Washington Univ., Washington, D.C. Inst. of Management Science and Engineering.
A CLOSED FORM LOCAL SOLUTION OF A NONLINEAR STRUCTURAL DESIGN PROBLEM IN TERMS OF THE DESIGN PARAMETERS Scientific Report
Anthony V. Fiacco and Abolfazi Ghaemi 10 Aug. 1981 27 p refs
(Contract N00014-75-C-0729; NR Proj. 347-020)
(AD-A107669; SERIAL-T-449) Avail: NTIS HC A03/MF A01 CSCL 13/13

Using the results of previous analysis of the corrugated bulkhead model, a closed form of the optimal solution of this model is easily derived as a function of the many design parameters. The analytic solution is valid over large changes in the parameters. This demonstrates the possibility of making very accurate (in this instance, exact) local estimates of a markedly nonlinear parametric solution, once one solution is found, even though the original problem statement might appear to make this prohibitive. It is shown that the local parametric solution obtained can be extended to include large changes in the parameters, particularly when the parametric perturbations are restricted and highly structured, as is typical in practical applications. Aside from the practical value of such a result, it is reported because this problem is well publicized and has been utilized for some time as a test problem. Knowledge of the precise solution for a range of parameter values provides ideal information for further studies. Author (GRA)

N82-17532# Iowa Univ., Iowa City. Div. of Materials.
DISTRIBUTION THEORETIC METHODS FOR DYNAMIC ANALYSIS AND OPTIMIZATION OF MECHANISMS WITH INTERMITTENT MOTION Final Report
Edward J. Haug and Roger A. Wehage 1 Nov. 1981 9 p refs
(Contract DAAG29-79-C-0221)
(AD-A108021; ARO-16635.4-M) Avail: NTIS HC A02/MF A01 CSCL 20/11

A computer aided dynamic and design sensitivity analysis technique for planar dynamic systems undergoing intermittent motion is developed and applied. Planar dynamic systems made up of multiple rigid bodies connected by joints and force elements are modeled. A constrained dynamic system approach that accounts for discontinuous velocities associated with impulsive loading and impact between bodies is developed. A new numerical integration technique for mixed differential and algebraic equations that automatically defines and integrates for independent generalized coordinates has been developed. It has demonstrated an order of magnitude improvement in computing efficiency compared to preceding techniques. Intermittent motion dynamic effects due to impulsive loading or impact have been incorporated into the dynamic simulation, using a pieced interval dynamic analysis technique in which momentum balance relations are used to determine discontinuities in velocity at logical event times. This technique has been demonstrated on multibody, multiple contact point applications in mechanisms and automatic weapons. To assist in design optimization of mechanical system dynamics an adjoint variable design sensitivity analysis technique has been developed for calculation of first and second order derivatives of dynamic response with respect to design. Numerical calculations have demonstrated that accurate first and second derivatives can be obtained for moderate scale dynamic systems. Author (GRA)

N82-17533# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Structural Integrity Branch.
EVALUATION OF SEVERAL BONDING PARAMETERS ON THE RANDOM BENDING FATIGUE LIFE OF ADHESIVELY BONDED ALUMINUM JOINTS Final Report, Jun. 1978 - Nov. 1980
Howard F. Wolfe, Carl L. Rupert, and Herbert S. Schwartz Aug. 1981 57 p refs
(AF Proj. 2401)
(AD-A107995; AFWAL-TR-81-3096) Avail: NTIS HC A04/MF A01 CSCL 11/6

Eighteen adhesively bonded aluminum coupons were tested on a vibration shaker at room temperature to determine the effects of varying the adhesive type/thickness, primer and adherend surface preparation on their random bending fatigue life. Most of the fatigue failures occurred within one million to one billion cycles, all at 900 microstrain. While neither the primer thickness nor the surface treatment seemed to influence the overall results, the coupons with thicker adhesive had a noticeable shorter fatigue life. Fractographic analyses of the failed adhesive surfaces showed the locus of fracture for all coupons was predominantly within the adhesive. The nitrile phenolic adhesive demonstrated a better fatigue resistance than the nitrile epoxy. GRA

N82-17534# Bendix Corp., Kansas City, Mo.

MECHANICAL SHOCK TEST ANALYSIS Final Report

W. E. Layman Sep. 1981 13 p
(Contract DE-AC04-76DP-00613)
(DE82-000932; BDX-613-2678) Avail: NTIS HC A02/MF A01

A hammer impact form of mechanical shock testing as a substitute for the standard drop test for use on a high voltage electrical assembly was investigated. The hammer was attached so that it could fall freely through a specified angle of elevation. The hammer impact test, simulates the ringing environment a weapon system could encounter. DOE

N82-17535# Bendix Corp., Kansas City, Mo. Technical Communications.

SURVEY OF ADVANCED FRACTURE-MECHANICS TEST METHODS Final Report

G. D. Swanson Sep. 1981 20 p refs
(Contract DE-AC04-76DP-00613)
(DE82-000823; BDX-613-2639) Avail: NTIS HC A02/MF A01

The state of the art in test methods for advanced elastic-plastic fracture mechanics is determined. Four areas of potential future need were matched with ten appropriate test methods. The costs of additional equipment and fixturing, and the approximate lead time needed to implement each test capability are estimated. DOE

N82-17536# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Drehfluegler und Verkehr.

STRESS ANALYSIS AND TEST PHILOSOPHY FOR WIND ENERGY CONVERTER BLADES

H. Bansemir and K. Pfeifer 1980 28 p Presented at 4th Meeting of Experts on Rotor Blade Technol. with Special Respect to Fatigue Design Probl., Stockholm, 21-22 Apr. 1980
(NBB-UD-300-80-O) Avail: NTIS HC A03/MF A01

Projected wind energy converter blades for a 5MW plant are described and analyzed. The calculation of laminate cross-section properties as well the overall behavior of the blade is considered. Special attention is given to the bolted area and to the compression stresses in the blade, because it is mainly loaded by bending moments. Tests performed in order to obtain basic data of the materials used in the design are discussed. Special components such as the bolted area are tested by static and dynamic loads. Finally the strains in the entire blade under load and the eigenfrequencies are measured. A.R.H.

N82-17537# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

PAST, PRESENT AND FUTURE OF SHELL STABILITY ANALYSIS

J. Arbocz May 1981 56 p refs Presented at DGLR Jahrestagung, Aachen, 12-14 May 1981
(VTH-LR-320) Avail: NTIS HC A04/MF A01

The development of the lower bound design philosophy is summarized and the theory of imperfection sensitivity is outlined. Empirical knockdown factors are applied to the results of the classical small deflection theory. The knockdown factor is chosen so that its product with the classical buckling load leads to a lower bound to all the experimental data for the shell loading configuration. By properly accounting for the effect of the initial imperfections and by taking the correct experimental boundary conditions into account, close correlation between the theoretical predictions and the experimental values is achieved. Characteristic initial imperfection distributions associated with fabrication are shown. Reliability curves obtained via the stochastic analysis of the experimentally measured initial imperfections are introduced. This concept offers a way of including the notion of imperfection sensitivity routinely into the shell design procedures. Author (ESA)

N82-17538# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.

LOAD CAPACITY OF NOTCHED COMPONENTS AS DERIVED FROM POST-YIELD FRACTURE CRITERIA [TRAGLASTBESTIMMUNG GEKERBTER BAUTEILE NACH FLIESSBRUCHMECHANISCHEN KRITERIEN]

J. S. Doltsinis and H. Wuestenberg 1980 28 p refs In GERMAN
(ISD-286; ISSN-0170-6071) Avail: NTIS HC A03/MF A01

Post-yield fracture mechanics were reviewed and elastoplastic behavior was studied, using finite element analysis. The elastic limit was derived and the analytic load capacity was established. The fracture mechanical assessment involves post-yield fracture criteria, a critical crack opening displacement computation, and a validity check of the failure assessment diagram. The numerical results are evaluated and shown to compare reasonably well with experimental data. Author (ESA)

N82-17539# Oxford Univ. (England). Engineering Lab.

A DERIVATION OF THE SMALL-STRAIN INCREMENTAL THEORY OF PLASTICITY FROM THERMOMECHANICS

G. T. Houlsby 1981 27 p refs
(OUEL-1371/81; SM020/GTH/81) Avail: NTIS HC A03/MF A01

It is postulated that a material can be entirely described by two functions of kinematic variables: the specific free energy and the specific dissipation functions. For certain choices of these functions, the two phenomena of a yield surface and a flow rule are automatically derived and an elastic-plastic material is described. The flow rule and yield surface are not, however, introduced as special hypotheses. The theory has certain advantages over the conventional approach: (1) plasticity models, involving nonassociated flow, can be accommodated without the violation of any thermodynamic principles; (2) elastic-plastic coupling is treated simply and without any ambiguity in the definition of plastic strain; (3) a criterion for plastic loading arises logically; and (4) unity between elasticity, plasticity and viscosity theories is achieved. These points are illustrated by simple examples. Author (ESA)

N82-17540# Oxford Univ. (England). Engineering Lab.

A CORRECTION TO THE ENGINEERING THEORY OF ELASTIC STABILITY

J. D. Renton 1981 15 p refs
(OUEL-1376/81) Avail: NTIS HC A02/MF A01

Bolotin continuum equations for the stability of isotropic, linearly elastic media are discussed. Implicit in the derivation of these equations are the usual engineering assumptions that the embedded coordinate system is not significantly different in the loaded state from that in the unloaded state and that the equations of linear isotropic elasticity relate small increments of stress to small increments of strain from the loaded state. An analysis where the first assumption is retained, strains in the elastic region being limited to very small values for structural metals, is presented. However, the relationship between the increments of stress and strain are now derived from an elastic potential expressed as a function of the Lagrangian strain. Results show that this gives rise to additional terms of the same order of magnitude as those already included in Bolotin's equations. Author (ESA)

N82-17541# Oxford Univ. (England). Engineering Lab.

STRESS INTENSITY FOR INTERACTING FLAWS. PART 2: A LITERATURE SURVEY OF FRACTURE CRITERIA

C. Ruiz and Y. P. Phang 1981 76 p refs 2 Vol.
(OUEL-1367/81-Pt-2) Avail: NTIS HC A05/MF A01

Theories of fracturing, beginning with the 15th century to present, are reviewed. Classical fracture analysis, leading up to the ductile-brittle transition temperature approach, is surveyed. Energy release rate criteria, linear elastic fracture mechanics, and elastic plastic fracture mechanics are considered. General yielding fracture mechanics and modern failure analysis are presented. Author (ESA)

N82-17542# Oxford Univ. (England). Engineering Lab.

STRESS INTENSITY FOR INTERACTING FLAWS. PART 3: PHOTOELASTIC DETERMINATION OF MIXED

MODES; STRESS INTENSITY FACTORS FOR INTERACTING FLAWS
C. Ruiz and Y. P. Phang 1981 38 p refs 2 Vol.
(OUEL-1368/81-Pt-3) Avail: NTIS HC A03/MF A01

The photoelastic method was used to characterize the severity of interaction of cracks by evaluation of the stress intensity factors at the interacting crack tips. Existing methods for retrieving stress intensity factors from the isochromatic fringe pattern are reviewed. Since all the methods can be related to the general case of a crack subjected to both opening and sliding modes of loading, a relation between the isochromatic fringe order and the stress intensity factor was derived. None of the existing methods determines mixed mode stress intensity factors in three-dimensional bodies. A method for direct determination of K sub 1, K sub 2, and K sub 3 in a three-dimensional body is suggested. As photoelastic determination of stress intensity factors is based on modified Westergaard equations, their validity for interpreting isochromatic fringe patterns is examined. Results show that these equations are not sufficient for complete interpretation of the fringe pattern of interacting cracks; incorporation of a series stress function is necessary.
Author (ESA)

N82-17543# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. d'Informatique.
WEIGHTING OF DISTANCES IN FACTORIAL ANALYSIS [PONDERATION DES DISTANCES EN ANALYSE FACTORIELLE]
Yves LeFoll Oct. 1981 24 p refs In FRENCH Presented at Congr. de l'Assoc. des Statisticiens Univ. (A.S.U.), Jun. 1981
(ENST-C-81005) Avail: NTIS HC A02/MF A01

Similarities between factorial analysis methods and principal component analysis are pointed out. The latter is characterized by weights and distances of the points in a representation. When the weights are associated to the distances the factorial components can have quasi-ordinal, local or statistical properties. The type of extremum problems, the solution of which makes this possible, is defined. A basic problem in interpretation of the axes and principal subspaces of inertia of a Euclidean representation is solved, then discussed as a problem in proximity analysis.
Author (ESA)

N82-17544# European Space Agency, Paris (France).
INELASTIC BUCKLING OF COLUMNS OF L AND U CROSS SECTION
Rolf Zick Dec. 1981 35 p refs Transl. into ENGLISH of "Beulen von L- u. U-profilen im plastischen Bereich" Rept. DFVLR-FB-80-31 Brunswick, 1980 Original report in GERMAN previously announced as N81-22435
(ESA-TT-709; DFVLR-FB-80-31) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 12

The buckling stresses of axially compressed columns, having either U or L cross section, are determined using the Prandtl-Reuss law and the method of transfer matrices. The deflections of the cross sectional elements are described by the plate equation and the linearized differential equation for planar deformations. The results are discussed in terms of stress-strain laws and are satisfactorily compared with test measurements. Agreement is also shown with a standard method of calculation which is briefly described.
Author (ESA)

42 GEOSCIENCES (GENERAL)

N82-17545 Northwestern Univ., Evanston, Ill.
GLOBAL TECTONIC CONTROL OF SECULAR VARIATIONS IN PHANEROZOIC SEDIMENTARY ROCK/OCEAN/ATMOSPHERE CHEMISTRY Ph.D. Thesis
John Dowling Pigott 1981 211 p
Avail: Univ. Microfilms Order No. 8124979

Global changes in sea level owing to geotectonic mechanisms during the Phanerozoic have dynamically affected the partitioning of carbon and sulfur among the exogenic reservoirs. As a result, the chemistry of the Earth's surface environment has been time variant. Analyses of mineralogically homogeneous brachiopod shell material and associated micrite organics support the secular variability of whole rock isotopic data compiled from the literature. Together, the data indicate the ratio of reduced carbon to total carbon sediments is low at times of global high sea level and high at times of global low sea level. Conversely, reduced and oxidized sulfur as calculated from the del 34S values of evaporites follow opposite trends: the ratio of reduced sulfur species to total sulfur species is high at times of high sea level and low at times of low sea level. The operation of a global tectonic model of carbon and sulfur cycling described by a set of mass transfer reactions consistent with these observations is proposed.
Dissert. Abstr.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N82-17546 Illinois Univ. at Urbana-Champaign.
HYDROLOGY AND HYDROGEOCHEMISTRY OF THE SOUTH FORK, WRIGHT VALLEY, SOUTHERN VICTORIA LAND, ANTARCTICA Ph.D. Thesis
Henry John Hayden Harris 1981 359 p
Avail: Univ. Microfilms Order No. 8127604

Don Juan Pond is a large, unique brine pond situated in a closed basin at the topographically lowest point of the south fork. The floor of the basin is a discharge zone for groundwater brines confined in an underlying dolerite aquifer. Rapid, transient fluctuations of fluid pressure in the aquifer were recorded at a borehole drilled in the basin. The fluctuations are explained for the behavior of fluids in stressed porous media; they are interpreted as evidence of movements in a rock glacier lying near the pond. The characteristics of the fluctuations suggest that the causative movements were small and abrupt and involved a large part of the rock glacier. The major element chemistry of the brines is controlled by phase relations in the aqueous system CaCl2-NaCl, for which the important solid phases are antarcticite, halite, hydrohalite, and ice. Evaporation which forces the precipitation of halite and antarcticite and dilution control the chemistry of the pond during the austral summer; temperatures as low as -50 C control its chemistry during winter.
Dissert. Abstr.

N82-17547 Florida Univ., Gainesville.
THE SIGNIFICANCE OF TROPICAL CYCLONE RAINFALL IN THE WATER SUPPLY OF SOUTH FLORIDA Ph.D. Thesis
Donald Brandes 1981 163 p
Avail: Univ. Microfilms Order No. 8127418

If hurricanes fail to influence the rainfall of South Florida, either because of human intervention by weather modification or because of possible natural climatic change, the water budget is affected. The study of tropical cyclone rainfall for a sixty-year period from 1919 through 1978 reveals that the amount of rain from hurricanes declined significantly in the last several decades. This decline is discussed in relation to its effects on water supply and management in the South Florida Water Management District. Although declining supplies and increasing consumption portend severe chronic water shortages in the region, the knowledge that hurricanes do not bring as much rain as water management officials had thought should allow more effective use of surface storage reservoirs.
Dissert. Abstr.

N82-17548 Michigan State Univ., East Lansing.
RATES AND IMPLICATIONS OF BLUFF RECESSION ALONG THE LAKE MICHIGAN SHOREZONE OF MICHIGAN AND WISCONSIN Ph.D. Thesis
William Roger Buckler 1981 221 p
Avail: Univ. Microfilms Order No. 8126477

Long-term Lake Michigan bluff crest recession rates at 118 widespread locations in Michigan and Wisconsin were determined by contrasting recent field measurements with those from 19th century government land office surveys. These rates are evaluated spatially and related to selected shorezone characteristics. Lake level records and serial photographic data were compared to determine recent recession rates at closely spaced case study sites in Shoreham, Michigan, and Kenosha County, Wisconsin; these provide a basis for predicting future bluff crest positions. Results of the two case studies disclose that: (1) modern recession rates vary according to the interval between measurements; (2) the highest rates tend to occur within periods that contain the greatest percentage of years when lake levels are high; and (3) modern rates are not similar to longer-term retreat values, a condition largerly attributable to increasing numbers of shore protection structures that may accelerate bluff retreat in some places. Dissert. Abstr.

N82-17549 Colorado State Univ., Fort Collins.
A METHOD OF EVALUATING LANDFORM CLASSIFICATION SYSTEMS FOR RENEWABLE RESOURCE ASSESSMENT AND PLANNING Ph.D. Thesis
Lawrence Gene Kolenbrander 1981 223 p
Avail: Univ. Microfilms Order No. 8126437

A methodology for evaluating different landform classification systems was developed based on the landform attributes, structural arrangement, and operational characteristics of a landform classification system ideally suited for natural resource assessment and planning. Eighteen morphometric, surficial materials, genetic, and combined approaches to landform classification were reviewed and evaluated in a two-stage process. All eighteen systems were examined and rated according to a conceptual testing procedure. From the eighteen systems, four systems were selected for empirical field application and testing. None of the existing landform classification systems which was examined meets the needs of natural resource assessment and planning as defined by the objectives and evaluation criteria. There is no readily identifiable method of integrating two or more of the four systems into one acceptable landform classification system. Dissert. Abstr.

N82-17550 Michigan Univ., Ann Arbor.
SIMULATION OF ICE-COVER GROWTH AND THERMAL DECAY ON THE UPPER ST. LAWRENCE RIVER Ph.D. Thesis
Gordon Mather Greene 1981 156 p
Avail: Univ. Microfilms Order No. 8125117

Four computer models are described. The first two models are based on analytic solutions to equations describing the transfer of heat within an ice cover with uniform properties. A third model is described which combines a surface energy balance solution for a surface temperature with a finite difference implicit heat diffusion scheme that permits non-linear temperature gradients in the ice. The fourth model incorporates elements from the first three models. A surface temperature is derived from computations of the surface energy fluxes. This temperature then becomes an upper boundary condition for an analytic model that includes turbulent heat transfer beneath the ice cover. This model best approximates the observed rates of growth and decay if one assumes a frazil ice layer beneath the ice cover so that the water temperature close to the lower boundary can be set close to 0 C. Dissert. Abstr.

N82-17551*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PSYCHO-SOCIAL ASPECTS OF PRODUCTIVITY IN UNDERGROUND COAL MINING
Gib Akin 1 Oct. 1981 91 p refs
(Contract NAS7-100; DE-AI01-76ET-12548)
(NASA-CR-168429; JPL-Pub-81-113; DOE/ET-12548/10) Avail: NTIS HC A05/MF A01 CSCL 08I

The psychosocial aspects of productivity in underground coal mining were investigated. The following topics were studied: (1) labor productivity in deep mines and the explanations for productivity changes; (2) current concepts and research on psychosocial factors in productivity; (3) a survey of experiments in productivity improvement; (4) the impact of the introduction of new technology on the social system and the way that it accomplishes production; (5) a clinical study of a coal mining operation, model described how production is actually accomplished by workers at the coal face; (6) implications and recommendations for new technology design, implementation and ongoing management. E.A.K.

N82-17552# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
HELIUM PRODUCTION IN NATURAL GAS RESERVOIRS
E. B. Pereira and J. A. S. Adams (Rice Univ., Houston, Tex.) Aug. 1981 14 p refs Submitted for publication
(INPE-2214-PRE/014) Avail: NTIS HC A02/MF A01

About 11,000 published natural gas analyses of helium were used in the estimation of the average global scale accumulation and concentration of radiogenic helium in sediments. Simple lognormal statistics are employed to derive a net accumulation rate between 1000,000 to 670,000 helium atoms per cubic meter of reservoir rock per second. This accumulation rate permits an inference of an average helium concentration of non-reservoir sediments of about 67 ppm. By assuming a simple closed system model, it is shown that deep seated sources of helium are not necessary to explain the present regime of helium in sediments on a global scale, and that the accumulation rate and concentration obtained are in close agreement with existing fundamental geochemical estimates of uranium and thorium in rather average type of sediments. R.J.F.

N82-17553*# Wyle Labs., Inc., Huntsville, Ala. Scientific Services and Systems Group.
BASELINE STUDIES ON THE FEASIBILITY OF DETECTING A COAL/SHALE INTERFACE WITH A SELF-POWERED SENSITIZED PICK Final Report
Granville R. Anderson, II 19 Feb. 1981 98 p refs
(Contract DEN8-000011)
(NASA-CR-161960) Avail: NTIS HC A05/MF A01 CSCL 08I

The feasibility of utilizing a sensitized pick to discriminate between cutting coal and roof material during the longwall mining process was investigated. A conventional longwall mining pick was instrumented and cutting force magnitudes were determined for a variety of materials, including Illinois #6 coal, shale type materials, and synthetic coal/shale materials. E.A.K.

N82-17554*# Mississippi State Univ., Mississippi State. Engineering and Industrial Research Station.
THE DESIGN OF A MECHANICAL REFERENCING SYSTEM FOR THE REAR DRUM OF THE LONGWALL SHEARER COAL MINER Final Report
E. William Jones and Thomas Chen-Hsing Yang 4 Jun. 1981 78 p refs
(Contract NCA8-00131)
(NASA-CR-161962; MSSU-EIRS-ME-81-4) Avail: NTIS HC A05/MF A01 CSCL 08I

The design of two systems which reference the position of a longwall shearer coal miner to the mine roof of the present cut and of the last cut are presented. This system is part of an automation system that will guide the rear cutting drum in such a manner that the total depth of cut remains constant even though the front drum may be following an undulating roof profile. The rear drum referencing mechanism continually monitors the distance from the mine roof to the floor for the present cut. This system provides a signal to control a constant depth of cut. The last cut follower mechanism continually monitors the distance from the mine roof of the prior cut to the cutting drum. This latter system provides a signal to minimize the step height in the roof between cuts. The dynamic response of this hydraulic-pneumatic and mechanical system is analyzed to determine accumulator size and precharge pressure. B.W.

N82-17555*# Missouri Univ., Rolla. Rock Mechanics and Explosives Research Center.
THE DETECTION OF THE COAL ROOF INTERFACE BY USE OF HIGH PRESSURE WATER Final Report
1981 55 p refs
(Grant NsG-8055)
(NASA-CR-161959) Avail: NTIS HC A04/MF A01 CSCL 08I

A device whereby water jets can be used to detect the interface between coal and the overlying roof rock is described. Once this identification is made this distance can be measured using instruments such as the autofocus systems recently developed in the photographic industry. Experiments carried out show that the dzvice can discriminate between coal and rock at coal thicknesses up to 8 inches. An autofocus system was examined which indicates accuracies of better than 0.1 inches. B.W.

N82-17556# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France).
BANGUI ANOMALY Progress Report
R. Godivier 24 Nov. 1981 13 p
(WORK-M-45) Avail: NTIS HC A02/MF A01

Gravity maps of central Africa are discussed. A seismic study of the region's crust and upper mantle is reported. A seismic study of the Bangui anomaly is reviewed. For individual titles, see N82-17557 through N82-17559.

N82-17557# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France).
GRAVITY MAPS OF CENTRAL AFRICA
R. Godivier and Y. Albouy *In its* Bangui Anomaly 24 Nov. 1981 2 p (For primary document see N82-17556 08-43)
Avail: NTIS HC A02/MF A01

Publication of gravity maps of Central Africa is announced. More than 3,000 pieces of data were used. To include the northern part of the Central African Republic and the southern part of the Chad Republic, a previously collected batch of data was added. The theoretical value of the gravity was calculated in the Potsdam's system in order to make the maps homogeneous with other maps. The terrain corrections were not calculated due to lack of accurate topographic maps. The elevation of most of the stations was determined from barometric measurement. N.W.

N82-17558# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France).
SEISMIC STUDY OF THE CRUST AND UPPER MANTLE OF THE R.C.A.
P. Mourgues *In its* Bangui Anomaly 24 Nov. 1981 5 p (For primary document see N82-17556 08-43)
Avail: NTIS HC A02/MF A01

Willmore seismometers of 2.3 second natural period with a damping of 0.8 were utilized. The records were obtained by a FM multiplex recording system on magnetic tape by triggering. The apparent azimuth (AZ sub o) was obtained by triangular solution for the best records of earthquakes occurring at distances greater than 30 deg. The azimuth anomaly (Delta AZ) was obtained by difference with geographical azimuth of epicenters (AZ sub T) as: Delta AZ = AZ sub o - AZ sub T. The general shape of Delta AZ distribution, as a function of AZ sub T, indicates a dominantly westward dip of deep structure which seems to evident from 60 deg to 300 deg of azimuth. However, the null deflection observed around 0 deg azimuth shows that structure is more complex and cannot be interpreted as a single dipping structure. N.W.

N82-17559# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France).
SEISMIC STUDY OF THE BANGUI ANOMALY
L. Dorbath and C. Dorbath *In its* Bangui Anomaly 24 Nov. 1981 5 p (For primary document see N82-17556 08-43)
Avail: NTIS HC A02/MF A01

The seismic recording of the anomaly was made along the line which cuts the maximum magnetic anomaly seen from the satellite. Eight stations equipped with transducers and recorders were set up every 20 kilometers. The deflection of the internal clocks was checked by the daily recording of the WWV radio signals. All the gains were adjusted at 84 db. Since the operation aims mainly at recording teleseisms, the signal from the transducer was filtered through a low-pass filter with a cut off frequency of 5Hz. The locations of the stations were determined through maps to the 1/200.00 and 1/2.000 scales. The recording is made on smoked paper with a traverse speed amounting to 120 mm/mn; the thickness of the line is lower than 0.1 mm; the reading through a micrometric lamp graduated in 0.1 mm allows to evaluate the 0.05 mm with a precision of 0.25 s. N.W.

N82-17560*# Shaker Research Corp., Ballston Lake, N. Y.
DEVELOPMENT OF SENSITIZED PICK COAL INTERFACE DETECTOR SYSTEM Final Report
R. F. Burchill [1982] 68 p
(Contract NAS8-32538)
(NASA-CR-161961) Avail: NTIS HC A04/MF A01 CSCL 08I

One approach for detection of the coal interface is measurement of pick cutting loads and shock through the use of pick strain gage load cells and accelerometers. The cutting drum of a long wall mining machine contains a number of cutting picks. In order to measure pick loads and shocks, one pick was instrumented and telemetry used to transmit the signals from the drum to an instrument-type tape recorder. A data system using FM telemetry was designed to transfer cutting bit load and shock information from the drum of a longwall shearer coal mining machine to a chassis mounted data recorder. The design of components in the test data system were finalized, the required instruments were assembled, the instrument system was evaluated in an above-ground simulation test, and an underground test series to obtain tape recorded sensor data was conducted. T.M.

N82-17561*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN OPTICAL MODEL FOR THE MICROWAVE PROPERTIES OF SEA ICE
P. Gloersen and J. K. Larabee Nov. 1981 28 p refs Submitted for publication
(NASA-TM-83865) Avail: NTIS HC A03/MF A01 CSCL 08L

The complex refractive index of sea ice is modeled and used to predict the microwave signatures of various sea ice types. Results are shown to correspond well with the observed values of the complex index inferred from dielectic constant and dielectric loss measurements performed in the field, and with observed microwave signatures of sea ice. The success of this modeling procedure vis a vis modeling of the dielectric properties of sea ice constituents used earlier by several others is explained. Multiple layer radiative transfer calculations are used to predict the microwave properties of first-year sea ice with and without snow, and multiyear sea ice. Author

N82-17562*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CHARACTERIZING USER REQUIREMENTS FOR FUTURE LAND OBSERVING SATELLITES
J. L. Barker, P. J. Cressy, C. C. Schnetzler, and V. V. Salomonson Dec. 1981 56 p refs
(NASA-TM-83867) Avail: NTIS HC A04/MF A01 CSCL 05B

The objective procedure was developed for identifying probable sensor and mission characteristics for an operational satellite land observing system. Requirements were systematically compiled, quantified and scored by type of use, from surveys of federal, state, local and private communities. Incremental percent increases in expected value of data were estimated for critical system improvements. Comparisons with costs permitted selection of a probable sensor system, from a set of 11 options, with the following characteristics: 30 meter spatial resolution in 5 bands and 15 meters in 1 band, spectral bands nominally at Thematic Mapper (TM) bands 1 through 6 positions, and 2 day data turn around for receipt of imagery. Improvements are suggested for both the form of questions and the procedures for analysis of future surveys in order to provide a more quantitatively precise definition of sensor and mission requirements. A.R.H.

N82-17563*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE-DERIVED ICE DATA SETS NO. 1: ANTARCTIC MONTHLY AVERAGE MICROWAVE BRIGHTNESS TEMPERATURES AND SEA-ICE CONCENTRATIONS, 1973 - 1976
H. J. Zwally Nov. 1981 35 p refs Submitted for publication
(NASA-TM-83812) Avail: NTIS HC A03/MF A01 CSCL 08L

A summary data set concerning 4 years of Antarctic sea-ice conditions was created and is available on magnetic tape. The data were derived from electrically scanning microwave radiometer brightness temperatures and were mapped into a polar stereographic grid enclosing the 50 deg S latitude circle. The grid size varies from about 32 by 32 sq km at the poles to about 28 by 28 sq km at 50 deg S. The microwave brightness temperatures of Antarctic sea ice are predominantly characteristic of first-year ice with an emissivity of 0.92 at 19 GHz frequency. Sea ice concentrations were calculated from the brightness temperature data for each grid element with an algorithm that uses an emissivity value of 0.92 and an ice physical temperature estimate from climatological surface air temperatures. Monthly, multiyear monthly, and yearly maps of brightness temperatures and sea ice concentrations were created for the 4 years, except for 7 months for which useable data were insufficient. Author

N82-17564# Sheffield Univ. (England). Dept. of Control Engineering.

THE MODELLING OF SEMIFLEXIBLE CONVEYOR STRUCTURES FOR COAL-FACE STEERING INVESTIGATIONS. PART 1: SPATIALLY DISCRETE MODELS

J. B. Edwards, R. A. Wolfenden (National Coal Board), and A. M. S. R. Yazdi Apr. 1981 35 p refs Submitted for publication 2 Vol.
(RR-151-Pt-1) Avail: NTIS HC A03/MF A01

The coal-cutting machine shown is of the ranging-drum shearer type. The machine both cuts the coal from the solid face as it proceeds along the face and simultaneously loads the product onto the scraper-chain conveyor. This operation is aided by the spiral vanes around the rotating drum periphery upon which the cutting picks are mounted. The scraper-chain conveyor also has more than a single function: it not only conveys the cut product to the face-end but, because of the robust construction if its structure, it also provides a comparatively smooth track upon which the power-loader rides. Mathematical models of the steering system and the overall process are presented. Examples of predicted behavior are given. J.M.S.

N82-17565# Sheffield Univ. (England). Dept. of Control Engineering.

THE MODELLING OF SEMIFLEXIBLE CONVEYOR STRUCTURES FOR COAL-FACE STEERING INVESTIGATIONS. PART 2: SPATIALLY CONTINUOUS MODELS

J. B. Edwards Apr. 1981 25 p refs Submitted for publication 2 Vol.
(RR-152-Vol-2) Avail: NTIS HC A02/MF A01

A linear model of a flexible conveyor used on longwall coal-faces and designed to permit vertical floor undulations to be followed is presented along with a continuous elastic beam model. Predictions of the multipass system stability using the beam model are discussed. J.M.S.

N82-17566# Research Inst. of National Defence, Stockholm (Sweden).

REMOTE SENSING TECHNIQUES SUITABLE FOR EXPLORATION AND NAVIGATION IN AND UNDER SEA ICE

Ragnar Thoren 1981 44 p refs Presented at Intern. Colloq. of the Intern. Soc. of Photogrammetry and Remote Sensing on Spectral Signatures of Objects in Remote Sensing, Avignon, France, 8-11 Sep., 1981
(FOA-Rept-Vol-15-No-2; FOA-B-60002-M7;
ISBN-91-7056-057-9) Avail: NTIS HC A03/MF A01; Research Inst. of National Defence, Stockholm Kr 9

The performance of advanced satellite navigation used aboard Swedish and Soviet icebreakers is reported. It is shown that the ships' position was obtained with very high precision in spite of frequent fog. Further development of remote sensing satellite systems for ocean monitoring, the development of LORAN C into an expanded and improved aid to navigation, and the importance of visual ice reconnaissance in combination with optical viewing systems in arctic waters are also addressed. Developments in underwater technology, including hydroacoustics, hydrooptics, laser depth sounding, underwater communication, and subsea exploratory drilling are included. J.M.S.

N82-17567# Office of Naval Research, Pasadena, Calif.

ARABIAN SEA PROJECT OF 1980: COMPOSITES OF INFRARED IMAGES

Ben J. Cagle and Robert Whritner Aug. 1981 67 p
(AD-A107910; OhNWEST-81-5) Avail: NTIS HC A04/MF A01 CSCL 08/1

A technique was developed for determining the mesoscale features of the Arabian Sea, and reported on in ONRWEST Report 81-3. A method for assembling composites of images in mosaic form is presented. Enhanced images are presented with surface interpretations for the spring and fall transition periods related to the Northeast and Southwest Monsoons, respectively. Author (GRA)

N82-17568# Defense Mapping Agency, Washington, D.C.

THE PAIGH GAZETTEER PROGRAM Interim Report

Richard R. Randall 27 Oct. 1981 9 p Prepared for Pan American Institute of Geography and History
(AD-A107549) Avail: NTIS HC A02/MF A01 CSCL 08/6

In March of 1980, PAIGH authorities approved a new program calling for the production of a series of national gazetteers. The gazetteers are to be based principally on names appearing on the PAIGH map series at 1:250,000, but will also include other names in accordance with national requirements. A meeting of a Gazetteer Working Group comprised of representatives of interested countries took place in Panama during July 1981. At that meeting, discussions centered on the development of common specifications for the gazetteers. Decisions were made regarding gazetteer format and the establishment of work and production schedules by participating nations. This paper describes the gazetteer program in detail and reports on the current status of work. Author (GRA)

N82-17569# Montana State Univ., Missoula.

AN INVESTIGATION OF THE HIGH RATE VOLUMETRIC PROPERTIES OF SNOW Final Report, 1 May 1978 - 31 Oct. 1981

R. L. Brown Nov. 1981 158 p refs
(Contract DAAG29-78-G-0089)
(AD-A108032; ARO-15413.9-GS) Avail: NTIS HC A08/MF A01 CSCL 08/12

Reported here are the results of a three year study of the high rate volumetric properties of snow. In addition to the report presented here, the project resulted with over ten publications which are included in the list of references. The constitutive behavior of dry snow is analyzed and described mathematically by means of two microdynamical models. These are then evaluated by means of previous experimental data. A number of applications are then investigated. These applications include vehicle mobility in shallow and deep snowpack, steady shockwaves, and nonsteady shockwaves. Finally, an electromagnetic stress wave generator was designed, constructed and used in a shockwave testing program on snow. Experimental results are presented and discussed. Author (GRA)

N82-17570# Inter-American Geodetic Survey, Fort Sam Houston, Tex.

PHOTOGRAMMETRY SOFTWARE. A PACKAGE FOR EVERYONE

James R. Hawk Oct. 1981 59 p
(AD-A108098) Avail: NTIS HC A04/MF A01 CSCL 08/2

An example photogrammetry software is presented for consideration. The system is being implemented throughout Latin America by IAGS. It includes both analytical and semi-analytical adjustments. It is a simplistic yet versatile system which has proven very successful. Author (GRA)

N82-17571# Inter-American Geodetic Survey, Fort Sam Houston, Tex.

CIMS: THE CARTOGRAPHIC INFORMATION MANAGEMENT SYSTEM

Jeff R. Ingram and Robert A. Simms 1981 19 p refs
(AD-A108108) Avail: NTIS HC A02/MF A01 CSCL 08/2

The system described in this paper is a small microcomputer system being developed for the cataloging of graphical and nongraphical cartographic data describing the sources available and/or used in constructing maps and charts. The system is envisioned as a useful method to cartographic managers for reviewing sources belonging to an agency and determining what sources to use in a new or revised map product. Author (GRA)

N82-17572# Donohue, Anstey, and Morrill, Boston, Mass.

A PROJECT TO TEST FOR SHALE GAS IN OHIO Final Report

30 Apr. 1981 197 p
(Contract DE-AC21-78MC-08339)
(DE82-000916; DOE/MC-12687/T3) Avail: NTIS HC A08/MF A01

Methods to find deep zones of natural fracture in the search for viable shale gas are discussed. The measurement of seismic velocity in the shale is examined. This speed is expected to be lowered by the presence of fractures, particularly if the fractures contain gas. The seismic reflection method, which times the echoes from deep rock layers, is used to measure the speed of sound in the shale. The results of the seismic velocity analysis are summarized. Gas was obtained from two naturally fractured zones in the Chagrin shale. The well was stimulated and tested at three separate levels: the Rhinestreet shale, Huron shale, and the Chagrin. DOE

N82-17573# Donohue, Anstey, and Morrill, Boston, Mass.
SHALE GAS IN THE SOUTHERN CENTRAL AREA OF NEW YORK STATE: PART 1. HOW TO FIND AND DEVELOP SHALE GAS IN NEW YORK STATE
Apr. 1981 71 p Sponsored in part by New York Energy Research and Development Authority
(Contract DE-AC21-79MC-12697)
(DE82-000913; DOE/MC-12697/T1) Avail: NTIS HC A04/MF A01

The economics of shale-gas exploration in New York are discussed. To date three wells have been artificially fractured in the Marcellus shale of New York, and all three appear to be producers. The chances of extracting gas are improved if geological techniques can identify zones of a suitable degree of natural fracturing in the shale. These techniques are aided by detailed structure maps of the shale units. It is concluded that the most likely source of shale gas in south central New York is the Marcellus formation. The following recommendations are made: shale gas wells should be drilled with air; the dry open hole should be logged with gamma-ray, density, temperature and noise logs; the shale should be artificially fractured using a nitrogen stimulation technique. DOE

N82-17574# Commercialization Insights, Tampa, Fla.
EVALUATION OF ALTERNATIVES IN DOWNHOLE STEAM GENERATION
Sep. 1981 82 p Sponsored by DOE
(DE82-001943; DOE/TIC-2001943) Avail: NTIS HC A05/MF A01

The development of downhole steam generators for requirements of commercialization, technical, and economic goals were evaluated. It is found that: (1) the high pressure downhole steam generator has potential for commercialization in the production of heavy oil; (2) oil yield is the critical performance parameter; (3) the downhole hydrogen/oxygen has potential for production of resources which are not unproducible or uneconomical; (4) the critical performance provided in nearly 1100 pre and posttraining forms returned by the solar and 201 stream sediment samples. Statistical and areal distributions of uranium and possible uranium related variables are displayed. Pertinent geologic factors in evaluating the potential for uranium mineralization are discussed. The high uranium values occur primarily in pleistocene delta deposits and in glacial outwash and till. Groundwater in this area is geographically associated with high values of calcium, magnesium, manganese, potassium, selenium, strontium, sulfate, and total alkalinity. DOE

N82-17575# New Mexico Inst. of Mining and Technology, Socorro. Petroleum Recovery Research Center.
DEVELOPMENT OF MOBILITY CONTROL METHODS TO IMPROVE OIL RECOVERY BY CO2 Quarterly Report, 1 Jul. - 30 Sep. 1981
J. P. Heller 1981 6 p refs
(Contract DE-AC21-79MC-10689)
(DE82-001968; DOE/MC-10689/10; PRRC-81-41; QR-8) Avail: NTIS HC A02/MF A01

The development of foam-type mobility control agents, core flooding system, and direct thickeners consisting of polymers soluble in CO2 are discussed. The core flooding test system is operational with all components essentially complete. Foam generation was principally concerned with experiments designed to ascertain the proper operating regions for the generator. The second mobility agent is being developed for the direct thickness of CO2. A number of polymeric compounds were found which are soluble in CO2. DOE

N82-17576# Gruy Federal, Inc., Houston, Tex.
TARGET RESERVOIRS FOR CO2 MISCIBLE FLOODING. TASK TWO. SUMMARY OF AVAILABLE RESERVOIR AND GEOLOGICAL DATA. VOLUME 1: PERMIAN BASIN GEOLOGICAL AND RESERVOIR DATA. PART 2: ADAIR-SAN ANDRES THROUGH EUNICE Final Report
L. B. Cobb Oct. 1981 336 p refs
(Contract DE-AC21-79MC-08341)
(DE82-001348; DOE/MC-08341/31-Vol-1-Pt-2) Avail: NTIS HC A15/MF A01

The types of injected fluid, type of injector, fluid status, efficiency of type injector, injection pattern, and operational problems are coded and tabulated for oil and gas reservoirs in New Mexico and Texas. Water analysis records are included. DOE

N82-17577# FMC Corp., Santa Clara, Calif. Engineered Sytems Div.
HIGH ANGLE MINING SYSTEM TASK REPORT: SYSTEM REQUIREMENTS, PERFORMANCE SPECIFICATIONS, AND REVIEW OF STATE-OF-THE-ART TECHNOLOGY
E. G. Brown Jan. 1981 36 p
(Contract DE-AC01-80FT-14257)
(DE82-001078; DOE/ET-14257/2) Avail: NTIS HC A03/MF A01

Existing mining systems operable from the surface with at least a limited down seam capability were compared. A normal down dip limitation of 15 degrees is shown for augers. At this angle conveying performance of the auger screw decreases slightly. At about 25 degrees, borehole packing begins to occur and conveying efficiency is substantially reduced. Higher rotational speeds and a shorter screw pitch improves conveying performance. Ten foot diameter holes were accomplished. Seven feet is the largest practical size. The deepest known penetration depth for a seven foot diameter is 150 feet. The largest practical size for a twin head auger would produce a 3 foot high by 6 foot wide oval hole about 150 feet deep. The largest practical diameter for a 200 foot penetration depth is believed to be about 42 inches. The efficiency factors are derived from the horizontal tonnage capacity and the gross horsepower for each machine. All of the continuous miners discussed are capable of operating down dip to the normal pitch limit without assistance modification. DOE

N82-17578# World Meteorological Organization, Geneva (Switzerland).
SEA-ICE FORMATION SERVICES IN THE WORLD
1981 114 p refs
(WMO-574; ISBN-92-63-10574-X) Avail: NTIS MF A01; print copy available at WMO, Geneva

The state of the art in the acquisition, exchange, processing, storage, and dissemination of sea ice information is described. The nature of sea ice, methods of observation, and the basis of ice information services are considered. The sea ice information services available from 17 countries are listed. For each, details as to organization, data acquisition, output products, forecasts, publications, and mailing address are given. Author (ESA)

N82-17579# New England River Basins Commission, Boston, Mass.
BEFORE THE WELL RUNS DRY: A HANDBOOK ON DROUGHT MANAGEMENT
Aug. 1981 63 p refs Sponsored in part by Geological Survey, Reston, Va.
(PB82-105818) Avail: NTIS HC A04/MF A01 CSCL 13B

A handbook is presented with a five-step planning process for local water supply officials to follow for designing a drought contingency plan. It explains and illustrates through a specific case study how and when a community can choose from among measures designed to augment supply and reduce demand to alleviate the problems of a drought. The key ingredients for a successful drought management plan are advance planning community cooperation. GRA

N82-17580# New England River Basins Commission, Boston, Mass.
BEFORE THE WELL RUNS DRY: A HANDBOOK FOR DESIGNING A LOCAL WATER CONSERVATION PLAN

Oct. 1980 96 p
(PB82-105826) Avail: NTIS HC A05/MF A01 CSCL 13B

A concise, clean cut, seven step planning procedure for local water supply officials to follow in designing a water conservation plan is presented. The procedure is flexible, can be used by any type of water utility, can be used anywhere in the country, and can meet a variety of goals. It is designed to help local officials consider the full range of options available to them and the potential impact of each option on the utility, the users, and the community. GRA

N82-17581# Nevada Univ. System, Reno. Water Resources Center.
WATER FOR NON-NUCLEAR ENERGY DEVELOPMENT IN THE GREAT BASIN
Sep. 1981 344 p refs Sponsored in part by Water Resources Council, Washington, D.C.
(PB82-116781) Avail: NTIS HC A15/MF A01 CSCL 13B

The availability of water to support conventional and emerging non-nuclear energy technologies under certain hypothetical world oil prices was assessed and major effects that these levels of energy development could have on the regions water resources were identified in an effort to aid national and regional energy supply planning and decision making. GRA

N82-17582# National Oceanic and Atmospheric Administration, Ann Arbor, Mich. Environmental Research Lab.
SIMULATION OF ICE-COVER GROWTH AND DECAY IN ONE DIMENSION ON THE UPPER ST. LAWRENCE RIVER
Gordon M. Greene Jun. 1981 90 p refs
(PB82-114208; NOAA-TM-ERL-GLERL-36; NOAA-81081904) Avail: NTIS HC A05/MF A01 CSCL 08L

A series of models simulating the growth and decay of channel ice in one dimension on the upper St. Lawrence River are presented. Ice growth and decay for the reach of the river between the Moses-Saunders Power Dam at Cornwall, Ont., and Lake Ontario are described. Simulation sites in both slow moving and faster reaches of the river are discussed. Thermodynamic processes appear to be sufficient to produce breakup without the additional simulation of mechanical forces. GRA

N82-17583# Foster-Miller Associates, Inc., Waltham, Mass.
DEVELOPMENT OF A MAN AND SUPPLY HOISTING SYSTEM FOR UNDERGROUND METAL AND NONMETAL MINES, VOLUME 1 Final Report, Jun. 1975 - Oct. 1980
David J. Hoadley and Billy C. Brunelle Apr. 1981 150 p refs
(Contract DI-BM-HO-25068)
(PB82-113366; BM-OFR-129(1)-81) Avail: NTIS HC A07/MF A01 CSCL 08I

The development and underground operation of a semiautomatic, raise, climber, human and supply hoist system designed for stope access in underground metal and nonmetal mines is described. The system has the capability of operating in crooked raises because the conveyance climbs two stationary wire ropes suspended down the raise. The drive unit is electrically powered with power and control signals supplied to the drive unit through in armored cable also suspended down the raise. The system is designed for portability, ease of installation, and minimum raise development. GRA

N82-17584# Energy Resources Co., Inc., Cambridge, Mass.
MONITORING TO DETECT GROUNDWATER PROBLEMS RESULTING FROM ENHANCED OIL RECOVERY Final Report
Ron Beck, Bernard Aboba, Douglas Miller, and Ivor Kaklins Oct. 1981 146 p refs
(Contract EPA-68-03-2648)
(PB82-119074; EPA-600/2-81-241) Avail: NTIS HC A07/MF A01 CSCL 08H

A four stage monitoring program to detect groundwater contamination events that may potentially result from enhanced oil recovery (EOR) projects was developed. The monitoring system is based on a statistical analysis evolving from a series of equations that model subsurface transport of EOR spills. Results of the design include spatial and frequency monitoring intervals that depend on properties of the local geology and dispersion characteristics of the potential contaminants. GRA

N82-17585# Ohio River Basin Commission, Cincinnati.
CUMBERLAND RIVER BASIN; REGIONAL WATER AND LAND RESOURCES PLAN
Jun. 1981 384 p refs Sponsored in part by Water Resources Council
(PB82-111501) Avail: NTIS HC A17/MF A01 CSCL 08H

The report is on the regional water resources management plan for the Cumberland River Basin in Virginia, Kentucky and Tennessee. An executive summary, recommended plans, and directions for the future are presented. M.D.K.

N82-17586# Geological Survey, Albany, N.Y. Water Resources Div.
NITROGEN IN GROUND WATER AND SURFACE WATER FROM SEWERED AND UNSEWERED AREAS, NASSAU COUNTY, LONG ISLAND, NEW YORK Final Water-Resources Investigation Report, 1952-1976
Stephen E. Ragone, Brian G. Katz, Grant E. Kimmel, and Juli B. Lindner 1981 74 p refs Revised Prepared in cooperation with Nassau County Dept. of Public Works
(PB82-109865; USGS/WRD/WRI/81-022; WRI-80-21) Avail: NTIS HC A04/MF A01 CSCL 08H

Areal and temporal distributions of nitrogen in ground water are correlated with natural and main-induced factors. These factors include hydrogeologic conditions, methods of sewage disposal, pumpage rate for public-water supply, and the types and relative importance of point and nonpoint sources of nitrate entering the ground water. The area discussed is limited to the areas south of the regional ground-water divide. T.M.

N82-17587# Geological Survey, Salt Lake City, Utah. Water Resources Div.
WATER RESOURCES DATA FOR UTAH, WATER YEAR 1980 Annual Water-data Report, 1 Oct. 1979 - 30 Sep. 1980
Jun. 1981 703 p refs
(PB82-108606; USGS/WRD/HD-81-070; USGS/WRD/UT-80-1) Avail: NTIS HC A99/MF A01 CSCL 08H

Water resources data for the 1980 water year for Utah consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of ground water. This report contains discharge records for 294 gaging stations; stage and contents for 22 lakes and reservoirs; water quality for 64 hydrologic stations, 194 partial-record stations, and 323 wells; and water levels for 36 observation wells. Additional water data were collected at various sites not involved in the systematic data-collection program and are published as miscellaneous measurements. These data represent that part of the National Water Data System collected by the U.S. Geologial Survey and cooperating State and Federal agencies in Utah. GRA

N82-17588# Hawaii Univ., Honolulu. Water Resources Research Center.
WATER QUALITY SIMULATION IN WAHIAWA RESERVOIR, O'AHU, HAWAII
Stephen F. Moore, G. Stephen Lowry, George P. Young, and Reginald H. F. Young Mar. 1981 56 p refs
(Contracts DI-14-34-0001-0113; DI-14-34-0001-1113; OWRT Proj. A-085-HI(1))
(PB82-108499; TMR-64; W81-05705; OWRT-A-085-HI(1)) Avail: NTIS HC A04/MF A01 CSCL 08H

To assist decision makers in selecting alternative water quality management strategies, the Water Quality for River-Reservoir Systems (WQRRS) model developed fo the U.S. Army Corps of Engineers was applied to the multiple-use, Wahiawa Reservoir, which has historically experienced water quality problems-especially low dissolved oxygen (DO) concentrations. The WQRRS model was calibrated and verified to adequately represent dynamic behavior of vertical profiles of water temperature and DO. Principal recommendations are to refine model calibrations, modify the model for artifical aeration simulation, and investigate other management strategies. GRA

N82-17589# National Ocean Survey, Rockville, Md.
GREAT LAKES WATER LEVELS, 1980. DAILY AND MONTHLY AVERAGE WATER SURFACE ELEVATIONS
1981 244 p

(PB82-107608; NOAA-81081106) Avail: NTIS HC A11/MF A01 CSCL 08H

Great Lakes water level gage records in both feet and meters are presented. Shown in tabular form for the calendar year are daily and monthly average levels for each gage in the network, the highest and lowest daily average level for each month, a frequency distribution of daily average levels showing the number of times each month the recorded levels were at, or above, specific elevations, and monthly average level stages for each lake from 1900 to the present. Author (GRA)

N82-17590# New England River Basins Commission, Boston, Mass.

CONNECTICUT COASTAL RIVER BASINS OVERVIEW: PUBLIC REVIEW DRAFT

Jul. 1981 175 p refs Sponsored in part by Water Resources Council, Washington, D.C. Original contains color illustrations
(PB82-105925) Avail: NTIS HC A08/MF A01 CSCL 08H

The Connecticut Coastal River basins contain numerous small rivers and streams that drain into Long Island Sound from 1,102 square miles in Connecticut and 47 square miles in New York. The basins exhibit a continuum of development, generally decreasing in intensity from west to east along the coast and from south to north away from Long Island Sound, with the exception of the urbanized Quinnipiac River Valley. Water resource problems in the basins include insufficient public water supplies in the western coastal area; coastal flooding and erosion; limited recreation opportunities, particularly for salt water swimming; and poor water quality. Author (GRA)

N82-17591# Geological Survey, Helena, Mont. Water Resources Div.

POTENTIAL EFFECTS OF URBANIZATION ON PEAK FLOWS IN RATTLESNAKE CREEK, MISSOULA COUNTY, MONTANA Final Water-Resources Investigations.

Charles Parrett Aug. 1981 25 p refs
(PB82-102583; USGS/WRD/WRI/81-080; USGS/WRI-81-34)
Avail: NTIS HC A02/MF A01 CSCL 08H

The potential effects of urbanization on the one-percent-chance flood on Rattlesnake Creek near Missoula, were assessed using a rainfall-runoff hydrograph model. The model, TR-20, was used to generate a one-percent-chance flood hydrography for existing conditions, natural (no-urban-development) conditions, and three different levels of potential future urbanization provided by the Missoula Planning Office. Author (GRA)

N82-17592# Texas Univ., Austin. Center for Research on Water Resources.

STREAMFLOW ASSESSMENT FOR COUNTIES

Leo R. Beard and Shin Chang 1 May 1981 31 p refs Sponsored in part by Water Resources Council, Washington, D.C.
(PB82-102450) Avail: NTIS HC A03/MF A01 CSCL 08H

The feasibility of water assessments at the county level subdivision is determined. It is desirable to obtain water availability data for political subdivisions so that they can be coordinated with census and other pertinent information that is gathered by political subdivision. GRA

N82-17593# Geological Survey, Menlo Park, Calif. Water Resources Div.

DIGITAL MODEL OF THE UNCONSOLIDATED AQUIFER SYSTEM IN THE MODESTO AREA, STANISLAUS AND SAN JOAQUIN COUNTIES, CALIFORNIA Final Water-resources Investigations

Clark J. Londguist Jul. 1981 43 p refs Prepared in cooperation with City of Modesto, Calif.
(PB82-102559; USGS/WRD/WRI/81-081; USGS/WRI-81-12)
Avail: NTIS HC A03/MF A01 CSCL 08H

A model was developed which can be used to determine the effects of increased pumping and water use on future water levels in the aquifer system. The model is divided into two layers or units that represent the unconsolidated alluvial deposits in the area. The lower unit in the model, called unit 1, represents an aquifer that is both confined and unconfined depending on location. The aquifer is confined in the western part of the study area by a clay bed 20 to 100 feet thick. Elsewhere, the aquifer is unconfined. GRA

N82-17594# Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.

REVEGETATING STRIP-MINED LAND WITH MUNICIPAL SEWAGE SLUDGE Final Report, Nov. 1976 - Oct. 1979

William E. Sopper and Sonja N. Kerr Sep. 1981 162 p refs Prepared in cooperation with Pennsylvania Dept. of Environmental Resources
(Grant EPA-S-804511)
(PB82-102484; EPA-600/2-81-182) Avail: NTIS HC A08/MF A01 CSCL 08I

Three sites representative of abandoned barren bituminous and anthracite mines were treated with various types of municipal sludge at high and low application rates and broadcast seeded with a mixture of greases and legumes. A monitoring system was installed at each demonstration site to determine the effects of the sludge applications on groundwater and soil percolate water chemical and bacteriological quality, chemical properties of the soil, and quality and growth of vegetative cover. GRA

N82-17595# Institute of Gas Technology, Chicago, Ill.

ANALYSIS OF GEOPRESSURED AQUIFERS Annual Report, Jan. - Dec. 1980

M. G. Doherty Aug. 1981 155 p refs
(Contract GRI-5011-310-0109)
(PB82-103862; GRI-80/0072) Avail: NTIS HC A08/MF A01 CSCL 08I

The Institute of Gas Technology undertook technical and economic analyses of the coproduction of water and gas from watered-out geopressured gas caps, hydropressured aquifers, and low-permeability geopressured aquifers for the Gas Research Institute. Out of over 100,000 wells screened in Louisiana and Texas, 489 were identified as having watered out under a strong water drive, making them possible candidates for watered-out geopressured gas cap wells. GRA

N82-17596# Bureau of Mines, Tuscaloosa, Ala.

DEWATERING FLORIDA PHOSPHATIC CLAY WASTES WITH MOVING SCREENS

Luther Warren Brandt Jul. 1981 22 p refs
(PB82-104373; BM-RI-8529; LC-80-607788) Avail: NTIS HC A02/MF A01 CSCL 08I

Various means of dewatering Florida phosphatic clay wastes and reclaiming mined lands were investigated and a technique to effectively dewater phosphatic clay wastes was developed. Solids in the clay waste slurry were slowly compressed by moving wire mesh screens through the system. In a typical application, the screens were moved downward, compressing solids ahead of the screens. The rate of movement of the screens is an important variable in the process. It is believed that the moving screens distort the gel structure of the phosphatic clay system and cause the release of water. Samples of 18 clay wastes, including a high-grade attapulgite from beneficiation plants of the Florida phosphate field, were studied using the method. GRA

N82-17597# Southwest Research Inst., San Antonio, Tex. Dept. of Mining Technology.

STUDY OF AIR COMPRESSOR HAZARDS IN UNDERGROUND AND SURFACE MINES Open File Report, Nov. 1979 - Jan. 1981

Martin B. Treuhaft and B. Chope Dial Jan. 1981 93 p refs
(Contract DI-BM-JO-10006)
(PB82-105164; BM-OFR-122-81) Avail: NTIS HC A05/MF A01 CSCL 08I

Air compressor hazards in mines are analyzed and guidelines for eliminating fires, explosions, and their operational hazards that can result when compressors are used in coal and metal nonmetal mining applications are presented. Government data bases and reports for mine accident are reviewed and examined. Foreign and domestic standards, regulations, and codes governing air compressor usage are discussed and compared industry trends toward air compressor usage are considered and their impact on compressor safety is analyzed. Recommendations are directed toward MSHA, mine management, and the Bureau of Mines regarding their involvement in accident reporting and prevention. GRA

N82-17598# Bureau of Mines, Washington, D. C. Office of Minerals Information and Analysis.

MINERALS YEARBOOK, 1978-79. VOLUME 2: AREA REPORTS, DOMESTIC
Jul. 1981 605 p
(PB82-105248; BM-MYB-1977-Vol-2) Avail: NTIS HC A99/MF A01 CSCL 08I

Data is presented on crude nonfuel mineral production in each of the 50 States, the U.S. possessions in the Pacific Ocean and the Caribbean Sea, and the Commonwealth of Puerto Rico. A statistical summary is included. GRA

N82-17599 Colorado State Univ., Fort Collins.
REGIONAL PROPERTIES OF ANGULAR REFLECTANCE MODELS Ph.D. Thesis
John Michael Davis 1981 215 p
Avail: Univ. Microfilms Order No. 8126427

The inference of the reflected flux density from satellite radiance measurements requires a knowledge of the angular properties of the reflected radiance field. The angular dependence and the spatial variability of the radiance fields reflected from 30 regional atmospheric scenes were examined. The reflected radiance data set was collected from a high altitude aircraft during the Summer Monsoon Experiment using a unique multi-detector instrument which permitted an instantaneous sampling of the radiance fields from twelve angular veiwing coordinates. All of the scenes display sufficient anisotropy to conclude that neglecting the angular variation of the reflected radiances would lead to significant errors (10-100%) in the inferred flux density. Radiances over the relatively isotropic scenes converge to their regional mean values on a spatial scale which is small compared to that of the total region. Dissert. Abstr.

N82-17600 Columbia Univ., New York.
ADDITION OF RADIOCARBON TO THE MIXED-LAYERS OF TWO SMALL LAKES: PRIMARY PRODUCTION, GAS EXCHANGE, SEDIMENTATION AND CARBON BUDGET Ph.D. Thesis
Peter Michael Bower 1981 259 p
Avail: Univ. Microfilms Order No. 8125254

Addition of radiocarbon to the mixed layers of two small dimictic lakes made it possible to assess the validity of enclosing natural phytoplankton populations in bottles for the purpose of estimating primary production. Simultaneous determinations of daily integral primary production by the C-14 method were made by 4 and 16 hour in situ incubations, by an incubator based numerical model, and by dawn and dusk sampling of the mixed layer. Estimates of productivity from the in situ incubations averaged 0.73 and 0.87 of the whole lake results with the underestimation never more than 60%. Productivity results for the incubator model averaged from 0.77 to 0.93 of the whole lake values. Strong surface inhibition of photosynthesis was observed in the vertical profiles of production. It is argued that this strong surface depression of photosynthesis is an artifact of the stationary position of the bottles and the unnaturally long exposure to supraoptimal light. A correction for daytime respiration of C-14 incorporated on previous days suggests that whole lake productivity is significantly enhanced over that measured in bottles. Dissert. Abstr.

N82-17601 Michigan Univ., Ann Arbor.
SPECTRAL REFLECTANCES OF FRESHWATER ICE AND SNOW FROM 340 THROUGH 1100 nm Ph.D. Thesis
Stanley Joseph Bolsenga 1981 159 p
Avail: Univ. Microfilms Order No. 8125073

Measured spectral reflectances of new and moderately metamorphosed snow were generally > 80% from 340 to 950 nm. From 950 to 100 nm a characteristic dip and rise of spectral reflectances occurred. One scan over a deteriorated snow patch showed much lower spectral reflectances than fresh snow, but the shape of the curve remained similar to fresher snow. Spectral reflectances for clear ice contrasted sharply with those for snow. In general, values were < 10% and the curves lacked distinctive shape. Higher spectral reflectances, due to lighter colored ice in the measurement area, were measured at some sites. Secondary ice types (refrozen slush, pancake, brash, slush curd) revealed spectral reflectance curves similar in form to each other, but which varied significantly in the range of spectral reflectances for each ice type. All measurements were acquired with a pair of scanning spectroradiometers adapted to obtain automatically simultaneous readings of incident and reflected radiation from 340 to 100 nm. Dissert. Abstr.

N82-17602 Colorado State Univ., Fort Collins.
WATERSHED MODEL STUDY USING LANDSAT DATA Ph.D. Thesis
Tien-Po Chang 1981 331 p
Avail: Univ. Microfilms Order No. 8126421

In connection with the use of remote sensing techniques, a digital terrain model that characterizes geometric features and other terrain conditions of a watershed is necessary for watershed modeling. As a result of constructing a watershed cell system on the digital terrain model, the mathematical formation on simulated physical processes can be simplified since the mathematical expressions only handle the small-sized, well-defined and relatively homogeneous components of the physical processes within a watershed cell. Four submodels that link the processing of the remote sensed data to the watershed analysis were developed. The submodels are LANDSAT image data processing model, digital terrain model, hydrologic simulation model, and landslide-hazard potential delineation model. The structure, function, and computer programs related to these models, along with the results of watershed simulation using the models, are presented and discussed. Dissert. Abstr.

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-17603*# Gilbert/Commonwealth, Reading, Pa.
MAGNETOHYDRODYNAMICS (MHD) ENGINEERING TEST FACILITY (ETF) 200 MWe POWER PLANT CONCEPTUAL DESIGN ENGINEERING REPORT (CDER) Final Report
Sep. 1981 593 p refs
(Contracts DEN3-224; DE-AI01-77ET-10769)
(NASA-CR-165452-Vol-5; DOE/NASA/0224-1-Vol-5) Avail: NTIS HC A25/MF A01 CSCL 10B

The reference conceptual design of the magnetohydrodynamic (MHD) Engineering Test Facility (ETF), a prototype 200 MWe coal-fired electric generating plant designed to demonstrate the commercial feasibility of open cycle MHD, is summarized. Main elements of the design, systems, and plant facilities are illustrated. System design descriptions are included for closed cycle cooling water, industrial gas systems, fuel oil, boiler flue gas, coal management, seed management, slag management, plant industrial waste, fire service water, oxidant supply, MHD power train, magnet, heat recovery/seed recovery, inverter, heating, ventillating, and air conditioning, and electrical. N.W.

N82-17604*# Spectrolab, Inc., Sylmar, Calif.
DESIGN, ANALYSIS, AND TEST VERIFICATION OF ADVANCED ENCAPSULATION SYSTEMS Interim Report, period ending 1 Oct. 1980
Alec Garcia and Chuck Minning Nov. 1981 178 p refs
Sponsored in part by DOE Prepared for JPL
(Contract JPL-955567)
(NASA-CR-168407; DOE/JPL-955567-81/4; JPL-9950-619) Avail: NTIS HC A09/MF A01 CSCL 10A

Thermal, optical, structural, and electrical isolation analyses are decribed. Major factors in the design of terrestrial photovoltaic modules are discussed. Mechanical defects in the different layers of an encapsulation system, it was found, would strongly influence the minimum pottant thickness required for electrical isolation. Structural, optical, and electrical properties, a literature survey indicated, are hevily influenced by the presence of moisture. These items, identified as technology voids, are discussed. Analyses were based upon a 1.2 meter square module using

10.2 cm (4-inch) square cells placed 1.3 mm apart as shown in Figure 2-2. Sizing of the structural support member of a module was determined for a uniform, normal pressure load of 50 psf, corresponding to the pressure difference generated between the front and back surface of a module by a 100 mph wind. Thermal and optical calculations were performed for a wind velocity of 1 meter/sec parallel to the ground and for module tilt (relative to the local horizontal) of 37 deg. Placement of a module in a typical array field is illustrated. N.W.

N82-17605*# Spectrolab, Inc., Sylmar, Calif.
DESIGN, ANALYSIS, AND TEST VERIFICATION OF ADVANCED ENCAPSULATION SYSTEMS Triennual Report, Period ending 31 Jul. 1981
Alec Garcia and Chuck Minning Nov. 1981 27 p refs Sponsored in part by DOE Prepared for JPL
(Contract JPL-955567)
(NASA-CR-168406; DOE/JPL-955567-81/5; JPL-9950-620) Avail: NTIS HC A03/MF A01 CSCL 10A

The construction of optical and electrical verification test coupons is detailed. Testing of these coupons was completed and the results are presented. Additionally, a thermal simulation of roof mounted array conditions was done and the results documented. Author

N82-17606*# Mathematical Sciences Northwest, Inc., Bellevue, Wash.
OVERVIEW STUDY OF SPACE POWER TECHNOLOGIES FOR THE ADVANCED ENERGETICS PROGRAM
R. Taussig, S. Gross, A. Millner, M. Neugebauer, W. Phillips, J. Powell, E. Schmidt, M. Wolf, and G. Woodcock Oct. 1981 341 p refs
(Contract NAS3-22477)
(NASA-CR-165269; MSNW-1169) Avail: NTIS HC A15/MF A01 CSCL 10B

Space power technologies are reviewed to determine the state-of-the-art and to identify advanced or novel concepts which promise large increases in performance. The potential for increased performance is judged relative to benchmarks based on technologies which have been flight tested. Space power technology concepts selected for their potentially high performance are prioritized in a list of R & D topical recommendations for the NASA program on Advanced Energetics. The technology categories studied are solar collection, nuclear power sources, energy conversion, energy storage, power transmission, and power processing. The emphasis is on electric power generation in space for satellite on board electric power, for electric propulsion, or for beamed power to spacecraft. Generic mission categories such as low Earth orbit missions and geosynchronous orbit missions are used to distinguish general requirements placed on the performance of power conversion technology. Each space power technology is judged on its own merits without reference to specific missions or power systems. Recommendations include 31 space power concepts which span the entire collection of technology categories studied and represent the critical technologies needed for higher power, lighter weight, more efficient power conversion in space. Author

N82-17607*# United Technologies Corp., South Windsor, Conn. Power Systems Div.
ELECTROCHEMICAL ENERGY STORAGE FOR AN ORBITING SPACE STATION
R. E. Martin Dec. 1981 61 p refs
(Contract NAS3-21293)
(NASA-CR-165436; FCR-3142) Avail: NTIS HC A04/MF A01 CSCL 10C

The system weight of a multi hundred kilowatt fuel cell electrolysis cell energy storage system based upon alkaline electrochemical cell technology for use in a future orbiting space station in low Earth orbit (LEO) was studied. Preliminary system conceptual design, fuel cell module performance characteristics, subsystem and system weights, and overall system efficiency are identified. The impact of fuel cell module operating temperature and efficiency upon energy storage system weight is investigated. The weight of an advanced technology system featuring high strength filament wound reactant tanks and a fuel cell module employing lightweight graphite electrolyte reservoir plates is defined. E.A.K.

N82-17608*# Eaton Engineering and Research Center, Southfield, Mich. Engineering and Research Center.
STRAIGHT AND CHOPPED DC PERFORMANCE DATA FOR A RELIANCE EV-250AT MOTOR WITH A GENERAL ELECTRIC EV-1 CONTROLLER Final Report
Paul C. Edie Sep. 1981 58 p
(Contracts DEN3-123; DE-AI01-77CS-51044)
(NASA-CR-165447; DOE/NASA/0123-3; ERC-TR-8175) Avail: NTIS HC A04/MF A01 CSCL 10B

Straight and chopped DC motor performances for a Reliance EV-250AT motor with an EV-1 controller were examined. Effects of motor temperature and operating voltage are shown. It is found that the maximum motor efficiency is approximately 85% at low operating temperatures in the straight DC mode. Chopper efficiency is 95% under all operating conditions. For equal speeds, the motor operated in the chopped mode develops slightly more torque and draws more current than it does in the straight DC mode. E.A.K.

N82-17609*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SATELLITE POWER SYSTEM. CONCEPT DEVELOPMENT AND EVALUATION PROGRAM, VOLUME 6: CONSTRUCTION AND OPERATIONS
Harold Benson and Lyle M. Jenkins Apr. 1981 216 p refs
(NASA-TM-58233; JSC-17220-Vol-6) Avail: NTIS HC A10/MF A01 CSCL 10A

The construction, operation, and maintenance requirements for a solar power satellite, including the space and ground systems, are reviewed. The basic construction guidelines are explained, and construction location options are discussed. The space construction tasks, equipment, and base configurations are discussed together with the operations required to place a solar power satellite in geosynchronous orbit. A rectenna construction technique is explained, and operation with the grid is defined. Maintenance requirements are summarized for the entire system. Key technology issues required for solar power satellite construction operations are defined. E.A.K.

N82-17610*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RESULTS OF THE 1981 NASA/JPL BALLOON FLIGHT SOLAR CELL CALIBRATION PROGRAM
C. H. Seaman and R. S. Weiss 15 Jan. 1982 16 p refs
(Contract NAS7-100)
(NASA-CR-168442; JPL-Pub-81-115) Avail: NTIS HC A02/MF A01 CSCL 10A

The calibration of the direct conversion of solar energy through use of solar cells at high altitudes by balloon flight is reported. Twenty seven modules were carried to an altitude of 35.4 kilometers. Silicon cells are stable for long periods of time and can be used as standards. It is demonstrated that the cell mounting cavity may be either black or white with equal validity in setting solar simulators. The calibrated cells can be used as reference standards in simulator testing of cells and arrays. E.A.K.

N82-17611*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SENSITIVITY ANALYSIS OF THE ADD-ON PRICE ESTIMATE FOR THE SILICON WEB GROWTH PROCESS
Anant R. Mokashi 15 Dec. 1981 37 p refs
(Contracts NAS7-100; DE-AI01-76ET-20356; JPL Proj. 5101-175)
(NASA-CR-168422; JPL-5101-175; DOE/JPL-1012-61) Avail: NTIS HC A03/MF A01 CSCL 10A

The web growth process, a silicon-sheet technology option, developed for the flat plate solar array (FSA) project, was examined. Base case data for the technical and cost parameters for the technical and commercial readiness phase of the FSA project are projected. The process add on price, using the base case data for cost parameters such as equipment, space, direct labor, materials and utilities, and the production parameters such as growth rate and run length, using a computer program developed specifically to do the sensitivity analysis with improved price estimation are analyzed. Silicon price, sheet thickness and cell efficiency are also discussed. E.A.K.

N82-17612*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A NORMATIVE PRICE FOR ENERGY FROM AN ELECTRICITY GENERATION SYSTEM: AN OWNER-DEPENDENT METHODOLOGY FOR ENERGY GENERATION (SYSTEM) ASSESSMENT (OMEGA). VOLUME 1: SUMMARY
Robert G. Chamberlain and Kirby M. McMaster 15 Oct. 1981 62 p refs Sponsored by NASA and DOE 2 Vol.
(NASA-CR-168432; JPL-Pub-81-86-Vol-1; DOE/ET-20356/5) Avail: NTIS HC A04/MF A01 CSCL 10B

The utility owned solar electric system methodology is generalized and updated. The net present value of the system is determined by consideration of all financial benefits and costs (including a specified return on investment). Life cycle costs, life cycle revenues, and residual system values are obtained. Break even values of system parameters are estimated by setting the net present value to zero. While the model was designed for photovoltaic generators with a possible thermal energy byproduct, it applicability is not limited to such systems. The resulting owner-dependent methodology for energy generation system assessment consists of a few equations that can be evaluated without the aid of a high-speed computer. S.L.

N82-17613*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A NORMATIVE PRICE FOR ENERGY FROM AN ELECTRICITY GENERATION SYSTEM: AN OWNER-DEPENDENT METHODOLOGY FOR ENERGY GENERATION (SYSTEM) ASSESSMENT (OMEGA). VOLUME 2: DERIVATION OF SYSTEM ENERGY PRICE EQUATIONS
Robert G. Chamberlain and Kirby M. McMaster 15 Oct. 1981 100 p refs Sponsored in part by DOE 2 Vol.
(Contracts NAS7-100; DE-AI01-76ET-20356)
(NASA-CR-168433; JPL-Pub-81-86-Vol-2; DOE/ET-20356/5) Avail: NTIS HC A05/MF A01 CSCL 10B

The methodology presented is a derivation of the utility owned solar electric systems model. The net present value of the system is determined by consideration of all financial benefits and costs including a specified return on investment. Life cycle costs, life cycle revenues, and residual system values are obtained. Break-even values of system parameters are estimated by setting the net present value to zero. S.L.

N82-17614*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE 18TH PROJECT INTEGRATION MEETING Progress Report, Feb. - Jul. 1981
Jul. 1981 577 p refs Meeting held at Pasadena, Calif., 15-16 Jul. 1981
(Contract NAS7-100; DE-AI01-76ET-20356)
(NASA-CR-168431; JPL-Pub-81-94; JPL-5101-186) Avail: NTIS HC A25/MF A01 CSCL 10A

Progress in the low cost solar array project during the period February to July 1981 is reported. Included are: (1) project analysis and integration; (2) technology development in silicon material, large area silicon sheer and encapsulation; (3) process development; (4) engineering, and operations. E.A.K.

N82-17615*# Stonehart Associates, Inc., Madison, Conn.
PREPARATION AND EVALUATION OF ADVANCED ELECTROCATALYSTS FOR PHOSPHORIC ACID FUEL CELLS Quarterly Report, Oct. - Dec. 1981
Paul Stonehart, John Baris, John Hochmuth, and Peter Pagliaro Dec. 1981 44 p
(Contract DEN3-176; Contract DE-AI03-80ET-17088)
(NASA-CR-165594; DOE/NASA/0176-81/5; QR-8) Avail: NTIS HC A03/MF A01 CSCL 10A

Two cooperative phenomena are required the development of highly efficient porous electrocatalysts: (1) is an increase in the electrocatalytic activity of the catalyst particle; and (2) is the availability of that electrocatalyst particle for the electrochemical reaction. The two processes interact with each other so that improvements in the electrochemical activity must be coupled with improvements in the availability of the electrocatalyst for reaction. Cost effective and highly reactive electrocatalysts were developed. The utilization of the electrocatalyst particles in the porous electrode structures was analyzed. It is shown that a large percentage of the electrocatalyst in anode structures is not utilized. This low utilization translates directly into a noble metal cost penalty for the fuel cell. E.A.K.

N82-17616# Los Alamos Scientific Lab., N. Mex.
DOE-2 VERIFICATION PROJECT, PHASE 1 Interim Report
Stephen C. Diamond, Bruce D. Hunn, and Charlene C. Cappiello Apr. 1981 74 p refs
(Contract W-7405-eng-36)
(LA-8295-MS) Avail: NTIS HC A04/MF A01

Phase 1, an analytical and empirical verification of DOE-2 as computational algorithms, is reported. DOE-2 is a computer program developed to provide architect/engineers with a public domain tool for energy analysis buildings. Results of a comparison of plant equipment performance default values with manufacturer's data, and results of a series of comparisons of DOE-2 solar simulator predictions with predictions of other solar system simulation computer programs. Results of empirical tests of the full DOE-2 program are also presented, including comparisons with measured monthly and annual energy consumption for seven commercial buildings located in seven different cities and for nine elementary schools. Comparisons of predicted results of several building energy analysis computer programs are reported. E.A.K.

N82-17617# Kernforschungsanlage, Juelich (West Germany).
IMPLEMENTING AGREEMENT FOR A PROGRAM OF RESEARCH AND DEVELOPMENT ON WIND ENERGY CONVERSION SYSTEMS
Apr. 1981 109 p refs Partly in ENGLISH and GERMAN Presented at 1981 Meeting of Experts of Annex 3 and 3a on Integration of Wind Power into Natl. Elec. Supply Systems, Regensburg, West Germany, 29-30 Jan. 1981 Sponsored by Bundesministerium fuer Forschung und Technol. and Regensburg Univ., West Germany
(Juel-Spez-108; ISSN-0343-7639) Avail: NTIS HC A06/MF A01

The technical and economic feasibility of wind power electric generation in Germany and the Netherlands is discussed. Problems of power output fluctuations are considered. For individual titles, see N82-17618 through N82-17625.

N82-17618# Kernforschungsanlage, Juelich (West Germany).
METEOROLOGICAL DATA BASIS
L. Jarass (ATW, G.M.B.H., Regensburg, West Germany) *In its* Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 1-16 (For primary document see N82-17617 08-44)
Avail: NTIS HC A06/MF A01

Wind speed and direction data from 16 observation points in the Federal Republic of Germany are evaluated. Hourly mean figures for wind speed and direction, measured at heights of 10 m to 30 m above ground, for the years 1969 to 1976 at coastal stations and for the years 1969 and 1972 at inland stations, are analyzed. Daily and seasonal time variations and the temporal distribution of wind speed, lulls, and correlation and autocorrelation of wind speeds are considered and charted. Extreme velocities are discussed. A general evaluation of possible sites for wind power generation facilities is presented. J.D.H.

N82-17619# Regensberg Univ. (West Germany). Inst. fuer Physik.
ASSESSMENT OF TECHNICAL POTENTIAL: PROBLEMS, METHODS AND RESULTS
G. Obemair *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 17-28 (For primary document see N82-17617 08-44)
Avail: NTIS HC A06/MF A01

The technical and economic problems posed by the integration of wind energy into the electric power supply system are considered. Stability and control requirements, the efficiency of wind converters and the exclusion of technically inaccessable areas are applied to the stochastic wind field over the total area. The resulting technical potential is then reduced to an economic potential by applying an economic filter which involves competitiveness measured against other energy sources, comparative social costs and socio-economic preferences, and the actual cost and existing use of land for wind energy parks. J.D.H.

N82-17620# Regensberg Univ. (West Germany). Inst. fuer Volkswirtschaft.
ECONOMIC EVALUATION
L. Hoffman *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 28-37 (For primary document see N82-17617 08-44)
Avail: NTIS HC A06/MF A01

The economic significance of wind energy is assessed on the basis of its potential contribution to Germany's energy supply, its competitiveness vis-a-vis other energy sources, and its social desirability, measured by its contribution to the realization of general socio-economic goals. J.D.H.

N82-17621# Regensberg Univ. (West Germany). Forschungsprojekt Windenergie.
ASSESSMENT OF THE POTENTIAL OF LWECS IN THE NETHERLANDS
W. Dub *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 41-62 refs (For primary document see N82-17617 08-44)
Avail: NTIS HC A06/MF A01

The potential of large wind energy conversion systems (LWECS) in the Netherlands is assessed. Hourly data on mean wind speeds and wind directions from 5 stations are analyzed and extrapolated up to a height of 100 m and monthly and annual mean wind speeds. The wind power conversion efficiency of wind turbines and the monthly and annual energy production of WECS 1 are calculated. The daily wind energy production of a compound system of 3 MW wind turbines and the daily percentages of the 1980 national electric power needs they would meet are determined using 1975 wind data. The number of 3 MW and 0.8 MW wind turbines required to produce 9.97 TWh per year is determined. J.D.H.

N82-17622# Regensberg Univ. (West Germany). Forschungsprojekt Windenergie.
POWER FLUCTUATIONS: TECHNICAL AND STATISTICAL ASPECTS
H. Pape *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 63-70 refs (For primary document see N82-17617 08-44)
Avail: NTIS HC A06/MF A01

Electric power output fluctuations from wind turbines occurring within minutes are considered. Means of regulating the fluctuations are discussed. A statistical proof that an increasing number of wind turbines tends to generate a more regular power output than each individual wind turbine is presented. J.D.H.

N82-17623# Regensberg Univ. (West Germany). Forschungsprojekt Windenergie.
FORECASTING WIND POWER OUTPUT
W. Dub *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 71-80 refs (For primary document see N82-17617 08-44)
Avail: NTIS HC A06/MF A01

Long term forecasts of electric energy output from wind power are presented. Periods of 2-6 hours, 6-12 hours, 12-24 hours, and 24-48 hours are considered. The prediction of wind speed is discussed. It is determined that, having a good estimator of the mean wind speed V sub T for a planning period T, the mean wind power output will be underestimated, so long as the wind speed used is the range of cut-in and rated speeds. J.D.H.

N82-17624# Regensberg Univ. (West Germany). Forschungsprojekt Windenergie.
ASSURED LOAD CARRYING CAPABILITY AND CAPACITY CREDIT
H. Pape *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 81-95 refs (For primary document see N82-17617 08-44)
Avail: NTIS HC A06/MF A01

The determination of assured load carrying capability and the capacity credit for use in planning windpowered electric generation facilities is considered. Calculation of the available capacity of thermal power plants is described and compared with calculation of available capacity for wind turbines, taking into account outages caused by the unavailability of the primary energy, wind. The assured load carrying capability of power plants is defined. An operational definition of the capacity credit of wind turbines as related to a fixed time t Epsilon T is presented and extended to the period T. J.D.H.

N82-17625# Gesamthochschule, Kassel (West Germany). Fachbereich Elektrotechnik.
POSSIBILITIES FOR AVOIDING STRONG VARIATIONS OF THE ELECTRICAL OUTPUT POWER OF WIND ENERGY SYSTEMS [MOEGLICHKEITEN ZUR VERMEIDUNG VON STARKEN SCHWANKUNGEN DER ELEKTRISCHEN ABGABELEISTUNG VON WINDENERGIEANLAGEN]
G. Cramer *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 96-99 refs (For primary document see N82-17617 08-44)
Avail: NTIS HC A06/MF A01

The conversion of the kinetic energy of wind into electric power through wind powered converters by the primary energy of atmospheric circulation speed is discussed. It is suggested that wind powered generators which work with the supply network should avoid overloading the installation from wind performance caused by a fast change of the blade pitch. There are possibilities to achieve numerical comparison of the temporary storage performance of kinetic energy by application of rotating masses with flywheels, which allow for rotation speed variations. Through the feed of direct or alternate current in the rotor cycle form asynchronic machines with slip rings or through the influence of the slip performance a speed of variable duty on the network is accomplished. E.A.K.

N82-17626# Defence Research Establishment, Ottawa. (Ontario). Chemical Souces Section.
SAFETY DESIGN CONSIDERATIONS FOR LITHIUM BATTERIES IN CF APPLICATIONS
Walter J. Moroz Feb. 1981 21 p refs In ENGLISH; FRENCH summary Presented at the 11th Meeting of the DND Directors Comm. on Res. Requirements and Develop., Sep. 1980
(AD-A107619; DREO-TN-81-11) Avail: NTIS HC A02/MF A01 CSCL 10/3

Lithium-sulphur dioxide (Li-SO2) primary cells are being introduced as power supplies into Canadian Forces applications where advantage can be taken of their high energy density characteristics and low temperature capabilities. For safety reasons the high energy capabilities of these cells must be protected against the possibility of accidental abuse. DREO has investigated and identified a number of operational problem areas associated with Li-SO2 systems. Safety design considerations are proposed for three CF applications; the PRC 515 Radio Set/Radar Transponder SST-181X applications and the AN/PRQ-501 Personal Locater Beacon. Author (GRA)

N82-17627# Air Force Academy, Colo. Directorate of Chemical Sciences.
A NEW CLASS OF ROOM TEMPERATURE MOLTEN SALTS FOR BATTERY APPLICATIONS Interim Report, Sep. 1980 - Sep. 1981
John S. Wilkes, Joseph A. Levisky, John S. Landers, Robert L. Vaughn, Charles L. Hussey, Danilo A. Floreani, and Daniel J. Stech Oct. 1981 32 p refs Presented at the AFSC/NAVMAT Sci. and Eng. Symp., Wright-Patterson AFB, Ohio, 27-29 Oct. 1981
(Contract AF Proj. 2303)
(AD-A107989; FJSRL-TR-81-0011) Avail: NTIS HC A03/MF A01 CSCL 07/4

Salts that are liquid at room temperature would provide a completely ionic electrolyte for rechargeable batteries without the penalty of high operating temperatures. We have discovered and characterized a new class of molten salts that are liquids considerably below room temperature. The new materials are mixtures of dialkyimidazolium chlorides and aluminum chloride. The solid-liquid phase diagram of one member of the class shows that the material is liquid below room temperature over its entire composition range. A proof of concept battery cell using the new electrolyte was demonstrated. Electrochemical tests show that battery anodes and cathodes will operate in the new electrolytes. By varying the ratio of the components of the new melts, the chemical and physical properties can be changed over a very wide range. Author (GRA)

N82-17628# Jydsk Telefon A/S Biblioteket, Aarhus-Tranbjerg J. (Denmark).
SOLAR-CELL PROJECT Progress Report
B. Mortensen and Johs Jensen (Odense Univ.) Aug. 1980 42 p refs In DANISH
(DE82-301191; NP-2901191; PR-1) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

Commercially available solar cells and battery systems were tested. The details of the experimental solar cell/battery array placed on the roof of the Jutland Telephone telestation near Aarhus, Denmark are described. A survey of module calculations and meteorological data in this region is given. The systems tested, their components, solar cell arrays and mechanical and electrical equipment are described and measuring methods and data processing are outlined. DOE

N82-17629# Amax Exploration, Inc., Wheat Ridge, Colo.
TUSCARORA AREA, NEVADA: GEOTHERMAL RESERVOIR ASSESSMENT CASE HISTORY, NORTHERN BASIN AND RANGE Final Report, 1 Oct. 1978 - 9 Sep. 1980
H. D. Pilkington Aug. 1981 45 p refs
(Contract DE-AC08-79ET-27011)
(DE82-001328; DOE/ET-27011/1) Avail: NTIS HC A03/MF A01

A Geothermal exploration of the Tuscarora prospect consisted of an integrated program of geologic, hydrogeochemical and soil geochemistry studies. Geophysical exploration included: heatflow studies, aeromagnetic, self potential, gravity, dipole-dipole resistivity and magnetotelluric surveys. Exploration drilling includes 32 shallow thermal gradient holes, six intermediate depth temperature gradient wells and one 5454 foot test for discovery well. Shallow low temperature reservoirs were encountered in the Tertiary rocks and in the Paleozoic rocks immediately beneath the Tertiary. DOE

N82-17630# Gilbert (Glen A.) and Associates, Inc., Reading, Pa.
RESEARCH AND EVALUATION OF BIOMASS RESOURCES/CONVERSION/UTILIZATION SYSTEMS. BIOMASS ALLOCATION MODEL. VOLUME 1: TEST AND APPENDICES A & B
R. P. Stringer, Y. K. Ahn, H. T. Chen, R. W. Helm, E. T. Nelson, and K. J. Shields Aug. 1981 222 p refs 2 Vol.
(Contract DE-AC02-78ET-20611)
(DE82-000838; DOE/ET-20611/12-Vol-1; GAI-2204-Vol-1) Avail: NTIS HC A10/MF A01

A biomass allocation model was developed to show the most profitable combination of biomass feedstocks, thermochemical conversion processes, and fuel products to serve the seasonal conditions in a regional market. This optimization model provides a tool for quickly calculating which of a large number of potential biomass missions is the most profitable mission. Other components of the system serve as a convenient storage and retrieval mechanism for biomass marketing and thermochemical conversion processing data. The system can be accessed through the use of a computer terminal, or it could be adapted to a microprocessor. A User's Manual for the system is included. Biomass derived fuels included in the data base are the following: medium Btu gas, low Btu gas, substitute natural gas, ammonia, methanol, electricity, gasoline, and fuel oil. DOE

N82-17631# Gilbert (Glen A.) and Associates, Inc., Reading, Pa.
RESEARCH AND EVALUATION OF BIOMASS RESOURCES/CONVERSION/UTILIZATION SYSTEMS. BIOMASS ALLOCATION MODEL. VOLUME 2: APPENDICES C-E
R. P. Stringer, Y. K. Ahn, H. T. Chen, R. W. Helm, E. T. Nelson, and K. J. Shields Aug. 1981 323 p refs 2 Vol.
(Contract DE-AC02-78ET-20611)
(DE82-000839; DOE/ET-20611/12-Vol-2; GAI-2204-Vol-2) Avail: NTIS HC A14/MF A01

The Biomass Feedstock Allocation Model User's Manual is presented. The results of an economic analysis of biomass thermochemical conversion processes are presented as: a sample computer run for process economics; process cost sensitivity plots (the effect of plant capacity and feedstock cost on product cost); and the results of a computer analysis showing product costs using discounted cash flow and utility financing method. The results of process modeling activities are also included. DOE

N82-17632# Seymour Community Schools, Wis.
COMMUNITY SOLAR DEMONSTRATION/DISSEMINATION CENTER Final Report
Richard Tepp 8 Jul. 1981 14 p
(Contract DE-FG02-80R5-10250)
(DE82-000994; DOE/R5-10250/T1) Avail: NTIS HC A02/MF A01

A passive/active solar heating demonstration component was constructed. A greenhouse was installed, and the active system was completed. The fireplace was also completed. A direct gain 8 by 20 double glazed greenhouse system on concrete footings and masonary blocks was incorporated. The greenhouse includes a 4 in. concrete slab with 2 in. of thermal below grade insulation. Other key elements include a 30 in. hinged entrance door, screens and motor-operated louver vents for summer ventilation. Manual operated dampers are built into the trombe wall, which was constructed as the backdrop of the greenhouse. DOE

N82-17633# Texas Instruments, Inc., Dallas.
DEVELOPMENT OF A SOLAR-ENERGY SYSTEM Technical Summary Report
E. L. Johnson 3 Apr. 1981 23 p
(Contract DE-AC01-79ER-10000)
(DE81-030531; DOE/ER-10000/T2) Avail: NTIS HC A02/MF A01

Solar energy conversion by operation of small silicon solar cells immersed in an electrolyte is described. The current generated by the cells is used to separate the electrolyte into its constituent parts. The system consists of a solar chemical converter in which the electrolyte is separated, hydrogen storage, a fuel cell, and a heat exchanger for recovering heat from the system. Fabrication of the solar cells used in the solar chemical convertor and the storage of hydrogen as a metal hydride are discussed. DOE

N82-17634# Argonne National Lab., Ill. Energy and Environmental Systems Div.
CUSTOMER ATTITUDES TOWARD THERMAL-ENERGY-STORAGE HEATING
H. N. Hersh Jun. 1981 74 p refs
(Contract W-31-109-eng-38)
(DE82-003010; ANL-SPG-17) Avail: NTIS HC A04/MF A01

Attitudes among users of thermal energy storage (TES) heating systems were studied. A customer acceptance survey exploring attitudes and levels of satisfaction, face to face contacts between utility representatives and users, and a survey of pertinent published information are investigated. It is found that: (1) TES heating systems are installed for economic reasons by customers who can afford higher initial costs and understand the concept of lower total cost; and (2) attitudes toward TES are positive. The TES systems are not regarded more favorably than conventional systems, however, and it is likely that lower electric heating bills are responsible for the favorable perceptions of most TES users. DOE

N82-17635# Gould, Inc., Rolling Meadows, Ill.
DEVELOPMENT OF ZINC-BROMINE BATTERIES FOR UTILITY ENERGY STORAGE Monthly Progress Report, Aug. 1981
R. A. Putt 1981 31 p
(Contract DE-AC02-78ET-29346)
(DE82-002114; DOE/ET-29346/T5) Avail: NTIS HC A03/MF A01

Progress is reported on the following tasks related to the development of zinc-bromide batteries: component development and acceptance, hardware design and construction, and testing. Electrode test cell efficiency data and contract management summary reports are presented in tabular form. M.D.K.

N82-17636*# Thermo Electron Corp., Waltham, Mass.
DOE/JPL ADVANCED THERMIONIC TECHNOLOGY PROGRAM Progress Report, Oct. - Nov. - Dec. 1980
1980 54 p
(Contracts DE-AC02-76ET-11292; JPL-955009)
(NASA-CR-168436; DE81-769295; DOE/ET-11292/T5; COO-3056-62; TE4250/4247-149-81; PR-45) Avail: NTIS HC A04/MF A01 CSCL 10A

Accomplishments in the DOE program include: continuing stable output from the combustion life test of the one-inch diameter hemispherical silicon carbine diode (Converter No. 239) at an emitter temperature of 1730 K for a period of over 4200 hours; construction of four diode module completed; favorable results obtained from TAM combustor-gas turbine system analyses; and obtained a FERP work function of 2.3 eV with the W(100)-O-Zr-C electrode. JPL program accomplishments include: the average minimum barrier index of the last six research diodes built with sublimed molybdenum oxide collectors was 20 eV (WHK). DOE

N82-17637# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamic.
STATIC AND DYNAMIC INVESTIGATIONS OF DIFFERENT TOWERS FOR WIND TURBINES Final Report
J. H. Argyris and K. A. Braun 1980 125 p refs Transl. into ENGLISH of "Statische und dyn. untersuch. verschiedener tuerme fuer windturbinen" Rept. ISD-261 Stuttgart Univ., Stuttgart, 1979 122p Original report in GERMAN previously announced as N81-12628 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-274; ISD-261; ISSN-0170-6071) Avail: NTIS HC A06/MF A01

The kinematics of a cantilevered, a conventional guyed, and a compliant (elastic column held by a rigid framework) tower were studied. The static layout of the towers is established, using the reactions due to different gusts which a two-bladed rotor (120 m diameter) imposes on a rigid support as external loads. The rotor blades are assumed to be inelastic. Each one has a flapping hinge and a flap-pitch coupling. Dynamic responses were calculated by the finite element method. The guyed tower is superior to the cantilevered one. A 10.4 deg inclination angle seems best for the compliant tower, but more dynamic and stability analyses are needed before undertaking further tower geometry optimization. Author (ESA)

N82-17638# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
ROTOR MODEL FOR THE VERIFICATION OF COMPUTATIONAL METHODS Final Report
J. H. Argyris, W. Aicher, F. Karl, W. Kuemmerle, and M. Mueller 1980 66 p refs Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-275; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

A windmill rotor model with 7.3 m rotor diameter was constructed in order to test a data acquisition/transmission system and computational models. Data, e.g., strains, angles, linear movements, accelerations, are measured at the rotor, digitized, and transmitted optoelectronically. Measurements of rotor blade dynamic response to cyclic gravity loading are compared with theoretical values. Deviation between measurements and calculations is 11%. Author (ESA)

N82-17639# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
STATIC INVESTIGATIONS OF ROTOR BLADES UNDER DEADWEIGHT AND DURING STATIONARY OPERATION Final Report
J. H. Argyris, K. A. Braun, and B. Kirchgaessner 1980 62 p refs Transl. into ENGLISH of "Statische untersuch. von rotorblaettern unter eigengewicht und im stationaeren betrieb" Rept. ISD-243 Stuttgart Univ., Stuttgart, 1979 57 p Original report in GERMAN previously announced as N82-17639 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-269; ISD-243; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

Several rotorblades of a horizontal axis windmill are studied both nonoperating under deadweight, and under quasi-stationary loading with constant forces at rated operation, the blades of which have flap and lead-lag freedom as well as flap-pitch coupling. With a suitable mass distribution it is possible to reduce the blade bending moments in the flap direction drastically. The use of aircraft construction materials is considered. Carbon fiber reinforced plastic is the most suitable. Most of the blade models are investigated without lag hinge. The coning angle of rated operation assumed for the layout is reduced considerably for the blade models with lead-lag freedom in order to obtain sufficient centrifugal stiffness in the lag direction. Author (ESA)

N82-17640# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
STABILITY AND RESPONSE TO GRAVITY OF THE FLAP LAG MOTION FOR A RIGID ROTOR BLADE WITH FLAP-PITCH COUPLING Final Report
J. H. Argyris and B. Kirchgaessner 1980 59 p refs Transl. into ENGLISH of "Stabilitaet und schwerkraftresponse der schlag-schwenkbewegung eines starren rotorblattes mit blattwinkelrueckssteuerung" Rept. ISD-244 Stuttgart Univ., Stuttgart, 1979 80 p Original report in GERMAN announced as N80-30949 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-270; ISD-244; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

The coupled flap lag motion of a single, rigid rotor blade of a wind energy converter with flap and lag hinges and a coupling of the angle of attack with the flap motion is investigated. The equations of motion are developed under the assumption of linearized quasi-stationary aerodynamic forces. Static and dynamic stability of the coupled flap and lag motion are investigated. The equations are integrated for different cases under cyclic gravitational forces in order to estimate the importance of nonlinear terms and of the error resulting from the linearization of the conservative system. The nonlinear terms can be neglected, as can the effects of cyclic stiffness resulting from gravitational force. Results for nonlinearities arising from aerodynamic forces are inconclusive. Author (ESA)

N82-17641# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
DYNAMIC ANALYSIS OF A ROTOR BLADE WITH FLAP AND LAG FREEDOM AND FLAP-PITCH COUPLING Final Report
J. H. Argyris, K. A. Braun, and B. Kirchgaessner 1980 103 p refs Transl. into ENGLISH of "Dyn. anal. eines rotorblattes mit schlagfreiheit, schwenkreiheit u. blattwinkerlueckssteuerung" Rept. ISD-258 Stuttgart Univ., Stuttgart, 1979 95 p Original report in GERMAN previously announced as N80-30950 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-271; ISD-258; ISSN-0170-6071) Avail: NTIS HC A06/MF A01

For a windmill rotor blade, a linearized system of differential equations of motion is developed, using a finite element idealization of linearized quasi-stationary aerodynamic forces. Constant rotational speed and a rigidly supported hub are assumed. For two rotor blade models, which differ only in their stiffness in lag direction, the complex eigenfrequencies are calculated. The dynamic response of the rotor blades is computed for cyclic gravity loads at rated operation, for a gust, and, in one case, for the tower wake. From the deformation of the structure the stresses at selected points along the blade are calculated. Torque and rotor thrust are determined for one model. Additional stiffness improves stability and lead-lag ancles. The coning angle is excellently stabilized by the flap-pitch coupling. Author (ESA)

N82-17642# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
STATIC AND DYNAMIC INVESTIGATIONS FOR THE MODEL OF A WIND ROTOR Final Report
J. H. Argyris, K. A. Braun, B. Kirchgaessner, and R. Walther

1980 71 p refs Transl. into ENGLISH of "Statische und dyn. untersuch. and einem windrotormodell" Rept. ISD-259 Stuttgart Univ., Stuttgart, Jun. 1979 69 p Original report in GERMAN previously announced as N81-12626 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-272; ISD-259; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

A wind rotor was constructed in order to test a data acquisition/transfer system which collects experimental data from the operating model and displays it on a screen. The comparison between the experimental data and the model results is used to check the applied computation methods. The static and dynamic analyses of the rotor model are considered. An 11% difference between experimental and model results is shown. A response problem with variable stiffness in time which arose during the dynamic analysis is solved by setting the structural stiffness constant over small time intervals, diagonalizing the time interval considered and integrating. After integration the solutions of the generalized degrees of freedom are transformed back into the physical system, using the time interval eigenvectors.
Author (ESA)

N82-17643# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.

LOADING CYCLES AND MATERIAL DATA FOR THE LAYOUT OF A WIND TURBINE OF SPECIAL HUB CONCEPT

Final Report

J. H. Argyris and K. A. Braun 1980 38 p refs Transl. into ENGLISH of "Lastwechselzahlen und materialwerte fuer die auslegung einer windturbine spezieller nabenkonstruktion" Rept. ISD-260 Stuttgart Univ., Stuttgart, Jun. 1979 38 p Original report in GERMAN previously announced as N81-12627 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-273; ISD-260; ISSN-0170-6071) Avail: NTIS HC A03/MF A01

The number of loading cycles of a rotor blade was estimated in order to assess allowable blade stress. Fatigue strengths and allowable stresses are calculated for aeronautic construction materials. Using wind data, the number of starts and stops was estimated. With a guess for the number of revolutions necessary to reach stationary operation from standstill, the number of loading cycles was determined, using the blade aerodynamics. The number of operational hours gives the number of loading cycles for rated operation. Rotation speeds of 1.67 and 2 rad/sec are considered. For 1.67, the number of loading cycles during stationary operation = 2.06 x 10 to the 8th power; during starts and cut offs = 357,000. For 2 rad/sec, results are 2.47 x 10 to the 8th power and 463,000. Stress values, expressed in installed power/sqmm, are: aluminum alloy = 98; stainless steel = 294; glass fiber reinforced plastic = 98; and carbon fiber reinforced plastic = 147.
Author (ESA)

N82-17644# World Meteorological Organization, Geneva (Switzerland).

METEOROLOGICAL ASPECTS OF THE UTILIZATION OF SOLAR RADIATION AS AN ENERGY SOURCE, PART 1

1981 311 p refs 2 Vol.
(WMO-557-Vol-1; WMO-TN-172-Vol-1; ISBN-92-63-10557-X) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 50

Meteorological knowledge and activities related to the harnessing of solar energy are treated. The development of the utilization of various forms of energy by human society is reviewed along with WMO activities in support of the rational use of energy, with special regard to solar radiation. Specific actions by which meteorological services can contribute to the utilization of solar energy are pointed out. User requirements for meteorological data are set; how the data is presented and where it can be obtained are shown. Techniques for the measurement of solar radiation, including the calibration of instruments and quality control of data, are discussed while other meteorological parameters required (air temperature, wind speed, humidity, cloud amount, etc.) are also considered. The retrieval of past data, interpolation methods for the estimation of solar radiation, and publishing and archiving data are dealt with. Author (ESA)

N82-17645# World Meteorological Organization, Geneva (Switzerland).

METEOROLOGICAL ASPECTS OF THE UTILIZATION OF SOLAR RADIATION AS AN ENERGY SOURCE. PART 2: ANNEX. WORLD MAPS OF RELATIVE GLOBAL RADIATION

1981 33 p refs 2 Vol.
(WMO-557-Vol-2; WMO-TN-172-Vol-2) Avail: NTIS MF A01; print copy available at WMO, Geneva, SwFr 50

World maps are presented from which the monthly and annual global radiation can be derived, and an overall picture of the distribution of solar radiation as an energy source can be evolved. The radiation reaching the surface of the Earth in the absence of clouds and the atmosphere was calculated from pure astronomical relationships. Results are given in MJ/sq m by 5 deg of latitude. The establishment of an empirical relationship between satellite brightness data and the relative global radiation (defined as the percentage ratio of actual surface global radiation to the astronomically possible global radiation), using available surface global radiation data as reference values, is suggested.
Author (ESA)

N82-17646# World Meteorological Organization, Geneva (Switzerland).

METEOROLOGICAL ASPECTS OF THE UTILIZATION OF WIND AS AN ENERGY SOURCE

1981 201 p refs
(WMO-575; ISBN-92-63-10575-8; WMO-TN-175) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 40

The application of meteorological data and knowledge to the planning and operation of wind energy conversion systems (WECS) is discussed. The development of WECS and WMO activities related to energy matters, with special regard to wind energy, is reviewed. Atmospheric circulation systems of various scales, atmospheric turbulence, and the boundary layer are considered, including numerical models. Wind energy technology, i.e., the different types of wind machines (both small and large conversion systems) together with their usual possibilities of application, and the environmental impact of WECS, which should be kept in mind in the planning stage in order to reduce it to a minimum, are treated. As to wind energy meteorology, the requirements for, and the availability of, meteorological data for use in the exploratory, planning and operational phases of WECS are determined. The economic aspects of deciding on the establishment of wind energy systems are also indicated. A world map, illustrating the global distribution of wind energy potential is included.
Author (ESA)

N82-17647# Office of Technology Assessment, Washington, D. C.

SOLAR POWER SATELLITES

Aug. 1981 300 p refs
(PB82-108846; OTA-E-144; LC-81-600129) Avail: NTIS HC A13/MF A01 CSCL 10B

The energy potential of the solar power satellite (SPS) was evaluated. The preliminary nature of SPS technology is considered by comparing four alternative SPS systems across a broad range of issues: their technical characteristics, long term energy supply potential, international and military implications, environmental impacts, and institutional effects. The SPS options are also compared to potentially competitive future energy technologies.
GRA

N82-17648# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

DESIGN AND SYSTEM LEVEL PERFORMANCE OF A BATTERY CHARGE REGULATOR FOR SOLAR PHOTOVOLTAIC POWERED AIDS TO NAVIGATION

Walter E. Allen Aug. 1981 52 p Sponsored in part by Coast Guard
(PB82-108824; JHU/APL/CP-083) Avail: NTIS HC A04/MF A01 CSCL 10C

The design characteristics of the battery charge regulator in photovoltaic solar powered aids to navigation are reported and are specifically designed to match the electrical characteristics of the solar array and batteries to be used. The regulator, a series high/low rate type using a FET switch, is examined. GRA

N82-17649 Texas Univ. at Dallas.
THERMAL STRATIFICATION IN STORAGE TANKS Ph.D. Thesis
Mohammad Ali Abdoly 1981 333 p
Avail: Univ. Microfilms Order No. 8126589

The future of solar energy as a commercial source of energy critically depends on cost reduction and/or improvement in the performance of solar systems. Use of a properly designed thermocline storage tank is one factor in reducing overall solar system costs. Thermal stratification of a fluid in storage tank is a natural process that takes place due to the decreased density of the fluid at higher temperature. This natural process creates a transition zone temperature gradient between cold and hot fluid zones, called the thermocline. The percentage of recoverable heat (PHR), and thickness of the thermocline (d) are defined and theoretical relationships are found between PHR, d and different design parameters such as length of tank, radius of tank, insulation thickness, time, and initial temperature difference between cold and hot water. Dissert. Abstr.

N82-17650 Colorado State Univ., Fort Collins.
DEVELOPMENT OF ION BEAM SPUTTERED ITO/POLYSILICON SOLAR CELL TECHNOLOGY Ph.D. Thesis
Alan Paul Genis 1981 264 p
Avail: Univ. Microfilms Order No. 8126429

Indium Tin Oxide (ITO) was successfully used in place of a metal for solar cells of the conductor insulator semiconductor (CIS) type. An evaluative study to determine whether efficient and stable ITO based solar cells could be fabricated reproducibly with large area on polycrystalline silicon substrates was performed. The development of fabrication techniques and supporting analytical studies used are described. Ion beam sputtering technology was used to fabricate the cells. It was necessary to develop sputter deposition fixturing, optimize temperature, pressure and operation time parameters and incorporate hydrogen in the sputtering gas. The more efficient solar cells apparently consist of an induced n-on-p junction in the silicon. Poorer cells with smaller barriers likely resemble Schottky barriers in that the metalurgical and electronic junctions coincide. Various electrical and optical characterizations of initially inefficient devices were used to optimize cell fabrication procedures. ITO/polycrystalline silicon solar cells were fabricated on a wide variety of substrates. Results of the study are presented. Dissert. Abstr.

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-17651 North Carolina Univ. at Chapel Hill.
SULFUR BALANCE IN OUTDOOR SMOG CHAMBERS AND RESULTING IMPLICATIONS FOR SULFUR DIOXIDE PHOTOOXIDATION STUDIES Ph.D. Thesis
Janet Stickney Meyer 1981 208 p
Avail: Univ. Microfilms Order No. 8125602

To determine the causes of SO2 disappearance in a smog chamber, sulfur balances in inert and in photochemically oxidizing atmospheres were investigated. Teflon bag, sulfur deposited on surfaces is measured using a radioactive tracer technique. Analysis of SO2 behavior in the chamber indicates that SO2 concentrations decrease due to three factors. First dilution due to sampling decreases SO2 concentrations at a rate of 1 to 3%/hr. Second, uptake of SO2 by water films and metal surfaces removes SO2 at a rate of 0 to 9%/hr, depending on surface conditions. Third, deposition on surfaces apparently increases by 10%/hr or more, in photochemically oxidizing atmospheres. The increased deposition appears to be due to heterogeneous oxidation of SO2 by nitrogen oxides. The findings of the chamber studies suggest the presence of wet surfaces which encourage the hypothesized heterogeneous reactions significantly influence the behavior of SO2 in photochemically oxidizing atmospheres. Dissert. Abstr.

N82-17652# South Dakota State Univ., Brookings.
INFILTRATION LAND TREATMENT OF STABILIZATION POND EFFLUENT Final Report, 15 Jun. 1975 - 17 Jun. 1979
James N. Dornbush Sep. 1981 57 p refs
(Grant EPA-R-803804)
(PB82-109919; EPA-600/2-81-226) Avail: NTIS HC A04/MF A01 CSCL 13B

A pilot rapid infiltration wastewater treatment system consisting of three 0.07 hectare basins was operated for four seasons at Brookings, South Dakota. The objectives of the study were to demonstrate the rapid infiltration land treatment could upgrade stabilization pond effluent to meet stringent effluent requirements and to identify winter operating constraints for the system. After passing through 1.3 m of the soil profile, the following quality was observed: BOD5 was less than 4 mg/1 all of the time and generally less than 2 mg/1; suspended solids rarely exceeded 4 mg/1; total phosphorus rarely exceeded 1 mg/1; ammoniacal nitrogen was less than 2 mg/1 and usually less than 1.1 mg/1; and nitrate nitrogen rarely exceeded 10 mg/1. Winter operation of the pilot units with intermittent applications was not practical. GRA

N82-17653*# Kearney State Coll., Nebr. Dept. of Physics and Physical Science.
A COMPARISON OF IN-CLOUD HCl CONCENTRATIONS FROM THE NASA/MSFC MDM TO MEASUREMENTS FOR THE SPACE SHUTTLE LAUNCH Final Technical Report
Marvin E. Glasser 12 Apr. 1981 42 p refs
(Contract NAS8-16162)
(NASA-CR-167497) Avail: NTIS HC A03/MF A01 CSCL 13B

The Multilevel Diffusion Model (MDM) Version 5 was modified to include features of more recent versions. The MDM was used to predict in-cloud HCl concentrations for the April 12 launch of the space Shuttle (STS-1). The maximum centerline predictions were compared with measurements of maximum gaseous HCl obtained from aircraft passes through two segments of the fragmented shuttle ground cloud. The model over-predicted the maximum values for gaseous HCl in the lower cloud segment and portrayed the same rate of decay with time as the observed values. However, the decay with time of HCl maximum predicted by the MDM was more rapid than the observed decay for the higher cloud segment, causing the model to under-predict concentrations which were measured late in the life of the cloud. The causes of the tendency for the MDM to be conservative in over-estimating the HCl concentrations in the one case while tending to under-predict concentrations in the other case are discussed. Author

N82-17654*# Old Dominion Univ., Norfolk, Va. Dept. of Economics.
ENERGY ENVIRONMENT STUDY Final Report, 16 May 1980 - 15 Mar. 1981
Raymond Strangways Dec. 1981 123 p refs
(Contract NAG1-66)
(NASA-CR-168458) Avail: NTIS HC A06/MF A01 CSCL 13B

The international demand for and supply of oil between the years 1980 and 2000 is assessed and future world oil prices and their implications for the price of jet fuel are estimated. Three critical questions are investigated: (1) how long will the world supply of oil continue to keep pace with its demand under likely trends in its use and discovery; (2) at what price will demand and supply clear the world oil market; (3) what does the analysis imply about the price of jet fuel. Projection of oil price is based upon supply and demand, which is consistent with microeconomic analysis. E.A.K.

N82-17655# Committee on Commerce, Science, and Transportation (U. S. Senate).
NOISE IMPACT ON COMMUNITIES FROM AIRCRAFT
Washington GPO 1981 40 p Hearing before the Comm. on Com., Sci., and Transportation, 97th Congr., 1st Sess., 10 Feb. 1981
(GPO-80-617) Avail: Committee on Commerce, Science, and Transportation

The environmental and noise pollution problems of Cannon International Airport in Reno, Nevada are discussed. Restrictions imposed by the Federal government and the airport management on flight into and out of the airport were reviewed. Near-by urban development projects are described and the impact of airport traffic on them was evaluated. Discussion focused on the balance of economic development brought about by the airport and the rights of residents to enjoy a comfortable environment. T.M.

N82-17656# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.

PIXE AND ITS APPLICATION TO THE ELEMENT ANALYSIS OF MILAN AIR PARTICULATE MATTER

E. Caruso, G. M. Marcazzan, and P. Redaelli 1981 20 p refs Presented at 5th Intern. Conf. on Anal. Chem., Lancaster, United Kingdom, 20-26 Jul. 1980 Sponsored by Ente Nazionale per l'Energia Elettrica - Direzione Studi e Ricerche
(CISE-1685) Avail: NTIS HC A03/MF A01

The features of the Particle Induced X-ray Emission (PIXE) system using the proton beam of the tandem Van de Graaff accelerator are described. The system was calibrated for quantitative analyses, its reliability was verified, and its advantages were compared with other techniques. The main advantage of the PIXE system is shown to be in the analysis of microquantities of matter. The system was used in the study of the atmospheric aerosol of Milan. Average element concentrations and their daily and seasonal variations are given along with particle size distributions. J.M.S.

N82-17657# MSA Research Corp., Evans City, Pa. Div. of Mine Safety Appliances Co.

MODIFICATION OF SPILL FACTORS AFFECTING AIR POLLUTION. VOLUME 1: AN EVALUATION OF COOLING AS A VAPOR MITIGATION PROCEDURE FOR SPILLED VOLATILE CHEMICALS Final Report, Sep. 1978 - Dec. 1980

J. S. Greer, S. S. Gross, R. H. Hiltz, and M. J. McGoff Sep. 1981 86 p refs 2 Vol.
(Contract EPA-68-03-2648)
(PB82-108362; Rept-80-197-Vol-1; EPA-600/2-81-214) Avail: NTIS HC A05/MF A01 CSCL 13B

Spilled chemicals that pose a hazard to the land and water ecosystems can also provide a significant vapor hazard. Although the vapors released by such chemicals may ultimately be dispersed in the environment with little long-term effects, they do pose a hazard to life and property downwind of the spill. Among the vapor amelioration techniques that were considered is the use of a coolant to lower the temperature of a spill and reduce its equilibrium vapor pressure. GRA

N82-17658# MSA Research Corp., Evans City, Pa. Div. of Mine Safety Appliances Co.

MODIFICATION OF SPILL FACTORS AFFECTING AIR POLLUTION. VOLUME 2: THE CONTROL OF THE VAPOR HAZARD FROM SPILLS OF LIQUID ROCKET FUELS Final Report, Jan. - Dec. 1980

J. S. Greer, S. S. Gross, R. H. Hiltz, and M. J. McGoff Sep. 1981 30 p 2 Vol.
(Contract EPA-68-03-2648)
(PB82-108390; Rept-80-197-Vol-2; EPA-600/2-81-215) Avail: NTIS HC A03/MF A01 CSCL 13B

Coolants exhibited some control over vapor release from the hypergolic fuels. Liquid nitrogen was the most effective material. Logistics were deemed a major disadvantage for the anticipated spill scenarios. Foams using commercial agents were beneficial with hydrazine but were not effective against nitrogen tetroxide. Modified foam systems incorporating acrylic resins were more effective. They were able to maintain hydrazine concentrations at or below 0.5 ppm. Some control was also exhibited with nitrogen tetroxide, but there was intermittent vapor release through the foam. Based upon the work of this program, the acrylic foams offer a promising approach to the control of the vapor hazard from hydrazine and nitrogen tetroxide. GRA

N82-17659# Culp/Wesner/Culp Clean Water Consultants, Cameron Park, Calif.

GRANULAR ACTIVATED CARBON INSTALLATIONS Final Report

Russell L. Culp, Justine A. Fuisst, and Clinton E. Smith (Rubel and Hager, Inc., Tucson, Ariz.) Sep. 1981 296 p refs
(Contract EPA-68-03-2516; CI-76-0288)
(PB82-102492; EPA-600/2-81-177) Avail: NTIS HC A13/MF A01 CSCL 13B

Design criteria, performance data, and cost information were compiled and summarized from twenty-two operating granular activated carbon (GAC) installations. These plants produce municipal water for drinking, treat municipal and industrial wastewaters, and process food and beverage products. Guidance is provided in estimating the cost of GAC treatment for public water supplies. Intended for use in connection with a previous series of EPA reports on 'Estimating Water Treatment Costs' to obtain project specific cost estimates, this manual describes how to obtain design criteria for water systems. GRA

N82-17660# Kerr (Robert S.) Environmental Research Lab., Ada, Okla.

MANUAL OF GROUND-WATER QUALITY SAMPLING PROCEDURES

Marion R. Scalf, James F. McNabb, William J. Dunlap, Roger L. Cosby, and John S. Fryberger (Engineering Enterprises, Inc., Norman, Okla.) Sep. 1981 105 p refs
(PB82-103045; EPA-600/2-81-160) Avail: NTIS HC A06/MF A01 CSCL 13B

Recent environmental legislation has recognized the importance of ground water quality protection and the stresses that man's activities, especially waste disposal, place on this vital national resource. To provide a realistic assessment of current and potential pollution problems and a rational basis for ground water quality protection, it is necessary to collect repesentative samples from this remote and relativity inaccessible environment. Some procedures currently utilized to sample ground water and subsurface earth materials for microbial and inorganic and organic chemical parameters are reported. GRA

N82-17661# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.

REMOVING WATER-SOLUBLE HAZARDOUS MATERIAL SPILLS FROM WATERWAYS WITH CARBON Final Report, Jun. 1978 - Jan. 1979

George R. Schneider Sep. 1981 67 p refs
(Contract EPA-68-03-2648)
(PB82-103813; EPA-600/2-81-195) Avail: NTIS HC A04/MF A01 CSCL 13B

The removal of water soluble organic materials from water by carbon filled, buoyant packets and panels is described. Equations are derived for the removal of dissolved organic compounds from waterways by buoyant packets that are either cycled through a water column, or suspended in the waterway by natural turbulence, and by panels mechanically suspended in waterways. The effects of turbulence on the suspension of buoyant packets and of turbulent mixing and longitudinal dispersion of spills in waterways on the removal of water-soluble hazardous materials, are considered. GRA

N82-17662# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.

INVESTIGATION OF PETROLEUM IN THE MARINE ENVIRONS OF THE STRAIT OF JUAN DE FUCA AND NORTHERN PUGET SOUND, PART 2 (SECOND-YEAR CONTINUATION)

Donald W. Brown, Andrew J. Friedman, Patty G. Prohaska, and William D. MacLeod, Jr. Apr. 1981 46 p refs
(PB82-104290; NOAA-TM-OMPA-7; NOAA-81072001) Avail: NTIS HC A03/MF A01 CSCL 13B

Existing levels of petroleum hydrocarbons in the Strait of Juan de Fuca and Northern Puget Sound were measured. Spatial and temporal trends in occurrence, concentration, and composition of petroleum-related hydrocarbons were investigated. Although the sites were relatively free from petroleum contamination, hydrocarbons indicative of petroleum were found. It is concluded that hydrocarbon concentrations in intertidal sediment and mussels can be used to monitor for spilled oil in this region. GRA

N82-17663# Illinois State Geological Survey, Urbana.

ATTENUATION OF POLYBROMINATED BIPHENYLS AND HEXACHLOROBENZENE BY EARTH MATERIALS Final Report

R. A. Griffin and S. F. J. Chou Sep. 1981 60 p refs
(Grant EPA-R-804684)

(PB82-107558; EPA-600/2-81-191) Avail: NTIS HC A04/MF A01 CSCL 13B

The aqueous solubility, adsorption, mobility, and microbial degradation of polybrominate biphenyls (PBBs) and hexachlorobenzene (HCB) were studied. It is indicated that PBBs were more than 200 times, and HCB more than 2.5 times soluble in landfill leachate than in distilled water. Also, the solubilities of PBBs and HCB were higher in creekwater and landfill leachates than in purified waters. HCB showed a greater tendency for adsorption than PBBs. The PBBs and HCB were strongly adsorbed by the Ambersorb XE-348, but not by organic solvents. The PBBs and HCB remained immobile when leached with water or landfill leachate but were highly mobile when leached with organic solvents. It is found that PBBs and HCB are resistant to microbial degradation. GRA

N82-17664# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.

ASSESSMENT OF OIL PRODUCTION VOLATILE ORGANIC COMPOUND SOURCES Final Report, Jan. - Sep. 1980

W. S. Eaton, G. R. Schneider, W. Unterberg, and F. G. Bush, III Sep. 1981 75 p

(Contract EPA-68-03-2648)

(PB82-108176; EPA-600/2-81-197) Avail: NTIS HC A04/MF A01 CSCL 13B

Oil and gas exploration and production drilling technology are described with emphasis on the makeup, use, and disposal of drilling fluids. A model for assessment of volatile organic compounds (VOC) emissions accompanying drilling is presented, along with an estimation of the potential VOC emissions associated with drilling activities. Emissions of volatile organic compounds from oil production in new fields were estimated, based on three types of information: (1) extent of new oil and gas fields (those that started production after 1974) in the contiguous 48 states; (2) drilling techniques used for oil and gas exploration and production wells (and their VOC potential), with specific emphasis on the drilling fluids; and (3) equipment and techniques for oil and gas production in new fields and their potential VOC sources. GRA

N82-17665# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.

A HAZARDOUS MATERIALS SPILL WARNING SYSTEM Final Report, Jun. 1974 - Dec. 1976

Milton Kirsch, Robert Melvold, and John Vrolyk Sep. 1981 69 p refs

(Contract EPA-68-03-2080)

(PB82-108424; RI/RD77-263; EPA-600/2-81-212) Avail: NTIS HC A04/MF A01 CSCL 13B

A list of materials defined as hazardous substances based on their aquatic toxicity was developed and certain materials have been designated as priority pollutants. The spill alarm system detects the presence of hazardous toxic materials in streams and rivers. It consists of nonselective detection components which together serve to detect all the materials on the designated hazardous materials list, and the priority pollutants. GRA

N82-17666# TRW Environmental Services, Redondo Beach, Calif.

FEASIBILITY OF COMMERCIALIZED WATER TREATMENT TECHNIQUES FOR CONCENTRATED WASTE SPILLS Final Report

Masood Ghassemi, Kar Yu, and Sandra Quinlivan Sep. 1981 125 p refs

(Contract EPA-68-03-2560)

(PB82-108440; EPA-600/2-81-213) Avail: NTIS HC A06/MF A01 CSCL 13B

The suitability and economics of using reverse osmosis, ultrafiltration, ion exchange, wet air oxidation, high purity oxygen activated sludge process, ultraviolet ozone oxidation, and coagulation/precipitation for onsite treatment of concentrated wastes were evaluated. When used alone, none of the processes considered would be economically applicable to on-site mobile unit treatment of the variety of concentrated wastes encountered, although reverse osmosis, ion exchange, and wet air oxidation meet many of the application requirements and hence require less pretreatment and/or post-treatment. The estimated capital costs for a unit suitable for trailer mounting vary from as low as $35,000 for a 227,000 liters/day (60,000 gpd) ultrafiltration unit to as high as $1.25 to $1.5 million for a 54,000 liters/day (14,400 gpd) 2-trailer wet air oxidation unit. Author (GRA

N82-17667# Mason and Hanger-Silas Mason Co., Inc., Leonardo, N. J.

USE OF SELECTED SORBENTS AND AN AQUEOUS FILM FORMING FOAM ON FLOATING HAZARDOUS MATERIALS Final Report, 2-13 May 1977

Michael K. Breslin and Michael D. Royer Sep. 1981 58 p

(Contract EPA-68-03-0490)

(PB82-108895; EPA-600/2-81-211) Avail: NTIS HC A04/MF A01 CSCL 13B

The effect of sorbent materials and fire fighting foam on containment, recovery and vapor suppression of floatable hazardous materials (HM) spilled on water were determined. The devices used in both programs were the clean water incorporated harbour boom and the industrial and municipal engineering swiss OELA III skimmer. Dioctyl phthalate (DOP), octanol, and naphtha served as the hazardous materials. The sorbent materials were polyurethane foam cubes, Sorbent C and Imbiber Beads. An aqueous film forming foam (AFFF), FC-206, was used as the fire fighting foam. The type of HM, Sorbent, tow speed, and wave condition served as controlled and independent variables. Critical tow speed of the boom, HM vapor concentration, and fluid recovered by the skimmer were the dependent variables. GRA

N82-17668# Mason and Hanger-Silas Mason Co., Inc., Leonardo, N. J.

PERFORMANCE TESTING OF THE DIPERNA SWEEPER Final Report

Michael K. Breslin Sep. 1981 44 p

(Contract EPA-68-03-2642)

(PB82-109174; EPA-600/2-81-229) Avail: NTIS HC A03/MF A01 CSCL 13B

Forty-three oil recovery tests were run. A range of best performance for an oil skimmer under various environmental conditions in light and heavy oils was established. The DiPerna Sweeper is a self-contained, floating oil skimmer that can operate in either a stationary or advancing mode. Its principle of operation is based upon drawing oil and water into a sealed container by creating a slight vacuum in the container. A floating weir serves as the inlet. The partial vacuum is created by pumping fluid from the sealed container. The container serves as an oil/water separator. Separate pumps draw water from the bottom of the vessel while others draw oil from the top. The device was able to recover over 75% of the oil presented to it in calm water at tow speed up to two knots. GRA

N82-17669# TRW, Inc., Research Triangle Park, N.C. Environmental Engineering Div.

PERFORMANCE EVALUATION OF AN INDUSTRIAL SPRAY DRYER FOR SO2 CONTROL Final Report, Mar. 1980 - Jun. 1981

James A. Kezerle, Steve W. Mulligan, Dave-Paul Dayton, and Patricia J. Perry Aug. 1981 274 p refs Prepared in cooperation with Celanese Fibers Company, Cumberland, Md. and Rockwell International, Downey, Calif., and Wheelabrator-Frye, Inc., Pittsburgh, Pa.

(Contract EPA-68-02-3174)

(PB82-110701; EPA-600/7-81-143) Avail: NTIS HC A12/MF A01 CSCL 13B

Results of a test to evaluate the SO2 removal performance of the lime-spray-dryer/fabric-filter system treating flue gas from the stoker-coal-fired boiler are presented. Continuous monitors were used to collect data according to EPA procedures for compliance testing. Data were collected for 23 days with the boiler operating at about half load. In addition to evaluating SO2 removal by dry flue gas desulfurization, operating experience with the boiler and spray-dryer/baghouse system was obtained for 5 months. Data were reduced to express SO2 removal on a mass per unit energy input basis as prescribed by EPA. Test results showed the mean SO2 removal efficiency to be 70% (standard deviation of + or - 9%) when the sulfur content of the bituminous coal averaged 2%. T.M.

N82-17670# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.
GUIDE FOR SPILL PREVENTION CONTROL AND COUNTERMEASURE INSPECTORS Final Report, 20 Apr. 1978 - 31 Jul. 1979
Walter Unterberg and Robert M. Moorehead Oct. 1981 119 p refs
(Contract EPA-68-2648)
(PB82-115296; EPA-600/2-81-239) Avail: NTIS HC A06/MF A01 CSCL 13B

Implementation of the Oil Pollution Prevention Regulations promulgated in 40CFR112 for nontransportation related onshore and offshore facilities are reported. The SPCC regulations, the role of the SPCC inspector, the affected facilities, and procedures for carrying out the inspection are reported. Forms for use by the inspector in the field and for documentation are indicated. The use of these forms provide nationwide uniformity in SPCC reporting. GRA

N82-17671# Environmental Design and Planning, Inc., Boston, Mass.
EVALUATION OF A TREATMENT LAGOON FOR COMBINED SEVER OVERFLOW Final Report, Jul. 1979 - Oct. 1980
Daniel J. Connick, William C. Pisano, and Gerald L. Aronson Sep. 1981 117 p refs
(PB82-105214; EPA-600/2-81-196) Avail: NTIS HC A06/MF A01 CSCL 13B

The effectiveness of a 143 MG facultative lagoon for treating combined sewer overflow and polishing secondary wastewater treatment plant effluent was assessed. The lagoon performance was evaluated for changes in the degree of aeration. This parameter has the dual function of mixing the lagoon and increasing the oxygen levels above that provided by natural reaeration. The pollutant removal performance of the lagoon was evaluated for different discharge levels/detention periods. The effects of the stormwater loadings on lagoon performance were assessed so as to determine the buffering capacity of the lagoon for treating volumes of highly polluted intermittent flow. A full scale 18 MGD application of state of the art disinfection technology was utilized for bacterial reduction. GRA

N82-17672# Louisville Gas and Electric Co., Ky.
PILOT FIELD STUDIES OF FGD WASTE DISPOSAL AT LOUISVILLE GAS AND ELECTRIC Final Report, May 1976 - Aug. 1979
R. P. VanNess, A. L. Plumley (Combustion Engineering, Inc., Windsor, Conn.), N. C. Mohn (Combustion Engineering, Inc., Windsor, Conn.), C. R. Ulrich (Louisville Univ., Kentucky), and D. J. Hagerty (Louisville Univ., Kentucky) 1981 314 p refs
(Contract EPA-68-02-2143)
(PB82-105479; EPA-600/7-81-155) Avail: NTIS HC A14/MF A01 CSCL 13B

The gas desulfurization (FGD) waste disposal was studied. It is shown that properly prepared landfill from FGD sludge/fly ash mixtures prevents trace element contamination of underlying groundwater. Small synthetically lined, above ground impoundments has higher concentrations of trace contaminants than subsurface impoundments. Most sites developed compressive strengths greater than the minimum required for recreational or light structural landfill. Water samples from beneath larger subsurface impoundments indicated that the filtering action of soil aids in decreasing the concentration of contaminants reaching the ground water supply. Certain mixtures under fixation reaction, reducing the permeability and minimizing the release of moisture and/or contaminants to the surrounding soil. GRA

N82-17673# Association of Metropolitan Sewerage Agencies, Washington, D.C.
SURVEY AND EVALUATION OF FINE BUBBLE DOME DIFFUSER AERATION EQUIPMENT Final Report, 1 Aug. 1979 - 15 Sep. 1980
Daniel H. Houck and Arthur G. Boon (British Water Research Centre, Stevenage, England) Sep. 1981 189 p refs
(Grant EPA-R-806990)
(PB82-105578; EPA-600/2-81-222) Avail: NTIS HC A09/MF A01 CSCL 13B

The oxgyen transfer performance, operation and maintenance (O&M) requirements, and proper design approaches for fine bubble dome diffuser aeration systems used in activated sludge wastewater treatment were examined. Wastewater treatment plants with dome diffuser aeration equipment were surveyed. Influent and effluent wastewater characteristics, power demand, air supply, and process parameters were compiled for a 5 yr period. It is indicated that, relative to other devices, fine bubble dome diffuser systems perform at high energy efficiency when proper design, operation, and maintenance practices are followed and when strong alpha depressing industrial wastes are absent. The O&M experience with this equipment has generally been very good, with 6-10 yrs or longer, between cleaning. Oxygen transfer performance is highly variable between the plants. GRA

N82-17674# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.
DETECTION AND MAPPING OF INSOLUBLE SINKING POLLUTANTS Final Report, Jun. 1978 - Oct. 1980
Raymond A. Meyer, Milton Kirsch, and Larry F. Marx Sep. 1981 92 p refs
(Contract EPA-68-03-2648)
(PB82-105586; EPA-600/2-81-198) Avail: NTIS HC A05/MF A01 CSCL 13B

A continuous submersible monitor using a cyclically purged electrical conductivity probe capable of long term deployment even when buried in sand or silt was conceived, designed, and tested. The submersible unit, which is battery powered and has no connection to the shore based receiver, transmits the conductivity data via ultrasonic transmission. Laboratory tests show that a 200 kHz depth finder system can resolve the echoes from the surface of a 1 cm-deep layer of carbon tetrachloride (CCl4) from those returning from a hard, sandy or muddy bottom. Field tests indicate that few precursors to the bottom echo return are present that might mask or interfere with the detection of an echo from a pollutant pool. Return echoes were evaluated by 16 mm motion picture photography. A computer based comparator counter technique was developed for data management. GRA

N82-17675# Sanitation District No. 1 of Campbell and Kenton Counties, Covington, Ky.
DEMONSTRATION PHYSICAL CHEMICAL SEWAGE TREATMENT PLANT UTILIZING BIOLOGICAL NITRIFICATION Final Report, Jun. 1973 - Dec. 1978
E. Brenton Henson Sep. 1981 88 p refs
(Grant EPA-S-802719)
(PB82-101643; EPA-600/2-81-173) Avail: NTIS HC A05/MF A01 CSCL 13B

The feasibility of treating sewage with a physical chemical type of wastewater treatment plant with a biological process for nitrification was demonstrated. The system has unit processes consisting of screening, flow equalization, chemical clarification using lime, biological nitrification, filtration, and activated carbon adsorbtion. Phosphorous levels were reduced by more than 80% during the chemical clarification step. Total nitrogen concentration was reduced by up to one third during the treatment. Effluent BOD5 and suspended solids levels were significantly lower for this process than the average values obtained from seven various types of biological treatment plants. GRA

N82-17676# Environmental Resources Management, Inc., West Chester, Pa.
PRODUCTION ENGINEERING AND MARKETING ANALYSIS OF THE ROTATING DISK EVAPORATOR Final Report, Sep. 1978 - May 1979
Phillip L. Buckinghan Sep. 1981 52 p refs
(Contract EPA-68-02-2738)
(PB82-101676; EPA-600/2-81-179) Avail: NTIS HC A04/MF A01 CSCL 13B

Mechanical evaporation of wastewater from single family homes by rotating disk evaporator (RDE) and functions in a nondischarging mode was analyzed. The device has potential use where site limitations preclude conventional methods of onsite disposal. The marketing analysis defined the market potential for RDE systems, developed a practical design, estimated production and installation costs, and refined market estimates based on cost comparisons. GRA

N82-17677# Engineering-Science, Inc., Durham, N.C.
EXAMPLE EMISSION INVENTORY DOCUMENTATION FOR 1982 OZONE STATE IMPLEMENTATION PLANS (SIPS)
Mar. 1981 148 p refs Prepared in cooperation with Peat, Marwick, Mitchell, and Co., Washington, D.C.
(Contracts EPA-68-02-3506; EPA-68-02-3509)
(PB82-101908; EPA-450/4-80-033) Avail: NTIS HC A07/MF A01 CSCL 13B

Example documentation showing the items and format required as part of the VOC/NOx emission inventory submittals for the 1982 ozohe state implementation plans (SIPs) is reported. The EPA summary reporting tables are exemplified. Documentation on point, area, and highway vehicle sources is included. GRA

N82-17678# Illinois Univ. at Urbana-Champaign.
POTENTIAL WATER QUANTITY AND WATER QUALITY IMPACTS OF POWER PLANT DEVELOPMENT SCENARIOS ON MAJOR RIVERS IN THE OHIO BASIN
E. Downey Brill, Jr., Shoou-Yuh Chang, Robert W. Fuessle, and Randolph M. Lyon Apr. 1981 225 p refs
(Grant EPA-R-805588)
(PB82-102401; EPA-600/7-81-045) Avail: NTIS HC A10/MF A01 CSCL 13B

Water consumption levels associated with power plant cooling were estimated for different energy development scenarios for the Ohio River Basin potential impacts of power plant consumption and pollutant emissions on ambient water quality were also estimated. Cumulative water consumption was compared to the 7 day 10 year low flow values for various locations along the tributaries and main stem of the Ohio River. The total potential consumption associated with projected municipal and non power industrial was evaluated. Potential water quality impacts were estimated. Potential impacts on water quality result mainly from plant consumption are generally small in comparison to background levels. GRA

N82-17679# Delaware River Basin Commission, Trenton, N.J.
THE DELAWARE RIVER BASIN COMPREHENSIVE (LEVEL B) STUDY Final Environmental Impact Statement
May 1981 161 p refs Prepared for Water Resources Council, Washington, D.C.
(PB82-111477) Avail: NTIS HC A08/MF A01 CSCL 13B

Water resource problems were identified. Policies, programs, and projects are considered that encompass water conservation, water quality, water supply, flow maintenance, flood loss reduction, fish, wildlife and recreation, energy, and navigation. The roles of the Commission, the federal, state, and local governments, and the private sector in implementing the Level-B Preferred Plan are addressed. GRA

N82-17680# Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
EXTENSION OF THE SOIL CONSERVATION SERVICE RAINFALL-RUNOFF METHODOLOGY FOR UNGAGED WATERSHEDS Final Report
Hubert J. Morel-Seytoux and James P. Verdin Jul. 1981 82 p refs
(Contract DOT-FH-PO-93-0015)
(PB82-111394; FHWA/RD-81/060) Avail: NTIS HC A05/MF A01 CSCL 13B

An extension of the method employing modern physically based infiltration equations is presented. Runoff estimates are based upon the soil types and land use practices occurring within a watershed. The table permits the estimation of direct runoff by physical infiltration equations for any ungaged watershed for which a curve number may be determined by knowledge of soil types and land use. GRA

N82-17681# Tetra Tech, Inc., Lafayette, Calif.
IMPACT OF CANADIAN POWER PLANT DEVELOPMENT AND FLOW APPORTIONMENT ON THE POPLAR RIVER BASIN Final Environmental Impact Statement
Jun. 1981 392 p refs
(Contract EPA-68-01-4873)
(PB82-111618; TETRAT-TC-3254; EPA-908/5-81-003) Avail: NTIS HC A17/MF A01 CSCL 13B

A 300 megawatt coal-fired power plant was constructed by Saskatchewan Power Corporation on the East Fork of the Poplar River about 4 miles north of the International Boundary, another 300 megawatt unit is under construction. The power plant and associated reservoir will result in a water use and will modify the transboundary flow of the Poplar River. The impacts of several flow apportionment alternatives are addressed in addition to other potential impacts of the power plant on the U.S. part of the Poplar River Basin. The Poplar River flows will be reduced under conditinns of the recommended apportionment. These reduced flows result in less water available for irrigation expansion. GRA

N82-17682# Great Lakes Basin Commission, Ann Arbor, Mich.
GREAT LAKES ENVIRONMENTAL PLANNING STUDY Summary Report
Sep. 1981 25 p Sponsored by Water Resources Council
(PB82-112970) Avail: NTIS HC A02/MF A01 CSCL 13B

Valuable products of the study include: an inventory of present and anticipated mathematical modeling tools; an overview of how these models can be useful to managers; a Great Lakes nearshore water quality index; and environmental quality maps for the Great Lakes basin. More importantly, the study provided insights that will assist more effective management of the lakes in the future. GRA

N82-17683# GCA Corp., Bedford, Mass. Technology Div.
CONTROL OF PARTICULATE EMISSIONS FROM ATMOSPHERIC FLUIDIZED-BED COMBUSTION WITH FABRIC FILTERS AND ELECTROSTATIC PRECIPITATORS Final Report, Dec. 1979 - Dec. 1980
D. V. Bubenick, Robert R. Hall, and John A. Dirgo Jun. 1981 77 p refs
(Contract EPA-68-02-2693)
(PB82-115528; EPA-600/7-81-105) Avail: NTIS HC A05/MF A01 CSCL 13B

Results of a study of chemical and physical characteristics affecting the performance of particulate control equipment, based on five fly ash samples from full- and pilot-scale atmospheric fluidized-bed combustion (AFBC) units are reported. Analysis of acquired data by fabric filter (FF) and electrostatic precipitator (ESP) mathematical models illustrates how control device performance may be affected by AFBC fly ash properties. M.D.K.

N82-17684# Tennessee Valley Authority, Muscle Shoals, Ala. Div. of Energy Demonstrations and Technology.
DEFINITIVE SOx CONTROL PROCESS EVALUATIONS: AQUEOUS CARBONATE AND WELLMAN-LORD (ACID, ALLIED CHEMICAL, AND RESOX) FGD (FLUE GAS DESULFURIZATION) TECHNOLOGIES Final Report, Apr. 1978 - Apr. 1981
J. R. Byrd, K. D. Anderson, S. V. Tomlinson, and R. L. Torstrick Jun. 1981 319 p refs
(Contract EPA-IAG-D9-3721-81)
(PB82-118670; EPA-600/7-81-099; EDT-121) Avail: NTIS HC A14/MF A01 CSCL 13B

Economic evaluations of two processes: (1) the aqueous carbonate process (ACP) and the Wellman-Lord process, applied to a sulfuric acid plant, (2) the Resox process, and the coal reduction process, all for sulfur production are reported. The ACP uses a spray dryer flue gas desulfurization (FGD) system and molten salt reduction with coal to make sulfur. The ACP has a major cost advantage because it incorporates final fly ash and chloride removal as process functions. The ACP has a major advantage in annual revenue requirements because it does not need process or reheat steam. Wellman-Lord process costs are the same for all three applications. GRA

N82-17685# New York Sea Grant Inst., Albany.
SEA GRANT MARITIME HERITAGE SERIES: THE BIGHT OF THE BIG APPLE
Donald F. Squires 1981 93 p refs Prepared for NOAA
(PB82-119439; NYSG-RS-81-00; NOAA-81082003) Avail: NTIS HC A05/MF A01 CSCL 13B

The history of the New York Bight harbors and the relationship between man and the ocean is described. The growth and development of the region has revolved around ocean resources and waterborne transport for nearly four centuries; a consequential segment of the economy is still based upon the resources of the ocean and the transport the ocean makes possible. The Bight has often been neglected resulting in enormous negative impact upon the coastal ocean. There are opportunities to rebuild the heritage, to once again enjoy those aspects of the coastal ocean that shaped the development of the region, to undo some damage that has been done. GRA

N82-17686# National Oceanic and Atmospheric Administration, Silver Spring, Md. Air Resources Labs.
THE POTENTIAL ATMOSPHERIC IMPACT OF CHEMICALS RELEASED TO THE ENVIRONMENT: PROCEEDINGS OF FOUR WORKSHOPS
John M. Miller, ed. Jan. 1981 240 p refs Workshop held at Jekyll Island, Ga., Nov. 1979; Workshop held at Boulder, Colo., Nov. 1979; Workshop held at Boulder, Colo., Sep. 1979; Workshop held at Boulder, Colo., Sep. 1979
(Contract EPA-IAG-98120-AOTE)
(PB82-119447; EPA-560/5-80-001) Avail: NTIS HC A11/MF A01 CSCL 13B

The impact of toxic chemicals on the abiotic environment (specifically, the atmosphere), to the feasibility of screening chemicals for these impacts are assessed and whenever possible to develop a screening logic were assessed. Four workshops are reported: (1) toxic substances in atmospheric deposition; (2) screening chemicals for inadvertent modification of the stratosphere; (3) the impact of chemicals on the radiative transfer imbalance; and (4) the impact of anthropogenic chemicals on precipitation processes. GRA

N82-17687# Institute of Gas Technology, Chicago, Ill.
MULTI-FUEL LOW-NOx BURNER DEVELOPMENT, PHASE 2 Annual Report, Jan. - Dec. 1980
Hamid A. Abbasi, Mark J. Khinkis, and Richard T. Waibel Jan. 1981 46 p Sponsored in part by Bloom Engineerings, Hauck Manufacturing and Eclipse, Inc.
(Contract GRI-5014-342-0284)
(PB82-115494; GRI-80/0054) Avail: NTIS HC A03/MF A01 CSCL 13A

Industrial burners that incorporate various NOx control techniques while maintaining the heat transfer characteristics of the flames suitable for the particular process application were investigated. NOx control by catalytic combustion, staged combustion, and/or recirculation is incorporated in the various burners. The program had three tasks, one for each of the burners: (1) to develop a direct fired air heater burner with catalyst to determine if it can burn natural gas under the conditions required to produce ultra low Nox levels; (2) a mounting rig was designed to allow the firing angle to be varied during the baseline trials on the Hauck burner; (3) the Bloom baseline baffle burner is installed, and the prototype Bloom burner for steel reheat furnaces is designed. GRA

N82-17688# JRB Associates, McLean, Va.
SOLID WASTE DATA: A COMPILATION OF STATISTICS ON SOLID WASTE MANAGEMENT WITHIN THE UNITED STATES
1981 74 p refs
(Contract EPA-68-01-6000)
(PB82-107301) Avail: NTIS HC A04/MF A01 CSCL 13B

A comprehensive compilation of the most current available information of solid waste management within the United States is presented. This information is in tabular form and organized by general categories for ease of reference. Factors such as employment in solid waste management, composition of solid wastes, collection methods, transportation, processing, and disposal are considered for both municipal and rural areas. GRA

N82-17689# California Univ., Davis. Dept. of Civil Engineering.
PERFORMANCE OF ACTIVATED SLUDGE PROCESSES: RELIABILITY, STABILITY AND VARIABILITY Final Report
Saler Niku, Edward D. Schroeder, George Tchobanoglous, and Francisco J. Samaniego Sep. 1981 165 p refs
(Grant EPA-R-805097)
(PB82-109604; EPA-600/2-81-227) Avail: NTIS HC A08/MF A01 CSCL 13B

The performance of a large number of activated sludge processes was statistically analyzed and procedures for introducing reliability and stability concepts into design and operation of treatment plants was developed. Using the log-normal distribution and a coefficient of reliability (COR), a probabilistic model and design tables and graphs were developed for predicting achievable effluent BOD and SS concentrations. The stability of various activated sludge processes was examined. The standard deviation was found to be the most appropriate indicator of stability. Correlations and regression analyses are used to investigate the cases of effluent quality variability and to identify the extend of the factors contributing to this variability. An approach that can be used to design a process stochastically when the effluent standards are deterministic in nature is presented. GRA

N82-17690# Colorado State Univ., Fort Collins. Dept. of Agronomy.
FIELD STUDIES ON USBM AND TOSCO 2 RETORTED OIL SHALES: VEGETATION, MOISTURE, SALINITY, AND RUNOFF Final Report, 1977 - 1980
M. K. Kilkelly, W. A. Berg, and H. P. Harbert, III Aug. 1981 120 p refs
(Grant EPA-R-804719)
(PB82-109810; EPA-600/7-81-139) Avail: NTIS HC A06/MF A01 CSCL 13B

The vegetative stabilization of processed oil shales and moisture and soluble salt movement within the soil/shale profile were investigated. Research plots with two types of retorted shales (TOSCO II and USBM) with leaching and soil cover treatments were established at two locations: low-elevation and high elevation. Vegetation was established by intensive management, N and P fertilization, seeding, mulching, and irrigation. After seven growing seasons, a good vegetative cover remains with few differences between treatments, with the exception of the TOSCO retorted shale, south aspect, which consistently supports less perennial vegetative cover than other treatments. With time, a shift from perennial grasses to dominance by shrubs is observed. GRA

N82-17691# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
NATO-CCMS PILOT STUDY ON DISPOSAL OF HAZARDOUS WASTES. PROJECT: THERMAL TREATMENT. PROJECT LEADER: FEDERAL REPUBLIC OF GERMANY Final Report
23 Mar. 1981 183 p refs
(PB82-114521; NATO/CCMS-118) Avail: NTIS HC A09/MF A01 CSCL 13B

The incineration of hazardous waste in the participating countries is examined including topics such as co-incineration of hazardous wastes with domestic refuse, hazardous waste as a fuel substitute in the cement manufacturing industry, incineration of selected wastes (PCB, mineral oil wastes), incineration of herzardous wastes at sea, and research and development. GRA

N82-17692# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
NATO-CCMS PILOT STUDY ON DISPOSAL OF HAZARDOUS WASTES: CHEMICAL, PHYSICAL, AND BIOLOGICAL TREATMENT OF HAZARDOUS WASTES IN NATO COUNTRIES. PROJECT LEADER: UNITED STATES Final Report
9 Mar. 1981 145 p refs
(PB82-114539; NATO/CCMS-119) Avail: NTIS HC A07/MF A01 CSCL 13B

The state-of-the-art of technology for chemical, physical and biological treatment of hazardous industrial waste is reported. Hazardous waste management policies, waste treatment centers and the potential recovery of hazardous wastes are discussed. GRA

N82-17693# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
NATO-CCMS PILOT STUDY ON DISPOSAL OF HAZARDOUS WASTES. PROJECT: LANDFILL RESEARCH. PROJECT LEADER: CANADA Final Report
16 Feb. 1981 56 p
(PB82-114547; NATO/CCMS-120) Avail: NTIS HC A04/MF A01 CSCL 13B

Problems associated with landfill disposal methods are discussed including: co-disposal, contaminant migration and attenuation, waste isolation, waste immobilization, landfill procedures, long-term effect, leachate treatment, and national guidelines and/or regulations. Use of liner materials for landfills and of disposal in containers is discussed. Surface sealing of landfills to prevent leaching is discussed. GRA

N82-17694# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).

NATO-CCMS PILOT STUDY ON DISPOSAL OF HAZARDOUS WASTES: METAL FINISHING WASTES. PROJECT LEADER: FRANCE Final Report

Mar. 1981 281 p refs
(PB82-114554; NATO/CCMS-121) Avail: NTIS HC A13/MF A01 CSCL 13B

The metal finishing industry is described with emphasis upon its potential for polluting the environment. Control procedures and non-polluting and low-polluting processes are reviewed. Effluent treatment and its cost are studied. Legislation and practice concerning effluent treatment in various countries are reviewed. GRA

N82-17823# Joint Publications Research Service, Arlington, Va.

AEROSOLS DISTRIBUTION OF MICROORGANISMS IN A MANNED PRESSURIZED CHAMBER AND EFFECT OF ARTIFICIAL AIR IONIZATION

S. N. Zeloguyev, B. V. Anisimov, A. N. Viktorov, and V. P. Gorshkov *In its* USSR Rept.: Space Biol. and Aerospace Med., v. 15, no. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 59-62 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 44-46 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17849# Joint Publications Research Service, Arlington, Va.

PHYSICAL FACTORS OF ENVIRONMENT AS HYGIENE PROBLEM

M. G. Shandala *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 17-28 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 1, Jan. 1981 p 9-16 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N82-17695 Minnesota Univ., Minneapolis.

HYDROGEOCHEMISTRY AND KINETICS OF SILICATE WEATHERING IN A GABBROIC WATERSHED: FILSON CREEK, NORTHEASTERN MINNESOTA Ph.D. Thesis

Donald Ira Siegel 1981 289 p
Avail: Univ. Microfilms Order No. 8126023

Results of the study indicate that Filson Creek is impacted by acid precipitation that enhances the dissolution process. For example, leaching of sulfate acidity during snowmelt increased sulfate concentrations in Filson Creek from less than 2 to as much as 12 milligrams per liter, and H + or - ion concentrations from 10 to minus 6.5 power to as much as .00001. Annual chemical budgets determined at five locations on the creek in 1977 show net losses of dissolved silica, bicarbonate, calcium, magnesium, and sodium of 30.9, 19.6, 3.8, 3.8, and 1.5 kilograms per hectare per year, respectively, and net gains of dissolved potassium and sulfate of 0.4 and 8.9 kilograms per hectare. On a molar basis, about 1.5 times as much magnesium was lost from the watershed than calcium, even though the amount of ferromagnesium minerals in till and bedrock underlying the watershed is about an order of magnitude less than the amount of calcium-plagioclase. Dissert. Abstr.

N82-17696 Bureau of Mineral Resources, Geology and Geophysics, Canberra (Australia). Geological Survey of Queensland.

GEOLOGICAL EVOLUTION AND ECONOMIC GEOLOGY OF THE BURDEKIN RIVER REGION, QUEENSLAND

K. R. Levingston and W. H. Oldham, ed. 1981 72 p refs
(BMR-BULL-208; ISSN-0084-7089; ISBN-0-642-05830-X)
Avail: NTIS HC A04

The geological history of the area is presented, from the Precambrian to the Cainozoic ages. The physiography of the land is described, and the economic aspects of the geology are discussed in relation to metals, fuels (coal and petroleum), and nonmetallic minerals. S.L.

N82-17697 Academy of Sciences (USSR), Moscow. Space Research Inst.

THE PLASMA ION COMPOSITION IN THE HIGH-LATITUDE MAGNETOSPHERIC BOUNDARY LAYER ACCORDING TO PROGNOZ-7 DATA

E. M. Dubinin, A. V. Zakharov, N. F. Pissarenko, R. Lundin (Kiruna Geophysical Inst., Sweden), and B. Hultqvist (Kiruna Geophysical Inst., Sweden) 1981 23 p refs Presented at the IAGA Assembly, Edinburgh, 1981
(Rept-658) Copyright. Avail: Issuing Activity

A mass analysis of the plasma in the high-latitude boundary layer (the plasma mantle) was made. Direct evidence was obtained that the ionosphere, similar to the solar wind, is a source of the plasmas in this region, filling it by ions (H+) and (O+). The number density of ionospheric ions (O+) in the mantle is usually several percent. During the disturbed periods it increases up to several tens of percent. Energies of these ions are several keV. The content of ions (O+) is usually much higher than that of ions (He+) that indicates the ionospheric but not plasmasphere origin of them. The mechanism of ion acceleration is probably such that it ensures an equal energy to all the ions independently or their mass. The content of ions (O+) correlates positively with the magnetospheric activity level. Author

N82-17698# Oregon State Univ., Corvallis.

ANALYSIS OF THE ATMOSPHERIC WATER VAPOR TRANSPORT AND HYDROLOGIC CYCLE SIMULATED IN A GLOBAL CIRCULATION MODEL Ph.D. Thesis

Jy-Tai Chang 1982 214 p
Avail: Univ. Microfilms Order No. 8126225

An atmospheric moisture balance is diagnostically analyzed from the January and July data of the atmospheric general circulation model, which was integrated for thirty-nine months of simulation with seasonally-varying sea-surface temperature and solar insolation. The model hydrologic processes analyzed for the balance include the surface evaporation, the precipitation by large-scale and cumulus condensation, the vertical transport by large-scale and cumulus mass fluxes, and the horizontal transport of water vapor. The large-scale transports include the contributions from the standing and transient components of motion. Also analyzed are the potential and stream functions of horizontal transport, and the statistics of seasonal and interannual variabilities of the global and hemispheric effects of the hydrologic processes. As a result of these analyses, the hydrologic cycle is constructed and understood for both January and July of the model. Dissert. Abstr.

N82-17699 Utah Univ., Salt Lake City.

SATELLITE SOUNDING OF CLOUD PARAMETERS AND TEMPERATURE PROFILES IN CLOUDY ATMOSPHERES FROM INFRARED AND MICROWAVE DATA Ph.D. Thesis

Hwa-Young Yeh 1981 181 p
Avail: Univ. Microfilms Order No. 8125908

The utilization of both infrared and microwave sounding channels for the simultaneous inference of the cloud parameters and temperature profiles in cloudy atmospheres is studied. The necessary parameterized equations for infrared and microwave radiative transfer were derived, and the retrieval programs were developed for the determination of the high cloud top height, high cloud thickness, low cloud top height, surface emissivities, cloud liquid water content, and temperature profile successively utilizing selected HIRS and SCAMS channels. Hypothetical error analyses were performed and it is found that the retrieval technique is theoretically rigorous and practically feasible. The retrieval technique is then applied to the Nimbus 4 HIRS and SCAMS data for a number of carefully selected cases associated with summertime convective cloud systems and wintertime large scale synoptic cyclones. Cloud parameters and temperature profiles appear to be in qualitative agreement with the available synoptic, radiosonde, surface, and radar observations. Dissert. Abstr.

N82-17700 Washington Univ., Seattle.
FORBIDDEN 5200 ANGSTROMS EMISSION BY ATOMIC NITROGEN IN A MIDLATITUDE AURORA Ph.D. Thesis
Thomas C. Washington Tyler 1981 143 p
Avail: Univ. Microfilms Order No. 8126153

The little measured emission of the forbidden radiation at N(2D) 5200 A by metastable atomic nitrogen in a mid latitude aurora were studied. A new style of modulated interference filter photometer built to measure it is described. The new photometer uses a circle of collimating lenses and slits to collect and modulate the incidence angle at a fixed filter, thereby greatly increasing the collection aperture for weak light from a small region of the sky. Line and line ratios versus time are consistent with the input of low energy primary electrons and with the geometrical limits set by two station viewing. The measurements expand the available information on this minor emission at mid latitudes, identify its source as aurora give records of substantial intensity, and relate its strength to the derived energy spectrum of incident electrons. Dissert. Abstr.

N82-17701 North Carolina Univ. at Chapel Hill.
DEPOSITIONAL ENVIRONMENTS OF THE SUBSURFACE CRETACEOUS DEPOSITS OF SOUTHEASTERN NORTH CAROLINA Ph.D. Thesis
Edward Scheid Custer, Jr. 1981 221 p
Avail: Univ. Microfilms Order No. 8125569

The subsurface Cretaceous deposits of southeastern North Carolina were analyzed. Six lithologic units were recognized. These are, in ascending stratigraphic order: an unnamed Lower Cretaceous unit, Cape Fear Formation, unnamed Upper Cretaceous unit, Middendorf Formation, Black Creek Formation, and Peedee Formation. The unnamed Lower Cretaceous unit contains interbedded fine to medium grained sands, calcareous sandstones, sandy limestones and clays which were deposited in environments ranging from nearshore to fluvial. The Cape Fear Formation consists of very fine to coarse tan sands interbedded with brown and reddish clays. The Upper Cretaceous unnamed unit is composed of tan and yellow medium to coarse sands interbedded with tan and red clays deposited in braided fluvial environments. The Black Creek Formation consists of lignitic dark clays and coarse to very fine sands. Formation is composed of dark green to greenish-gray, micaceous, glauconitic clays and sands interbedded with calcareous sandstones or sandy limestones. Dissert. Abstr.

N82-17702 Illinois Univ. at Urbana-Champaign.
GEOLOGY AND GEOCHEMISTRY OF SPHALERITE IN COAL Ph.D. Thesis
James Collins Cobb 1981 220 p
Avail: Univ. Microfilms Order No. 8127568

The morphology of sphalerite vein walls in coal is investigated. Sphalerite veins postdate cleats and are often developed in cleats. Some sphalerite deposition was contemporaneous with subsidence of coal into sinkholes. Compactional features in the coal show that from 8 to 14 percent of the compaction in the coal occurred after sphalerite deposition commenced. A relationship between porosity, inherent moisture, and compaction of the host coals suggests that the sub-bituminous (B) rank achieved at the time of sphalerite deposition. Homogenization temperatures for the sphalerite fluid inclusions are nearly identical for the sphalerite from the Illinois and Forest City Basins and range from 75 to 113 C. There is a moderately high correlation coefficient (r = 75) between the vitrinite reflectance of the host coals and homogenization temperatures. This data may eliminate the possibility of fluid flow initiated by thermally-produced convection and raises the possibility of convection by compaction and loading of basin sediments. Dissert. Abstr.

N82-17703 Tulane Univ., New Orleans, La.
DEPOSITION AND DIAGENESIS OF GLAUCONITE SANDSTONE, BERRYMORE-LOBSTICK-BIGORAY AREA, SOUTH CENTRAL ALBERTA: A STUDY OF PHYSICAL CHEMISTRY OF CEMENTATION Ph.D. Thesis
Indurani Dayal Meshri 1981 178 p
Avail: Univ. Microfilms Order No. 8127777

Examination of logs, core descriptions, stratigraphic cross sections, sand-isolith and structure maps, regional geology and paleogeography reveal the depositional environments of the Glauconite Sandstone in the Berrymore-Lobstick-Bigoray area to be distributary channels, delta platform, distributary mouth bars, and interdistributary bays. Distributary channel-fill deposits are immature texturally and mineralogically. Their composition varies from submature feldspathic litharenites to immature feldspathic litharenites. Siderite, ankerite and illite are early cements. Abundant ankerite and some pyrite are found associated with the erosional base of the distributary channels with abundant clay clasts. Zones of pore-filling hematite are present as intermediate to late stage cement. Pore-lining to pore-filling kaolinite, pore-bridging illite and coarse crystalline siderite are late-stage cements. Dissert. Abstr.

N82-17704 Institut d'Aeronomie Spatiale de Belgique, Brussels.
CHEMICAL FLUCTUATIONS AND INCOHERENT SCATTERING THEORY IN THE TERRESTRIAL D REGION
G. Kockarts and J. Wisemberg 1981 34 p refs Submitted for publication
(Aeronomica-Acta-A-233-1981) Avail: Issuing Activity

The continuum theory of incoherently scattered electromagnetic waves is modified in order to include possible effects of thermally induced chemical fluctuations by introducing fluctuating parts in the production and loss terms of the continuity equations. An equivalent ionospheric model is developed for electrons and for negative and positive ions. A matrix formulation gives simultaneous access to fluctuating parts of each charged component. Numerical results indicate that chemical fluctuations are important over the height range where negative ions are comparable or > the electron concentration. Strong enhancements of the incoherent scatter cross section occur for frequency shifts < 20 Hz. A simple approximation is given for the contribution of chemical fluctuations. Author (ESA)

N82-17705 Institut d'Aeronomie Spatiale de Belgique, Brussels.
STRATOSPHERIC AEROSOL PROPERTIES FROM EARTH LIMB PHOTOGRAPHY AND MIE SCATTERING THEORY
M. Ackerman, C. Lippens, and C. Muller 1981 46 p refs Submitted for publication Original contains color illustrations
(Aeronomica-Acta-A-235-1981) Avail: Issuing Activity

A method for measuring stratospheric aerosol size distributions and density is described. Balloon-borne cameras simultaneously record various wavelengths of light from the Earth limb below the horizontal line of sight when solar elevation is low. Limb radiances are expressed in solar radiance units. The depression angles at which limb radiances are measured are related to the line of sight altitude of closest approach to the Earth surface. The measured integrated radiances can be inverted, taking into account absorption by ozone and air along the line of sight, in order to yield the in situ radiance per unit length versus altitude. The scattering angle of direct solar radiation is computed from the relation between the depression angle at which the atmospheric radiance is measured and the solar elevation angle at the time of measurement. The method is sensitive to particles of radius 0.04 to 0.4 microns. A larger number of particles of radius < 0.1 micron is estimated, compared to previous data. Author (ESA)

N82-17706*# Desert Research Inst., Reno, Nev. Atmospheric Sciences Center.
STRATOSPHERIC CCN SAMPLING PROGRAM Final Report, 1 Apr. 1981 - 22 Jan. 1982
C. Fred Rogers and James G. Hudson 22 Jan. 1982 59 p refs
(Grant NAG2-114)
(NASA-CR-168396) Avail: NTIS HC A04/MF A01 CSCL 04A

Two one liter grab samples of stratospheric aerosol were returned from each of six U-2 sampling missions. Cloud condensation nuclei (CCN) spectra from each sample were obtained. Interest was centered on the effects of volcanic activity. Spurious particle generation was found to be a serious problem in container 9 LFT and a much smaller problem in container 9 RT. Initial studies of an option for improved sample containers and values were completed. A CCN spectrometer, able to operate at an internal pressure of 300 mb, was designed. N.W.

N82-17707*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.

EFFECTS OF MULTIPLE SCATTERING AND SURFACE ALBEDO ON THE PHOTOCHEMISTRY OF THE TROPOSPHERE Final Report, period ending 30 Nov. 1981

T. R. Augustsson and S. N. Tiwari Dec. 1981 264 p refs
(Contract NCC1-30)
(NASA-CR-168417) Avail: NTIS HC A12/MF A01 CSCL 04A

The effect of treatment of incoming solar radiation on the photochemistry of the troposphere is discussed. A one dimensional photochemical model of the troposphere containing the species of the nitrogen, oxygen, carbon, hydrogen, and sulfur families was developed. The vertical flux is simulated by use of the parameterized eddy diffusion coefficients. The photochemical model is coupled to a radiative transfer model that calculates the radiation field due to the incoming solar radiation which initiates much of the photochemistry of the troposphere. Vertical profiles of tropospheric species were compared with the Leighton approximation, radiative transfer, matrix inversion model. The radiative transfer code includes the effects of multiple scattering due to molecules and aerosols, pure absorption, and surface albedo on the transfer of incoming solar radiation. It is indicated that significant differences exist for several key photolysis frequencies and species number density profiles between the Leighton approximation and the profiles generated with, radiative transfer, matrix inversion technique. Most species show enhanced vertical profiles when the more realistic treatment of the incoming solar radiation field is included. E.A.K.

N82-17708*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SESSION III OF THE VLBI/LASER INTERCOMPARISON TASK OF THE NASA CRUSTAL DYNAMICS PROJECT

Henry Fliegel 1 Nov. 1981 50 p refs
(Contract NAS7-100)
(NASA-CR-168427; JPL-Pub-81-96) Avail: NTIS HC A03/MF A01 CSCL 08E

Baseline vector measurements are reported for a line crossing most of the state of California from Quincy to Mt. Otay near the Mexican border. They were obtained to compare three space geodetic techniques: very long baseline interferometry, satellite laser ranging, and Doppler satellite tracking. A.R.H.

N82-17709# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

OBSERVATIONS OF LARGE SCALE F-REGION IRREGULARITIES USING AIRFLOW EMISSIONS AT 7774 DEG A AND 6300 DEG A

Y. Sahai, J. A. Bittencourt, N. R. Teixeira, and H. Takahashi Oct. 1981 24 p refs Submitted for publication Sponsored by the Brazilian Fund for Science and Technology
(INPE-2236-PRE/023) Avail: NTIS HC A02/MF A01

The measurements were made with a two-channel photometer which permitted scanning observations both along and across the magnetic meridian. Observations at 7774 A can detect large scale irregularities near the F-region peak height, whereas observations at 6300 A detect such irregularities at an altitude about 50 km to 100 km lower, depending on the F-region height. On several nights, during spread-F conditions, as indicated by an ionosonde operating at the same location, the presence of large intensity depletions of short duration were detected in both emissions. These depletions were observed to move towards the east in the east-west scans, and usually towards the south in the north-south scans. Salient features of these observations are presented and discussed. T.M.

N82-17710# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

DIFFERENTIAL BEHAVIOUR OF THE EQUATORIAL IONOSPHERES ON THE EASTERN AND WESTERN COASTS OF THE SOUTH AMERICAN CONTINENT

Rajaram Purushottam Kane Oct. 1981 11 p refs Submitted for publication Sponsored in part by FNDCT
(INPE-2237-PRE/024) Avail: NTIS HC A02/MF A01

A comparison of the daily variation patterns of the geomagnetic field components H, Z, D and the ionospheric F sub 0 F sub 2, at the equatorial locations Huancayo (12 degrees S, 75 degrees W, dip + 1.9 degrees) on the west coast and Eusebio, Fortaleza (4 degrees S, 39 degrees W, dip - 3.5 degrees) on the east coast of the South American continent, shows that the equatorial electrojet and the associated fountain effect are weaker on the east coast. R.J.F.

N82-17711# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

PARTICLE PRECIPITATION AND ATMOSPHERIC X-AND GAMMA-RAYS IN THE SOUTH ATLANTIC MAGNETIC ANOMALY BY BALLOON EXPERIMENTS Progress Report, 1968 - 1981

Jose Marques daCosta Jun. 1981 10 p refs Presented at the 1st Aeronomy Workshop Brazil-Argentina, Foz do Iguacu, Brazil, 18-20 Jul. 1981 Sponsored in part by the Fundo Nacional de Desenvolvimento Cientifico e Technologico - FNDCT
(INPE-2119-RPE/343) Avail: NTIS HC A02/MF A01

Particle precipitation from the Van Allen belts into the atmosphere of the South Atlantic magnetic anomaly region, were observed with balloon-borne instrumentation. Balloons carrying onboard charged particle and X-and gamma ray detectors formed by plastic scintillators were used. Measurements of bremsstrahlung X-rays and low energy gamma rays as well as the charged particles themselves were made at the altitude of the stratospheric balloons, and simultaneous measurements of the geomagnetic variations were made by rapid run ground magnetometers. S.L.

N82-17712# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

LARGE HORIZONTAL ELECTRIC FIELDS MEASURED AT HEIGHTS OF THE BRAZILIAN MAGNETIC ANOMALY AND ASSOCIATION TO LOCAL ENERGETIC PARTICLE PRECIPITATION

W. D. Gonzalez, A. E. C. Pereira, I. M. Martin, S. L. G. Dutra, O. Pinta, Jr., J. Wygant (California Univ., Berkeley), and F. S. Mozer (California Univ., Berkeley) Jun. 1981 12 p refs Presented at the 1st Aeronomy Workshop Brazil-Argentina, Foz do Iguacu, Brazil, 18-20 Jul. 1981 Submitted for publication
(INPE-2120-RPE/344) Avail: NTIS HC A02/MF A01

Large scale electric fields were measured, by balloon flights, at the Brazilian Magnetic Anomaly with double probe detectors. The results of the flight during a time interval with fair weather at the observing region and enhanced geomagnetic activity are reported. It is suggested that a BAND of precipitating energetic particles, moving equatowards with respect to the balloon, produce a conductivity enhancement down to the middle atmosphere, distorting the vertical atmospheric electric field and giving rise to the type of horizontal fields. E.A.K.

N82-17713*# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.

PLASMA AND ELECTRIC FIELD BOUNDARIES AT HIGH AND LOW ALTITUDES ON JULY 29, 1977

J. F. Fennell, R. G. Johnson (Lockheed Missiles and Space Co., Palo Alto, Calif.), D. T. Young (Bern Univ., Switzerland), R. B. Torbert (California Univ., Berkeley), and T. E. Moore (New Hampshire Univ., Durham) 12 Jan. 1982 46 p refs Sponsored in part by NASA, Washington and by the Swiss National Science Foundation
(Grants NSF ATM-80-00518; NSF ATM-78-03600)
(NASA-CR-165118; ATR-82(7883)-2) Avail: NTIS HC A03/MF A01 CSCL 04A

Hot plasma observations at high and low altitudes were compared. The plasma ion composition at high altitudes outside the plasmasphere was O+. Heavy ions were also observed at low altitudes outside the plasmasphere. It is shown that at times these ions are found well below the plasmapause inside the plasmasphere. Comparisons of the low altitude plasma and dc electric fields show that the outer limits of the plasmasphere is not always corotating at the low L-shells. The corotation boundary, the estimated plasmapause boundary at the boundary of the inner edge of plasma sheet ions were at the same position. The inner edge of plasma sheet electrons is observed at higher latitudes than the plasmasphere boundary during disturbed times. The inner edge of the plasma sheaths shows a strong dawn to dusk asymmetry. At the same time the inner edge of the ring current and plasma sheath also moves to high latitudes reflecting an apparent inflation of the magnetosphere. E.A.K.

N82-17714*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

SOME NEW METHODS IN GEOMAGNETIC FIELD MODELING APPLIED TO THE 1960 - 1980 EPOCH

R. A. Langel, R. H. Estes (Business and Technological Systems, Seabrook, Md.), and G. H. Mead Dec. 1981 42 p refs Submitted for publication

(NASA-TM-83868) Avail: NTIS HC A03/MF A01 CSCL 08N

The utilization of satellite and surface data together permitted the incorporation of a solution for the anomaly field at each observatory. The residuals of the observatory measurements to such models is commensurate with the actual measurment accuracy. Incorporation of the anomaly estimation enabled the inclusion of stable time derivatives of the spherical harmonic coefficients up to the third derivative. A spherical harmonic model is derived with degree and order 13 in its constant and first time derivative terms, six in its second derivative terms and four in its third derivative terms. E.A.K.

N82-17715*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

SATELLITE AND SURFACE GEOPHYSICAL EXPRESSION OF ANOMALOUS CRUSTAL STRUCTURE IN KENTUCKY AND TENNESSEE

M. A. Mayhew (BTS, Inc.), H. H. Thomas, and P. J. Wasilewski Jul. 1981 29 p refs

(NASA-TM-82163) Avail: NTIS HC A03/MF A01 CSCL 08N

An equivalent layer magnetization model is discussed. Inversion of long wavelength satellite magnetic anomaly data indicates a very magnetic source region centered in south central Kentucky. Refraction profiles suggest that the source of the gravity anomaly is a large mass of rock occupying much of the crustal thickness. The outline of the source delineated by gravity contours is also discernible in aeromagnetic anomaly patterns. The mafic plutonic complex, and several lines of evidence are consistent with a rift association. The body is, however, clearly related to the inferred position of the Grenville Front. It is bounded on the north by the fault zones of the 38th Parallel Lineament. It is suggested that such magnetization levels are achieved with magnetic mineralogies produced by normal oxidation and metamorphic processes and enhanced by viscous build-up, especially in mafic rocks of alkaline character. E.A.K.

N82-17716# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.

A SEISMIC STUDY ON CRACKS IN CRYSTALLINE ROCK

Hans Israelson Jul. 1981 24 p refs Sponsored by Swedish National Council for Radioactive Waste

(FOA-C-20417-E1) Avail: NTIS HC A02/MF A01

Results from a field study with in-situ seismic measurements in crystalline rock are summarized. It was found that among a few potential seismic techniques the so called cross hole method would probably provide the most powerful capability for detecting cracks and fracture zones. By this method the area between two holes are systematically scanned by seismic raypaths. Seismic signals are generated in one hole by microexplosions and recorded in the other at various combinations of depths. A test sample of scanning data showed a rather dramatic variation of the seismic P-wave velocity (5-6 km/s). Analysis procedures like tomographic imaging was applied to this data set primarily to illustrate the kind of structural mapping such procedures can provide. Author

N82-17717# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).

HIGH LATITUDE DAYSIDE PRECIPITATING ELECTRON REGIONS DURING THE SOUTHERN HEMISPHERE SUMMER AND THEIR DEPENDENCE OF IMF AND K SUB P

M. Candidi, H. K. Kroehl (NOAA, Boulder, Colorado), and C.-I. Meng (Applied Physics Lab., Laurel, Maryland) May 1981 30 p refs Sponsored in part by ESA

(IPS-81-4) Avail: NTIS HC A03/MF A01

The influence of the IMP Bz and By polarity on the location of precipitation regions of low energy electrons recorded by DMSP F-2 is studied. The average electron flux of the regions is analyzed as a function of the corrected geomagnetic coordinates in the dayside southern hemisphere. The average precipitation patterns are similar for the channels below 434 eV. The current carried by these particles agrees with the TRIAD measurements of the cleft field-aligned currents. When Bz > 0, the lower energy channels reveal a marked asymmetrv between the By < 0 and By > cases. When By > 0, the maximum of the flux of precipitating electron is located between 0800 and 1200 MLT and between -76 and -83 degrees MLAT. When By < 0, the maximum is located between 1200 and 1600 MLT and between -79 and -82 degrees MLAT. The general dynamics associated with Bz < 0 obscure this By effect. Author

N82-17718# SRI International Corp., Menlo Park, Calif.

A STEPPED-FREQUENCY HF RADAR FOR IONOSPHERIC DIAGNOSTICS Topical Report, 16 Jun. 1980 - 16 Jan. 1981

Juris Petriceks, Charles L. Rino, and Walter G. Chesnut 20 Mar. 1981 32 p refs

(Contract DNA001-80-C-0255; SRI Proj. 1827)

(AD-A107810; DNA-5723T) Avail: NTIS HC A03/MF A01 CSCL 04/1

Naturally occurring ionospheric disturbances generate structure over an extremely large range of scale sizes and intensities. To diagnose the interacting plasma processes that cause this structure continuum requires a variety of complex instruments. This report describes a multiple-frequency HF backscatter radar that can measure the Doppler spectrum of structure in the scale-size region from tens of meters to meters. This structure regime is important in its own right and acts as tracer for macroscale parameters such as plasma depletions, currents, and electric fields. Author (GRA)

N82-17719# Systems Science and Software, La Jolla, Calif.

DETECTION, LOCATION AND IDENTIFICATION OF EXPLOSIONS AND EARTHQUAKES USING REGIONAL SEISMIC DATA RECORDED AT A SINGLE STATION Final Report, Aug. 1980 - Aug. 1981

J. R. Murphy Jun. 1981 85 p refs

(Contract ACDA-ACOMC107)

(AD-A107587; SSS-R-81-5010) Avail: NTIS HC A05/MF A01 CSCL 17/10

The results of an analysis of the various factors affecting the detection, location, and event identification capability of a single seismic station in the regional distance range are summarized. A regional seismic detection model is described and applied to the evaluation of the frequency dependent detectability of underground explosions in various source media. On the basis of these analyses it is concluded that P waves from explosions with yields as small as 1 kt should be detectable at ranges on the order of 1000 km or more over regional propagation paths characteristic of the Eastern U.S. Event location capability associated with single station seismic data is assessed. It is concluded that epicentral distance accuracies on the order of 10 to 15 km and source azimuth accuracies of better than 10 degrees are achievable using routinely available data processing procedures. GRA

N82-17720# World Meteorological Organization, Geneva (Switzerland).

REPORT OF THE SECOND SESSION OF THE JOINT SCIENTIFIC COMMITTEE Global Atmospheric Research Programme

1981 162 p refs Presented at Vienna, 17-26 Mar. 1981 Sponsored by Global Atmospheric Research Programme and World Climate Research Programme Prepared in cooperation with ICSU, Rome

Avail: NTIS MF A01; print copy available at WMO, Geneva, SwFr 25

Work to date and planned experiments are reported on the global weather experiment, the GARP Atlantic tropical experiment, the GARP mountain subprogram, and the world climate program are described. Climatologically significant parameters are discussed, i.e., cloudiness and radiation, ocean processes, ocean-cryosphere processes, hydrology and land surface processes, radiatively important gases, and aerosols. The use of satellite soundings is outlined. Status of the various projects is determined. Author (ESA)

N82-17721# World Meteorological Organization, Geneva (Switzerland).
REPORT OF THE THIRD SESSION OF THE WEST AFRICAN MONSOON EXPERIMENT (WAMEX) SCIENTIFIC REGIONAL COMMITTEE Global Atmosphere Research Programme
1981 202 p refs In ENGLISH and FRENCH Presented at Geneva, 10-14 Nov. 1980 Prepared in cooperation with ICSU, Rome
(GARP-Spec-Rept-37) Avail: NTIS MF A01; print copy available at WMO, Geneva

After completion of the field phase of WAMEX, operations were assessed, further planning of data management activities was reviewed, and plans for the research and evaluation phase were coordinated. The WAMEX project was conducted concurrently with the first GARP Global Experiment. Impending data collection and processing activities are stressed in plans to promote the timely and complete analysis of the present situation. The advantages to be gained through international cooperation among scientists are emphasized. Author (ESA)

N82-17722# Research Inst. of National Defence, Stockholm (Sweden).
SEISMOLOGY 1980, NUCLEAR TEST BAN VERIFICATION, EARTHQUAKE AND EARTH RESOURCE INVESTIGATION Progress Report, 1980
Brittmarie Tygaard Oct. 1981 69 p refs Sponsored by National Council for Radioactive Waste
(FOA-C-20427-T1) Avail: NTIS HC A04/MF A01

Seismological projects are reported, including nuclear explosion monitoring, the development of international data centers, seismic risk estimation for nuclear power plants, oil exploration using seismic methods, and crystalline rock investigation using seismic cross hole measurements. The Swedish seismic network is described. In 1980, China conducted 1 nuclear test, France 11, Britain 3, the US 14, and the USSR 21. Apart from the Chinese test, the explosions were underground and within the 150 kton limit. France is the only country which increased the number of tests compared with previous years. Author (ESA)

N82-17723# National Oceanic and Atmospheric Administration, Boulder, Colo. Space Environment Lab.
TOWARD GLOBAL MONITORING OF THE IONOSPHERE IN REAL TIME BY A MODERN IONOSONDE NETWORK: THE GEOPHYSICAL REQUIREMENTS AND TECHNOLOGICAL OPPORTUNITY
J. W. Wright and A. K. Paul Jul. 1981 72 p refs Original contains color illustrations
(PB82-106444; NOAA-81081803) Avail: NTIS HC A04/MF A01 CSCL 04A

Current developments in ionospheric sounders demonstrate the advantages of fully computer-interactive systems and digital data acquisition, in which all aspects of system control and real-time data processing are software-defined. Priority is being given to vertical-incidence capabilities, and particularly to automatic estimation of the electron density distribution and its time variation. Two or more such instruments can obtain measurements bistatically to sample ionospheric properties at intermediate locations. Measureable properties, whether by vertical or oblique sounding, include the time and frequency dependence of group path and phase, the signal amplitude, the echo direction of arrival and polarization. GRA

N82-17724# Cambridge Univ. (England). Dept. of Engineering.
CONE PENETROMETER AND LIQUID LIMIT
1981 22 p refs
(PB82-113507; CUED/D-SOILS/TR-101-1981; ISSN-0309-7439) Avail: NTIS HC A02/MF A01 CSCL 08M

The use of the cone penetrometer to determine the liquid limit of soils is briefly discussed. Published data of shear strength at moisture contents near the liquid limit, and of penetrations of the fall cone of angle 30 degrees and weight 80gf into soils at water contents near the liquid limit, are compared. It is concluded that strength tends to decrease and cone penetration to increase with the value of the liquid limit and that consequently precise correspondence between liquid limits determined with the cone penetrometer and with the traditional Casagrande apparatus is not to be expected. The satisfactory predictive ability of a simple expression relating compression index and plasticity index is demonstrated. GRA

N82-17725# Technische Universitaet, Brunswick (West Germany). Naturwissenschaftliche Fakultaet.
ON THE GEOLOGY, GEOCHEMISTRY AND GENESIS OF THE TOM Pb-Zn-BARITE DEPOSIT, YUKON TERRITORY, CANADA Ph.D. Thesis
Duncan Large 1981 161 p refs
(PB82-116708) Avail: NTIS HC A08/MF A01 CSCL 08G

The Tom Pb-Zn-barite prospect was discovered in 1951 by prospectors working for the Hudson Bay Exploration and Development Company. The prospect is located close to the border between the Yukon Territory and the Northwest Territories, Canada. The Tom deposit is still under evaluation and no decision has been made to mine the ore. To date company work has consisted of surface geological mapping. Diamond drilling and an underground exploratory drive. The recognition of the Tom as an example of sediment-hosted, submarine exhalative mineralization, and the recent discovery of further occurrences of similar mineralization at the same stratigraphic horizon within the Selwyn Basin, raises the possibility that the eastern Yukon could become a very important Pb-Zn-barite mining camp. GRA

N82-17726 Texas Univ. at Dallas.
THE SEISMICITY OF FOREARC MARGINAL WEDGES (ACCRETIONARY PRISMS) AND SEISMOTECTONICS OF CONVERGENT MARGINS Ph.D. Thesis
Tzann-Hwang Chen 1981 123 p
Avail: Univ. Microfilms Order No. 8126593

Three different types of seismic data from island arc regions were examined: teleseismically-recorded earthquakes that were reported in the literature as occurring in major arc-trench regions; local earthquakes located by combined ocean bottom seismograph and land networks in the arc-trench region in the New Hebrides and the central and eastern Aleutian Trench; and S-P intervals measured at stations on islands located on the outer ridge or at ocean bottom seismograph stations on the forearc marginal wedge. The results indicate that: primary normal faulting occurs in the top of Benioff zone underneath the active margin, primary thrust faulting occurs in the active margin of overriding plate and the angle between the axis of the compressional stress and the downdipping slab is increased with depth, and primary normal faulting is also found above the zone of thrust faulting in the shallowest part of the overriding plate in New Hebrides. Dissert. Abstr.

N82-17727 Texas Univ. at Dallas.
PETROLOGY OF THE ULTRAMAFIC XENOLITHS ON THE KOOLAU SHIELD, OAHU, HAWAII. PART 1: LIQUIDUS PHASE RELATIONS ON THE JOIN ANORTHITE-FORSTERITE-SILICA AT 10 kBAR, PART 2 Ph.D. Thesis
Gautam Sen 1981 204 p
Avail: Univ. Microfilms Order No. 8126595

On the basis of petrography and mineral chemistry, the xenoliths were classified into three major xenoliths suites: dunite, spinel lherzolite, and pyroxenite suites. Apart from these major suites, xenoliths with distinct cumulate feature, and a plagioclase-spinel lherzolite xenoliths occur. The dunites are interpreted to represent cumulates rather than residual from partial fusion. For liquid phase relations three piercing points were found: two of them are generated by the reaction curves liquid + spinel = anorthite + enstatite and liquid + forsterite = spinel + enstatite. The third piercing point represents the univariant curve along which anorthite, diopside, and a hi-quartz crystallize in equilibrium. Dissert. Abstr.

N82-17728 Texas Univ. at Dallas.
THE BIOSTRATIGRAPHY AND TAXONOMY OF MESOZOIC RADIOLARIA FROM THE SAMAIL OPHIOLITE AND HAWASINA COMPLEX, OMAN Ph.D. Thesis
Phyllis Russell Tippit 1981 403 p
Avail: Univ. Microfilms Order No. 8126594

Radiolarian biostratigraphic data confirms the hypothesis that rocks exposed in the Oman Mountains were deposited in a Mesozoic ocean basin and later tectonically emplaced in a vertical stratigraphic sequence. Radiolaria extracted from mudstones interbedded with the pillow lavas at the top of the Samail Ophiolite were Late Cretaceous (Cenomanian) in age, indicating a Cenomanian age of origin for the Ophiolite. Samples from the Haliw Formation of the Hawasina Complex were Triassic in age. No older pelagic sediments were found. These Haliw sediments, together with a Late Triassic horizon at the base of the Halfa Formation, overlie basalts and may represent deep-water sedimentation early in the basin's history. The longest sections of radiolarian chert and mudstone were deposited during another period of regional deepening and pelagic sedimentation during the Late Jurassic and Early Cretaceous. Dissert. Abstr.

N82-17729 Colorado State Univ., Fort Collins.

ENERGY TRANSPORT WITHIN THE EARTH'S ATMOSPHERE OCEAN SYSTEM FROM A CLIMATE POINT OF VIEW Ph.D. Thesis

George Garrett Campbell 1981 167 p

Avail: Univ. Microfilms Order No. 812642

The Earth's atmosphere-ocean system is considered from an energy balance point of view. The monthly mean satellite observations of the radiation budget are discussed. In particular the Nimbus 6 Earth Radiation Budget experiment is emphasized since it contributes half of the radiation data. The many sources of measurement error are presented with the conclusion that about half of the + or - 9W/sq m errors in the net radiation comes from systematic errors. From the annual net radiation map the divergent component of the flux of energy was calculated. This vector field shows the expected equator to pole energy transport but it also shows substantial eastwest flows. The magnitude of the west-east components is about the same as the deviations from the latitude zonal mean of the north-south fluxes. The global circulation divides into an eastward and westward flow hemisphere with zero flux line at 20 deg E and 190 deg E.

Dissert. Abstr.

N82-17730 Florida State Univ., Tallahassee.

THE KINEMATIC AND METAMORPHIC DEVELOPMENT OF THE TOWALIGA-GOAT ROCK MYLONITES, GEORGIA-ALABAMA Ph.D. Thesis

Willis Algeon Holland, Jr. 1981 116 p

Avail: Univ. Microfilms Order No. 8127540

The Towaliga-Goat Rock and Bartletts Ferry deformation zones are major tectonic boundaries of the southeastern Piedmont. The Towaliga zone separates the Pine Mountain Belt and the Inner Piedmont and the Goat Rock and Bartletts Ferry Zones separate the Pine Mountain and Uchee Belt. The Uchee Belt is composed of granitic gneisses and amphibolites modified by deformational phases, each represented by distinctive mesoscopic folding patterns. The earliest is a poorly developed folding of obscure compositional layering. Later leucocratic banding is folded by recumbent isoclines with subhorizontal axial plane cleavage. Intensification of cleavage to the northwest produces the southeast dipping mylonitic foliation of the Goat Rock and Bartletts Ferry Zone. Mesoscopic structural patterns is accounted for by regional compressive folding accompanied by ductile drag folding and mylonitization on the limbs of a major anticlinal structure.

Dissert. Abstr.

N82-17731 Michigan Univ., Ann Arbor.

GEOLOGY, MINERALOGY, AND GEOCHEMISTRY OF THE MCCLURE MOUNTAIN ALKALIC COMPLEX, FREMONT COUNTY, COLORADO Ph.D. Thesis

Donald Henry Alexander 1981 352 p

Avail: Univ. Microfilms Order No. 8125054

The McClure Mountain alkalic complex is evolved from a consanguineous suite of gabbroic, syenitic, and lamprophyric magmas. Field, mineralogical, and chemical data suggest several differentiation hypotheses which are tested by means of linear least squares mixing models. Initially, partial melting of alkali peridotite produced parental nepheline-normative alkali basalt magma. A part of this magma ascended to shallow crustal levels along deep-seated faults and differentiated to a stratiform body of cumulitic olivine gabbros, gabbros, anorthosites, and magnetite-ilmenite ores. Petrographic studies, graphical analyses, and modeling support the hypothesis that the late lamprophyres were formed by mixing of a partly crystalline alkalic basalt magma with syenitic magma. Models rule out the hypothesis that the lamprophyres can be parental to syenite and gabbro. Progressive changes in the petrography along the strike of individual lamprophyres can be explained by differentiation during transport.

Dissert. Abstr.

N82-17732 California Univ., San Diego.

THE DIAGENESIS OF MARINE CARBONATE SEDIMENTS: EXPERIMENTAL AND NATURAL GEOCHEMICAL OBSERVATIONS Ph.D. Thesis

Paul Arthur Baker 1981 153 p

Avail: Univ. Microfilms Order No. 8125435

Analysis of Sr and Ca ratios of several deep-sea carbonate sediments and porewaters shows that Sr is expelled by the solids during recrystallization and transported in solution out of the system. Quantitative treatment of these data reveals that: (1) most ancient limestones have undergone major chemical exchange only with marine pore fluids; (2) limestone cement is largely derived from within the original carbonate pile; (3) externally-imposed fluid flow is not a prerequisite for total carbonate recrystallization; (4) the values of the distribution coefficient of Sr in calcite appropriate for diagenetic studies were determined in laboratory experiments. Experimental replacement of calcite by dolomite under a variety of conditions indicates that dolomitization can take place in marine and lacustrine environments only under the following two conditions: (1) low dissolved sulfate concentrations, and (2) insubstantial contemporaneous silica diagenesis. Three sectors of North Sea Mastrichtian and Danian age chalks were studied geochemically. At one site in the Vem field, large amounts of isotopically heavy carbon, derived from microbial degradation of organic material, were incorporated into the carbonate during diagenesis. Dissert. Abstr.

N82-17733 Columbia Univ., New York.

GEOLOGICAL INVESTIGATIONS OF PRE-LATE JURASSIC TERRANES IN THE SOUTHERNMOST ANDES Ph.D. Thesis

Randall David Forsythe 1981 298 p

Avail: Univ. Microfilms Order No. 8125286

Pre-Late Jurassic terranes of the Patagonian Archipelago were investigated. Their regional stratigraphic and structural characteristics were surveyed. Their significance in the late Paleozoic to early Mesozoic evolution of South America were determined. Pre-Late Jurassic rocks within the archipelago are distributed in two belts. Within the outer belt the Madre de Dios Archipielago was studied in detail. Pre-Late Jurassic rocks of this area are divisibtle into three mappable units. These three units are interpreted to be part of a late Paleozoic to early Mesozoic accretionary prism that was located along the ancestral Pacific margin of the South American sector of Gondwana. Within the inner belt, the region of Peninsula Staines was studied in detail. In this region greenschist facies metamorphism and pervasive deformation fabrics prevent stratigraphic subdivision of the terrane. However the lithologies present are correlative with the outer belt suggesting that they also were part of the late Paleozoic to early Mesozoic accretionary prism.

Dissert. Abstr.

N82-17734 Washington Univ., Seattle.

THE GEOCHEMISTRY OF SULFUR AND CARBON IN BASALTIC MELTS Ph.D. Thesis

Edmond Albigese Mathez 1981 153 p

Avail: Univ. Microfilms Order No. 8126125

Submarine basaltic lavas generally erupt in a sulfide-saturated state. Concentrations of sulfur dissolved in glasses are in the range 1000 to 1800 ppm and exhibit nearly perfect covariance with iron concentration, implying that the equilibrium governing sulfide stability in basaltic magmas is FeO + 1/2S2 reversible reaction FeS + 1/2O2. The iron contents of sulfide-saturated melts control f sub S sub 2 and f sub O sub 2. However, the range of iron contents of most basalts suggests that these variables are nearly identical for tholeiitic magmas at equivalent temperatures. Crystallization of plagioclase and olivine drive residual magma compositions along paths approximately parallel to the sulfide-saturation surface. Consequently, large quantities of sulfides will not separate until the relatively late stages of fractional crystallization. Dissert. Abstr.

N82-17735 Columbia Univ., New York.

STRATIGRAPHY OF THE WESTERN NORTH ATLANTIC BASED ON THE STUDY OF REFLECTION PROFILES AND DSDP RESULTS Ph.D. Thesis

Gregory Stuart Mountain 1981 331 p
Avail: Univ. Microfilms Order No. 8125352

Three hundred thousand km of single- and multichannel reflection profiles from the western North Atlantic were examined. Basement and ten sedimentary reflectors were recognized, and type profiles for each are identified and described. Two-way travel time to all reflectors were digitized along 30,000 km of the best profiles. Regression analysis of sound velocities measured along the IPOD line provides linear equations of interval velocity vs. one-way time that are superior to those derived from sonobuoy wide-angle reflections, and three equations which describe horizontal and vertical velocity variations were derived. Using these equations, each digitized profile was converted from travel time to depth, and thickness between adjacent reflectors and total depth to basement were calculated and contoured in nine basin-wide maps. Results from 25 DSDP boreholes and 2 COST wells were integrated with the seismic stratigraphy. Dissert. Abstr.

N82-17736 Connecticut Univ., Storrs.

AN APPLICATION OF RAY THEORY TO THE INVESTIGATION OF SEISMIC HEAD WAVE POST-Pn PHASES Ph.D. Thesis

Edward Joseph Close 1981 185 p
Avail: Univ. Microfilms Order No. 8125450

At epicentral distances between 200 and 1,000 kilometers the first energy to arrive from a seismic event is generally identified as a compressional headwave, Pn. According to Snell's Law, there are eleven separate waveforms to be expected, following Pn. These are termed the post-Pn phases and are the result of various conversions upon reflection from the surface, refraction along the uppermost mantle as a compressional wave, and returning to the surface as a compressional or shear phase. These post-Pn phases are expected to arrive at the seismic station in one to twenty seconds after the Pn event and prior to the P^* event, which has traveled along the Conrad discontinuity. For the shorter epicentral distances, in the 200 kilometer range, some of the post-Pn phases are seen to arrive after P^*. Only the earthquakes which will have originated from a shallow, crustal focus, usually of three to twenty kilometer depth are considered. Dissert. Abstr.

N82-17737 Utah Univ., Salt Lake City.

TIME DEPENDENT THERMAL MODELING OF PLATE TECTONIC PROCESSES Ph.D. Thesis

Kevin Patrick Furlong 1981 149 p
Avail: Univ. Microfilms Order No. 8125899

Three dimensional evolution of convergence plate boundaries and triple junctions, coupled with time dependent thermal modeling using the Method of Lines numerical techniques is discussed. The path which subducting lithosphere follows can be broken into three regions: (1) a sub-horizontal region of nearly constant dip near the trench; (2) a region of rapidly increasing dip; (3) a region generally deeper than 125 km, again of nearly constant dip. Modeling of the thermal evolution of subducting slabs as they pass through these three regions, with the actual path simulated by appropriate time dependent boundary conditions, indicates that the geometry of the slab in region can be related directly to the thermal structure of the slab, and thus indirectly to the age and velocity of the subducting lithosphere. Rapid increase in convergence velocity can provide an enabling mechanism for back-arc spreading, while migration of the arc, uplift, enhanced heat flow, and crustal partial melt can result from the subduction of progressively younger lithosphere. Dissert. Abstr.

N82-17738 Michigan Univ., Ann Arbor.

TERRESTRIAL HEAT FLOW OVERLYING THE ANDEAN SUBDUCTION ZONE Ph.D. Thesis

Steven George Henry 1981 204 p
Avail: Univ. Microfilms Order No. 8125124

As a result of a geothermal investigation, thirty-four new heat flow sites in the countries of Peru, Bolivia, and Brazil were established. The Andes were divided into five regions based on their apparently different uplift and erosional histories. The heat flow in each of these regions can be interpreted in terms of their past tectonic and magmatic history, which in turn is most likely related to the angle of subduction. In central Peru the heat flow is low and the angle of subduction is low 10 to 15 deg., in southern Peru and northern Bolivia the heat flow is intermediate where the subducted plate is transition from low to higher angle subduction, and directly east of the active and recent volcanism of central and southern Bolivia the heat flow is high and the angle of subduction reaches 30 deg. Explanations for the low heat flow include the possibility that magnetic injections in regions of compression yield a relatively small thermal perturbation, and the low angle of subduction may result in an underplating of the continent. Dissert. Abstr.

N82-17739 Columbia Univ., New York.

ANOMALOUS RADON (222) EMISSION AND ITS ASSOCIATION WITH EARTHQUAKES AND TECTONISM Ph.D. Thesis

Egill Hauksson 1981 161 p
Avail: Univ. Microfilms Order No. 8125301

During 1978 and 1979 radon content in groundwater from nine geothermal wells in Iceland was monitored to correlate possible precursory changes in radon content with local seismicity. Radon emission from fumaroles at Krafla volcano in north Iceland was monitored to establish a possible relationship between radon emission and ongoing epsiodic microseismicity, rifting, and volcanism. To shed light on the physical basis of anomalous radon emission as a precursor to earthquakes, world-wide radon data are interpreted in terms of recent results in rock mechanics. Dissert. Abstr.

N82-17740 Northwestern Univ., Evanston, Ill.

KINEMATIC THERMAL MODELS OF THE EARTH'S MANTLE Ph.D. Thesis

Robert Thomas Langan 1981 84 p
Avail: Univ. Microfilms Order No. 8124938

The thermal evolution of the mantle geotherm under oceanic lithosphere was examined using a numerical simulation for a radially symmetric Earth. The viscosity of the mantle is assumed to be low enough to allow slabs to sink to near the core-mantle boundary. The return flow to ridges is modelled as a uniform vertical mass flux. The spreading rate and the resulting vertical mass flux are assumed to be constant over each of two major time periods in the Earth's history: from the approximate time for formation, 4.55 billion years before present (bybp), to the end of the Archean (here assumed to be 2.76 bybp) and from the end of the Archean to the present. This break is consistent with a global change in geotectonic style. Dissert. Abstr.

N82-17741 Columbia Univ., New York.

ON THE TECTONIC EVOLUTION OF THE PHILIPPINE PLATE: MARINE GEOPHYSICAL AND GEOLOGICAL STUDIES OF THE PARECE VELA BASIN, THE WEST PHILIPPINE BASIN AND THE MARIANA FORE ARC Ph.D. Thesis

Cary Louis Mrozowski 1981 214 p
Avail: Univ. Microfilms Order No. 8125353

The Parece Vela Basin, which forms much of the eastern Philippine Plate, is divided into two topographic provinces by the north-trending Parece Vela Rift. The rough western province is thinly sedimented and has a north-trending basement fabric. The eastern province is thickly blanketed by sediments derived from the West Mariana Ridge. The Parece Vela Rift is composed of discrete deeps which typically exceed 6 km in depth. Geochemical and seismic data show the basin crust to be oceanic. The oceanic West Philippine Basin forms the western half of the Philippine Plate and can be subdivided into three basins. The Mariana arc trench system is along the eastern edge of the Philippine Plate. The Mariana fore arc deepens gradually from the Mariana Ridge to the trench slope break. The sediment-smoothed seafloor is frequently offset 10 to 250 m across faults; below seafloor intrasediment and basement reflectors are also offset. The faults, which are active, are high-angle normal faults. Dissert. Abstr.

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-17742 Illinois Univ. at Urbana-Champaign.
CLIMATIC INFLUENCES OF RESIDENTIAL ENERGY CONSUMPTION Ph.D. Thesis
Stewart Jay Cohen 1981 193 p
Avail: Univ. Microfilms Order No. 8127570

A climatic index, applicable to the estimation of residential energy consumption was developed. The index is based on seasonal frequencies of upper-air (500-mb height) circulation patterns. A multivariate statical technique, principal component analysis with oblique rotation of eigenvectors was used to classify 33 years of daily 500-mb height anomaly, patterns into 30 components. Each component represents two modes, positive and inverse, thereby resulting in sixty 500-mb types. Additional aggregation procedures reduced the number of types to 48. 78% of all days were categorized by this method. Two sets of regression analyses were performed on the data base, on set using 500-mb type frequencies, the other using population weighted heating degree days (POPHDD) and unweighted heating degree days (HDD). Results show that the 500-mb type frequency is a better climatic index of long term residential natural gas consumption than either HDD or POPHDD. Dissert. Abstr.

N82-17743 Michigan State Univ., East Lansing.
MOISTURE STRESS AND MID-TROPOSPHERIC CIRCULATION PATTERNS INFLUENCING THE FOREST-PRAIRIE TRANSITION IN SOUTH CENTRAL UNITED STATES Ph.D. Thesis
William Thomas Corcoran 1981 191 p
Avail: Univ. Microfilms Order No. 8126485

The characteristics and frequency of mid-tropospheric wind patterns controlling the distribution of climate in the south central states were investigated. Two climatic variables, vapor pressure deficit (VPD) and evapotranspiration were studied. The major findings were: (1) a strong mean VPD gradient exists coincident with the southern portion of the ecotone; (2) days having the strongest VPD gradients across the southern U.S. had 500 mb flow patterns similar to the modal 500 mb pattern; (3) drought years during the 1970's did not experience an increased frequency of the modal 500 mb pattern, but did experience increased frequency of the second most frequent pattern; drought years of the 1950's were associated with greater frequency of the modal 500 mb pattern; (4) the T-mode principal components analysis was cumbersome to use with daily data; use of raw pressure height data rather than zonal anomaly value retained excess variance not contributed by wave forms in the 500 mb pressure field. Dissert. Abstr.

N82-17744*# City Univ. of New York, N. Y.
INVESTIGATION OF MODELS FOR LARGE SCALE METEOROLOGICAL PREDICTION EXPERIMENTS Final Report
Jerome Spar Jan. 1982 27 p refs
(Grant NGR-33-013-086)
(NASA-CR-168415) Avail: NTIS HC A03/MF A01 CSCL 04B

Long-range numerical prediction and climate simulation experiments with various global atmospheric general circulation models are reported. A chronological listing of the titles of all publications and technical reports already distributed is presented together with an account of the most recent reseach. Several reports on a series of perpetual January climate simulations with the GISS coarse mesh climate model are listed. A set of perpetual July climate simulations with the same model is presented and the results are described. T.M.

N82-17745# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SUBSYNOPTIC-SCALE BAROCLINIC INSTABILITY
Prakki Satyamurty, Vadlamudi BrahmanandaRao, and Antonio DivinoMoura Oct. 1981 37 p refs Submitted for publication
(INPE-2241-PRE/027) Avail: NTIS HC A03/MF A01

A linear stability of the basic states encountered in the vicinity of idealized weak thermal fronts is discussed. Vertical profiles of the basic zonal wind and potential temperature are taken to be of the hyperbolic tangent type. A Boussinesq primitive equation model with high resolution is used. Unstable modes of intermediate scales are generated when the curvature of the basic flow in the lower levels is negative. Even if the curvature in the lower levels is positive, intermediate-scale unstable modes appear for smaller static stability and shear or for certain vertical distributions of diabatic heating due to the liberation of latent heat in the lower troposphere. The amplitude of the most unstable intermediate-scale wave is confined to the lower troposphere and its growth rate increases with inclusion of diabatic heating. T.M.

N82-17746# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE SEVERITY OF THE BRAZILIAN FREEZE OF JULY 1981, AS MONITORED BY SATELLITE
Michael Allen Fortune Sep. 1981 20 p refs
(INPE-2231-RPE/398) Avail: NTIS HC A02/MF A01

The location and intensity of freezing temperature during very cold nights ('geadas') in Brazil is discussed using satellite infrared television image data. The data are needed to lay the groundwork for a short-term freeze forecast model, which is to be developed before winter 1982. A cold snap occurred on 20-22 July 1981, which destroyed a large part of the future coffee, sugar and other harvest is documented. The photographs of enhanced satellite images document the widespread occurrence of subfreezing temperature in the states of Parana, Sao Paulo, Mato Grosso do Sul, and Minas Gerais. These sub-tropical areas are located north of the region which usually experiences frost, and thus damage to agriculture was particularly extensive. The synoptic factor responsible for the cold was a wandering cold-core cut-off low in the upper air, and not a strong cold front. The data contained in the photographs, when combined with the meteorological observations also presented will be valuable in developing a prediction model for the occurrence of 'geadas'. R.J.F.

N82-17747# World Meteorological Organization, Geneva (Switzerland).
PROCEEDINGS OF THE TECHNICAL CONFERENCE ON CLIMATE: ASIA AND WESTERN PACIFIC
1981 454 p refs Conf. held at Guangzhou, China, 15-20 Dec., 1980
(WMO-578; ISBN-92-63-10578-2) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The impact of the natural variability of climate on food production, availability of water and other vital resources is of increasing importance and needs to be considered in the planning and management of a wide range of activities. The acquisition of meteorological data, weather forecasting, the application of climatic data to agriculture, and the socio-economic impact of climate are discussed. For individual titles, see N82-17748 through N82-17783.

N82-17748# World Meteorological Organization, Geneva (Switzerland).
THE WORLD CLIMATE PROGRAM
Bo R. Doeoes *In its* Tech. Conf. on Climate: Asia and Western Pacific 1981 p 39 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFR 28

This program was established in order to improve the knowledge of climate and to apply this knowledge in the planning and coordination of related activities. The extent to which climate can be predicted and man's influence on it are investigated. Methods for assessing climatic impact and the characteristics of human societies that make them especially vulnerable or resilient to climatic factors are studied. Climatological networks and the development of an international data system, which includes satellite and ground based observations is discussed. S.L.

N82-17749# Bureau of Meteorology, Melbourne (Australia).
DEVELOPMENT OF A GLOBAL SYSTEM FOR ACQUIRING AND PROCESSING CLIMATOLOGICAL DATA
D. H. Lee *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 43-69 (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFR 28

The type of data which is emphasized is what is referred to as basic long term data. That is data which are essential for the determination of the climate of a place or region. Other uses of this class of data are to assess the probability of occurrence of a specific element within a specific range of values - leading to risk assessment; or for assessing the degree of abnormality of a specific occurrence. It is essential that such basic long term data be recorded over a long period of time with homogeneous methods of observation and sampling. A global system for acquiring and processing climatological information requires that each nation provide such basic long term data. The data has to be of an acceptable level of quality and efficiently standardized so as to allow comparisons between locations in different countries. S.L.

N82-17750# Indian Meteorological Dept., New Delhi.

CLIMATIC DATA OF ASIA AND WESTERN PACIFIC, ITS AVAILABILITY, NETWORK, AND APPLICATIONS

R. P. Sarker *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 70-84 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Climate data are being preserved with sufficient care by countries in Asia and the Western Pacific. A number of climatic publications are being brought out by these countries for users. Manual methods of data scrutiny and quality control, etc., are being followed in most of these countries. The climatic data is being put to various well known applications in government organizations, public and private industry, research establishments, etc. S.L.

N82-17751# Meteorological Satellite Center, Tokyo (Japan).

METEOROLOGICAL PRODUCTS AND SOME APPLICATIONS OF GLOBAL METEOROLOGICAL SATELLITE (GMS) DATA

Seiichi Hatsukoto *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 85-104 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The role of satellite derived data is important for climate studies and it is required to improve its accuracy. Satellite derived and ship observed sea surface temperature data were compared and the results are presented. The water content in the air column has a large influence on estimates of the sea surface temperature, therefore, some improvements are introduced empirically for precipitable water. The resulting root mean square difference decreased considerably, to less than 1.5 C. Concerning the accuracy of wind vector estimation, various kinds of error sources are considered. Among them the assignment of wind level seems to have a critical effect. Satellite cloud wind estimate and rawinsonde measurements are compared and the results are summarized. S.L.

N82-17752# National Oceanic and Atmospheric Administration, Washington, D. C. Environmental Data and Information Service.

A SYSTEM FOR CROP/CLIMATE ASSESSMENT USING METEOROLOGICAL AND SATELLITE DATA

Augustine Y. M. Yao *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 105-126 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

A system of crop assessment using meteorological and satellite information is discussed. The suitability of a crop to climatic environment is analyzed, alternative crops are suggested, and methods of weather modification that reduce hazards and minimize yield losses should adverse weather occur are recommended. This methodology uses near real time meteorological and satellite information to assess crop growth. The assessment provides not only useful warnings for decision makers should adverse weather occur, but also is used with crop yield models to make necessary adjustments to model estimates. Meteorological and agricultural information is used to construct models that estimate crop yield. S.L.

N82-17753# Pakistan Meteorological Dept., Karachi.

METEOROLOGICAL EVALUATION OF WIND ENERGY POTENTIAL IN THE COASTAL BELT OF PAKISTAN

Muhammad Rahmatullah and Qazi Waliullah *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 127-138 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Recent improvements in windmill design and the automatic arrangement for the use of a rotor to turn at a low chosen wind speed requires a reappraisal of wind power potential particularly in the coastal belt of Pakistan. Wind data is analyzed to determine the prevailing wind duration within various ranges of speeds at these stations. S.L.

N82-17754# National Oceanic and Atmospheric Administration, Princeton, N. J. Geophysical Fluid Dynamics Lab.

CLIMATE MODELING

J. Smagorinsky *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 139-151 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

There is a practical end in calibrating both the real atmosphere and models. A knowledge of the natural variability is essential to estimating the sampling error when selecting a single year: for the real atmosphere this shows up, for example, in designing an observational program. For models, this shows up in comparing a single year's simulation to a long term climatological average. In trying to detect a small long term trend from observational data, it is necessary to determine if that signal is significantly large compared to the noise of natural interannual variability. Conversely, in conducting model sensitivity studies, such as a CO2 perturbation experiment, it is necessary to determine if the signal to noise ratio is sufficiently large for valid conclusions. The signal and noise levels differ for different geographical locations and with season. S.L.

N82-17755# Japan Meteorological Agency, Tokyo.

PRESENT STATUS OF LONG-RANGE WEATHER FORECASTING

Yukio Kikuchi *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 152-166 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The status of the operational implementation of long range forecasting, the current techniques and research on long range forecasting and the accuracy of operational long range forecasts are presented. The techniques are classified into the empirical method and the dynamical method. Furthermore, the empirical method is classified into the analogue method, the correlation method and the periodic extrapolation method, are described. S.L.

N82-17756# Indian Inst. of Tech., New Delhi.

TROPICAL EASTERLY JET AND CONTRIBUTION OF INTERACTING ATMOSPHERIC WAVES IN MONSOON REGION

M. P. Singh, R. K. Datta (Indian Meteorological Dept., New Delhi), and R. C. Raghava *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 167-177 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The easterly jet stream is classified into two categories. One is the type of jet stream which is sporadic in nature and occurs anywhere over the globe in the southern periphery of an anticyclone. Occassionally, during southward motion a westerly jet stream of temperature zone splits and one branch travels along the periphery of a dynamic anticyclone as northerly or northeasterly current. One flow pattern depicts a strong easterly jet associated with the establishment of a block. The flow pattern exhibiting this feature is presented. Because of the sporadic nature of this type of jet stream, they cancel out (in the mean) and, therefore, are not obviously reflected in mean conditions anywhere over the globe except that they appear only for a few days with fluctuating locations. S.L.

N82-17757# Canadian Climate Centre (Ontario).

THE NATURE AND SCOPE OF CLIMATE APPLICATIONS

Morley K. Thomas *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 178-186 (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

'Climate applications' is defined as the knowledge of how to apply climate information for the use of mankind as an aid in solving social, economic and environmental problems. The general term 'climate applications' includes both consultative and operational activities. Archived historical and statistical climate data are used in consultation work to aid in planning where capital investment and other long term considerations are involved. Climate applications consists of more than simply the provision of climate data and information. Much consultation is usually required between the climatologist and the potential user to obtain an understanding of the relationships between climate and the various socio-economic and environmental sectors. S.L.

N82-17758# United Nations Educational, Scientific and Cultural Organization, Paris (France).

CLIMATE, CLIMATE DATA, AND WATER RESOURCES

James L. Irish *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 187-198 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The trends and developments in the field of climate and water resources are emphasized. Water resources development is seen throughout Asia as an integral part of social and economic development. Alternatives are generally evaluated, often in a benefit cost framework, but also in the context of environmental impact and social consequences. National objectives have generally stressed a more oquitable distribution of the fruits of development - not only in terms of income, but also improved access to wealth and education services. This trend is welcomed, in the orientation of financial and technical assistance given to developing countries. S.L.

N82-17759# Food and Agriculture Organization of the United Nations, Rome (Italy).

CLIMATE APPLICATIONS TO AGRICULTURAL PROBLEMS

G. F. Popov *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 199-204 (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

An operational method which utilizes climatic and meteorological information for agrometeorological crop monitoring and forecasting is discussed. It is designed in such a way that it provides a first qualitative monitoring of crop conditions and allows preparation of quantitative yield assessments utilizing information from an agroclimatic data bank. The applications of the method to the following areas is discussed: (1) problems related to water (drainage, irrigation, fisheries); (2) forestry problems; (3) energy sources for agriculture; (4) analysis of past climatic data; and (5) forecasting situations influencing agricultural production and food procurement. Rainfall is cited as the single most important parameter to be considered in gathering present and future agrometeorological information. M.D.K.

N82-17760# New England Univ., Armidale (Australia). Agricultural Economics.

METEOROLOGICAL SERVICES IN AGRONOMIC AND ECONOMIC EVALUATIONS OF RISK

Jock R. Anderson *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 205-209 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Methods appropriate for reviewing new agronomic techniques are explored. The perspective is policy-oriented, towards enhancing the economic efficiency of agriculture. The focus is on the contribution to the process of evaluation that can and probably should be made by meteorology and meteorological services. Crop growth models, methods for evaluating risk in new cropping techniques, are discussed. Options for evaluation of agronomic techniques, utilizing meteorological data, are reviewed. The necessity for economic allocation for meteorological stations and the need for establishing a coarse grid of stations for enhanced economy in collection and related data processing are addressed. M.D.K.

N82-17761# Shanghai Meteorological Inst. (China).

THE STABILITY OF YIELDS IN SHANGHAI AND THE CLIMATIC CONDITIONS

Jiang De-long and Gao Shi-xiu *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 210-216 (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The effect of climatic conditions on agricultural yields in Shanghai is discussed in the context of agricultural meteorology. The stability of agricultural yields is reported in terms of climatic anomalies, interannual variations in climate, unfavorable climatic conditions in the critical growing season, and agricultural innovations necessary to account for climatic variability. Data on climatic trends is presented and considered in terms of tentative trend forecasts. M.D.K.

N82-17762# United Nations Research Inst. for Social Development, Geneva (Switzerland).

FOOD CRISES AND FAMINES: THE UNRISD FOOD SYSTEMS APPROACH

P. Spitz *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 217-226 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

An enquiry into food-climate interactions was made. The relationships between society and nature food and climate were considered. The extreme case of famines and food crises triggered by climatic fluctuation was chosen as a starting point. A Food Systems approach was formulated and applied not only to countries which still have to face periodic dramatic food situation, but also to countries which have succeeded in eliminating these crises. The Food Systems approach is discussed in terms of: seasonal variations, urban versus rural circumstances, the transfer of resources, and the present state of knowledge about food crises and famines. Increased climatic knowledge is suggested as a means for the reduction of food systems vulnerability. M.D.K.

N82-17763# Stockholm Univ. (Sweden). Dept. of Meteorology.

INCREASE OF ATMOSPHERIC CO2 AND POSSIBLE CLIMATIC CHANGES

Bert Bolin *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 227-238 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Numerous surveys of man's impact on climate, particularly the possible effects of an increasing concentration of atmospheric CO2 were made. A brief account summarizing the state of knowledge in this regard is made. Consideration is given to: (1) the characteristics of the carbon cycle and its response to man-made emissions to the atmosphere; (2) the climatic change that may be induced by an increasing amount of CO2 in the atmosphere; and (3) the likely developments over the next 50 years as a result of man's increasing exploitation of the global resources of fossil fuels and the terrestrial ecosystems. Analysis of the way in which the carbon cycle responds to disturbances due to man, i.e., fossil fuel combustion, deforestation and expansion of agriculture is considered to be of particular importance. M.D.K.

N82-17764# Leeds Univ. (England). School of Geography.

ENERGY AND CLIMATE IN SOUTH-EAST ASIA AND THE WESTERN PACIFIC

G. J. Lockwood *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 239-263 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Regional and global aspects of energy use were reviewed. The combined results of population increases, changing patterns of population densities, and escalating per capita energy consumption has concentrated in some regions of the world very large energy fluxes per unit area (energy flux density) when compared with the world average; consequences are considered. Climate is discussed as related to increasing energy use in three major areas: (1) climate as an energy source; (2) pollution of the atmosphere by energy use (waste heat and aerosols); and (3) climatic controls on energy use and the effects of climatic variations. Long term climatic changes and the attendant economic consequences of increased atmospheric carbon dioxide are discussed. Utilization of wind, water, and solar power as climate related energy sources is also considered. M.D.K.

N82-17765# National Oceanic and Atmospheric Administration, Rockville, Md. National Climate Program Office.
APPLICATIONS OF CLIMATE INFORMATION AND THE UNITED STATES NATIONAL CLIMATE PROGRAM
Edward S. Epstein *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 264-266 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The United States National Climate Program established with the purpose of assisting the Nation and the world to understand and respond to natural and man-induced climate processes and their implications is discussed. The basic strategy of the program is to emphasize early production of useful data and information based on existing knowledge of climate, while simultaneously expanding understanding of climate and its impacts on society. Three areas discussed in which progress should be made are: (1) understanding climate; (2) responding to impacts and policy implications of climate; and (3) providing climate products. The generation, dissemination and application of climate information and the creation and utilization of national data inventory and clearinghouse is also discussed. A summation of current activity areas within the program is presented. M.D.K.

N82-17766# World Meteorological Organization, Geneva (Switzerland).
STUDY OF CLIMATE AND ITS APPLIED ASPECTS
E. P. Borisenkov (USSR) and N. V. Kobysheva (USSR) *In its* Tech. Conf. on Climate: Asia and Western Pacific 1981 p 267-273 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The need for a reliable scientific basis for estimating the climate effect on the economic, biological and social aspects of society is considered. The foundation of this basis should include: knowledge of the general statistical characteristics of climate and its changeability for different regions and the whole globe and the methods for their consideration when forming a long-term plan of production development; and knowledge of the effect of climatic extremes on different aspects of economic and social life. The effect of climatic change on agriculture, on agricultural energy consumption, energy production, water resource management, and consequences of climatic variations on fish industry and human health is discussed. Methods for optimal consideration of future climate in planning man's economic activities are also discussed. M.D.K.

N82-17767# All-Union Research Inst. of Agricultural Meteorology, Moscow (USSR).
THE PROVISION OF CLIMATIC INFORMATION FOR AGRICULTURE IN THE USSR
Y. A. Khvalensky *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 274-277 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Examples of the adverse effects of climatic variability on agricultural productivity and practices are discussed. The vulnerability of agriculture to unfavorable climatic variations may be decreased by taking into account agroclimatic peculiarities of different territories. Examples of agroclimatic reference materials used for hydrometeorological support of agriculturists and for solution of practical problems in agricultural production are cited and discussed as means of decreasing agricultural vulnerability. M.D.K.

N82-17768# Central Meteorological Service, Peking (China).
ON POSSIBLE IMPACTS OF CLIMATIC VARIATIONS ON AGRICULTURE IN CHINA
Zhang Jia-cheng *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 278-288 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The impacts of climatic variation on agriculture which are significant in China are discussed. The impacts increase with their time scales and amplitudes. These impacts are discussed. The present state of agroclimate and the amplitudes of unit climatic variation and its impacts on agriculture are outlined. M.D.K.

N82-17769# Hydrometeorological Centre of the USSR (Moscow).
CLIMATE CIRCULATION PROCESSES IN SOUTH-EAST ASIA DURING WINTER MONSOON
B. S. Chuchalov *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 289-301 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

In South-East Asia the principal features of weather and climate variations are associated with seasonal migrations of the subtropical anticyclone belt in the northern and southern hemispheres, of the ITCZ zones in both hemispheres and also with the migration of extra-tropical frontal zones. Some elements of circulation processes which are needed to assess the distribution of and changes in climate conditions over South-East Asia are reviewed. Basic processes governing these climate dynamics are discussed. M.D.K.

N82-17770# World Meteorological Organization, Geneva (Switzerland).
THE NATURE OF DROUGHT AND STRATEGIES TO REDUCE ITS EFFECTS
W. J. Gibbs *In its* Tech. Conf. on Climate: Asia and Western Pacific 1981 p 302-315 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Areas in which water availability is critical and drought has a major impact are considered. These include hydroelectric and other forms of power generation, manufacturing industries, large urban communities, crop yields, and the condition and number of livestock. Four aspects of the subject examined in detail are: (1) the nature of drought, (2) frequency distributions and probability of rainfall, (3) drought impacts, and (4) strategies to reduce drought impacts. The manner in which man uses available water together with the occurrence of severe rainfall deficiencies and attendant social and economic repercussions are considered. M.D.K.

N82-17771# Andhra Univ., Waltair (India). Dept. of Meteorology and Oceanography.
THE SUMMER MONSOON RAINS OVER SOUTH AND EAST ASIA AND WEST PACIFIC
I. Subbaramayya, O. S. R. U. BhanuKumar, and S. V. Babu *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 316-333 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

A comprehensive review, intended to focus attention on some important aspects of the summer monsoon rains, is presented. Studies regarding the atmospheric circulation change in the troposphere in relation to the advance of the monsoon over India are described. Advance of the monsoon in relation to the surface circulation changes, in particular the ITCZ, as a case study during MONEX period is presented. N.W.

N82-17772# Academy of Science of Water Conservancy and Electric Power, Beijing (China).

ANALYSIS OF DROUGHT OCCURRENCE AND LONG-TERM VARIATION OF ANNUAL STREAMFLOW IN EASTERN REGIONS OF CHINA

Chen Jiaqi and Shen Zhenrong IN WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 334-340 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Deficiencies of monthly rainfall at several raingauge stations are shown. A drought day is defined in the sense of agricultural production, when the soil moisture content begins with less than the required moisture for the main vegetation in certain districts. Historical accounts covering nearly 400 years were analyzed. Several regions of drought are evident. Successive water shortage periods, reflected in annual streamflow of large rivers, is found. N.W.

N82-17773# World Meteorological Organization, Geneva (Switzerland).

CLIMATIC CHANGE AND SOCIAL DISTURBANCE

Koichiro Takahasni *In its* Tech. Conf. on Climate: Asia and Western Pacific 1981 p 341-349 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The relationship between climate and society is analyzed statistically and objectively by expressing climatic change and social disturbance in terms of certain indices. Single decade mean values of middle latitude temperatures are estimated based on actual observations for recent years and on tree ring widths and historical records of famines, ice conditions, freezing, etc., for ancient periods. Social disturbances are calculated, assuming within stated limits that the relative length of historical descriptions is a measure of social upheaval. These values are then analyzed to determine the relationship between geomagnetic disturbances and air pressure. N.W.

N82-17774# National Center for Atmospheric Research, Boulder, Colo. Environmental and Societal Impacts Group.

YAKIMA (WASHINGTON) STREAMFLOW FORECAST STUDY: THE IMPACT OF AN ERRONEOUS FORECAST

Michael H. Glantz *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 350-359 (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

An erroneous streamflow forecast in which the water supply was underestimated by 50% is discussed. Benefits gained each year from 'accurate' forecasts, results suggest, might easily be overshadowed by just one erroneous forecast. Forecasters had balanced out 'return flow' with some relatively minor allocation to other irrigation projects. When they divided the available water supply based on their model outputs they did not take return flow into account as part of the water supply available for the allocation. N.W.

N82-17775# Kyoto Univ. (Japan). Inst. of Geophysics.

CHANGE OF GLOBAL CLIMATE DURING RECENT 100 YEARS

Ryozaburo Yamamoto *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 360-375 refs Sponsored by Japanese Ministry of Education (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The Northern Hemisphere mean surface air temperature of the past 100 years (including errors) is analyzed. The 30 year mean shows a warming from the late 19th century to the decade of the 1940s, and thereafter a cooling, starting about 1940. Confirmation of the cooling effects of volcanic eruptions is attempted, utilizing the year to year changes of the Northern Hemisphere mean temperature. Computation of volcanic loading in the stratosphere is made for the past 100 years. N.W.

N82-17776# Beijing Univ. (China). Dept. of Geophysics.

FURTHER STUDIES ON THE CLIMATIC CHANGE DURING HISTORICAL TIMES IN CHINA

Wang Shao-wu, Zheng Pei-yuan (Academia Sinica, China), and Zhang De-er (Central Meteorological Service) *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 376-393 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

An understanding of climatic change is one of the central issues society must address. It is important to reconstruct past climate, because estimating future climate must be based upon understanding of the past. Methods used in reconstructing past climate vary with the interested time scale. Based on numerous historical material, a consistent picture of the main outline of climatic variations in China during the past 5000 years is mentioned. In China, many records about natural calamities and agricultural damages have been kept in historical writings and voluminous local historical books. Recently meteorological and scientific research institutes and universities co-operated in a systematic compilation of the vast amount of climatic material in literature written in the last 500 years. Consequently, the annual distribution maps of dryness and wetness since 1470 were constructed and a winter temperature index series has been obtained. These have made it possible to take a closer view of climatic variations during recent centuries. N.W.

N82-17777# Tsukuba Univ. (Japan). Inst. of Geoscience.

REGIONALITY OF CLIMATIC CHANGE IN MONSOON ASIA

Masatoshi M. Yoshino and Kazuko Urushibara (Ashikaga Inst. of Technology, Japan) *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 394-410 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Regional differences in climatic changes are of importance to establish the counter-measure for damage by anomalous climate on agricultural production. It is not unusual to suffer floods in some regions and droughts in the nearby regions at the same time. This paper deals mainly with the regionality of climatic changes in East Asia during the recent years, using the year climate method expressed by the Koppen's system of climatic classification. Occurrence frequencies of year climate during the last 100 years were calculated for the four stations: Hong Kong, Manila, Shanghai and Tokyo. The results were compared with the distribution types of winter temperature and summer precipitation in China. A schema of the regionality of climatic fluctuation in East and Southeast Asia was given in relation to the upper-air streams. N.W.

N82-17778# United Nations Educational, Scientific and Cultural Organization, Paris (France). Intergovernmental Oceanographic Commission.

LARGE-SCALE OCEANOGRAPHIC VARIATIONS IN THE WESTERN NORTH PACIFIC

Koichi Nagasaka *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 411-418 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Long-term variations of the oceanographic conditions in the western equatorial Pacific are presented based upon the data obtained from the repeated hydrographic observations along the meridian at 137 deg E. Some of their effects on atmospheric events in the western Pacific area are discussed. N.W.

N82-17779# Hydrometeorological Centre of the USSR (Moscow).

OCEAN'S ROLE IN PROCESSES OF SHORT-RANGE CLIMATIC VARIATION FORMATION

S. A. Musaelyan *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 419-427 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Contributions of initial data and external energy sources to the numerical weather prediction over various time scales are examined, along with the oceanic heat memory and the oceanic cloud cover. The results cited show that there exists a close negative asynchronous relationship between the summer anomalies in cloudiness over the North Atlantic and the deviations from the normal winter air temperatures over the European area of the U.S.S.R. This means that the heat absorbed and accumulated by the oceanic active layer during the warm half-year is conserved in the depths of the ocean for a long time and is given back to the atmosphere in winter months. J.M.S.

N82-17780# AARI, Leningrad (USSR).
OCEAN INFLUENCE ON CLIMATE FORMATION AND CHANGES
A. I. Voskresensky and Y. V. Nikolayev *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 428-432 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The role of the ocean in climate formation is addressed with emphasis on solar heat accumulation and ocean currents. Differences in the thermal regime of the ocean surface in comparison to the atmosphere and land, the transport of heat to high latitudes, and hypotheses concerning the causes of climatic variations and the role of the ocean in those variations are discussed. J.M.S.

N82-17781# Kyoto Univ. (Japan). Centre for Southeast Asian Studies.
THE IMPACTS OF CLIMATIC CHANGE ON HUMAN SOCIETY
Shinichi Ichimura *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 433-438 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The interrelationships between climatic conditions and human socio-economic activities are examined. A schematic presentation is given of the effects of climatic variations in temperature, wind, precipitation, and ecological balance. Primary effects are observed in four fields of human activity: agriculture, industry, household, and society. Secondary effects, or the response to climatic variations are shown to be more serious than the primary effects. These secondary effects include development patterns, demographic mobility, socio-political effects, and international relations. Emphasis is given to agricultural production and socio-political impacts and international relations. J.M.S.

N82-17782# ESCAP, Bangkok (Thailand).
EFFECT OF CLIMATE ON THE DEVELOPMENT OF NATURAL RESOURCES IN ASIA
B. X. Zheng *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 439-445 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Since climate is considered to be a consequence of average values in the basic meteorological elements of temperature, moisture, wind, pressure, and evaporation, these average values are used to develop a general criterion for use in planning and managing the development of natural resources. Emphasis is placed on early recognition that an abnormal climatic cycle may be developing and an accurate weather forecast to pinpoint the location and geographic extent of the disaster. The interrelationships between climate and development are addressed in the following areas: human resources, animal and range resources, agricultural resources, forest resources, fishery resources, water resources, mineral resources, and energy resources. J.M.S.

N82-17783# Clark Univ., Worcester, Mass. Center of Technology, Environment and Development.
IMPROVING THE SCIENCE OF CLIMATE IMPACT STUDY
Robert W. Kates *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 446-449 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The interrelationships between climate, nature, and society are explored. Models of the interrelationships are discussed and the elements of study are described. These elements include: climate events, the identification of targets or receptors of impacts and exposure, the type of impacts or consequences to be considered, and the extent of their propagation through human socio-economic and political systems. Emphasis is placed on application of climatic data to productive human activity and to the mitigation of hazardous events. J.M.S.

N82-17784# Meteorology Research, Inc., Altadena, Calif.
NATURAL AND HISS CLOUD DROPLET DATA AS SAMPLED DURING THE 1980 - 1981 AEFA/SAINT PAUL FIELD PROGRAM Final Report, Jan. - Mar. 1981
M. E. Humbert, L. D. Dzamba, and S. M. Callander Sep. 1981 197 p refs
(Contract DAAK51-81-C-0005; DA Proj. 1L2-63209-D-103)
(AD-A107577; MRI-81-FR-1813) Avail: NTIS HC A09/MF A01 CSCL 04/2

During the months of January, February, and March 1981, the US Army Aviation Engineering Flight Activity (AEFA) conducted natural and artificial icing tests in the vicinity of St. Paul, Minnesota. The natural events involved exposure of a fully instrumented JUH-IH 'Huey' and a UH-60A 'Black Hawk' helicopter to extended periods of flight in supercooled stratiform clouds. The artificial portion of the testing required the same aircraft to fly in the cloud produced by the helicopter icing spray system (HISS) aboard a CH-47C 'Chinook' helicopter. The tanker cloud was sampled at various water flow rates, air speeds, humidities and temperatures. During the test period, each sampling helicopter was equipped with droplet sizing instrumentation. GRA

N82-17785# TRW Defense and Space Systems Group, Redondo Beach, Calif. Engineering Sciences Lab.
ANALYTIC MODELING OF SEVERE VORTICAL STORMS Final Report, 9 Jul. 1980 - 31 Dec. 1981
George Carrier, Francis E. Fendell, and Phillip Feldman Oct. 1981 58 p refs
(Contract N00014-79-C-0508)
(AD-A107706; TRW-35524-6002-UT-00) Avail: NTIS HC A04/MF A01 CSCL 04/2

The analytic modeling of well-organized rotating convective storms is invoked to elucidate the evolution from a moderately intense one-cell vortex, characterized by low-level pressure deficits on the order of one percent of atmospheric pressure, to a very intense two-cell vortex, characterized by low-level pressure deficits on the order of ten percent of atmospheric pressure. The physical distinction between the two stages rests on the insertion of a dry, compressionally heated, nonrotating, central downdraft of originally tropopause-level air in the transition to the more severe case. The quasisteady nature description of the thermohydrodynamic structure of each vortex is being developed, and then the conditions for transition from the moderately intense to the very intense vortex will be sought. The practical motivation is to make progress toward the highly desirable, but very formidable task of being able to anticipate which tropical storms or minimal hurricanes will evolve to supertyphoons. With a description of the one-cell storm, believed adequate for present purposes, already available, description of the two-cell vortex is the current challenge. GRA

N82-17786# Naval Environmental Prediction Research Facility, Monterey, Calif.
A VERIFICATION STUDY OF THE IMPROVED REGIONAL RAPID ANALOG SYSTEM (IRRAS) Final Report
L. Robin Brody Sep. 1981 54 p
(W0513CC0)
(AD-A107647; NEPRF-TR-81-05) Avail: NTIS HC A04/MF A01 CSCL 04/2

An analog system designed to make midrange regionalized forecasts is described. The analog system uses a unique historical data base which has been formulated to reduce data handling while speeding up analog matching procedures. Tuning and verification of the system are carried out for the Greater Mediterranean region. Verification results indicate that this analog system does not perform significantly better than either persistence type forecasting or forecasts produced by the current operational FNOC (Fleet Numerical Oceanography Center) analog. Possible causes for these results are discussed. Included as an appendix is a discussion of an analog-matching technique which, using the same unique historical data base, is designed to estimate the current meteorological conditions for any possible silent data area. An experiment is described which tests the adequacy of this data base to produce matching analogs for a region covering the western U.S.S.R. Results indicate that there will have to be a substantial improvement in the historical data base if acceptable analogs are to be found. Author (GRA)

N82-17787# Aircraft Research and Development Unit, Edinburg (Australia).

MEAN ATMOSPHERIC CONDITIONS: AUSTRALIAN TROPICAL OPERATING CONDITIONS

G. Gartrell Oct. 1981 12 p refs
(AD-A107904; ARDU-TN-Aero-72; AR-002-477) Avail: NTIS HC A02/MF A01 CSCL 04/2

The ARDU mean tropical atmosphere differs significantly from the ICAO standard atmosphere and is based upon data gathered prior to 1965. More recent data have been considered in a reassessment of the validity of the ARDU atmosphere. The new data support the retention of both the ARDU tropical atmosphere and the ICAO atmosphere to describe mean conditions in their respective regions of application. It is recommended, however, that where extreme operating conditions for the Australian region are required, reference should be made to DEF(AUST) 5168 Part II Air Operations. Author (GRA)

N82-17788# Alfa Sierra Urfysik, Darmstadt (West Germany).

THE EXPLANATION OF BALL LIGHTNING [DIE ERKLAERUNG DES KUGELBLITZES]

Alfred Seeger 1 May 1981 9 p In GERMAN
Avail: NTIS HC A02/MF A01

The phenomenon and origins of ball lightning are examined. Ball lightning is an electrically activated minitornado and its interference with spacecraft and aeronautics is discussed. The thermal explosions of the conduit, the skin effect and the electric repulsion of equal charges, causes the electrical storm to separate into a nuclear storm which is carried by the heavy and positive ion atoms, and a convection current carried by the lighter negative electrons. Through rolling friction with the surrounding air, a minitornado like a ball lightning has considerable momentum, which finally absorbs its energy content. Because of the greater friction with the faster medium like air, the ball lightning moves preferably along extensive walls, until it finally replaces sizes, corners and peaks like a soap bubble with mostly absorbed energy. Transl. by E.A.K.

N82-17789# Danish Meteorological Inst., Copenhagen. Dept. for Climatology.

A STATISTICAL ANALYSIS OF MONTHLY PRECIPITATION IN DENMARK

Peter Allerup 1981 33 p refs
(DMI-CLIMATOL-PAPERS-7; ISBN-87-7478-100-1) Avail: NTIS HC A03/MF A01

Data from 44 weather stations are analyzed in an attempt to establish a statistical model which explains monthly precipitation variation throughout the country, and the variation of the precipitation in one place studied over a period of time. No comprehensive explanation is found, but the use of a normal distribution model for residual variation reveals a series of structural facts e.g., a simple additive structure in the log values, stating that the expected logarithmic precipitation at a station can be calculated as a sum of a site specific parameter and a time specific parameter which is different for different months. Author (ESA)

N82-17790# World Meteorological Organization, Geneva (Switzerland).

WORLD WEATHER WATCH TROPICAL CYCLONE PROGRAM. TYPHOON OPERATIONAL EXPERIMENT (TOPEX): AUTOMATIC WEATHER STATIONS FOR TROPICAL CYCLONE AREAS

1981 73 p
(WMO-570; ISBN-92-63-10570-1) Avail: NTIS MF A01; print copy available at WMO, Geneva

Design and operation details necessary for developing countries with suitable sites for automatic weather stations in order to obtain data for tropical cyclone detection and warning are presented. Assessment of various surface meteorological parameters for tropical cyclone monitoring is explained. Selection of sensors, associated components, and automatic weather station platforms is discussed. Automatic data transmission and remote display are covered. Utilization of satellites for data collection and transmission is also considered. Data recording and quality control objectives are mentioned. Classification procedures, supervision and systems improvement are described. Author (ESA)

N82-17791# Minority Services, Inc., Washington, D.C.

PUBLIC REQUIREMENTS FOR WEATHER INFORMATION AND ATTITUDES CONCERNING WEATHER SERVICE

Joel M. Reaser Jun. 1981 133 p
(Grant NA80SA-C-00654)
(PB82-109117; NOAA-81081302) Avail: NTIS HC A07/MF A01 CSCL 04B

Public requirements for weather information was determined. The purpose of the project is to improve services. The data were collected by a telephone interview survey of a statistically representative sample of some 1300 respondents throughout the country interviewed between September 23 and October 7, 1980. GRA

N82-17792# National Oceanic and Atmospheric Administration, Washington, D. C. National Earth Satellite Service

PUBLICATIONS AND REPORTS ON CONTRACTS AND GRANTS, 1980 Final Report

Nancy A. Everson May 1981 19 p refs
(PB82-103219; NOAA-TM-NESS-115; NOAA-81072202) Avail: NTIS HC A02/MF A01 CSCL 04B

This bibliography cites the titles and authors of 122 articles and reports published by or for the National Earth Satellite Service (NESS). The first section includes publications by NESS staff members and the second section includes final reports on contracts and grants sponsored by NESS. GRA

N82-17793# Atmospheric Turbulence and Diffusion Lab., Oak Ridge, Tenn. Air Resources Labs.

AN ANALYSIS OF WANGARA MICROMETEOROLOGY: SURFACE STRESS, SENSIBLE HEAT, EVAPORATION, AND DEWFALL

B. B. Hicks Jun. 1981 43 p refs Sponsored by NOAA
(PB82-114190; NOAA-TM-ERL-ARL-104; NOAA-81081902) Avail: NTIS HC A03/MF A01 CSCL 04B

Eddy fluxes and gradients for the Wangara experiment and earlier investigation of flux gradient relations used to derive values of the sensible heat flux and friction velocity appropriate to the general area of the Wangara experiment rather than to the considerably smoother central site were reported. Friction velocities appear to be considerably greater than those developed in previous studies of the Wangara data set. Sensible heat fluxes are similar during daytime, but differ greatly from other estimates for night. Dewfall evaluations indicate a total of about 9 mm during the experiment; condensation occurred at the theoretical maximum rate of about 0.07 mm/hr. Maximum dewfall occurred under clear skies and in moderate winds. GRA

N82-17794# National Severe Storms Lab., Norman, Okla.

MULTIPLE DOPPLER RADAR ANALYSIS OF SEVERE THUNDERSTORMS: DESIGNING A GENERAL ANALYSIS SYSTEM

R. A. Brown, C. R. Safford, S. P. Nelson, D. W. Burgess, W. C. Bumgarner, M. L. Weible, and L. C. Fortner Jun. 1981 34 p refs Sponsored by NOAA, DOE, FAA and Nuclear Regulatory Commission
(PB82-114117; NOAA-TM-ERL-NSSL-92; NOAA-81081905) Avail: NTIS HC A03/MF A01 CSCL 04B

Synthesis and analysis of data acquired by multiple Doppler radars proceed in stages of editing, data interpolation to grid points, synthesis of data for definition of three dimensional flow, calculation of kinematic parameters, and display of analyzed data. The procedure for designing such an analysis system is described in the report. GRA

N82-17795# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.

METEOROLOGICAL SETTINGS ASSOCIATED WITH SIGNIFICANT CONVECTIVE STORMS IN COLORADO

R. A. Maddox, D. M. Rodgers, W. Deitrich, and D. L. Bartels

Jun. 1981 85 p refs
(PB82-106238; NOAA-TM-ERL-OWRM-4) Avail: NTIS HC A05/MF A01 CSCL 04B

A climatology of Colorado severe convective storms, those that produce damaging hail, damaging winds, tornadoes or flash floods, was developed. It is shown that Colorado's severe storm season occurs considerably later in the year than it does in the central and eastern United States. The meteorological settings that lead to severe storms are reviewed and a number of recent significant events are analyzed. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-17796 Wisconsin Univ. - Madison.
THE CHARACTERIZATION AND EVOLUTION OF CARBONATE TIDAL DELTAS, UPPER FLORIDA KEYS Ph.D. Thesis
David Samuel Charlton 1981 421 p
Avail: Univ. Microfilms Order No. 8117507

South Florida was inundated by the last sea-level rise, initiating tidal exchange between Florida Bay and the open ocean at bedrock lows along the Florida Keys. Carbonate tidal deltas, composed of mangrove peat and carbonate sediments, formed during the last 5000 years seaward and bayward of tidal channels at Snake Creek, Whale Harbor and Tavernier Creek. The carbonate tidal delta system at Snake Creek is emphasized. Six surface depositional zones of the Snake Creek bayside delta and diagnostic elements recognized in cores, representing environmental gradients from most restricted circulation to more open marine conditions are discussed. Dissert. Abstr.

N82-17797 California Univ., San Diego.
TIDAL VARIABILITY IN THE CURRENT AND TEMPERATURE FIELDS ON THE SOUTHERN CALIFORNIA CONTINENTAL SHELF Ph.D. Thesis
Alan Wayne Bratkovich 1981 129 p
Avail: Univ. Microfilms Order No. 8125436

Observations were analyzed in the tidal frequency band (.6-6 cpd). The seasonal variability of the temperature and horizontal velocity component fields for this frequency band is characterized both in terms of mean variance statistics and changes in the power spectra. Energetic tidal peaks were observed centered at frequencies of 1, 2, 3 and 4 cpd which are cuspate in appearance. The bandwidth of the peaks is approximately 0.2 cpd. Spatial patterns in the velocity and temperature fields vary in amplitude and phase over vertical and horizontal spatial scales comparable to the local depth and shelf width respectively. The vertically averaged cross shelf mass transport associated with semidiurnal and diurnal cross shelf currents is sufficient to sustain tidal sea surface elevation changes. The total cross shelf mass exchange is found to be about three times larger than the net mass flux at tidal frequencies. Dissert. Abstr.

N82-17798*# Old Dominion Univ., Norfolk, Va. Dept. of Oceanography.
THE RELATIONSHIP AMONG SEA SURFACE ROUGHNESS VARIATIONS, OCEANOGRAPHIC ANALYSES, AND AIRBORNE REMOTE SENSING ANALYSES Final Report, 16 May - 31 Oct. 1981
George F. Oertel and Terry L. Wade Dec. 1981 252 p refs
(Grant NAG1-189)
(NASA-CR-168444; TR-81-2) Avail: NTIS HC A12/MF A01 CSCL 08C

The synthetic aperture radar (SAR) was studied to determine whether it could image large scale estuaries and oceanic features such as fronts and to explain the electromagnetic interaction between SAR and the individual surface front features. Fronts were observed to occur at the entrance to the Chesapeake Bay. The airborne measurements consisted of data collection by SAR onboard an F-4 aircraft and real aperture side looking radar (SLAR) in Mohawk aircraft. A total of 89 transects were flown. Surface roughness and color as well as temperature and salinity were evaluated. Cross-frontal surveys were made. Frontal shear and convergence flow were obtained. Surface active organic materials, it was indicated, are present at the air-sea interface. In all, 2000 analyses were conducted to characterize the spatial and temporal variabilities associated with water mass boundaries. N.W.

N82-17799*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SENSITIVITY OF A CLIMATOLOGICALLY-DRIVEN SEA ICE MODEL TO THE OCEAN HEAT FLUX
Claire L. Parkinson and Michael R. Good Jan. 1982 34 p refs
(NASA-TM-83877) Avail: NTIS HC A03/MF A01 CSCL 08L

Ocean heat flux sensitivity was studied on a numerical model of sea ice covering the Weddell Sea region of the southern ocean. The model is driven by mean monthly climatological atmospheric variables. For each model run, the ocean heat flux is uniform in both space and time. Ocean heat fluxes below 20 W m to the minus 2 power do not provide sufficient energy to allow the ice to melt to its summertime thicknesses and concentrations by the end of the 14 month simulation, whereas ocean heat fluxes of 30 W m to the minus 2 power and above result in too much ice melt, producing the almost total disappearance of ice in the Weddell Sea by the end of the 14 months. These results are dependent on the atmospheric forcing fields. E.A.K.

N82-17800# Naval Oceanographic Office, Bay St. Louis, Miss.
VARIATIONS IN THE THERMAL STRUCTURE AND WIND FIELD OCCURRING IN THE WESTERN INDIAN OCEAN DURING THE MONSOONS Technical Report, Oct. 1975 - Dec. 1979
John G. Bruce Aug. 1981 177 p refs
(Contracts N00014-74-C-0262; N00014-79-C-0262; Grant NSF ATM-74-2226; NR Proj. 083-004)
(AD-A107761; NOO-TR-272) Avail: NTIS HC A09/MF A01 CSCL 08/3

The changes occurring in the temperature field in the Somali Basin and off the Arabian coast were monitored by a time series of temperature sections obtained along the tanker sea lane offshore. The development and decay of the large eddy (up to roughly 600 km in diameter) and its smaller associated eddies were observed each southwest monsoon. Strong horizontal thermal gradients particularly in the upper 200 m occurred at the eddy boundaries; currents in this region can attain velocities up to 7 knots. Monthly wind stress clearly shows the southwest monsoon from May through September to be considerably stronger than the northeast monsoon with maximum in January. Maps of wind stress curl during the southwest monsoon show a large region of negative curl to the northeast off the Somali coast, whereas a region of a high positive curl occurs off the Arabian peninsula and in a small band off the Somali east coast north of 5 N. Sverdrup mass transports of up to 40 x 10 to the -12th g/sec to the north off the Somali coast are in rough agreement with observed values. GRA

N82-17801# Naval Research Lab., Washington, D. C.
UNDERWATER FLOW VISUALIZATION METHODS IN THE UPPER LAYER OF THE OCEAN Interim Report
J. R. McGrath, C. M. Gordon, D. Greenwalt, A. Schuetz, M. Long, and C. F. Dohne (Science Applications, Inc., McLean, Va.)
22 May 1981 67 p refs
(RR0310441)
(AD-A107919; NRL-MR-4509) Avail: NTIS HC A04/MF A01 CSCL 08/3

A unique approach to measuring shear in the ocean has been developed. The approach involves dye tracing to determine the presence and location of shear in water velocity profiles and underwater photography as the data acquisition technique. Subsequent application of photogrammetric techniques is shown to be feasible and puts the observations on a quantitative footing. The advantage of underwater flow visualization over conventional (free-fall) shear measurements is that the result provides graphic evidence of fluid motion and its subsequent evolution. This approach should lend itself to both new and/or improved models of the upper ocean. Author (GRA)

N82-17802# European Space Agency, Paris (France).
SEA STATE MEASUREMENT WITH A TWO FREQUENCY SCATTEROMETER (THEORY)
Michael Kleintz Dec. 1981 177 p refs Transl. into ENGLISH of "Seegangsbestimmung mit dem Zweifrequenz-Scatterometer (Theoretische Grundlagen)" Rept. DFVLR-FB-80-32 Oberpfaffenhofen, West Germany, May 1980 Original report in GERMAN previously announced as N81-22675
(ESA-TT-710; DFVLR-FB-80-32) Avail: NTIS HC A09/MF A01; DFVLR, Cologne DM 31,20

In the context of the Spacelab program, sea state measurements with a two frequency scatterometer are considered. A system analysis of two frequency scatterometry, especially signal analysis for stationary and airborne (aircraft; satellite) measurements, is presented, and an unambiguous method for wind direction determination is given. A statistical model of sea state, based on the frequency spectrum of the water wave height distribution, is used. The radar echo from the sea surface is characterized for a monochromatic ouptut signal. An autocorrelation function is developed, and application in consideration of the Doppler spectrum of the sea surface reflectance function is shown.
Author (ESA)

N82-17803# National Oceanic and Atmospheric Administration, Rockville, Md. Ocean Technology and Engineering Services.
ERROR ANALYSIS OF PULSE LOCATION ESTIMATES FOR SIMULATED BATHYMETRIC LIDAR RETURNS
Gary C. Guenther and Robert W. L. Thomas Jul. 1981 59 p refs Prepared in cooperation with EG and G Washington Analytical Services Center, Inc., Rockville, Md.
(PB82-109448; NOAA-TR-OTES-1; NOAA-81081101) Avail: NTIS HC A04/MF A01 CSCL 08J

A Poisson count simulator is used to generate precision and offset results for the estimated temporal location of quantum limited laser pulses. Pulse sizes, shapes, and charge integration times are varied over appropriate ranges. A number of location estimators including variations on peak, centroid, and threshold detectors are examined. Comparisons with experimental results are presented. Hardware and software design parameters of an airborne lidar hydrography system are discussed. GRA

N82-17804# Rhode Island Univ., Narragansett. School of Oceanography.
NEARSHORE MARINE TRACE METAL GEOCHEMISTRY Final Report
Michael L. Bender Aug. 1981 102 p refs
(Grant EPA-R-803243)
(PB82-109372; ERLN-X11; EPA-600/3-81-050) Avail: NTIS HC A06/MF A01 CSCL 08J

Aspect of the nearshore geochemistry of trace metals which give information on consequences of trace metal pollution attending nearshore waste disposal are summarized. The distribution of dissolved and particulate trace metals in the Hudson River Estuary; pore water nutrient, carbon and metal geochemistry in Narragansett Bay; trace metal adsorption in Narragansett Bay sediments; and benthic fluxes of transition metals out of Narragansett Bay sediments. GRA

N82-17805# National Bureau of Standards, Boulder, Colo. Wave Propagation Lab.
RECOVERING OCEAN WAVEHEIGHT FROM HF RADAR SEA ECHOES DISTORTED BY IMPERFECT IONOSPHERIC REFLECTION
T. M. Georges, J. W. Maresca, C. T. Carlson, J. P. Riley, R. M. Jones, and D. E. Westover May 1981 156 p refs
(PB82-113283; NOAA-TM-ERL-WPL-73; NOAA-81081901) Avail: NTIS HC A08/MF A01 CSCL 08C

A real-time signal processing package to collect high-quality sea-echo Doppler spectra under many different ionospheric conditions found in nature was developed. Graphical displays and objective quality indices help the radar operator sort undistorted spectra from those distorted by imperfect ionospheric reflection, so that ocean wave height can be reliably estimated while the data are being collected. The package can be used either off-line on archival data or for on-line adaptive processing of radar data as part of an ocean-scanning strategy.
Author (GRA)

N82-17806# National Oceanic and Atmospheric Administration, Washington, D. C. Environmental Data and Information Service.
BRINE DISPOSAL IN THE GULF OF MEXICO: PROJECTED IMPACTS FOR WEST HACKBERRY BASED ON BRYAN MOUND EXPERIENCE
Jun. 1981 90 p refs
(PB82-109513; NOAA-81080702) Avail: NTIS HC A05/MF A01 CSCL 08A

Brine discharge into the Gulf of Mexico from the Strategic Petroleum Reserve West Hackberry facility, Cameron Parish, Louisiana is investigated in terms of its environmental effects. Projected impacts on brine disposal on the nearshore marine environment are presented because of post-discharge experience and knowledge gained from the Bryan Mound, Texas brine disposal site which has been operational for one year. Based on Bryan Mound discharge experience, brine disposal at West Hackberry is projected to have minimal impact on the biota and sediment and water quality.
Author (GRA)

N82-17807# Office of Technology Assessment, Washington, D. C.
TECHNOLOGY AND OCEANOGRAPHY: AN ASSESSMENT OF FEDERAL TECHNOLOGIES FOR OCEANOGRAPHIC RESEARCH AND MONITORING
Jun. 1981 172 p refs
(PB82-101718; OTA-O-141; LC-81-600086) Avail: NTIS HC A08/MF A01 CSCL 08J

This report was intended to provide Congress with a useful structure to evaluate both ongoing ocean programs and new initiatives, especially those that involve costly and complex technologies. The assessments describes the status of technologies in use today, such as research ships, submersibles, buoy systems, aircraft, and satellites. It analyzes future problems and opportunities and examines the Federal agencies and programs charged with conducting oceanic studies and providing the necessary management and hardware systems. GRA

N82-17808 Columbia Univ., New York.
THE THERMO-MECHANICAL PROPERTIES OF THE OCEANIC LITHOSPHERE Ph.D. Thesis
John Howard Bodine 1981 338 p
Avail: Univ. Microfilms Order No. 8125251

The oceanic lithosphere is observed to have sufficient intrinsic strength to support the weight of large seamounts, undersea volcanoes, and oceanic islands for long periods of time. The support of these features appears to be accommodated by regional isostatic compensation related to flexure of the lithosphere. While the evidence for the flexure of the lithosphere can be successfully analyzed using a simple elastic plate model, rheological considerations and observations of flexure at some trenches indicate that an elastic processes play an important role in the response of the plate. Observations of the bending of the oceanic lithosphere may be compared to flexure predicted by a model of the lithosphere in which the rheology is determined from the results of experimental rock mechanics. Model results relate the mechanical properties of the oceanic lithosphere to the thermal structure of the lithosphere.
Dissert. Abstr.

N82-17809 California Univ., San Diego.
AN ACTIVE SOURCE ELECTROMAGNETIC METHOD FOR PROBING THE EARTH'S ELECTRICAL CONDUCTIVITY STRUCTURE BENEATH THE OCEAN FLOOR Ph.D. Thesis
Peter David Young 1981 255 p
Avail: Univ. Microfilms Order No. 8125446

The electrical conductivity structure of the basement rocks in the area of the East Pacific Rise at 21 deg N latitude. The source was a length of cable, insulated except for bared ends, deployed on the sea floor and powered from shipboard; this antenna, once straightened and oriented by dragging on the bottom, formed an end grounded horizontal dipole source. Through this antenna were fed a number of different tailored waveforms, which between them gave transmissions at the frequencies 0.25 Hz, 0.50 Hz, 0.75 Hz, 1.50 Hz, and 2.25 Hz with roughly equal dipole strengths on the order of 25,000 ampere-meters. Results show conductivity roughly on the order of that of seawater immediately beneath the seafloor, and a fairly thick region with a conductivity less than .004 S/m no more than 1.5 kilometers

under the seafloor and falling below .001 S/m at depths on the order of 5 to 8 kilometers; for greater depths a reasonable interpretation of the inversion results on the basis of geophysical arguments gives a continued rise with increasing depth.
Dissert. Abstr.

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-17810 Rush Univ., Chicago, Ill.
SOME MECHANISMS OF CALCIUM TRANSPORT BY THE CARDIAC SARCOLEMMA Ph.D. Thesis
Ronald F. Ledvora 1981 80 p
Avail: Univ. Microfilms Order No. 8124733

Purified sarcolemmal membrane vesicles were prepared from frozen dog heart ventricles by a combination of differential and sucrose step gradient ultracentrifugation. The Ca ++ flux measurements were made using a rapid filtration technique. About 80 percent of the Ca(++) accumulated by Na(+)/Ca(++) exchange or Ca(++)/Ca(++) exchange could be released as free Ca(++), while up to 20 percent was probably bound. The mechanisms for Na(+)/Ca(++) exchange and Ca(++)/Ca(++) exchange are located in the sarcolemmal membrane of cardiac muscle cells. Both processes transport freely-exchangeable Ca(++) across the membrane. Electrogenic Na(+)/Ca(++) exchange may influence the excitability of the cardiac muscle cell. Both processes are probably carrier mediated transport mechanisms, although not by the same carrier. Both Na(+)/Ca(++) exchange and Ca(++)/Ca(+) exchange probably play important roles as Ca(++) homeostatic mechanisms in the cardiac muscle cell.
Dissert. Abstr.

N82-17811 Illinois Univ. at Urbana-Champaign.
THE STRUCTURE AND FUNCTION OF CHLOROPHYLL-PROTEINS IN PHOTOSYSTEM 1 AND THE LIGHT HARVESTING COMPLEX OF PHOTOSYSTEM 2 Ph.D. Thesis
John Emerson Mullet 1980 150 p
Avail: Univ. Microfilms Order No. 8127654

The functional units of chloroplast membranes which mediate photosynthetic electron transport from water to NADP are structurally organized into integral complexes. Two of these membrane-bound complexes, Photosystem I (PSI) and Photosystem II (PS II), consist in part of chlorophyll proteins. Photosystem I complexes were isolated by a technique which allowed purification of PSI which retained characteristics attributed to PS I in vivo. The purified PS I complexes were further fractionated by detergent treatment and PS I complexes which were depleted of chlorophyll proteins were isolated. The major chlorophyll-protein of chloroplast membranes which is structurally organizing into light harvesting complexes associated with PS II was isolated and characterized and its role in thylakoid adhesion tested. The chlorophyll-protein complex, termed LHC-II, were incorporated into lipid vesicles; this preparation was used to demonstrate the involvement of LHC-II in cross-membrane adhesion between thylakoid membranes.
Dissert. Absrt.

N82-17812# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOL. 15, NO. 5, SEP. - OCT. 1981
O. G. Gazenko, ed 2 Nov 1981 146 p refs Transl. into ENGLISH of Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981
(JPRS-79346) Avail: NTIS HC A07/MF A01

The varied effects of space flight factors on the human body are addressed. Results of simulation studies as well as data gathered in-flight are presented. Experimental studies performed on rats flown onboard various Cosmos satellites are also included. For individual titles, see N82-17813 through N82-17838.

N82-17813# Joint Publications Research Service, Arlington, Va.
IN-FLIGHT DIETS AND QUANTITATIVE ADEQUACY THEREOF TO PILOT EXPENDITURE c54
I. G. Popov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 1-13 refs Transl. into English from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 4-14 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Nutrition of aircraft crews in prolonged flights is discussed. Meal arrangements in flights of up to 4 hours, physiological-hygienic requirements to flight diets and, on this basis, possible improvement of crew nutrition through a better utilization of meals on the ground are addressed. The Soviet and foreign data on pilot energy expenditures and caloric value of diets in flights over 4 hours are reviewed with emphasis on potential development of excessive food intake with symptoms of acute overeating in prolonged flights.
J.M.S.

N82-17814# Joint Publications Research Service, Arlington, Va.
EFFECT OF STATIONARY MAGNETIC FIELD ON THE ENDOCRINE SYSTEM c52
Ye. A. Zagorskaya *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 14-20 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 14-17 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

It is indicated that endocrine glands react to the constant magnetic field (CMF). The phasic pattern of the hypophyseal-adrenal reaction and GMF effects on the sympathoadrenal system and thyroid are discussed. The potential therapeutic applications of the CMF is addressed with emphasis on the fact that most morphological data available need biochemical support.
J.M.S.

N82-17815# Joint Publications Research Service, Arlington, Va.
DIET OF CREWS OF THREE MAIN EXPEDITIONS ABOARD SALYUT-6 ORBITAL STATION c54
V. P. Bychkov, S. Kalandarov, M. V. Markaryan, N. D. Radchenko, K. A. Stepchkov, and M. L. Frumkin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 21-25 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 17-20 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The advanced space diets of three prime crews who made 96-, 140- and 175-day flights aboard Salyut-6 are described. It is concluded that the diets facilitated maintenance of a good nutrient status, high work capacity and normal health condition.
J.M.S.

N82-17816# Joint Publications Research Service, Arlington, Va.
AMINO ACID METABOLISM DURING PROLONGED INTAKE OF DEHYDRATED FOODS AND SIMULATION OF SOME SPACE FLIGHT FACTORS c52
V. P. Bychkov, I. I. Borodulina, and T. F. Vlasova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 26-29 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. Oct. 1981 p 21-23 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Forty-two healthy volunteers, aged 19 to 49, participated in three bed rest studies of 69 to 180 days in duration. The test subjects were kept on the diet consisting of dehydrated foods: fresh, stored for up to 2 years, and exposed to proton irradiation at a dose of 24,000 rad. Metabolism of amino acids was investigated under these conditions. It was concluded that during prolonged storage and irradiation proteins of dehydrated foods retained their biological value. This allows their use in long term space flights.
Author

N82-17817# Joint Publications Research Service, Arlington, Va.
EFFECT OF SPACE FLIGHTS OF DIFFERENT DURATION ON ENERGY METABOLISM OF HUMAN ERYTHROCYTES c52
A. S. Ushakov, S. M. Ivanova, S. S. Brantova, and O. I. Labetskaya

In its USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 30-34 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 23-27 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The energy metabolism of red blood cells of cosmonauts was investigated before and after flights of varying duration. Certain changes in red blood metabolism were found after prolonged space flights. Author

N82-17818# Joint Publications Research Service, Arlington, Va.

PREVENTION OF STAPHYLOCOCCAL INFECTIONS DURING SPACE FLIGHTS c52

S. N. Zaloguyev, A. N. Viktorov, V. P. Gorshkov, T. Yu Norkina, and M. M. Shinkareva *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 35-38 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 27-29 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The incidence of carriers of photogenic staphylococci among cosmonauts and candidates (applicants) for positions of crew members in spacecraft was investigated. The staphylococcal flora of carriers were assessed while they participate in space flights varying in duration. Samples of microflora were taken from people in their ordinary habitat by means of cotton swabs. To collect samples of miroflora from cosmonauts while in the cabin of a spacecraft, specially developed test tubes containing a preservative were used. The material was analyzed under laboratory conditions after delivering specimens to Earth. Pathogenic staphylococci (Staph. aureus) were identified by testing the capacity to decompose mannitol under anaerobic conditions, production of the enzymes, coagulase and lecithinase, as well as on the basis of presence and intensity of toxin production, in the isolated cultures. The strains of pathogenic staphylococci were submitted to phage typing using the international set of staphylococcal bacteriophages. J.M.S.

N82-17819# Joint Publications Research Service, Arlington, Va.

HUMAN ADRENOSYMPATHETIC SYSTEM DURING IMMERSION IN WATER c52

N. A. Davydova, R. A. Tigranyan, and Ye. B. Shulzhenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 39-44 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 30-34 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The activity of the sympathoadrenal system (SAS) of 12 volunteers exposed to water immersion for 7 days was studied. Before and after water immersion, six of the test subjects were exposed to acceleration of +3 Gz for 15 min. It was demonstrated that water immersion increased the hormonal activity and decreased the transmitter activity of the SAS. Exposure to acceleration stimulated the SAS, thus increasing immersion tolerance. Author

N82-17820# Joint Publications Research Service, Arlington, Va.

COMBINED EFFECT OF SIMULATED WEIGHTLESSNESS AND ACCELERATIONS ON ENERGY METABOLISM ENZYMES

Ye. G. Vetrova, T. Ye. Drozdova, R. A. Tigranyan, and Ye. B. Shulzhenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 45-49 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 34-38 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Exposure to simulated weightlessness (7 day water immersion and 7 day head-down tilt) caused a decrease in the activity of malate (MDH) and isocitrate dehydrogenase (ICDH), and creatine phosphokinase (CPK) at the expense of its MM isoform whereas the activity of alanine (ALT) and aspartate aminotransferase (AST) and pattern of distribution of MDH isoforms remained unchanged. Exposure to acceleration of +3 Gz before and after simulated weightlessness revealed similar changes in the activity of MDH, ICDH, ALT, AST and MDH cytoplasmic fractions. However, the higher increase in the enzyme activity after simulated weightlessness may give evidence for a greater change in cell membrane permeability during acceleration effects that followed simulated weightlessness. Author

N82-17821# Joint Publications Research Service, Arlington, Va.

CARDIAC OUTPUT AND CARDIAC CYCLE PHASE STRUCTURE OF PILOTS DURING FLIGHTS c52

V. A. Degtyarev, V. S. Bednenko, A. B. Vasilyev, A. N. Kozlov, V. Ya. Kolyagin, and A. P. Yarunin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 50-54 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 38-41 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Changes in cardiac output and systolic time intervals of pilots in-flight were examined by the Doppler ultrasound method. The changes were related to the degree of complexity of different flight stages. It is recommended that the above parameters be monitored during flight training in order to standardize professional loads. Author

N82-17822# Joint Publications Research Service, Arlington, Va.

HUMAN LIPID METABOLISM DURING CONFINEMENT IN PRESSURE CHAMBER c52

V. P. Bychkov and O. S. Khokhlova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 55-58 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 41-43 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The effect of prolonged enclosure, changed diet, atmosphere, and hypolinesia on lipid metabolism was investigated in 115 test subjects during 27 experimental runs. It was conducted that the changes in lipid metabolism occurred primarily due to reduced work load. Author

N82-17823# Joint Publications Research Service, Arlington, Va.

AEROSOLS DISTRIBUTION OF MICROORGANISMS IN A MANNED PRESSURIZED CHAMBER AND EFFECT OF ARTIFICIAL AIR IONIZATION c45

S. N. Zaloguyev, B. V. Anisimov, A. N. Viktorov, and V. P. Gorshkov *In its* USSR Rept.: Space Biol. and Aerospace Med., v. 15, no. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 59-62 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 44-46 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Male subjects spent 16 days in a pressure chamber 24 cu m in size. The parameters of microclimate, work and test schedule, food allowance and personal hygiene resources were kept in the range inherent in manned spacecraft cabins. The results indicate that a highly dispersed phase of bacterial aerosol, represented by microorganisms that are the most probable pathogens of diseases among crews of spacecraft, is formed in the air of an airtight compartment. Elevation of the level of bipolar air ionization is a factor which has an adverse effect on the intensity of transmission of conditionally pathogenic bacteria. These findings must be taken into consideration when working out the means of removing dust and microorganisms from the atmosphere of spacecraft cabins. J.M.S.

N82-17824# Joint Publications Research Service, Arlington, Va.

VITAMIN C, B SUB 1 AND B SUB 6 EXCRETION IN URINE DURING 182-DAY ANTIORTHOSTATIC HYPOKINESIA c52

V. P. Bychkov and V. A. Korshunova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 63-67 refs Transl. into ENGLISH

from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 46-49 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Renal excretion of ascorbic acid, thiamin, and 4-pyridoxic acid was studied in 18 test subjects exposed for 182 days to head-down tilt. Two groups of subjects (6 subjects in each) performed exercises of different work load and the third control group was exposed to hypokinesia as such. It is shown that exercises produced a beneficial effect on vitamin metabolism. It is recommended to develop preliminary adaptation to the work load planned as a countermeasure in real or simulated weightlessness. Author

N82-17825# Joint Publications Research Service, Arlington, Va.

JUGULAR, RIGHT ATRIAL PRESSURE AND CEREBRAL HEMODYNAMICS OF HEALTHY MAN SUBMITTED TO POSTURAL TESTS c52

V. Ye. Katkov, V. V. Chestukhin, V. V. Rumyantsev, A. Z. Troshin, and O. Kh. Zybin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 6873 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 49-53 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Ten test subjects were catheterized and exposed to head up and head down tilts at 10, 30, and 75 deg for 5 min each to measure blood pressure in the upper bulb of the internal jugular vein and right atrium. Blood acid base equilibrium, hemoglobin content, and oxygen saturation were also determined. In the head up position at 75 deg the jugular pressure decreased, remaining positive (2.8 mm Hg) in most cases, whereas the atrial pressure fell down to reach the subatmospheric level. In the head down position the jugular pressure increases in proportion to the tilt angle, amounting to 32.2 mm Hg at 75 deg the atrial pressure changed in a different fashion: in 7 cases it increased and in 3 cases decreased. Throughout the test the oxygen arteriovenous difference in the brain and the acid base equilibrium in the outflowing blood remained essentially unchanged. This reflects autoregulation of the cerebral blood flow and its adequacy to metabolic requirements. Author

N82-17826# Joint Publications Research Service, Arlington, Va.

EFFECTS OF EMBIENT PARAMETERS ON MAN c52

R. M. Arslanova, I. Ye. Ganelina, V. Ye. Manoylov, L. K. Sapozhkov, and S. K. Churina *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 74-77 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 53-55 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The effects of meteogeophysical parameters on the incidence of cardiovascular disorders were studied. It is shown that geomagnetic activity has a negative effect on the incidence and that at certain seasons this effect is minimal. Author

N82-17827# Joint Publications Research Service, Arlington, Va.

ANTIHYPOXIC EFFICACY OF INTERMITTENT MODE OF PRESSURE CHAMBER CONDITIONING OF MAN c52

A. Yu. Katkov, Ye. A. Kovalenko, G. A. Davydov, R. N. Chabdarova, S. A. Vtoryy, A. P. Manik, Yu. A. Spasskiy, Yu. P. Starshinov, and N. M. Utkina *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 78-81 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 56-58 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

It is shown that a 10-day altitude chamber training in an intermittent mode can increase the maximum altitude man tolerates from 8,400 to 9,500 m and maximum time of exposure to increasing hypoxia (from 5,000 m) from 37 to 49 min. The antihypoxic effect of the above training persists for 10 days after its completion, leading to a better oxygen supply to various tissues. Author

N82-17828# Joint Publications Research Service, Arlington, Va.

INFORMATIVENESS OF ULTRASONIC DOPPLER CARDIOGRAPHY IN EVALUATION OF CORONARY CIRCULATION c52

V. S. Bednenko, V. A. Degtyarev, A. N. Kozlov, N. N. Popov, and G. K. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 82-86 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 58-61 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The use of ultrasonic Doppler cardiography (with respect to the integral values of the signal at systole) to determine efficient coronary circulation was investigated in acute dog experiments (in comparison to the electromagnetic method) and in biophysical models. On the basis of the comparative studies it is concluded that ultrasonic Doppler cardiography can be applied to measure relative changes in the efficient coronary circulation. Author

N82-17829# Joint Publications Research Service, Arlington, Va.

AGE RELATED DISTINCTIONS OF COSMONAUTS REGIONAL HEMODYNAMICS c52

I. D. Vasilyeva, Kh. Kh. Yarullin, and V. I. Zhuyko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 82-90 ref Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 61-64 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Hemodynamics of the large hemispheres of the brain, vertebral basilar system, lungs and legs of 60 cosmonauts aged 30-37 and 38-47, were investigated rheographically. Measurements were made in the morning, under conditions of basal metabolism and in the daytime, before orthostatic tests. Comparison of hemodynamic parameters recorded in the morning and at the daytime and in the two age groups showed significant differences revealing the effects of different factors, first of all psychoemotional tension, on the vasomotor regulation, and greatest resistance of cerebral and pulmonary vascular systems of older cosmonauts to those effects. These investigations emphasize great importance of studies of regional hemodynamics, especially rheoencephalography, not only before provocative tests but also under conditions of basal metabolism. Author

N82-17830# Joint Publications Research Service, Arlington, Va.

COMPARATIVE EVALUATION OF ANTIMICROBIAL ACTIVITY OF SOME URINE PRESERVATIVES c52

T. Ye. Lebedeva, I. V. Yakimova, N. M. Nazarov, and S. V. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 91-94 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 64-66 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Antiseptics were examined for their antimicrobial activity with respect to the microorganisms that are most likely to occur in the urine subject to prolonged storage. Chlorine and iodine containing compounds were found to have the highest antimicrobial activity combined with a wide spectrum of antimicrobial action. The antimicrobial effect of these compounds was mostly expressed in regard to the typical representatives of urobacteria that actively hydrolyze urea to yield ammonia during prolonged storage of urine. Author

N82-17831# Joint Publications Research Service, Arlington, Va.

RAT AMINO ACID COMPOSITION AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE

T. F. Vlasova, Ye. B. Miroshnikova, T. A. Smirnova, and I. A. Dmitriyeva *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 95-97 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 66-68 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Data concerning the amino acid pool of rats flown onboard Cosmos-1129 and exposed to the ground based synchronous experiment are presented. Certain changes in the amino acid pool of flight and synchronous rats were found. The changes seem to be associated with the selective rate of incorporation of free amino acids into the biosynthetic processes during acute adaptation and with alterations in the protein synthesis rate.
J.M.S.

N82-17832# Joint Publications Research Service, Arlington, Va.

MYOCARDIAL PROTEIN FRACTIONS AND ENZYMATIC ACTIVITY THEREOF IN EXPERIMENTAL RATS FLOWN ABOARD COSMOS-936 BIOSATELLITE

R. A. Tigranyan, Ye. A. Nosova, Ye. V. Kolchina, N. A. Veresotskaya, L. M. Kurkina, and N. S. Kolganova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 98-102 refs Transl. into ENGLISH fom Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 68-71 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The effect of artificial gravity on protein fractions and their enzyme activity in the myocardium of rats flown onboard Cosmos-936 was studied. In weightless rats the content of sarcoplasmatic proteins increased at R + 0 and that of T fraction proteins decreased at R + 25. In centrifuged rats such changes were not seen. In centrifuged rats the enzyme activity of sarcoplasmatic proteins did not alter. In weightless rats ATPase activity of myosin decreased significantly, and in centrifuged rats it remained almost unchanged.
Author

N82-17833# Joint Publications Research Service, Arlington, Va.

METABOLIC PROCESSIS IN RAT SKELETAL MUSCLES AFTER FLIGHT ABOARD COSMOS-936

Ye A. Nosova, N. A. Veresotskaya, Ye. V. Kolchina, L. M. Kurkina, R. A. Belitskaya, and R. A. Tigranyan *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 103-107 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 71-75 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The study of skeletal muscles of rats flown on Cosmos-936 demonstrated different metabolic reactions in muscle fibers of different function and type to weightlessness and Earth gravity. The data obtained gave evidence that artificial gravity may considerably prevent metabolic changes in muscles developing in response to specific effects of weightlessness.
Author

N82-17834# Joint Publications Research Service, Arlington, Va.

ACTIVITY OF SOME ENZYMES OF CARBONHYDRATE METABOLISM IN RAT SKELETAL MUSCLES AFTER SPACE FLIGHT

V. P. Nesterov, N. A. Veresotskaya, and R. A. Tigranyan *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 p 108-112 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 75-78 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Space flight factors did not influence activity of glycogen phosphorylase and adenylate cyclase in skeletal muscles of rats. Activity of glucose-6-phosphate and 6-phosphogluconate dehydrogenases increased noticeably in the most active muscles (gastrocnemius and tibialis anterior muscles). Activation of enzymes involved in the pentosephosphate pathway of glucose conversion may be associated with compensatory processes induced by muscle changes due to diminished motor activity of animals in space flight.
Author

N82-17835# Joint Publications Research Service, Arlington, Va.

ULTRASTRUCTURE OF BLOOD VESSELS AND MUSCLE FIBERS OF RAT SKELETAL MUSCLES AFTER FLIGHTS ABOARD COSMOS-605 AND COSMOS-782 BIOSATELLITES

Z. F. Davik and K. D. Rokhlenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 113-118 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 78-83 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Electron microscopy was used to study ultrastructures of the wall of blood vessels and muscle fibers of the red (soleus) and mixed gastrocnemius) muscles of rats flown on Cosmos 605 for 22.5 days and on Cosmos 782 for 19.5 days and sacrificed 4 to 6 hours, 48 hours and 25 to 27 days postflight. It was demonstrated that the orbital flight did not induce significant changes in the ultrastructure of blood vessels of the soleus and gastrocnemius muscles but caused atrophy of muscle fibers and reduction of the number of functioning capillaries. Readaptation of the soleus vascular system to 1 g led to degradation of permeability of capillary and venular walls and development of edema of the perivascular connective tissue. This may be one of the factors responsible for dystrophic changes in muscle fibers.
Author

N82-17836# Joint Publications Research Service, Arlington, Va.

BLOOD FIBRINOGEN AS RELATED TO IMMERSION IN WATER FOR SEVEN DAYS AND SHORT-TERM SPACE FLIGHT c52

A. N. Fomin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 119-122 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 83-85 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

A scrutiny of the literature dealing with hemocoagulation under hypokinetic conditions revealed that blood fibrinogen was studied exclusively in conjunction with other parameters characterizing the blood clotting system. Increase in fibrinogen concentration in blood was demonstrated in individuals submitted to prolonged hypokinesia, patients restricted to bed rest and animals used in experiments with hypokinesia. Blood tests were made on six healthy men before, during, and after seven days of immersion in water as well as cosmonauts before and after seven and four day flights. The microtechnique for measuring the concentration of fibrinogen in blood is based on the phenomenon of heat denaturation of this protein at a temperature of 56 C. Results indicate that the fibrinogen increased during the four to six days of the study.
J.M.S.

N82-17837# Joint Publications Research Service, Arlington, Va.

METHOD OF ASSESSING INDIVIDUAL RESISTANCE OF RATS TO HYPOXIC HYPOXIA

Yu. V. Farber, A. Yu. Grigoryev, and A. I. Yelfimov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 123-125 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 85-86 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The question of screening experimental animals according to resistance to hypoxia is addressed in view of the need to investigate individual distinctions with regard to resistance to the body to various extreme factors, including a shortage of oxygen. There are some methodological approaches to the study of this question. In particular, one determines coefficient K as the ratio of rat survival time at an altitude of 12,000 m to restitution time. Experimental data on individual reactions to acute hypoxic hypoxia, which are obtained by determining the time of retention of the postural reflex with a static load are presented.
J.M.S.

N82-17838# Joint Publications Research Service, Arlington, Va.

ASSAY OF DISSOLVED CARBON IN RECLAIMED WATER PRODUCED IN SPACECRAFT WATER SUPPLY SYSTEMS c25

Yu. S. Koloskova, Z. P. Pak, and S. V. Chizhov *In its* USSR

Rept.: Space Biol. and Aerospace med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 126-129 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 87-89 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The method of assaying total, organic and inorganic carbon based on infrared spectroscopy into the practice of monitoring and checking the quality of reclaimed potable water is described. The results of measuring total, organic and inorganic carbon in samples of reclaimed water obtained by physicochemical methods from various moisture-containing waste by means of an analyzer of total carbon content are presented. J.M.S.

N82-17839# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF HOMING PIGEONS IN BRAZIL: SOME PRELIMINARY RESULTS
R. Ranvaud Oct. 1981 16 p refs Presented at Intern. Symp. on Avian Navigation, Tirrenia, Italy, 14-18 Sep. 1981
(INPE-2248-PRE/032) Avail: NTIS HC A02/MF A01

Observations of vanishing bearings are described. The ability of pigeons to home quite well under some rather unfavorable conditions, namely with the Sun not too far from the zenith and under total overcast in relatively weakly inclined magnetic fields, as well as in cases where the inclination of the magnetic field actually reverses during the flight home is discussed. Homing in regions where the apparent diurnal motion of the Sun's azimuth reverses during the year, the midday Sun being to the north in June and to the south in December, is reported. Homing right across the so called south atlantic anomaly, at which the principal component of the Earth's magnetic field has an absolute minimum, providing a situation in which the gradient of total intensity is zero in all directions, is also reported. T.M.

N82-17840# Litton Bionetics, Inc., Kensington, Md.
MAMMALIAN TOXICOLOGICAL EVALUATION OF DIMP AND DCPD (PHASE 3 - IMPA) Final Report, Dec. 1976 - Apr. 1980
Francis J. Mecler May 1981 277 p
(Contract DAMD17-77-C-7003; DA Proj. 3E1-62720-A-835)
(AD-A107574) Avail: NTIS HC A13/MF A01 CSCL 06/20

IMPA (Isopropyl Methylphosphonic Acid) had oral LD50's of 7650 and 6070 mg/kg in male and female rats, respectively, and of 5620 and 6550 mg/kg in male and female mice. It was not irritant to rabbit eyes. It was mildly irritant to rabbit skin but produced no systemic toxicity at a dose of 2 mg/kg. IMPA did not induce dermal sensitization in guinea pigs. No evidence of toxicity followed administration of IMPA in the drinking water at levels up to 3000 ppm to rats for 90 days. IMPA was not mutagenic to five strains of Salmonella indicator organisms in the Ames assay both with and without rat liver activation. GRA

N82-17841# California Univ., Irvine, Dayton, Ohio.
RESPIRATORY TOXICOLOGY, 1981 Annual Technical Report, Jun. 1980 - May 1981
Paul E. Newton Wright-Patterson AFB, Ohio AFAMRL Aug. 1981 45 p refs
(Contract F33615-80-C-0512; AF Proj. 6302)
(AD-A107672; AFAMRL-TR-81-81) Avail: NTIS HC A03/MF A01 CSCL 06/20

The Respiratory Toxicology research programs conducted at the Toxic Hazards Research Unit (THRU), Wright-Patterson Air Force Base by the University of California, Irvine are reviewed in this annual report. Preliminary results are presented of studies concerning: (1) the effect of propylene glycol dinitrate on the cardiovascular system in the dog; (2) the evaluation of pulmonary clearance after exposure to 1.2 ppm of ozone, and (3) the evaluation of small airway test sensitivity in enzyme induced emphysema. Author (GRA)

N82-17842# California Univ., Irvine. Dept. of Community and Environmental Medicine.
COMPARATIVE BIOCHEMISTRY AND METABOLISM. PART 2: NAPHTHALENE LUNG TOXICITY Annual Report, Jun. 1980 - May 1981
Alan R. Buckpitt Wright-Patterson AFB, Ohio Aerospace Medical Research Labs. Oct. 1981 43 p refs
(Contract F33615-80-C-0512; AF Proj. 6302)
(AD-A107673; AFAMRL-TR-81-84) Avail: NTIS HC A03/MF A01 CSCL 06/20

Earlier studies have shown that intraperitoneal administration of naphthalene causes selective pulmonary bronchiolar necrosis in mice and have suggested a role for reactive naphthalene metabolites in the tissue damage. These studies have been extended to show that covalent binding of reactive naphthalene metabolites to tissue macromolecules in lung, liver and kidney is dose-dependent. High levels of covalent binding occur only after tissue glutathione levels are depleted substantially and only at doses of 200 mg/kg and above. The 200 mg/kg dose is the lowest dose at which lung lesions are observed. Piperonyl butoxide pretreatment decreases pulmonary damage and covalent binding and partially blocks glutathione depletion by 400 mg/kg naphthalene. In comparison, SKF 525 A pretreatment decreased covalent binding levels to a much smaller extent and failed to alter glutathione depletion or pulmonary damage after 400 mg/kg naphthalene. When compared to vehicle pretreated controls, phenobarbital or 3-methylcholanthrene pretreatment produced no change in the severity of lung damage after doses of naphthalene ranging from 50 to 400 mg/kg nor did these inducers alter covalent binding at doses of naphthalene of 200 mg/kg or less. Pretreatment of mice with p-xylene preferentially inactivated pulmonary cytochrome p450 and blocked naphthalene induced lung damage but failed to selectively decrease covalent binding of reactive metabolites in the lung. Current studies are continuing to examine the role of cytochrome P450 dependent metabolic activation of naphthalene in the lung in the bronchiolar damage. Author (GRA)

N82-17843# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Abt. Angewandte Physik.
BIOPHYSICAL FUNDAMENTALS AND INSTRUMENTATION FOR THE ENDOVESICAL Nd:YAG-LASER APPLICATION
T. Halldorsson 5 Jun. 1981 25 p refs In GERMAN; ENGLISH summary
(MBB-UA-581-81-O) Avail: NTIS HC A02/MF A01

The laser irradiation power needed for tumor therapy was investigated. From considerations of the absorptivity of cellwater and blood as well as the multiple scattering of the radiation and heat conduction in tissue, a theoretical model was developed which enabled an accurate calculation of the temperature distribution up to the denaturation point as well as the percentage of the radiation power lost through backward and forward scattering of light. The theoretical calculations were experimentally verified in animal experiments and measurements on specimens of human bladder tissue performed with a thermocamera. According to the requirements of endoscopic laser therapy, a medical Nd:YAG laser system was developed. For the beam transport into the urinary bladder, flexible light pipes made from thin quartz fibers were used. A.R.H.

N82-17844# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 4
4 Jan. 1982 62 p refs Transl. into ENGLISH of various Russian articles
(JPRS-79780) Copyright. Avail: Issuing Activity

The effects of nonionizing electromagnetic radiation on organisms and tissues are discussed. For individual titles, see N82-17845 through N82-17853.

N82-17845# Joint Publications Research Service, Arlington, Va.
EFFECT OF COMMERCIAL FREQUENCY ELECTROMAGNETIC FIELD ON ANDROGEN FUNCTION OF RAT TESTS
A. G. Reznikov and L. V. Tarasenko *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 1-5 refs Transl. into ENGLISH from Fiz. Zh. (USSR), v. 27, no. 1, Jan. - Feb. 1981 p 121-124 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

The biological effects of commercial frequency electromagnetic fields (CFEMF) generated by high voltage electric power lines on the gonads of male rats were investigated. The effect of CFEMF on the endocrine function of rat tests consists of an intensification of steroidogenetic processes and a corresponding increase in the activity of the steroid delta(5)-3 beta-o1 dehydrogenase. No appreciable changes in testosterone levels in peripheral blood plasma were observed following CFEMF irradiation for a period of four months. J.D.H.

N82-17846# Joint Publications Research Service, Arlington, Va.

FEATURES OF METABOLIC DISTURBANCES IN RAT MYOCARDIUM UNDER EFFECT OF ALTERNATING MAGNETIC FIELDS OF DIFFERENT PARAMETERS

F. A. Kolodub, O. N. Chernysheva, and G. I. Yevtushenko *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 6-10 refs Transl. into ENGLISH from Kardiologiya (USSR), v. 21, no. 4, Apr. 1981 p 82-85 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The effect of alternating magnetic fields of various voltages and exposures on the metabolism of carbohydrates, macroergic phosphates, and low molecular nitrogen compounds in the rat heart was investigated. The direction and degree of metabolic disturbances in the myocardium after exposure to industrial frequency alternating magnetic fields depend on the voltage of the field and the length of exposure. An alternating magnetic field with a voltage of 32 kA/m delays oxidation and phosphorylation processes without affecting their coupling, and the proportion of oxidized carbohydrates increases as compared with fatty acids. The conversion of carbohydrates and of nitrogen substances are stimulated by an alternating magnetic field with a voltage of 7.5 kA/m. J.D.H.

N82-17847# Joint Publications Research Service, Arlington, Va.

INFLUENCE OF ELECTROMAGNETIC WAVES IN MILLIMETER BAND ON INDUCTOPROTEIN SYNTHESIS OF PENICILLINASE BY STAPHYLOCOCCUS AUREUS

A. Z. Smolyanskaya, A. M. Makhov, E. A. Gelvich, and M. B. Golant *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 11-16 refs Transl. into ENGLISH from Biol. Nauki (USSR), no. 5, May 1981 p 24-28 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The effect of electromagnetic waves in the millimeter band on the synthesis and activity of pencillinase produced by strains of Staphylococcus aureus and Escherichia coli is examined. Experiments demonstrated that wave lengths of 6,478 and 6,468 mm inhibit the induction of the enzyme by St. aureus. However, this type of radiation does not affect the activity of the exoenzyme released from the St. aureus strain, and also does not affect the constitutive synthesis of the penicillinase by E. coli. The relationship of effect of the duration of irradiation, bacterial population, and the strength of current density is elucidated. Author

N82-17848# Joint Publications Research Service, Arlington, Va.

PHYSICAL FACTORS OF ENVIRONMENT AS HYGIENE PROBLEM c45

M. G. Shandala *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 17-26 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 1, Jan. 1981 p 9-16 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The direction of scientific research into the effect of physical factors influenced by industrial and technical development on the environment is surveyed. Physical factors considered are mechanical, thermal, optical, electrical, magnetic, electromagnetic and ionizing radiation. Findings on the effect of these factors on environmental hygiene are reviewed. J.D.H.

N82-17849# Joint Publications Research Service, Arlington, Va.

EFFECTS ON BIOLOGICAL SYSTEMS OF ELECTROMAGNETIC OSCILLATIONS IN MILLIMETER RANGE OF WAVELENGTHS

N. D. Devyatkov, O. V. Betskiy, E. A. Gelvich, M. B. Golant, A. M. Makhov, T. B. Rebrova, L. A. Sevastyanova, and A. Z. Smolyanskaya *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 27-36 refs Transl. into ENGLISH from Radiobiol. (USSR), v. 21, no. 2, Mar. - Apr. 1981 p 163-171 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The main patterns of the effects of millimeter radiation of nonthermal intensity on various biological objects are discussed on the molecular, cellular levels, as well as on the level of complex living organisms. The main objects of the studies were hemoglobin and erythrocytes and human blood, E. coli, Staphylococcus aureus, Aspergilla mold, mice and rats. Author

N82-17850# Joint Publications Research Service, Arlington, Va.

CURRENT PROBLEMS OF RADIOBIOLOGY OF ELECTROMAGNETIC RADIATION OF RADIO-FREQUENCY RANGE c52

I. G. Akoyev *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 37-43 refs Transl. into ENGLISH from Radiobiol. (USSR), v. 20, no. 1, Jan. - Feb. 1980 p 3-8 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

On the basis of analysis of the current state of the radiobiology of nonionizing radiation, the need for accelerated development of basic research on the biological action of these radiations, especially in the radio-frequency range, is substantiated. An objective is set for accumulation of experimental data on questions of reversibility and cumulative effects, selectivity, specificity and additivity, direct and indirect action, sensitivity, adaptation and stability in regard to radiation, species differences, and possible mechanisms of operation of radiation. Author

N82-17851# Joint Publications Research Service, Arlington, Va.

PARTICULAR FEATURES OF CONDITIONED ELECTRODEFENSIVE REFLEX IN WHITE RATS ON BACKGROUND OF CONSTANT MAGNETIC FIELD

I. V. Shust, S. I. Galantyuk, and Yu. V. Cheretyanko *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 44-50 refs Transl. into ENGLISH from Fiz. Zh. (USSR), v. 26, no. 2, Mar. - Apr. 1980 p 264-268 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The formation of a conditioned electrodefensive reflex in white rats exposed to a 1,000 Oe constant magnetic field was investigated. The influence of the vitamin preparation galascorbin on the formation of the reflex was also studied. The tenacity of the conditioned reflex was reduced by exposure to the CMF, with a greater reduction observed in the initial phase of its development. Changes in conditioned reflex activity were observed during exposure and during the aftereffect period. The threshold of the avoidance reaction initially increased, then decreased, with normalization of the indicator observed until the end of the experiment. Administration of galascorbin promoted tenacious development of the conditioned reflex, which remained more pronounced in the CMF aftereffect period. J.D.H.

N82-17852# Joint Publications Research Service, Arlington, Va.

MORTALITY IN ACUTE MYOCARDIAL INFARCTION AS FUNCTION OF GEOMAGNETIC FIELD ACTIVITY IN YEREVAN c52

N. N. Karazyan and L. A. Akhverdyan *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 51-55 Transl. into ENGLISH from Dokl. Akad. Nauk Arm. SSR (USSR), v. 22, no. 3, 1981 p 188-191 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The medical history of patients who died from acute myocardial infarction in the city of Yerevan, Armenian SSR, during 1974-1978 was analyzed and compared with records of geomagnetic field activity. The basic causes of death from complications of myocardial infarction were also evaluated. A direct connection was observed between the mortality rate and increased magnetic activity, with men exhibiting a greater sensitivity to high geomagnetic field activity than women. J.D.H.

N82-17853# Joint Publications Research Service, Arlington, Va.
EFFECT OF HYPOGEOMAGNETIC FIELD ON ACTIVITY OF SOME CEREBRAL ENZYMES c52
A. V. Shakula and G. M. Chernyakov *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 56-59 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 9, Sep. 1981 p 11-13 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

The activity of key brain enzymes of rabbits whose embryonic and early postnatal development occurred during exposure to a hypogeomagnetic field was investigated. The activity of succinate dehydrogenase (SDH), glucose-6-phosphate dehydrogenase (G-6-PDH), tetrazolium oxyreductanse (NAD-H), and hexokinase (HK) as determined. Histological examination of neuronal bodies of the cortex, of astroglia and oligodendroglia revealed very high G-6-PDH and NAD-H activity, moderate SDH activity, and mild HK activity. A hypogeomagnetic field was found to be a biologically active factor having an adverse effect on the enzymes regulating energy metabolism. J.D.H.

N82-17854 Washington Univ., St. Louis, Mo.
MUSCLE, MOTOR CORTEX, CEREBELLAR NUCLEAR, AND SPINDLE AFFERENT DURING SLOW HOLD-RAMP-HOLD POSITION-TRACKING MOVEMENTS OF THE MONKEY'S WRIST Ph.D. Thesis
Marc Hudson Schieber 1982 469 p
Avail: Univ. Microfilms Order No. 8122756

Two Rhesus monkeys were trained to perform flexion and extension wrist movements guided by a tracking display. The monkey used a wrist position control to operate a cursor with which he pursued a visual target. The target, and therefore the monkey's wrist, moved in slow hold-ramp-hold (HRH) trajectories. By changing parameters of the target's trajectory, changes were produced in the parameters of the monkey's wrist movement. The second monkey was trained additionally to perform self-spaced alternating wrist movements and to receive occasional pulses of torque about the wrist. It is hypothesized that during slow HRH wrist movements, two parallel motor systems operated in relative dissociation. The first system included class I motor cortex neurons, alpha motoneurons, and extrafusal muscle. The second system included class II motor cortex neurons, nearly all related dentate and interposed neurons, gamma motoneurons, and spindle afferents. This system could have provided for the continuous acquisition of dynamically sensitive spindle afferent feedback constantly maintained in the face of widely varying peripheral conditions. Dissert. Abstr.

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-17855 Minnesota Univ., Minneapolis.
FACILITATED DIFFUSION OF SMALL NON-ELECTROLYTES IN THE HUMAN RED BLOOD CELL
Robert Ray Mayrand 1981 136 p
Avail: Univ. Microfilms Order No. 8125991

The design of a new simple continuous flow system for the analysis of rates of permeation of small non-electrolytes across human red cell membranes is described. With this system it was demonstrated that ethylene glycol equilibrium exchange is saturable, KM = 175 mM, and inhibitable, glycerol K1 = 1200 mM. Ethylene glycol yielded a permeability coefficient of P sub s = .000336 cm/s. Urea equilibrium exchange was also examined with the continuous flow system. Saturation was again observed, KM = 218 mM. The maximal rate of urea exchange was P sub s = .000808 cm/s. The estimated non-inhibitable (presumably through the lipid) portion of urea equilibrium exchange was .0000258 cm/s which is 3.2 percent of the maximal rate. Dissert. Abstr.

N82-17856 Columbia Univ., New York.
TEMPORAL INTEGRATION OF ACOUSTIC POWER FOR INTERRUPTED STIMULI AT SUPRATHRESHOLD LEVELS Ph.D. Thesis
Joyce Rodriguez-Arrufat 1981 132 p
Avail: Univ. Microfilms Order No. 8125375

Threshold and suprathreshold temporal integration data employing experimental variables were investigated. Data were collected to experimental conditions: three stimulus types, nine signal durations and four presentation levels including threshold. Subjects were three normal hearing listener who participated in 20 practice sessions and 12 test sessions of 20 minutes each. Mean threshold and point of subjective equality (PSE) values were calculated for each subject and each experimental condition. It is indicated that the constants of the function are a product of the interaction between stimulus type and intensity as incorporated in a two part linear regression model. It is suggested that critical duration decreases with intensity and is essentially independent of stimulus type at 50 db and 80 dB SPL. The slope of the function varies as a function of intensity and stimulus type, being largest for 1000 Hz and smallest for white noise. These findings are discussed in terms of Zwislocki's exponential theory of loudness summation. Dissert. Abstr.

N82-17857 Ohio Univ., Athens.
QUANTIFICATION OF PSYCHOACOUSTIC TUNING CURVE SHARPNESS: AN ANALYSIS OF FREQUENCY RESOLUTION IN CHILDREN AND ADULTS Ph.D. Thesis
Neal Alan Sloane 1981 120 p
Avail: Univ. Microfilms Order No. 8126067

Probe tone frequencies were pulsed with a rise/fall time of 50 msec., duration of 400 msec., and were delivered at 10 dB SL using a simultaneous masking paradigm. Masked threshold was determined using a modified Hughson-Westlake technique. After the first set of tuning curves was obtained, each subject returned in 24 hours to replicate the test. Results show that the main effect for age is nonsignificant, the main effect for sessions also is nonsignificant, the main effect for frequency is significant, and all possible interactions are nonsignificant. A Tukey Test, calculated for the main effect of frequency, established that all three tuning curves differ significantly from one another in sharpness, it is concluded that within the age range under study, age does not influence tuning curve sharpness, d sub 1 oct. values do not change significantly across experimental sessions, and tuning curves increase significantly in sharpness across probe tone frequencies of 500, 1000, and 2000 Hz. Dissert. Abstr.

N82-17858 Florida State Univ., Tallahassee.
A STUDY OF THE ACOUSTIC REFLEX AS ELICITED BY SELECTED ENVIRONMENTAL NOISE STIMULI Ph.D. Thesis
Marshall Melvin Smith 1981 114 p
Avail: Univ. Microfilms Order No. 8125790

The acoustic reflex thresholds (ARTs) for the environmental noise ranged from 78.83 through 81.78 db SPL. The ARTs for the white noise, and the pure-tone were 81.38 and 95.19 dB SPL, respectively. For all practical purposes (19%) the ARTs for the environmental noises lie within + or - 5 db of the ART for the white noise. The latency at threshold for the environmental noises ranged from 452.5 through 552.50 msec. Similarly, the latencies were 402.5 and 487.5 msec for the white noise and the pure-tone, respectively. The latency at dB SL sub R (20 dB above the threshold) for the environmental noises ranged from 152 through 180 msec. There was a decrease in latency at 20 dB SL sub R compared to that at threshold across all the stimuli. The contraction rate at 20 dB SL sub R for all stimuli ranged from .0009 through .0011 cc/msec. The contraction magnitude at 20 dB SL sub R for all the environmental noises and the white noise ranged from .669 through .816 cc. Dissert. Abstr.

N82-17859 North Carolina Univ. at Chapel Hill.
STUDIES ON STRUCTURE AND FUNCTION RELATIONSHIP IN FIBRINOGEN Ph.D. Thesis
Nadia Aldyth Carrell 1981 160 p
Avail: Univ. Microfilms Order No. 8125561

The literature concerning the chemical properties of fibrinogen and the mechanisms of fibrinogen function was reviewed. The experimental work was aided by the availability of two patients with congenital molecular variants of fibrinogen and one patient with an inhibitor to fibrin polymerization. The fibrinogen level in the first patient was found to be about one third of the normal level by both coagulation and immunologic methods. The second patient had a low plasma level of clotable protein with normal antigen concentration, high amounts of fibrinogen related material in serum, and prolonged thrombin and reptilase clotting times. The third patient developed an inhibitor which markedly prolonged the thrombin and reptilase times of both patient and normal plasmas. A procedure was developed to direct chemical modifications selectively at lysine residues which function in polymerization. An assay to measure the binding of fibrinogen to fixed washed platelets was developed. Dissert. Abstr.

N82-17860 Florida Univ., Gainesville.
FORWARD MASKING OF AUDITORY NERVE (N SUB 1) AND BRAINSTEM RESPONSES (WAVE V) IN HUMANS Ph.D. Thesis
Steven John Kramer 1981 186 p
Avail: Univ. Microfilms Order No. 8127440

The influence of a response to one sound (probe) another sound (masker) when the two sounds occur simultaneously or in a temporal relation was demonstrated. The effects of forward masking on wave-V of the ABR along with N responses recorded simultaneously (on a separate channel) from the ear canal were investigated. Postmasking recovery functions were measured for different masker durations, masker levels, and masker low frequency cutoffs (high-pass masking). The effects on wave-V were different than on N1. The primary effects of forward masking on the probe responses were decreases in N1 amplitude and increases in wave-V latency. Characteristic changes in the recovery functions for variations on masker parameters were found. It is suggested that the relation between wave-V latency and N1 amplitude, along with other characteristics of underlying mechanisms include a recording of the neutral input (N1) within the brainstem pathways generating the wave-V potential.
Dissert. Abstr.

N82-17861 Ohio Univ., Athens.
HUMAN AUDITORY BRAINSTEM ELECTRIC RESPONSES TO BINAURAL AND MONAURAL STIMULI Ph.D. Thesis
Paul Alfred Lobaugh 1981 149 p
Avail: Univ. Microfilms Order No. 8126058

The auditory brainstem electric response (ABER) is recorded from electrodes attached to the scalp of humans and consists of a series of sub-microvolt peaks which occur in the 10 ms period following presentation of simple auditory stimuli such as clicks. The ABER differences due to binaural and monaural stimulation which are defined as binaural interaction are investigated. It is also possible that binaural signal processing, if reflected by the ABER, may occur in an asymmetric manner. The effects of a stimulus variable, click polarity, and a subject variable, headsize, upon the ABER are studied. Click-evoked ABERs were acquired from 44 normally hearing adolescent and adult subjects. Responses to binaural and monaural stimulation were analyzed. It is concluded that polarity of the stimulus does not affect ABERs in response to 60 and 70 dB SL clicks. For 80 dB SL stimulation, negative polarity clicks evoke shorter latency waves than do positive polarity clicks. Dissert. Abstr.

N82-17862*# Narco Scientific, Houston, Tex.
PORTABLE MEDICAL STATUS AND TREATMENT SYSTEM Final Report
Dec 1981 25 p
(Contract NAS9-15821)
(NASA-CR-167496) Avail: NTIS HC A02/MF A01 CSCL 06E

A portable medical status and treatment system is discussed. The vital signs monitor includes electrocardiogram, respiration, temperature, blood pressure, alarm, and power subsystems, which are described. A DC defibrillator module, a radio module, and their packaging are also described. These subsystems were evaluated and the results and recommendations are presented.
S.L.

N82-17863# Institute of Human Performance, Fairfax, Va.
PHYSICAL PERFORMANCE TASKS REQUIRED OF U. S. MARINES OPERATING IN A DESERT ENVIRONMENT
Paul O. Davis, Arthur V. Curtis, Jr., and Steven A. Bixby Nov. 1981 62 p refs
(Contract N00014-80-C-0473)
(AD-A107866; TR-7) Avail: NTIS HC A04/MF A01 CSCL 15/7

Nine representatives of the Institute of Human Performance were integrated into a marine battalion during a CAX (combined arms exercise) for the purpose of gathering descriptive and objective information regarding the nature and types of physical performance tasks encountered by marine infantrymen (MOS 0311) during desert combat. Through the use of minicassette recorders, scales, cameras and other data collection equipment, scenarios were described which typify the critical, frequent and strenuous types of tasks indigenous to marines in this environment. Distances covered on foot, loads carried, rates of travel and grades encountered are detailed and described as well as other environmental overlays which impact on troop performance. It was determined that for the most part, a mechanized, motorized combat scenario does not require high levels of physical ability; however, fire team rushes represent a critical scenario, with high levels of aerobic and anaerobic power, particularly when performed in ambient temperatures of 100-107 F. A taxonomy of physical tasks from this environment will be added to physical performance data from other Marine Corps theaters of operations for the purpose of developing a complete job analysis of activities involving strength and endurance factors. Author (GRA)

N82-17864# California Univ., Irvine. Dept. of Community and Environmental Medicine.
CYTOLOGIC AND BIOCHEMICAL GENETIC EFFECTS OF CHEMICAL CARCINOGENS Annual Report, 1 Jul. 1980 - 30 Jun. 1981
Ronald E. Rasmussen Wright-Patterson AFB, Ohio Aerospace Medical Research Lab. Oct. 1981 43 p refs
(Contract F33615-80-C-0512; AF Proj. 6302)
(AD-A107615; AFAMRL-TR-81-82) Avail: NTIS HC A03/MF A01 CSCL 06/20

The first project is concerned with the relationship between initiation of cancer by chemicals and the damage and repair of DNA in cells and tissues susceptible to the carcinogenic action of the chemicals. The working hypothesis is that interaction of the carcinogen with cellular DNA is a necessary step in carcinogenesis and that this interaction may cause DNA damage which is then followed by DNA repair synthesis. The second project was conducted with the cooperation of the staff of the Toxic Hazards Research Unit at AMRL, WPAFB. Rats and hamsters were exposed by inhalation to hydrazine at 750 ppm for one hour. Groups of animals which had been exposed only once or which had been exposed 10 times were shipped to UC Irvine for study. The factors studied were (1) DNA replication in the lung; (2) DNA repair synthesis in the lung; (3) Cellular replication in the lung and nasal turbinates; and (4) Metabolism of a known lung carcinogen, 3H-benzo(a)pyrene, by lung slices from the treated animals. The third project was initiated during the current year with the goal of developing an animal model in which biochemical and cytogenetic factors could be studied during the process of tumorigenesis. Range-finding studies are underway at the Toxic Hazards Research Unit (THRU) to establish the intratracheal dosage of 3-methylcholanthrene (MCA) necessary to produce a high yield of lung tumors in Fischer 344 rats within 12 months. GRA

N82-17865# California Univ., Irvine. Dept. of Community and Environmental Medicine.
COMPARATIVE BIOCHEMISTRY AND METABOLISM. PART 1: CARCINOGENESIS Annual Report, Jun. 1980 - May 1981
Robert C. Shank Wright-Patterson AFB, Ohio Aerospace Medical Research Lab. Oct. 1981 38 p refs
(Contract F33615-80-C-0512; AF Proj. 6302)
(AD-A107614; AFAMRL-TR-81-83-Pt-1) Avail: NTIS HC A03/MF A01 CSCL 06/20

Oral administration of the inorganic hepatotoxin, hydrazine, to male Fischer 344 or Sprague Dawley rats results in the endogenous methylation of liver DNA at the 7- and O6-positions

of guanine. At doses below the LD50 (45, 60 or 75 mg hydrazine/kg body weight), methylation levels varied little and averaged about 500 micromol 7-methylguanine/mol guanine and 20 micromol O6-methylguanine/mol guanine. At 90 mg hydrazine/kg body weight (approximately the 7-day LD50) the methylation levels were 869 micromol 7-methylguanine and 58 micromol O6-methylguanine/mol guanine 24 hours after toxicant administration. A single dose of 3 mg hydrazine/kg body weight did not result in detectable levels of methylguanines in liver DNA; however, after three or four daily administrations of hydrazine at this dose, liver damage was evident, and liver DNA contained 50-100 micromol 7-methylguanine/mol guanine, about the limit of analytical detection. Following a single oral administration of 90 mg hydrazine/kg body weight, liver DNA guanine rapidly became methylated. The time for half-maximum alkylation at 7-guanine was 30 minutes and at O6-guanine, 45 minutes. The rates of removal of these methylated bases were consistent with published values from experiments using methylating carcinogens and with values obtained in this laboratory with the model compound, 1,2-dimethylhydrazine.
GRA

N82-17866# Environmental Protection Agency, Ann Arbor, Mich. Inspection and Maintenance Staff.

HEALTH EFFECTS OF CARBON MONOXIDE AND OZONE

Jul. 1981 20 p refs Prepared in cooperation with Energy and Environmental Analysis, Inc., Arlington, Va.
(PB82-114265; EPA-AA-IMS-81-8) Avail: NTIS HC A02/MF A01 CSCL 06T

The information known about the health effects of carbon monoxide (CO) and ozone (O3) is summarized. How that information is used by EPA to set National Ambient Air Quality Standards is discussed. The sources most likely to contribute to high levels of CO and O3 and how EPA control programs will reduce emissions from these sources in the future are discussed. The health effects on humans and plants are discussed.
Author (GRA)

N82-17867 American Univ., Washington, D. C.

A MODEL FOR ESSENTIAL HYPERTENSION: METABOLIC STUDIES Ph.D. Thesis

James Patterson Church 1981 101 p
Avail: Univ. Microfilms Order No. 8126862

The extent to which blood pressures and tissue lipid levels are manipulated by dietary control of low levels of essential fatty acids in rat strains used as models of hypertensive and normotensive man were determined. Procedures included gravimetric total lipids, colorimetric cholesterol and phospholipids, fluorimetric triglycerides and gas liquid chromatographic fatty acids. Samples were taken from plasma liver and kidney. Total lipids were lower in plasma, liver, and kidney of the SHR than the WKY. Liver triglyceride and kidney cholesterol and phospholipid (PL) were lower with liver PL higher in SHR than in WKY. Total individual fatty acids in plasma and in neutral lipid and PL fractions of liver and kidney exhibited several strain and diet differences. A high metabolic rate in the SHR suggests defective transport of essential fatty acids from the liver. Dissert. Abstr.

N82-17868 California Univ., San Diego.

CEREBRAL HEMISPHERIC ACTIVITY AND AUTOMONIC NERVOUS FUNCTION Ph.D. Thesis

Deborah Ann Werntz 1981 130 p
Avail: Univ. Microfilms Order No. 8125444

An otherwise unknown relationship between cerebral hemispheric activity, as exhibited by the EEG, and the autonomic nervous system as exhibited by the nasal cycle and its self-induced alteration as regulated by forced uninostril respiration is demonstrated. It is proposed that the correlation of the nasal cycle with alternating relative EEG amplitude asymmetry is indicative of and consistent with a single ultradian ocillator system. It is also proposed that the nasal cycle is controlled via a central mechanism, whereby the hypothalamus regulates the sympathetic/parasympathetic balance and the vasomotor tone throughout the body. The 'feedback' effect of nasal airflow on EEG asymmetry is mediated through the olfactory system and its connecting pathways to the hypothalamus. The data demonstrate the individual's ability to noninvasively and predictably after cortical activity and possibly other autonomic functions. Dissert. Abstr.

N82-17869 Michigan State Univ., East Lansing.

THE ROLE OF INTESTINAL NERVES IN THE NUTRIENT INDUCED INTESTINAL HYPEREMIA Ph.D. Thesis

Richard Arlan Nyhof 1981 124 p
Avail: Univ. Microfilms Order No. 8126536

The blood flow to the small intestine increases following a meal, and this hyperemia appears to be localized to those portions of the intestine exposed to nutrients. Evidence indicates that local intestinal nerves may participate in producing this hyperemia. The venous outflow of isolated canine jejunal segments, the arteriovenous oxygen difference, and the rate of oxygen consumption were measured before and after administration of a local anesthetic and several neurotransmitter antagonists. Intestinal nerves do not appear to play a role in the intestinal hyperemia produced by luminal placement of nutrient solutions. On the basis of the magnitude of hyperemic and metabolic responses, the hyperemia produced by glucose appears to be metabolically mediated. The oleic acid induced hyperemia more closely resembles that produced by vasodilator chemicals. The hyperemia produced by food would likely involve a combination of these mechanisms. Dissert. Abstr.

N82-17870 Yale Univ., New Haven, Conn.

REGULATION OF CALCIUM CURRENT AND CALCIUM ACTIVITY IN HEART CELLS Ph.D. Thesis

Eduardo Marban 1981 152 p
Avail: Univ. Microfilms Order No. 8125689

The regulation of calcium current in mammalian ventricular muscle and Purkinje fibers was studied by voltage clamp technique. The effects of changes in intracellular calcium on the size of the slow inward calcium current (I sub si) were found to explain the digitalis-induced increase in this current, as well as some properties of the inactivation of I sub si. The involvement of K+ as a charge carrier of the transient outward current is shown Ca entry leads to inactivation, as previously suggested for Paramecium, Aplysia neurons, and stick insect skeletal muscle. Enhancement of I sub si is observed in association with the positive inotropic effect of digitalis. It is suggested that a rise in Na sub I leads to increased I sub si possibly through a secondary rise in Ca. Quiescent ventricular muscle, a mean free Ca2+ concentration of micro is found. During contractures, transients rising up to 10 micro are reported. In studying the effects of catecholamines on free Ca2+ and force, it is evidenced that epinephrine reduces myofibrillar Ca2+ sensitivity in heart muscle. Dissert. Abstr.

N82-17239# Joint Publications Research Service, Arlington, Va.

STATUS OF SPACE BIOMEDICAL PROGRAMS

Avadalik Ignatyevich Burnazyan *In its* USSR Rept.: Space, No. 1, (JPRS-79711) 22 Dec. 1981 p 29-33 Transl. into ENGLISH from Pravda (Moscow), 15 Jun. 1981 p 3 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

N82-17814# Joint Publications Research Service, Arlington, Va.

EFFECT OF STATIONARY MAGNETIC FIELD ON THE ENDOCRINE SYSTEM

Ye. A. Zagorskaya *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 14-20 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 14-17 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17816# Joint Publications Research Service, Arlington, Va.

AMINO ACID METABOLISM DURING PROLONGED INTAKE OF DEHYDRATED FOODS AND SIMULATION OF SOME SPACE FLIGHT FACTORS

V. P. Bychkov, I. I. Borodulina, and T. F. Vlasova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 26-29 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. Oct. 1981 p 21-23 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

(USSR), v. 15, no. 5, Sep. - Oct. 1981 p 23-27 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17818# Joint Publications Research Service, Arlington, Va.
PREVENTION OF STAPHYLOCOCCAL INFECTIONS DURING SPACE FLIGHTS
S. N. Zaloguyev, A. N. Viktorov, V. P. Gorshkov, T. Yu Norkina, and M. M. Shinkareva *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 35-38 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 27-29 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17819# Joint Publications Research Service, Arlington, Va.
HUMAN ADRENOSYMPATHETIC SYSTEM DURING IMMERSION IN WATER
N. A. Davydova, R. A. Tigranyan, and Ye. B. Shulzhenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 39-44 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 30-34 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17821# Joint Publications Research Service, Arlington, Va.
CARDIAC OUTPUT AND CARDIAC CYCLE PHASE STRUCTURE OF PILOTS DURING FLIGHTS
V. A. Degtyarev, V. S. Bednenko, A. B. Vasilyev, A. N. Kozlov, V. Ya. Kolyagin, and A. P. Yarunin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 50-54 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 38-41 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17822# Joint Publications Research Service, Arlington, Va.
HUMAN LIPID METABOLISM DURING CONFINEMENT IN PRESSURE CHAMBER
V. P. Bychkov and O. S. Khokhlova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 55-58 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 41-43 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17824# Joint Publications Research Service, Arlington, Va.
VITAMIN C, B SUB 1 AND B SUB 6 EXCRETION IN URINE DURING 182-DAY ANTIORTHOSTATIC HYPOKINESIA
V. P. Bychkov and V. A. Korshunova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 63-67 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 46-49 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17825# Joint Publications Research Service, Arlington, Va.
JUGULAR, RIGHT ATRIAL PRESSURE AND CEREBRAL HEMODYNAMICS OF HEALTHY MAN SUBMITTED TO POSTURAL TESTS
V. Ye. Katkov, V. V. Chestukhin, V. V. Rumyantsev, A. Z. Troshin, and O. Kh. Zybin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 6873 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 49-53 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17826# Joint Publications Research Service, Arlington, Va.
EFFECTS OF EMBIENT PARAMETERS ON MAN
R. M. Arslanova, I. Ye. Ganelina, V. Ye. Manoylov, L. K. Sapozhkov, and S. K. Churina *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep.-Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 74-77 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 53-55 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17827# Joint Publications Research Service, Arlington, Va.
ANTIHYPOXIC EFFICACY OF INTERMITTENT MODE OF PRESSURE CHAMBER CONDITIONING OF MAN
A. Yu. Katkov, Ye. A. Kovalenko, G. A. Davydov, R. N. Chabdarova, S. A. Vtoryy, A. P. Manik, Yu. A. Spasskiy, Yu. P. Starshinov, and N. M. Utkina *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 78-81 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 56-58 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17828# Joint Publications Research Service, Arlington, Va.
INFORMATIVENESS OF ULTRASONIC DOPPLER CARDIOGRAPHY IN EVALUATION OF CORONARY CIRCULATION
V. S. Bednenko, V. A. Degtyarev, A. N. Kozlov, N. N. Popov, and G. K. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 82-86 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 58-61 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17829# Joint Publications Research Service, Arlington, Va.
AGE RELATED DISTINCTIONS OF COSMONAUTS REGIONAL HEMODYNAMICS
I. D. Vasilyeva, Kh. Kh. Yarullin, and V. I. Zhuyko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 82-90 ref Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 61-64 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17830# Joint Publications Research Service, Arlington, Va.
COMPARATIVE EVALUATION OF ANTIMICROBIAL ACTIVITY OF SOME URINE PRESERVATIVES
T. Ye. Lebedeva, I. V. Yakimova, N. M. Nazarov, and S. V. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 91-94 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 64-66 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17836# Joint Publications Research Service, Arlington, Va.
BLOOD FIBRINOGEN AS RELATED TO IMMERSION IN WATER FOR SEVEN DAYS AND SHORT-TERM SPACE FLIGHT
A. N. Fomin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 119-122 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 83-85 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17850# Joint Publications Research Service, Arlington, Va.
CURRENT PROBLEMS OF RADIOBIOLOGY OF ELECTROMAGNETIC RADIATION OF RADIO-FREQUENCY RANGE
I. G. Akoyev *In its* USSR Rept.: Life Sci. Effect on Nonionizing

N82-17817# Joint Publications Research Service, Arlington, Va.
EFFECT OF SPACE FLIGHTS OF DIFFERENT DURATION ON ENERGY METABOLISM OF HUMAN ERYTHROCYTES
A. S. Ushakov, S. M. Ivanova, S. S. Brantova, and O. I. Labetskaya *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 30-34 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med.

Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 37-43 refs Transl. into ENGLISH from Radiobiol. (USSR), v. 20, no. 1, Jan. - Feb. 1980 p 3-8 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

N82-17852# Joint Publications Research Service, Arlington, Va.
MORTALITY IN ACUTE MYOCARDIAL INFARCTION AS FUNCTION OF GEOMAGNETIC FIELD ACTIVITY IN YEREVAN
N. N. Karazyan and L. A. Akhverdyan *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 51-55 Transl. into ENGLISH from Dokl. Akad. Nauk Arm. SSR (USSR), v. 22, no. 3, 1981 p 188-191 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

N82-17853# Joint Publications Research Service, Arlington, Va.
EFFECT OF HYPOGEOMAGNETIC FIELD ON ACTIVITY OF SOME CEREBRAL ENZYMES
A. V. Shakula and G. M. Chernyakov *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 56-59 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 9, Sep. 1981 p 11-13 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-17871*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN EVALUATION OF HELICOPTER NOISE AND VIBRATION RIDE QUALITIES CRITERIA
C. E. Hammond, D. D. Hollenbaugh, S. A. Clevenson, and J. D. Leatherwood Dec. 1981 14 p refs Presented at the Technol. for the Jet Smooth Ride, A Natl. Specialists' Meeting on Helicopter Vibration, Hartford, Conn., 2-4 Nov. 1981; sponsored by the American Helicopter Society Prepared in cooperation with Army Research and Technology Lab., Fort Eustis, Va.
(NASA-TM-83251) Avail: NTIS HC A02/MF A01 CSCL 05H

Two methods of quantifying helicopter ride quality; absorbed power for vibration only and the NASA ride comfort model for both noise and vibration are discussed. Noise and vibration measurements were obtained on five operational US Army helicopters. The data were converted to both absorbed power and DISC's (discomfort units used in the NASA model) for specific helicopter flight conditions. Both models indicate considerable variation in ride quality between the five helicopters and between flight conditions within each helicopter. T.M.

N82-17872*# Singer Co., Sunnyvale, Calif.
VTOL/STOL VISUAL STUDY Final Report
Frank P. Lewandowski Jun. 1980 38 p
(Contract NAS2-10222)
(NASA-CR-166292) Avail: NTIS HC A03/MF A01 CSCL 05I

The development of data bases and real time techniques to improve the realism of sea state, bow and stern wake, and ship motion is addressed. This system was designed for use with the Vertical Motion Simulator to perform basic studies on VTOL/STOL aircraft. B.W.

N82-17873# Dunlap and Associates, Inc., La Jolla, Calif.
DEVELOPMENT OF THE AUTOMATED PERFORMANCE ASSESSMENT AND REMEDIAL TRAINING SYSTEM (APARTS): A LANDING SIGNAL OFFICER TRAINING AID Final Report, Sep. 1979 - Mar. 1981
Steven T. Breidenbach and Clyde A. Brictson Orlando, Fla. Naval Training Equipment Center Jun. 1981 53 p refs
(Contract N61339-79-D-0105)
(AD-A106224; NAVTRAEQUIPC-79-D-0105-1) Avail: NTIS HC A04/MF A01 CSCL 05/9

Development of the automated performance assessment and remedial training system (APARTS) is described. The APARTS is an automated training aid designed to assist the landing signal officer (LSO) in training pilots during the acquisition of carrier landing skills. The APARTS is based on general principles of learning and provides graphic displays of pilot landing technique problems for LSO evaluation and pilot feedback. The APARTS also integrates field carrier landing practice, conducted in the aircraft, with night carrier landing training (NCLT) instruction. Once landing problems are identified and feedback is provided to the pilot, remedial instruction is given in the NCLT. An improved APARTS conceptual model along with two computer programs designed to process, store and graphically display pilot performance data are described. Future APARTS developments are outlined for improved carrier landing effectiveness. GRA

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-17874*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
TIME DOMAIN IDENTIFICATION OF AN OPTIMAL CONTROL PILOT MODEL WITH EMPHASIS ON THE OBJECTIVE FUNCTION
David K. Schmidt 1982 22 p refs Presented at AFFTC/NASA Dryden/AIAA Workshop on Flight Testing to Identify Pilot Workload and Pilot Dynamics, Edwards, Calif., 19-21 Jan. 1981
(Grant NAG4-1)
(NASA-CR-168487) Avail: NTIS HC A02/MF A01 CSCL 05H

A method for the identification of the pilot's control compensation using time domain techniques is proposed. From this information we hope to infer a quadratic cost function, supported by the data, that represents a reasonable expression for the pilot's control objective in the task being performed, or an inferred piloting strategy. The objectives for this method are: (1) obtain a better understanding of the fundamental piloting techniques in complex tasks, such as landing approach; (2) the development of a metric measuurable in simulations and flight test that correlate with subjective pilot opinion; and (3) to further validate pilot models and pilot vehicle analysis methods. E.A.K.

N82-17875*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HUMAN-MACHINE INTERFACE ISSUES IN THE MULTI-SATELLITE OPERATIONS CONTROL CENTER-1 (MSOCC-1) Technical Memorandum, 1 Jun. - 7 Aug. 1981
Christine M. Mitchell (George Mason Univ.) Aug. 1981 68 p refs
(NASA-TM-83826) Avail: NTIS HC A04/MF A01 CSCL 05H

An analysis of the Multisatellite Operations Control Center facilities (MSOCC-1) is presented. The analysis focuses on the human machine interfaces and interactions present in the data operations control area, the computer support operations, and the mission operations rooms in both current facilities and the proposed automated MSOCC-1. An alternative approach to the design of the automated MSOCC-1, which highlights human factors and human machine interaction dimensions of the design process, is also presented. S.L.

N82-17876# Federal Aviation Administration, Washington, D.C.
DOT/FAA HUMAN FACTORS WORKSHOP ON AVIATION. TRANSCRIPT, VOL 1
Nov. 1980 112 p Workshop held at Cambridge, Mass., 24-25 Nov. 1980 2 Vol.
(AD-A107802) Avail: NTIS HC A06/MF A01 CSCL 01/2

The opinions of airline pilots are considered in a presentation of aviation human factors safety issues. Human behavior is considered in the design, operation, and maintenance of aviation man machine systems. GRA

N82-17877# Federal Aviation Administration, Washington, D.C.
DOT/FAA HUMAN FACTORS WORKSHOP ON AVIATION. TRANSCRIPT, VOLUME 2
25 Nov. 1980 219 p refs Workshop held at Cambridge, Mass., 24-25 Nov. 1980
(AD-A107803) Avail: NTIS HC A10/MF A01 CSCL 01/2

Training issues and flight fatigue are considered in a presentation of aviation human factors safety issues. Human behavior is considered in the design, operation, and maintenance of aviation man machine systems. GRA

N82-17813# Joint Publications Research Service, Arlington, Va.
IN-FLIGHT DIETS AND QUANTITATIVE ADEQUACY THEREOF TO PILOT EXPENDITURE
I. G. Popov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 1-13 refs Transl. into English from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 4-14 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17815# Joint Publications Research Service, Arlington, Va.
DIET OF CREWS OF THREE MAIN EXPEDITIONS ABOARD SALYUT-6 ORBITAL STATION
V. P. Bychkov, S. Kalandarov, M. V. Markaryan, N. D. Radchenko, K. A. Stepchkov, and M. L. Frumkin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 21-25 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 17-20 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N82-17878*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
USER'S GUIDE FOR SKETCH
David R. Hedgley, Jr. Feb. 1982 13 p
(NASA-TM-81369; H-1169) Avail: NTIS HC A02/MF A01 CSCL 09B

A user's guide for the computer program SKETCH is presented. The removal of hidden lines from images of solid objects is a problem in computer graphics which is solved by SKETCH. S.L.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N82-17879*# Case Western Reserve Univ., Cleveland, Ohio.
INVESTIGATION AND EVALUATION OF A COMPUTER PROGRAM TO MINIMIZE THREE-DIMENSIONAL FLIGHT TIME TRACKS Final Report, 15 Sep. 1980 - 12 Aug. 1981
Frederic I. Parke 12 Aug. 1981 150 p
(Grant NAG3-101)
(NASA-CR-168419) Avail: NTIS HC A07/MF A01 CSCL 09B

The program for the DC 8-D3 flight planning was slightly modified for the three dimensional flight planning for DC 10 aircrafts. Several test runs of the modified program over the North Atlantic and North America were made for verifying the program. While geopotential height and temperature were used in a previous program as meteorological data, the modified program uses wind direction and speed and temperature received from the National Weather Service. A scanning program was written to collect required weather information from the raw data received in a packed decimal format. Two sets of weather data, the 12-hour forecast and 24-hour forecast based on 0000 GMT, are used for dynamic processes in testruns. In order to save computing time only the weather data of the North Atlantic and North America is previously stored in a PCF file and then scanned one by one. R.J.F.

N82-17880*# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Computer Engineering and Science.
SHADED COMPUTER GRAPHIC TECHNIQUES FOR VISUALIZING AND INTERPRETING ANALYTIC FLUID FLOW MODELS Final Report, Jul. 1978 - Jun. 1981
Frederic I. Parke Jun. 1981 17 p refs
(Grant NsG-3207)
(NASA-CR-168418) Avail: NTIS HC A02/MF A01 CSCL 09B

Mathematical models which predict the behavior of fluid flow in different experiments are simulated using digital computers. The simulations predict values of parameters of the fluid flow (pressure, temperature and velocity vector) at many points in the fluid. Visualization of the spatial variation in the value of these parameters is important to comprehend and check the data generated, to identify the regions of interest in the flow, and for effectively communicating information about the flow to others. The state of the art imaging techniques developed in the field of three dimensional shaded computer graphics is applied to visualization of fluid flow. Use of an imaging technique known as 'SCAN' for visualizing fluid flow, is studied and the results are presented. S.L.

N82-17881# Naval Underwater Systems Center, Newport, R.I. Combat Control Systems Dept.
INTERCOMPUTER TRANSPORTATION OF ASSEMBLY LANGUAGE SOFTWARE THROUGH DECOMPILATION
Donald L. Brinkley 15 Oct. 1981 46 p refs
(AD-A107645; NUSC-TR-6004) Avail: NTIS HC A03/MF A01 CSCL 09/2

Portability of assembly language software can be achieved in a practical way only through the use of automated translators. The fact that translation between two representations at the same semantic level is a clumsy and difficult task has frustrated the development of such technology. This clumsiness stems from the fundamental differences in the architectural structures of different machines. In its simplest form, the translation process actually becomes the process of simulating one machine or another. The goal of such translation, however, should be the generation of assembly language code for the target machine that approximates, in efficiency and in appearance, code written to perform the same task by a 'good' assembly language programmer in the target language. A translator that performs a decompilation of the source program into an intermediate representation at a higher semantic level is described. Code in the target assembly language can later be generated from this intermediate representation. This translation scheme is shown to remove most of the machine dependency from assembly language software. Author (GRA)

N82-17882# National Communications System, Washington, D. C.
OPEN SYSTEMS INTERCONNECTION (OSI) REFERENCE MODEL (AUG. 1981) (ISO SECOND DRAFT PROPOSAL (DP) 7498)
Sep. 1981 113 p refs
(AD-A107644; NCS-TIB-81-1A) Avail: NTIS HC A06/MF A01 CSCL 09/2

The reference model was developed to establish a framework for the coordination of existing and future standards developed to facilitate the interconnection of information systems. The model does not specify services and protocols for interconnection. It is designed to be the common basis for the planning and coordination of consistent standard protocols and families of protocols in a hierarchical manner. Implementation of standards development in consonance with the Model should allow the exchange of information among terminal devices, computers, people, application processes, etc., that are 'open' to each other by virtue of their mutual use of applicable standards. The Reference Model has a hierarchical organization of 7 architectual layers, based on the transfer of data by telecommunication means. GRA

N82-17883# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
COMPUTER SCIENCE AND TECHNOLOGY: AN ASSESSMENT AND FORECAST OF ADP IN THE FEDERAL GOVERNMENT Final Report
Martha Mulford Gray Aug. 1981 160 p
(PB82-116112; NBS-SP-500-79; LC-81-600094) Avail: NTIS HC A08/MF A01 CSCL 05C

The findings of the International Data Corporation (IDC) on the current status of Federal ADP and projects ADP trends in the Federal Government for 1979 through 1985 are summarized. Hardware areas included are computers and related peripheral equipment such as magnetic tape drives, disk drives, terminals, printers, modems, multiplexers, and word processors. Other areas included are: an analysis of programming languages; analysis of software spending; analysis of installation workload by mode of operation and by application; implementation of data base management systems; scope of contract services in the Federal Government in selected Federal installations. GRA

N82-17087# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
DISTRIBUTED DATA PROCESSING: WHAT IS IT?
Philip H. Enslow, Jr. *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p refs (For primary document see N82-17086 08-01)
(Contract N00014-79-C-0873)
Avail: NTIS HC A18/MF A01

N82-17094# FGAN, Wachtberg-Werthhoven (West Germany).
EXPERIENCES WITH THE EXPERIMENTAL FFM-MCS
Hermann von Issendorff *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17095# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.
SAVANT: A DATABASE MANIPULATION TECHNIQUE FOR SYSTEM ARCHITECTURE DESIGN VERIFICATION AND ANALYSIS
A. A. Callaway *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17098# Ferranti Ltd., Bracknell (England). Computer System Div.
FUNCTIONAL DOCUMENTATION. A PRACTICAL AID TO THE ORDERLY SOLUTION OF THE SYSTEM DESIGN PROBLEM
J. J. Martin *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17101# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
DISTRIBUTED AND DECENTRALIZED CONTROL IN FULLY DISTRIBUTED PROCESSING SYSTEMS
Philip H. Enslow, Jr. *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 p 16 refs (For primary document see N82-17086 08-01)
(Contract F30602-78-C-0120)
Avail: NTIS HC A18/MF A01

N82-17107# Litton Technische Werke, Freiburg (West Germany).
RECONFIGURATION: A METHOD TO IMPROVE SYSTEMS REALIABILITY
J. Szlachta *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17108# Societe d'Applications Generales d'Electricite et de Mecanique, Paris (France).
A RECONFIGURABLE CHANGE NETWORK FOR DISTRIBUTED PROCESS CONTROL [RESEAU D'ECHANGE RECONFIGURABLE POUR CONTROLE DE PROCESSUS REPARTI]
Ch. Meraud and B. Maurel (Societe Anonyme de Telecommunications) *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p refs In FRENCH (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17109# Norwegian Defence Research Establishment, Kjeller.
PROTOCOL LEVEL MODULES FOR COST EFFECTIVE STANDARD COMPUTER COMMUNICATION
Oyvind Hvinden, Yngvar Lundh, and Oystein Sandholt *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17112# Fraunhofer-Inst. fuer Informations- und Datenverarbeitung, Karlsruhe (West Germany).
THE TRAFFIC FLOW IN A DISTRIBUTED REAL TIME COMPUTING SYSTEM (RDC-SYSTEM) WITH A FIBER-OPTIC RINGBUS SYSTEM
Dirk Heger and Reinhard Baehre *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17116# Naval Weapons Center, China Lake, Calif. Facility Engineering Branch.
STATE-OF-THE-ART COMPUTER MONITORING EQUIPMENT
Harvey G. Nelson *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 6 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-17884*# Mississippi State Univ., Mississippi State. Engineering and Industrial Research Station.
A STUDY OF HIGH DENSITY BIT TRANSITION REQUIREMENTS VERSUS THE EFFECTS ON BCH ERROR CORRECTING CODING Interim Final Report, 1 Jul. 1980 - 31 Dec. 1981
Frank Ingels and William O. Schoggen 31 Dec. 1981 100 p refs

(Contract NAS8-33887)
(NASA-CR-161957; MSSU-EIRS-EE-81-5) Avail: NTIS HC A05/MF A01 CSCL 09B

The various methods of high bit transition density encoding are presented, their relative performance is compared in so far as error propagation characteristics, transition properties and system constraints are concerned. A computer simulation of the system using the specific PN code recommended, is included.

S.L.

N82-17885# Massachusetts Univ., Amherst. Dupt. of Computer and Information Science.

COMPUTER INTERPRETATION OF A DYNAMIC IMAGE FROM A MOVING VEHICLE Ph.D. Thesis

Thomas Dell Williams May 1981 297 p refs
(Contract N00014-75-C-0459; Grant NSF DCR-75-16098)
(AD-A107565; COINS-TR-81-22) Avail: NTIS HC A13/MF A01 CSCL 09/2

The goal of this thesis is the design and implementation of a computer program that constructs an interpretation of images of a natural scene, in particular one imaged while the camera is in a moving automobile. The succession of images is to be interpreted in terms of surfaces and objects in three dimensional space. The agreement between image dynamics and an internal surface model of the environment is measured by comparing a pair of temporally disparate images (two movie frames). Using the model, an image taken at one location can be transformed into a synthetic image of the scene as it would be viewed from another location. This synthesis accounts for point displacements and occlusion effects as predicted by the internal model. Differences between the real and the synthetic images are then used as an error measure in a search that refines the model. Once the model is refined, unresolved errors are used to correct the initial surface model by resegmenting the image into a better approximation of the surfaces in the environment. GRA

N82-17886# Missouri Univ. -Columbia. Dept. of Statistics.

AN ISOTONIC REGRESSION ALGORITHM Technical Report, Jun. 1981

Richard L. Dykstra Jul. 1981 18 p refs
(Contract N00014-78-C-0655)
(AD-A107620; TR-106) Avail: NTIS HC A02/MF A01 CSCL 12/1

A 'pooling sets' type of algorithm is developed and shown to be valid for computing an isotonic regression function for a general quasi-order. The method is direct and intuitive. The algorithm works best when the quasi-order is complex and the objective function is nearly isotonic. An example is worked out in detail. Author (GRA)

N82-17887# Ohio State Univ., Columbus. Computer Graphics Research Group.

TERRAIN MODEL ANIMATION Final Report, 1 Dec. 1979 - 15 Oct. 1980

John L. Booker, Charles Csuri, Robert Marshall, and Roger Wilson Sep. 1981 48 p
(Contract N61339-80-C-0008)
(AD-A107911; NAVTRAEQUIPC-80-C-0008-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

Procedure models are used to combine fundamental data elements in the creation of unified objects comprising the terrain model. A procedure model to generate trees of various species was implemented. Interactive techniques were developed to generate mountains. An analysis was made of the performance of a Z-buffer display algorithm. Test results are included in the report. Author (GRA)

N82-17888# University of Southeastern Massachusetts, North Dartmouth. Dept. of Electical Engineering.

ON A TWO-DIMENSIONAL MAXIMUM ENTROPY SPECTRAL ESTIMATION METHOD FOR THE TEXTURE IMAGE ANALYSIS

C. H. Chen and Gia-Kinh Young 30 Oct. 1981 28 p refs
(Contract N00014-79-C-0494; NR Proj. 042-422)
(AD-A107569; SMU-EE-TR-81-16) Avail: NTIS HC A03/MF A01 CSCL 09/2

The two dimensional maximum entropy spectral estimation method proposed by Lim and Malik is studied and modified for spectral analysis of texture images. The computational efficiency of the algorithm makes it feasible for minicomputer implementation to extract effective spectral domain texture features for texture discrimination. Extensive computer results are presented. GRA

N82-17889# Naval Underwater Systems Center, New London, Conn.

TWO-CHANNEL LINEAR-PREDICTIVE SPECTRAL ANALYSIS: PROGRAM FOR THE HP 9845 DESK CALCULATOR

Albert H. Nuttall 1 Oct. 1981 58 p refs
(ZR0000101)
(AD-A107634; NUSC-TR-6533) Avail: NTIS HC A04/MF A01 CSCL 12/1

A program for linear-predictive spectral analysis of two channels of data, including estimation of the auto-spectra, cross-spectrum, magnitude-squared-coherence, and the argument of the coherence, is presented in BASIC for the HP 9845 desk calculator. Timing results for the major subroutines are included, and their dependence on the fundamental parameters of the data, filter, and desired spectral resolution is indicated. This technique and program for spectral analysis are very appropriate for short data segments. In particular, a positive-definite spectral matrix estimate is guaranteed. Applications to examples including a strong tonal interference in one channel are made, and a possible shortcoming of the technique is pointed out. A suggested remedy is proposed and a philosophy for multichannel spectral analysis is suggested for further consideration.

Author (GRA)

N82-17890# Computers/Structures International, Oakland, Calif.

THEORETICAL BASIC FOR CTABS80: A COMPUTER PROGRAM FOR THREE-DIMENSIONAL ANALYSIS OF BUILDING SYSTEMS Final Report

Edward L. Wilson, H. H. Dovey, and Ashraf Habibullah Vicksburg, Miss. Army Engineer Waterways Experiment Station Sep. 1981 132 p refs
(AD-A107635; WES-TR-K-81-2) Avail: NTIS HC A07/MF A01 CSCL 13/13

This report presents the theoretical basis for CTABS80, a computer program for the linear three dimensional structural analysis of multistory frame and shear wall buildings subjected to static or dynamic loadings. In CTABS80, the building is idealized as an assemblage of vertical independent frame and shear wall systems interconnected by horizontal floor diaphragms which are rigid in their own plane. The frame and shear wall systems must basically be of rectangular geometry (in elevation) with vertical columns (or piers) and horizontal beams (or spandrels). However, with special modeling techniques, very complex situations may be considered. A special shear panel element is developed to enable modeling of discontinuous shear walls and shear walls with arbitrary openings. A diagonal bracing system to model braced frames (X-braced, K-braced, or eccentrically braced systems) is also presented. The column, shear panel, and diagonal formulations include the effects of bending, axial, and shear deformations. Bending and shear deformations are also included in the beam formulation; however, the effects of axial deformations are neglected. The effects of the finite dimensions of the beams and columns on the stiffness of a frame or shear wall system are automatically included. The buildings may be unsymmetrical and nonrectangular in plan. Torsional behavior and interstory compatibility are accurately reflected in the results. GRA

N82-17891# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.

AN UNDERLYING CONTEXT-FREE GRAMMAR OF ALGOL 68 PLUS

L. G. L. T. Meertens and J. C. vanVliet Jul. 1981 22 p refs
(MC-IW-171/81) Avail: NTIS HC A02/MF A01

The description of ALGOL 68+, a superlanguage of ALGOL 68, by a two-level Van Wijngaarden grammar is considered. This type of grammar is not well suited for standard parsing techniques. A method by which a context free grammar is obtained from the two-level grammar is explained. The differences introduced through this transition are discussed. When appropriate, hints are offered as to where during the parsing process these differences can be dealt with in a reasonable way. The context free grammar is presented in a self-explanatory format. Although

this grammar was developed with a very specific (top-down) parsing method in mind, it is general enough to be useful as a starting point for a wide variety of parsing algorithms.
Author (ESA)

N82-17892# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
PEP: AN INTERACTIVE PROGRAMMING SYSTEM WITH AN ALGOL-LIKE PROGRAMMING LANGUAGE
P. W. E. Verhelst and N. F. Verster (Tech. Univ., Eindhoven, Netherlands) Aug. 1981 22 p refs Submitted for publication Sponsored by Netherlands Organization for the Advancement of Pure Research (ZWO)
(MC-IW-172/81) Avail: NTIS HC A02/MF A01

Construction of an interactive programming environment which provides a better structured language than BASIC, but which retains the attractive properties of BASIC systems, is intended. A simple computer network, consisting of a central PDP 11/23 host computer and several small LSI 11 satellite computers for the control of physics experiments, was used. The main tasks of the satellite computers are data acquisition, adjusting experiment parameters, and simple numerical analysis. The system is interpreter based. The language processed by the system allows declaration of variables, constants, and procedures; it has structured statements for conditional and repetitive execution of program parts. Experience shows that the system is much more powerful than available BASIC systems. The slowness of an interpreter based system is completely compensated for by the ease with which the system can be used and by the fast response to program changes. Author (ESA)

N82-17893# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
AN OPERATOR-PRIORITY GRAMMAR FOR ALGOL 68 PLUS
L. G. L. T. Meertens and J. C. vanVliet Aug. 1981 31 p refs
(MC-IW-173/81) Avail: NTIS HC A03/MF A01

How an operator-precedence grammar for ALGOL 68+ can, through a simple right-to-left transduction scheme, be made to be of type LL (1) is discussed. If a grammar is of type LL (1), this easily leads to a parsing method for that grammar, implemented by a set of mutually recursive routines, one for each nonterminal of the grammar. The superlanguage of ALGOL 68, ALGOL 68+, is powerful enough to describe the standard-prelude. If, in addition, the grammar is an operator-priority grammar, an easy and consistent error recovery mechanism can be applied. Such an operator-priority grammar for ALGOL 68+ is given. An account of the differences between the language generated by this grammar, and ALGOL 68+, insofar as these are due to the transition to an operator-priority grammar, is given as well. These differences somehow have to be catered for during the parsing process. Author (ESA)

N82-17894# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
SOME THOUGHTS ON A TUPLE ORIENTED PROGRAMMING SYSTEM
P. Verhelst Aug. 1981 17 p refs
(MC-IW-174/81) Avail: NTIS HC A02/MF A01

The system is intended to be used as the lowest level of an interactive programming system. It is shown how abstract data types and syntax extensions may be handled in this system. A basic framework that supports the definition and manipulation of arbitrary types of objects (including programs) is presented. In the same way as is done in LISP, a translation from programs to tuples is made. The tuple processor executes these translated programs. The tuple form of programs allows manipulation of programs and, by mapping the processor state on tuples, program debugging. By defining all types of objects within this framework, the corresponding operations are automatically available in the programming language. Author (ESA)

N82-17099# British Aircraft Corp., Preston (England). Aircraft Group.
A CONSISTENT APPROACH TO THE DEVELOPMENT OF SYSTEM REQUIREMENTS AND SOFTWARE DESIGN
A. O. Ward *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 16 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17100# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
A PEARL SOFTWARE SYSTEM FOR MULTI-PROCESSOR SYSTEMS
P. Elzer and H.-J. Schneider *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 6 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

62 COMPUTER SYSTEMS

Includes computer networks.

N82-17895# Cornell Univ., Ithaca, N. Y. Dept. of Computer Science.
ROUTING IN NETWORKS
John E. Hopcroft and Allan Borodin (Toronto Univ.) Nov. 1981 16 p refs
(Contract N00014-76-C-0018)
(AD-A107841; TR-81-477) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report is concerned with routing protocols in networks. The major result is a low bound for any oblivious routing strategy where the route of a packet depends only on the source and destination of the packet. We show that for any oblivious routing protocol for a network of n processors in which the maximum number of processors directly connected to any processor is d, there exists a permutation that requires time (sq. root of n) d (to the 3/2). For specific networks such as an n-cube we give an oblivious routing algorithm whose performance is close to this lower bound. Author (GRA)

N82-17896# Brookhaven National Lab., Upton, N. Y. Applied Mathematics Dept.
INTRODUCTION TO THE CENTRAL SCIENTIFIC COMPUTING FACILITIES
K. Fuchel Jun. 1981 57 p
(Contract DE-AC02-76CH-00016)
(DE82-003258; BNL-51432) Avail: NTIS HC A04/MF A01

Introduction to the Central Scientific Computing Facilities (CSCF) is the first of several documents which make up the BNL CSCF Computer Users Guide. The Introduction provides a broad picture of hardware and software facilities and operational policies of the CSCF. Adhering to the premise that CDC and other software purveyors provide sufficient documentation for their products, the Introduction does not reproduce material found elsewhere but refers the reader to the sections of the manuals pertinent to a particular area of interest. DOE

N82-17102# INRIA, Rocquencourt (France).
RECOVERY IN DISTRIBUTED PROCESSING SYSTEMS
Liba Svobodova *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17103# Massachusetts Univ., Amherst. Dept. of Electrical and Computer Engineering.
GENERALIZED POLLING ALGORITHMS FOR DISTRIBUTED SYSTEMS
Jack Keil Wolf *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)
(Grant NSF ESC-79-21140)
Avail: NTIS HC A18/MF A01

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

N82-17897*# SRI International Corp., Menlo Park, Calif. Artificial Intelligence Center.
COMPUTATIONAL THEORY OF LINE DRAWING INTERPRETATION Final Report
Andrew P. Witkin Hampton, Va. NASA. Langley Research Center Dec. 1981 31 p refs
(Contract NAS1-16282)
(NASA-CR-165804) Avail: NTIS HC A03/MF A01 CSCL 09B

The recovery of the three dimensional structure of visible surfaces depicted in an image by emphasizing the role of geometric cues present in line drawings, was studied. Three key components are line classification, line interpretation, and surface interpolation. A model for three dimensional line interpretation and surface orientation was refined and a theory for the recovery of surface shape from surface marking geometry was developed. A new approach to the classification of edges was developed and implemented signatures were deduced for each of several edge types, expressed in terms of correlational properties of the image intensities in the vicinity of the edge. A computer program was developed that evaluates image edges as compared with these prototype signatures. E.A.K.

N82-17898*# Iowa State Univ. of Science and Technology, Ames. Engineering Research Inst.
STOCHASTIC CONTROL SYSTEM PARAMETER IDENTIFIABILITY
Chih-hsiao Lee and Charles J. Herget May 1975 141 p refs
(Contract NCAR-304-402)
(NASA-CR-166300; ISU-ERI-AMES-75134) Avail: NTIS HC A07/MF A01 CSCL 09B

The parameter identification problem of general discrete time, nonlinear, multiple input/multiple output dynamic systems with Gaussian white distributed measurement errors is considered. The knowledge of the system parameterization was assumed to be known. Concepts of local parameter identifiability and local constrained maximum likelihood parameter identifiability were established. A set of sufficient conditions for the existence of a region of parameter identifiability was derived. A computation procedure employing interval arithmetic was provided for finding the regions of parameter identifiability. If the vector of the true parameters is locally constrained maximum likelihood (CML) identifiable, then with probability one, the vector of true parameters is a unique maximal point of the maximum likelihood function in the region of parameter identifiability and the constrained maximum likelihood estimation sequence will converge to the vector of true parameters. S.L.

N82-17899# Sheffield Univ. (England). Dept. of Control Engineering.
CONTROLLER DESIGN FOR UNKNOWN MULTIVARIABLE SYSTEMS USING MONOTONE MODELING ERRORS
D. H. Owens and A. Chotai Feb. 1981 52 p refs
(Grant SRC-GR/B/23250)
(RR-144) Avail: NTIS HC A04/MF A01

The problem of controller design for an unknown discrete or continuous multivariable system in the frequency domain based on open-loop step response data alone is considered. The approach is based on the use of simple approximate plant models possessing the property that the resulting error in modeling the plant open-loop step response is both monotonic and sign definite as a function of time. In such circumstances the frequency domain properties of the approximating feedback system and the error involved in predicting steady state characteristics is sufficient data to predict the stability of the real feedback system. If integral controller elements are included, the results also provide sufficient conditions for exact tracking of step demands. Under certain circumstances, the technique has strong connections with the well-known inverse Nyquist array design method and can be regarded in part as a modification and generalization of that technique to cope with unknown interaction dynamics. Author

N82-17900# Fondazione Ugo Bordoni, Rome (Italy).
CQNA: CLOSED QUEUEING NETWORK ANALYZER
Mauro Brizzi and Davide Grillo Sep. 1980 16 p refs Presented at Tech. Conf. on Meas., Modeling and Evaluation of Computer Systems, Juelich, West Germany, 23-25 Feb. 1981
(FUB-48-1980) Avail: NTIS HC A02/MF A01

The package CQNA-2 allows the computation of metrics related to queueing networks. The networks that can be analyzed belong to a subset of the well known BCMP class, main characterizations being fixed population size ('closed network' assumption), state independent service rates, and stations with one of the following service disciplines: FCFS, LCFS-PR and RR-PS. The package is an extended and thoroughly revised edition of CQNA-1. The use of the package requires mapping of the queueing network to be investigated into its CQNA-2 counterpart. The mapping is quite straightforward and guidelines and examples are reported. Keys for controlling the degree of detail associated to the production of metrics are made available. J.M.S.

N82-17901# Texas Univ. at Arlington. Center for Cybernetic Studies.
QUASI-NEWTON METHODS CONVERGE AT THE GOLDEN SECTION RATE
J. Barzilai Aug. 1981 13 p refs
(Contract N00014-75-C-0569; NR Proj. 047-021)
(AD-A106683; CCS-RR-403) Avail: NTIS HC A02/MF A01 CSCL 12/1

Newton's method for the minimization of f: R to the n power yields R requires computation and inversion of the Hessian matrix at each iteration. Quasi-Newton methods approximate the Hessian or tis inverse by first order (i.e., gradient) information. These methods extend the classical secant (of False Position) method for $n > 1$. They are known to converge to the solution superlinearly. Thus, it is commonly accepted that the price paid for the approximation of the Hessian by gradient information is a reduction from second order to superlinear convergence. It is proven that the rate of convergence of a class of quasi-Newton methods, without line search and without restart, is given by the golden section ratio. J.D.H.

N82-17902# Oxford Univ. (England). Dept. of Engineering Science.
A DISCRETE-TIME MULTIVARIABLE CRITERION FOR LIMIT CYCLE PREDICTIONS
B. Kouvaritakis and R. Cameron (Bradford Univ., England) 1981 13 p refs Sponsored by Science and Engineering Research Council
(OUEL-1369/81) Avail: NTIS HC A02/MF A01

The use of circulant matrices in the study of the steady state response of discrete time systems to periodic inputs is discussed. System description applied to a nonlinear feedback configuration enables the derivation of simple sufficient conditions for the nonexistence of limit cycles. Application of the usual loop transformation to scalar systems recovers the classical circle criterion. The approach can also be applied to multivariable systems. However, instead of circulant matrices, circulant block matrices which are not normal are dealt with; the loop transformation is no longer straightforward. Suitable bounds on the numerical range of the loop transformed linear operator in terms of bounds on the numerical range of the original system are proposed. It is then possible to derive a multivariable circle type criterion with a Nyquist interpretation. Author (ESA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-17903 State Univ. of New York at Stony Brook.
RIEMANNIAN FIBRATIONS OF EUCLIDEAN SPACES Ph.D. Thesis
I-Ping Chu 1981 42 p
Avail: Univ. Microfilms Order No. 8127105

Local and global properties of Riemannian fibrations of flat euclidean space over some complete Riemannian manifold were studied. It is proved that every Riemannian fibration of R(n) over M(n-k), with connected fibers, has a totally geodesic flat fiber in R(n). All Riemannian fibrations of R(n) are classified in terms of group representations of R(k) in the orthogonal group O(n-K). Furthermore, it is shown that Riemannian foliations with 1 dimensional leaves, are fibrations and in one-one correspondence with (non-vanishing) Killing fields of R(n). Dissert. Abstr.

N82-17904 Institut d'Aeronomie Spatiale de Belgique, Brussels.
STOCHASTIC ASPECTS OF CLIMATIC TRANSITIONS: RESPONSE TO PERIODIC FORCING
C. Nicolis 1981 31 p refs Submitted for publication Sponsored in part by Inst. Internationaux de Physique et de Chimie
(Aeronomica-Acta-A-234-1981) Avail: Issuing Activity

The effects of a long time scale on climate dynamics are examined. The time dependent properties of the Fokker-Planck equation corresponding to a zero-dimensional climate model, showing bistable behavior and subject to a weak external periodic forcing, are analyzed. Conditions under which the response is amplified are found analytically. The 100,000 year eccentricity variation of the Earth's orbit, connected with glaciation cycles, was simulated. Although the amplitude of the forcing was small, response amplitude changed dramatically in the presence of fluctuations due to changes in climatic potential and the time scale related to the variance of the fluctuations. Theoretical and numerical analyses of glaciation cycle periodicity agree well. Author (ESA)

N82-17905# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
TWO THEOREMS ON THE DECOMPOSITION OF A PARA-UNITARY FUNCTION INTO A SUM OF TERMS WITH UNIFORM ARGUMENT
Plinio Tissi Sep. 1981 8 p refs Submitted for publication
(INPE-2217-PRE/015) Avail: NTIS HC A02/MF A01

The design of band separation networks is based upon the decomposition of a rational paraunitary (RPU) function q(s) into a sum of terms which possess, at each frequency s = iw, the same argument phi(w). The first theorem presents a sufficient condition on q(s) for the existence of such a decomposition. The second theorem presents the general solution to the problem of finding q(s), when the cross over frequencies and the respective asymptotic slopes are given. S.L.

N82-17906# Bonn Univ. (West Germany). Physikalisches Inst.
REGULARIZATION PROCEDURE FOR STRING FUNCTIONALS
T. Filk Sep. 1981 53 p refs
(HE-81-16; ISSN-0172-8733) Avail: NTIS HC A04/MF A01

A regularization for the partition function of string models, i.e., theories for fields defined on two dimensional manifolds, is proposed. One and two-loop contributions are shown to be finite in a large class of theories and no counter terms are required although these theories are nonrenormalizable in the sense of the usual power counting arguments. Plausibility arguments are given that even in higher corrections a large class of graphs, if not all, might turn out to be finite. Author

N82-17907# Naval Research Lab., Orlando, Fla. Underwater Sound Reference Detachment.
COMPLEX ROOT-FINDING PROGRAM WITH APPLICATION TO THE DISPERSION RELATION OF WAVES PROPAGATING IN A FLUID LOADED PLATE Interim Report
P. S. Dubbelday (Oak Harbour Marine Associates, Southport, Fla.) Washington 20 Nov. 1981 48 p refs
(Contract N00173-79-D-0004; Grant NSF SPI-80-13287; RR0110842)
(AD-A107631; NRL-MR-4559) Avail: NTIS HC A03/MF A01 CSCL 12/1

A method of finding complex roots in described, applicable to the situation where the given equation depends on a parameter in such a way that there exists a real root for a certain value of this parameter. This real root should be determined first by a real root finding routine. By incrementing the parameter by adjustable steps to the desired value, the progression of the corresponding root can be followed from the real axis into the complex plane. Alternately, this method can be applied to the case where it is desired to refine an approximate complex root obtained by other means, or track its progression through the complex plane when a parameter of the equation is varied. The method is a two dimensional counterpart to the one dimensional technique whereby the change of sign of the pertinent function delimits the location of a root. The complex root is similarly enclosed in a nested set of squares of diminishing size. The method is illustrated by a typical example, the dispersion relation for the propagation of straight crested waves in a homogeneous plate. GRA

N82-17908# Missouri Univ. -Columbia. Dept. of Statistics.
DUAL CONVEX CONES OF ORDER RESTRICTIONS WITH APPLICATIONS
Richard L. Dykstra Sep. 1981 25 p refs
(Contract N00014-78-C-0655)
(AD-A108126; TR-111) Avail: NTIS HC A02/MF A01 CSCL 12/1

The concept of closed convex cones in finite dimensional Euclidian space and their duals has proven to be a useful construct. Here dual cones are exhibited for specific closed, convex cones including those pertaining to starshaped orderings and concave (convex) functions. Applications include finding projections involving starshaped orderings, generalizations of Kimball's inequality, an inequality for concave (convex) functions and a characterization of certain kinds of positive dependence. GRA

N82-17909# Harvard Univ., Cambridge, Mass. Dept. of Statistics.
ROBUST PRINCIPAL COMPONENTS AND DISPERSION MATRICES VIA PROJECTION PURSUIT
Zhonglian Chen and Guoying Li Sep. 1981 19 p refs
(Contract N00014-79-C-0512; Grant NSF MCS-79-08685)
(AD-A107827; PJH-8) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper discusses a new kind of robust procedure for estimating covariance/correlation matrices and their principal components. Robust eigenvectors and eigenvalues of a covariance matrix are obtained by the projection pursuit method (PP) with robust variance as a projection index. Monte Carlo simulation results show that the best of the three projection pursuit type procedures introduced in this study compares favorably with approaches based on M-estimators of covariance: the estimate obtained by the new procedure has about the same bias and variance as the best M-estimators, and a somewhat better breakdown point. Author (GRA)

N82-17910# Harvard Univ., Cambridge, Mass. Dept. of Statistics.
PROJECTION PURSUIT
Peter J. Huber Aug. 1981 24 p refs
(Contract N00014-79-C-0512; Grant NSF MCS-79-08685)
(AD-A107817; PJH-6) Avail: NTIS HC A02/MF A01 CSCL 12/11

Projection pursuit (PP), which goes back to Kruskal and Friedman and Tukey, is discussed from a conceptual point of view. Originally, it was merely concerned with finding 'interesting' projections to aid the visual analysis of high dimensional data. It will be argued that there is a very general concept behind PP, having a much broader scope than anticipated by its originators. In its most important aspect it is concerned with finding least normal projections of the data, and it has ramifications reaching into topics as varied as robust covariance estimation, factor analysis, nonparametric signal detection, computer tomography and Hilbert's 13th problem. Author (GRA)

N82-17911# Rochester Inst. of Tech., N. Y.
EFFECT OF RECORD LENGTH ON THE CORRELATION OF COMPLEX EXPONENTIALS
Tapan K. Sarkar, Joshua Nebat (Syracuse Univ., N.Y.), Donald D. Weiner (Syracuse Univ., N.Y.), and Vijay K. Jain (Univ. of South Florida, Tampa) Nov. 1981 28 p refs
(Contract N00014-79-C-0598)
(AD-A107738; TR-81-4) Avail: NTIS HC A03/MF A01 CSCL 12/1

With the advent of the Singularity Expansion Method (SEM) there has been a great interest on the identification of a linear time-invariant system by a sum of complex exponentials. In this paper the suitability of the exponential functions for modelling a finite time domain impulse response is examined. More specifically, we address the question of how long a data set does one need so that the record length behaves as if it were infinite. In other words, what is the minimum length of record required to resolve the various components of decaying exponentials. The answer to this question may yield data for a meaningful analysis. GRA

N82-17912# Rochester Inst. of Tech., N. Y. Dept. of Electrical Engineering.

RATIONAL MODELING BY PENCIL-OF-FUNCTION METHOD

Vijay K. Jain (Univ. of South Florida, Tampa), Tapan K. Sarker, and Donald D. Weiner (Syracuse Univ., N.Y.) Nov. 1981 34 p refs
(Contract N00014-79-C-0598; NR Proj. 371-014)
(AD-A107741; TR-81-7) Avail: NTIS HC A03/MF A01 CSCL 20/3

Pole-zero modeling of signals, such as an electromagnetic-scatterer response, is considered in this paper. It is shown by use of pencil-of-functions theorem that (a) the true parameters can be recovered in the ideal case (where the signal is the impulse response of a rational function H(z)), and (b) the parameters are optimal in the functional dependence sense when the observed data are corrupted by additive noise or by systematic error. Although the computations are more involved than in all-pole modeling, they are considerably less than those required in iterative schemes of pole-zero modeling. The advantages of the method are demonstrated by a simulation example and through application to the electromagnetic response of a scatterer. The paper also includes very recent and promising results on a new approach to noise correction. In contradistinction with spectral subtraction techniques, where only amplitude information is emphasized (and phase is ignored), we propose a method that (a) estimates the noise spectral density for the data frame, and then (b) performs the subtraction of the noise correlation matrix from the Gram matrix, of the signal. Author (GRA)

N82-17913# Rochester Inst. of Tech., N. Y. Dept. of Electrical Engineering.

APPROXIMATION BY A SUM OF COMPLEX EXPONENTIALS UTILIZING THE PENCIL OF FUNCTION METHOD

Tapan K. Sarkar, Donald K. Weiner (Syracuse Univ.), and Vijay K. Jain (University of South Florida, Tampa) Nov. 1981 23 p refs
(Contract N00014-79-C-0598, RR0210101)
(AD-A107742; TR-81-8) Avail: NTIS HC A02/MF A01 CSCL 12/1

The approximation of a function by a sum of complex exponentials, in general, is a nonlinear optimization problem. The optimization problem, however, is linearized through the application of the pencil of function method. This noniterative method yields the best exponential approximation for a given order of approximation. The method differs radically from the classical Wiener least squares approach in the sense that exponents calculated by the pencil of function method are directly proportional to the integrated squared error in the approximation. As the integrated squared error approaches zero, the exponents calculated by the pencil of function method approach the best least squares exponents in a continuous fashion. Among the advantages of the method are its natural insensitivity to noise in the data and explicit determination of the signal order. Examples are presented to illustrate the stability of this technique especially when noise is present in the data. GRA

N82-17914# California Univ., Berkeley. Operations Research Center.

TWO PAPERS ON RECURSIVE EVALUATION OF COMPOUND DISTRIBUTIONS

Willian S. Jewell and Bjorn Sundt Jul. 1981 48 p refs
(Grant AF-AFOSR-0122-81; AF Proj. 2304)
(AD-A107912; ORC-81-20) Avail: NTIS HC A03/MF A01 CSCL 12/1

The first paper, entitled further Results on Recursive Evaluation of Compound, is discussed. A recent by Panjer provides a recursive algorithm for the compound distribution of aggregate claims when the counting law belongs to a special recursive family. In the present paper we first give a characterization of this recursive family, then describe some generalizations of Panjer's result. The second paper, entitled Improved Approximations for the Distribution of a Heterogeneous Risk Portfolio, is discussed. A traditional actuarial method for the difficult task of finding the exact distribution of a heterogeneous postfolio approximates the distribution with a compound Poisson law with identically distributed risks. This paper shows that a Binomial compound law provides a better match to the second moment of the distribution, thus giving a better approximation, while retaining a simple, recursive algorithm for calculating the distribution. A modified Binomial compound law further refines the approximation, with slight additional work. GRA

N82-17915# California Univ., Berkeley. Dept. of Industrial Engineering and Operations Research.

A SIMPLE HEURISTIC APPROACH TO SIMPLEX EFFICIENCY

Sheldon M. Ross Aug. 1981 12 p refs
(Grant AF-AFOSR-0122-81; AF Proj. 2304)
(AD-A107913; ORC-81-21) Avail: NTIS HC A02/MF A01 CSCL 12/1

Consider the standard linear program: Minimize c x-subject to: A x = b, x greater than or equal to 0, where A is an m x n matrix. The simplex algorithm solves this linear program by moving from extreme point of the feasibility region to a better (in terms of the objective function c x) extreme point (via the pivot operation) until the optimal is reached. In order to obtain a feel for the number of necessary iterations, we consider a simple probabilistic (Markov chain) model as to how the algorithm moves along the extreme points. At first we suppose that if at any time the algorithm is at the jth best extreme point then after the next pivot the resulting extreme point is equally likely to be any of the j - 1 best. Under this assumption, we show that the time to get from the Nth best to the best extreme point has approximately, for large N, a Poisson distribution with mean equal to the logarithm (base e) of N. We also consider a more general probabilistic model in which we drop the uniformity assumption and suppose that when at the jth best the next one is chosen probabilistically according to weights wi, i = 1, ..., j - 1. Author (GRA)

N82-17916# Naval Surface Weapons Center, Dahlgren, Va. Strategic Systems Dept.

NSWC/DL LIBRARY OF MATHEMATICS SUBROUTINES

Alfred H. Morris, Jr. Oct. 1981 235 p Supersedes NSWC/TR-79-338
(AD-A108106; NSWC/TR-81-410; NSWC/TR-79-338) Avail: NTIS HC A11/MF A01 CSCL 12/1

The NSWC/DL library is a library of general-purpose FORTRAN subroutines that provide a basic computational capability in a variety of mathematical activities. Although intended for use on the CDC 6000 series computers, emphasis has been placed on the transportability of the codes. Subroutines are available in the following areas: Elementary Operations, Geometry, Special Functions, Polynomials, Solutions of Nonlinear Equations, Vectors, Matrices, Sparse Matrices, Eigenvalues and Eigenvectors, Least Squares Solutions of Linear Equations, Optimization, Transforms, Approximation of Functions, Curve Fitting, Surface Fitting over Rectangular Grids, Surface Fitting over Arbitrarily Positioned Data Points, Numerical Integration, Ordinary Differential Equations/Initial Value Problems, and Random Number Generation. Author (GRA)

N82-17917# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.

STABILITY ANALYSIS OF NUMERICAL METHODS FOR VOLTERRA INTEGRAL EQUATIONS WITH POLYNOMIAL CONVOLUTION KERNELS

S. Amini (Manchester Univ., England), C. T. H. Baker (Manchester Univ., England), P. J. vanderHouwen, and P. H. M. Wolkenfelt Aug. 1981 28 p refs Submitted for publication
(MC-NW-109/81) Avail: NTIS HC A03/MF A01

Direct quadrature methods as well as classical and modified Runge-Kutta methods are applied to a class of test equations with polynomial convolution kernels yielding structured systems of equations. Exploiting the structure of the results obtained in the stability analysis for a basic test equation, finite recurrence relations which make it possible to relate the stability properties of the numerical methods to the location of the zeros of appropriate stability polynomials were derived. Author (ESA)

N82-17918# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
SMOOTHING AND COARSE GRID APPROXIMATION PROPERTIES OF MULTIGRID METHODS
W. J. A. Mol Aug. 1981 23 p refs
(MC-NW-110/81) Avail: NTIS HC A02/MF A01

Smoothing processes, which are used in multigrid methods, are analyzed with the smoothing analysis of Brandt. The smoothing processes are applied to model problems: the Poisson, anisotropic diffusion and convection diffusion equations. An estimate is given of the Galerkin coarse grid approximation. These and other theoretical results, in comparison with experiments with multigrid methods, are remarked on. Numerical experiments show that these methods are efficient and robust in the sense that they do not need to be adapted to the problem at hand.
Author (ESA)

N82-17919# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Methods.
APPLICATION OF MULTIGRID METHODS FOR INTEGRAL EQUATIONS TO TWO PROBLEMS FROM FLUID DYNAMICS
H. Schippers Aug. 1981 27 p refs Submitted for publication
(MC-NW-111/81) Avail: NTIS HC A03/MF A01

Multigrid methods are applied in order to efficiently solve the nonsparse systems of equations that occur in the numerical solution of two problems: (1) calculation of potential flow around bodies; and (2) calculation of oscillating disk flow. Problem (1) is reformulated as a boundary integral equation of the second kind that is approximated by a first order panel method resulting in a full system of equations. This method is in widespread use for aerodynamic computations. Problem (2) is described by Navier-Stokes and continuity equations. By means of the von Karman similarity transformations, these equations are reduced to a nonlinear system of parabolic equations which are approximated by implicit finite difference techniques. From the periodic conditions in time, a nonsparse system of equations is obtained. For both these problems, the fast convergence of multigrid methods for integral equations is established by numerical experiments. Author (ESA)

N82-17920# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
ON THE CONTRACTIVITY OF A COMPLEX RUNGE-KUTTA SCHEME
J. G. Verwer Oct. 1981 7 p refs Submitted for publication
(MC-NW-112/81) Avail: NTIS HC A02/MF A01

An attempt to break the order barrier p < or = 1 for contractive Runge-Kutta schemes with a special Runge-Kutta scheme of order 2, containing a complex parameter, is made. The implicit Runge-Kutta method is recalled and a previous result is cited, i.e., if the method is contractive with respect to all f belonging to the class of all differential systems (y' - f (t, y), t > or = 0, y (0) = y sub 0) with respect to a given norm, where the given norm may be arbitrary, then its order of accuracy p is not > 1. Taking a complex backward Euler scheme as an example, the order barrier p < or = 1 is found to be in fact unavoidable. This is proven by a counter example. Author (ESA)

N82-17921# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
RIGOROUS HIGH SPEED SEPARATION OF ZEROS OF RIEMANN'S ZETA FUNCTION
J. vandeLune, H. J. J. teRiele, and D. T. Winter Oct. 1981 40 p refs
(MC-NW-113/81) Avail: NTIS HC A03/MF A01

The Riemann hypothesis was numerically investigated, using a FORTRAN/COMPASS program executed on a CDC system of two CYBER 750 computers. The strategy for finding the required number of sign changes of Z (t) in a Gram block of length L > or = Z is explained. Computation of Z (t) and error analysis are discussed. The program is given. Results, obtained by extensive computations, show that the first 200,000,001 zeros of the Riemann zeta function, zeta (s), in the critical strip are simple and lie on the line Re (s) = 1/2. This extends Brent's previous bound of 156,800,001. Author (ESA)

N82-17922# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
ANOTHER PROOF FOR THE COMPLETENESS OF A RULE FOR THE FAIR TERMINATION OF GUARDED COMMANDS AND ANOTHER RULE FOR THEIR JUST TERMINATION
Daniel Lehmann (Hebrew Univ.) Sep. 1981 9 p refs Submitted for publication
(MC-IW-178/81) Avail: NTIS HC A02/MF A01

An iterative guarded command C of the type: * open brackets d'Alembertian operator i belongs to I for B sub i tends to C sub i close brackets, where I is a set of indexes, the B sub i's are Boolean expressions (without side effects), and the C sub i's are commands, is considered. There is no assumption of fairness for the successive executions of each C sub i. The assumption of fairness at the outer level is made by assuming that if, in the course of executing C, an infinite number of times at the beginning of the body of the loop with B sub i being true is obtained, then the command C sub i, is chosen for execution an infinite number of times. The completeness of a rule for fair termination is proved. The result is an almost immediate consequence of a previous completeness result. Another completeness result suggests a rule for proving just termination of loops. It is different from a proposed proof rule dealing with fairness. It is also shown to be sound and complete.
Author (ESA)

N82-17923# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
PRINCIPAL COMPONENTS BIPILOTS AND ALPHA AND BETA DIVERSITY
Cajo J. F. terBraak Jan. 1981 19 p refs
(Contract IWIS-TNO-07.6.17806)
(IWIS-A-81-ST-23-15) Avail: NTIS HC A02/MF A01

Noncentered principal components analysis (PCA) on proportion data are used in order to give site ordinations that display approximate alpha diversities of sites and beta diversities of groups of sites, as measured by Simpson index and mean squared Euclidean distance. Species centering gives a better approximation to beta diversities; alpha diversities can still be visualized, if the true origin is projected into the plane of the ordination. The approximate species composition of each site can be visualized if the site ordination is combined with a species ordination. Noncentered and species centered distance biplots of diatom samples taken from pools in the 1920's and 1978 are compared. These plots show the approximate change in the pools since the 1920's: impoverishment in species composition and decrease in alpha diversity of pools as well as in beta diversity among pools. Species centered PCA yield more accurate approximations. Distortion is least in low diversity samples.
Author (ESA)

N82-17924# Loughborough Univ. of Technology (England).
THE ITERATIVE SOLUTION OF A NON-LINEAR FREDHOLM INTEGRAL EQUATION ARISING FROM A CHEMICAL REACTOR PROBLEM
G. A. Evans, J. Hyslop, and A. P. G. Morgan Mar. 1981 17 p refs
(MATHS-Res-156) Avail: NTIS HC A02/MF A01

Material balance equations for tubular reactors with axial diffusion are discussed. For a Fredholm equation, the equation for the residual at any stage of the iteration is reduced to a linear integral equation for the required perturbation, using Newton's method. This equation is then solved by using a low order expansion in terms of Chebyshev polynomials. The numerical integrations required in the basic iterative process are carried out by the Clenshaw-Curtis quadrature prescription. Results are compared with conventional solutions of the parent differential equation and also with attempts at direct iterative solution of the integral equation by standard Neumann-Liouville series. The method is rapid and accurate in areas where conventional algebraic approaches are difficult. Author (ESA)

N82-17925# Oxford Univ. (England). Dept. of Engineering Science.
COMPLEX ALIGN: A TECHNIQUE FOR THE CHARACTER-

ISTIC LOCUS METHOD OF DESIGN

B. Kouvaritakis Jul. 1981 14 p refs Sponsored by Science and Engineering Research Council
(OUEL-1366/81) Avail: NTIS HC A02/MF A01

Eigenvector alignment techniques which play an important role in the characteristic locus design of commutative controllers for multivariable systems are considered. The effectiveness of this design procedure depends on the degree of commutativity between the open loop transfer function matrix operator, G (s), and the construction of a controller, K (s), at some specific frequency of interest, s = s sub O. This in turn depends on the degree of success of the least squares algorithm, ALIGN, which generates the real vector approximations to the eigenvectors of G (s sub O). In order to extend the flexibility and effectiveness of the technique, the approximation of eigenvector pairs by constant complex conjugate vectors is examined. The COMPLEX ALIGN algorithm for the optimum design of the real and imaginary part of the eingenvector approximations is proposed.
Author (ESA)

N82-17926# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Systemes et Communications.

TWO ESTIMATION METHODS FOR NONSTATIONARY SPECTRA [DEUX METHODES D'ESTIMATION DE SPECTRES NON STATIONNAIRES]

Yves grenier Oct. 1981 16 p refs In FRENCH
(ENST-D-81006) Avail: NTIS HC A02/MF A01

The methods are the Burg method where the identified model has the structure of a grid filter and the Prony-Pisarenko method where the model is a null input system whose output is distorted by observation. Both methods make the hypothesis that the model parameters to be identified evolve in a space generated by a small number of time functions f sub o (t)... f sub d (t). The theoretical framework of evolutive spectrum estimation is described and an algorithm that permits calculation of the estimator is given for each method. Author (ESA)

N82-17927# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

THE STABLE PEDIGREES OF CRITICAL BRANCHING POPULATIONS

Olle Nerman 1981 29 p refs Sponsored by Swedish Natural Science Research Council
(CTH-Math-1981-15) Avail: NTIS HC A03/MF A01

The asymptotical sizes and compositions of critical general branching processes conditioned on nonextinction were treated. Results for processes counted with random characteristics allowed to depend on the whole daughter processes are given. These are used to derive conditional limit theorems for the pedigrees of randomly sampled individuals among populations counted with 0-1-valued characteristics. The limiting stable pedigrees have independence structures and are derived from the original branching laws. Author (ESA)

N82-17928# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

A STUDY OF ORDERS IN QUATERNION ALGEBRAS

J. Brzezinski 1981 28 p refs
(CTH-Math-1981-16) Avail: NTIS HC A03/MF A01

For each A-order Lambda in a generalized quaternion algebra H over the field of fractions F of a Dedekind ring A, its Gorenstein closure is defined. This is a Gorenstein A-order G (Lambda) in H such that Lambda is the least A-order containing (b underlined) (Lambda) G (Lambda) for an ideal (b underlined) (Lambda) in A. A list of all Gorenstein orders (and consequently of all orders) in quaternion algebras over a complete A is given where for each Gorenstein A-order Lambda is a construction of a minimal chain of Gorenstein orders begining with A and ending with a hereditary order. Author (ESA)

N82-17929# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

ON L SUB P-DECAY AND SCATTERING FOR NONLINEAR KLEIN-GORDON EQUATIONS

Philip Brenner 1981 42 p refs
(CTH-Math-1981-17) Avail: NTIS HC A03/MF A01

Previous results on scattering and decay are extended to a larger class of nonlinearities and to dimensions > 3. In particular, for nonlinearities of the type (modulus u) (sup rho-1) (u) the existence of scattering states is proved for 1 + 4/n < rho < 1 + 4 gamma sub n/(n-2), where gamma sub n = 1 for < or or = 10 and gamma sub n = n/(n+1) for n > 10. No quantitative restrictions are placed on the data. Earlier results of this type were only known for n = 3 and 8/3 < rho < 5.
Author (ESA)

N82-17930# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

ASYMPTOTIC BEHAVIOR OF THE BOLTZMANN EQUATION WITH INFINITE RANGE FORCES

Leif Arkeryd 1981 13 p refs
(CTH-Math-1981-18) Avail: NTIS HC A02/MF A01

Previously obtained existence results for the space-homogeneous, nonlinear Boltzmann equation for a class of encounters with infinite range, including inverse Kth power molecules with k > 3, are considered. These solutions are proved to converge in the weak L sup 1 sense for k > or = 5 to Maxwellian distributions when t tends to infinity. Also, the higher moments converge to those of the relevant Maxwellian. The method of proof relies on nonstandard techniques. Author (ESA)

N82-17931 Bowling Green State Univ., Ohio.

EXACT DISTRIBUTION OF CERTAIN GENERAL TEST STATISTICS IN MULTIVARIATE ANALYSIS Ph.D. Thesis

Jen Tang 1981 108 p
Avail: Univ. Microfilms Order No. 8127345

In multivariate analysis, many statistics and likelihood ratio test (LRT) criteria are distributed as products of several independent tests random variables. The exact distribution of the type B variable is obtained in general forms as a mixture of weighted gamma distributions as well as a mixture of beta distributions. Some important cases are studied in detail. The exact distribution of Bartlett's test statistic for equality of variances of normal populations is obtained. The problem for equal sample sizes case of the corresponding multivariate Bartlett's test was completely solved by obtaining the exact distribution in an easily computable form and providing tables of its percentage points. The exact distribution of a statistic with Box's (1949) generalized moment function is obtained. Dissert. Abstr.

N82-17932 Clemson Univ., S.C.

PARAMETER ESTIMATION IN A REPRODUCING KERNEL HILBERT SPACE FOR LINEAR HEREDITARY SYSTEMS Ph.D. Thesis

Stephen Lewis Benz 1981 86 p
Avail: Univ. Microfilms Order No. 8126926

Often a model for a physical system contains parameters that must be adjusted to obtain a best fit to observed data. Two methods are presented here for the estimation of coefficient and delay parameters in linear hereditary systems. The models h = f + B gamma h and h = A gamma f for linear hereditary systems are studied within the following context. The input output pair (f,h) is approximated by functions from the space of Hellinger integrable functions which is shown to be a reproducing kernel Hilbert space. Using properties of this space, representations for the operators B gamma and A gamma are developed in terms of the unknown vector of parameters gamma. A discretization of each of the models is then introduced on a finite dimensional subspace of the space of Hellinger integrable functions. The discretization permits the development of suitable estimation methods based on the observations. It is shown that under appropriate conditions the discrete models converge to the continuous models. Dissert. Abstr.

N82-17933 State Univ. of New York at Stony Brook.

DERIVATION OF QUASI-NEWTON UPDATES FOR NONLINEAR EQUATIONS AND UNCONSTRAINED OPTIMIZATION Ph.D. Thesis

Douglas Edward Salane 1981 102 p
Avail: Univ. Microfilms Order No. 8126236

The derivation of quasi-Newton algorithms for solving nonlinear equations and unconstrained optimization problems is discussed. The use of those iterative methods to derive some of the well known quasi-Newton updates used in algorithms for solving nonlinear equations is demonstrated. The same techniques are then shown to provide a unified derivation of the symmetric minimum norm updates used in unconstrained optimization algorithms. A modification to existing quasi-Newton updates which is designed to improve the performance of these methods when they are used to minimize functions which deviate from quadratic behavior is examined. The modified update present reduces to a classic quasi-Newton update when applied to a quadratic functional and is locally and superlinearly convergent when used to minimize a suitably restricted nonlinear functional. Numerical evidence suggests that the new methods are competitive with existing quasi-Newton algorithms. Dissert. Abstr.

N82-17934 Colorado State Univ., Fort Collins.
MULTIGRID METHODS FOR DIFFERENTIAL EIGENVALUE AND VARIATIONAL PROBLEMS AND MULTIGRID SIMULATION Ph.D. Thesis
John Wilbur Ruge 1981 87 p
Avail: Univ. Microfilms Order No. 8126450

The use of multigrid methods for solving a wide variety of problems efficiently is increasing. Application of multigrid to each new class of problems yields new information about the method itself which can extend to other areas. Work on both the practical and the theoretical aspects of the method is presented. A method for finding the first several eigenvalues of a self adjoint, elliptic differential operator is discussed. The numerical experiments indicate that this method is very efficient. A proof of convergence for a class of variational problems is studied. The proof is quite simple, and it is hoped that it will help close the gap between provable and observed convergence rates. A simple program simulating multigrid which is a powerful tool for the study of multigrid and is application to more complex problems is discussed. It can be used in place of conventional relaxation or solution schemes within target programs and, although less efficient than multigrid, can give an indication of how multigrid would perform in that context. Dissert. Abstr.

N82-17935 Michigan State Univ., East Lansing.
FINITE ELEMENT METHODS FOR PERIODIC SOLUTIONS OF DYNAMICAL SYSTEMS Ph.D. Thesis
Mohamed Shendy El-Mandouh 1981 130 p
Avail: Univ. Microfilms Order No. 8126497

The problem of computing the normal modes of nonlinear Hamiltonian systems is discussed. The normal modes are assumed to exist and depend continuously on the total energy E for E in some range. The finite element method, in which the time variable is discretized, is applied to such systems and transforms the mathematical problem that is governed by nonlinear differential equations into one governed by a set of nonlinear algebraic equations which is to be solved for various values of E. The main contribution was to establish the existence of solutions of the nonlinear algebraic finite element equations by a contraction mapping argument. This was done by relating the Jacobian of the discrete problem to that of the exact problem. Furthermore, if the exact problem has an isolated branch of solutions for some E in a neighborhood of E sub O then, correspondingly the finite element solution that exists for E sub O is also isolated and can be uniquely continued, for small mesh size, in a neighborhood of E sub O. Algorithms for implementing the numerical work are discussed and some illustrative numerical results are also presented. Dissert. Abstr.

N82-17936 Michigan Univ., Ann Arbor.
F-PURITY AND RATIONAL SINGULARITY Ph.D. Thesis
Richard Scott Fedder 1981 65 p
Avail: Univ. Microfilms Order No. 8125109

Singularities which are F-pure (respectively, F-pure type) are investigated. A ring R of characteristic p is F-pure if for every R module M,O yields direct product of M and R yields direct product of M and (1)R is exact where (1)R denotes the R-algebra structure induced on R by the Frobenius map. F-pure type is defined in characteristic O by reducing to characteristic p. When R = S/I is the quotient of a polynomial ring S, it is proven that R is F-pure at the prime ideal Q. Known results about rational singularities are paralleled. Classifying F-pure singularities for complete interaction ideals, it is also proven, can be reduced to classifying such singularities for hypersurfaces. Dissert. Abstr.

N82-17937 North Carolina Univ. at Chapel Hill.
COMPOUND FUNCTION AND LINEAR MODEL METHODS FOR THE MULTIVARIATE ANALYSIS OF ORDINAL CATEGORICAL DATA Ph.D. Thesis
Kofi Alavi Semenya 1981 226 p
Avail: Univ. Microfilms Order No. 8125618

A well recognized aspect of the analysis of ordinal categorical data is that a considerable gain in efficiency is, in principle, feasible for tests which use the information in the scale of the categories rather than the conventional Pearson Chi-Square test of homogeneity. A broad class of hypotheses involving subpopulation differences is expressed in terms of generalized mean scores and/or parameters of underlying parametric models and generalized measures of association. Estimates of these quantities are formulated in terms of functions of the observed data. The proportional hazards model is discussed. A set of rank scores are developed which are analogous to those corresponding to the Mantel-Haenszel test for survival data. Recommendations are given regarding the relative advantages and disadvantages of the respective methods for a range of potential applications. Dissert. Abstr.

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-17938 Michigan Univ., Ann Arbor.
A METHOD OF NONPARAMETRIC SURVIVAL ANALYSIS FOR DOUBLY CENSORED DATA Ph.D. Thesis
Dianne Madelyn Schwartz Finkelstein 1981 109 p
Avail: Univ. Microfilms Order No. 8125110

A model and method of analysis for survival time data which can be right and/or left censored is presented. The covariates are treated as random variables. Nonparametric estimates are found for the survival distribution, $G(s) = P(s>s)$. The estimates are computed using a general E-M algorithm. This method generalizes easily to left or right censored and tied data, and offers an alternative to the widely accepted Cox proportional hazards model. This approach yields a broadly applicable methodology for nonparametric estimation of the survival distribution. Dissert. Abstr.

N82-17939 North Carolina Univ. at Chapel Hill.
A CONTINUOUS SHADING SCHEME FOR TWO-VARIABLE MAPPING Ph.D. Thesis
Laurence William Carstensen, Jr. 1981 177 p
Avail: Univ. Microfilms Order No. 8125563

A continuous-tone approach to bivariate mapping is presented and tested. The key is made much simpler with a logic that is easy to internalize. In the testing performed, the continuous-tone monochrome map allowed better subject estimates of the encoded data, and better estimates of the relationship between the two variables portrayed than the U.S. Bureau of the Census maps which used a four by four color classification scheme. In regionalization tests using the monochrome maps, subjects performed at more than adequate levels. Overall, the results of the study validate the hypothesis that continuous shading can represent bivariate distributions, and call for further research into the information content-simplification balance which is so critical to two variable mapping. Dissert. Abstr.

N82-17940# Missouri Univ. -Columbia. Dept. of Statistics.
A ROBUST NONPARAMETRIC LIKELIHOOD RATIO TEST
Richard L. Dykstra, Richard W. Madsen, and Kenneth Fairbanks
Aug. 1981 22 p refs
(Contract N00014-78-C-0655)
(AD-A108124; TR-109) Avail: NTIS HC A02/MF A01 CSCL 12/1

The likelihood ratio principle is employed to suggest a nonparametric test for testing equality of two distributions against a stochastic ordering alternative. The test appears to be robust against a wide range of alternatives. Percentage points for sample sizes less than or equal to twenty are provided as well as a comparison of power values for the Kolmogorov-Smirnov and Mann-Whitney-Wilcoxon tests. Author (GRA)

N82-17941# Missouri Univ. -Columbia. Dept. of Statistics.
MULTIVARIATE HARMONIC NEW BETTER THAN USED IN EXPECTATION DISTRIBUTIONS Technical Report, Aug. 1981
A. P. Basu and Nader Ebrahimi Aug. 1981 20 p refs
(Contract N00014-78-C-0655; Grant NSF INT-80-09463)
(AD-A108125; TR-110) Avail: NTIS HC A02/MF A01 CSCL 12/1

Various definitions of multivariate harmonic new better than used in expectation (MHNBUE) life distributions are introduced and their interrelationship is studied. These are multivariate generalizations of the largest available univariate class of distributions with aging properties. Examples are given to illustrate these concepts. Various closure properties of MHNBUE distributions are proved. Author (GRA)

N82-17942# Missouri Univ. -Columbia. Dept. of Statistics.
P-VALUES FOR MULTI-STAGE AND SEQUENTIAL TESTS
Richard W. Madsen and Kenneth Fairbanks Oct. 1981 19 p refs
(Contract N00014-78-C-0655)
(AD-A108127; TR-112) Avail: NTIS HC A02/MF A01 CSCL 12/1

P-values are commonly given for ordinary single stage statistical tests. In this note we give a general method for calculating p-values for a large class of multi-stage and sequential tests. We also give some tables of p-values for multi-stage tests about the parameter of an exponential distribution when test plans from MIL-STD-781C are used. Author (GRA)

N82-17943# North Carolina Univ. at Chapel Hill. Office of Operations Research and Systems Analysis.
ACCELERATED CONVERGENCE IN THE SIMULATION OF COUNTABLY INFINITE STATE MARKOV CHAINS
George S. Fishman Sep. 1981 34 p refs
(Contract N00014-76-C-0302)
(AD-A107869; TR-81-4) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper describes a method of obtaining results from the simulation of a countably infinite state positive recurrent aperiodic Markov chain at a cost considerably below the cost required to achieve the same accuracy with pure random sampling. By reorganizing k independent epochs or tours simulated serially into k replications simulated in parallel, one can induce selected joint distributions across replications that produce the cost-saving benefits. The joint distributions follow from the use of rotation sampling, a special case of the antithetic variate method. The chains considered are of the band type so that for the state space S = (0,1,2,...) there exists an integer, delta, such that transition from a state i can move no further than to states i - delta and i + delta. The paper shows that an estimator of interest has variance bounded above by O(delta squared (ln k) to the 4th power/k squared) when using rotation sampling, as compared to a variance O(l/k) for independent sampling. Moreover, the mean cost of simulation based on rotation sampling has an upper bound O((delta ln k) squared) as compared to at least O(k) for independent sampling. The paper also describes how one can exploit special structure in a model together with rotation sampling to improve the bound on variance for essentially the same mean cost. GRA

N82-17944# Cambridge Univ. (England). Dept. of Engineering.
PERSON-BY-PERSON OPTIMAL SOLUTION TO THE DECENTRALISED LQG STOCHASTIC CONTROL PROBLEM WITH CONTROL SHARING INFORMATION PATTERN
H. M. Tan 1981 46 p refs
(PB82-113457; CUED/F-CAMS/TR-212-1981; ISSN-0309-765X) Avail: NTIS HC A03/MF A01 CSCL 12A

The decentralized LQG stochastic control problem with control sharing information pattern, whereby controllers exchange controls but not observations, is considered. Previous work and their shortcomings are examined, and a person-by-person optimal solution is obtained. This solution is seen to be unique and linear in the information variables and represents the first feasible and complete solution satisfying the necessary conditions for optimality of this control sharing problem. GRA

N82-17945 Washington Univ., Seattle.
PROPORTIONAL HAZARDS MODEL WITH TIME-DEPENDENT COVARIATES: LARGE SAMPLE THEORY AND RELATED TOPICS Ph.D. Thesis
Steven Glenn Self 1981 124 p
Avail: Univ. Microfilms Order No. 8126142

The proportional hazards (PH) model is a regression model widely used in the analysis of failure time data. The estimator for the regression coefficients in the PH model most commonly used is the maximum partial likelihood estimator (MPLE). However, its consistency and asymptotic normality have been demonstrated only heuristically. Recently, Liu and Crowley and Tsiatis rigorously established the strong consistency and asymptotic normality of the MPLE for the special case of time-independent, almost-surely bounded covariates. Using the theory of weak convergence, the approach of Tsiatis was extended to rigorously demonstrate the strong consistency and asymptotic normality of the MPLE in the general case of time-dependent covariates. Approaches for outlier detection, residual plots and robust testing/estimation procedures for the PH model are also discussed. Dissert. Abstr.

N82-17946 Michigan Univ., Ann Arbor.
HYPOTHESIS TESTING IN CONTINGENCY TABLES WITH SMALL SAMPLES Ph.D. Thesis
Jean Lambert 1981 330 p
Avail: Univ. Microfilms Order No. 8125152

Solutions to the problem of small samples for hypothesis testing in a contingency table framework are presented. The impact of a variance estimator choice on the conservativeness or liberalism of the procedure with respect to the type 1 error is discussed. New continuity corrections for testing homogeneity in a (2 x 2) comparative trial with arbitrary sample sizes are proposed. These continuity corrections are based on the average interval between successive differences of binomial proportions. In a second step, unconditional of approximate exact tests for different sampling designs are derived. The sizes of these unconditional exact tests are then obtained by associating an estimated sampling distribution with an ordering criterion, i.e., a chi-squared test statistic, in order to construct an empirical cumulative distribution function on that statistic. Monte Carlo simulations are performed to study the closeness of the empirical significance level to the nominal significance level with the chi-squares corrected for the proposed continuity corrections. Formulas based on the proposed continuity corrections are derived for sample size determination. Dissert. Abstr.

N82-17947 Michigan Univ., Ann Arbor.
DIRECTION AND COLLINEARITY FACTORS IN GROWTH CURVE MODELS AND OTHER PROBLEMS IN DISCRIMINANT ANALYSIS Ph.D. Thesis
Thomas Michael Davis 1981 214 p
Avail: Univ. Microfilms Order No. 8125095

The exact direction and collinearity factors of Wilks's Lambda are extended to the growth curve model both when the discriminant function is in the space of the dependent variables and when it is in the space of the independent, or dummy, variables. The case in which only a submatrix of the parameters is of interest is dealt with, as is the case of more than one discriminant function. The hypothesis that the discriminant function is the same from one pair of populations to another is addressed. This hypothesis is equivalent to proportionally of differences in means. Exact criteria are derived for this hypothesis, for the value of a porposed constant of proportionally, and for the direction of a proposed constant of function. These criteria are generalized to the hypothesis that several pairs of groups share the same discriminant function. Dissert. Abstr.

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-17948# Office of the Chief of Staff (Army), Washington, D. C. Management Directorate.
REFLECTIONS ON AIRCRAFT UNMASK RANGES
James J. Metzger and David C. Hardison 6 Oct. 1981 13 p

(AD-A107953) Avail: NTIS HC A02/MF A01 CSCL 15/3

An analytic representation is obtained of the range at which a terrain-following aircraft unmasks to an air defense site. The unmask range is expressed as a distribution that depends on a single parameter, the mean unmask range. That parameter is given as a function of terrain characteristics, aircraft height, and air defense site location. Author (GRA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-17949 Pennsylvania Univ., Philadelphia.
ON COMPOSITIONS OF MULTISETS Ph.D. Thesis
Rodica Eugenia Simion 1981 145 p
Avail: Univ. Microfilms Order No. 8127075

Three aspects of the compositions of multisets are studied. The logarithmic concavity of the sequence of numbers (omicron (vector n,k)) sub k of compositions of any multiset vector n into k nonempty parts, and its consequences are found. This is proved in the setting of Sturm sequences of polynomials associated with the elements of a poset. An order relation on the partitions of integers is induced by the comparability of their corresponding vectors (omicron(vector n,k)) sub k and it is shown how this order and the position of the mode of these vectors behave with respect to other orderings, previously known, on the partitions of integers. The question of determining a multiset from its number of compositions, and two related problems are studied. The problem of poset reconstruction from 'scarce' values of the zeta function is discussed. Dissert. Abstr.

N82-17950 Arkansas Univ., Fayetteville.
FUNDAMENTAL ORDER RELATIONS ON REGULAR SEMIGROUPS Ph.D. Thesis
Simon M. Goberstein 1981 97 p
Avail: Univ. Microfilms Order No. 8127293

An order relation < or = on a semigroup S is fundamental if an ordered semigroup (S, < or =) is o-isomorphic to a semigroup of functions (= partial transformations) on some set ordered by inclusion (i.e., extension) of functions. Fundamental orders on some significant classes of regular semigroups such as completely [O-]simple semigroups, normal bands of groups, inverse semigroups, orthodox semigroups with right regular and normal bands of idempotents are studied. All stable orders on inverse semigroups considered as algebras with two operations, multiplication and inversion, are described by means of fundamental orders on these semigroups. The structure of inverse semigroups having the natural order relations as the only nontrivial fundamental order are described. Dissert. Abstr.

N82-17951# DSM/nv Nederlandse Staatsmijnen, Geleen.
GENERALIZATION OF KRAMERS-KRONIG TRANSFORMS AND SOME APPROXIMATIONS OF RELATIONS BETWEEN VISCOELASTIC QUANTITIES
Henk C. Booij and Truus P. J. M. Thoone 21 Aug. 1981 23 p refs
(MS-1569) Avail: NTIS HC A02/MF A01

On the basis of some very plausible assumptions about the response of physical systems to stimuli, such as Boltzmann's superposition principle and the causality principle, it is shown that the following characteristics are obtained for the modulus and compliance functions: (1) they are analytic in the lower half of the complex frequency plane; (2) they are limited if the frequency tends to infinity; and (3) the real and imaginary parts are even and odd functions, respectively, of the frequency. It is demonstrated that the real and imaginary parts of every function satisfying these three requirements and without singularities on the real frequency axis, are interrelated by Kramers-Kronig transforms. Similar relations hold between the logarithm of the modulus and the argument of the function. Under certain conditions the Kramers-Kronig relations may be approximated by rather simple equations. For linear viscoelastic materials, for instance, approximate relations were obtained for the components of the complex dynamic shear modulus. Author

N82-17952# Commission of the European Communities, Ispra (Italy). Joint Research Centre.
FLUID-STRUCTURE COUPLING IN LAGRANGE-LAGRANGE AND EULER-LAGRANGE DESCRIPTIONS
A. V. Jones 1981 103 p refs Submitted for publication
(EUR-7424-EN) Avail: NTIS HC A06/MF A01

The principal finite difference methods employed in solving fluid-structure interaction problems are reviewed. The chief representations of the equations of motion of the fluid and structure and of their coupling are surveyed and the Lagrange-Lagrange and Euler-Lagrange representations are examined. The necessity of treating the structure in Lagrangian coordinates and the respective merits of the Lagrangian and Eulerian representations for the fluid are explained, both for coupling between continua and for coupling between a fluid and a thin shell. Analyses of the stability and numerical dissipation of the Lagrange-Lagrange and Euler-Lagrange coupling techniques in a very simple one dimensional problem are detailed to supply indicators as to stability and dissipation in more complex multidimensional situations and to bring out the theoretical complexity of seemingly simple coupling algorithms. A.R.H.

N82-17953# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
AN OPERATIONAL SEMANTICS FOR BONDED NONDETERMINISM EQUIVALENT TO A DENOTATIONAL ONE
R. Kuiper Jul. 1981 30 p refs Submitted for publication
(MC-IW-169/81) Avail: NTIS HC A03/MF A01

Dyadic nondeterministic choice is added to the programming language with recursive procedures used in de Bakker's monograph on program correctness. This leads to considerable changes in the operational semantics. The possible result of the execution of a program is no longer given as a single state, but as a set of possible states. Furthermore, the execution of a program is no longer given as a computation sequence, but as a set of possible computation sequences with tree-like properties. A natural operational semantics O, defined by a function Comp, where Comp yields for each program R and each state sigma a set of computation sequences, characterized by Cook equations, is presented. For this set of equations, in a topological setting, the existence of a unique solution and the equivalence of the operational semantics to the usual denotational one, defined by fixed point techniques, is proved. Author (ESA)

N82-17954 Michigan Univ., Ann Arbor.
COMBINATORIAL MAPS Ph.D. Thesis
Andrew Joseph Vince 1981 159 p
Avail: Univ. Microfilms Order No. 8125216

A purely combinatorial generalization of a map was formulated. Besides maps on orientable and non-orientable surface, these combinatorial maps include, as special cases, polytopes, the hypermaps, certain toroidal 'complexes', and higher dimensional analogues of maps. The concept of a combinatorial map is formulated in four equivalent ways: as an incidence structure, as a labeled graph, as a set of permutations and group theoretically. An agreeable outcome of the theory is that the cellular and embedding scheme approaches are naturally unified. Particular emphasis is placed on those combinatorial maps that are highly symmetric. By using a combinatorial analogue of covering space theory, coverings of a given combinatorial map are shown to be in one-to-one correspondence with permutation representations of a combinatorially defined homotopy group. This leads to an algorithm for generating all regular combinatorial maps that are cyclic coverings of a given regular combinatorial map. Dissert. Absr.

N82-17955 Auburn Univ., Ala.
SEMIGROUPS OF COLUMN STOCHASTIC MATRICES Ph.D. Thesis
Owen Campbell Litz 1981 54 p
Avail: Univ. Microfilms Order No. 8127299

An investigation of Green's relations for column stochastic matrices is made. Particular emphasis is placed on determining necessary and sufficient conditions for the A and L relations. This objective is achieved by dividing the set of column stochastic matrices into two categories: (1) column stochastic matrices in which negative entries are allowed, and (2) column stochastic matrices in which all entries must be nonnegative. Green's relations for column stochastic matrices of the first type and Green's relations for column stochastic matrices of the second type are discussed. Necessary and sufficient conditions for two elements of any subsemigroup of semigroup of all nxn complex matrices to be L related. Several semigroup properties are studied. Necessary and sufficient conditions for a column stochastic matrix of either type to be left or right cancellable are obtained. It is shown that the set of matrices of the first type form a regular semigroup. Finally, given a column stochastic matrix of either type, a method for finding a column stochastic rank factorization is exhibited. Dissert. Abstr.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-17956# Rochester Inst. of Tech., N. Y. Dept. of Electrical Engineering.
AN ITERATIVE METHOD FOR SOLVING ELECTROSTATIC PROBLEMS
Tapan K. Sarkar and Sadasiva M. Rao Nov. 1981 21 p refs
(Contract N00014-79-C-0598; NR Proj. 371-014)
(AD-A107740; TR-81-6) Avail: NTIS HC A02/MF A01 CSCL 20/3

The method of steepest descent is applied to the solution of electrostatic problems. The relationship between this method and the Rayleigh-Ritz, Galerkin's, and the method of least squares is outlined. Also, explicit error formulas are given for the rate of convergence for this method. It is shown that this method is also suitable for solving singular operator equations. In that case this method monotonically converges to the solution with minimum norm. Finally, it is shown that the technique yields as a by-product the smallest eigenvalue of the operator in the finite dimensional space in which the problem is solved. Numerical results are presented only for the electrostatic case to illustrate the validity of this procedure which show excellent agreement with other available data. Author (GRA)

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-17957 British Broadcasting Corp., Kingswood (England).
THE EFFECT OF FABRIC COVERINGS ON THE ACOUSTIC PERFORMANCE OF MODULAR ABSORBERS
R. Walker and P. H. C. Legate Nov. 1981 12 p
(BBC-RD-1981/8) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

Acoustic treatment consisting of a standard size of module with different internal and front panel construction is widely used for the control of the acoustic environment of rooms such as studios, cubicles, and listening rooms. It is common practice to cover the treatment with a lightweight stretched fabric. The effects of this fabric covering on the acoustic performance of the treatment are considered. Some experimental measurements of these effects are presented. The fabric covering has no significant effect on the performance of acoustic treatment which absorbs most of the incident sound energy. However, at high frequencies some acoustic treatments are effective reflections of sound energy and, under these circumstances, the effects of the fabric covering can be significant. S.L.

N82-17958 Admiralty Marine Technology Establishment, Teddington (England).
ACOUSTIC INTENSITY VECTORS FROM AN INFINITE PLATE WITH LINE ATTACHMENTS
W. J. Spicer Oct. 1981 17 p refs
(AMTE(N)-TM-81086; BR80903) Copyright. Avail: Issuing Activity

Theoretically derived time averaged acoustic intensity vectors from an elastic plate with time harmonic forces, masses, masses and springs, grounded springs or displacement constraints are provided. Intensity plots of acoustic features caused by single line-force 250 Hz excitation show that radiation is very efficient. The intense near field shows areas where energy is being received by the plate. A fluid surface wave associated with the subsonic plate flexural wave is evident. A closed loop of energy circulation exists. At 2.5 kHz plate radiation efficiency increases. At 25 kHz (twice critical frequency) a leaky wave beam with low attenuation emanates from the plate surface. Author (ESA)

N82-17959# Naval Research Lab., Washington, D. C.
USRD TYPE F63 TRANSDUCER Interim Report
M. D. Jevnager and A. C. Tims Nov. 1981 12 p refs
(AD-A106748; NRL-MR-4585) Avail: NTIS HC A02/MF A01 CSCL 20/1

A small reversible audio frequency range transducer was developed. The type F63 transducer is designed to meet the specific needs of the user. It is sensitive and stable with temperature and moderate hydrostatic pressures as required by Naval Mine Engineering Facility to improve their mission capability. M.D.K.

N82-17960# Pennsylvania State Univ., University Park. Applied Research Lab.
THE REVERBERATION AND ABSORPTION CHARACTERISTICS OF A WATER-FILLED CHAMBER WITH AND WITHOUT A PRESSURE-RELEASE WALL LINING M.S. Thesis
K. Anthony Hoover 2 Jul. 1981 66 p refs
(Contract N00024-79-C-6043)
(AD-A107876; ARL/PSU/TM-81-150) Avail: NTIS HC A04/MF A01 CSCL 20/1

The requirements for a reverberation chamber in air have been described in the appropriate standards, but there is no mention that these same requirements cannot be applied to underwater reverberation chambers. A number of acoustic measurements were made to determine the reverberation time and absorption characteristics of an underwater chamber with and without a pressure-release wall covering. The reverberation times were found to be faster than the transient response times of conventional analog equipment. Therefore, a digital computer was employed to filter the data and to determine the slope, and thus, the reverberation time by using a linear, least-squares curve fit. The pressure-release wall covering was found to reduce the average sound absorption coefficients to values acceptable for a reverberation chamber based on the standards for air acoustics. Author (GRA)

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-17961 Utah Univ., Salt Lake City.
THE MASSES AND THE ELECTROMAGNETIC AND PION DECAY RATES OF PARTICLES CONTAINING ONE CHARMED OR BOTTOM QUARK Ph.D. Thesis
Dale Lee Izatt 1981 106 p
Avail: Univ. Microfilms Order No. 8127527

The masses of the S state hadrons containing only light quarks or containing a single charmed or bottom quark are calculated in a bag model using the static cavity approximation. The decay quarks are treated as point particles fixed at the center of the bag and the light quarks are treated in the usual way of being free particles confined to the bag. The MIT bag model has been extended to include center of mass corrections, asymptotic freedom, and Johnson's vacuum in applying the nonlinear boundary condition of minimizing the mass as a function of the radius, a rigorous first order approach is used that identifies and eliminates higher order terms in alpha sub s that normally appear in the expression for the mass when center of mass corrections are included. The electromagnetic and pion decay rates have also been calculated for those S state hadrons containing a single charmed or bottom quark. Dissert. Abstr.

N82-17962 Louisiana State Univ. and A&M Coll., Baton Rouge.
SCATTERING OF ELECTRONS BY HYDROGENIC IONS
Ph.D. Thesis
Najib Nimer AbuSalbi 1981 265 p
Avail: Univ. Microfilms Order No. 8128944

The algebraic variational method in atomic physics is applied to the scattering (both elastic and inelastic) of electrons by highly stripped (hydrogenic) atomic ions. The overall behavior of the excitation 1s to 2s and 1s to 2p cross section is investigated using a 6 state expansion (1s-2s-2p one and two p pseudo-states) of the target wave function. The close coupling calculation is carried out up to a total angular momentum L sub max, (L sub max < or = 5) and for energies ranging from just above the n = 2 threshold to 6 times threshold; otherwise the Coulomb Born approximation with exchange is used. The computed collision strengths are then fit by an analytic formula. Finally, using a large pseudostate set, resonances between the n = 2 and n = 3 thresholds are investigated and accurately traced. Resonance enhancement of excitation rates is discussed. Results are reported for electron scattering by C(5+) and O(7+). Comparison is made to other theoretical calculations. Dissert. Abstr.

N82-17963 Connecticut Univ., Storrs.
CANONICAL QUANTIZATION OF NON-ABELIAN GAUGE THEORIES Ph.D. Thesis
Ralph Gregg Brickner 1981 158 p
Avail: Univ. Microfilms Order No. 8125449

Non-Abelian gauge theory in a manifestly covariant gauge is formulated as a theory of canonical field operators and embedded in an indefinite metric space. A gauge fixing field is included and every field component has a non-vanishing adjoint momentum with which it has canonical commutation (or anticommutation) relations. Faddeev-Popov fields are represented as scalar fermion fields with ghost particle excitations. A discussion is given of the relation between the existence of a subsidiary condition and the existence of pure gauge states that dynamically detach from observable states. Feynman rules are derived from the canonical formulation. Unitarity and the existence of unphysical degrees of freedom is discussed. The mechanism responsible for the fact that S matrix elements to pure gauge states vanish in non-Abelian gauge theories, is examined in detail. The pure gauge states include single particle gluon and Faddeev-Popov ghosts, and two particle combinations of gluon and Faddeev-Popov ghosts. Dissert. Abstr.

N82-17964 Pennsylvania Univ., Philadelphia.
A DENSITY FUNCTIONAL APPROACH TO MANY-BODY EFFECTS IN THE OPTICAL RESPONSE OF ATOMS
Ph.D. Thesis
Andrew Zangwill 1981 234 p
Avail: Univ. Microfilms Order No. 8127096

A method for calculating the optical response of finite electronic system which is accurate, computationally simple and lends itself to a ready physical interpretation of the results is presented. A time dependent local density approximation (TDLDA) represents a natural generalization of the usual local density approximation to the ground state properties of a many electron system. Using standard first order time dependent perturbation theory, a self consistent mean field theory for an effective field is derived which replaces the external field in the dipole matrix elements of the Golden Rule for photoabsorption. For photoabsorption from the rare gases and barium, i.e., closed shell atoms. It is shown that the TDLDA has the effect of redistributing the spectral oscillator strength to higher energies in such a way so that quantitative agreement is found with experiments performed using synchrotron radiation. The TDLDA is found to be more accurate than the traditional Hartree-Fock based random phase approximation with exchange. Dissert. Abstr.

N82-17965 Washington Univ., Seattle.
QCD AND WEAK ASYMMETRIES IN LEPTON PAIR PRODUCTION Ph.D. Thesis
David James Edward Callaway 1981 165 p
Avail: Univ. Microfilms Order No. 8126086

The interference of electromagnetic and weak production mechanisms for lepton pair production violate parity and charge symmetry are discussed. These effects are generally of the order of 1 percent for dilepton masses of 10 GeV. Measurements of these asymmetries in collisions of pions with polarized protons may lead to a greatly enhanced understanding of the polarization distributions of quarks in a polarized proton. The polarization structure of the d quark is shown to be of special interest. The asymmetries are computed within the framework of the parton model. The major focus is on the asymmetries calculated with the inclusion of first order perturbative QCD effects. A parity-violating asymmetry which may occur in collisions of unpolarized hadrons is also discussed. Dissert. Abstr.

N82-17966 Louisiana State Univ. and A&M Coll., Baton Rouge.
ACOUSTIC DETECTION OF HIGH ENERGY PARTICLES
Ph.D. Thesis
Stanley Dean Hunter 1981 110 p
Avail: Univ. Microfilms Order No. 8126961

The acoustic signals generated by charged particles traversing a medium offer a new technique for particle detection. Rapid thermal expansion of the medium produces an impulsive signal with a shape similar to one cycle of a sine wave. In the case of charged particles, the energy deposition results from thermalization of the particles ionization energy loss in the medium. A thermodynamic model which derives an acoutic potential for the signal produced by a given energy deposition is presented. The relationship between the acoustic potential and the signal period and amplitude is illustrated. Three nonthermal mechanisms, microbubble production, molecular dissociation and electrostriction, are discussed. The acoustic potential and pulse shapes for these mechanisms are also shown. Dissert. Abstr.

N82-17967 Yale Univ., New Haven, Conn.
HEAVY HIGGS BOSONS AND THEIR LOW ENERGY IMPACT
Ph.D. Thesis
Anthony Carmine Longhitano 1981 117 p
Avail: Univ. Microfilms Order No. 8125687

Spontaneously broken gauge theories have been rather successfully in describing the electroweak interactions of elementary particles, but one of the least understood aspects of these theories is the dynamical role of the elementary scalar fields. Although they are required in order to trigger spontaneous symmetry breakdown and, thereby, generate masses for the vector bosons and fermions, their presence in the Lagrangian as fundamental degrees of freedom leads to undersirable consequences: the values of certain coupling constants must be adjusted to very high accuracy and the quadratic mass divergences which accompany the scalars force the physical mass scale to be unstable against small variations of the fundamental parameters of the theory. A solution to these problems is provided by a mass generation mechanism in which the scalars are bound states of a new species of strongly interacting fermions. Dissert. Abstr.

N82-17968 State Univ. of New York at Stony Brook.
VERTICAL COHERENT INSTABILITIES IN BUNCHED PARTICLE BEAMS Ph.D. Thesis
Ronald Don Ruth 1981 96 p
Avail: Univ. Microfilms Order No. 8126240

The vertical coherent instabilities which occur in bunched particle beams were studied. The velocity of a single particle in a bunch is not constant, but rather consists of an equilibrium velocity and an oscillation about that. The single particle equations of motion and the Vlasov equation to obtain an integral equation which governs the coherent motion of a single bunch of particles are used. The solutions to the integral equation are then examined in two different regions. For the case of a bunch long compared to the characteristic wavelength of the instability, two regions of instability were found. The first is a region of slow blowup at low currents (growth rate less than the synchrotron frequency). The second is a region of fast blowup (growth rate much greater than the synchrotron frequency). For the case of a bunch shorter than the characteristic wavelength of the instability the behavior is quite different. Dissert. Abstr.

N82-17969 Columbia Univ., New York.
TWO-DIMENSIONAL INTERACTION OF ION-ACOUSTIC SOLITONS Ph.D. Thesis
Patrick Aubrey Folkes 1981 121 p
Avail: Univ. Microfilms Order No. 8125285

The two dimensional nonlinear interaction of two planar ion acoustic solitons were studied experimentally. When the angle between the wave vectors of the two interacting solitons is small and the solution amplitudes approach a critical value, a resonant nonlinear interaction occurs resulting in the formation of a new soliton. The measured spatial structure of the density perturbation near resonance and experimental measurements of the phase shift and the amplitude enhancement ratio show reasonably good agreement with theory. When two solitons interact at large angles, only a linear superposition of the two solitons is observed with no evidence of a phase shift not the formation of a new soliton. Contrary to theoretical results for small angles and soliton amplitudes larger than the critical value, no singular solitons were observed. Dissert. Abstr.

N82-17970 Florida Univ., Gainesville.

ENERGY TRANSFER IN MOLECULAR COLLISIONS Ph.D. Thesis

Eduardo Fermin Vilallonga 1981 162 p

Avail: Univ. Microfilms Order No. 8127473

Vibrational and rotational energy transfer in hyperthermal molecular collisions are investigated by means of time correlation function methods. Within this approach, the collisional differential cross section is expressed as the Fourier transform of the time correlation function of the transition operator, which evolves in time in accordance with the internal motions of the noninteracting molecules. The approach used allows the systematic introduction of approximations to the transition operator, which are based on models of the intermolecular forces and of the collision dynamics, the resulting correlation functions are readily evaluated for most polyatomics without need of internal state or partial wave expansions. The multicenter representation of the intermolecular potential is investigated, and multicenter surfaces are developed for ther interaction of Li(+) with CO and with CO2. Combining these developments, differential cross sections for the vibrational and rotational excitation of N2, CO and CO2 in collisions with hyperthermal Li(+) ions are calculated. Dissert. Abstr.

N82-17971 Illinois Univ. at Urbana-Champaign.

NUCLEAR MATTER WITH REALISTIC HAMILTONIANS Ph.D. Thesis

Isaac Lagaris 1981 159 p

Avail: Univ. Microfilms Order No. 8127625

Determination of the nuclear Hamiltonian is a prerequisite for development of a microscopic theory to explain the structure and the properties of observed nuclei and neutron stars. It may contain terms associated with two, three or many particle interactions. Some theoretical methods designed to handle the nuclear matter many body problem are reviewed. A realistic V sub 14 model of two nuclear interaction was obtained by fitting the available two body data in S, P, D and F waves. The variational theory was extended to treat this realistic interaction model and nuclear matter properties were calculated with it neglecting many nucleon interactions. A form for a three nucleon interaction (TNI), inspired from the meson theory of nuclear interactions is postulated. The effect of TNI on the energy of nuclear matter is described with three parameters to obtain the empirical energy, density and compressibility of nuclear matter. The effective nuclear hamiltonian obtained in this work may be used to study the equation of state of hot and cold nucleon matter, the structure of neutron stars, and the volume part of the nucleon nucleus optical potential. Dissert. Abstr.

N82-17972 North Carolina Univ. at Chapel Hill.

NUCLEAR MAGNETIC RESONANCE STUDIES OF TRANSITION METAL COMPLEXES Ph.D. Thesis

Michael Andrew Freeman 1981 200 p

Avail: Univ. Microfilms Order No. 8125577

Aminopolycarboxylate ligands with three facially arranged dentates form stable oxomolybdenum complexes in solution. At pH6, ligands containing amine and carboxylate dentates form complexes containing the MoO3 cis moiety. Ligands with a hydroxyl dentate form dimeric complexes with a Mo2O5(2+) oxobridged core. The hydroxyl proton is lost in the reaction. The transinfluence of coordinated alkoxyl dentates determines the site of the oxobridge. A correlation of transinfluence with other oxobridged forms is seen. A qualitative measure of the transinfluence of ligands is obtained from crystal structure data and these are correlated to proton affinities of model compounds. Oxygen 17 NMR chemical shifts of MoO3L complexes are far more sensitive to transinflurences than crystal structure bond distance measurements. The O-17 shifts of oxomolybdenum complexes and oxoanions reveal a smooth, nonlinear relation between chemical shift and MoO bond length. Dissert. Abstr.

N82-17973 Missouri Univ. -Rolla.

NEUTRON ACTIVATION ANALYSIS OF NUCLIDES FROM STELLAR AND MAN-INDUCED NUCLEAR REACTIONS Ph.D. Thesis

Lawrence Lee Oliver 1981 109 p

Avail: Univ. Microfilms Order No. 8123584

Neutron activation and gamma counting were used to determine the relative abundances of six stable tellurium isotopes in the acid-etched residues of the Allende meteorite. The results were correlated with the isotopic compositions of xenon and the elemental abundances of helium and neon in similarly prepared residues. Nucleosynthesis appears to be the only viable explanation or the anomalous isotopic and elemental compositions observed in these residues. Results suggest that the solar system condensed from an isotopically and chemically zoned nebula that was produced by the explosion of a supernova, concentric with the present Sun. A combination of neutron activation and mass spectrometry was used to determine the concentrations of fissiogenic iodine 129 and stable iodine 127 in rain, milk and the thyroids of man, cow and deer from Missouri. Rain and deer thyroids show the highest average values of the iodine 129/iodine 127 ratio. Milk and the thyroids of cattle and humans show successively lower values of the iodine 129/iodine 127 ratio due to dietary additives of mineral iodine and to biological averaging. Dissert. Abstr.

N82-17974 Arkansas Univ., Fayetteville.

RECENT INJECTIONS OF NUCLEAR DEBRIS IN THE ATMOSPHERE Ph.D. Thesis

Stanley Warren Stevens 1981 139 p

Avail: Univ. Microfilms Order No. 8127266

The Sr-89/Sr-90 and Ba-140/Sr-90 ratio variation in rain and snow samples were studied. The presence of fresh nuclear debris was detected following the Chinese tests. A tropospheric cycling effect was clearly indicated in the radiostrontium and radiobarium data. The stratospheric residence time for Sr-90 was calculated to be 1.00 yr (stratospheric residence half-time = 0.71 yr). The mean tropospheric residence times were compared to the mean residence times determined from long-lived radon daughters following each of the Chinese tests. Results from the measurements of Sr-89/Sr-90 ratios in rain indicate that the mean residence time of the fallout particles in the lower stratosphere is 200 + or - 100 days. Nuclear debris injected into the atmosphere by the Three-Mile-Island accident was not detected in rain samples. Dissert. Abstr.

N82-17975 Florida State Univ., Tallahassee.

LONG RANGE INTERMOLECULAR POTENTIALS FROM STATIC FORM FACTORS Ph.D. Thesis

Ker-Fong Lee 1981 117 p

Avail: Univ. Microfilms Order No. 8125776

An expression is derived for the charge density susceptibility which under the Unsold approximations, reduces to the Fourier transforms of electron density functions. When considering uncorrelated wavefunctions, the susceptibility is given simply by static form factors in terms of which the second order Coulomb energy may be calculated. This is equivalent to applying the Unsold approximations directly unto the second order Coulomb energy expression in the usual time independent Rayleigh-Schrodinger perturbation theory. Using the interactions of hydrogen-hydrogen and helium-helium diatoms as test cases, the various integrals for their second order dispersion energies were evaluated numerically and analytically. The two approaches differ in that while the latter requires analytic form factors, the former can use both analytic as well as the readily available tabulated form factors. Their results are found to be in excellent agreements. Dissert. Abstr.

N82-17976# Fom-Instituut voor Plasmafysica, Jutphaas (Netherlands).

SPACE AND TIME RESOLVED MEASUREMENTS OF ION ENERGY DISTRIBUTIONS BY NEUTRAL BEAM INJECTION

IN TORTUR 2
H. J. B. M. Brocken Oct. 1951 36 p refs Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (ZWO)
(Rept-81-137) Avail: NTIS HC A03/MF A01

The method is used in the TORTUR 2 Tokamak to study the space and time evolution of the ion temperature profile of the plasma. The method fails when multiple charge exchanges occur between the beam region and the plasma edge. Measurements are disturbed by attenuation of the flux of charge exchange neutrals originating from the beam and by neutrals lost from the beam becoming part of the neutral gas background, thereby enhancing the flux of charge exchange neutrals originating from the remainder of the plasma. Beam modulation, phase sensitive detection, and good access overcome these effects. Author (ESA)

N82-17977# California Univ., San Diego.
MOLECULAR BEAM STUDIES OF LOW ENERGY REACTIONS Annual Summary Report
R. H. Neynaber and S. Y. Tang 20 Nov. 1981 8 p refs
(Contract N00014-81-K-0255; NR Proj. 393-004)
(AD-A108099) Avail: NTIS HC A02/MF A01 CSCL 20/7

The report describes merging-beams studies of charge-transfer reactions. Included are investigations of the Cl(+)-Xe and He(+)-He(23S) systems. GRA

N82-17978# Singer Co., Little Falls, N. J.
RELAXATION PHENOMENA IN OPTICALLY PUMPED MERCURY ISOTOPES Final Scientific Report, 1 Jul. 1976 - 30 Jun. 1981
J. H. Simpson, P. A. Heimann, M. J. Kelly, and D. I. Shernoff 31 Aug. 1981 104 p refs
(Contract F49260-76-C-0009; AF Proj. 2301)
(AD-A107604; KD-81-15; AFOSR-81-0724TR) Avail: NTIS HC A06/MF A01 CSCL 20/8

Relaxation measurements of optically pumped 199 Hg and 201 Hg in nuclear magnetic resonance (NMR) cells have shown that the activation energy for adsorption of ground state mercury atoms ranged from .22 eV to .24 eV for a variety of materials. These measurements also provided a means of determining the temperature dependence of the product of concentration and strength of paramagnetic centers on the inner cell surfaces. The origins and effects of both randomly-fluctuating and steady-state quadrupole perturbations on 201 Hg have been clarified. A calculation predicts that the relaxation rate of 201 Hg in a cube-shaped cell should be independent of cell orientation. This prediction was verified experimentally. Another calculation, which modelled 201 Hg as a single four-level spin system, predicted a functional form for the non-exponential decay of 201 Hg in the presence of a quadrupole perturbation. These predictions were also verified experimentally. Techniques have been developed for producing mercury NMR cells with long relaxation times and stable characteristics. Author (GRA)

N82-17979# Brookhaven National Lab., Upton, N. Y. Accelerator Dept.
VERTICAL COHERENT INSTABILITIES IN BUNCHED PARTICLE BEAMS Ph.D. Thesis
R. D. Ruth Jul. 1981 94 p refs
(Contract DE-AC02-76CH-00016)
(DE82-003246; BNL-51425) Avail: NTIS HC A05/MF A01

The velocity of a single particle in a bunch is not constant, but rather consists of an equilibrium velocity and an oscillation about that. This synchrotron oscillation occurs at a frequency which is in general much less than the other characteristic frequencies of the system: the revolution frequency and the transverse betatron frequencies. The approach illuminates the effect of the synchrotron frequency in setting the time scale for an instability, without making restrictive assumptions on the relative size of the synchrotron frequency and the coherent frequency shift (on growth rate). DOE

N82-17980# Washington Univ., Seattle.
ORBITING EFFECTS IN THE INELASTIC SCATTERING OF PROTONS TO THE CONTINUUM
H. C. Bhang, I. Halpern, and T. A. Trainor 1981 12 p refs
(Contract DE-AC06-76ER-01388)
(DE82-002287; DOE/ER-01388/508) Avail: NTIS HC A02/MF A01

The persistent positive analyzing powers in the backward hemisphere for moderate energy (p Vector.p') reactions to the continuum are found to be reproduced by one-step DWBA calculations. An analysis of these calculations shows that the effect arises from protons incident on one side of the nucleus and leaving on the other. DOE

N82-17981# New York Univ., N. Y. Inst. of Mathematical Sciences.
COMPUTATIONAL METHODS FOR THE NUCLEAR- AND NEUTRON-MATTER PROBLEMS Progress Report
M. H. Kalos 1981 9 p refs
(Contract DE-AC02-79ER-10353)
(DE82-001584; DOE/ER-10353/3) Avail: NTIS HC A02/MF A01

The development of Monte Carlo methods for the treatment of extensive nuclear and neutron matter is reported. Treatment of finite nuclei is also discussed. DOE

N82-17982# Oxford Univ. (England). Nuclear Physics Lab.
THE LASER ACCELERATOR-ANOTHER UNICORN IN THE GARDEN
L. N. Hand Jul. 1981 21 p refs Sponsored in part by the Guggenheim Foundation and the Science Research Council
(PB82-115197; Rept-62/81) Avail: NTIS HC A02/MF A01 CSCL 20G

Some proposed techniques for using laser beams to accelerate charged particles was reviewed. Two specific ideas for grating type accelerating structures are discussed. Speculations are presented about how a successful laser accelerator could be used in a multipass collider; a type of machine which would have caharacteristics intermediate between those of synchrontrons and linear (single pass) colliders. No definite conclusions about practical structures for laser accelerators are reached, but it is suggested that a serious effort be made to design a small prototype machine. Achieving a reasonable luminosity demands that the accelerator either be a cw machine or that laser peak power requirements to be much higher than those presently available. Use of superconducting gratings requires a wavelength in the sub-millimeter range. GRA

N82-17983# Oxford Univ. (England). Nuclear Physics Lab.
A MODEL FOR HADRONIC INCLUSIVE CROSS-SECTIONS
J. Wells Aug. 1981 26 p refs
(PB82-115205; Rept-70/81) Avail: NTIS HC A03/MF A01 CSCL 20H

A model based on the simple quark model is proposed which describes the inclusive cross-sections for hadronic interactions. This model gives separate predictions for the 'beam residue', 'target residue' and central components of the inclusive cross-sections. A method of extracting these components from experimental data is described; separated components are compared with the predictions. GRA

N82-17984# Oxford Univ. (England). Nuclear Physics Lab.
LOW-ENERGY BEHAVIOUR OF THE REAL DEPTH OF THE PROTON OPTICAL POTENTIAL
B. Gyarmati, R. G. Lovas, T. Vertse, and P. E. Hodgson 1980 11 p refs
(PB82-115213; Rept-71/81) Avail: NTIS HC A02/MF A01 CSCL 20H

The coupling of the elastic channel to the inelastic ones reached through strongly excited collective levels are examined. The coupling effects the real pair of the optical potential around the Coulomb barrier considerably. T.M.

N82-17985 Washington Univ., Seattle.
A SPACE-TIME STUDY OF DOUBLE SCATTERING IN HADRON DEUTERON COLLISIONS Ph.D. Thesis
Eric Osbourne Rogers 1981 374 p
Avail: Univ. Microfilms Order No. 8126138

A space-time picture of double scattering in the deuteron (those events where both the neutron and proton interact with the incoming hadron), is developed. Work is done in the deuteron rest frame using the assumption that processes involving large

virtual masses are damped. For the general case, the process is shown to consist of sequential scatterings, while for large momenta, due to Lorentz contraction, separation between neutron and proton may be neglected and the Abramovskii, Gribov, Kancheli cutting rules derived. The process is modeled with the Mandelstam diagram and verifies previous results by explicit calculation. A numerical estimate is then made of the size of the effect and a comparison with experimental data is made.
Dissert. Abstr.

N82-17986 Arkansas Univ., Fayetteville.

APPLICATION OF EIKONAL APPROXIMATION TO CHARGE TRANSFER IN ENERGETIC ION-ATOM COLLISIONS Ph.D. Thesis

Tak-San Ho 1981 92 p

Avail: Univ. Microfilms Order No. 8127211

The eikonal approach is applied to the evaluation of the cross section for electron capture from an arbitrary nlm shell of a hydrogenic target atom into an arbitrary n'l'm' shell of a fast hydrogenic projectile. Both the impact and wave pictures are employed and their equivalance is discussed. The results are obtained in exact analytical closed form. The approach is also extended here to allow for multi-electron targets, where, as a first approximation, each atomic orbital is specified by three hydrogenic quantum numbers, an effective nuclear charge Z sub T, and an energy eigenvalue in the impact picture, or ionization potential in the wave picture. Because of incomplete information on the many-body target, the Z sub T prime appearing in the eikonal phase factor is left undetermined; nonetheless, analytic expressions are derived for the theoretical cross sections, and numerical values calculated for simple choices of Z sub T prime. Present calculations are compared with the OBK results and the existing experimental data for the capture from H and from the multielectron targets C, Ne, Ar, N2, O2, and He.
Dissert. Abstr.

N82-17987 Arizona Univ., Tucson.

BEAM-FOIL STUDIES OF ATOMIC MEAN-LIVES IN THE VACUUM ULTRAVIOLET Ph.D. Thesis

Peter Walden Rathmann 1981 130 p

Avail: Univ. Microfilms Order No. 8126181

The beam-foil method was used to determine mean-lives of excited atomic states. Initial studies were done on states of the helium-and hydrogen-like ions B(IV) and B(V), with the mean-lives determined by fitting the decay curves to sums of exponential terms. Since theoretical values of the mean-lives are very precise in these simple atomic systems, the accuracy of the experimental method is indicated. A series of measurements was made of the low lying 2s 2p states in nitrogen-like Ne(IV), Na(V) Mg(VI), A(VII), and Si(VII). The experimental results were compared to theoretical calculations and showed excellent agreement with nonclosed-shell many electron theory. The lifetimes of the 4P 2p1/2 and 4P 2p3/2 states in copper-like Br (VII) were determined by measuring decay curves for both the primary and cascade decays and then analyzing the curves jointly.
Dissert. Abstr.

N82-17988 Carnegie-Mellon Univ., Pittsburgh, Pa.

A QUARK MODEL OF THE NONSTRANGE BARYONS Ph.D. Thesis

Charles Patterson Forsyth 1981 142 p

Avail: Univ. Microfilms Order No. 8127350

The masses, elastic widths and photoproduction amplitudes of the S=O resonance with masses less than 2.5 GeV were fit using a quark model with hyperfine interactions. Included in the analysis are all of the states of N=O, 1, 2, and 3 bands. In addition, predictions for the resonance decays to all ground state baryons and mesons were provided. Three models for the decays of these states were examined. It was concluded that the usual spectator model for the decays must be modified. In order to fit the photoproduction data, a third term was added to the minimal electromagnetic Hamiltonian. No positive evidence was found for a tensor force, while conflicting evidence was found for a three body split orbit force. A significant contact force is needed but its strength seems to vary from band to band. Finally, it is concluded that the (56,1-) multiplet is primarily a three quark state, although its mass is lower than expected. Dissert. Abstr.

N82-17989 Clemson Univ., S.C.

A THEORETICAL STUDY OF THREE-BODY CORRELATIONS IN ATOMIC FLUIDS Ph.D. Thesis

Robert Neal Sane 1981 51 p

Avail: Univ. Microfilms Order No. 8126927

A theoretical study of triplet correlations in simple classical fluids was made from two distinct approaches. In one approach the first order terms in the h-bond expansion for triplet correlations as given by Abe is accurately evaluated numerically for the Lennard-Jones fluid. Results are obtained for a range of fluid densities and comparisons are made to the accurate data obtained through Monte Carlo computer simulations. These comparisons indicate that the first order term is inadequate near and beyond the triplet point of the system. In the other approach the description of triplet correlations is discussed in terms of fitting computer generated data to a truncated expansion in orthonormal functions. A novel set of functions that are othonormal over a finite triangular domain is introduced. The expansion method is illustrated with an application to the rigid sphere model. This second approach could lead to the best method of describing triplet correlations in simple fluids. Dissert. Abstr.

N82-17990 Colorado State Univ., Fort Collins.

PHOTODISSOCIATION OF METAL-HALIDES: LASERS, ABSORPTION LINESHAPE, AND POLARIZATION OF FLUORESCENCE STUDIES Ph.D. Thesis

Hamid Hemmati 1981 188 p

Avail: Univ. Microfilms Order No. 8126433

An anisotopic velocity distribution of the photoproducts which is observed through the Doppler lineshape of atomic emission, and, a polarization of the emission from the excited photoproducts were observed in atomic T1 photofragments: Five new atomic lasers were obtained in the neutral spectrum of Ga, Pb, Ge, Sn, and Sb on pulsed basis following photodissociation of the corresponding metal halide parent molecules by a 193 nm ArF laser. One of the Ga laser transition terminates on the ground state, while the other laser transitions terminate on the lowest metastable state of the atoms. The atomic fragments are shown to have been produced following multiphoton dissociation of the parent molecule. The degree of polarization of atomic T1, Hg, Pb, and Na photofragments was measured to determine whether a particular magnetic sublevel of the atomic products is populated preferentially following photodissociation of the parent molecules. The degree of polarization of T1 emission at 535 nm was measured to be -0.043 + or - 0.003. Dissert. Abstr.

N82-17991 Carnegie-Mellon Univ., Pittsburgh, Pa.

ELASTIC AND INELASTIC SCATTERING OF 800 MeV/c K+/- MESONS FROM CARBON-12 AND CALCIUM-40 Ph.D. Thesis

Daniel Robert Marlow 1981 445 p

Avail: Univ. Microfilms Order No. 8127354

The four elastic scattering reactions C-12 (K+/-,K+/-) and Ca-40 (K+/-,K+/-), and the four inelastic scattering reactions, C-12 (K+/-,K+/-) to the J(p) = 2+ 4.43 MeV and J(p) = 3-states were studied using the hyper-nuclear spectrometer and the low energy separated beam at the alternating gradient synchrotron. The agreement between the experimental data and the theoretical predictions is reasonable over the angular range of the data, with the exception of Glauber calculations of the K+ elastic scattering. In those cases, the eikonal approximation proves to be a poor approximation. Smaller discrepancies are found in some other cases, indicating the possible need for more sophisticated calculations. Reasonable agreement with the inelastic data is realized only with single impulse calculations, leading to the conclusion that the collective model descriptions of the transition densities are not adequate. The K+ scattering results show particular sensitivity to the details of the transition densities.
Dissert. Abstr.

N82-17992 Arkansas Univ., Fayetteville.

NEUTRON SPECTRA PRODUCED BY A FAST PULSE ASSEMBLY IN FREE FIELD AND PERTURBED ENVIRONMENTS Ph.D. Thesis

Thomas Michael Flanders 1980 153 p

Avail: Univ. Microfilms Order No. 8127253

The free field radiation environment produced by the White Sands Missile Range Fast Burst Reactor (FBR) was calculated.

The primary ranges of interest were for positions 7 meters and 170 meters from the FBR. Calculations were also made for penetrations at ranges of 600 meters and 1000 meters. Neutron spectral shapes were also calculated for a perturbed environment produced by iron and iron + aluminum shielding materials. The radiation transport calculations were performed using the ANISN and DOT 3 discrete ordinates codes. Both codes provide solutions to the Boltzmann transport equation by the discrete ordinates method. The DOT 3 two dimensional code required the use of the GRTUNCL auxiliary code to provide a first-collision source. The use of a first-collision source minimizes the ray effect which is associated with 2 dimensional geometry. The calculated spectral shapes, integral fluences, and neutron dose agree well with experimental determinations of the FBR in a free field environment. Dissert. Abstr.

N82-17993 Houston Univ., Tex.
PROBABILISTIC TREATMENT OF RELATIVISTIC SCATTERING OF SCALAR PARTICLES AND THEIR MASS SPECTRUM Ph.D. Thesis
Vigen Ohanian 1980 110 p
Avail: Univ. Microfilms Order No. 8126941

Stuckelberg's manifestly covariant wave equation describing relativistic spin zero particles, the four space formalism (FSF), is assessed through specific physical applications. A machinery for performing scattering calculations were developed. The solutions incorporate the Stuckelberg-Feynman interpretation for particle antiparticle pairs. The probability interpretation for relativistic scattering of scalar particles results. Application to low order Coulomb scattering of Pi(+) mesons is discussed in detail. Calculational and conceptual experiencies of this approach was emphasized. The PSF approach may be used to directly investigate problems involving particles of finite width in an interacting medium. Via the mass representation of the FSF, exact solutions for the mass spectrum of scalar particles in a static uniform electric field perpendicular to a static uniform magnetic field is discussed. Advantages of the FSF operator language, such as the hermiticity in the usual sense of the evolution operator, is emphasized. Dissert. Abstr.

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N82-17994# Imperial Coll. of Science and Technology, London (England). Heat Transfer Section.
MATHEMATICAL MODELS IN NUCLEAR-REACTOR THERMAL HYDRAULICS
D. Brain Spalding Mar. 1980 62 p refs Presented at Am. Nucl. Soc. Meeting on Nucl.-Reactor Thermal Hydraulics, Saratoga, N.Y., 6 Oct. 1980
(HTS/81/3) Avail: NTIS HC A04/MF A01

The mathematical problem of predicting the flow of interspersed phases, possessing differing (average) velocities at the same instant and location, and of successful methods of solving the problem are reviewed. It is argued that the mathematical difficulties having now been overcome, further attention should be devoted, on the computational side, to faster algorithms and more flexible computer codes; and, on the physical side, to the development of models for interfacial area, interphase transport, and interactions with solid structural elements. J.M.S.

74 OPTICS

Includes light phenomena.

N82-17995 Columbia Univ., New York.
PHOTON ECHO MODULATION IN LaF3:Pr3+ Ph.D. Thesis
Kophu Chiang 1981 120 p
Avail: Univ. Microfilms Order No. 8125263

The photon echo modulation technique was utilized to measure the hyperfine structure and relaxation characteristics of the terminal levels of the 3H4 (3P0(477.7 nm) transition in Praseodymium doped Lanthanum trifluoride (LaF3:P4(3+)). Using two home made nitrogen laser pumped dye lasers modulated photon echoes were observed over a 8 micro sec range of pulse separations. In this range the echoes decay in a simple exponential manner by a factor of 10 to the 5th power and yield a homogeneous linewidth of 70 Khz (FWHM) for a 0.03% LaF3:P(3+) sample. Experiments performed with a less concentrated sample (0.01%) show that the homogeneous linewidth is even narrower, and is about 40 Khz (FWHM). By Fourier transforming the echo modulation data it was possible to determine the hyperfine energy level splittings and their associated linewidths in both the ground (3)H4 and excited (3)P0 states. Dissert. Abstr.

N82-17996 Illinois Univ. at Urbana-Champaign.
EXPERIMENTAL CORRELATION AND SELF CONSISTENT ANALYSIS OF AN IR, FIR, MW TRIPLE RESONANT SYSTEM IN AMMONIA Ph.D. Thesis
William Wei-Long Lee 1981 120 p
Avail: Univ. Microfilms Order No. 8127630

In a triple resonant system of NH3, the interactions between the IR, FIR, and MW were studied by means of density matrix. The FIR and MW frequencies calculated from the self consistent analysis were verified by the experiments. The density matrix equations for the triple resonance were solved in matrix form which provided an inexpensive way for the calculations. The gain curves for the FIR and MW were plotted from the results of the calculations in which the M-degeneracy was included. The curves displayed the linear, Raman, and Hyper-Raman processes between the IR, FIR, and MW. For the Raman process, the IR threshold intensity (10 kW/sq cm) and saturation intensity (500 kW/sq cm) were identified which implied the use of a CO2TEA laser in the experiment. The calculated Raman gain and Hyper-Raman gain as functions of pressures have provided a reasonable interpretation of the measured optimal pressure (3.3 torr) and maximum pressure (10 torr). The self consistent analysis for the FIR and MW frequencies was conducted via a series of calculations for their gain curves. Dissert. Abstr.

N82-17997 Michigan Univ., Ann Arbor.
OPTICAL PROPAGATION THROUGH HORIZONTALLY STRATIFIED, QUASI-SINUSOIDAL, PHASE GRATINGS Ph.D. Thesis
Kim Allen Winick 1981 225 p
Avail: Univ. Microfilms Order No. 8125222

A general theory was developed for determining the reflection and transmission coefficients of holographically produced, horizontally stratified, quasi-sinusoidal, phase gratings as a function of incident angle, wavelength and polarization. Theorems are stated and proved about polarization effects and about the relationship between the spectral and angular characteristics of such gratings. Strong similarities are shown to exist between these gratings and conventional multilayer dielectric stacks. The inverse scattering problem is considered. It is shown that horizontally stratified phase gratings can be used as position-invariant, frequency domain filters in coherent optical systems. An interferometric technique is developed for fabricating horizontally stratified, quasi-sinusoidal, phase gratings. Some simple reflection gratings are fabricated in dichromated gelatin, and their properties are reported. Dissert. Abstr.

N82-17998*# Honeywell Electro-Optics Center, Lexington, Mass.
MODERATE TEMPERATURE DETECTOR DEVELOPMENT Final Technical Report, Sep. 1979 - May 1980
J. W. Marciniec, R. J. Briggs, and A. K. Sood Dec. 1981 45 p refs
(Contract NAS9-15250)
(NASA-CR-167504; HONEYWELL-8103-26) Avail: NTIS HC A03/MF A01 CSCL 20F

P-side backside reflecting constant, photodiode characterization, and photodiode diffusion and G-R currents were investigated in an effort to develop an 8 m to 12 m infrared quantum detector using mercury cadmium telluride. Anodization, phosphorus implantation, and the graded band gap concept were

approaches considered for backside formation. Variable thickness diodes were fabricated with a back surface anodic oxide to investigate the effect of this surface preparation on the diffusion limited zero bias impedance. A modeling technique was refined to thoroughly model diode characteristics. Values for the surface recombination velocity in the depletion region were obtained. These values were improved by implementing better surface damage removal techniques.
A.R.H.

N82-17999# Drexel Univ., Philadelphia, Pa. Dept. of Physics and Atmospheric Sciences.
AN INVESTIGATION OF VARIABLE COHERENCE SOURCES AND OF SOME PRACTICAL APPLICATIONS Final Report
Lorenzo M. Narducci and James D. Farina 9 Nov. 1981 31 p refs
(Contract DAAG29-80-K-0001)
(AD-A107715; ARO-17514.1-P) Avail: NTIS HC A03/MF A01 CSCL 20/6

We have investigated, designed and tested a modified form of Mach-Zehnder interferometer for measuring the coherence length of a partially coherent source. The instrument is unique that it allows the recording of a fringe pattern and the extraction of the corresponding visibility curve even for sources with poor spatial coherence by virtue of the instrument's differential magnification. To our knowledge, the idea of magnifying a coherence pattern is new and could have important laboratory applications.
Author (GRA)

N82-18000# Defence Research Establishment Valcartier (Quebec). Research and Development Branch.
MULTIPLE TARGET TRACKING WITH AN AM RETICULE SEEKER
K. W. Morgan Sep. 1981 53 p In ENGLISH; FRENCH summary
(AD-A107854; DREV-R-4203/81) Avail: NTIS HC A04/MF A01 CSCL 17/5

A generic AM-reticle seeker was modelled, and its steady-state equilibrium position, in the presence of either two point targets or a point and an extended target, determined by digital computer simulation.
Author (GRA)

N82-18001# European Office of Aerospace Research and Development, FPO New York 09510.
OPTICAL THIN FILM COATINGS
Armen E. Mardiguian and J. H. Fenner Jun. 1981 68 p
(AD-A107808; EOARD-TR-82-1) Avail: NTIS HC A04/MF A01 CSCL 11/3

Results of a survey on optical thin film and substrate technology conducted by the European Office of Aerospace Research and Development are reported. Over thirty university, commercial, and government laboratories were visited in ten Western European nations. Specific subject areas include design, synthesis, and characterization of optical thin films, substrate preparation and testing, and production of equipment for thin film deposition. Summary section indicating the most significant efforts and general state of optical coating research in Europe is included.
Author (GRA)

N82-18002# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Apparate.
BEAM BROADENING IN DENSE SCATTERING MEDIA
J. Langerholc 1981 22 p refs
(MBB-UA-583-81-O) Avail: NTIS HC A02/MF A01

The full 3D integral equation for the spherically symmetric scattering of light in a medium of densely packed uniformly distributed scattering centers is solved for the case of a cylindrically symmetric laser beam (Gaussian profile) directed normally at the slab. The intensity (irradiation) of the scattered light is calculated as a function of the r and z coordinates in the slab, and the distribution of the light scattered out of the slab is studied. After reduction to a two dimensional problem, the discretized integral equation is solved by a standard iteration procedure. The resulting two dimensional distribution is reconverted to 3D to obtain the r and z dependence of the irradiance. From the irradiance distribution the angular distribution of backward and forward scattered light is calculated; special emphasis is placed on the radial dependence of the scattered light emerging normal to the surface. Spot size is defined and calculated for various values of beam radius and material parameters nominally chosen to represent irradiation of translucent biological tissue by a Nd:YAG laser.
Author

N82-18003# European Space Agency, Paris (France).
DEFINITION OF THE MAROTS REFLECTOR MERIDAN LINE BY INTERPOLATION: APPLICATION TO OPTICAL MEASUREMENTS
M. Bouthier Nov. 1981 21 p Transl. into ENGLISH of "Definition de la Meridienne du Reflecteur de Marots par Interpolation. Application aux mesures Optiques" rept. CNES-78/CT/PRT/SST/SM/105 Toulouse Original report in FRENCH previously announced as N81-30969
(ESA-TT-696; CNES-78/CT/PRT/SST/SM/105) Avail: NTIS HC A02/MF A01

The positioning of the optics, as part of laboratory tests on the MAROTS reflector in order to measure thermoelastic deflections while simulating typical orbital temperature distributions, is described. The experiment revolves around a theodolite located at the axis of the reflector; small mirrors are attached to the reflector. Consequently, positioning depends on the reflector surface being known with sufficient accuracy. As the meridian line is initially defined by 40 points, interpolation of measurement data provides accurate coordinates and slopes at any point. Interpolation by adequate spline functions is shown to give satisfactory results, making it possible to optimize the location of the theodolite and the mirrors for the deflection measurements.
Author (ESA)

N82-18004# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
MEASUREMENT OF VISIBLE RADIATION TRANSFER IN WATER UNDER LABORATORY AND FIELD CONDITIONS Technical Report, 1 Oct. 1978 - 30 Sep. 1981
F. P. Incropera Sep. 1981 93 p refs Sponsored by Office of Water Research and Technology
(PB82-108481; PWRRC-TR-140; OWRT-A-058-IND(2)) Avail: NTIS HC A05/MF A01 CSCL 06C

Solar radiation transfer in a body of water strongly influences thermal conditions and the growth of photosynthetic organisms. The development of methods for accurately predicting this transfer is investigated. The optical properties of natural waters and the distribution of radiation of water samples under laboratory conditions were measured. The results were compared with predictions. The distribution of radiation under field conditions were also measured. A complete set of optical property measurements were obtained from samples of water from the Wabash River.
GRA

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-18005 Princeton Univ., N. J.
STUDIES OF RUNAWAY ELECTRON TRANSPOT IN PLT AND PDX Ph.D. Thesis
Cris William Barnes 1981 190 p
Avail: Univ. Microfilms Order No. 8127747

The physical mechanisms responsible for anomalous electron heat transport were examined. The confinement time of the runaway electrons was measured by a variety of experiments on the Princeton Large Torus (PLT) and the Poloidal Divertor Experiment (PDX). Measurements made in different energy ranges show the confinement time being 2-6 msecs between 0.4-1.0 MeV (10-30 percent of the thermal confinement time), and increasing to 50-100 msecs or greater between 8-22 MeV. The confinement time increases with bulk plasma density, and with toroidal field at low densities. Experiments include determination of the electron spectrum from the amount of photonuclear activation of a stainless steel limiter, and of the runaway electron scrape-off thickness measured from the angular distribution of that activation. The ratio of electrodisintegration to photon-neutron production, and the time dependence of those emissions, are related to transport coefficients.
Dissert. Abstr.

N82-18006 Princeton Univ., N. J.

FUNCTIONAL INTEGRAL APPROACH TO CLASSICAL STATISTICAL DYNAMICS Ph.D. Thesis

Roderick Von Jensen 1981 129 p
Avail: Univ. Microfilms Order No. 8127749

The functional integral method for the statistical solution of stochastic differential equations is extended to a broad, new class of nonlinear dynamical equations with random coefficients and initial conditions. This work encompasses previous results for classical systems with random forces and initial conditions with arbitrary statistics, and provides results for systems with nonlinear interactions which are nonlocal in time. Closed equations of motion for the correlation and response functions were derived which have applications in the calculation of particle motion in stochastic magnetic fields and in the description of electromagnetic plasma turbulence. As an illustration of the results for nonlocal interactions and non-Gaussian initial conditions, the electromagnetic dispersion tensor was calculated to first order in renormalized perturbation theory. Dissert. Abstr.

N82-18007# Nagoya Univ. (Japan). Inst. of Plasma Physics.

RECOMMENDED VALUES OF TRANSPORT CROSS SECTIONS FOR ELASTIC COLLISION AND TOTAL COLLISION CROSS SECTION OF ELECTRONS IN ATOMIC AND MOLECULAR GASES

Makoto Hayashi Nov. 1981 66 p refs
(IPPJ-AM-19) Avail: NTIS HC A04/MF A01

Recommended values are presented for the integral, momentum-transfer and viscosity cross sections for elastic collisions and total collision cross section of electrons in He, Ne, Ar, Kr, Xe, H2, N2, O2, CO and CO2. A wide range of electron energies (.001 to 10,000 eV) is considered, but emphasis is placed on the 1 - 1,000 eV range. A comprehensive list of references for the relevant cross sections is given. Author

N82-18008# Nagoya Univ. (Japan). Inst. of Plasma Physics.

THE DYNAMICS OF MICROPROCESSES AND CURRENT TURBULENT HEATING OF IONS IN URAGAN-2 STELLARATOR

N. F. Perepelkin (Ukrainian Academy of Sciences, Kharkov), V. A. Suprunenko, A. S. Slavny, M. P. Vasilev, A. G. Dikii, V. D. Kotsubanov, B. V. Kravchin, and A. E. Kulaga Oct. 1981 41 p refs
(IPPJ-548) Avail: NTIS HC A03/MF A01

Noise spectra and UHF radiations within a wide range of electron cyclotron, electron plasma and ion plasma frequencies were investigated in 'Uragan-2' stellarator. Threshold dependences on electrical and magnetic fields of kinetic instability excitations were studied as well as of ion heating and disruption of quasi-stationary run away of electrons in a plasma heated by a powerful current pulse in high magnetic fields. Near omega sub ce/omega sub pe approximately = 1, the threshold character of growth of hot ion number and energy, as well as of the excitation of epithermal nonstationary electromagnetic radiations on Langmuir frequency and ion plasma frequency harmonics were connected with the ion acoustic turbulence and the processes of nonlinear sound transformation. These effects are increased with the rise of magnetic field strength and are followed by the drop of a resistance absolute value. At the rise of electrical field strength no restrictions in injection of high ohmic power into a plasma and ion temperature rise were observed. The results of ion heating in Tokamaks were compared. Author

N82-18009# Nagoya Univ. (Japan).

NEW EXCITATION AND IONIZATION MECHANISM OF IONS IN DENSE PLASMAS: THE ROLE OF AUTOIONIZING STATES

Takashi Fujimoto and Takako Kato Oct. 1981 15 p refs
(IPPJ-549) Avail: NTIS HC A02/MF A01

It is shown that, in dense plasmas, dielectronic capture into doubly excited ionic states followed by the ladder like excitation ionization chain becomes important in the excitation ionization process of ions. For an example of a hydrogen like ion, its contribution to the excitation 1s yields 2s, 2p as well as to the ionization was evaluated by the method of the quasisteady state solution to the rate equations. The increase is found to be substantial, i.e., by more than a factor of two both for the excitation and ionization rate coefficients. Author

N82-18010# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

EXPERIMENTAL DETERMINATION OF THE ELECTRON ENERGY DISTRIBUTION FUNCTION IN PLASMAS

Tetsuya Akitsu Jun. 1981 12 p refs Presented at the 33rd Ann. Meeting of SBPC, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2107-RPE/333) Avail: NTIS HC A02/MF A01

The energy distribution function of electrons is measured by the Druyevestein method using a pulsed electrostatic probe circuit. The electronic circuit developed for the measurement and the experimental results obtained in a double plasma machine are described. R.J.F.

N82-18011# Fom-Instituut voor Plasmafysica, Rijnhuizen (Netherlands).

FIRST-ORDER TOROIDAL CORRECTION TO THE MINIMUM ENERGY STATE OF A CYLINDRICAL PLASMA COLUMN OF FINITE BETA

W. Schuurman and J. W. Edenstrasser (Innsbruck Univ.) Aug. 1981 19 p refs Sponsored by Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek and Euratom
(Grant S-18/03)
(Rept-81-133) Avail: NTIS HC A02/MF A01

An inverse aspect ratio expansion was used to formulate a first-order toroidal correction to the minimum energy equilibrium state of a cylindrical plasma column of finite beta, embedded in a vacuum region. The use of this correction improves the comparison between the theoretical model, set up for a rotationally symmetric straight cylinder, and the toroidal pinch experiments. The comparison demands the numerical evaluation of an integral with an apparent singularity at the plasma axis, and matching of four parameters to appropriate boundary conditions. A.R.H.

N82-18012# Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).

GRAPHS OF ANOMALOUS ENERGY CONFINEMENT TIMES FOR ASDEX, INTOR, JET, PLT, TFTR AND ZEPHYR

H. K. Wimmel Jul. 1980 55 p refs
(IPP-6/200) Avail: NTIS HC A04/MF A01

Anomalous transport due to the dissipative trapped-ion instability, anomalous heat conductivity of electrons, and neoclassical heat conductivity of ions are considered. The energy confinement time resulting from the combined effects is represented graphically as a function of the mean temperature and for several values of the mean density for the following Tokamaks: ASDEX, INTOR, JET, PLT, TFTR, and ZEPHYR. Author

N82-18013# Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).

MODEL CALCULATIONS OF THE TEARING INSTABILITY ASSOCIATED WITH AC-MODULATION OF THE PLASMA-CURRENT IN TOKAMAKS

F. Pohl, S. vonGoeler, W. Engelhardt, K. Lackner, and M. Murmann Jun. 1980 63 p refs
(IPP-6/198; IPP-III/60) Avail: NTIS HC A04/MF A01

An experiment was performed on the pulsator Tokamak at Garching in which an ac component was superposed on the plasma current. To interpret and plan these experiments, a computer program was developed to calculate the current distributions accompanying the ac modulation taking into account the skin effect. The experiments show that ac modulation of high amplitude impairs the plasma stability and can lead to disruption. Since tearing modes are believed to be responsible for the disruptive instability, calculations on the stability of these modes were performed. The computer program and its results are described. The skin effect, the stability of tearing modes, and the heating effects associated with ac modulation are discussed. Computer program documentation is included. A.R.H.

N82-18014# California Univ., Berkeley. Electronics Research Lab.

STABILIZATION OF THE LOWER HYBRID DRIFT INSTABILITY BY RESONANT ELECTRONS

Yu-Jiuan Chen, William M. Nevins (California Univ., Livermore), and Charles K. Birdsall 16 Sep. 1981 30 p refs
(Contracts N00014-77-C-0578; W-7405-eng-48)
(AD-A107652; UCB/ERL-M81/72) Avail: NTIS

HC A03/MF A01 CSCL 20/9

The lower hybrid drift instability was studied with a two dimensional electrostatic simulation code. Simulations showed good agreement of the measured local growth rates and frequencies with the results of local theory during the early stage of wave growth. At later times nonlocal effects become important, and a coherent mode structure develops. This normal mode was observed to propagate up the density gradient. At zero plasma beta and zero electron temperature, we found that the lower hybrid drift instability is stabilized by the local current relaxation due to both ion quasilinear diffusion and electron E x B trapping which causes electron heating to occur. Author (GRA)

N82-18015# California Univ., Berkeley. Electonics Research Lab.

ROTATIONAL INSTABILITIES IN THE FIELD-REVERSED THETA PINCH: RESULTS OF HYBRID SIMULATIONS

Douglas S. Harned 14 Sep. 1981 36 p refs
(Contract N00014-77-C-0578)
(AD-A107651; UCB/ERL-M81/70) Avail: NTIS
HC A03/MF A01 CSCL 20/9

Rotational instabilities in rigidly rotating field-reserved theta pinch equilibria are studied using a quasineutral hybrid simulation code. We observe unstable $m=2$ modes at levels of ion rotation below instability thresholds predicted by finite Larmor radius fluid theory. Nonlinear effects are found to reduce the growth rate and lower the real frequency of the $m=2$ mode at large amplitude. Instabilities with $m>2$ have been observed for some strongly reversed cases. It is also found that growth rates for these instabilities can be greatly reduced by increasing the ratio of the plasma radius to the ion Larmor radius. Author (GRA)

N82-18016# California Univ., Berkeley. Electronics Research Lab.

REVIEW OF THE LOWER HYBRID DRIFT INSTABILITY AND ITS SATURATION MECHANISMS

Yu-Jiuan Chen 20 Aug. 1981 15 p refs
(Contract N00014-77-C-0578)
(AD-A107550; UCB/ERL-M81/60) Avail: NTIS
HC A02/MF A01 CSCL 20/4

A survey is given of previous research on the linear theory of the lower hybrid drift instability (Sec. I). A summary is made of research recently completed as well as research currently in progress on the nonlinear theory and computer simulations of the lower hybrid drift instability (Sec. II). Author (GRA)

N82-18017# Naval Research Lab., Washington, D. C.

STEADY-STATE PLANAR ABLATIVE FLOW Interim Report

W. M. Manheimer, D. G. Colombant, and J. H. Gardner 18 Nov. 1981 32 p refs
(Contract DE-AI08-79DP-40092)
(AD-A107601; NRL-MR-4644) Avail: NTIS
HC A03/MF A01 CSCL 20/9

Steady state planar ablative flow in a laser produced plasma is studied. Our calculations relate all steady state fluid quantities to only three parameters, the material, absorbed irradiance and laser wavelength. The fluid is broken into three regions: the subcritical expanding plasma, the steady state ablation front and the accelerated slab. Boundary conditions at the interfaces of these regions are given. If the absorbed irradiance is nonuniform, the nonuniformity in ablation pressure is calculated. Results are compared with experiment and fluid simulation for both uniform and nonuniform illumination. Author (GRA)

N82-18018# Naval Research Lab., Washington, D. C. Plasma Physics Div.

ELECTRON CYCLOTRON RESONANCE HEATING OF TANDEM MIRRORS AT RELATIVISTIC ENERGIES Interim Report

Bertram H. Hui, K. H. Chu, and Thomas Antonsen 16 Nov. 1981 9 p refs Sponsored by DOE
(AD-A107944; NRL-MR-4511) Avail: NTIS
HC A02/MF A01 CSCL 18/1

Successful operation of a tandem mirror fusion reactor is critically dependent on electron cyclotron resonance heating. We find that for proof-of-principle parameters, this frequency is more than a factor of two lower than the nonrelativistic cyclotron frequency. Presently available sources can provide relatively high power at this frequency. Author (GRA)

N82-18019# Naval Research Lab., Washington, D. C.

RESISTIVE INTERCHANGE MODES IN REVERSED FIELD PINCHES Interim Report

John M. Finn (Science Applications, Inc., McLean, Va.) and Wallace M. Manheimer 24 Nov. 1981 21 p refs
(Contract EX-76-A-34-1006)
(AD-A108129; NRL-MR-4520) Avail: NTIS
HC A02/MF A01 CSCL 02/9

A new regime is found in which the growth rate of the resistive interchange mode in cylindrical geometry is considerably smaller than previously believed. This stabilization is due to coupling to the external, tearing stable, region. Considering the crossover point from the conventional resistive interchange to the new regime as a critical beta, beta sub c, we find beta sub c about 7% for classical resistivity with T sub e = 10 eV, in agreement with recent numerical studies. However, beta sub c scales as T sub e to the -3/5th power, giving beta sub c about 1% for T sub e = 1 keV. Marginally stable pressure profiles for totally localized modes in the Bessel function model for a reversed field pinch are also computed, and show that the central pressure may be up to 400 times the pressure at the wall. Author (GRA)

N82-18020# TRW Defense and Space Systems Group, Redondo Beach, Calif.

MICROWAVE PLASMA SOURCE FOR NEUTRAL-BEAM INJECTION SYSTEMS Quarterly Technical Progress Report

15 Aug. 1981 26 p
(Contract DE-AC03-81ER-52071)
(DE81-029122; DOE/ER-52071/T2; SN-36833) Avail: NTIS
HC A03/MF A01

The overall program is described and the technical and programmatic reasons for the decision to pursue both the RFI and ECH sources into the current hydrogen test stage is discussed. The general characteristics of plasma sources in the parameter regime of interest for neutral beam applications are considered. The operational characteristics, advantages and potential problems of RFI and ECH sources are discussed. DOE

N82-18021# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.

ON THE RELATION BETWEEN PLASMA AND NEUTRAL GAS PROFILES IN A COLD GAS BLANKET SYSTEM Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Physics (EUR-NE)

M. Bures 27 Sep. 1981 19 p refs Sponsored by EURATOM
(TRITA-PFU-81-03; ISSN-0348-7644) Avail: NTIS
HC A02/MF A01

A solution for the neutral density profile using measured plasma density and temperature gradients is presented. The fluid model is used. The method indicates that the penetration length for neutrals is underestimated when integrated profiles are used. The ionization rate need not be inferred in the present calculation, because the ionization of neutrals diffusing into the plasma is implicitly included in measured profiles. This calculation is advantageous in the low temperature range where the ionization rate is a strongly varying function of temperature. Results show that the temperature gradient plays the essential role in the determination of the neutral density profile. Author (ESA)

N82-18022# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.

MICROINSTABILITIES IN A RADIALLY CONTRACTING INHOMOGENEOUS CYLINDRICAL PLASMA SLAB. PART 2: LOWER HYBRID AND ELECTRON CYCLOTRON DRIFT INSTABILITIES IN THE PLASMA FOCUS

R. Deutsch and H. J. Kaeppeler Dec. 1980 86 p refs
(IPF-80-13-Pt-2) Avail: NTIS HC A05/MF A01

The frequency, growth rate, turbulent electron and ion heating rates, and the effective collision frequency are calculated for both instabilities in parameter ranges associated with the late compression phase of the plasma focus. Simple analytical formulas were deduced for these parameters. Results indicate a regime in which the lower hybrid drift induced turbulence can heat the electrons up to a few keV within 10nsec. This result agrees with experimental observations. Author (ESA)

N82-18023# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
EXPERIMENTAL INVESTIGATION OF THE INFLUENCE OF HIGH VOLTAGES ON THE PERFORMANCE OF A PLASMA FOCUS Ph.D. Thesis [EXPERIMENTELLE UNTERSUCHUNG DES EINFLUSSES HOHER SPANNUNGEN AUF EINEN PLASMAFOKUS]
Tilman Oppenlaender Jan. 1981 82 p refs In GERMAN
(IPF-81-2) Avail: NTIS HC A05/MF A01

The influence of the application of high voltages for plasma current optimization at constant stored energy on the discharge evolution and the formation of a plasma focus was investigated. Such a current optimization is indicated by the known scaling of neutron yield with plasma current. The plasma diagnostics are described: holographic interferometry for electron density; soft X-ray, using the filter method for electron temperature; silver activation counters for neutron yield; time of flight techniques for neutron energy spectra; and magnetic and electric probes for macroscopic electrical parameters. Results show the expected neutron production scaling with current and typical yields of 10 to the tenth neutrons at 28kJ, 60kV operation. The electron density is about 50% and the production of energetic deuterons about 10 times higher than in other experiments with comparable energies. Neutrons with energy in excess of 5MeV were observed. Author (ESA)

N82-18024# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
MEASUREMENT OF HEAVY ION COMPONENTS IN A HYDROGEN PLASMA BY CO2 LASER SCATTERING WITH COHERENT DETECTION
W. Kasparek and E. Holzhauer Feb. 1981 15 p refs
(IPF-81-5) Avail: NTIS HC A02/MF A01

Ion temperatures and composition were determined in a hydrogen plasma with argon, nitrogen and helium additives. A CO2 hybrid laser beam is focussed into the plasma and the detected spectrum is transformed from IR to RF. After amplification the spectral resolution is obtained from a set of band filters of 20 MHz bandwidth. The mixing term (the high frequency part of the spectrum) is proportional to scattered signal amplitude, which is characteristic for a coherent receiver. In order to obtain the power spectrum the signal is squared, rectified and photographed. Measured spectra agree well with theory. Author (ESA)

N82-18025# Paris-Sud Univ., Orsay (France). Lab. de Physique des Gaz et des Plasmas.
SPECTROSCOPY OF MOLECULAR PLASMAS AND KINETICS OF EXCITED STATES [SPECTROSCOPIE DES PLASMAS MOLECULAIRES ET CINETIQUES DES ETATS EXCITES]
A. Ricard Mar. 1981 148 p refs In FRENCH
(LP-187) Avail: NTIS HC A07/MF A01

Excited states (radiative and metastable) in a nonequilibrium plasma are defined. Reactions are classified for metastable atoms and selective transfer. Spectroscopy of diatomic molecular emission, applied to the radicals NO, NH, and SiH excited in discharges in mixtures of N2 + O2, N2 + H2, R + O2, R + NH3, etc., where R is a rare gas (Ar), is discussed. It is shown how plasma temperature can be deduced. Measurement methods by optical absorption that are applicable to rare gas metastables and radicals are presented. The use of tunable lasers considerably improves the accuracy of optical absorption measurement. Applications of transfers between excited states in laser physics and in plasma physicochemistry are illustrated. Author (ESA)

N82-18026# Paris-Sud Univ., Orsay (France). Lab. de Physique des Gaz et des Plasmas.
QUANTUM CORRECTIONS TO THE PROPERTIES OF DENSE PLASMAS [CORRECTIONS QUANTIQUES AUX PROPRIETES DES PLASMAS DENSES]
M. M. Gombert May 1981 259 p refs Partly in FRENCH and ENGLISH
(LP-189) Avail: NTIS HC A12/MF A01

Quantum corrections are considered for the thermodynamic properties of dense plasmas such as found at the center of the Sun or those created by inertial compression fusion. The pseudopotential between two charged particles is discussed. The single component plasma model as well as multicomponent models are treated in terms of perturbation developments in functions of different small parameters, i.e., the plasma parameter, the measure of the quantum diffraction effect, and electron exchange effects. The problem of iron demixing at the center of the Sun is addressed; results show no iron demixing. The effect of quantum corrections on the static thermal microfield in a plasma is also studied as well as Bohm diffusion. Author (ESA)

N82-18027# Paris-Sud Univ., Orsay (France). Lab. de Physique des Gaz et des Plasmas.
MICROWAVE DISCHARGES
J. Marec, E. Bloyat, M. Chaker, P. Leprince, and P. Nghiem Oct. 1981 66 p refs Presented at Lecture on Electrical Breakdown and Gas Discharges, Les Arcs, France, Jul. 1981
(LP-192) Avail: NTIS HC A04/MF A01

The breakdown conditions of microwave discharges and the difficulties of obtaining them theoretically are reviewed. Classic experimental results are interpreted by the diffusion theory, whose limits and physical meaning are studied. Steady state discharges are described. Plasma columns sustained by a traveling surface wave are discussed. Applications of microwave discharges are outlined, e.g., for spectroscopy studies, in lasers, as ion sources, the stimulation of combustion in order to accelerate burning of lean air-fuel mixtures in internal combustion engines, and in plasma chemistry for the preparation of hydrogenated amorphous silane. Being electrodeless, microwave discharges minimize pollution. Author (ESA)

N82-18028 Auburn Univ., Ala.
ELECTRON TEMPERATURE EVOLUTION AND MACROSCOPIC SIZE OF A VACUUM SPARK DISCHARGE PLASMA Ph.D. Thesis
Robert Edward OConnor 1981 142 p
Avail: Univ. Microfilms Order No. 8127297

The temporal development of the electron temperature of the point plasma formed in a vacuum spark discharge (VSD) is determined at capacitor bank voltages ranging from 6 to 18 kV. The measurement is based on an X-ray absorption technique utilizing three foils (Cr, Mn, and Fe). Bremsstrahlung, radiative recombination, and line radiation are calculated for a coronal equilibrium plasma model. Experimentally obtained ratios of the detector foil combinations over the time profile of the X-ray signals are compared with the theoretically obtained ratios to determine the temporal development of the electron temperature. A peak electron temperature of 2.6 keV was found. The bulk, or macroscopic, plasma formed in the VSD is studied with respect to its physical size, electron temperature, and electron density. Dissert. Abstr.

N82-18029 Brigham Young Univ., Provo, Utah.
MAGNETOHYDRODYNAMIC STABILITY OF STRUCTURALLY STABLE TOROIDAL PLASMAS Ph.D. Thesis
Frederick Cattley Rock 1981 103 p
Avail: Univ. Microfilms Order No. 8126330

The MHD stability of sharp boundary axisymmetric toroidal plasmas with the poloidal field and 'kidney bean' shape implied by the requirements of structural stability (immunity of the magnetic field topology to small perturbations) is investigated. High values of marginal beta (up to 36 percent for $R/a = 2$) are found. Results are presented for the four magnetic field topologies on the sharp boundary surface with this shape and as a function of elongation. Dissert. Abstr.

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N82-18030 Columbia Univ., New York.
MAGNETIC CIRCULAR DICHROISM AND FARADAY ROTATION OF CESIUM-ARGON EXCIMERS AND CESIUM

DIMERS Ph.D. Thesis
Muhammad Azadul Islam 1981 81 p
Avail: Univ. Microfilms Order No. 8125310

Direct information about the angular momentum quantum numbers and the angular momentum coupling schemes of excimer molecules was obtained in an experiment in which the MCD and the FR of cesium-argon excimer and cesium dimer absorption bands between 5000 A and 10,000 A were measured for the range of temperature from 116 C to 355 C. The measured MCD data at the blue wing of D2 line clearly shows that the assignment of sigma 2/2 to this excited state, assuming Hund's case (b), is a poor approximation. By a simple inspection of the MCD data it is found that the coupling scheme is more nearly Hund's case (c) than Hund's case (b). The blue wing associated with 5D transition in atomic cesium is devoid of MCD and exhibits strong MCD in the red wings. The yellow-green band associated with 7s-6s transition in atomic cesium shows no MCD.
Dissert. Abstr.

N82-18031# State Univ. of New York at Stony Brook.
QUANTUM BEATS IN PHOTOIONIZATION CURRENT Ph.D. Thesis
Ting Shan Luk 1981 80 p
Avail: Univ. Microfilms Order No. 8126234

A quantum beat signal was observed in the total photoionization current from the Zeeman levels of the 3 super 2 P sub 3/2 state. Atoms in a thermal beam were excited to the 3P state by a resonant light pulse, allowed to evolve for about 36 nsec in an applied magnetic field, and then photoionized by a second, optically delayed light pulse. Two dye lasers pumped by the same N2 laser provided the stepwise excitation at 5890A and ionization at about 4060A. Quantum beats from the 3P state's Zeeman structure were observed in the photocurrent as the field was swept from -35 to +35 Gauss. It also has application to increasing the sensitivity of level crossing and quantum beat spectroscopy.
Dissert. Abstr.

N82-18032 Yale Univ., New Haven, Conn.
ELECTRONIC EXCITATION OF HELIUM AND KRYPTON BY ELECTRON IMPACT Ph.D. Thesis
Julia Mae Phillips 1981 151 p
Avail: Univ. Microfilms Order No. 8125693

A crossed beam electron impact spectrometer is modified to enable the study of near threshold electronic excitation of He and Kr by electron impact. Absolute differential cross sections for excitation of the individual n = 2 states of He and 3p55s states of Kr are measured within the first four electron volts of threshold. In He pronounced angle dependent structures are apparent in the threshold excitation of the 2p3 state and in the near threshold excitation of the 2S3 state. These experimental observations suggest the existence of a new 2P resonance near 20.8 eV. The results on Kr demonstrate that the angular momentum of the Kr(-) ion core 4p5 has a strong influence on the excitation cross sections, both on the relative magnitudes of the cross sections and on the relative strengths of resonant structures in the excitation functions. The angular momentum of the entire electron cloud of an excited state has less of an effect on the cross sections.
Dissert. Abstr.

N82-18033 Columbia Univ., New York.
DEFECT STRUCTURE IN THE ALKALI-GALLATE FAST ION CONDUCTORS Ph.D. Thesis
Michael Paul Anderson 1981 256 p
Avail: Univ. Microfilms Order No. 8125237

For crystals prepared from K2O-Ga2O3 starting materials, the defect responsible for nonstoichiometry is a complex Frenkel defect, which introduces both interstitial oxygen and interstitial potassium into the crystals. For crystals prepared from Na2O- Ga2O3 starting materials, two complementary defect processes occur. The first is the Frenkel defect observed in K beta gallate. The second is the substitutional replacement of Ga(+3) by Na(+) in tetrahedral sites. It is shown that 'self-doping' by Na(+) is responsible for the stabilization of Na beta' gallate. The physical origin of nonstoichiometry is discussed in terms of Pauling's electrostatic valence principle. Models for short range correlations in the crystals are presented. The mixed ion effect was also analyzed. It has been shown that the anomalous drop in conductivity is accompanied by the partioning of mixed ion carriers into different sites.
Dissert. Abstr.

N82-18034 Brandeis Univ., Waltham, Mass.
HIGH FIELD NMR STUDIES OF STATIC ORDERING AND SPIN-ENERGY COUPLING IN MnF2 Ph.D. Thesis
Shyam Chandra Das 1981 297 p
Avail: Univ. Microfilms Order No. 8126872

The antiferromagnetic to paramagnetic transition in MnF2 in a 75 kG field applied along [001] was studied using MNR. The time average staggered and uniform magnetizations N and M were obtained respectively from the difference and sum of the NMR frequencies of the two F-19 sites alpha and beta, over the range .12 K < T sub c - T < 6 K.
Dissert. Abstr.

N82-18035 Illinois Univ. at Urbana-Champaign.
ENERGY BANDS AND SUPERLATTICE FORMATION IN TITANIUM DISELENIDE Ph.D. Thesis
Bancherd DeLong 1981 120 p
Avail: Univ. Microfilms Order No. 8127579

The superlattice formation in TiSe2 is related to a soft phonon mode near the zone boundary. This mode is supported by a coupling of the electrons at L and the holes at gamma, which causes an anomalously large electronic susceptibility. When the transition occurs, a large portion of the Fermi surface gaps, new electronic states and energy bands are formed, resulting in the lowering of the electronic energy. The 2a x 3a superlattice was directly observed by electron diffraction in dilute Zr-doped TiSe2 crystals. The powerful technique of angle-resolved photoemission spectroscopy has been extended to low temperature. Changes in the energy band structure of TiSe2 due to superlattice formation were observed for the first time.
Dissert. Abstr.

N82-18036 Pennsylvania Univ., Philadelphia.
GAUGE-DEPENDENT CRITICAL PROPERTIES OF THE NEMATIC TO SMECTIC-A PHASE TRANSITION IN LIQUID CRYSTALS IN THE 1/N EXPANSION Ph.D. Thesis
Stuart Gordon Dunn 1981 134 p
Avail: Univ. Microfilms Order No. 8127018

A generalized de Gennes model for the nematic to smectic-A transition with a N complex component order parameter, Psi, is studied in the 1/N-expansion. A continuum of gauges parameterized by an angle Theta with Theta = 0 (Theta = Pi/2) corresponding to the physical (LC) and SC gauges is introduced. Isotropic and anisotropic critical behavior is found as the Epsilon expansion. The susceptibility Chi sub LC in the LC gauge is related to that Chi sub SC, in the SC gauge via Chi sub LC = Chi sub SC to the exp(g) power, where g is negative and more than logarithmically singular in reduced temperature t and wave number q near criticality, because the splay elastic constant K sub 1 to the 0 behaves as a dangerous irrelevant variable.
Dissert. Abstr.

N82-18037 Illinois Univ. at Urbana-Champaign.
OPTICAL CHARACTERIZATION OF THIN METALLIC AND SEMICONDUCTING FILMS IN THE FAR INFRARED Ph.D. Thesis
Mark Stuart Durschlag 1981 119 p
Avail: Univ. Microfilms Order No. 8127582

The performance in a CW optically pumped air infrared (fir) laser of a hybrid metal mesh-dielectric mirror consisting of an assembly of thin metallic and semiconducting films is evaluated. Its construction is described and an overview of theoretical approaches predicting its optical properties is outlined. From the general model which best agrees with the experimentally determined transmission a simplified model is derived and shown to maintain sufficient accuracy to warrent its further utilization. Ultra-thin semiconducting heterostructures are also examined using fir techniques. In particular, it is shown that by fitting a calculated reflectivity based on a simple classical model to the fir reflectivity obtained experimentally, both electrical (free carrier concentration, mobility) and lattice (polar phonon frequencies) parameters can be obtained with reasonable accuracy.
Dissert. Abstr.

N82-18038 Illinois Univ. at Urbana-Champaign.
MOSSBAUER STUDIES ON PARTIALLY ORIENTED

SAMPLES OF CARBON MONOXYMYOGLOBIN AND PHOTODISSOCIATED CARBON MONOXYMYOGLOBIN Ph.D. Thesis

Richard Maury Emberson, Jr. 1981 149 p
Avail: Univ. Microfilms Order No. 8127586

Iron-57 studies on partially oriented samples of carbon monoxymyoglobin (MbCO) and photodissociated carbon monoxymyoglobin (Mb*CO) are reported. The spectrum of each Mb species consists of a doublet which is the result of the quadrupole interaction with the electric field gradient (EFG) at the Fe-57 nucleus. The photo-produced partial orientation affects the intensity ratio R of the two lines: measurements of R versus the fraction MbCO remaining allows the determination of the asymmetry parameter eta of the EFG and the angle psi between its principal axis and the normal to the optical axis, which coincides with the heme normal. The feasibility was demonstrated of such an experiment by measuring eta and psi for MbCO and Mb*CO. Dissert. Abstr.

N82-18039 Brandeis Univ., Waltham, Mass.

THE FERMI SURFACE RECONSTRUCTED MOMENTUM DENSITY OF V3Si FROM POSITRON ANNIHILATION EXPERIMENTS Ph.D. Thesis

William Sidney Farmer 1981 258 p
Avail: Univ. Microfilms Order No. 8126873

The angular correlation of annihilation radiation (ACAR) technique was used to provide information about the electron positron momentum density via point slit distributions. Each two dimensional distribution corresponds to an integral of the three dimensional momentum density. Two dimensional point slit distributions were measured for seven V3Si crystal orientation using 64 detector ACAR apparatus. A circular averaging technique extracted the small oscillations from the nearly Gaussian ACAR distributions and displayed them clearly. A reconstruction algorithm computed the three dimensional momentum density from six of the ACAR distributions. Model densities were produced from some recent A15 APW band calculations and are compared to the reduced reconstructed ACAR result. Dissert. Abstr.

N82-18040 Illinois Univ. at Urbana-Champaign.

SURFACE ANALYSIS APPLIED TO THIN FILMS OF MOLECULAR SOLIDS Ph.D. Thesis

Robert Edgar Davis 1981 149 p
Avail: Univ. Microfilms Order No. 8127577

Auger depth profiling was established as a reliable technique for determining the elemental composition in depth of phthalocyanine/phthalocyanine (Pc/Pc) and Pc/metal interfaces initially. The mechanisms which can lead to physical and chemical degradation of these interfaces with time were also examined. A variety of techniques were relied upon to study the chemical degradation of FePc which took place during annealing in air. The question of a molecular sputtering mechanism is addressed. Using the results obtained from these AES studies, the technique of SIMS was evaluated for the analysis in depth of molecular solids. The method has advantages which allow the identification of silver on the surface of unannealed Pc/Ag/glass assemblies. The presence of silver was not detectable by AES due to spectral overlap, and had not been anticipated by previous researchers. Some preliminary results with polymer film assemblies were presented. Dissert. Abstr.

N82-18041*# California Univ., Irvine. Dept. of Physics.

HARMONIC AND ANHARMONIC PROPERTIES OF DIAMOND STRUCTURE CRYSTALS WITH APPLICATION TO THE CALCULATION OF THE THERMAL EXPANSION OF SILICON Ph.D. Thesis. Final Report

Keith Herbert Wanser Dec. 1981 288 p refs
(Grant NsG-7472)
(NASA-CR-168437) Avail: NTIS HC A13/MF A01 CSCL 20L

Silicon has interesting harmonic and anharmonic properties such as the low lying transverse acoustic modes at the X and L points of the Brillouin zone, negative Gruneisen parameters, negative thermal expansion and anomalous acoustic attenuation. In an attempt to understand these properties, a lattice dynamical model employing long range, nonlocal, dipole-dipole interactions was developed. Analytic expression for the Gruneisen parameters of several modes are presented. These expressions explain how the negative Gruneisen parameters arise. This model is applied to the calculation of the thermal expansion of silicon from 5K to 1700K. The thermoelastic contribution to the acoustic attenuation of silicon is computed from 1 to 300 K. Strong attenuation anomalies associated with negative thermal expansion are found in the vicinity of 17K and 125K. S.L.

N82-18042# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

A MODEL FOR ELECTRONS EXISTING IN HYBRIDIZED NARROW AND WIDE BANDS

R. Kishore Jun. 1981 21 p refs Presented at the 33rd Ann. Meeting of SBPC., Salvador, Brazil, 8-15 Jul. 1981 Submitted for publication
(INPE-2127-RPE/351) Avail: NTIS HC A02/MF A01

A model is proposed for electrons existing in hybridized narrow and wide bands which occur in the transition metals, the mixed valence systems of rare earth metals and their compounds, and the doped semiconductors. The model is derived from the standard basis operator (SBO) form of the extended Anderson model, originally proposed for the dilute magnetic alloys. Equations of motion method was used to obtain the SBO's Green's functions, and thereby the spectrum of the quasi-particle excitations. For the translationally invariant systems, the possiblity of the nonmetallic behavior and the metal-nonmetal transition for the nonintegral number of electrons per lattice site is described. B.W.

N82-18043*# Rensselaer Polytechnic Inst., Troy, N. Y.

CRYSTAL GROWTH FROM THE VAPOR PHASE EXPERIMENT MA-085, SECTION 7 Final Report

H. Wiedemeier, H. Sadeek, F. C. Klaessig, M. Norek, and R. Santandrea [1982] 40 p refs
(Contract NAS8-30578)
(NASA-CR-161965) Avail: NTIS HC A03/MF A01 CSCL 20B

The positive effects of microgravity on crystal quality and the fundamental properties of the vapor transport reaction were established by analyzing the results of three transport experiments on multicomponent systems performed during the Apollo-Soyuz Test Project mission. The systems employed were GeSe0.99Te0.01 - GeI4, GeS0.98Se0.02 - GeCl4, and GeS-GeCl4-Ar. The crystallographic analysis is based on a direct comparison of space and ground-based (prototype) crystals employing X-ray diffraction, microprobe, microscopic, and chemical etching techniques. The results demonstrate a considerable improvement of the space-grown crystals in terms of chemical and crystalline homogeneity, surface morphology, and bulk perfection relative to ground specimens. The confirmation of greater mass transport rates than predicted for microgravity by present vapor transport models is of basic scientific and practical importance for the improvement of transport models and techniques on Earth and for the development of a transport model for space conditions. R.J.F.

N82-18044*# Massachusetts Inst. of Tech., Cambridge.

QUANTITATIVE DETERMINATION OF ZERO-GRAVITY EFFECTS ON ELECTRONIC MATERIALS PROCESSING GERMANIUM CRYSTAL GROWTH WITH SIMULTANEOUS INTERFACE DEMARCATION EXPERIMENT MA-060, SECTION 5 Final Report

H. C. Gatos, A. F. Witt, M. Lichtensteiger, and C. J. Herman [1982] 65 p refs
(Contract NAS8-30576)
(NASA-CR-161964) Avail: NTIS HC A04/MF A01 CSCL 20B

The crystal growth and segregation characteristics of a melt in a directional solidification configuration under near zero g conditions were investigated. The germanium (doped with gallium) system was selected because it was extensively studied on Earth and because it lends itself to a very detailed macroscopic and microscopic characterization. An extensive study was performed of the germanium crystals grown during the Apollo-Soyuz Test Project mission. It was found that single crystal growth was achieved and that the interface demarcation functioned successfully. On the basis of the results obtained to date, there is no indication that convection driven by thermal or surface tension gradients was present in the melt. The gallium segregation, in the absence of gravity, was found to be fundamentally different in its initial and its subsequent stages from that of the ground based tests. None of the existing theoretical models for growth and segregation can account for the observed segregation behavior in the absence of gravity. B.W.

N82-18045# Rockwell International Corp., Thousand Oaks, Calif.
RESEARCH IN LPE OF DOPED LnibOsub3 AND LiTaOsub3 THIN FILMS Final Report, 1 Apr. 1977 - 31 Mar. 1981
R. R. Neurgaonkar Jun. 1981 55 p refs
(Contract F49620-77-C-0081; AF Proj. 2306)
(AD-A107686; ERC41004.11FR; AFOSR-81-0721TR) Avail: NTIS HC A04/MF A01 CSCL 20/2

The crystal chemical approach has been shown to be successful in improving the temperature stability of ferroelectric LiNbO3 phase. LiNbO3 films doped with cations that are larger than Li+ and Nb5+, e.g., Na+, Na+ + Ta5+, Ag+, Co2+ + Zr4+, etc., have successfully been grown by the liquid phase epitaxial (LPE) technique using the vanadium containing flux systems. X-ray diffraction studies indicate that the films grown from the vanadium containing fluxes have a high single crystallinity with good epitaxy. To date, the temperature coefficient of SAW velocity was reduced by 40%; this translates into 40% improvement in the temperature stability of LiNbO3 SAW devices. This is a significant result in the present work and opens a new interest in the LiNbO3 family for SAW application. By using such a novel approach, it should be possible to improve the temperature stability of other important structural families such as quartz or tungsten bronze structural family compositions. GRA

N82-18046# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
ELECTRONIC STRUCTURE OF GRAIN BOUNDARIES AND INTERFACES IN POLYCRYSTALLINE ZINC OXIDE
M. H. Sukkar, H. L. Tuller, and K. H. Johnson 18 Nov. 1981 9 p refs
(Contract N00014-81-K-0299; NR Proj. 056-757)
(AD-A107864; TR-2) Avail: NTIS HC A02/MF A01 CSCL 20/2

Preliminary theoretical models for the electronic structure of grain boundaries and interfaces in polycrystalline ZnO have been constructed on the basis of self-consistent-field-X-alpha scattered-wave (SCF-X alpha-SW) cluster molecular-orbital calculations. The disposition and character of the interface states, relative to the valence and conduction bands of the otherwise perfect crystalline material, have been studied for clusters representing coordinatively unsaturated Zn surface sites and molecular O2 chemisorption thereon. The possible effects of the resulting interface states on electron transport at grain boundaries in ZnO varistors have been addressed. GRA

N82-18047# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
PREPARATION OF InP BY SOLUTION AND MELT GROWTH TECHNIQUES Final Technical Report, 1 Nov. 1978 - 30 Nov. 1980
August F. Witt Griffiss AFB, N.Y. RADC Sep. 1981 17 p refs
(Contract F19628-79-C-0042; AF Proj. 4600)
(AD-A107646; RADC-TR-81-231) Avail: NTIS HC A02/MF A01 CSCL 20/2

A modified InP synthesis system has been designed, constructed and put into operation. Basic studies on InP growth have been initiated and deficiencies inherent to the growth system identified. The nature of the effects of liquid encapsulation has been studied using Ga-doped Ge as a model system. Author (GRA)

N82-18048# Oklahoma State Univ., Stillwater. Dept. of Physics.
STUDY OF DEFECTS PRODUCED BY THE GROWTH, POST TREATMENT AND FABRICATION OF QUARTZ Interim Report, 15 Apr. 1980 - 15 Apr. 1981
Larry E. Halliburton, Joel J. Martin, and William A. Wibley Griffiss AFB, N.Y. RADC Oct. 1981 82 p refs
(Contract F19628-80-C-0086; AF Proj. 2306)
(AD-A107771; RADC-TR-81-276) Avail: NTIS HC A04/MF A01 CSCL 20/6

We are using a number of experimental techniques to investigate the various as grown and radiation-induced defects in commercially available high-quality synthetic quartz. Interstitial ions such as H(+), Li(+), and Na(+) as well as radiation-induced holes trapped at oxygen ions act as charge compensator's located adjacent to the aluminum and this gives rise to Al-OH(-), Al-Li(+), Al-Na(+), and Al-hole centers. Absolute concentrations of these compensated aluminum centers have been determined as a function of irradiation and annealing temperature for a variety of samples, both swept and unswept. The various treatments simply exchange one type of compensator for another at the aluminum sites and, within experimental error, the sum of the aluminum centers remains constant for a given sample. This direct accountability of all the aluminum ions in hydrogen-swept samples strongly suggests that the 1/3306 cm and 1/3367 cm infrared bands are associated with the Al-OH(-) center. Also, the ESR and IR results show that the aluminum content of randomly selected bars of high-quality quartz can vary by an order of magnitude. Acoustic loss measurements on a 5 MHz 5th overtone resonator blank show no loss peaks that can be attributed to the Al-Li(+) center. A series of oxygen-vacancy-associated centers have been discovered by ESR. An investigation of the thermally stimulated luminescence, TSL, from quartz irradiated at 95 K has been made below room temperature. GRA

N82-18049# Rutgers - The State Univ., Piscataway, N. J. High Pressure Research Lab.
POLARIZATION MECHANISMS IN PHASE 2 POLY (VINYLIDENE FLUORIDE) FILMS Interim Technical Report
B. A. Newman, J. I. Scheinbeim, C. H. Yoon, and K. D. Pae 12 Nov. 1981 46 p refs
(Contract N00014-75-C-0540; NR Proj. 356-564)
(AD-A107850; TR-24) Avail: NTIS HC A03/MF A01 CSCL 07/4

Unoriented phase 2 films were poled with fields up to 3.2 MV/cm at room temperature. A determination of the piezoelectric strain coefficent provided a measure of the residual polarization achieved, while an X-ray diffraction study provided information about field-induced phase changes which appeared to be related directly to the residual polarization. In an unoriented film, crystals make all possible orientation with respect to the poling field and different polarization mechanisms appear to depend on the crystal orientation. A number of different polarization mechanisms are discussed. A new crystal form for Poly(Vinylidene Fluoride) (PVF2) was observed. Author (GRA)

N82-18050# California Univ., Los Angeles. Dept. of Chemistry.
SPECTRAL DIFFUSION IN ORIENTATIONALLY DISORDERED ORGANIC SOLIDS Interim Technical Report
Paras N. Prasad (New York State Univ. at Buffalo), Jack R. Morgan, and Mostafa A. El-Sayed 20 Nov. 1981 16 p refs
Submitted for publication
(Contract N00014-75-C-0602; NR Proj. 056-498)
(AD-A107950; TR-39) Avail: NTIS HC A02/MF A01 CSCL 20/2

The spectral diffusion within the inhomogeneous linewidth of the T1 from S0 transition is presented for an orientationally disordered organic solid under the condition when kT (approximately 3/cm) is much smaller than the inhomogeneous linewidth (approximately 83/cm). The rate of the transfer is found to increase as the site energy increases. This result is explained in terms of a phonon assisted undirectional (high to low) energy transfer process in which the increasing density of the low energy sites (acceptors) with an increase in the excitation energy plays an important role. GRA

N82-18051# Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
STUDY OF GRAIN-BOUNDARY SEGREGATION USING THE AUGER ELECTRON EMISSION TECHNIQUE Final Report, 1 Sep. 1971 - 31 Mar. 1981
D. F. Stein and L. A. Heidt 1981 5 p refs
(Contract DE-AS02-76ER-02166)
(DE82-000789; DOE/ER-02166/27) Avail: NTIS HC A02/MF A01

Several phenomena were investigated by surface analytical methods. They include: correlation of embrittlement and grain boundary segregation; intergranular corrosion; stress corrosion cracking of copper alloys; embrittlement of Ni-Cu by hydrogen and liquid metals; beneficial segregants in creep rupture phenomena; and analytical and theoretical studies. DOE

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-18052 State Univ. of New York at Stony Brook.
INTERACTING QUANTUM FIELD THEORY IN CURVED SPACE-TIME Ph.D. Thesis
Richard Gordon Gass 1981 133 p
Avail: Univ. Microfilms Order No. 8126242

The status of interaction quantum field theory in curved space-time was surveyed and several new results were obtained. The use of the renormalization group in curved space-time is discussed and the equation governing the effective conformal coupling xi (kappa) is derived for phi 4 and phi 3. The t(prime) Hooft pole equation for the conformal coupling constant counterterms is derived. Using dimensional regularization phi 3 is renormalized at the one-loop level in a six-dimensional conformally flat space-time. It is shown that if x is treated as a renormalizable coupling constant then phi 3 in a six-dimensional conformally flat space-time is not renormalized at the two-loop level due to the noncancellation of the state dependent infinities. The implications of this are discussed. Dissert. Abstr.

N82-18053 State Univ. of New York at Stony Brook.
TOPICS IN ULTRAVIOLET AND INFRARED PROPERTIES OF PERTURBATIVE QUANTUM FIELD THEORY Ph.D. Thesis
Sunil Mukhi 1981 112 p
Avail: Univ. Microfilms Order No. 8127115

An algorithm was developed to study ultraviolet divergences of the most general real supersymmetric non-liner sigma model in two dimensions, order by order in perturbation theory, using the background field method. The one- and two-loop divergences of this class of models are then explicitly calculated, using the manifestly supersymmetric formulation of perturbation theory in terms of the so-called supergraphs. The results of these calculations are that models defined on Ricci-flat manifolds have no one-or two-loop divergences, while models defined on symmetric spaces or Einstein spaces have no two-loop divergences. The dependence of the cross-section for the process e(+) e(-) yields two hadronic jets is examined in perturbative quantum chromodynamics. An algorithm is obtained by which the sum of all logarithms (in all orders of perturbation theory) of the 'jet parameters' can be calculated to any desired accuracy, in the approximation in which terms suppressed by inverse powers of large energies are neglected. Dissert. Abstr.

N82-18054*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CALCULATION OF THE THERMODYNAMIC PROPERTIES OF A MIXTURE OF GASES AS A FUNCTION OF TEMPERATURE AND PRESSURE
Gilberto Colon Dec. 1981 22 p refs Revised
(NASA-TM-83861) Avail: NTIS HC A02/MF A01 CSCL 20M

The evaluation of the thermodynamic properties of a gas mixture can be performed using a generalized correlation which makes use of the second virial coefficient. This coefficient is based on statistical mechanics and is a function of temperature and composition, but not of pressure. The method provides results accurate to within 3 percent for gases which are nonpolar or only slightly polar. When applied to highly polar gases, errors of 5 to 10 percent may result. For gases which associate, even larger errors are possible. The sequences of calculations can be routinely programmed for a digital computer. The thermodynamic properties of a mixture of neon, argon and ethane were calculated by such a program. The result will be used for the design of the gas replenishment system for the Energetic Gamma Ray Experiment Telescope. Author

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N82-18055*# National Aeronautics and Space Administration, Washington, D. C.
NASA'S UNIVERSITY PROGRAM: ACTIVE PROJECTS, FISCAL YEAR 1981
1981 345 p
(NASA-TM-84416) Avail: NTIS HC A15/MF A01 CSCL 05A

Active university R and D activities funded by NASA which contribute to mission needs are documented. Technical rather than fiscal information is emphasized. A classification of government sponsored research is included. A cross index providing access to the project description is also included. N.W.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-18056# Commission of the European Communities, Ispra (Italy). Joint Research Center.
ORDER: A PROGRAM PACKAGE FOR INFORMATION ON MANAGEMENT OF STAFF ACTIVITIES AND EXPENDITURES
J. Eder, C. Pagny, and H. Reylander 1981 46 p Partly in ENGLISH and FRENCH Submitted for publication
(EUR-7442-EN) Avail: NTIS HC A03/MF A01

A set of two programs for information on management of staff activity and expenditures executed by a Division or other unit is presented. In order to render a detailed and transparent account for the employment of staff and for the utilization of resources, computer programs were developed. The base is given by existing staff, previsions on how to employ these persons in the scope of certain research programs (jobs), and accorded credits. A monthly updating data input consists of actual working time of each person employed for the job to which he is engaged and expenditures. This data is compiled in data sets on disk. The program allows elaboration and sorting of various listings, the most important of them being: (1) staff and organization of the Division; (2) activity and budget reports; and (3) orders and other expenditures. J.M.S.

N82-18057# Army Construction Engineering Research Lab., Champaign, Ill.
EXPECTED USE OF MICRO-BASED NETWORK ANALYSIS Final Report
Carl E. DeLong and Janet H. Spoonamore Nov. 1981 22 p refs
(DA Proj. 4A7-62731-AT-41)
(AD-A107660; CERL-TM-P-122) Avail: NTIS HC A02/MF A01 CSCL 05/1

Over the next decade, engineers have an excellent opportunity to use available low-cost, micro-based hardware. Network analysis is a suitable software tool for managing small and large, simple and complex project networks even on the small machines. One may ask whether and how engineers will use micro-based network analysis given its limited use in the past. Data on the current construction projects indicate that engineers will not quickly and easily adapt these micro-based tools. The same data also suggest that established users will more and more depend on their micro computers. Author (GRA)

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N82-18058# Commission of the European Communities, Ispra (Italy).
AN INTEGRATED SCHEME FOR NDA DATA EVALUATION
S. Guardino 1 Dec. 1980 10 p refs Presented at 2nd Advisory Group on the NDA Quality of Data, Vienna, 10-14 Nov. 1980
Avail: NTIS HC A02/MF A01

The general scheme of a computer program developed to aid in the analysis of the NDA data evaluation is presented. The scheme is designed to be compatible with the use of fully automated instruments. The procedures discussed include collection of NDA data in the plant, recording the data on magnetic tape cassettes, and reprocessing of the raw measurement and recorded data to indicate quality indexes. J.M.S.

N82-18059# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
IMPLEMENTATION OF A DISPLAY ROUTINE FOR CODED MAP DATA BASES
Tomas Claesson Sep. 1981 28 p refs
(FOA-C-30241-E) Avail: NTIS HC A03/MF A01

The implementation of a display routine for coded map data bases is presented. The display routine is a decoder for the Display RC-code. This code enables efficient coding of binary images, and combines storage efficiency with accessibility. Author

N82-18060# National Bureau of Standards, Washington, D.C.
FEDERAL REQUIREMENTS FOR A FEDERAL INFORMATION PROCESSING STANDARDS DATA DICTIONARY SYSTEM
Patricia A. Konig, Judith J. Newton, and Roy G. Saltman Sep. 1981 81 p
(PB82-117607; NBSIR-81-2354) Avail: NTIS HC A05/MF A01 CSCL 05B

Information and prliminary conclusions about Federal agencies' requirements for a Federal Information Processing Standard Data Dictionary System are presented. Some initial requirements were identified through analysis of comments made on the Prospectus for Data Dictionary System Standard which describes NBS' efforts to develop a standard. Most of the data used to develop preliminary conclusions on Federal requirements was collected during interviews with Federal Government users and developers of Data Dictionary Systems. Comments received on the Prospectus and data collected during the interviews are summarized. Preliminary conclusions and issues being investigated also are presented. GRA

N82-18061# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
A SURVEY OF STANDARDIZATION EFFORTS OF CODED CHARACTER SETS FOR TEXT PROCESSING Final Report
Joan E. Knoerdel Sep. 1981 55 p refs
(PB82-105891; NBS-SP-500-81; LC-81-600108) Avail: NTIS HC A04/MF A01 CSCL 05B

A description of the major national and international standards organizations which develop code standards is included. Next, the various code standards are described according to the following categories: basic code sets for information interchange, methods of augmenting those basic code sets, additional control characters to be used with the basic code sets, and code sets developed specifically for text communications, limitations which still exist when interchanging information via communicating text processors are discussed. GRA

N82-18062# National Bureau of Standards, Washington, D.C. Technical Information and Publications Div.
PUBLICATIONS OF THE NATIONAL BUREAU OF STANDARDS 1980 CATALOG: A COMPILATION OF ABSTRACTS AND KEY WORDS AND AUTHOR INDEXES Report, Jan. - Dec. 1980
Betty L. Burris, ed. and Rebecca J. Morehouse, ed. Jun. 1981 664 p
(PB82-104688; NBS-SP-305-Suppl-12; LC-48-47112) Avail: NTIS HC A99/MF A01 CSCL 05B

The supplement lists the publications of the Bureau issued between January 1 - December 31, 1980. It includes an abstract of each publication, key word and author indexes; and general information and instructions about NBS publications. GRA

N82-18063# Council for Scientific and Industrial Research, Pretoria (South Africa).
TRAINING OF INFORMATION SPECIALISTS
1980 186 p refs In ENGLISH; partly in AFRIKAANS Presented at a Symp. Held at Pretoria, 6-7 May 1980
(PB82-103227) Avail: NTIS HC A09/MF A01 CSCL 05I

In the last decade a new industry has emerged from the conjunction of databases, computers, telecommunications and information retrieval programs. The growth of this industry is reviewed showing how the initial application of computers for production purposes produced new forms of information which allowed the development of computerized retrieval. The various trends in the database field are identified and the results of an economic modelling study are used to project future cost levels for searching databases online. This generates the need for increased training emphasis on knowing the databases if industry is to get maximum return from their use. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-18064# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CONTRIBUTION OF THE SECOND UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE (UNISPACE)
Nelson deJesus Parada Jun. 1981 40 p
(INPE-2137-RPE/360) Avail: NTIS HC A03/MF A01

Space science activities are summarized. These consist of high energy astrophysics; radio astronomy and solar physics; geomagnetism; and ionosphere, upper atmosphere, and plasma physics. Space technology activities are reported. These consist of satellite technology, systems engineering, computer science and informatics, material science and technology, sensor systems, combustion, space geodesy, digital and analog systems, and telecommunication by satellite. Space applications activities are presented. These involve reception, processing and dissemination of images and data from meteorological satellites; meteorological instrumentation; meteorological applications; dynamic meteorology; image production; agronomy and forestry; ocean resources; environmental analysis; image processing and recognition; crop forecasting; and cartography. International cooperation is also considered. N.W.

N82-18065# Committee on Appropriations (U. S. House).
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT - INDEPENDENT AGENCIES APPROPRIATION ACT, 1981
Washington GPO 1980 25 p H.R. 7631 enacted into law by the 96th Congr., 15 Dec. 1980

(Pub-Law-96-526; GPO-79-139) Avail: US Capitol, House Document Room

Appropriations are provided for the modernization of low income housing, rent supplements for housing for the elderly and handicapped. Monies are also appropriated for mortgage assistance, energy conservative home improvements, and community development projects. The bill also funds the Consumer Protection Safety Commission, Environmental Protection Agency activities, etc. S.L.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

N82-18066*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

VEHICLE TEST REPORT: ELECTRIC VEHICLE ASSOCIATES ELECTRIC CONVERSION OF AN AMC PACER

Theodore W. Price, Vincent A. Wirth, Jr., and Michael F. Pompa 15 Oct. 1981 61 p refs
(Contracts NAS7-100; DE-AI01-78CS-54209)
(NASA-CR-168425; JPL-Pub-81-97; DOE/CS-54209/4) Avail: NTIS HC A04/ A01 CSCL 13F

Tests were performed to characterize certain parameters of the EVA Pacer and to provide baseline data that can be used for the comparison of improved batteries that may be incorporated into the vehicle at a later time. The vehicle tests were concentrated on the electrical drive subsystem; i.e., the batteries, controller and motor. The tests included coastdowns to characterize the road load, and range evaluations for both cyclic and constant speed conditions. A qualitative evaluation of the vehicle's performance was made by comparing its constant speed range performance with other electric and hybrid vehicles. The Pacer performance was approximately equal to the majority of those vehicles assessed in 1977. A.R.H.

N82-18067*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

UPGRADED DEMONSTRATION VEHICLE TASK REPORT

J. Bryant, K. Hardy, R. Livingston, and J. Sandberg 15 Oct. 1981 158 p refs
(Contracts NAS7-100; DE-AI01-78CS-54209)
(NASA-CR-168424; JPL-Pub-81-98; DOE/CS-54209/5) Avail: NTIS HC A08/MF A01 CSCL 13F

Vehicle/battery performance capabilities and interface problems that occurred when upgraded developmental batteries were integrated with upgraded versions of commercially available electric vehicles were investigated. Developmental batteries used included nickel zinc batteries, a nickel iron battery, and an improved lead acid battery. Testing of the electric vehicles and upgraded batteries was performed in the complete vehicle system environment to characterize performance and identify problems unique to the vehicle/battery system. Constant speed tests and driving schedule range tests were performed on a chassis dynamometer. The results from these tests of the upgraded batteries and vehicles were compared to performance capabilities for the same vehicles equipped with standard batteries. S.L.

N82-18068*# Department of Transportation, Cambridge, Mass.

FUEL ECONOMY AND EXHAUST EMISSIONS CHARACTERISTICS OF DIESEL VEHICLES: TEST RESULTS OF A PROTOTYPE FIAT 131TC 2.4 LITER AUTOMOBILE

S. S. Quayle Jan. 1982 58 p refs
(NASA Order C-32817-D; Contract DE-AI01-80CS-50194)
(NASA-CR-165535; DOE/NASA/2817-2; DOT-TSC-NASA-81-2) Avail: NTIS HC A04/MF A01 CSCL 13F

The results obtained from fuel economy and emission tests conducted on a prototype Fiat 131 turbocharged diesel vehicle are presented. The vehicle was tested on a chassis dynamometer over selected drive cycles and steady-state conditions. Two fuels were used, a United States number 2 diesel and a European diesel fuel. Particulate emission rates were calculated from dilution tunnel measurements and large volume particulate samples were collected for biological and chemical analysis. It was determined that turbocharging accompanied by complementary modifications results in small but substantial improvements in regulated emissions, fuel economy, and performance. Notably, particulate levels were reduced by 30 percent. Author

N82-18069*# Denver Univ., Colo. Transfer Research and Impact Studies Project.

NASA TECHNOLOGY UTILIZATION PROGRAM: THE SMALL BUSINESS MARKET Final Report

Jeanne K. Vannoy, Felipe Garcia-Otero, F. Douglas Johnson, and Eileen Staskin 1 Jul. 1980 115 p refs
(Contract NASw-3021)
(NASA-CR-168447) Avail: NTIS HC A06/MF A01 CSCL 05A

Technology transfer programs were studied to determine how they might be more useful to the small business community. The status, needs, and technology use patterns of small firms are reported. Small business problems and failures are considered. Innovation, capitalization, R and D, and market share problems are discussed. Pocket, captive, and new markets are summarized. Small manufacturers and technology acquisition are discussed, covering external and internal sources, and NASA technology. Small business and the technology utilization program are discussed, covering publications and industrial applications centers. Observations and recommendations include small business market development and contracting, and NASA management technology. N.W.

N82-18070# Open Univ., Milton (England). Energy Research Group.

COMMUNICATION AND INTEGRATION WITHIN THE AGRICULTURE WATER, WASTE, AND ENERGY INDUSTRIES

D. C. Andrews Sep. 1980 28 p refs
(ERG-033) Avail: NTIS HC A03/MF A01

The special area of interest lies in the possible benefits of integrating and coordinating the activities of the agriculture, water, waste and energy (AWWE) sectors, where large cash and energy savings seem possible. The integration of the AWWE sectors is a specific example, but the comments and methods suggested are general in their application to complex problem-solving areas. A general method is described which, compared with conventional research, makes the collection of information on potential integration and coordination of any complex activities much easier. It also makes it more likely that the information is relevant and correct but, above all, the method ensures that any useful results of the research will be brought to the attention of relevant policy makers, with therefore a better chance that such results will be acted upon. Lateral access networks are proposed as a general means of achieving these practical benefits. J.M.S.

N82-18071# McElroy (Ralph) Co., Austin, Tex.

POSSIBILITY FOR ENERGY CONSERVATION IN TRANSPORTING FREIGHT BY TRUCK

M. Millar Sep. 1981 20 p Transl. into ENGLISH from Symp. on Evaluation and Reinforcement of Pavements and Energy in Transportation, Argentina, 1980 p 121-30 Symp. held in San Miguel de Tucuman, Argentina, 4-6 Sep. 1980 Prepared for Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE81-030072; ANL-Trans-1199) Avail: NTIS HC A02/MF A01

Increasing energy efficiency in transporting freight by truck in interurban areas is discussed. Technical parameters to improve fuel economy are: (1) efficiency of the engine and drive train;(2) rolling resistance; (3) gross weight of the vehicle; (4) accessory load; and (5) aerodynamic resistance. Operating procedures to improve fuel economy are also discussed. Savings obtained up to the present in the USA due to the use of these various devices are summarized. DOE

N82-18072# Department of Energy, Washington, D. C. Office of Vehicle and Engine Research and Development.
ELECTRIC AND HYBRID VEHICLE PROGRAM Quarterly Report, Apr. - Jun. 1981
Aug. 1981 12 p
(DE82-000904; DOE/CE-0011/15) Avail: NTIS HC A02/MF A01

Development of engineering models of electronically commutated permanent magnet propulsion motors for electric vehicles is nearing completion. Tests on a samarium-cobalt motor and a ferrite motor were completed, a phase 1 ac propulsion system breadboard was installed on the road load simulator, lead-acid multicell modules surpassed 390 cycles in ongoing tests, and ongoing tests on nickel iron modules demonstrated greater than 670 cycles in one case, and 430 cycles in another. The final report of the environmental control system of the electric hybrid vehicle study recommends a split heat pump system. DOE

N82-18073# Open Univ., Milton (England). Energy Research Group.
ELECTRIC VEHICLE REFUELLING INFRASTRUCTURE
Mike Baker Oct. 1981 69 p refs
(ERG-038) Avail: NTIS HC A04/MF A01; Secy. Energy Research Group, Milton Keynes, England

Energy and economic aspects of refueling infrastructures required in 2025 by complete fleets of electric battery and coal derived liquid fuel powered road vehicles are compared. Data are drawn from a study of the United Kingdom. The electric car is cheaper than the liquid powered one. If battery exchange is discounted, all electric vehicles have lower fuel costs than their equivalent. The electric vehicle alternative shows a very large saving in both primary energy and running cost. It requires a much smaller installed electricity generating capacity whose load factor is such that it can be totally nuclear. Author (ESA)

N82-18074# Decision Group, Inc., McLean, Va.
INITIAL INTERFACE STANDARDS FOR RAPID TRANSIT CAR SUBSYSTEM COMPONENTS Final Technical Report
R. E. Morris, A. Pali, C. Urian, and W. Walker Jun. 1981 182 p
(Contract DOT-UT-70043)
(PB82-104704; UMTA-IT-06-0175-81-2) Avail: NTIS HC A09/MF A01 CSCL 13F

Initial interface standards for subsystem components of a typical rapid transit car system are presented. These standards were derived from an interface definition analysis of 128 product applications on seven of the newest North American rapid transit car system designs. Analysis of the product specific data provide the basis for either defining the functional and physical interfaces of each major component and the minimal space which must be allocated upon the carbody structure or truck frames to incorporate a major component into the carbody structural design, or determine that a major component does not appear to be amenable to interface standardization. Transit industry adoption of interface standards for car mounted equipment results in cars which cost less to build and own. GRA

N82-18075# New England River Basins Commission, Boston, Mass.
PROCEDURES FOR PREPARING REGIONAL TRANSPORTATION MANAGEMENT PLANS
Michael J. Goetz Aug. 1981 177 p refs
(Contract DI-AA851-IOA-51)
(PB82-106162) Avail: NTIS HC A09/MF A01 CSCL 13B

A set of procedures is presented to provide planners with a working framework for preparing regional transportation management plans. These plans are designed to insure the safe and timely transportation of oil and gas produced offshore to onshore processing and distribution systems. A case study application to the Georges Bank region of the North Atlantic outer continental shelf is included. GRA

N82-18076# SG Associates, Inc., Annandale, Va.
OPERATING COSTS AND CHARACTERISTICS OF MINIBUSES Final Report, Jan. - May 1981
Stephen J. Andrle, Frank Spielberg, and Arnie Hungerbuhler (Technology Research and Analysis Corp., Arlington, Va.) Aug. 1981 110 p refs
(Contract DTRS-557-81-C-00053)
(PB82-107038; UMTA-MA-06-0126-81-1; DOT-TSC-UMTA-81-35) Avail: NTIS HC A06/MF A01 CSCL 13B

An analysis of minibus operating characteristics based on operating data obtained from transit operators which use minibuses is presented. Eleven operators were contacted, and useful data were obtained from seven. The focus of this evaluation is on fixed route transit applications of minibuses. The intent of this analysis is to identify the costs of operating minibuses and the manner in which these costs vary. The report also seeks to clarify the conditions in which minibuses are the most cost effective buses to operate. Representative cost and operating statistics are shown for prototypical applications of minibuses in environments found to be appropriate. It makes little difference from a long term point of view whether purpose built or medium duty vehicles are selected. GRA

N82-18077# National Clearinghouse for Improving the Management of Human Services, Rockville, Md.
TECHNOLOGY TRANSFER AND THE MANAGEMENT OF HUMAN SERVICES
Aug. 1981 33 p Sponsored by Dept. of Health and Human Services
(Proj. SHARE)
(PB82-105644) Avail: NTIS HC A03/MF A01 CSCL 05K

The Project SHARE bibliography on technology transfer in the human services sector is an information resource selected to reflect recent research, demonstrations, transfer experiments, and experience in the human services field. It is a sample of the documentation on technology transfer, not an exhaustive listing of the literature in the field or in the Project SHARE data base. As such, it should be an aid to determining what technologies are available for transfer in human services as well as how transfer might be effectively implemented. GRA

N82-18078# Federal Highway Administration, Washington, D.C. Office of Research and Development.
A METHOD FOR ESTIMATING FUEL CONSUMPTION AND VEHICLE EMISSIONS ON URBAN ARTERIALS AND NETWORKS
Juri Raus Apr. 1981 60 p refs
(PB82-108523; FHWA/TS-81/210) Avail: NTIS HC A04/MF A01 CSCL 13F

A method to estimate motor vehicle fuel consumption and vehicle emissions in an urban driving environment which requires a minimum of field data collection and processing effort was developed. Average transient speed measured by travel time is a good composite parameter reflecting stops and slowdowns and is closely correlated with fuel consumption and vehicle emission rates. Data were obtained for fuel speed and emission speed profiles for a 1980 typical mix of passenger cars, single unit trucks, tractor trailers and busses. Data and computational procedure provide an approach for estimating fuel consumption and emissions and can be used to gain insight into existing traffic operations and the merits of proposed or actual flow improvements. GRA

N82-18079# Polytechnic Inst. of New York, Brooklyn. Transportation Training and Research Center.
URBAN DECENTRALIZATION AND THE ROLE OF PUBLIC TRANSPORTATION Final Report
Arnold J. Bloch and Louis J. Pignataro Jul. 1981 100 p refs 2 Vol.
(PB82-114844; UMTA-NY-11-0023-81-4) Avail: NTIS HC A05/MF A01 CSCL 13B

The opportunities and difficulties that are likely to occur during the near term if a transition is to be made in terms of the future directions of public transportation were examined. The recent transportation planning and implementation experiments in a number of urban areas were reviewed in order to discern how well urban America is prepared for a likely future scenario of continued population decentralization. T.M.

N82-18080# Polytechnic Inst. of New York, Brooklyn. Transportation Training and Research Center.
URBAN DECENTRALIZATION AND THE ROLE OF PUBLIC TRANSPORTATION. EXECUTIVE SUMMARY

Arnold J. Bloch and Louis J. Pignataro Jul. 1981 13 p
2 Vol.
(PB82-114836; UMTA-NY-11-0023-81-3) Avail: NTIS
HC A02/MF A01 CSCL 13B

Five case studies were examined in detail in terms of growth patterns, land use policies toward growth and decentralization, and the types of public transportation projects planned or implemented. The case study urban areas are identified as follows: relatively declining urban areas--Boston, MA, and Rochester, NY; maturing sun belt growth--Atlanta, GA; and booming urban areas--Tampa, FL, and San Jose, CA. It was found that most projects were planned with an incomplete or inaccurate understanding of decentralization patterns, were not usually in concert with land use objectives, and others reflected unrealistic expectations of what public transportation services can perform. The recommendations center around a reformulation of the relationship between land use policy and public transportation in the future. GRA

N82-18081# Metcalf and Eddy, Inc., Palo Alto, Calif.
URBAN STORMWATER MANAGEMENT AND TECHNOLOGY: CASE STUDY IN SAN FRANCISCO Final Report, Sep. 1979 - May 1980
John A. Lager, Ranjit K. Advani, and Elizabeth M. Gowen Sep. 1981 59 p refs
(Contract EPA-68-03-2877)
(PB82-105594; EPA-600/2-81-204) Avail: NTIS
HC A04/MF A01 CSCL 08H

Urban (CSO) management is discussed. San Francisco's experiences with the planning and design of CSO control and treatment facilities is presented. The development of the San Francisco combined sewer overflow control master plan a continuing process for treatment needs with the costs and environmental social impacts in a large urban area. GRA

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-18082 Princeton Univ., N. J.
A SEARCH FOR HALOS AROUND SPIRAL GALAXIES Ph.D. Thesis
Bernard Herman Siebers, Jr. 1981 127 p
Avail: Univ. Microfilms Order No. 8127760

An attempt to detect massive luminous halos around a total of 13 edge-on spiral galaxies is described. Observations were made in the wavelength bands 5000 A to 7000 A and 9000 A to 9500 A with a cooled charge coupled device. No halos are seen, and lower limits are set on the mass/light ratio of one galaxy in the 5000 A to 7000 A band and of four galaxies in the 9000 A to 9500 A band. The limits, taken together, imply that in these four galaxies a single stellar-type halo population would have to be made up of stars which are fainter than an M7 red dwarf. Dissert. Abstr.

N82-18083 Michigan Univ., Ann Arbor.
TWO-DIMENSIONAL PHOTOMETRY OF PLANETARY NEBULAE Ph.D. Thesis
Peter Nathan Kupferman 1981 295 p
Avail: Univ. Microfilms Order No. 8125148

Two-dimensional spectrophotometry is used to study problems of geometric structure, optical opacity, temperature variation, and density distribution for three planetary nebulae: NGC 7662, NGC 6720 and NGC 2392. Monochromatic images, using narrow band interference filters were taken using a linear intensified silicon vidicon and the Palomar 1.5 meter telescope. These digital images were used to construct two-dimensional maps of intensity, emissivity, electron temperature and electron density. The Abel transformation is used to solve for the volume emissivity. The distribution of O(0), He(+) and He(+) ions for these nebulae are used to test for optical opacity in the H I and He II Lyman continuua. Electron temperature maps indicate a radial monotonic drop of 2000 K for NGC 7662 and NGC 6720, while the distribution of NGC 2392 is more complex. Electron density maps indicate that knots in NGC 7662 are denser than the surrounding gas, while filaments in NGC 6720 are not.
Dissert. Abstr.

N82-18084 Yale Univ., New Haven, Conn.
A PHOTOMETRIC SEARCH FOR WHITE DWARFS IN INTERMEDIATE-AGE OPEN CLUSTERS Ph.D. Thesis
Barbara Jean Anthony-Twarog 1981 247 p
Avail: Univ. Microfilms Order No. 8125653

Star clusters which represent coeval populations of stars, aged 20 to 700 million years old can be dated by the masses and spectroscopic properties of the surviving stars. Any white dwarf members may be assumed to have been originally more massive than these survivors. The open clusters IC 2602, NGC 6405, M 34 and Praesepe were surveyed and the results compared to related studies in other clusters. Photographic photometry was used as well as dispersion spectrophotometry. The evidence suggests that the upper limit for the masses of single star white dwarf precursors is about 5 solar masses. The requirements for faint photoelectric photometry, and spectroscopic confirmation of photometric candidates are stringent, as there may be contaminating populations of blue objects at all galactic latitudes. This result does not rule out white dwarf products of more massive binary systems. Dissert. Abstr.

N82-18085*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HIGH ENERGY X-RAY OBSERVATIONS OF CYG X-3 FROM FROM OSO-8: FURTHER EVIDENCE OF A 34.1 DAY PERIOD
J. F. Dolan, C. J. Crannell, B. R. Dennis, K. J. Frost, and L. E. Orwig Nov. 1981 21 p refs
(NASA-TM-83862) Avail: NTIS HC A02/MF A01 CSCL 03A

The X-ray source Cyg X-3 (=4U2030+40) was observed with the high energy X-ray spectrometer on OSO-8 for two weeks in 1975 and in 1976 and for one week in 1977. No change in spectral shape and intensity above 23 keV was observed from year to year. No correlation is observed between the source's intensity and the phase of the 34.1 day period discovered by Molteni, et al. (1980). The pulsed fraction of the 4.8 hour light curve between 23 and 73 keV varies from week to week, however, and the magnitude of the pulsed fraction appears to be correlated with the 34.1 day phase. No immediate explanation of this behavior is apparent in terms of previously proposed models of the source. Author

N82-18086 Princeton Univ., N. J.
OPTICAL AND INFRARED SEARCH FOR MASSIVE HALOS OF GALAXIES Ph.D. Thesis
Peter Reed Saulson 1981 146 p
Avail: Univ. Microfilms Order No. 8127759

An investigation of the notion that galaxies are surrounded by massive halos made of very faint stars was made. A review of the evidence concerning the existence, mass, morphology, and composition of massive halos is given, along with a critical examination of previous attempts to detect the halos optically. A report is given of observations made in the R and I bands of four galaxies, using a charge-coupled device detector, which set stringent lower limits on the mass-to-light ratios of the massive halos. The results of new observations of the spiral galaxy NGC 4565 in the infrared K band are presented, showing that the halos must be made of material less luminous than the faintest known main sequence star, VB10. Finally, the implications of these observations for the nature of massive halos are discussed. Dissert. Abstr.

N82-18087 Michigan Univ., Ann Arbor.
A STUDY OF EXTRAGALACTIC SUPERNOVA REMNANTS

Ph.D. Thesis
William Patrick Blair 1981 149 p
Avail: Univ. Microfilms Order No. 8125071

Image tube photographs of eight fields in the nearby spiral galaxy M31, using interference filters that isolate the emission lines of H alpha + [NII] at lambda 6570A and [SII] lambda 6725A, revesied nebulae believed to be supernova remnants (SNRs). Spectroscopic observations were used to confirm this identification for twelve of these nebulae. The initial energy in each remnant had a mean value of E approximately equal to 3 x 10 to the 50th power ergs. Comparison of SNR spectra to shock wave models allowed estimates of nitrogen, oxygen and sulfur in the interstellar gas of M31. Eleven H II regions in M31 were observed for comparison to the SNRs. Element abundances were derived. The variation of abundances as a function of galactocentric distance in M31 were found to be similar to the abundance gradients in our own Galaxy. An emission region in the irregular galaxy NGC 4449 was also investigated. From optical spectrophotometry broad emission lines with widths that suggest an expansion at 3500 km 10 to the minus 1 power were found. About 0.1 solar mass of oxygen is present in the gas that is presently cooling. The absence of hydrogen suggests that nucleosynthesis was important in the star that created this remnant. Combining the optical data with X-ray observations provides a consistent overall picture of the interaction between the SNR and the H II region in which it is embedded. Dissert. Abstr.

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-18088 Academy of Sciences (USSR), Moscow. Space Research Inst.
EFFECT OF CAPTURING OF HARD PHOTONS BY STRONG MAGNETIC FIELD AND THE ROLE IT MAY PLAY IN PULSARS
A. E. Shabad and V. V. Usov 1981 15 p refs Submitted for publication
(Rept-663) Copyright. Avail: Issuing Activity

The resonance effects near the threshold of creation of e(+),e(-) pairs by a gamma-quantum in a magnetic field B > or = 01. B sub Cr lead to the bending of its trajectory and to considerable increase of its free path. This removes the existing difficulties in explaining the luminosity of the Crab and Vela pulsars. Author

N82-18089 Academy of Sciences (USSR), Moscow. Space Research Inst.
DUST-LIKE STAGES IN THE EARLY UNIVERSE AND THE RESTRICTIONS ON THE PRIMORDIAL BLACK HOLE SPECTRUM
M. Yu. Khlopov and A. G. Polnarev 1981 27 p refs Submitted for publication
(Rept-646) Copyright. Avail: Issuing Activity

Early possible dust like stages of the universe are shown to result in softening of the restrictions on the fraction of matter contained in primordial black holes (PBH). Taking into account such softening, limits on the parameters of unified theories are given. The inhomogeneity of the early universe on a small scale, it is concluded, is made compatible with modern observational limits on the PBH spectrum. Author

N82-18090 Academy of Sciences (USSR), Moscow. Space Research Inst.
ORIGIN OF THE INITIAL INHOMOGENEITIES OF THE UNIVERSE
D. A. Kompaneets, V. N. Lukash, and I. D. Novikov 1981 36 p refs Presented at the Conf. on Origin of the Struct. of the Universe, Tallin, 6-10 Apr. 1981 Submitted for publication
(Rept-652) Copyright. Avail: Issuing Activity

The problem of the origin of small inhomogeneities in the expanding Universe and their evolution near the cosmological singularity is analyzed. All physical fluctuation modes, it is hypothesized, have an equal energy at the initial moment t sub 0 (equipartition hypothesis). This hypothesis implies quite a different relation between the initial perturbation modes than assumed earlier. The mechanisms of amplification of the potential perturbations near the cosmological singularity, it is shown, results in the significant growth of the initial fluctuations. The initial value of the amplitude of the perturbations is made possible by tens of orders of magnitude less than asummed earlier. A physical interpretation of the amplification mechanism is given. The conclusions are applied to the problem of the formation of the large scale structure of the Universe. N.W.

N82-18091 Academy of Sciences (USSR), Moscow. Space Research Inst.
ELECTRIC CHARGE IN THE KRUSKAL SPACE-TIME AND THE JEANS CONJECTURE
M. Demianski (Warsaw Univ.) and I. D. Novikov 1981 31 p refs Submitted for publication
(Rept-653) Copyright. Avail: Issuing Activity

An attempt was made to realize Jeans' conjecture that there might be regions in space, such as galactic centers, where matter could be flowing into our universe from other universes. Studies of a test electromagnetic field produced by a point charge in the maximally extended Schwarzschild space-time, show that an observer at infinity can always get information on the value of the charge, even if it is hidden inside a white hole. It is concluded that the Jean conjecture cannot be realized in this manner. A.R.H.

N82-18092 Texas Univ. at Arlington.
A SPECTROSCOPIC STUDY OF THE RADIAL VELOCITY VARIATIONS AND ACCRETION DISKS FOUND IN FOUR DWARF NOVAE Ph.D. Thesis
Richard James Stover 1981 276 p
Avail: Univ. Microfilms Order No. 8119381

Time resolved spectroscopic observations of the four dwarf novae SS Cyg, EM Cyg, U Gem, and RU Peg are presented. Although these systems were studied previously, all of the spectroscopic studies were done photographically. A linear response, digital detector is employed. Analytic techniques to the study of the radial velocity variations and emission line profiles found in dwarf novae are applied. In the study of SS Cyg cross-correlation techniques were used for the first time to measure the radial velocity variations of the secondary star absorption lines. In the study of U Gem, analysis of the accretion disk emission lines showed that the motion of the material in the disk cannot be described accurately by orbits defined within the three-body approximation. The observations of EM Cyg reveal an unstable accretion disk, with emission lines that vary erratically on timescales of minutes to days. New measurements of the radial velocity variations of the emission and absorption lines found in the spectrum of RU Peg agree with previous measurements but have a higher accuracy. Dissert. Abstr.

N82-18093 Yale Univ., New Haven, Conn.
GRAVITATIONAL WAVE GENERATION BY STELLAR CORE COLLAPSE Ph.D. Thesis
Thomas Andrew Moore 1981 149 p
Avail: Univ. Microfilms Order No. 8126359

A model of stellar core collapse which treats deviations from spherical symmetry as small perturbations on a spherical background is presented. It may be used to predict qualitative and quantitative features of the gravitational radiation emitted by stellar cores with odd-parity, axisymmetric fluid perturations, and more general asymmetries. The present consensus on the physics of core collapse is reviewed, and the important features, assumptions, and limitations of the model are outlined. A series of model runs are presented and discussed. Several proposals for future research are presented. The mathematical features of the present model and its realization on the computer are explored. Dissert. Abstr.

N82-18094 Princeton Univ., N. J.
COMPONENTS IN THE INTERSTELLAR MEDIUM Ph.D. Thesis
Eric Russell Martin 1981 165 p
Avail: Univ. Microfilms Order No. 8127758

The lines of sight toward 32 stars with a procedure that gives velocity components for various interstellar ions are analyzed.

The column densities found for species expected to be relatively undepleted are used to estimate the column density of neutral hydrogen in each component. Whenever possible, the molecular hydrogen excitation temperature, abundances (relative to S II), electron density, and hydrogen volume density are calculated for each component. The results for each star are combined to give total H I column density as a function of (LSR) velocity. The derived velocities correspond well with those found in optical studies. The mean electron density is found to be approximately constant with velocity, but the mean hydrogen volume density is found to vary. The data presented here are consistent with the assumption that some of the velocity components are due to circumstellar material. Dissert. Abstr.

N82-18095*# Wisconsin Univ., Madison. Space Physics Lab.
EXTENDED ADIABATIC BLAST WAVES AND A MODEL OF THE SOFT X-RAY BACKGROUND
Donald P. Cox and Paul R. Anderson (California Univ., Santa Barbara) Aug. 1981 85 p refs
(Grant NGL-50-002-044)
(NASA-CR-168411; Rept-137) Avail: NTIS HC A05/MF A01 CSCL 03B

An analytical approximation is generated which follows the development of an adiabatic spherical blast wave in a homogeneous ambient medium of finite pressure. An analytical approximation is also presented for the electron temperature distribution resulting from coulomb collisional heating. The dynamical, thermal, ionization, and spectral structures are calculated for blast waves of energy E sub 0 = 5 x 10 to the 50th power ergs in a hot low-density interstellar environment. A formula is presented for estimating the luminosity evolution of such explosions. The B and C bands of the soft X-ray background, it is shown, are reproduced by such a model explosion if the ambient density is about .000004 cm, the blast radius is roughly 100 pc, and the solar system is located inside the shocked region. Evolution in a pre-existing cavity with a strong density gradient may, it is suggested, remove both the M band and OVI discrepancies. N.W.

N82-18096*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE DISTRIBUTION OF FREE ELECTRONS IN THE INNER GALAXY FROM PULSAR DISPERSION MEASURES
David S. Harding and Alice K. Harding Dec. 1981 33 p refs
Submitted for publication
(NASA-TM-83875) Avail: NTIS HC A03/MF A01 CSCL 03B

The dispersion measures of a sample of 149 pulsars in the inner Galaxy (absolute value of l < 50 deg) were statistically analyzed to deduce the large-scale distribution of free thermal electrons in this region. The dispersion measure distribution of these pulsars shows significant evidence for a decrease in the electron scale height from a local value greater than the pulsar scale height to a value less than the pulsar scale height at galactocentric radii inside of approximately 7 kpc. An increase in the electron density (to a value around .15/cu cm at 4 to 5 kpc) must accompany such a decrease in scale height. There is also evidence for a large-scale warp in the electron distribution below the b + 0 deg plane inside the Solar circle. A model is proposed for the electron distribution which incorporates these features and Monte Carlo generated dispersion measure distributions are presented for parameters which best reproduce the observed pulsar distributions. M.G.

N82-18097# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RADIAL EVOLUTION OF POWER SPECTRA OF INTERPLANETARY ALFVENIC TURBULENCE
B. Bavassano (Istituto di Ricerca e Technologi a per lo Studio del Plasma Nello Spazio, Rome), M. Dobrowolny (Istituto di Ricerca e Technologia per lo Studio del Plasma Nello Spazio, Rome), F. Mariani (Rome Univ.), and N. F. Ness Sep. 1981 28 p refs
(IPS-81-13) Avail: NTIS HC A03/MF A01

The radial evolution of the power spectra of the MHD turbulence within the trailing edge of high speed streams in the solar wind was investigated with the magnetic field data of Helios 1 and 2 for heliocentric distance between 0.3 and 0.9 AU. In the analyzed frequency range (.00028 Hz to .0083 Hz) the computed spectra have, near the Earth, values of the spectral index close to that predicted for an incompressible hydromagnetic turbulence in a stationary state. Approaching the Sun the spectral slope remains unchanged for frequencies f > or approximately .00 Hz, whereas at lower frequencies, a clear evolution toward a less steep fall off with frequency is found. The radial gradient of the power in Alfvenic fluctuations depends on frequency and it increases upon increasing frequency. For frequencies f > or approximately .00 Hz, however, the radial gradient remains approximately the same. Possible theoretical implications of the observational features are discussed. Author

N82-18098# Technische Universitaet, Munich (West Germany). Sonderforschungsbereich 78 Satellitengeodaesie.
MATERIAL ON THE DYNAMICS OF EARTH-MOON SYSTEMS: PLANETARY LIBRATION, FUNDAMENTALS [MATERIALIEN ZUR DINAMIK DES ERDE-MOND-SYSTEMS: LIBRATIONENIDES MONDES, GRUNDBEGRIFFE]
Karlheinz Goller, Heinrich Goeixner, and Manfred Schneider 1981 43 p refs In GERMAN Sponsored by Deutschen Forschungsgemeinschaft
(Mitt-155) Avail: NTIS HC A03/MF A01

Basic concepts on the optical and physical libration fundamentals of the Moon are analyzed. Optical libration is defined and ecliptic and equatorial lunar coordinates are discussed. Celestial mechanics of the physical libration theory based on Cassini's laws are defined. Linearized gyro equations are outlined in libration angles, directional cosines which are applicable to aeromechanics of angles of roll, yaw, and pitch which are connected with the distribution of variables. E.A.K.

N82-18099# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.
THE ROLE OF CYCLOTRON RESONANCE PROCESSES IN THE SPECTRA OF ACCRETING NEUTRON STARS
Joachim Truemper 1981 11 p refs Presented at Workshop on Gamma-Ray Transients and Related Astrophys. Phenomena, San Diego, Calif., 5-8 Aug. 1981
(ISSN-0340-8922) Avail: NTIS HC A02/MF A01

The theory and observation of cyclotron resonance features in pulsating source spectra are reviewed, and gamma ray bursts are discussed. Scintillation counter, proportional counter, and cooled Ge spectrometer data confirm a first harmonic spectral feature in Her X-1, but not a second one in the 1976 observations. A large number of gamma ray burst sources are neutron stars with magnetic fields of 3 to 8 X 10 to the 12th power Gauss. The sources show extreme temperature stratification (10 to several 100 KeV). Column density range of the absorbing/scattering layers in the sources is narrow. Author (ESA)

N82-18100# Oxford Univ. (England). Nuclear Physics Lab.
THE ORIGIN OF NULLS MODE CHANGES AND TIMING NOISE IN PULSARS
P. B. Jones 1981 14 p refs
(PB82-115221; Rept-74/81) Avail: NTIS HC A02/MF A01 CSCL 03B

A solvable polar cap model obtained previously has normal states which may be associated with radio emission and null states. The solutions cannot be time-independent; the neutron star surface temperature T and mean surface nuclear charge Z are both functions of time. The normal and null states, and the transitions between them, form closed cycles in the T-Z plane. Normal-null transitions can occur inside a fraction of the area on the neutron star surface intersected by open magnetic flux lines. The fraction increases with pulsar period and becomes unity when the pulsar nears extinction. Frequency noise, mode changes, and pulse nulls have a common explanation in the transitions. GRA

N82-18101 State Univ. of New York at Stony Brook.
H2 EMISSION IN MOLECULAR CLOUDS Ph.D. Thesis
Jacqueline Fischer 1981 123 p
Avail: Univ. Microfilms Order No. 8127104

By observation in the 2 micron lines of vibrationally excited H2, H2 emission near a variety of types of very young objects was detected in the DR21/W75, NGC 7538, OMC-2, NGC 6334 and NGC 1999(HH2) molecular clouds. The observed v = 1.0 S(1) line luminosities range from 0.006 solar luminosity to 2 solar luminosity. Observations in the CO(J = 1.0) line (lambda = 2.6 mm) indicate that all the H2 emission sources, with the exception of the Herbig Haro Object Number 2, are associated with enhanced high velocity wing emission (v nv approximately 7.20 km sec 10 to the minus 1 power) indicative of very supersonic gas flows. For most of the sources, the energy (approximately 10 to the 46th - 10 to the 47th power ergs sec 10 to the minus 1 power) and the momentum (approximately 10 to the minus 1 power g cm 10 to the minus 1 power) observed in the high velocity gas are under the assumption of shock excitation. The line ratios in DR21/H2 are inconsistent with pure ultraviolet excitation and derive an excitation temperature of 1700 K plus or minus 1100 K. The region of broad wing emission in DR21 is more compact than originally reported and the H2 emission region lies just outside the half power radius of the blue blue-wing emission. Dissert. Abstr.

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-18102 Academy of Sciences (USSR), Moscow. Space Research Inst.

THREE-DIMENSIONAL SHAPE AND POSITION OF VENUS'S BOW SHOCK

V. N. Smirnov, O. L. Vaisberg, S. A. Romenov, J. A. Slavin, C. T. Russel, and D. S. Intriligator 1981 29 p refs

(Rept-656) Copyright. Avail: Issuing Activity

The results of determination of the shock front position near Venus according to the Venera-9, 10 and Pioneer-Venus data are compared. It is shown that the presence of an asymmetry of the three dimensional form of the shock wave and its position in the ecliptic plane makes possible the explanation of the recently obtained discrepancy in determining the front position based on the data from the Venera and Pioneer-Venus data. Both the identified asymmetry of the shock wave form and the rotation of its axis of symmetry in the ecliptic plane additionally at an angle of 7.5 deg are probably associated with the interplanetary magnetic field influence. Author

N82-18103 California Univ., San Diego.

INTERACTIONS OF COMETS WITH THE SOLAR WIND AND SOLAR RADIATION Ph.D. Thesis

Harry Louis Francis Houpis 1981 347 p

Avail: Univ. Microfilms Order No. 8125439

A basic flow model was developed which uses the Newtonian thin layer approximation for the interaction between two adiabatic hypersonic systems to derive the three dimensional axisymmetric flow structure of the cometary ionosphere. The supersonic outflow of the cometary ions is braked and diverted to the tail by an inner shock whose size and shape is determined analytically. The layer between the inner shock and the tangential discontinuity surface is found to be somewhat thin near the symmetry axis, being about .23 of the inner shock nuclear distance. The effects of sunward jets observed in several comets on the structure of the layer were studied. It is shown that the jets tend to broaden the shock layer both near the axis and toward the flanks. The strong activity of comet Humason (1962 VIII) is explained. The production of dust from comets at large heliocentric distances is considered with particular emphasis placed on the extended dust coma observed in comet Bowell (1980b) at 7.17 AU. Dissert. Abstr.

N82-18104*# Illinois Univ., Urbana. Dept. of Astronomy.

EARTH-BASED REMOTE SENSING OF PLANETARY SURFACES AND ATMOSPHERES AT RADIO WAVELENGTHS

John R. Dickel [1982] 36 p refs Sponsored by NASA

(NASA-CR-168414) Avail: NTIS HC A03/MF A01 CSCL 03B

Two reasons for remote sensing from the Earth are given: (1) space exploration, particularly below the surfaces or underneath cloud layers, is limited to only a very few planets; and (2) a program of regular monitoring, currently impractical with a limited number of space probes, is required. Reflected solar and nonthermal radiation are discussed. Relativistic electrons, trapped in large magnetospheres on Saturn and Jupiter, are discussed. These electrons produce synchrotron radiation and also interact with the ionosphere to produce bursts of low frequency emission. Because most objects are black-bodies, continuum radiometry is emphasized. Spectroscopic techniques and the measurement of nonthermal emission are also discussed. N.W.

N82-18105*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

VOYAGER 1 ASSESSMENT OF JUPITER'S PLANETARY MAGNETIC FIELD

J. E. P. Connerney, M. H. Acuna, and N. F. Ness Dec. 1981 20 p refs Submitted for publication

(NASA-TM-83882) Avail: NTIS HC A02/MF A01 CSCL 03B

An estimate of Jupiter's planetary magnetic field is obtained from the Voyager 1 observations of the Jovian magnetosphere. An explicit model for the magnetodisc current system is combined with a spherical harmonic model of the planetary field with both sets of parameters determined simultaneously using a nonlinear generalized inverse methodology. The resulting model fits the observations extremely well throughout the analysis interval (r > 20 Jovian radii). The Jovian internal field model obtained from the Voyager 1 data is very similar to the octopole Pioneer 11 models. The best fitting magnetodisc lies in the centrifugal equator, 2/3 of the way between the rotational and magnetic equators, as appropriate for centrifugal loading of the magnetosphere by a cold plasma. S.L.

N82-18106*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

EVIDENCE FOR A DISTANT (< 8700 R SUB J) JOVIAN MAGNETOTAIL: VOYAGER 2 OBSERVATIONS

R. P. Lepping, L. F. Burlaga, M. D. Desch, and L. W. Klein (Computer Sciences Corp., Silver Spring, Md.) Jan. 1982 20 p refs Submitted for publication

(NASA-TM-83881) Avail: NTIS HC A02/MF A01 CSCL 03B

A correlative survey of magnetometer (MAG) and Planetary Radio Astronomy (PRA) 1.2 kHz continuum radiation measurements from Voyager 2 provide evidence for at least eight distant Jovian magnetotail sightings occurring about once a month over the first 2/3 of 1981 at distances of approximately 5,000 to 9,000 R sub J. The occurrences of these events are in good agreement with prior Plasma Wave Science and Plasma Science identifications. Observations of these distant magnetotail, or tail filament, encounters appear most prevalent in both MAC and PRA data sets when the spacecraft was closest to the Jupiter-Sun axis at approximately 6,500 R sub J from the planet; the PRA events are also most intense during those times. A specific tail encounter occurring in mid-February 1981 is analyzed and shown to possess a remarkably symmetric magnetic field signature and to have a bipolar field structure in the central region. The bipolarity is characteristic of most of the eight events. Author

N82-18107# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).

THE PRESENT PICTURE OF IO'S ELECTRODYNAMIC COUPLING WITH THE MAGNETOSPHERE OF JUPITER

M. Dobrowolny May 1981 23 p refs

(IPS-81-6) Avail: NTIS HC A02/MF A01

Theoretical models of Io-Jovian magnetosphere interaction are reviewed and Voyager 1 data are analyzed. Magnetic field measurements, Io's plasma torus, and radio measurements are discussed. Magnetic measurements prove the existence of an Alfven wave current system associated with Io. The multiplicity of decametric arcs during one Jupiter rotation is correlated with the multiple Alfven wave system installed by Io around Jupiter. The separation between waves falls in the same range as temporal separation between arcs. The width of an arc agrees well with the width of the corresponding Alfven wings. These associations are phenomenological, and do not constitute a theory of Io's controlled decametric emissions. Author (ESA)

N82-18108# Chalmers Univ. of Technology, Goteborg (Sweden) Research Lab. of Electronics.
COMETS, INTERSTELLAR MOLECULES AND THE ORIGIN OF LIFE
William M. Irvine and Ake Hjalmarson 1981 34 p refs
Submitted for publication
(PB82-104274; RR-143) Avail: NTIS HC A03/MF A01 CSCL 03B

Comets and the relative abundance of molecules in the gas phase in interstellar clouds are investigated. The justification for a joint treatment lies in the possibility that comets may consist of a frozen matrix of interstellar volatiles and grains formed during the early stages of the collapse of the molecular cloud which ultimately produced the Sun and planets. These topics may in turn be related to the origin of life. The observed properties of comets and current models of their nature and composition are reviewed. The determination of relative molecular abundance in interstellar clouds and the evidence favoring a primarily gas phase chemistry in such regions, concluding with a tabulation of molecular abundances in the cold cloud known as TMC-1 which has been called a protosolar nebula is discussed. GRA

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-18109 Columbia Univ., New York.
SOLAR X-RAY FLARES: SPECTROSCOPIC RESULTS FROM THE EIGHTH ORBITING SOLAR OBSERVATORY AND THE DEVELOPMENT OF A SPACE SHUTTLE BORNE POLARIMETER Ph.D. Thesis
James Randall Lemen 1981 292 p
Avail: Univ. Microfilms Order No. 8125331

Observations made with spectrometers on board the OSO-8 satellite which observed flares during the previous solar minimum period are discussed. The high reflectivity of the crystal spectrometers enabled the observation of the X-ray continuum through all phases of flare development. Various coronal cooling theories were investigated by surveying 30 solar flares. It is shown that neither radiative nor conductive cooling models alone are capable of explaining the majority of events observed. A viable cooling model probably must also include convection. A polarimeter, built and scheduled to fly on the fourth test flight of the space shuttle is described. It has a bandwidth of 5 to 30 kiloelectron volts and is sufficiently sensitive to measure polarization with an accuracy of 1 to 2 percent over times as short as 10 seconds. Dissert. Abstr.

N82-18110 Institut d'Aeronomie Spatiale de Belgique, Brussels.
DIFFERENCES BETWEEN SOLAR WIND PLASMOIDS AND IDEAL MAGNETOHYDRODYNAMIC FILAMENTS
J. Lemaire and M. Roth 1981 24 p refs Submitted for publication
(Aeronomica-Acta-A-232-1981) Avail: Issuing Activity

The time dependent impulsive penetration model of solar wind plasma-magnetosphere interaction is elaborated on in order to emphasize its differences from ideal MHD models. The plasma-magnetic field entities differ from ideal MHD filaments. Their skin is not infinitely thin, but has a physical thickness determined by the gyromotion of the thermal ions and electrons. They are finite and their magnetic flux is interconnected with the interplanetary magnetic flux. When they penetrate into the magnetosphere their magnetic field lines become rooted in the ionosphere, i.e., in a medium with finite transverse conductivity. The external Lorentz force acting on their boundary surface depends on the orientation of their magnetic moment with respect to the external magnetic field. When their mechanical equilibrium is perturbed, hydromagnetic oscillations can be generated. The front side of all solar wind plasmoids which penetrate into the magnetosphere is considered to be the inner edge of the magnetospheric boundary layer, while the magnetopause is the surface where the magnetospheric plasma ceases to have a trapped pitch angle distribution. Author (ESA)

N82-18111*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
THERMAL PERTURBATION OF THE SUN
L. W. Twigg and A. S. Endal [1982] 9 p refs
(Grant NAG5-13)
(NASA-CR-168459) Avail: NTIS HC A02/MF A01 CSCL 03B

Thermal perturbations of the solar convection zone can be modeled (to the first order) by perturbing the mixing length parameter alpha (equal to the ratio of the mixing length to the pressure scale height) used in the standard mixing length theory of convection. Results of such an analysis are presented and discussed in relation to recent work by others. A.R.H.

N82-18112*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
EVOLUTIONARY VARIATIONS OF SOLAR LUMINOSITY
A. S. Endal [1982] 11 p refs
(Grants NAG5-13; NSF AST-79-19688)
Avail: NTIS HC A02/MF A01 CSCL 03B

The Theoretical arguments for a 30% increase in the solar luminosity over the past 4.7 billion years are reviewed. A scaling argument shows that this increase can be predicted without detailed numerical calculations. The magnitude of the increase is independent of nuclear reaction rates, as long as conversion of hydrogen to helium provides the basic energy source of the Sun. The effect of the solar luminosity increase on the terrestrial climate is briefly considered. It appears unlikely that an enhanced greenhouse effect, due to reduced gases (NH3, CH4), can account for the long-term paleoclimatic trends. Author

N82-18113*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
THE EFFECT OF PERTURBATIONS OF CONVECTIVE ENERGY TRANSPORT ON THE LUMINOSITY AND RADIUS OF THE SUN
A. S. Endal and L. W. Twigg [1982] 39 p refs
(Grant NAG5-13)
(NASA-CR-168445) Avail: NTIS HC A03/MF A01 CSCL 03B

The response of solar models to perturbations of the efficiency of convective energy transport is studied for a number of cases. Such perturbations primarily effect the shallow superadiabatic layer of the convective envelope (at depth of approx. > 1000 km below the photosphere). Independent of the details of the perturbation scheme, the resulting change in the solar radius is always very small compared to the change in luminosity. This appears to be true for any physical mechanism of solar variability which operates in the outer layers of the convection zone. Changes of the solar radius have been inferred from historical observations of solar eclipses. Considering the constraints on concurrent luminosity changes, this type of solar variability must be indicative of changes in the solar structure at substantial depths below the superadiabatic layer of the convective envelope. Author

N82-18114# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo. Environmental Data and Information Service.
SOLAR-GEOPHYSICAL DATA NUMBER 442. PART 2: COMPREHENSIVE REPORTS, DATA FOR DECEMBER 1980, NOVEMBER 1979, MISCELLANEA
Helen E. Coffey Jun. 1981 91 p 2 Vol.
(PB82-106337; SGD-442-Pt-2; NOAA-81080303) Avail: NTIS HC A05/MF A01 CSCL 03B

In addition to an index for 1980 - 1981, this issue of comprehensive reports provides data on: solar radio emission, solar X-ray radiation, and mass ejections from the Sun. A new schedule will cause the daily flare index and the regional flare index to appear 13 and 14 months from the date of observation. This issue contains data on solar flares. Miscellaneous data includes: active regions synoptic solar maps, and the regional flares index. GRA

N82-18115# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo. Environmental Data and Information Service.

SOLAR-GEOPHYSICAL DATA NUMBER 442. PART 2: PROMPT REPORTS, DATA FOR MAY 1981, APRIL 1981 AND LATE DATA
Helen E. Coffey Jun. 1981 186 p 2 Vol.
(PB82-106328; SGD-442-Pt-1; NOAA-81080302) Avail: NTIS HC A09/MF A01 CSCL 03B

In addition to an index this report provides data on: alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, inferred interplanetary magnetic field polarities, mean solar magnetic field, spacecraft observations and Boulder geomagnetic substorm log. It also provides data on: daily solar activity centers, sudden ionospheric disturbances, solar radio emission, cosmic rays, geomagnetic indices, and radio propagation indices. Late data includes solar radio emission, solar wind measurements, Spacecraft observations, Sudden ionosheric disturbances, cosmic rays, and geomagnetic indices.
GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-18116# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).
COSMIC RAY NM-64 NEUTRON MONITOR DATA-4
G. Villoresi, N. L. Zangrilli, A. Felici, F. Re, and F. Signoretti Jun. 1981 32 p refs Prepared in cooperation with Rome Univ.
(IPS-81-9) Avail: NTIS HC A03/MF A01

Pressure-corrected data from the Rome neutron monitor as well as barometric pressure data are given in tabular form for the year 1979, together with the graphs of the corrected intensity. Details on the devices employed, operational mode and data handling are given.
Author

N82-18117*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STATISTICAL PROPERTIES OF MHD FLUCTUATIONS ASSOCIATED WITH HIGH SPEED STREAMS FROM HELIOS 2 OBSERVATIONS
B. Bavassano (Inst. Plasma Spazio, Frascati, Italy), H. Dobrowolny (Inst. Plasma Spazio, Frascati, Italy), G. Fanfoni (Rome Univ.), F. Mariani (Inst. Plasma Spazio, Frascati, Italy), and N. F. Ness May 1981 29 p refs
(IPS-81-5) Avail: NTIS HC A03/MF A01

Helios 2 magnetic data were used to obtain several statistical properties of MHD fluctuations associated with the trailing edge of a given stream served in different solar rotations. Eigenvalues and eigenvectors of the variance matrix, total power and degree of compressibility of the fluctuations were derived and discussed both as a function of distance from the Sun and as a function of the frequency range included in the sample. The results obtained add new information to the picture of MHD turbulence in the solar wind. In particular, a dependence from frequency range of the radial gradients of various statistical quantities is obtained.
Author

N82-17241# Joint Publications Research Service, Arlington, Va.
GAMMA-RAY INSTRUMENTATION AND ITS USES IN SPACE
V. G. Kirillov-Ugryumov, R. Z. Sagdeyev, and Yu. P. Semenov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 42-50 Transl. into ENGLISH from Zemlya i Vselennaya (Moscow), no. 4, Jul. - Aug. 1981 p 4-8 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

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N82-18118# Office of Naval Research, San Francisco, Calif.
ONR TOKYO SCIENTIFIC BULLETIN. VOLUME 6: NUMBER 3, JULY TO SEPTEMBER 1981
Young B. Kim and Mary Lou Moore Sep. 1981 86 p
(AD-A107649) Avail: NTIS HC A05/MF A01 CSCL 07/4

Contents: Japanese Participation in the BIOMASS Program: Austral Summer 1980-1981; The Fate of the Standard Zooplankton Samples Collected during the Cooperative Study of the Kuroshio and Adjacent Region (CSK); Fifth Australian Electrochemistry Conference; Asian Institute of Technology Bangkok, Thailand; Central Research Institute of Electric Power (CRIEPI) in Japan; The Biological Laboratory of the Japanese Imperial Household; Friction's Foe: Japan's Mechanical Engineering Laboratory at Tsukuba; Observations on Scientific Research and the Research Environment at the Institute for Molecular Science in Okazaki, Japan; International Tsunami Symposium - Tsukuba University, Ibaraki, Japan: 1981; International Tsunami Symposium 1981; Boundary Layer and Turbulence Research in Japan Thirteenth Turbulence Symposium; and International Meetings in the Far East, 1981-1985.
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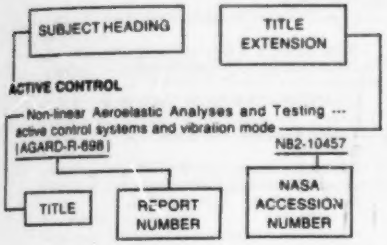

The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7050).

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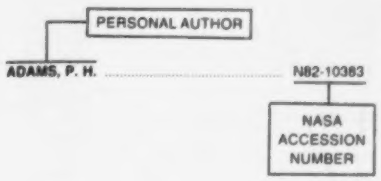

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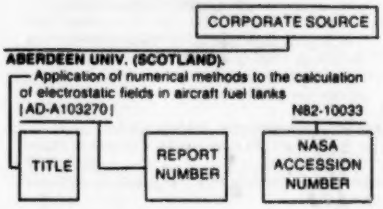
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CALIFORNIA ANALYTICAL LAB., SACRAMENTO.

Determination of volatile organics in industrial and municipal wastewaters
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The coherent structure of turbulent mixing layers. 1: Similarity of the primary vortex structure. 2: Secondary streamwise vortex structure
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CALIFORNIA UNIV., BERKELEY.

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CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.

Mechanical Engineering Department technical review
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CALIFORNIA UNIV., LOS ANGELES.

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CENTRE TECHNIQUE DES INDUSTRIES MECANIQUES, NANTES (FRANCE).

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Prospects for materials (plastics, elastomers, paints). Volume 3: Plastic materials (appendix 3, computer assisted design approach to injection molds)
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Prospects for materials (plastics, elastomers, paints). Volume 4: Plastic materials (appendix 2, automation and evolution of equipment for forming plastic materials)
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CENTRE TECHNIQUE DES INDUSTRIES MECANIQUES, ST. ETIENNE (FRANCE).

Study of the industrial use of organic additives for tempering
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Development status of the 'Adhesion of Metals' experiment and of the UHV Chamber facility
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COMMISSION OF THE EUROPEAN COMMUNITIES, ISPRA (ITALY).

CONVEC: A computer program for transient incompressible fluid flow based on quadratic finite elements. Part 1: Theoretical aspects
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CONVEC: A computer program for transient incompressible fluid flow based on quadratic finite elements. Part 2: User's manual
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COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).

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DEFENCE RESEARCH ESTABLISHMENT, OTTAWA. (ONTARIO).

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DEFENCE RESEARCH ESTABLISHMENT VALCARTIER (QUEBEC).

Multiple target tracking with an AM reticule seeker
[AD-A107654] N82-18000

DEFENCE RESEARCH INFORMATION CENTRE, ORPINGTON (ENGLAND).

The application of electrochemical detection in high performance liquid chromatograph (HPLC): Selective determination of readily oxidisable compounds at trace level
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Effects on solid-state reactions during thermal decomposition of nitrocellulose
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DEFENSE MAPPING AGENCY, WASHINGTON, D.C.

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DELAWARE RIVER BASIN COMMISSION, TRENTON, N.J.

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DENVER UNIV., COLO.

NASA technology utilization program: The small business market
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DEPARTMENT OF ENERGY, WASHINGTON, D. C.

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DEPARTMENT OF TRANSPORTATION, CAMBRIDGE, MASS.

Fuel economy and exhaust emissions characteristics of diesel vehicles: Test results of a prototype fiat 131TC 2.4 liter automobile
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DESERT RESEARCH INST., RENO, NEV.

Stratospheric CCN sampling program
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DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).

The influence of notch length and ligament length on the toughness of boron fiber reinforced aluminum
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Scientific report of the Fluid Mechanics Research Department N82-17469

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND, RAUMFAHRT, OBERPFAFFENHOFEN (WEST GERMANY).

Study on the accommodation potentials of NADIR-oriented payloads on space shuttle
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DONOHUE, ANSTEY, AND MORRILL, BOSTON, MASS.

A project to test for shale gas in Ohio
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Hydrogen bonding in asphaltenes and coal liquids
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EATON ENGINEERING AND RESEARCH CENTER, SOUTHFIELD, MICH.

Straight and chopped DC performance data for a reliance EV-250AT motor with a General Electric EV-1 controller
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ECOLE NATIONALE SUPERIEURE DES TELECOMMUNICATIONS, PARIS (FRANCE).

A very high throughput NETWORK: The ESCALIBUR project
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EG AND G WASHINGTON ANALYTICAL SERVICES CENTER, INC., ROCKVILLE, MD.

Error analysis of pulse location estimates for simulated bathymetric lidar returns
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ELEKTRONIK-SYSTEM G.M.B.H., MUNICH (WEST GERMANY).

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ENERGY AND ENVIRONMENTAL ANALYSIS, INC., ARLINGTON, VA.

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Investigation of in-situ gelation to control emissions from abandoned hazardous waste sites
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ENERGY RESOURCES CO., INC., CAMBRIDGE, MASS.
Monitoring to detect groundwater problems resulting from enhanced oil recovery
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ENGINEERING INFORMATION SYSTEMS, INC., SAN JOSE, CALIF.
SPAR reference manual update SPAR level 15
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ENGINEERING-SCIENCE, INC., DURHAM, N.C.
Example emission inventory documentation for 1982 ozone State Implementation Plans (SIPs)
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ENVIRONMENTAL DESIGN AND PLANNING, INC., BOSTON, MASS.
Evaluation of a treatment lagoon for combined sever overflow
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ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH.
Rolling resistance measurements 106 passenger car tires
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ENVIRONMENTAL RESOURCES MANAGEMENT, INC., WEST CHESTER, PA.
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EUROPEAN OFFICE OF AEROSPACE RESEARCH AND DEVELOPMENT, FPO NEW YORK 09510.
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EUROPEAN SPACE OPERATIONS CENTER, DARMSTADT (WEST GERMANY).
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FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
Active beacon collision avoidance logic evaluation. Volume 2: Collision avoidance (BCAS) threat phase
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Investigation of Wilcox model 585B very high frequency omnidirectional radio range (VOR) system, part 3
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FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
Census of US Civil aircraft, calender year 1980
[AD-A106675] N82-17084
DOT/FAA Human Factors Workshop on Aviation. Transcript, vol 1
[AD-A107802] N82-17876
DOT/FAA Human Factors Workshop on Aviation. Transcript, volume 2
[AD-A107803] N82-17877

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A method for estimating fuel consumption and vehicle emissions on urban arterials and networks
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The effect of increasingly more complex aircraft and avionics on the method of system design
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Functional documentation. A practical aid to the orderly solution of the system design problem
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FGAN, WACHTBERG-WERTHHOVEN (WEST GERMANY).
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High angle mining system Task report: System requirements, performance specifications, and review of state-of-the-art technology
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FOM-INSTITUUT VOOR PLASMAFYSICA, JUTPHAAS (NETHERLANDS).
Space and time resolved measurements of ion energy distributions by neutral beam injection in TORTUR 2
[REPT-81-137] N82-17976

FOM-INSTITUUT VOOR PLASMAFYSICA, RIJNHUIZEN (NETHERLANDS).
First-order toroidal correction to the minimum energy state of a cylindrical plasma column of finite beta
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FONDAZIONE UGO BORDONI, ROME (ITALY).
CQNA: Closed queueing network analyzer
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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, ROME (ITALY).
Climate applications to agricultural problems
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FOSTER-MILLER ASSOCIATES, INC., WALTHAM, MASS.
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[PB82-113366] N82-17583

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Potential effects of urbanization on peak flows in Rattlesnake Creek, Missoula County, Montana
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Digital model of the unconsolidated aquifer system in the Modesto area, Stanislaus and San Joaquin Counties, California
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GEOLOGICAL SURVEY, SALT LAKE CITY, UTAH.
Water resources data for Utah, water year 1980
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GEORGE WASHINGTON UNIV., WASHINGTON, D.C.
Experimental trim drag values for conventional and supercritical wings
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A closed form local solution of a nonlinear structural design problem in terms of the design parameters
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GEORGIA INST. OF TECH., ATLANTA.
Distributed data processing: What is it?
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Possibilities for avoiding strong variations of the electrical output power of wind energy systems
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GILBERT/COMMONWEALTH, READING, PA.
Magnetohydrodynamics (MHD) Engineering Test Facility (ETF) 200 MWe power plant Conceptual Design Engineering Report (CDER)
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GILBERT (GLEN A.) AND ASSOCIATES, INC., READING, PA.
Research and evaluation of biomass resources/conversion/utilization systems. Biomass allocation model. Volume 1: Test and appendices A & B
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Research and evaluation of biomass resources/conversion/utilization systems Biomass allocation model. Volume 2: Appendices C-E
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GREAT LAKES BASIN COMMISSION, ANN ARBOR, MICH.
Great Lakes environmental planning study
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GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.

An investigation of dynamic-analysis methods for variable-geometry structures
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GRUY FEDERAL, INC., HOUSTON, TEX.

Target reservoirs for CO2 miscible flooding, task two. Summary of available reservoir and geological data. Volume 1: Permian basin geological and reservoir data. Part 2: ADAIR-San Andres through EUNICE
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HARVARD UNIV., CAMBRIDGE, MASS.

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Water quality simulation in Wahiawa reservoir, O'Ahu, Hawaii
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HELSINKI UNIV. OF TECHNOLOGY, ESPOO (FINLAND).

Computerized gamma spectrum analysis with application to multicomponent activation detectors
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HERIOTT-WATT UNIV., EDINBURGH (SCOTLAND).

Submillimeter laser and Fabry-Perot spectroscopy using metallic mesh
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Attenuation of polybrominated biphenyls and hexachlorobenzene by Earth materials
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INSTITUT D'AERONOMIE SPATIALE DE BELGIQUE, BRUSSELS.

Rocket-borne instrumentation for the measurement of atomic oxygen based on chemical release in the lower thermosphere
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Chemical fluctuations and incoherent scattering theory in the terrestrial D region
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INSTITUTE FOR DEFENSE ANALYSES, ARLINGTON, VA.

Built-in-test Equipment Requirements Workshop. Workshop presentation
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INSTITUTE OF GAS TECHNOLOGY, CHICAGO, ILL.

Rapid-rate bituminous coal gasification
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INSTITUTE OF HUMAN PERFORMANCE, FAIRFAX, VA.

Physical performance tasks required of U. S. Marines operating in a desert environment
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INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).

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Contribution of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE)
[INPE-2137-RPE/360] N82-18084

INSTITUUT TNO VOOR WISKUNDE, INFORMATIEVERWERKING EN STATISTIEK, THE HAGUE (NETHERLANDS).

Principal components biplots and alpha and beta diversity
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INTER-AMERICAN GEODETIC SURVEY, FORT SAM HOUSTON, TEX.
Photogrammetry software. A package for everyone
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INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS, ROME (ITALY).
Report of the second session of the Joint Scientific Committee N82-17720
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Stochastic control system parameter identifiability
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IOWA UNIV., IOWA CITY.
Distribution theoretic methods for dynamic analysis and optimization of mechanisms with intermittent motion
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ISTITUTO DI RICERCA E TECNOLOGIA PER LO STUDIO DEL PLASMA NELLO SPAZIO, FRASCATI (ITALY).
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Upgraded demonstration vehicle task report
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JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.
USSR report: Space, no. 14
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Commentary on Soviet-French Aureole-3 satellite
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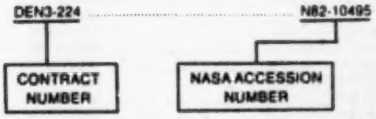

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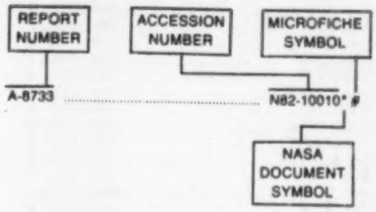

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>
> Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).
>
> For related information see also *Astronautics*.

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>
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>
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90 ASTROPHYSICS **1309**

Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **1309**

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **1309**

Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **1310**

Includes cosmic radiation; and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL **1310**

Note: N.A. means that no abstracts were assigned to this category for this issue.

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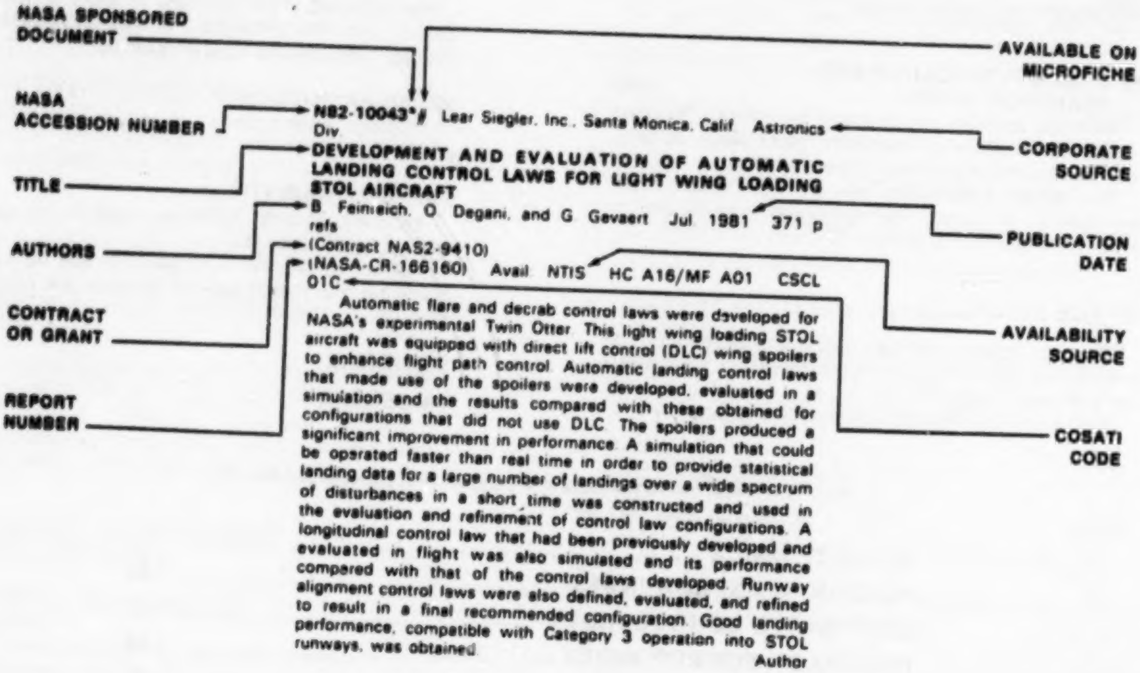
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N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.

DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT

B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
(Contract NAS2-9410)
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

VOLUME 20 NUMBER 9/MAY 8, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-18119# Deutsche Gesellschaft fuer Luft- und Raumfahrt, Cologne (West Germany).
SEVENTH EUROPEAN ROTORCRAFT AND POWERED LIFT AIRCRAFT FORUM
1981 951 p refs Proceeding of Conf. Held in Garmisch-Partenkirchen, West Germany, 8-11 Sep. 1981 Original contains color illustrations
Avail: NTIS HC A99/MF A01

Aspects of helicopter and turbine rotor are addressed. For individual titles, see N82-18120 through N82-18173.

N82-18120# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
DEVELOPMENTS IN ROTARY WING AIRCRAFT AERODYNAMICS c02
I. C. Cheeseman *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 27 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Developments in helicopter aerodynamics are reviewed, including new blade sections and planforms. Computer modelling of the flow and the need for further work in predicting oscillating loadings are considered. The greater attention being given to the need to reduce drag in forward flight due to extended range and fuel conservation costs is recognized. A forecast of advances is made. N.W.

N82-18121# Massachusetts Inst. of Tech., Cambridge.
A SIMPLIFIED APPROACH TO THE FREE WAKE ANALYSIS OF A HOVERING ROTOR c02
R. H. Miller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 15 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Rotor wake geometry and the number of blades are analyzed. Simplified approaches to the free wake aerodynamic analysis of hovering rotors permitting rapid evaluation of rotor aerodynamic characteristics are discussed. Analytical results are compared with existing measurements of blade bound circulation and wake geometry. N.W.

N82-18122# Politecnico di Milano (Italy). Instituto di Ingegneria Aerospaziale.
AN EXPERIMENTAL ANALYSIS OF THE SHAPE OF A ROTOR WAKE c02
Sergio DePonte and Luigi Vigevano *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 8 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Although the shape of a rotor wake may be described by potential flow methods, to get reasonable calculation costs it is necessary to introduce some simplification in the calculations. In order to check the accuracy and the validity field of the various assumptions a set of experimental data may be a good tool for comparisons. A hot wire technique to detect the presence of the blade wake is presented. N.W.

N82-18123# Tokyo Univ. (Japan).
AN EXTENSION OF THE LOCAL MOMENTUM THEORY TO THE ROTORS OPERATING IN TWISTED FLOW FIELD c02
Akira Azuma, Ken-ichi Nasu, and Takatoshi Hayashi *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The local momentum theory was developed to calculate the dynamic airloading of a helicopter rotor, where the velocity perpendicular to the plane of rotation was assumed to be negligibly low in comparison with the rotating velocity. In the case of propellers or windmills, however, this assumption is no longer adequate, and the flow field seen in the rotor-fixed-coordinate system is noticeably twisted along the span. In order to permit calculation of the induced velocity distribution as well as the airloading of the blade in such a twisted flow field, we have carried out an extension of the local momentum theory. Since our method of calculation is based on the instantaneous circulation distribution rather than the instantaneous momentum balance, it may be called the Local Circulation Method. The present method is also applicable to propellers and windmills in yawed flow. Author

N82-18124# Nanjing Aeronautical Inst. (China).
A SIMPLIFIED METHOD FOR PREDICTING ROTOR BLADE AIRLOADS c02
Wang Shi-cun and Xu Zhi *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 28 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Relations of first two harmonic induced velocities to the lower and same-order harmonic circulations are obtained from the generalized classical vortex theory of the rotor. Then, based on the blade element theory, a closed form of equations for circulation is established and, by taking the flapping condition into account, simplified formulae for predicting rotor blade airloads are set up. In particular, expressions of flapping coefficients are derived, including the effect of variable induced velocity distribution but in terms of blade parameters and flight parameters only. Finally, a calculation of a typical example is made and comparisons of airloads with those from the more accurate numerical solution are shown that the present method is fairly suitable for aerodynamic analysis and preliminary design of helicopters. Author

N82-18125# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Aeroelastik.
A THREE-DIMENSIONAL APPROACH TO LIFT AND MOMENT COEFFICIENTS OF ROTATING BLADES c02
Wolfgang Send *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary document see N82-18119 09-01)

Avail: NTIS HC A99/MF A01

The three dimensional incompressible flow around a thick blade is calculated in the limiting case of an infinitely high Reynolds number. The solution for a four bladed rotor is achieved by interacting the mutual influence of the induced velocities on the blades. Several properties of the three dimensional approach are compared with two dimensional theories. Unsteady results are obtained by combining the quasi-steady flow with the calculation for a given oscillation mode. The integral equation for the flow around the blades is solved by a higher order panel technique for the vorticity vector, continuous on the blade and downstream in the wake. An improper description of the wake integral is evident. The helical wake is substituted by its rectilinear counterpart, for which an analytical description was found. N.W.

N82-18126# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.

A COMPLETE METHOD FOR COMPUTATION OF BLADE MODE CHARACTERISTICS AND RESPONSES IN FORWARD FLIGHT c05

J. P. Lefrancq and B. Masure *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 9 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Hypotheses and equations, methods of calculation, and numerical adaptation concerning the dynamics of helicopter rotors are dealt with. Two problems raised by a spinning rotor are also dealt with: determination of natural models qualified by their eigen frequency and damping; and forward flight, using the azimuth method which avoids those difficulties inherent to the modal methods. The calculation process used to improve a rotor while at design stage is illustrated. N.W.

N82-18127# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Aeroelastik.

MODAL CHARACTERISTICS OF ROTOR BLADES: FINITE ELEMENT APPROACH AND MEASUREMENT BY GROUND VIBRATION TEST c05

D. Ludwig *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 23 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The mass and stiffness matrices for a rotating blade are established by the finite element method. The formulation is based on the Lagrange function for combined flapwise bending, chordwise bending, and torsion of twisted nonuniform rotor blades. The element matrices are created by the non-numeric computer program REDUCE. An ordering scheme was introduced to demonstrate which terms may be simplified or neglected. As examples, eigen analyses, with the finite element computer program, are performed for a homogeneous beam and for the nonrotating blade of a wind energy converter. The results of the calculations for the beam are compared with the analytical solutions. The rotor blade of the wind energy converter was tested in a ground vibration test. A short description of the ground vibration test technique and performance is given. N.W.

N82-18128# Hochschule der Bundeswehr, Munich. (West Germany). Inst. fuer Luftfahrttechnik und Leichtbau.

DYNAMIC AND AEROELASTIC CHARACTERISTICS OF COMPLETE WINDTURBINE SYSTEMS c02

E. W. Steinhardt *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

For the investigation of the dynamic and aeroelastic characteristics of large horizontal axis windturbines, a hybrid model consisting of rigid bodies and flexible continuous structures was developed. Degrees of freedom include tower bending and torsion, pitch and yaw of the nacelle as well as rotation, inplane and out-of-plane bending of the blades. Aerodynamic forces are introduced with special regard to motion-induced effects and on gusts. A set of partial integro-differential equations was established via the principle of virtual work. The application of Galerkin's extended method gives a system of linear periodic differential equations. The numerical results confirm strong rotor-tower-coupling and illustrate the typical features of periodic systems. Instationary aerodynamic terms are found to be of minor importance and hingeless rotors will be damped better than teetering rotors, but tower and blade reactions to gravity and gusts are higher. Author

N82-18129# Westland Helicopters Ltd., Yeovil (England). Dynamics Dept.

A STUDY OF THE TECHNIQUES OF DYNAMIC ANALYSIS OF HELICOPTER TYPE STRUCTURES c05

G. M. Venn and D. J. Boon *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 21 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The techniques used in the dynamic analysis of helicopter type structures using finite elements are discussed. A test structure was designed and built which incorporated many design features found in helicopter structures. Experiments were performed on this structure to determine the natural frequencies and normal modes. These experimental results were compared with theoretical finite element results. Altering the build state added one or two extra problems so that these could be studied. The modelling problems investigated were: riveted panel-stringer constructions, deep fabricated beams, discontinuous load paths, bolted joints, honeycomb panels, gearboxes, engine mounts, and engines. The techniques used to model these features are discussed. Problems were found when attempting to compare the theoretical and experimental results. N.W.

N82-18130# Virginia Polytechnic Inst. and State Univ., Blacksburg.

THE EFFECTS OF SLIGHT NON-LINEARITIES ON MODAL TESTING OF HELICOPTER-LIKE STRUCTURES c05

D. J. Ewins (Imperial College of Science and Technology) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 11 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

A comprehensive series of modal tests was made on a specially built test piece designed to simulate many of the characteristics of helicopter structures. These tests identified the presence of a 'slight' degree of nonlinearity and further established that this almost unnoticed effect causes significant discrepancies in the modal properties deduced from measured data. However, systematic analysis of the measurements may be used to isolate the nonlinear effects and to eliminate them from the results. Author

N82-18131# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.

PARAMETRIC STUDY OF THE INFLUENCE OF THE ENGINE UPON THE OPERATING COST OF A CIVIL HELICOPTER c83

Gilbert Beziac, Jean-Pierre Dedieu, and Philippe Cabrit *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 5 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The influence of engine characteristics (weight, fuel consumption, price, power range) upon the helicopter operating cost were studied. The parametric relationship between the various factors were defined. Several engine alternatives for a medium weight helicopter were compared. The following conclusions were made: (1) a sufficient power reserve is necessary but too high a value is not profitable; (2) the fuel consumption should be the result of a compromise: interest of a low value, engine complexity, reliability; and (3) a substantial increase in helicopter cost effectiveness is obtained thanks to a simultaneous evolution of aircraft and engine. M.D.K.

N82-18132# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

PREDICTION OF OFF-DESIGN PERFORMANCE OF TURBO-SHAFT ENGINES A SIMPLIFIED METHOD c07

H. Wittenberg *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Estimation of the off-design performance of a given gas turbine is generally based on detailed performance characteristics

of compressor and turbine(s). An approximate method for the estimation of the off-design behavior of turbojet and turbofan engines was developed using thermodynamic relationships only. The method is based on a matching procedure with generalized mass flow characteristics of the turbine(s) or exhaust nozzle(s). The method was adopted to turbo-shaft engines for this study. Examples are given for an actual engine type. There is fair agreement between the calculated off-design performance and the data derived from the manufacturer's engine brochure.
M.D.K.

N82-18133# Rolls-Royce Ltd., Watford (England).
MEASUREMENT TECHNIQUES USED TO ASSESS THE INSTALLED POWER OF A HELICOPTER ENGINE c07
T. G. Morton *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p Original contains color illustrations (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

To improve helicopter performance predictions, it is important to quantify any change in engine performance between the test bed and 'as installed' in the aircraft, and to attribute the reasons for any change as accurately as possible. Measurement techniques used to quantify performance for a particular Rolls-Royce Gem Engine installation is discussed. Extra sensors were added to engines in a production Lynx helicopter which was fitted with recorder equipment in the cabin and flown to a defined schedule. If the engine is considered as a thermodynamic unit, the input/output equation must balance. Test point data based on these inlet and exhaust conditions were obtained from both test bed and flight tests. Analysis of results when compared to a thermodynamic model of the engine, shows that the resultant data is very sensitive to the quality of measurements and will quickly show the deviation from predicted characteristics. Author

N82-18134# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
COMPONENT DESIGN AND DEVELOPMENT FOR FUTURE HELICOPTER ENGINES c07
Jean Hourmouziadis and Horst B. Kreiner *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Advances achieved today and results available from both rig and demonstrator test programs for present and future helicopter engines are discussed. These will form the basis for further component improvement required to yield a successful next generation engine. The significance of reduced fuel consumption, improved overall system performance, and reliability are considered in relation to design activity and reaction to changing customer needs.
M.D.K.

N82-18135# General Electric Co., Cincinnati, Ohio. Systems and Controls.
THREE-ENGINE CONTROL SYSTEM FOR THE PROTOTYPE EH-101 HELICOPTER c07
E. A. Chiuchiolo and J. J. Curran *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft 1981 10 p refs (For primary document see N82-18119 09-01)
(AEBG-9/81-1568L) Avail: NTIS HC A99/MF A01

The T700 control system configured for installation in the three-engined WG.34A helicopter (prototype for European Helicopter Industries EH-101) provides for a versatile control system which may be operated normally to provide the helicopter propulsion or may be operated as a totally independent system to power airframe avionics and power accessories. It is designed to maintain constant speed for accessories or load share with second and third engines and is independent of position in the aircraft. The total system is automatic and provides not only constant rotor speed but also closely matched torques. Modifications made to the T700 control system to provide the above capabilities are discussed. Discussion of the need for these modifications and the present status of the design is also designed.
Author

N82-18136# I.A.M. Rinaldo Piaggio, Finale Ligure (Italy).
ENGINE SUPERFICIAL TEMPERATURE AND INFRARED SIGNATURE c07
A. M. Ricci, A. N. Allavena, and W. Esposti (I.C.I.T.E., S. Giuliano Milanese, Italy) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

A system calibration and data processing method was set up to provide spatial information on temperature and a spatially accurate radiant intensity map under different angles. The methodology was developed to evaluate the thermal exchange between engine and engine-cowling and their infrared signature in the 1 - 6 micrometer range in order to evaluate special infrared treatment to reduce infrared emission. The infrared imagery camera was coupled to an analogic/digital data acquisition system. Calibration studies were conducted in an infrared laboratory to provide the absolute calibration on the thermograph in the previously defined spectral range. The results are presented in profiles of temperature and radiance.
Author

N82-18137# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
POINT OF VIEW OF A HELICOPTER MANUFACTURER ON AIRWORTHINESS REGULATIONS
Jean Boulet *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 5 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Helicopter airworthiness regulations are discussed. The need for airworthiness regulations to be drafted and modified through a process of constant consultation between Civil Aviation Authorities and manufacturers is discussed. The need to introduce the concept of probability to be able to come closer to the actual risks and to avoid penalizing aircraft with useless systems and demonstration requirements is also considered. It is suggested that these regulations tend toward one single international set of regulations and one single demonstration of compliance with the regulations. The possibility of reconciling a continuously improved safety level and a progressive reduction in helicopter costs is also considered.
M.D.K.

N82-18138# Italian Army General Staff, Rome.
MILITARY REQUIREMENTS: TOO LITTLE OR TOO MUCH
Emidio Valente *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 18 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Concepts useful for a better understanding of the military requirements, operational requirements for helicopters are discussed. The need for an understanding between military operators of rotary-wing aircraft, helicopter designers, and manufacturers is considered. Two viewpoints are summarized: (1) The helicopter is a weapon system featuring the same indispensability level of all other systems required to integrate the battlefield. (2) The helicopter must be designed to reflect military requirements which cover all those elements likely to condition its operation, this is to say: operational environment, human factor, and economical aspects. The following considerations are recommended for further investigation: (1) whether commercial operators are really affected and (2) whether solutions can be found which in the end prove to be a saving rather than a deterioration in cost, weight and complexity.
M.D.K.

N82-18139# Italian Air Force Pratica di Mare, Rome. Flight Test Centre.
PARAMETRIC CRITERIA AND IMPACT ON DESIGN TRENDS c05
Roberto dePompeis and Fulvio Gagliardi (Ministry of Defence) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 25 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Laws or trends of typical parameters which contribute to the definition of an 'ideal' specific helicopter which can be used as a reference model and give a nondimensional measure of effectiveness are discussed. Operative requirements, taking into account the main factors affecting missions were transferred into a mathematical model. The procedure was derived from theoretical studies already applied to aircraft selections and consists of three main steps: (1) Effectiveness program; (2) Total operating cost estimation; and (3) Evaluation of effectiveness-cost ratio and optimization of the fleet selection. All costs (manufacturing, maintenance, training, operating, etc.) for the operative life are estimated with a similar methodology and lead to the determination of the effectiveness-cost ratio which may be optimized taking into account the fleet consistency required to fulfill the task.

M.D.K.

N82-18140# Hughes Helicopters, Culver City, Calif.
DESIGN PHILOSOPHY OF THE HUGHES MODEL 600 HELICOPTER
c05
R. S. Taylor *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The design philosophy of a new model helicopter, the Hughes model 600X, which took into consideration a number of factors is discussed. The following subjects are discussed and a rationale for the selected approach is given: (1) whether to grow or develop a totally new configuration. To be cost effective, a growth helicopter would need to produce significant additional advantages which would be offset by the ever present compromises of the old design; (2) how to grow an 'egg', especially one with internal structure; (3) how to replace the old model or is the new model to be produced in addition to the old one; and (4) how is the market potential to be assessed. Details of approaches are presented with reasons for accepting or rejecting each one. Results of market analysis and response of the helicopter public is presented to show the viability of the selected configuration.

M.D.K.

N82-18141# United Technologies Corp., East Hartford, Conn. Aircraft Div.
SH-60B TEST PROGRAM
c05
Frederick J. Silverio *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The SEAHAWK Program, a successful helicopter development program, is discussed in detail. The following program tests are described: modifications for shipboard compatibility and mission requirements; preflight ground tests; flight and shakedown testing; evaluation of the pitot-static system and digital computer system; reliability tests and component systems analysis. Failure modes not detected in flight tests or qualifications bench tests, but discovered in testing under service use, are discussed. M.D.K.

N82-18142# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
NAVAL VERSIONS OF THE DAUPHIN AND THE AS 15 TT WEAPON SYSTEM
c05
J. P. Dubreuil *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 10 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Aerospatiale's Dauphin II helicopter family, initially intended to satisfy civil market demand, is presently subject to development that makes it possible to derive military versions from it. The equipment specific to naval versions whose basic system is the AS 15 TT is discussed in detail. All the arrangements and modifications that were necessary to adapt the N aircraft to naval, rescue and attack missions and which led to the SA 365 F version are discussed. The AS 15 TT and surface vessel system are described in detail. The modifications which affected almost all the constitutive elements and aimed at improving not only performance but also maintenance led to a reduction in fabrication and operation costs.

M.D.K.

N82-18143# Westland Helicopters Ltd., Yeovil (England).
ARMY LYNX: PRODUCT DEVELOPMENT MATCHED TO MILITARY COMBAT DEVELOPMENT
c05
D. A. S. Howell *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The Lynx helicopter program to date and planned product development related to the evolution of military combat thinking especially the anti-armour role are presented. The background for this product development is the impact of technology in the areas of materials, sensors, armaments and systems, both in the context of the helicopter as a total weapon system and the development of air defense systems that pose a threat to the helicopter in the battlefield scenario.

Author

N82-18144# Societe Nationale Industrielle Aerospatiale, La Courneuve (France).
A LIGHT HELICOPTER FOR NIGHT FIRING
c05
J. F. Candau *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 18 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Structural design criteria and armament system requirements for a flight combat helicopter for night firing are discussed. Helicopter characteristics and performance requirements for night time antitank missions are considered. The following areas of consideration are discussed: piloting, navigation, target seeking, and firing. Operational use, crew organization, and program development are also reviewed.

M.D.K.

N82-18145# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
TETHERED ROTORPLATFORMS AND THEIR MISSION POTENTIAL
c05
W. Goeller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 13 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

A definition of tethered rotorplatforms is given and the main objectives that are pursued with these vehicles are presented. A short retrospect on rotorplatform history is given. The Dornier 'Kiebitz' is described. It is designed to lift payloads for battlefield surveillance, air defense, EW or communication to some hundred meters above ground for long mission times. A very small tethered rotorplatform for elevating electro optical sensors of 5 to 10 kg is described. The energy for its flight time of about 70 seconds is stored in a massive momentum ring surounding its rotor. Finally, a proposed rotorplatform with an electric drive system for payloads of about 30 kg for target acquisition and target designation, is also discussed.

M.D.K.

N82-18146# Southampton Univ. (England).
WIND TUNNEL INVESTIGATION OF HIGH SPEED ROTOR NOISE
c71
H. Tadghighi and I. C. Cheeseman *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 25 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

A high speed model rotor (tip Mach number of 0.75) was developed to investigate tail rotor noise in forward flight conditions. The existing 2.1 by 1.5 m low speed (30 m/sec) closed circuit wind tunnel was modified and utilized to enable acoustic measurements of forward flight to be made. Check tests in the 24 ft anechoic wind tunnel show excellent agreement with the development tests. The model rotor noise data are found to correlate well with full scale helicopter rotor values. Simultaneously recorded aerodynamic performance of the model rotor (blade loading, steady thrust, torque and trimmed moments) is compared with theoretical aeroacoustic treatments. It is concluded that the model rotor accurately simulates full scale rotor aeroacoustic data.

J.M.S.

N82-18147*# Army Research and Technology Labs., Moffett Field, Calif. Aeromechanics Lab.
PREDICTION OF BLADE VORTEX INTERACTION NOISE FROM MEASURED BLADE PRESSURE
c02
Yoshiya Nakamura *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 20 p refs Sponsored by NASA (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01 CSCL 01A

The impulsive nature of noise due to the interaction of a rotor blade with a tip vortex is studied. The time signature of this noise is calculated theoretically based on the measured blade surface pressure fluctuation of an operational load survey rotor in slow descending flight and is compared with the simultaneous microphone measurement. Particularly, the physical understanding of the characteristic features of a waveform is extensively studied in order to understand the generating mechanism and to identify the important parameters. The interaction trajectory of a tip vortex on an acoustic planform is shown to be a very important parameter for the impulsive shape of the noise. The unsteady nature of the pressure distribution at the very leading edge is also important to the pulse shape. The theoretical model using noncompact linear acoustics predicts the general shape of interaction impulse pretty well except for peak amplitude which requires more continuous pressure information along the span at the leading edge. Author

N82-18148# Westland Helicopters Ltd., Yeovil (England).

PRELIMINARY THOUGHTS ON HELICOPTER CABIN NOISE PREDICTION METHODS c71

J. S. Pollard *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 14 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The problems of predicting helicopter cabin noise are discussed with particular reference to the Lynx helicopter. Available methods such as model analysis adopted for propeller noise prediction do not cope with the higher frequency discrete tone content of helicopter gear noise, with the airborne and structure-borne noise contributions. Statistical energy analysis methods may be the answer but until these are developed, one has to rely on classical noise transmission analysis and transfer function methods. Author

N82-18149# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.

THE MEASUREMENT OF THE MOBILITY OF STRUCTURES AT ACOUSTIC FREQUENCIES c39

Susan M. Damms *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 21 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The development of a technique to measure the response of structures to vibrational input forces and moments is described. So far, simple structures with known properties have been used but it is intended to apply the technique in the design of an interface which isolates vibrationally the gearbox of a helicopter from the cabin at acoustic frequencies. In a first experiment, no moments were applied. The main object was to demonstrate that measurements could be made on two components of a structure with sufficient accuracy to correctly predict measurements on the assembled structure. The two components were a beam and a dynamic absorber. In a second experiment a special block was attached to a beam to enable forces and moments to be applied and translations and rotations to be measured. The particular mobilities measured were chosen so that they could be easily compared with theory and also with measurements without a block. J.M.S.

N82-18150# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

FLIGHT CHARACTERISTICS DESIGN AND DEVELOPMENT OF THE MBB/KHI BK117 HELICOPTER c05

H. Huber and T. Masue (Kawasaki Heavy Industries) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 21 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The BK 117 light, twin-engine helicopter was designed to provide high flexibility of operations, attractive performance characteristics, and outstanding handling qualities. Dominant features result from the hingeless rotor system, which provides inherent high control power and high angular velocity damping. Further optimization is achieved through refinement of the fuselage aerodynamic design, and by a proper layout of the empennage configuration, taking into account the interactional aerodynamic phenomena. The particular design features and their impact on the helicopter flight characteristics are described. The results obtained in the areas of static and dynamic stability (longitudinal, lateral directional), control response and maneuver characteristics, aeromechanical stability and loads and vibrations are presented, including correlation of flight test data with computer model simulations. J.M.S.

N82-18151# Politecnico di Milano (Italy). Dipartimento di Ingegneria Aerospaziale.

A GENERAL PURPOSE PROGRAM FOR ROTOR BLADE DYNAMICS c05

M. Borri, M. Lanz, and P. Mantegazza *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 15 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

A computer program for rotor blade dynamics capable of dealing both with hinged and hingless rotors, suitable for steady state flight analysis and stability evaluation was developed. Blade motion is represented by finite elements in the space-time domain, covering the span of one or more rotor revolutions, and allowing for different nonlinearities. This method gives a flexible unitary approach for the very different model complexities required by the different design phases, such as the simplest rigid blade schemes, and the more sophisticated ones including nonlinearities arising from large blade flexibilties and large movements in control links. The aerodynamics, at the present development state, considers prescribed wake geometry and blade element theory, including stall and compressibility effects. J.M.S.

N82-18152# Hindustan Aeronautics Ltd., Bangalore (India). Helicopter Design Bureau.

AUTOMATIC GENERATION OF EQUATIONS FOR ROTOR-BODY SYSTEMS WITH DYNAMIC INFLOW FOR A PRIORI ORDERING SCHEMES c02

J. Nagabhushanam, G. H. Gaonkar (Indian Inst. of Science), and T. S. R. Reddy (Indian Inst. of Science) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 37 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

In helicopter dynamics research with interpretive models, the process of manually deriving state equations for a priori ordering schemes is tedious and of limited reliability. The feasibility of its computerization by a completely self contained symbolic processor in FORTRAN 4 is discussed. The symbolic manipulation details are presented for a coupled rotor-fuselage system with dynamic inflow in forward flight. The coupled system refers to a rotor with rigid blades executing lag and flap motions and to a fuselage idealized as a simple rigid body executing roll and pitch motions. The feedback from dynamic inflow refers to a first-order model based on an unsteady actuator-disk theory. The use of such a processor offers considerable promise in that for an adequate model representation, state equations can be generated for a priori ordering schemes as required in stability, vibration and combined stability and vibration analyses. Author

N82-18153# National Aerospace Lab., Amsterdam (Netherlands).

A CONTROL MODEL FOR MANEUVERING FLIGHT FOR APPLICATION TO A COMPUTER-FLIGHT TESTING PROGRAM c08

H. Haveridings *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

A computer-flight-testing (CFT) program for helicopters to evaluate helicopter dynamics and handling and control qualities is described. The nonlinear six degrees of freedom helicopter model is driven by control inputs generated by a specially developed control model (or 'pseudo pilot') to eliminate problems in estimating control inputs during maneuvering flight. This is an adaptation of a linear optimal control model as used in human factor analysis. The helicopter model is based on two-dimensional strip aerodynamics steady-state rotor blade dynamics using only out-of-plane bending mode shapes, which are suitable for various types of rotor articulation. The 'pilot' model consists of a flight path generation (FPG)-model and a stabilitization (STAB)-model. The FPG-model is based on linearized system dynamics using terminal optimal control, generating both required flight path and the control inputs to achieve it. These controls are input into the helicopter model. The two flight paths are compared, and differences are fed back to the STAB-model to generate corrective control inputs of such a nature that the helicopter-model-generated flight path tracks the required flight path generated by the FPG-model. Also the STAB-model is based on linearized system dynamics. As an example, two flare maneuvers are 'flown', and the results discussed. The pseudo-pilot model performs well, provided that helicopter dynamics do not change much during a specific maneuver. J.M.S.

N82-18154# Westland Helicopters Ltd., Yeovil (England).

THE ROLE OF SIMULATION IN THE DESIGN PROCESS

c05

I. F. Montgomerie and G. C. F. Wyatt *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Real-time simulation of helicopters and their avionic systems is discussed. The nature of the problems facing the helicopter and systems designers are reviewed, and the potential benefits accuring from the timely and effective use of simulation are examined. The development of simulation as a design tool over the last two decades are reviewed, and the characteristics of the simulation facilities are described.

J.M.S.

N82-18155# Royal Aircraft Establishment, Farnborough (England).

PRELIMINARY INVESTIGATION INTO THE ADDITION OF AUXILIARY LONGITUDINAL THRUST ON HELICOPTER AGILITY

c05

P. J. Legge, P. W. Forestcue (Southampton Univ.), and P. Taylor (Southampton Univ.) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The agility requirements in specific maneuvers performed by military helicopters are investigated. A simple mathematical simulation of the helicopter accelerating and decelerating longitudinally is used to examine the advantages of auxiliary thrust. For helicopters operating in the Nap-of-Earth environment the longitudinal acceleration and deceleration performance is shown to be uniquely important. Large improvements in agility, measured by a performance function, are obtained by adding auxiliary thrust. The need for the helicopter to change its attitude is drastically reduced, and the pilot workload improved. The type of flight profile used is also examined, using a nondimensional Froude number. There was no benefit in a 'maximum effort' flight profile, which consequently further improves the pilot workload. Auxiliary thrust improved agility performance by increasing the helicopter's ability to change position while maintaining precise attitude control.

J.M.S.

N82-18156# National Defence Academy, Yokosuka (Japan). Dept. of Aeronautical Engineering.

OPTIMUM PERFORMANCE AND WAKE GEOMETRY OF CO-AXIAL ROTOR IN HOVER

c05

Tomoari Nagashima and Kenji Nakanishi *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Numerical studies to clear out the rotor-wake interference effects on the optimum performance and wake geometry of a coaxial rotor in hover are performed using the generalized momentum theory and the simplified free wake analysis. For applying the momentum concept to the performance predictions of the coaxial rotor system, each wake of rotors and flow fields around them are modeled so as to properly incorporate wake contractions, rotational velocities, and nonlinear mutual interference effects. In case of the free wake analysis, it is approximated by a finite number of discrete circular vortices whose numbers and core radii are deduced from the sensitivity analysis. The numerical results clearly show that the performances and its wake geometries are largely dependent on the axial spacings and the pitch differences between rotors and there are unique combinations of them which could produce the optimum performance. It is also understood that the upwash effect of the contracted upper rotor wake on the lower rotor plays a fundamental role to improve the hover performance with coaxial rotor arrangement.

Author

N82-18157# Tokyo Univ. (Japan). Inst. of Interdisciplinary Research.

A NUMERICAL APPROACH TO CO-AXIAL ROTOR AERODYNAMICS

c02

Shigeru Saito and Akira Azuma *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

In the simple momentum theory, the aerodynamic characteristics of the lower rotor of a coaxial rotor system are usually evaluated under the highly deteriorated conditions caused by the fully developed wake of the upper rotor, specifically under the conditions of hovering flight. Analysis using the Local Momentum Theory not only shows the performance of the lower rotor to be higher than that calculated by the simple momentum theory but also makes it possible to calculate the instantaneous airloading of blades operating in a complex wake system. By introducing the radial shrinkage of the rotor wake, the accuracy of the analysis of blade airloading is further improved. The calculated results are compared with those of wind tunnel tests in both hovering and forward flights. In forward flight, the performance of the lower rotor improves not only with increases in the forward speed but also with increase in the vertical distance between the upper and lower rotors. In hovering flight, the improvement in the performance is not remarkable because the lower rotor is strongly influenced by the upper rotor wake.

Author

N82-18158# Institut fuer Flugmechanik, Brunswick (West Germany).

HELICOPTER ROTOR DOWNWASH: RESULTS OF EXPERIMENTAL RESEARCH AT THE DFVLR-ROTOR TEST STAND AND THEIR COMPARISON WITH THEORETICAL RESULTS

c02

B. Junker and H.-J. Langer *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 23 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

System tests and dynamic researches at the rotor test stand were compared with several downwash measurements to demonstrate the dependency between mathematical parameter values and rotor control values, e.g., thrust, advance ratio, and control angles. For comparisons mathematical models like the local momentum theory, and a fixed vortex model were applied. For these experiments a four bladed hingeless rotor and a two bladed See Saw rotor with an advance ratio of up to mu = 0.2 were used. Numerous tests were performed to study the flow field of rotor downwash in different wind tunnels. The measuring equipment for the downwash was set up on both sides of the rotor stand. So it was possible to receive two values at the same time. At first pneumatic probes were applied, that gave acceptable mean values, and then hot-wire probes in X-configuration were used to investigate downwash dynamics in more detail. Measurements were conducted in the x-z-plane. Wind tunnel test results, correlation to the mathematical models, and errors are discussed.

J.M.S.

N82-18159*# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.

HOVER TESTS OF A MODEL H-FORCE ROTOR

c05

H. R. Velkoff *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
(Contract NCA2-OR565-001)
Avail: NTIS HC A99/MF A01

The potential of using tip vanes at the ends of helicopter rotor blades to obtain a controllable H-force is considered. The addition of vanes placed perpendicular to the blade tips can be used to obtain an inplane force. By varying the angle of the vanes, a radial force can be created which can be controllable in azimuth position. Such a force could be used to provide translational motion of the rotor and aircraft without the requirement for rotor tilting. In addition, an H-force generated at high flight speed could be used as a propulsive force in a matter similar to a propeller. The force generated by the vanes could also affect the aircraft's stability characteristics. The H-force could also modify rotor performance in hovering since they could be thought to act as a virtual shroud. Tests were run with a model rotor which has a 6 foot diameter with a 3 inch chord blade. Test data are presented on the effects of various tip-vane configurations on the hovering figure of merit. The extreme sensitivity of the performance to vane arrangement is shown.

Author

N82-18160# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

THE PROBLEM OF CALCULATION OF THE FLOW AROUND HELICOPTER ROTOR BLADE TIPS c02
H. Stahl *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 18 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

There are special problems with the theoretical analysis of the flow around helicopter rotor blade tips that are based on the fact that the flow is three dimensional, unsteady, rotational, and on the advancing blade in fast forward flight also transonic. Theories for this problem based upon potential flow theory are presented. Calculations show that this approach can lead to a sufficient discription of the actual flow. Computer programs for the three dimensional steady and the unsteady two dimensional flow past fixed wings were modified for rotating rotor blades. Results are shown. T.M.

N82-18161# Office National d'Etudes et de Recherches Aeronautiques, Paris (France).
APPLICATION OF THE ONER DYNAMIC STALL MODEL TO A HELICOPTER BLADE IN FORWARD FLIGHT c05
C. T. Tran and D. Falchero (SNIAS, Marignane, France) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 26 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The model was applied to the case of a helicopter rotor system in forward flight. Aspects of stability and periodic response are described and include: the form of the Floquet modes-subharmonic oscillation and almost periodic oscillation; the evolution of these modes as functions of the rotor advance ratio; the periodic response and aerodynamic force and moment; and a comparison with a quasi-steady aeroelastic calculation showing the effects of unsteady phenomena. T.M.

N82-18162# Royal Aircraft Establishment, Farnborough (England).
SOME UNSTEADY AERODYNAMIC EFFECTS ON HELICOPTER ROTORS c02
P. G. Wilby, M. J. Riley, and Judith Miller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 14 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Unsteady effects have an important influence on the aerodynamic loading experienced by a helicopter rotor in forward flight. These effects include dynamic stall characteristics with the associated stall delay and large nose-down change in pitching-moment. All unsteady effects must be taken into account when predicting rotor loads, performance and flight envelope. However, the full unsteady effects on the rotor result from simultaneous oscillatory variations of both incidence and Mach number, and it is difficult to study these effects in isolation from the rest of the rotor environment. Empirical methods for modelling these effects, especially dynamic stall characteristics, were developed and incorporated in the rotor loads prediction methods. Results from a program of work involving oscillatory aerofoil tests, flight experiments and unsteady aerodynamic prediction methods are presented. T.M.

N82-18163# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
SEPARATED FLOW AROUND HELICOPTER BODIES c02
G. Polz and J. Quentin *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

On the rear part of the helicopter fuselage, flow separation is often unavoidable owing to the shape of the afterbody which is often defined more in accordance with operational requirements (for example cargo door) and with only minor consideration to aerodynamic aspects. Because of the separated flow, an analytical calculation of the flow field using potential flow theory is not possible. After an overview about the separated flow phenomena a method is explained based on a combination of panel methods with boundary layer analysis. In this method the wake flow region is represented by a wake body which consists of a uniformly distributed vorticity. Calculated pressure distributions and flow fields are shown in comparison with wind tunnel test results. The main interest lies in the more downstream part of the wake, which is very important for the tail surface and tail rotor effectiveness. Author

N82-18164# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
A METHOD OF PREDICTING FUSELAGE LOADS IN HOVER c02
P. Taylor *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 13 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

A computer program called DOWNLOAD was developed in which the fuselage separated flow is modelled using a vortex sheet representation. The vortex sheet model can predict the separated flow pressure distribution provided the separation point is known. Unfortunately, the poor behavior of the vorticity vector in the separation region prevents an accurate prediction of the separation line. DOWNLOAD was applied to three simple fuselage shapes with a simple triangular representation of the rotor downwash. The predicted download values were in the lower region of the figures usually quoted as a percentage of thrust. T.M.

N82-18165# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
IMPACT OF SYSTEMS TECHNOLOGY AND INTEGRATION ON HELICOPTER DESIGN c05
K. Schymanietz *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 20 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

A helicopter design depends on a variety of parameters, criteria and requirements. A new design is generated either by a direct order of a customer or due to industrial investigations in the different fields like market trend studies, application of advanced or new technologies and/or overall efficiency improvements. A complete design includes not only the vehicle design with its main functional groups but also the integration of the systems/equipment concept. In the past a new helicopter design was conducted mainly due to the task for a new vehicle. The fact that - especially in the military field - the impact of systems gets an increasing influence in all design areas, gives an impression of the importance of systems technology and integration in the helicopter design. Future changes in design concepts are considered in terms of the chronological advance in the design of the different system components, new technologies for new systems, e.g., in the field of visionics, and system architecture based on a digital bus connection. T.M.

N82-18166# Army Aviation Research and Development Command, St. Louis, Mo.
REVIEW OF HELICOPTER MAST MOUNTED SIGHT (MMS) BASE MOTION ISOLATION AND LINE-OF-SIGHT (LOS) STABILIZATION CONCEPTS c06
Daniel P. Schrage *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Incorporation of a MMS or any precision stabilized pointing system on a helicoper is a complex and interesting dynamic design problem which combines automatic control through a servomechanism with vibration reduction techniques. Generally, the helicopter disturbance inputs to the MMS must be accomodated by a stiffer MMS structure and servo-system. However, weight and cost are usually critical and many benefits could be derived from incorporation of a lightweight vibration isolator. There are important design considerations on both sides of the interface, the airframe and the MMS. A review of these design considerations and several vibration isolation concepts is presented. The need for adequate simulation modeling of this complex dynamic environment is discussed. T.M.

N82-18167# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
MAST MOUNTED VISUAL AIDS c06
R. D. vonReth *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 24 p refs (For primary

document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

Initial flight tests with a spherical mock up, having the same shape, weight and moments of inertia as the actual system were carried out on a Bo 105 with two different rotormast extensions (90 and 120 cm). A vibration survey over most of the Bo 105's flight envelope showed vibrational loads which can be tolerated by the actual system. As a next step the actual stabilized platform with FLIR, TV-camera and laser range finder was installed on the rotormast. In addition several subsystems used for the display of the video images with superimposed symbology are described. For direct comparison purposes three different systems, head up, head down and helmet mounted sight and display were evaluated. The influence of the rotorplane, vibrational loads and meteorological conditions on the performance of the FLIR image is described.
T.M.

N82-18168# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.
EXPERIMENTAL INVESTIGATION OF VISUAL AIDS FOR HELICOPTERS: LOW LEVEL FLIGHT AT NIGHT AND POOR VISIBILITY
c06
R. Beyer, E. Danneberg, E. Kohnen, and H. Stein *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 15 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The potential and the limitations of advanced display systems for visual aids in helicopters were investigated. A combination of the sensor image and computer generated instrument displays in a head-down display, helmet mounted sight/display and night goggles, were evaluated. The layout of the instrument display is considered assuming transport mission and various display modes are implemented. The visual aids were flight tested in Bo 105 and Bell UH-1D helicopters with particular emphasis on the usefulness of the display modes on flight performance and low level flight performance.
T.M.

N82-18169# Litton Systems (Canada) Ltd., Toronto (Ontario). Advance Programs.
THE MULTI MODE MATRIX FLAT PANEL DISPLAY: TECHNOLOGY AND APPLICATIONS
c06
A. Moffat and P. Wright *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

An important aspect of current developments in advanced cockpit design is the introduction of a small number of interactive multi-function electronic displays with digital data processing, in conjunction with a MIL-STD-1553 type of multiplex data bus in an integrated system as opposed to the conventional approach of large numbers of stand-alone electro-mechanical instruments and a variety of different and independent dedicated inputs. Advances in high speed vector graphic display systems based on modular LED flat panel technology and micro-programmable multiprocessor data handling with MIL-STD-1553B compatible interfaces are described. Applications and systems performance are discussed in terms of typical military airborne mission-oriented display image formats and associated hardware and software characteristics. The real-time vector graphic presentations as described include flight control, navigation, communications, engine and fuel management, weapons management, symbolic map, signal communication and other types of real-time cockpit advisory information.
T.M.

N82-18170# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany).
A REDUNDANCY CONCEPT FOR A DIGITAL CSAS **c05**
P. Wuest and M. Keller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 12 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

One of the promises of digital technology is the possibility of implementing more intelligent monitoring techniques, for example, self monitoring methods. Typical redundancy and monitoring concepts, which were realized in aircraft, helicopter and engine control systems were reviewed. A system which was orginally not designed for a helicopter application but which shows all characteristics of a CSAS is described. The system is based on two essentially autonomous computing lanes, each able to provide all the necessary control and monitoring functions.
T.M.

N82-18171# Newmark (Louis) Ltd., Croydon (England).
THE INFLUENCE OF SENSOR AND ACTUATOR CHARACTERISTICS ON OVERALL HELICOPTER AFCS DESIGN
c05
S. G. Spreadborough *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The overall performance of a flight control system is dependent on the characteristics of: sensors-type and performance; control low computing and logic; actuation-performance, configuration redundancy and authority. The specifications in each of these areas are considered in producing an integrated AFCS design which is compatible with the basic aircraft characteristics. The choice of sensors and the configuration and performance of the actuation, important decisions involving a high level of interdependence with the control law and system logic design, are discussed.
T.M.

N82-18172# Institut fuer Flugmechanik, Brunswick (West Germany).
EVALUATION OF THE HELICOPTER LOW AIRSPEED SYSTEM LASSIE
c06
J. Kaletka *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 23 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

To evaluate the airspeed sensing capability and the dynamic response characteristics of the system, both flight tests and wind tunnel tests were conducted. The system uses a swivelling pitot static probe designed to operate within rotor downwash in the low airspeed regime and out of downwash for higher speeds. Due to nonlinearities in the sensor transition phase an accurate system characterization is necessary to obtain reliable airspeed data. Flight tests that were conducted to characterize the system for a Bo 105 helicopter are described. The evaluation method and results, showing uncalibrated and calibrated data are discussed in detail. To investigate the dynamic behaviour of the system, dynamic tests in a wind tunnel equipped with a gust generating system were conducted. LASSIE transfer functions were measured for four different wind tunnel speeds. Representative results are shown and discussed.
T.M.

N82-18173# Elektronik-System G.m.b.H., Munich (West Germany).
INTEGRATION OF INERTIAL SENSORS IN HELICOPTERS
c06
Volkmar Held *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

The demand for saving weight, volume and especially cost requires new design concepts for avionic systems. In future, highly integrated systems will replace the conventional systems with specific stand-alone equipment for each system function. A concept for the integration of inertial function flight control, sight-stabilization, navigation of a helicopter is presented. A configuration with a minimum number of dislocated inertial sensors is proposed. The system functions are accomplished on system level by integration and multiple use of the sensor signals. It is shown that the navigation functions, attitude and heading can be derived from the flight control and stabilization hardware so that the usually required seperate attitude and heading reference system for the navigation is saved. Moreover, the proposed concept provides as an additional function the autonomous initial alignment to north.
T.M.

N82-18174# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
[AVIATION AND SPACE FLIGHT RESEARCH ACTIVITIES] Annual Report, 1980 [JAHRESBEREICHT 1980]
Sep. 1981 176 p refs In GERMAN
Avail: NTIS HC A09/MF A01

Results on the main research projects conducted in 1980 are described in the areas of transport and communication systems, airplanes, space flight techniques, exploration techniques, and energy and turbomachinery techniques. The improvement of reliability and security in transportation is a common feature of all projects. Aviation research is focussed on projects such as AIRBUS, fighter aircraft, and helicopters. Spacelab and the development of suitable payloads are the central issues of the space research effort with emphasis on material and processing techniques as well as biophysics and biomedicine. Data acquisition, using sensors and processing of satellite and Spacelab data is actively pursued. Recent developments in the domain of turbomachinery, nonnuclear energy research, energy conservation, and high energy laser techniques are also discussed.
Author (ESA)

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-18175 Ohio State Univ., Columbus.
RIME ICE ACCRETION AND ITS EFFECT ON AIRFOIL PERFORMANCE Ph.D. Thesis
Michael Bradford Bragg 1981 194 p
Avail: Univ. Microfilms Order No. 8128967

A methodology was developed to predict the growth of rime ice, and the resulting aerodynamic penalty on unprotected subcritical, airfoil surfaces. The system of equations governing the trajectory of a water droplet in the airfoil flowfield was developed and a numerical solution was obtained to predict the mass flux of super cooled water droplets impinging on the airfoil leading edge. By assuming that the droplets freeze on impact, a rime ice shape is predicted. The effect of time on the ice growth is modeled by a time stepping procedure where the flowfield and droplet mass flux are updated periodically through the ice accretion process. A similarity analysis was performed for the rime icing problem. Two new similarity parameters, are found to govern the accretion of rime ice. In addition an analytical solution is presented for Langmuir's classical modified inertia parameter. Dissert. Abstr.

N82-18176 California Univ., Berkeley.
INVESTIGATION OF SUPERSONIC SEPARATED FLOW IN A COMPARISON CORNER BY LASER DOPPLER ANEMOMETRY Ph.D. Thesis
Edmund Craig Baroth 1981 131 p
Avail: Univ. Microfilms Order No. 8200017

A single-component, computer-operated, three dimensional traversing laser doppler velocimetry (L.D.V.) system was designed and constructed for use in a supersonic wind tunnel. The model used was a 10 deg compression corner (Aspect Ratio = 1.34) which spanned the test section and was sealed at the side windows. The model provided an example of two dimensional laminar boundary layer separation. Mean streamwise velocity and turbulence intensity profiles were obtained for the region extending from upstream of separation to downstream of reattachment. The trend of decreasing upstream influence with increasing Reynolds number was confirmed. The two dimensional nature of the flow was confirmed by spanwise pressure taps. The laser system gave excellent results within the recirculation zone. The flow was found to be of the laminar type until downstream of reattachment. Individual mean velocity and turbulence intensity profiles, as well as velocity histograms are presented.
Dissert. Abstr.

N82-18177 Royal Aircraft Establishment, Farnborough (England).
MEASUREMENTS IN THE NEAR-WAKE OF A TRANSPORT MODEL, TO DETERMINE THE LIFT, DRAG AND DRAG COMPONENTS USING MASKELL'S ANALYSIS
A. J. Priest, D. G. Dobney, and R. P. Hill 3 Feb. 1981 91 p refs
(RAE-TR-81012; RAE-Aero-3497; BR79571) Copyright. Avail: Issuing Activity

A plane normal to the wake of a sweptwing/fuselage model of AIRBUS type, at C sub L = 0.49 in incompressible flow was measured, using a computer controlled wake traverse system incorporating a null reading five hole yawmeter probe. The results define the detailed distributions of total pressure defect, flow velocity, flow angles and streamwise vorticity in the viscous wake at that plane. The results allow the calculation of lift and drag from traverse data and the resolution of the drag into provisionally defined components CD1 and CD2, relating to the profile drag and vortex drag. Author (ESA)

N82-18178*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPARISON OF TWO PARALLEL/SERIES FLOW TURBOFAN PROPULSION CONCEPTS FOR SUPERSONIC V/STOL
R. W. Luidens, G. E. Turney, and J. Allen 1981 15 p refs
Presented at the V/STOL Conf., Palo Alto, Conf., 7-9 Dec. 1981
(NASA-TM-82743; AIAA-81-2637; E-1056) Avail: NTIS HC A02/MF A01 CSCL 01A

The thrust, specific fuel consumption, and relative merits of the tandem fan and the dual reverse flow front fan propulsion systems for a supersonic V/STOL aircraft are discussed. Consideration is given to: fan pressure ratio, fan air burning, and variable core supercharging. The special propulsion system components required are described, namely: the deflecting front inlet/nozzle, the aft subsonic inlet, the reverse pitch fan, the variable core supercharger and the low pressure forward burner. The potential benefits for these unconventional systems are indicated. Author

N82-18179*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN ANALYTICAL INVESTIGATION OF THE FREE-TIP ROTOR FOR HELICOPTERS
Robert H. Stroub Feb. 1982 30 p refs
(NASA-TM-81345; A-8806) Avail: NTIS HC A03/MF A01 CSCL 01A

A rotor configuration called the free-tip rotor was analytically investigated for its potential to improve helicopter forward-flight performance characteristics. This rotor differs from a conventional rotor only in the blade tip region. In this configuration, the tip is self-adjusting in pitch with respect to the rest of the blade, in accordance with a moment balance about its pitch axis. With this self-adjusting capability, the resulting pitch motion generates a more uniform airload distribution around the azimuth. Computer math models were used to compare performance characteristics of the free tip rotor with those of a conventional rotor operation at flight speeds from 130 to 160 knots. The results of this analysis indicate that the free-tip rotor improves cruise lift-drag ratio by at least 22%. Author

N82-18180*# United Technologies Research Center, East Hartford, Conn.
AN EXPERIMENTAL INVESTIGATION OF GAPWISE PERIODICITY AND UNSTEADY AERODYNAMIC RESPONSE IN AN OSCILLATING CASCADE. VOLUME 2: DATA REPORT. PART 1: TEXT AND MODE 1 DATA Final Report
Franklin O. Carta Dec. 1981 411 p refs
(Contract NAS3-22018)
(NASA-CR-165457-Vol-2-Pt-1; R81-914618-28-Vol-2-Pt-1)
Avail: NTIS HC A16/MF A01 CSCL 01A

Tests were conducted a linear cascade of airfoils oscillating in pitch to measure the unsteady pressure response on selected blade along the leading edge plane of the cascade, over the chord of the center blade, and on the sidewall in the plane of the leading edge. The tests were conducted for all 96 combinations 2 mean camberline incidence angles 2 pitching amplitudes 3 reduced frequencies and 8 interblade phase angles. The pressure data were reduced to Fourier coefficient form for direct comparison, and were also processed to yield integrated loads and particularly, the aerodynamic damping coefficient. Data obtained during the test program, reproduced from the printout of the data reduction program are complied. A further description of the contents of this report is found in the text that follows. Author

N82-18181*# United Technologies Research Center, East Hartford, Conn.

AN EXPERIMENTAL INVESTIGATION OF GAPWISE PERIODICITY AND UNSTEADY AERODYNAMIC RESPONSE IN AN OSCILLATING CASCADE. VOLUME 2: DATA REPORT. PART 2: MODE 2 DATA Final Report

Franklin O. Carta Dec. 1981 390 p refs
(Contract NAS2-22018)
(NASA-CR-165457-Vol-2-Pt-2) Avail: NTIS
HC A17/MF A01 CSCL 01A

Computer data are provided for tests conducted on a linear cascade of airfoils oscillating in pitch to measure the unsteady pressure response on selected blades along the leading edge plane of the cascade, over the chord of the center blade, and on the sidewall in the plane of the leading edge. N.W.

N82-18182# Technische Hogeschool, Delft (Netherlands).

A METHOD OF CHARACTERISTIC SURFACES. THE APPROXIMATE SOLUTION OF THREE-DIMENSIONAL SUPERSONIC FLOW FIELDS FROM THE NEAR FIELD UP TO THE SONIC BOOM REGION Ph.D. Thesis

Theodorus Petrus Marie Hendriks 12 Nov. 1981 163 p refs
Avail: NTIS HC A08/MF A01

A method of characteristic surfaces is presented, which may be used to describe the supersonic flow past a three dimensional body uniformly valid up to first order. The method is based on a geometric study of the characteristic surfaces, which envelop the most important disturbances in the originally undisturbed free stream. This leads to the conclusion that the linearized theory can be made valid throughout a supersonic flow field, provided that the predicted flow perturbations are shifted from acoustical characteristic surfaces towards corresponding first order surfaces. Author

N82-18183*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SPIN-TUNNEL INVESTIGATION OF A 1/13-SCALE MODEL OF THE NASA AD-1 OBLIQUE-WING RESEARCH AIRCRAFT

William L. White and James S. Bowman, Jr. Feb. 1982 28 p ref
(NASA-TM-83236; L-14834) Avail: NTIS HC A03/MF A01 CSCL 01A

The spin and recovery characteristics of a 1/13-scale model of the NASA AD-1 oblique-wing research aircraft at wing-skew positions of 0, 25, 45, and 60 deg (right wing forward) were investigated. Spins were obtained for all wing-skew positions tested. For the unskewed wing position, two spin modes were possible. One spin mode was very steep and recoveries were obtained within 1 turn or less by rudder reversal. The second spin mode was flat and fast; the angle of attack was about 75 deg and the spin rate was about 145 deg/sec (2.5 seconds per turn). For the skewed wing positions, spins were obtained only in the direction of the forward-skewed wing (right wing forward). No spins were obtained to the left when the wing was skewed with the right wing forward. Recoveries should be attempted by deflecting the rudder to full against the spin, the ailerons to full with the spin, and movement of the wings to 0 deg skew. If the wing is skewed, the recovery may not be effected until the wing skew approaches 0 deg. B.W.

N82-18184*# Pennsylvania State Univ., University Park. Dept. of Aerospace Engineering.

NUMERICAL ANALYSIS AND FORTRAN PROGRAM FOR THE COMPUTATION OF THE TURBULENT WAKES OF TURBOMACHINERY ROTOR BLADES, ISOLATED AIRFOILS AND CASCADE OF AIRFOILS Final Report - Ph.D. Thesis Mar. 1980

C. Hah and B. Lakshminarayana Washington NASA Feb. 1982 171 p refs
(Grant NsG-3012)
(NASA-CR-3509; PSU-TURBO-81-4) Avail: NTIS
HC A08/MF A01 CSCL 01A

Turbulent wakes of turbomachinery rotor blades, isolated airfoils, and a cascade of airfoils were investigated both numerically and experimentally. Low subsonic and incompressible wake flows were examined. A finite difference procedure was employed in the numerical analysis utilizing the continuity, momentum, and turbulence closure equations in the rotating, curvilinear, and nonorthogonal coordinate system. A nonorthogonal curvilinear coordinate system was developed to improve the accuracy and efficiency of the numerical calculation. Three turbulence models were employed to obtain closure of the governing equations. The first model was comprised to transport equations for the turbulent kinetic energy and the rate of energy dissipation, and the second and third models were comprised of equations for the rate of turbulent kinetic energy dissipation and Reynolds stresses, respectively. The second model handles the convection and diffusion terms in the Reynolds stress transport equation collectively, while the third model handles them individually. The numerical results demonstrate that the second and third models provide accurate predictions, but the computer time and memory storage can be considerably saved with the second model. B.W.

N82-18185# Lockheed-Georgia Co., Marietta.

CAVITY OSCILLATION IN CRUISE MISSILE CARRIER AIRCRAFT Final Report, Aug. 1979 - Apr. 1981

Harold W. Bartel and James M. McAvoy Wright-Patterson AFB, Ohio AFWAL Jun. 1981 151 p refs
(Contract F33615-79-C-3207; AF Proj. 2401)
(AD-A108610; LG81ER0156; AFWAL-TR-81-3036) Avail: NTIS HC A08/MF A01 CSCL 20/4

This report discusses cavity oscillation in general, and particularly the problem of cavity oscillation in the missile bays of cruise missile carrier aircraft during missile launch. The missile bay configurations analyzed ranged from the complete interior volume of a large transport aircraft, to the bomb bay of a conventional bomber. All of the carrier aircraft cases evaluated were conceptual; no specific airframe models or manufacturers are identified. The principles and technology presented are not limited to missile bays; they are applicable to general cavities having free-stream flow velocities above Mach 0.4. It is observed that above Mach 0.4 the pressure fluctuations in an oscillating cavity may arise from: (a) sustained periodic pressure fluctuations in the aperture shear layer that radiate noise into the cavity; and (b) sustained periodic pressure fluctuations in the aperture shear layer that couple with the cavity volume acoustic modes (this generally produces by far the most intense cavity oscillation). Theoretical/empirical techniques are presented for predicting oscillatory frequency, pressure level, pressure spatial distribution in the cavity, and the degree of alleviation achievable with suppressors. The information is based on extensive experimentation with subscale models having apertures of 2 to 6 in. in a cold air wall-jet flow facility. A bibliography is included containing 145 listings. Author (GRA)

N82-18186# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

THE FORMATION OF A RING VORTEX AT A CIRCULAR JET NOZZLE AND ITS TRANSFORMATION DURING TAKEOFF INTO A LIQUID LAYER AND AT THE LIQUID SURFACE [DIE BILDUNG EINES RINGWIRBELS AN EINER KREISFOERMIGEN DUE SENMUENDUNG UND SEINE UMBILDUNG BEIM AUFSTIEG IN EINER FLUESSIGKEITSSCHICHT UND AN DER FLUESSIGKEITSOBERFLAECHE]

Thomas Krauch Dec. 1980 53 p refs In GERMAN
(MPIS-27/1980; ISSN-0436-1199) Avail: NTIS
HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,65

Simulated formation and transformation of a rotating vortex was performed. Boundary layer vortex transformation is reviewed. The transformation of a vortex ring on a water surface is also studied. Transl. by E.A.K.

N82-18187# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.

ON THE CALCULATION OF TRANSONIC BLADE TIP FLOW FOR HELICOPTER ROTORS [ZUR BERECHNUNG DER TRANSSONISCHEN BLATTSPITZENUMSTROEMUNG BEI HUBSCHRAUBERROTOREN]

H. Stahl and V. Mikulla 8 May 1981 27 p refs In GERMAN
Presented at DGLR Jahrestagung 1981, Aachen, 12-14 May 1981
(MBB-UD-320-81-O; DGLR-81-025) Avail: NTIS
HC A03/MF A01

Blade element theory (two dimensional) based on the rotor calculation program, its radials and its chronological relationship was demonstrated. Blade tip flow is three dimensional and interstationary and the forward moving blade in a fast forward flight becomes transonic. Theories, based on potential theory are proposed, though these do not perform on rotary wings. This method demonstrates the real flow rate. A three dimensional calculation of the aerodynamic characteristics of the fixed wings, was utilized, to show that by introducing a Mach number per gradient along the rotor radius, rotor calculation can be modified.

Transl. by E.A.K.

N82-18188# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).

ON THE CALCULATION OF SEPARATED FLOW ON HELICOPTER FUSELAGES [ZUR BERECHUNG DER ABGELOESTEN STROENUNG AN HUBSCHRAUBER-RUEMPFEN]

G. Polz 11 May 1981 28 p refs In GERMAN Presented at DGLR Jahrestagung 1981, Aachen, 12-14 May 1981
(MBB-UD-321-81-O; DGLR-81-026) Avail: NTIS HC A03/MF A01

Separated flows in helicopters with dead water formation on the fuselage tail were examined. A model was developed which is based on a combination of panel and interface calculation method, which is simulated in the dead water area by a similar circulation coated track alignment body. The point of gravity lies more on the fuselage, which is especially significant for helicopter, because of its effect on tail rotor and tail plane. Results from wind tunnel tests and flight tests are presented.

Transl. by E.A.K.

N82-18189# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.

INVESTIGATIONS OF THE SEPARATION BEHAVIOR ON AIRFOILS AT HIGH ANGLES OF ATTACK, USING LINEAR LIFT THEORY Thesis - Hochschule der Bundeswehr, Munich [UNTERSUCHUNGEN ZUM ABREISSVERHALTEN VON TRAGFLUEGELN IM HOHEN ANSTELLWINKELBEREICH MIT HILFE DER TRAGLINIENTHEORIE]

Karl-Heinz Haerdtl 1 Nov. 1980 157 p refs In GERMAN
(MBB-FE-122/S/PUB/37; Rept-80/7) Avail: NTIS HC A08/MF A01

Different methods for calculating the lift coefficient of an airfoil wing were examined. The calculation of aerodynamic characteristics of airplanes is of great importance. Complex three dimensional boundary layers, especially for swept back wings with leading edge slats and trailing edges with split flaps which very much effect airfoil fluws. Two different methods to calculate three dimensional boundary layers are presented.

Transl. by E.A.K.

N82-18190# European Space Agency, Paris (France).

LAMINAR AIRFOILS FOR TRANSPORT AIRCRAFT

Armin Quast Oct. 1981 33 p refs Transl. into ENGLISH of "Laminarprofile fuer verkehrsflugzeuge" Rept. DFVLR-Mitt-80-07 DFVLR, Brunswick, Mar. 1980 33 p
(ESA-TT-680; DFVLR-Mitt-80-07) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 8,30

The development of laminar airfoils in order to save fuel by reducing drag is discussed. Laminarization through shaping is considered. Laminar and turbulent boundary layer theory and subjective assessment indicate that laminar airfoils for high Reynolds numbers are feasible, with a 22% fuel saving. The reduced cruising speeds, required, however, decrease passenger comfort, making them more suitable for freight carrying.

Author (ESA)

N82-18191# European Space Agency, Paris (France).

THEORETICAL PREDICTION OF BASE PRESSURE ON MISSILE BODIES HAVING A TURBULENT DEAD-AIR REGION AT SUPERSONIC VELOCITIES

Mauri Tanner Nov. 1981 71 p refs Transl. into ENGLISH of "Theoretische Bestimmung des Basisdruckes von Flugkoerperruempfen mit turbulentem Totwasser bei Ueberschallgeschwindigkeiten" Rept. DFVLR-FB-80-29 DFVLR, Goettingen, West Germany, Sep. 1980 79 p
(ESA-TT-708; DFVLR-FB-80-29) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 13,60

A theory which predicts the base pressure and afterbody drag on axisymmetric missile bodies at supersonic velocities is presented. The body is assumed to have a turbulent dead air region behind the base. This theory extends the theory of Oswatitsch which connects the drag of the body with the entropy increase in the flow. Values for missile bodies at angles of incidence < or = 20 deg are approximated. Various calculation examples are shown and a comparison with experimental values shows good agreement between theory and measurement.

Author (ESA)

N82-18120# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.

DEVELOPMENTS IN ROTARY WING AIRCRAFT AERODYNAMICS

I. C. Cheeseman *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 27 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18121# Massachusetts Inst. of Tech., Cambridge.

A SIMPLIFIED APPROACH TO THE FREE WAKE ANALYSIS OF A HOVERING ROTOR

R. H. Miller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 15 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18122# Politecnico di Milano (Italy). Instituto di Ingegneria Aerospaziale.

AN EXPERIMENTAL ANALYSIS OF THE SHAPE OF A ROTOR WAKE

Sergio DePonte and Luigi Vigevano *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 8 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18123# Tokyo Univ. (Japan).

AN EXTENSION OF THE LOCAL MOMENTUM THEORY TO THE ROTORS OPERATING IN TWISTED FLOW FIELD

Akira Azuma, Ken-ichi Nasu, and Takatoshi Hayashi *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18124# Nanjing Aeronautical Inst. (China).

A SIMPLIFIED METHOD FOR PREDICTING ROTOR BLADE AIRLOADS

Wang Shi-cun and Xu Zhi *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 28 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18125# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Aeroelastik.

A THREE-DIMENSIONAL APPROACH TO LIFT AND MOMENT COEFFICIENTS OF ROTATING BLADES

Wolfgang Send *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18128# Hochschule der Bundeswehr, Munich. (West Germany). Inst. fuer Luftfahrttechnik und Leichtbau.

DYNAMIC AND AEROELASTIC CHARACTERISTICS OF COMPLETE WINDTURBINE SYSTEMS

E. W. Steinhardt *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18147*# Army Research and Technology Labs., Moffett Field, Calif. Aeromechanics Lab.

PREDICTION OF BLADE VORTEX INTERACTION NOISE FROM MEASURED BLADE PRESSURE

Yoshiya Nakamura *In* DGLR Seventh European Rotorcraft and

Powered Lift Aircraft Forum 1981 20 p refs Sponsored by NASA (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01 CSCL 01A

N82-18152# Hindustan Aeronautics Ltd., Bangalore (India). Helicopter Design Bureau.
AUTOMATIC GENERATION OF EQUATIONS FOR ROTOR-BODY SYSTEMS WITH DYNAMIC INFLOW FOR A PRIORI ORDERING SCHEMES
J. Nagabhushanam, G. H. Gaonkar (Indian Inst. of Science), and T. S. R. Reddy (Indian Inst. of Science) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 37 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18157# Tokyo Univ. (Japan). Inst. of Interdisciplinary Research.
A NUMERICAL APPROACH TO CO-AXIAL ROTOR AERODYNAMICS
Shigeru Saito and Akira Azuma *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18158# Institut fuer Flugmechanik, Brunswick (West Germany).
HELICOPTER ROTOR DOWNWASH: RESULTS OF EXPERIMENTAL RESEARCH AT THE DFVLR-ROTOR TEST STAND AND THEIR COMPARISON WITH THEORETICAL RESULTS
B. Junker and H.-J. Langer *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 23 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18160# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
THE PROBLEM OF CALCULATION OF THE FLOW AROUND HELICOPTER ROTOR BLADE TIPS
H. Stahl *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 18 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18162# Royal Aircraft Establishment, Farnborough (England).
SOME UNSTEADY AERODYNAMIC EFFECTS ON HELICOPTER ROTORS
P. G. Wilby, M. J. Riley, and Judith Miller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 14 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18163# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
SEPARATED FLOW AROUND HELICOPTER BODIES
G. Polz and J. Quentin *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18164# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
A METHOD OF PREDICTING FUSELAGE LOADS IN HOVER
P. Taylor *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 13 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N82-18192# Rockwell International Corp., El Segundo, Calif.
MULTIPLE EJECTION EFFECTS ANALYSIS Final Report, 8 May - 30 Dec. 1980
G. A. Freeman and G. R. Casteel Wright-Patterson AFB, Ohio Air Force Medical Research Labs. Aug. 1981 92 p refs
(Contract F33615-80-C-0519; AF Proj. 7231)
(AD-A108277; NA-80-545; AFAMRL-TR-80-140) Avail: NTIS HC A05/MF A01 CSCL 05/5

Wind tunnel data for the ACES-B1 ejection seat in the presence of the B-1 forebody are documented and analyzed. Significant aerodynamic interactions exist at high speed between dual seats and between seat/forebody. Trajectory data are presented with and without the forebody effect upon the seat. The forebody flow field is shown to increase the human engineering/biomechanical problems during high-speed ejection.
Author (GRA)

N82-18193# Douglas Aircraft Co., Inc., Long Beach, Calif.
AIRCREW RESTRAINT AND MOBILITY TEST FIXTURE Final Report
A. Blair McDonald Wright-Patterson AFB, Ohio AMRL Jul. 1981 33 p refs
(Contract F33615-79-C-0522; AF Proj. 7231)
(AD-A108274; AFAMRL-TR-81-27) Avail: NTIS HC A03/MF A01 CSCL 14/2

The next generation combat aircraft with advanced aerodynamic and control features will have combat maneuver capability which will impose multiaxial accelerations on the aircrew. Advanced aircrew systems will be required for restraint, support, and mobility during these combat conditions. New concepts for these systems have been defined, but tests under representative dynamic conditions are necessary to evaluate the effectiveness of these concepts when implemented.
Author (GRA)

N82-18194# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
PHYSIOLOGICAL ACCEPTABILITY TESTS OF THE SJU-5/A EJECTION SEAT: SECOND PHYSIOLOGICAL ACCEPTANCE DEMONSTRATION Final Report
William C. Ward, Jr. and Kenneth L. Miller 1 Jul. 1981 23 p refs
(AD-A108688; NADC-81215-60) Avail: NTIS HC A02/MF A01 CSCL 01/3

This program was conducted to evaluate solutions to deficiencies of the F18 Aircraft Martin-Baker SJU-5/A escape system which had been identified during the initial Physiological Acceptability Demonstration (Report No. NADC-79040-60). The proposed solutions evaluated during this program included: incorporation of 'toe guides' on the rudder pedals, relocation of the head rest, modification of the back support, and incorporation of leg garters into the anti-'G' suit. Of these, the head rest and back support still require additional modification. Upon satisfactory correction of the head rest and back support deficiencies, physiological acceptance of the F18 escape system will be recommended for the pilot's station.
Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N82-18195# RAND Corp., Santa Monica, Calif.
DISTRIBUTED INTELLIGENCE FOR AIR FLEET CONTROL

Interim Report
Randall Steeb, Stephanie Cammarata, Frederick A. Hayes-Roth, Perry W. Thorndyke, and Robert E. Wesson Jun. 1981 59 p refs
(Contract MDA903-78-C-0029; ARPA Order 3640)
(AD-A108611; RAND/R-2728-ARPA; LC-81-13913; ISBN-0-8330-0353-4) Avail: NTIS HC A04/MF A01 CSCL 17/7

Distributed planning and control techniques provide potential advantages over centralized processing in speed, cost, reliability, flexibility, and minimization of long-distance communications for a variety of tasks, including military threat assessment, command and control decisionmaking, disaster relief coordination, and civilian air traffic control. Six different architectures for distribution of control among multiple processors are presented, and the influences of different task environments on each are discussed. The work focuses primarily on the use of distributed planning and control for civilian air traffic control. One architecture, in which each aircraft is controlled by a separate processor, is described in detail in an illustrative scenario. An initial system design is presented in which cooperating 'experts' comprise a processor. These cooperating experts sense or infer aircraft intentions, generate and evaluate plans, control and monitor plan execution, and communicate with other processors.
Author (GRA)

N82-18196# Army Missile Command, Redstone Arsenal, Ala. Guidance and Control Directorate.
SOFTWARE FEATURES APPLICABLE TO INERTIAL MEASUREMENT UNIT SELF ALIGNMENT
H. V. White, J. C. Hung, and W. G. Cantrell Dec. 1980 36 p refs
(AD-A108511; AD-E950182; DRSMI/RG-81-11-TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report documents two software features applicable to inertial measurement unit self-alignment. Features are the continuous-time algorithm and the 'scraping' technique. FORTRAN programs for least-square with and without scraping are included.
Author (GRA)

N82-18197# Nebraska Univ., Lincoln. Dept. of Electrical Engineering.
IMPROVEMENTS AND EXTENSIONS OF THE GEOMETRICAL DILUTION OF PRECISION (GDOP) CONCEPT FOR SELECTING NAVIGATION MEASUREMENTS Final Report, 1 May 1980 - 1 May 1981
William L. Brogan Wright-Patterson AFB, Ohio AFWAL Sep. 1981 69 p refs
(Contract F33615-80-C-1092; AF Proj. 6095)
(AD-A108607; AFWAL-TR-81-1142) Avail: NTIS HC A04/MF A01 CSCL 17/7

The optimal measurement selection problem was studied for the Global Positioning Satellite system (GPS). The fundamentals of the Geometrical Dilution of Precision (GDOP) concept were briefly reviewed, because GDOP is frequently used to rank the effectiveness of potential measurements. It is shown that GDOP does not always select the best measurements in the sense of minimum mean square navigation error. For this reason weighted least-squares and minimum variance (Kalman filter) methods were used to derive several improved measurement ranking schemes. Nonuniform measurement noise and a prior knowledge about the state are taken into account. Any specified weighted combination of the component error variances can be minimized. Eigenvalue-eigenvector theory was used to derive useful bounds and to provide geometrical insight. A purely algorithmic approach is also presented and applied to a number of representative GPS cases.
GRA

N82-18198# European Space Agency, Paris (France).
A POSSIBLE WAY OF SPECIFICALLY CORRECTING LOCATION AND NAVIGATIONAL ERRORS CAUSED BY REFLECTION AND OTHER PROPAGATION ANOMALIES
Fritz Stelzel Jul. 1981 125 p refs Transl. into ENGLISH of "Uber eine Moeglichkeit zur gezielten Korrektur von Ortungs- u. Navigationsfehlern, die durch Reflexionen u. sonstige Ausbreitungsanomalien verursacht werden", Rept. DFVLR-Mitt-79-17 DFVLR, Oberpfaffenhofen, West Germany, May 1979
(ESA-TT-667; DFVLR-Mitt-79-17) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 21.20

Electromagnetic wave propagation in urban areas is discussed in relation to vehicle location. Current methods are reviewed for vehicles on a arbitrary route. Isophase and hyperbola systems are compared. The isophase system is more accurate. A correction procedure for multipath induced errors is presented, based on measuring time signals from four transmitters. The use of measured times in order to reduce location errors caused by propagation anomalies is described. The methods were tested on a simulated city area covered by transmitters on the corners of a 25 km square. Results are inconclusive.
Author (ESA)

N82-18199# European Space Agency, Paris (France).
EXTENSION OF PROPORTIONAL NAVIGATION BY THE USE OF OPTIMAL FILTERING AND CONTROL METHODS
Hans-Dieter Joos Aug. 1981 31 p refs Transl. into ENGLISH of "Erweiterung der Proportionalnavigation durch Anwendung optimaler Filterungs- und Regelungsmethoden", Rept. DFVLR-FB-80-10 DFVLR, Oberpfaffenhofen, West Germany, Mar. 1980 36 p
(ESA-TT-683; DFVLR-FB-80-10) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 8.30

A suboptimal guidance law for homing missiles, based on quadratic optimal stochastic control theory is investigated. On-line backward integration from final time to actual time is not required. A Kalman-Bucy filter which takes nonlinearity and target maneuvers into account is presented. The model is compared to the conventional and extended proportional navigation systems (simulated on a nonlinear quidance loop model). Positional error behavior improves by 45%. Author (ESA)

N82-18200# European Space Agency, Paris (France).
MIDAIR AND NEAR MIDAIR COLLISIONS ON TWO- AND THREE-DIMENSIONAL CURVILINEAR FLIGHT PATHS
Otto Weber Aug. 1981 119 p refs Transl. into ENGLISH of "Zusammenstoesse und gefaehrliche Begegnungen bei zwei- und dreidimensionalen Kurvenfluegen", Rept. DFVLR-FB-80-13 DFVLR, Brunswick, Mar. 1980 107 p
(ESA-TT-685; DFVLR-FB-80-13) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 21

Collision avoidance by the see and avoid concept, advanced secondary radar systems on the ground, and independent electronic systems onboard are discussed. For two and three dimensional stationary turns, basic geometrical and physical aspects of conflict detection are derived and details are given on the apparent size and motion of the other aircraft on the windshield. For conflict warning by means of ground based or onboard electronic systems, a linear track model is used. The predicted minimum distance at the closest approach, the lead times to this event or to the penetration of a zone of protection around the intruder, and the zeta parameter are analyzed as potential conflict criteria. Similarity rules and the separation of three dimensional conflicts into horizontal and vertical problems are treated. Commercial pilots lack special training in optically based risk assessment. Autonomous onboard warning systems do not make the see and avoid concept obsolete. Author (ESA)

N82-18201# National Ocean Survey, Rockville, Md.
UNITED STATES COAST PILOT 9. PACIFIC AND ARCTIC COASTS ALASKA: CAPE SPENCER TO BEAUFORT SEA
Jan. 1981 425 p Revised
(PB82-109562; NOAA-81021105) Avail: NTIS HC A18/MF A01 CSCL 17G

Coast Pilot subjects include navigation regulations, outstanding landmarks, channel and anchorage peculiarities, dangers, weather, ice, freshets, routes, pilotage, and port facilities. Information is included on navigation regulations, Cape Spencer to Beaufort Sea, Cape Spencer to Cook Inlet, Kodak Island, Alaska Peninsula, Aleutian Islands, Bering Sea and Arctic Ocean.
GRA

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.
For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-18202*# McDonnell-Douglas Corp., Long Beach, Calif.
A STUDY TO DEFINE THE RESEARCH AND TECHNOLOGY REQUIREMENTS FOR ADVANCED TURBO/PROPFAN TRANSPORT AIRCRAFT Final Report
Irene M. Goldsmith Feb. 1981 313 p refs
(Contract NAS2-10078)
(NASA-CR-166138; ACEE-16-FR-0016) Avail: NTIS HC A14/MF A01 CSCL 01C

The feasibility of the propfan relative to the turbofan is summarized, using the Douglas DC-9 Super 80 (DS-8000) as the actual operational base aircraft. The 155 passenger economy class aircraft (31,775 lb [14,413 kg] payload), cruise Mach at 0.80 at 31,000 ft (8,450 m) initial altitude, and an operational capability in 1985 was considered. Three propfan arrangements, wing mounted, conventional horizontal tail aft mounted, and aft fuselage pylon mounted are selected for comparison with the DC-9 Super 80 P&WA JT8D-209 turbofan powered aircraft. The configuration feasibility, aerodynamics, propulsion, structural loads, structural dynamics, sonic fatigue, acoustics, weight maintainability, performance, rough order of magnitude economics, and airline coordination are examined. The effects of alternate cruise Mach number, mission stage lengths, and propfan design characteristics are considered. Recommendations for further study, ground testing, and flight testing are included. Author

N82-18203*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SLOTTED VARIABLE CAMBER FLAP Patent Application
Dana G. Andrews, inventor (to NASA) (Boeing Commercial Airplane Co., Seattle) Filed 30 Oct. 1981 13 p Sponsored by NASA
(NASA-Case-LAR-12541-1; US-Patent-Appl-SN-315588) Avail: NTIS HC A02/MF A01 CSCL 01C

Variable camber actuator assemblies broaden the range of speeds at which lift to drag performance is maximized for slotted flap wings. Lift is improved by varying wing camber with rotational flap movements that do not introduce wing slots and induced drag. Forward flaps are secured to forward flange links which extend from, and are a part of, forward flap linkage assemblies. The forward flaps rotate about flap pivots with their rotational displacement controlled by variable camber actuator assemblies located between the forward flaps and the forward flange links. Rear flaps are held relative to the forward flaps by rear flap linkage assemblies which may act independently from the forward flap linkage assemblies and the variable camber actuator assemblies. Wing camber is varied by rotating the flaps with the variable camber actuator assemblies while the flaps are in a deployed or tucked position. Rotating flaps in a tucked position does not introduce significant wing surface discontinuities, and reduces aircraft fuel consumption on most flight profiles. NASA

N82-18204*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DYNAMICS OF AIRCRAFT ANTISKID BRAKING SYSTEMS
John A. Tanner, Sandy M. Stubbs, Robert C. Dreher, and Eunice G. Smith Feb. 1982 100 p refs
(NASA-TP-1959; L-14788) Avail: NTIS HC A05/MF A01 CSCL 01C

A computer study was performed to assess the accuracy of three brake pressure-torque mathematical models. The investigation utilized one main gear wheel, brake, and tire assembly of a McDonnell Douglas DC-9 series 10 airplane. The investigation indicates that the performance of aircraft antiskid braking systems is strongly influenced by tire characteristics, dynamic response of the antiskid control valve, and pressure-torque response of the brake. The computer study employed an average torque error criterion to assess the accuracy of the models. The results indicate that a variable nonlinear spring with hysteresis memory function models the pressure-torque response of the brake more accurately than currently used models. T.M.

N82-18205# Committee on Armed Services (U. S. House).
REVIEW OF DEFENSE-RELATED VERTICAL AND SHORT TAKEOFF AND LANDING (V/STOL) AIRCRAFT PROGRAMS
Walter Z. Collings Washington GPO 1979 206 p refs
Presented to the Comm. on Armed Serv., 96th Congr., 1st Sess., Sep. 1978 Prepared by AIAA, New York
(GPO-55-278) Avail: Committee on Armed Services

A technology review of bases supporting the development of Vertical of Short Takeoff and Landing (V/STOL) aircraft is presented. Representative aircraft were summarized according to their type of lift generation mechanisms. Successes, failures, problems encountered in development, and plans for the future are also presented. Some discussion of the Navy's envisionment/commitment to V/STOL aircraft is also presented. M.D.K.

N82-18206# Rockwell International Corp., Columbus, Ohio. Aircraft Div.
XFV-12A DIAGNOSTIC AND DEVELOPMENT PROGRAMS Summary Report, Jan. 1979 - May 1981
P. M. Bevilaqua and C. P. Combs Nov. 1981 367 p refs
(Contract N00019-73-C-0053)
(AD-A108354; NR81H-50) Avail: NTIS HC A16/MF A01 CSCL 01/3

Activity during the XFV-12A thrust augmenter development program conducted from May 1979 to June 1981 is reported and documented. Diagnostic tests indicated a major source of performance deficiency could be attributed to feed duct/augmenter component interface problems rather than basic augmenter configuration. Interface problems seriously affected both isolated performance and flow quality of the primary augmenter nozzles resulting in significantly low levels of augmentation. A remedial program, the subject of this report, was initiated. The primary objective of this program was to systematically improve the performance of the XFV-12A aircraft's thrust augmenter lift systems. Major emphasis was placed not only on correcting flow deficiencies but also identifying and incorporating improvements in the augmenter design which would increase its performance potential. GRA

N82-18207# General Accounting Office, Washington, D. C.
POTENTIAL REDUCTIONS IN AIRCRAFT OPERATION AND MAINTENANCE COSTS BY USING THRUST COMPUTING SUPPORT EQUIPMENT Report to the Honorable Joseph P. Addabbo, Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives
27 Oct. 1981 17 p
(AD-A108463; GAO/PLRD-82-4) Avail: NTIS HC A02/MF A01 CSCL 01/2

This report addresses the evaluation of thrust measuring equipment. We interviewed Air Force officials and contractor representatives, reviewed documentation pertaining to the key events in the evaluation of the thrust computing system program, reviewed test data and analyses by Air Force and contractor engineers, and observed the operation of the thrust computing system. Our analyses show that the accurate measurement and setting of thrust for installed jet engines is of vital importance not only for aircraft readiness and safety but also for operation and maintenance cost reductions. Although test results indicate that a system is available that can perform such measurements, the services have not been using it. The Air Force has conducted extensive tests that will measure thrust for installed J85-5 engines, but has not implemented a system. The Navy has not performed any tests to determine whether its aircraft jet engines might benefit from such a system. GRA

N82-18208# Institute for Defense Analyses, Arlington, Va. Systems Evaluation Div.
C-5A AUSTERE AIRFIELD OPERATIONAL UTILITY EVALUATION. PHASE 2: OPERATION ON UNPAVED SOIL SURFACES FOLLOWING RAINFALL Final Report
Waldemar O. Breuhaus Oct. 1981 46 p refs
(Contract MDA903-79-C-0018)
(AD-A108597; AD-E500466; IDA-P-A1621; IDA/HQ-81-23896) Avail: NTIS HC A03/MF A01 CSCL 01/3

During the summer of 1980 and the winter of 1980-1981, an Operational Utility Evaluation (OUE) was conducted to determine operating characteristics of the C-5A airplane when taxiing or being towed and off-loaded on unpaved soil surfaces and on snow-covered surfaces. Subsequent to the successful completion of those tests, questions arose concerning the effects of rainfall that wets otherwise adequate bare soil areas to a significant depth. Tests with simulated rainfall of various amounts applied by agricultural sprinkler systems were conducted at March AFB, California, during July 1981. The airplane performed well, though it approached its performance limits in the most severe test conditions. Difficulties were encountered in arriving at a sprinkler system configuration reasonably approximating naturally occurring rainfall, and in arriving at a single simple descriptor to properly characterize the strength of soil in such a complex situation.
GRA

N82-18209# Army Aeromedical Research Lab., Fort Rucker, Ala. Biodynamics Research Div.
VIBRATION LEVELS IN ARMY HELICOPTERS: MEASUREMENT RECOMMENDATIONS AND DATA Final Report
John C. Johnson and David B. Priser Sep. 1981 35 p refs (DA Proj. 3E1-6277-A-878)
(AD-A108131; USAARL-81-5) Avail: NTIS HC A03/MF A01 CSCL 01/3

Surveys on vibration levels found in currently fielded helicopters were used to prepare a comparative summary of vibration exposure levels at crew stations and of the test methods used to measure these levels. This effort was initiated at the request of the Air Standardization Coordinating Committee (ASCC) Working Party 61 and because of the wide variety of methods used in data capture and instrumentation documentation. Sources of the literature reviewed included technical reports of U.S. Government agencies and papers in open literature. Articles were reviewed based upon three criteria: (1) quantitative description of vibration in currently fielded U.S. Army rotary winged aircraft, (2) article contents are unclassified and available for publication in open literature, (3) article describes human exposure levels of aircraft vibration.
Author (GRA)

N82-18210# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Flight Technology Div.
A DIGITAL SIMULATION PROGRAM DESCRIBING THE MOTION OF AN AIRCRAFT UNDERGOING ENGINE FAILURE DURING ITS TAKEOFF GROUND ROLL Final Report, Jun. 1980 - Mar. 1981
Michael J. Miedlar Sep. 1981 77 p refs
(AD-A108420; ASD-TR-81-5030) Avail: NTIS HC A05/MF A01 CSCL 01/2

This report presents a non-interactive 'MIMIC' program developed to generate the time history of an aircraft undergoing an engine failure during its ground roll. The program calculates the forces and moments acting on the aircraft, and uses MIMIC's implicit integration routine to track its motion. The equations and assumptions used are presented and discussed. This report also lists the program and delineates its functions. Author (GRA)

N82-18211# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
THEORETICAL INVESTIGATIONS ON THE INFLUENCE OF DIFFERENT STRAKE, TAIL UNIT, AND CONVENTIONAL HLW ARRANGEMENT AS WELL AS OF CCV ON THE AERODYNAMIC CHARACTERISTICS OF FIGHTER AIRCRAFT CONFIGURATIONS Thesis - Hochschule der Bundeswehr, Munich [THEORETISCHE UNTERSUCHUNGEN UEBER DEN EINFLUSS VON VERSCHIEDENEN, STRAKE, ENTENLEITWERKS- UND KONVENTIONELLEN HOEHENLEITWERKSANORDNUNGEN SOWIE VON C.C.V. AUF DIE AERODYNAMISCHEN EIGENSCHAFTEN VON KAMPFFLUGZEUG-KONFIGURATIONEN]
Herbert Klimt, Dieter Oberst, and Walter Schmalhofer 1 Oct. 1980 486 p refs In GERMAN
(MBB-FE-122/S/PUB/36) Avail: NTIS HC A01/MF A01

Linear and nonlinear aerodynamic characteristics for fighter airplane configurations with three separate tail-wing-surface ratios as related to lift coefficients were optimized. The optimal configurations were reduced by 5% for stability and 10% for instability and their lifting responses are compared. Fuselage effect and convergence of aerodynamic factors are also studied.
Transl. by E.A.K.

N82-18212# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
INTERPRETATION AND CONSTRUCTION OF A DYNAMIC SIMILARITY MODEL OF THE A 310 WINGS [AUSLEGUNG UND BAU EINES DYNAMISCH AEHNLICHEN MODELLS DES A 310 FLUEGELS]
H. Hoenlinger 5 May 1981 34 p refs In GERMAN Presented at DGLR-Jahrestagung 1981, Aachen, 11-14 May 1981
(MBB-FE-17/S/PUB/42; DGLR-81-035) Avail: NTIS HC A03/MF A01

The design and construction of a model for directional oscillation flutter for the A-310 wing with supercritical profile is discussed. The rigidity distribution in the model is simulated by a simple metal box. The profile geometry and the mass distribution of the model is copied exactly by a foam structure coated with a fiberglass laminate. A finite element model is used to explain the complicated engine mount, which is supported by a profile beam. Data on rigidity and vibration measurements are included.
Transl. by E.A.K.

N82-18213# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
CHARACTERIZATION OF THE AIRBUS HORIZONTAL STABILIZERS OF CFRP CONSTRUCTION AND STRUCTURAL ANALYSIS WITH THE FINITE ELEMENT METHOD [AUSLEGUNG DES AIRBUSSEITENLEITWERKS IN CFK-BAUWISE UND STRUKTURANALYSE MIT DER FINITE-ELEMENTE-METHODE]
Erhard Winkler May 1981 22 p Reprint from "Verarbeiten u. Anwenden kohlenstoffaserverstaerkter kunststoffe" Vereins Deut. Ingr., May 1981 p 181-198 In GERMAN
(MBB-UT-13-81-O) Avail: NTIS HC A02/MF A01

The use of carbon fiber reinforced plastics as a substitute for light weight metals in aircraft construction, which decreases the weight by 30%, is discussed. Environmental parameters, like temperature and humidity must be considered. A construction method with a variety of possibilities to fulfill these requirements and which competes with metal structures is developed. This means either a simplified weight reduction at the same or less cost, or a less costly method for the same or less weight.
Transl. by E.A.K.

N82-18214# European Space Agency, Paris (France).
TENDENCIES IN THE DEVELOPMENT OF SUBSONIC TRANSPORT AIRCRAFT WITH SPECIAL CONSIDERATION OF AERODYNAMICS
Horst Koerner Oct. 1981 42 p refs Transl. into ENGLISH of "Entwicklungstendenzen bei Unterschall-Transportflugzeugen unter besonderer Beruecksichtigung der Aerodynamik", Rept. DFVLR-Mitt-80-15 Brunswick, Jun. 1981 62 p
(ESA-TT-705; DFVLR-Mitt-80-15) Avail: NTIS HC A03/MF A01

Tendencies in subsonic transport aircraft development, specifically due to progress in aerodynamics, are surveyed. Prospective wing profile designs and improved integration of body dimensions are considered, citing examples from the AIRBUS development program. Possible fuel savings through supercritical wing technology and by optimizing reduction in friction drag are also studied. Advantages to be gained by active control, particularly from adaptive wing technology, are reviewed. As a potential application, an unconventional canard configuration, including transonic propellers, for an aircraft in the AIRBUS class is proposed.
Author (ESA)

N82-18126# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
A COMPLETE METHOD FOR COMPUTATION OF BLADE MODE CHARACTERISTICS AND RESPONSES IN FORWARD FLIGHT
J. P. Lefrancq and B. Masure *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 9 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18127# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Aeroelastik.
MODAL CHARACTERISTICS OF ROTOR BLADES: FINITE ELEMENT APPROACH AND MEASUREMENT BY GROUND VIBRATION TEST
D. Ludwig *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 23 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18129# Westland Helicopters Ltd., Yeovil (England). Dynamics Dept.
A STUDY OF THE TECHNIQUES OF DYNAMIC ANALYSIS OF HELICOPTER TYPE STRUCTURES
G. M. Venn and D. J. Boon *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 21 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18130# Virginia Polytechnic Inst. and State Univ., Blacksburg.
THE EFFECTS OF SLIGHT NON-LINEARITIES ON MODAL TESTING OF HELICOPTER-LIKE STRUCTURES
D. J. Ewins (Imperial College of Science and Technology) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 11 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18139# Italian Air Force Pratica di Mare, Rome. Flight Test Centre.
PARAMETRIC CRITERIA AND IMPACT ON DESIGN TRENDS
Roberto dePompeis and Fulvio Gagliardi (Ministry of Defence) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 25 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18140# Hughes Helicopters, Culver City, Calif.
DESIGN PHILOSOPHY OF THE HUGHES MODEL 600 HELICOPTER
R. S. Taylor *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18141# United Technologies Corp., East Hartford, Conn. Aircraft Div.
SH-60B TEST PROGRAM
Frederick J. Silverio *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18142# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
NAVAL VERSIONS OF THE DAUPHIN AND THE AS 15 TT WEAPON SYSTEM
J. P. Dubreuil *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 10 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18143# Westland Helicopters Ltd., Yeovil (England).
ARMY LYNX: PRODUCT DEVELOPMENT MATCHED TO MILITARY COMBAT DEVELOPMENT
D. A. S. Howell *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18144# Societe Nationale Industrielle Aerospatiale, La Courneuve (France).
A LIGHT HELICOPTER FOR NIGHT FIRING
J. F. Candau *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 18 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18145# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
TETHERED ROTORPLATFORMS AND THEIR MISSION POTENTIAL
W. Goeller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 13 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18150# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
FLIGHT CHARACTERISTICS DESIGN AND DEVELOPMENT OF THE MBB/KHI BK117 HELICOPTER
H. Huber and T. Masue (Kawasaki Heavy Industries) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 21 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18151# Politecnico di Milano (Italy). - Dipartimento di Ingegneria Aerospaziale.
A GENERAL PURPOSE PROGRAM FOR ROTOR BLADE DYNAMICS
M. Borri, M. Lanz, and P. Mantegazza *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 15 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18154# Westland Helicopters Ltd., Yeovil (England).
THE ROLE OF SIMULATION IN THE DESIGN PROCESS
I. F. Montgomerie and G. C. F. Wyatt *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18155# Royal Aircraft Establishment, Farnborough (England).
PRELIMINARY INVESTIGATION INTO THE ADDITION OF AUXILIARY LONGITUDINAL THRUST ON HELICOPTER AGILITY
P. J. Legge, P. W. Forestcue (Southampton Univ.), and P. Taylor (Southampton Univ.) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18156# National Defence Academy, Yokosuka (Japan). Dept. of Aeronautical Engineering.
OPTIMUM PERFORMANCE AND WAKE GEOMETRY OF CO-AXIAL ROTOR IN HOVER
Tomoari Nagashima and Kenji Nakanishi *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18159*# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.
HOVER TESTS OF A MODEL H-FORCE ROTOR
H. R. Velkoff *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
(Contract NCA2-OR565-001)
Avail: NTIS HC A99/MF A01

N82-18161# Office National d'Etudes et de Recherches Aeronautiques, Paris (France).
APPLICATION OF THE ONER DYNAMIC STALL MODEL TO A HELICOPTER BLADE IN FORWARD FLIGHT
C. T. Tran and D. Falchero (SNIAS, Marignane, France) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 26 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18165# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

IMPACT OF SYSTEMS TECHNOLOGY AND INTEGRATION ON HELICOPTER DESIGN
K. Schymanietz *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 20 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18170# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany).
A REDUNDANCY CONCEPT FOR A DIGITAL CSAS
P. Wuest and M. Keller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 12 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18171# Newmark (Louis) Ltd., Croydon (England).
THE INFLUENCE OF SENSOR AND ACTUATOR CHARACTERISTICS ON OVERALL HELICOPTER AFCS DESIGN
S. G. Spreadborough *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

N82-18215 Royal Aircraft Establishment, Farnborough (England).
NEW DEVELOPMENTS IN COCKPIT-HUMAN INTERFACES
E. B. Davies and J. B. Peckham 15 Jun. 1981 16 p Presented at 12th ICAS Congr., Munich, Oct. 1980
(RAE-TM-FS-412; BR80500) Copyright. Avail: Issuing Activity

Touch sensing displays, helmet sights, and direct voice inputs (DVI) are discussed. Cathode ray tubes (CRT) are cheaper than keyboards for touch sensing, but lack tactile differentiation capabilities. For designation tasks, e.g., touching the required radar return, accuracy must be much higher than for keyboarding. Head movement filtering is a problem with helmet sights, since output is delayed if too much filtering is attempted, and accuracy suffers if vibration is ignored. Cuing by LED's is restricted by the number of leads the helmet can incorporate, and CRT's are too heavy. Factors affecting DVI performance include electronic noise on intercoms, microphone to mouth distance, voice changes caused by stress, and the number of commands pilots can remember.
Author (ESA)

N82-18216# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AN ON BOARD SUPERVISORY SYSTEM FOR APPLICATIONS IN SPACE MISSIONS [UM SISTEMA DE SUPERVISAO DE BORDO PARA APLICACOES EM MISSOES ESPACIAIS]
Jose Carlos Maldonado and Ricardo deAzevedo Mendes Jun. 1981 13 p refs In PORTUGUESE; ENGLISH abstract Presented at the 2nd Natl. Automation Meeting, Salvador, Bahia, Brazil, Jul. 1981
(INPE-2097-RPE/327) Avail: NTIS HC A02/MF A01

The system, developed in the digital and analog system group/program, enables full duplex communication between an onboard and a ground microcomputer, based on a reserved protocol. The system performs the following functions: data acquisition, control, transmission and reception between an onboard payload and a ground station. It also executes housekeeping tasks and telecommand operations. This systems was, in particular, utilized in the balloon mission PEROBA-I. The performance of the system in the mission was satisfactory. T.M.

N82-18217# Hughes Aircraft Co., Canoga Park, Calif.
ANALYSIS OF BUILT-IN-TEST (BIT) FALSE ALARM CONDITIONS Final Technical Report, 24 Jan. 1980 - 28 Feb. 1981
John G. Malcolm and Richard W. Highland Griffiss AFB, N.Y. RADC Aug. 1981 122 p refs
(Contract F30602-80-C-0074; AF Proj. 2338)
(AD-A108752; RADC-TR-81-220) Avail: NTIS HC A06/MF A01 CSCL 14/2

Usefulness of BIT is seriously affected by the presence of false alarms. False alarms can degrade mission effectiveness of systems and contribute to the expenditure of excessive maintenance resources. The objectives of this study were to determine the root causes of the false alarm problem and to develop design guidelines to minimize the occurrence and the effect of false alarms. False alarm rates have been established for the three systems investigated and prediction factors defined.
Author (GRA)

N82-18218# Lockheed-Georgia Co., Marietta.
ANALYTICAL STUDY OF COCKPIT INFORMATION REQUIREMENTS Final Report, Oct. 1979 - Nov. 1980
J. D. Caldwell and T. G. Jones Washington FAA Apr. 1981 165 p refs
(Contract DOT-FA79WA-4368)
(AD-A108524; LG80ER0200; FAA/RD-81/4) Avail: NTIS HC A08/MF A01 CSCL 01/3

An assessment is made of cockpit information requirements likely to be imposed on aircraft in the next fifteen years as a result of improvements in the ATC system and in aircraft design. These requirements are analyzed by work centers and include flight control, navigation, collision avoidance, flight management, communications, caution/warning and monitoring, and checklist functions. From a baseline of current requirements and technology, the application of new requirements and technology is analyzed. Three aircraft are hypothesized representing three time periods of technical development. The purpose is to investigate the impact of future ATC changes on differently equipped aircraft. GRA

N82-18219# Arinc Research Corp., Annapolis, Md.
IMPACT OF TECHNOLOGY ON AVIONICS COST TRENDS
Steven Toth, William Lovelace, and Kelly Markin Nov. 1981 84 p
(Contract DTFA-01-80-C-10030)
(AD-A108494; Rept-1378-40-2-2553; FAA-EM-82-6) Avail: NTIS HC A05/MF A01 CSCL 09/3

This study provides an overview of nonmilitary generally aviation and commercial avionics price and cost structures as influenced by technology. It quantifies, computes, and evaluates the unique characteristics and behavior patterns of the industry, especially those that affect the frequency of innovation, the rate of technology diffusion from manufacturer to manufacturer or from product to product, and the anticipated major cost drivers of the future. The report reviews the impact of technology on the cost of avionics during the past 20 years and projects this impact for the next 20 years. This report concentrates on avionics in the low-performance general aviation aircraft category because they are the major components of the avionics industry. Typical units of detailed study are transponders, transceivers, navigation receivers, and course deviation indicators (CDIs). An examination of the price histories of more than twenty equipment families indicates that unit prices have been and are likely to continue increasing at the Producer Price Index (PPI) rate. This rate of price growth results from a balance between costs rising at the Consumer Price Index (CPI) rate and manufacturing cost reductions made possible through the introduction of new technologies.
Author (GRA)

N82-18220# National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.
TRENDS IN AIRLINE AVIONICS
F. J. Abbink 13 Mar. 1980 30 p refs Presented at Netherlands Assoc. of Aeron. Engr. Symp. on Develop. in Avionics, Delft, 25 Apr. 1980
(NLR-MP-80013-U) Avail: NTIS HC A03/MF A01

The evolution of aeronautical electronics is described. Trends towards system integration for airliners are indicated. The development of airline avionics specifications by the airlines and constructors is outlined. The design and function of avionics equipment, e.g., navigation aids, are explained. The Aeronautical Radio Incorporated 700 automatic flight system is introduced as an example of a system suited to the next generation of

airliners. Radio navigation, communication and identification equipment are controlled by the digital frequency/function selection unit. Automatic flight control and auto-throttle functions are executed by flight control and thrust control computers.
Author (ESA)

N82-18221# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
INTEGRATION OF COMPLEX SYSTEMS IN CURRENT AND FUTURE AIRCRAFT PROJECTS FOR THE EXAMPLE OF AVIONICS [INTEGRATION KOMPLEXER SYSTEME IN LAUFENDE UND ZUKUENFTIGE FLUGZEUGPROGRAMME AM BEISPIEL DER AVIONIK]
H. Haeuser 31 Jan. 1980 38 p In GERMAN
(MBB-UH-18-80-O) Avail: NTIS HC A03/MF A01

Equipment for electrical and avionic systems, and special equipment needed in the airplane program were developed. Avionics is defined as: airplane structure, airplane equipment (besides the mechanical system) includes that part of the equipment system which is supported by the electric and electronic system, and construction and general instruments necessary in airplane construction. Avionics enables the supply, transfer, processing, and production (activation) of information for the management of airplane systems, control of airplanes, and the execution of special functions. Transl. by E.A.K.

N82-18166# Army Aviation Research and Development Command, St. Louis, Mo.
REVIEW OF HELICOPTER MAST MOUNTED SIGHT (MMS) BASE MOTION ISOLATION AND LINE-OF-SIGHT (LOS) STABILIZATION CONCEPTS
Daniel P. Schrage *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18167# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
MAST MOUNTED VISUAL AIDS
R. D. vonReth *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 24 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18168# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.
EXPERIMENTAL INVESTIGATION OF VISUAL AIDS FOR HELICOPTERS: LOW LEVEL FLIGHT AT NIGHT AND POOR VISIBILITY
R. Beyer, E. Dannaberg, E. Kohnen, and H. Stein *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 15 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18169# Litton Systems (Canada) Ltd., Toronto (Ontario). Advance Programs.
THE MULTI MODE MATRIX FLAT PANEL DISPLAY: TECHNOLOGY AND APPLICATIONS
A. Moffat and P. Wright *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18172# Institut fuer Flugmechanik, Brunswick (West Germany).
EVALUATION OF THE HELICOPTER LOW AIRSPEED SYSTEM LASSIE
J. Kaletka *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 23 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18173# Elektronik-System G.m.b.H., Munich (West Germany).
INTEGRATION OF INERTIAL SENSORS IN HELICOPTERS
Volkmar Held *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-18222*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECTS OF FAN INLET TEMPERATURE DISTURBANCES ON THE STABILITY OF A TURBOFAN ENGINE
Mahmood Abdelwahab Dec. 1981 36 p refs
(NASA-TM-82699; E-382) Avail: NTIS HC A03/MF A01 CSCL 21E

The effects of steady-state and time-dependent fan inlet total temperature disturbances on the stability of a TF30-P-3 turbofan engine were determined. Disturbances were induced by a gaseous-hydrogen-fueled burner system installed upstream of the fan inlet. Data were obtained at a fan inlet Reynolds number index of 0.50 and at a low-pressure-rotor corrected speed of 90 percent of military speed. All tests were conducted with a 90 deg extent of the fan inlet circumference exposed to above-average temperatures. T.M.

N82-18223# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).
FURTHER DEVELOPMENT OF THE TEST CONCEPT OF THE ALPHA JET ENGINE LARZAC 04 [WEITERENTWICKLUNG DES PRUEFKONZEPTES FUER DAS ALPHA-JET-TRIEBWERK LARZAC 04]
Ernst Lerche 1981 33 p In GERMAN Presented at Seminars Prueftech. und Pruefstandstech., Hannover, 3 Apr. 1981
Avail: NTIS HC A03/MF A01

The test stand for the LARZAC 04 jet unit for the Alpha jet aircraft was developed. The test stand is outlined, and equipment extension, and a maintenance procedure for the driving system are presented. Transl. by E.A.K.

N82-18132# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
PREDICTION OF OFF-DESIGN PERFORMANCE OF TURBO-SHAFT ENGINES A SIMPLIFIED METHOD
H. Wittenberg *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18133# Rolls-Royce Ltd., Watford (England).
MEASUREMENT TECHNIQUES USED TO ASSESS THE INSTALLED POWER OF A HELICOPTER ENGINE
T. G. Morton *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p Original contains color illustrations (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18134# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
COMPONENT DESIGN AND DEVELOPMENT FOR FUTURE HELICOPTER ENGINES
Jean Hourmouziadis and Horst B. Kreiner *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18135# General Electric Co., Cincinnati, Ohio. Systems and Controls.
THREE-ENGINE CONTROL SYSTEM FOR THE PROTOTYPE EH-101 HELICOPTER
E. A. Chiuchiolo and J. J. Curran *In* DGLR Seventh European

Rotorcraft and Powered Lift Aircraft 1981 10 p refs (For primary document see N82-18119 09-01)
(AEBG-9/81-1568L) Avail: NTIS HC A99/MF A01

N82-18136# I.A.M. Rinaldo Piaggio, Finale Ligure (Italy).
ENGINE SUPERFICIAL TEMPERATURE AND INFRARED SIGNATURE
A. M. Ricci, A. N. Allavena, and W. Esposti (I.C.I.T.E., S. Giuliano Milanese, Italy) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-18224# Honeywell Systems and Research Center, Minneapolis, Minn. Aerospace and Defense Group.
INTEGRATED CONTROL DESIGN TECHNIQUES Final Report, Jun. 1979 - Nov. 1980
A. L. Jones, J. K. Mahesh, M. A. Kollodge, D. P. Pledger, E. R. Rang, and K. D. Graham Wright-Patterson AFB, Ohio AFWAL Aug. 1981 314 p refs
(Contract F33615-79-C-3609; AF Proj. 2403)
(AD-A108223; Rept-80SRC82; AFWAL-TR-81-3074) Avail: NTIS HC A14/MF A01 CSCL 01/3

A total systems approach methodology and computer-aided design tool for integrated flight control design and evaluation has been formulated. This methodology is a composition of classical system design steps and system performance, reliability/survivability, packaging and cost evaluation techniques assembled for interactive computer-based execution. The interactive sensor integration program developed under this methodology addresses the sensor requirements of the flight control, guidance and navigation, and weapon delivery functions as directed interactively by the designer and the mission, the system configuration, cost, power, weight, volume constraints and total system performance. The demonstration program contains performance reliability, size, power, weight, cost data for gyros, accelerometers, radars, seekers and air data systems in addition to analysis tools for evaluating navigation system accuracy, probability of target acquisition, and probability of kill for selected targets and weapons. Author (GRA)

N82-18153# National Aerospace Lab., Amsterdam (Netherlands).
A CONTROL MODEL FOR MANEUVERING FLIGHT FOR APPLICATION TO A COMPUTER-FLIGHT TESTING PROGRAM
H. Haverdings *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-18225# Instituut TNO voor Bouwmaycrialen en Bouwconstructies, Delft (Netherlands).
INVESTIGATION INTO THE UTILITY OF SOME QUICK SETTING CEMENTS FOR RUNWAY REPAIR [ONDERZOEK NAAR DE BRUIKBAARHEID VAN ENKELE SNELVERHARDENDE BINDMIDDELEN VOOR REPARATIE VAN STARTBANEN]
Mar. 1980 39 p refs In DUTCH
(B-80-157/60.7.0157; TDCK-75056) Avail: NTIS HC A03/MF A01

The application of quick setting cements in rapid runway repair was investigated. Needed strength and layer thickness of the hardening material was determined. The following results are reported: (1) it is possible to fill up a hollow space with quick setting cements, even in combination with proper additives like super plastifiers; (2) pressure strength for hardening time is accomplished within one hour; (3) a fast operating method is needed to prevent debinding of cement, continuous mixers for smaller quantities are recommended. Transl. by E.A.K.

N82-18226# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
THE LINK-HILES DRIVER TRAINING SIMULATOR FOR TRACKED VEHICLES: THE EFFECT OF METHOD AND DURATION OF TRAINING ON THE TRANSFER OF TRAINING
K. J. Poll 1980 20 p refs In DUTCH; ENGLISH summary
(Contract A76/KL/148)
(IZF-1980-28; TDCK-75019) Avail: NTIS HC A02/MF A01

Transfer of training through different methods and durations of training from a driving simulator to a task was investigated. In method A the candidates were under strict guidance of the instructor, while in method B the candidates trained more on their own and paid more attention to the integration of the part-tasks. The duration of training was dependant on the performance-level on which the candidate turned over from the simulator to the real tanks. These performance-levels were: the single trial execution of all tasks (low level), having all tasks under control (medium level), and sufficient integration of all part-tasks (high level). From the results it is clear that when the candidates were trained in pairs the mean number of kilometers for the two candidates shows to difference as a function of training method. Although the 'first' candidate needs less kilometers with method B, and 'second' candidate learns more from the 'first' with method A. The number of kilometers on the tank, necessary to pass the final driver's test, is a linear relation as a function of the duration of simulator training. J.M.S.

N82-18227# Coppin State Coll., Baltimore, Md.
TASK ANALYTIC TECHNIQUES: APPLICATION TO THE DESIGN OF A FLIGHT SIMULATOR INSTRUCTOR/OPERATOR CONSOLE Final Report
Charles D. Sanders Brooks AFB, Tex. Air Force Human Resources Lab. Dec. 1981 21 p refs Prepared for Southeastern Center for Electrical Engineering Education, St. Cloud, Fla. Submitted for publication
(Contract F49620-79-C-0038; AF Proj. 9983)
(AD-A108724; AFHRL-TP-81-38) Avail: NTIS HC A02/MF A01 CSCL 14/2

Instructional Systems Development (ISD) has contributed to the efficiency and low cost of air flight training through the medium of the simulator. Task analysis is a component of ISD, and its application to the improvement of devices such as simulator instructor/operator consoles will continue to enhance the quality of flight training. Task analytic techniques are inextricably interwoven into the design of an instructor/operator console. The application involves the process, persons, and a machine within the context of a flight simulator. The tasks of the instructor and student are primary in the design process. The efficiency and economy of the task analytic process has implications for its use in the future developments of automated flight training. Author (GRA)

N82-18228# SRI International Corp., Arlington, Va.
EVALUATION OF THE NORTH ISLAND A/C CRASH/RESCUE TRAINING FACILITY
R. S. Alger Aug. 1981 153 p refs
(Contract N00014-80-C-0696; SRI Proj. PYU-1943)
(AD-A108740) Avail: NTIS HC A08/MF A01 CSCL 05/9

Under Executive Order 11752, the Navy and the Air Force began a cooperative effort to develop training facilities that could provide more fire fighting training with less smoke and water pollution. Soon the central issue of pollution control was surrounded by a series of satellite questions that had to be

answered before training facilities could be designed, e.g., what type of training is required; how much training should be provided; where should firemen train; and how much departure from the real emergency situation is permissible. Various public and private groups contributed answers. The Naval Air Station, North Island, San Diego, Calif., Aircraft/Crash Fire Rescue Training Facility is the first Navy facility constructed as an outgrowth of this effort to improve training while reducing the environmental impact to an acceptable level. This report evaluates the performance of the North Island facility in a series of environmental and training tests. The scope includes: (1) the evaluation procedure and results; (2) a comparison to other training options; and (3) recommendations for future training activity.
GRA

N82-18229# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
BOMB CRATER REPAIR TECHNIQUES FOR PERMANENT AIRFIELDS. REPORT 1: SERIES 1 TESTS Technical Report, Jul. - Nov. 1978
David L. Cooksey Oct. 1981 129 p refs
(AD-A108716; WES/MP/GL-81-12) Avail: NTIS
HC A07/MF A01 CSCL 13/2

A test section with six simulated bomb craters was constructed for the purpose of developing an improved field method of repair and restoration of air base runways damaged by enemy attack. The crater repair materials tested in the reconstruction were a high-quality crushed stone, grouted concrete, portland cement concrete (PCC), and asphaltic concrete (AC). The performances of the different materials were evaluated under full-scale load testings with the F-4 and C-141 aircraft loadings. The gravity grout solution and the high-quality crushed stone method performed beyond required coverage levels and seem to be the two high candidate material systems for further research. The solutions were accomplished with the time, manpower, equipment, and performance constraints of operational requirements.
GRA

N82-18230# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
INVESTIGATION OF COMPACTION CRITERIA FOR AIRPORT PAVEMENT SUBGRADE SOILS Final Report, Mar. 1978 - Apr. 1981
William N. Brabston Washington, D.C. FAA Oct. 1981 174 p refs
(Contract DOT-FA78WAI-876)
(AD-A108518; WES/TR/GL-81-11; FAA-RD-81-48) Avail: NTIS HC A08/MF A01 CSCL 08/13

A study was conducted to determine the effect of lowering soil density requirements for subgrades under airport pavements. The investigation was primarily a laboratory effort in which molded specimens of three different soil types, compacted to densities at and below those currently specified by FAA criteria, were subjected to repeated axial loadings in a triaxial compression chamber. The primary response parameters of interest were permanent and resilient axial strain. Test results were formulated into a statistical model to predict permanent soil strain based on soil characteristics such as density, clay content, compaction characteristics, and sheer strength. The strain model was used to calculate values of permanent soil deformation at the surface of the subgrade for various combinations of soil density. Results of the test indicated that the wide variation in soil response among the three materials tested precluded any general alteration in current FAA compaction criteria.
Author (GRA)

N82-18231# Textron Bell Helicopter, Fort Worth, Tex.
ROTORCRAFT FLIGHT SIMULATION COMPUTER PROGRAM C81 WITH DATAMAP INTERFACE. VOLUME 2: PROGRAMMER'S MANUAL Final Report
P. Y. Hsieh Oct. 1981 264 p Supersedes USAAMRDL-TR-76-41A, USAAMRDL-TR-76-41B, and USAAMRDL-TR-76-41C
(Contract DAAK51-79-C-0015; DA Proj. 1L1-62209-AH-76)
(AD-A108294; BHT-699-099-111-Vol-2;
USAAVRADCOM-TR-80-D-38B; USAAMRDL-TR-76-41A;
USAAMRDL-TR-76-41B; USAAMRDL-TR-76-41C) Avail: NTIS
HC A12/MF A01 CSCL 09/2

This report documents the current version in the C81 family of rotorcraft flight simulation programs developed by Bell Helicopter Textron. This current version of the digital computer program is referred to as AGAP80. The accompanying program for calculating fully coupled rotor blade mode shapes is called DNAM05, and an associated rotor wake program is called AR9102. The AGAP80 version of C81 was developed by adding some analytical features to the AGAJ76 version and including the ability to generate Data Transfer Files for use by the File Creation Program of DATAMAP. An overview of the computer program capabilities and the principal mathematical models incorporated in the program are given in Volume I of the documentation for the AGAJ76 version of the program. Volume I, the User's Manual, contains detailed information necessary for setting up an input data deck and interpreting the computed data. Volume II, includes a catalog of subroutines and a discussion of programming considerations.
GRA

N82-18232# Naval Air Engineering Center, Lakehurst, N.J. Ship Installation Engineering Dept.
INVESTIGATION OF CROSSDECK PENDANT CATAPULT SLOT INTERACTION; PROPOSED CORRECTIVE MEASURES Final Report, Apr. 1978 - Mar. 1979
Alvin Hittner 20 Nov. 1981 56 p ref
(AD-A108149; NAEC-91-7964) Avail: NTIS
HC A04/MF A01 CSCL 01/5

This report documents the investigation of the crossdeck pendant failure aboard USS JOHN F. KENNEDY (CV 67) in March 1978, which caused the loss of an F-14A. Included are the results of a survey to determine the scope of the deck pendant/catapult slot interaction problem, testing to confirm the failure sequence, and the evaluation of slot filler devices (buttons) to resolve the problem.
Author (GRA)

N82-18233# MGA Research Corp., Buffalo, N.Y.
TEST SITE INSTRUMENTATION STUDY. VOLUME 2: CRASH 1 AND CRASH 2 RAW DATA Final Report, 22 Mar. 1980 - 31 Mar. 1981
Rudy H. Arendt and Patrick M. Miller Jun. 1981 150 p refs
(Contract DOT-HS-8-01936)
(PB82-111832; G22-V-2; DOT-HS-805980-Vol-2) Avail: NTIS
HC A07/MF A01 CSCL 13F

The data acquisition and reduction practices at fifteen crash and sled testing facilities which normally produce impact test data for the NHTSA were reviewed. Attention was focused on dynamic response characteristics, instrumentation calibration procedures, filtering techniques, equipment properties and analog to digital conversion techniques.
GRA

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-18234*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPACELAB MISSION 1 EXPERIMENT DESCRIPTIONS SECOND EDITION
Paul D. Craven, ed. Nov. 1981 154 p Revised Prepared jointly with ESA, Paris Original contains color illustration
(NASA-TM-82448; ESA/FSLP-EX-001) Avail: NTIS
HC A08/MF A01 CSCL 22A

Brief descriptions of experiments and their instrumentation selected for the flight of Spacelab 1 are presented. For individual titles, see N82-18235 through N82-18269.

N82-18235*# Michigan Univ., Ann Arbor.
AN IMAGING SPECTROMETRIC OBSERVATORY c74
M. R. Torr *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 20F

Measurement of the airglow spectrum from the extreme ultraviolet to the infrared using five identical imaging scanning spectrometers is planned. Functions and operation of the instrument are described.
J.D.H.

N82-18236*# Institut d'Aeronomie Spatiale de Belgique, Brussels.

GRILLE SPECTROMETER c35
M. Ackerman and A. Girard (ONERA) *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14B

High resolution infrared spectroscopic observations of the Earth's limb in the wavelength range characteristic of the vibrational-rotational lines of trace atmospheric constituents is planned. The instrument and its operation and the purpose of the experiments are summarized. J.D.H.

N82-18237*# Centre National de la Recherche Scientifique, Paris (France). Service d'Aeronomie.
WAVES IN THE OH EMISSIVE LAYER c35
M. Herse *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 2 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14E

Photography and measurement of cloud-like structures of bright parallel bands observed in near infrared photography of the night sky is planned. The instrument is described and the purpose of the experiment summarized. J.D.H.

N82-18238*# Centre National de la Recherche Scientifique, Paris (France). Service d'Aeronomie.
INVESTIGATION ON ATMOSPHERIC H AND D THROUGH THE MEASUREMENT OF THEIR LYMAN-ALPHA EMISSIONS c46
J. L. Bertaux *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 04A

Study of sources of Lyman-alpha emission in the atmosphere, in the interplanetary medium, and perhaps in the galactic medium is planned. Sources of Lyman-alpha emission are described and a schematic of the instrument presented. J.D.H.

N82-18239*# European Space Conference, Paris (France).
METRIC CAMERA EXPERIMENT c35
M. Reynolds *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14E

A test of the mapping capabilities of high resolution space photography taken at the resolution limit of image motion on large film format is planned. The metric camera system and its planned operation are described. J.D.H.

N82-18240*# European Space Conference, Paris (France).
MICROWAVE REMOTE SENSING EXPERIMENT c43
G. Dieterle *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14B

Operation of the microwave instrument as a two frequency scatterometer, a synthetic aperture radar, and a passive microwave radiometer is planned. Operation of the instrument in each of its three modes is discussed and the antenna system described. J.D.H.

N82-18241*# Tokyo Univ. (Japan).
SPACE EXPERIMENTS WITH PARTICLE ACCELERATORS c46
Tatsuzo Obayashi *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 04A

The purpose of space experiments with particle accelerators (SEPAC) is to carry out active and interactive experiments on and in the Earth's ionosphere and magnetosphere. It is also intended to make an initial performance test for an overall program of Spacelab/SEPAC experiments. The instruments to be used are an electron beam accelerator, magnetoplasma dynamic arcjet, and associated diagnostic equipment. The accelerators are installed on the pallet, with monitoring and diagnostic observations being made by the gas plume release, beam-monitor TV, and particle-wave measuring instruments also mounted on the pallet. Command and display systems are installed in the module. Three major classes of investigations to be performed are vehicle charge eutralization, beam plasma physics, and beam atmosphere interactions. The first two are mainly onboard plasma physics experiments to measure the effect of phenomena in the vicinity of Spacelab. The last one is concerned with atmospheric modification and is supported by other Spacelab 1 investigations as well as by ground-based, remote sensing observations. A.R.H.

N82-18242*# Centre National d'Etudes des Telecommunications, Bagneux (France).
PHENOMENA INDUCED BY CHARGED PARTICLE BEAMS c72
C. Beghin *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 20H

The injection of energetic particles along the Earth's magnetic field lines is a possible remote sensing method for measuring the electric fields parallel to the magnetic field with good time resolution over the entire magnetic field. Neutralization processes, return-current effects, dynamics of the beams, triggered instabilities, and waves must be investigated before the fundamental question about proper experimental conditions, such as energy, intensity and divergence of the beams, pitch-angle injection, ion species, proper probes and detectors and their location, and rendezvous conditions, can be resolved. An experiment designed to provide a better understanding of these special physical processes and to provide some answers to questions concerning beam injection techniques is described. A.R.H.

N82-18243*# Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
ATMOSPHERIC EMISSION PHOTOMETRIC IMAGING c46
S. B. Mende *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 04A

A dual-channel video system mounted on a stabilized two-axis gimbal system (mounted on the pallet) with associated optics and data handling electronics described the low light flux observations are required for: (1) investigating ionospheric transport processes by observing Mg^+ ions; (2) supporting magnetospheric electron bounce experiments; (3) measuring electron cross sections for selected atmospheric species; (4) detecting small particle contamination; and (5) studying natural auroras. A.R.H.

N82-18244*# Max-Planck-Institut fuer Aeronomie, Hanover (West Germany).
LOW-ENERGY ELECTRON FLUX AND ITS REACTION TO ACTIVE EXPERIMENTATION OF SPACELAB c46
K. Wilhelm *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 04A

An instrument capable of observing the natural electron flux in the energy range from 0.1 to 12.0 kiloelectron volts is discussed for use in an experiment intended as a forerunner of a method that will utilize artificially accelerated electrons as tracer particles for electron fields parallel to the magnetic field. Effects that are of importance either as means of detecting the echo beam or as causes of beam perturbations (e.g., spacecraft charging effects and electron background) are to be studied. The use of electron accelerators as a tool to probe magnetospheric processes rather than to modify them is planned. A.R.H.

N82-18245*# Oesterreichische Akademie der Wissenschaften, Vienna. Space Research Inst.
DC-MAGNETIC FIELD VECTOR MEASUREMENT c46
R. Schmidt *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 2 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 08N

A magnetometer experiment was designed to determine the local magnetic field by measuring the total of the Earth's magnetic field and that of an unknown spacecraft. The measured field

vector components are available to all onboard experiments via the Spacelab command and data management system. The experiment consists of two parts, an electronic box and the magnetic field sensor. The sensor includes three independent measuring flux-gate magnetometers, each measuring one component. The physical background is the nonlinearity of the B-H curve of a ferrite material. Two coils wound around a ferrite rod are necessary. One of them, a tank coil, pumps the ferrite rod at approximately 20 kilohertz. As a consequence of the nonlinearity, many harmonics can be produced. The second coil (i.e., the detection coil) resonates to the first harmonic. If an unknown dc or low-frequency magnetic field exists, the amplitude of the first harmonic is a measure for the unknown magnetic field. The voltages detected by the sensors are to be digitized and transferred to the command and data management system.
A.R.H.

N82-18246*# Kiel Univ. (West Germany). Inst. fuer Reine und Angewandte Kernphysik.

ISOTOPIC STACK - MEASUREMENT OF HEAVY COSMIC RAY ISOTOPES

c93

R. Beaujean *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 03B

Heavy cosmic ray nuclei with nuclear charge, Z, equal to or greater than 3 are to be measured using an isotopic stack consisting of passive visual track detectors which remain sensitive throughout the entire mission. The scientific data are stored in latent tracks which are produced by heavy ions and which can be revealed in the investigator's laboratory after recovery. During the mission, only housekeeping data have to be collected. The exposure onboard Spacelab 1 allows the study of the chemical composition and energy spectrum of articles which have energies in the range 20 to 100 million electron volts per atomic mass unit, as well as the isotopic composition of heavy galactic cosmic rays with energies in the range 100 to 1000 million electron volts per atomic mass unit.
A.R.H.

N82-18247*# European Space Agency, Paris (France).

MATERIALS SCIENCE

U. Huth, Y. Malmejac (CEA), and L. Napolitano (Naples Univ.) *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 16 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 22A

The first Spacelab space processing payload includes the following categories of hardware: (1) multiuser facilities, (2) common-support equipment, and (3) six autonomous experiments. All the hardware, with the exception of two elements (covering three experiments), will be integrated in a Spacelab double rack called the materials science double rack. The payload experimental facilities are intended to perform, during the first Spacelab mission, a number of significant pilot experiments in the fields of crystal growth, fluid physics and metallurgy, and, at the same time, to flight-verify the materials science hardware items developed (e.g., various furnaces, process chambers, etc.).
A.R.H.

N82-18248*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

WETTING, SPREADING AND OPERATING CHARACTERISTICS OF BEARING LUBRICANTS IN A ZERO-GRAVITY ENVIRONMENT

C. H. T. Pan (Shaker Research), Ann F. Whitaker, and Raymond L. Gause *In its* Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 22A

The prolonged zero-gravity condition in a Spacelab flight provides a unique opportunity to long-term distribution and movement of a lubricant as well as the dynamic stability mechanism of a journal bearing which is believed to be associated with the two-phase fluid boundary. The tribology experiment assembly includes four wetting and spreading modules, three journal bearing modules, a camera, film, lenses, a three axis low gravity accelerator system, and an electronics assembly.
A.R.H.

N82-18249*# California Univ., Berkeley.

FAR ULTRAVIOLET ASTRONOMY USING THE FAUST TELESCOPE

c89

C. S. Bowyer *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 03A

The Far Ultraviolet Space Telescope (FAUST) a compact, wide field-of-view, far ultraviolet instrument designed for astronomical observations of extended and point sources is discussed. The design and application of the instrument are described. The prime objective is to observe faint astronomical sources with sensitivities higher than previously available. Scientific programs will include: (1) a search for ultraviolet stars which are predicted to exist at the stage of evolution prior to the final death of a star; (2) observations of galaxies and quasars; and (3) joint programs with other Spacelab 1 experiments. The secondary objective is to verify the suitability of the Spacelab as a platform for far ultraviolet astronomy: data will be provided on the ultraviolet background levels due to astronomical, terrestrial, and spacecraft generated sources; the levels of contaminants which affect ultraviolet instruments; and the capability of the Orbiter for stable pointing at celestial sources for useful periods of time.
E.A.K.

N82-18250*# Laboratoire d'Aerothermique du C.N.R.S., Meudon (France).

VERY WIDE FIELD CAMERA

c35

G. Courtes *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14E

The study of galactic and faint extragalactic extended sources and peculiar ultraviolet objects by a very wide field of view camera, operated in the ultraviolet photometric and spectrometric modes is discussed. The photometric mode is direct photography through filters for observation of the following sources: (1) large scale distribution of ultraviolet radiation in the Milky Way; (2) diffusion of the galactic light above the galactic plane and in front of the large absorbing clouds; (3) the optical emission of the interstellar matter; (4) stars, and starlike objects with diameters less than 3 arc minutes. In the spectrometric mode (nebular spectrograph) the light from the center of the photometric field is concentrated on a slit covering 10 degrees by 10 arc minutes on the sky.
E.A.K.

N82-18251*# European Space Technology Center, Delft (Netherlands).

SPECTROSCOPY IN X-RAY ASTRONOMY

c89

R. Andresen *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 03A

Detailed features in cosmic X-ray sources and their associated temporal variation over a wide energy range were studied. Excess emission and absorption at approximately 6 to 7 kiloelectron volts in the spectra of supernova remnants, binary X-ray sources, and clusters of galaxies were observed. A gas scintillation proportional counter (GSPC) will be used as the detector system. In the gas scintillator the principal limitation is due to the statistics of the initial ionization process only.
E.A.K.

N82-18252*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ACTIVE CAVITY RADIOMETER

c35

R. C. Willson *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14B

The active cavity radiometer (ACR) experiment on the Spacelab 1 mission to measure the total solar irradiance is discussed. Short and long term variations in the total solar output of optical energy are studied. Solar total irradiance observation provides information on the solar cycle and other long term trends in solar output that are of climatological significance as well as short term solar physics phenomena. The interaction of solar radiation with the Earth's atmosphere, oceans, and land masses provides the primary driving forces for the formation of weather systems and the determination of climate. Astrophysical measurements determine the total energy flux. The principal role of the ACR observations support extended solar irradiance experiments on free flying satellites. Solar irradiance measurements are important in the establishment of the radiation scale at the solar total flux level in the international system of units (SI). E.A.K.

N82-18253*# Institut Royal Meteorologique de Belgique, Brussels.

MEASUREMENT OF THE SOLAR CONSTANT c92

D. Crommelynck *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 03B

The absolute value of the solar constant and the long term variations that exist in the absolute value of the solar constant were measured. The solar constant is the total irradiance of the Sun at a distance of one astronomical unit. An absolute radiometer removed from the effects of the atmosphere with its calibration tested in situ was used to measure the solar constant. The importance of an accurate knowledge of the solar constant is emphasized. E.A.K.

N82-18254*# Centre National de la Recherche Scientifique, Paris (France).

SOLAR SPECTRUM FROM 170 TO 3200 NANOMETERS c92

G. Thuiller *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 03B

The spectral irradiance of the Sun between 170 and 3200 nanometers was measured to determine accurately the solar constant, its possible variation with the solar cycle, and the wavelength range responsible for the observed variations. It is pointed out that measurements over very long time periods (10 years) involving flights of the same instrument on future Spacelab missions will be required. Few spectral solar irradiation measurements ranging from the near ultraviolet to the near infrared have been performed yet. The most extensive solar irradiation measurements were obtained by a spectrometer onboard an aircraft or from high altitude observatories. The full disk irradiation flux was measured, corrections for atmospheric absorption are applied in all of the measurements. E.A.K.

N82-18255*# Mainz Univ. (West Germany).

EFFECTS OF RECTILINEAR ACCELERATION, OPTOKINETIC AND CALORIC STIMULI IN SPACE c52

R. vonBaumgarten *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 5 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

The set of experiments comprising the Spacelab 1ES201 package designed to investigate the human vestibular system and equilibratory function in weightlessness are described. The specific objectives of the experiments include: (1) the determination of the threshold of perception of linear oscillatory motion; (2) measurement of physiological and subjective responses to supra threshold, linear and angular motion stimuli; (3) study of the postural adjustments, eye movements, and illusions of attitude and motion evoked by optokinetic stimuli, (i.e., moving visual patterns) in order to assess visual/vestibular interactions; (4) examination of the effect of thermal stimulations of the vestibular apparatus to determine if the eye movements elicited by the 'caloric test' are used by a density gradient in the semicircular canal; and (5) investigation of the pathogenesis of space motion sickness by recording signs and symptoms during the course of vestibular stimulation and, specifically, when the test subject is exposed to sustained, linear ocillatory motion. M.G.

N82-18256*# Massachusetts Inst. of Tech., Cambridge.

VESTIBULAR EXPERIMENTS c52

L. R. Young *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 5 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

Spacelab experiments designed to investigate space motion sickness, any associated changes in otolith-mediated responses occurring during weightlessness, and the carryover of any such changes to postflight conditions are described. The experiments aimed at assessing otolithic responses in space are intended to clarify presumed alterations in vestibular function during weightlessness. Vestibular function will be investigated at several levels: vestibulo-ocular reflexes, vestibulo-spinal pathways, cortical functions involving perception of motion and spatial orientation, visual vestibular interaction, and motion sickness susceptibility. A second major objective relates to space motion sickness and man's well-being and productivity in space. M.G.

N82-18257*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

VESTIBULO-SPINAL REFLEX MECHANISMS c52

M. F. Reschke *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 2 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

The specific objectives of experiments designed to investigate postural reflex behavior during sustained weightlessness are discussed. The first is to investigate, during prolonged weightlessness with Hoffmann response (H-reflex) measurement procedures, vestibulo-spinal reflexes associated with vestibular (otolith) responses evoked during an applied linear acceleration. This objective includes not only an evaluation of otolith-induced changes in a major postural muscle but also an investigation with this technique of the adaptive process of the vestibular system and spinal reflex mechanisms to this unique environment. The second objective is to relate space motion sickness to the results of this investigation. Finally, a return to the vestibulo-spinal and postural reflexes to normal values following the flight will be examined. The flight experiment involves activation of nerve tissue (tibial N) with electrical shock and the recording of resulting muscle activity (soleus) with surface electrodes. Soleus/spinal H-reflex testing procedures will be used in conjuction with linear acceleration through the subject's X-axis. M.G.

N82-18258*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

THE INFLUENCE OF SPACE FLIGHT ON ERYTHROKINETICS IN MAN c52

Carolyn S. Leach *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06S

An experiment is described the purpose of which is to measure specific factors relative to the control of erythrokinetics in man which might be altered during the first seven days of exposure to the weightless environment of space flight. It is anticipated that these data will provide information relative to the mechanism by which the red cell mass is reduced during space flight. Specifically, the experiment is designed to establish: (1) if there is a significant change in red cell mass and plasma volume during the initial period of exposure to weightlessness; (2) if the plasma concentration of erythropoietin is reduced; (3) if there is an increase in the plasma concentration of erythropoietin inhibitors; (4) if there is a change in the effectiveness of erythropoiesis; and (5) if the number and age distribution of reticulocytes are altered. M.G.

N82-18259*# Freie Univ., Berlin (West Germany). Physiologisches Inst.

MEASUREMENT OF CENTRAL VENOUS PRESSURE AND DETERMINATION OF HORMONES IN BLOOD SERUM DURING WEIGHTLESSNESS c52

K. Kirsch *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 2 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

A Spacelab experiment is described which proposes to obtain data on the degree of engorgement of the cephalad circulation during weightlessness by recording central venous pressure. Of practical importance is the question of how close the astronauts are to pulmonary edema and whether the pressure falls toward normal during the time of the mission. Another experiment to investigate deviations from normal fluid and mineral metabolism, possibly initiated by the central engorgement of the low pressure system, is discussed. Hormones responsible for the control of water and mineral balance (vasopressin, catecholamines, renin, aldosterone, corticosteroids, and prostaglandin E1) will be analyzed from blood samples. M.G.

N82-18260*# Illinois Univ., Urbana.
EFFECTS OF PROLONGED WEIGHTLESSNESS ON THE HUMORAL IMMUNE RESPONSE OF HUMANS c52
E. W. Voss, Jr. *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 2 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06S

An experiment to examine the possible interrelationship of various classes of immunoglobulins by utilizing the effect of weightlessness as a stress factor and subsequently measuring inhibitory, compensatory, or enhancing interrelationships. A second objective of the experiment is to investigate the state of immune competency under conditions of sustained weightlessness. M.G.

N82-18261*# Eidgenoessische Technische Hochschule, Zurich (Switzerland).
EFFECT OF WEIGHTLESSNESS ON LYMPHOCYTE PROLIFERATION c52
Autusto Cogoli *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

An experiment to study the effect of weightlessness on lymphocyte proliferation to detect possible alteration of the cells responsible for the immune response during long-duration space flights is described. Human lymphocytes in culture medium will be delivered shortly before launch in an incubator which will be kept at 37C. Mitogen will be added to the culture. A control without mitogen will be run in parallel. After 70 hours of incubation, radioactive thymidine will be added. After two hours, cellular activity will be stopped by fixation and incubator power switched off. Later, the amount of incorporated thymidine will be determined and the cell morphology and the distribution of cell organelles will be investigated. R.J.F.

N82-18262*# Rome Univ. (Italy).
THREE-DIMENSIONAL BALLISTOCARDIOGRAPHY IN WEIGHTLESSNESS c52
A. Scano *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06E

An experiment is described the aim of which is to record a three dimensional ballistocardiogram under the condition of weightlessness and to compare it with tracings recorded on the same subject on the ground as a means of clarifying the meaning of ballistocardiogram waves in different physiological and perphaps pathological conditions. Another purpose is to investigate cardiovascular and possibly fluid adaptations to weightlessness from data collected almost simultaneously on the same subjects during the other cardiovascular during the other cardiovascular and metabolic experiments. R.J.F.

N82-18263*# Clinical Research Centre, London (England).
PERSONAL MINIATURE ELECTROPHYSIOLOGICAL TAPE RECORDER c35
H. Green *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 2 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14E

The use of a personal miniature electrophysiological tape recorder to measure the physiological reactions of space flight personnel to space flight stress and weightlessness is described. The Oxford Instruments Medilog recorder, a battery-powered, four-channel cassette tape recorder with 24 hour endurance is carried on the person and will record EKG, EOG, EEG, and timing and event markers. The data will give information about heart rate and morphology changes, and document adaptation to zero gravity on the part of subjects who, unlike highly trained astronauts, are more representative of the normal population than were the subjects of previous space flight studies. R.J.F.

N82-18264*# Stirling Univ. (Scotland).
MASS DISCRIMINATION DURING WEIGHTLESSNESS c52
Helen Ross *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06S

An experiment concerned with the ability of astronauts to discriminate between the mass of objects when both the objects and the astronauts are in weightless states is described. The main object of the experiment is to compare the threshold for weight-discrimination on Earth with that for mass-discrimination in orbit. Tests will be conducted premission and postmission and early and late during the mission while the crew is experiencing weightlessness. A comparison of early and late tests inflight and postflight will reveal the rate of adaptation to zero-gravity and 1-g. The mass discrimination box holds 24 balls which the astronaut will compare to one another in a random routine. R.J.F.

N82-18265*# Pennsylvania Univ., Philadelphia.
NUTATION OF HELIANTHUS ANNUUS IN A MICROGRAVITY ENVIRONMENT c51
Allan H. Brown *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06C

An experiment to gather evidence to decide between the Darwinian concept of endogenously motivated nutation and the more mechanistic concept of gravity dependent nutation is described. If nutation persists in weightlessness, parameters describing the motion will be measured by recording in time lapse mode the video images of a population of seedlings that were grown at 1-g, but which will be observed at virtual zero gravity. Later, the plant images will be displayed on a video monitor in a laboratory, photographed on 16 millimeter film, and analyzed frame by frame to determine the kinetics of nutation for each specimen tested. R.J.F.

N82-18266*# State Univ. of New York at Binghamton.
PRELIMINARY CHARACTERIZATION OF PERSISTING CIRCADIAN RHYTHMS DURING SPACE FLIGHT: NEUROSPORA AS A MODEL SYSTEM c52
Frank W. Sulzman *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

The effects of the Spacelab environment on the circadian rhythms in microorganisms are investigated. Neurospora is chosen because of its well characterized circadian rhythm of growth. Growth rate, banding patterns, and circadian period and phase information are studied. B.W.

N82-18267*# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Aachen (West Germany). Abteilung Biophysik.
MICROORGANISMS AND BIOMOLECULES IN SPACE HARD ENVIRONMENT c51
G. Horneck *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06C

Microorganisms and biomolecules exposed to space vacuum and to different intensities of selected wavelengths of solar ultraviolet radiation is studied. The influence of these factors, applied singly or simultaneously, on the integrity of microbial systems and biomolecules is measured. Specifically, this experiment will study in Bacillus subtilis spores (1) disturbances in subsequent germination, outgrowth, and colony formation; (2) photochemical reactions of the DNA and protein in vivo and in vitro and their role in biological injury; and (3) the efficiency of repair processes in these events. B.W.

N82-18268*# San Francisco Univ., Calif.
RADIATION ENVIRONMENT MAPPING c52
E. Y. Benton *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)

Avail: NTIS HC A08/MF A01 CSCL 06R

An experimental set up to map the cosmic radiation fieldinside the Spacelab vehicle to determine the potential biological hazards present is described. In addition to the integral linear energy transfer (LET) spectrum for protons and HZE particles, the parameters to be determined include the total radiation dose: fluence of neutrons, protons, and high charge and energy (HZE) particles. These results are to be derived from measurements made in passive dosimeters. B.W.

N82-18269*# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Aachen (West Germany). Abtelung Biophysik.

ADVANCED BIOSTACK EXPERIMENT c52

H. Buecker *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)

Avail: NTIS HC A08/MF A01 CSCL 06R

The Advanced Biostack Experiment is described. The objectives are: (1) to confirm, complement, and enlarge the information obtained from the previous experiments by applying improved and advanced methods of localization and physical and biological evaluation, performing advanced experiments based on these data, and including additional biological specimens and additional radiation detectors; (2) to determine the biological importance of nuclear disintegration stars; (3) to determine the interference of HZE particle induced effects with those of other space flight factors (e.g., weightlessness); and (4) to determine the distribution of HZE particles and of disintegration stars at different locations inside the module and on the pallet. B.W.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N82-18270# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

AN ADAPTIVE SATELLITE ORBIT ESTIMATION SCHEME USING AN ANALYTICAL APPROACH AND A DYNAMICAL MODEL COMPENSATION TECHNIQUE

Atair Rios Neto and Ricardo Negreiros dePaiva Jan. 1982 23 p refs Presented at the Intern. Symp. and Workshop on the Motion of Planets and Satellites, Sao Paulo, Brazil, 14-18 Dec. 1981

(INPE-2304-PRE/072) Avail: NTIS HC A02/MF A01

An Earth satellite orbit estimation procedure for real time applications is presented. A perturbed two body physical model is considered for the satellite equations of motion in the mathematical model of the estimator. Using the KS transformation, an analytical solution is obtained in the correspondent parametric transformed space. The perturbations in the Keplerian motion are treated, in the parametric space, as unmodeled accelerations. A dynamical model compensation technique approximates each component of these accelerations by a first order Gauss-Markov process. These accelerations are estimated along with the satellite motion by the definition of an extended state, using the extended Kalman filter. During the estimation process, the observations nonlinearities and the state noise covariance matrix are adaptively determined to prevent filter divergence. Results of numerical tests under simulated conditions are presented and discussed. Author

N82-18271# European Space Agency, Paris (France).

GENERAL STUDY OF OPTIMAL LOW THRUST, LIMITED POWER TRANSFERS BETWEEN ARBITRARY ELLIPTICAL ORBITS

J. P. Marec (ONERA, Chatillon, France) and N. X. Vinh (Michigan Univ.) Nov. 1981 161 p refs Transl. into ENGLISH from "Etude Generale des Transferts Optimaux a Poussee Faible et Puissance Limitee entre Orbites Elliptiques Quelconques", Rept. ONERA-Publ-1980-2 ONERA, Paris, 1981 Original report in FRENCH previously announced as N81-32167

(ESA-TT-697; ONERA-Publ-1980-2) Avail: NTIS HC A08/MF A01

The Edelbaum study which concerns only coplanar and coaxial cases is generalized. The significance of the corresponding time-free, multi-impulse transfers is shown. The concept of mean Hamiltonian was used to write the differential system of optimal trajectories in the space of orbital elements. The orientation-shape subproblem (concerning the orbit orientation and eccentricity) and the dimension-time-cost subproblem (concerning the semi-major axis, time law and consumption) were examined. Author (ESA)

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

No abstracts in this category.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-18272# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

A RAPID ESTIMATION OF NEAR EARTH SATELLITE LIFETIMES WITH QUASI-DYNAMIC ATMOSPHERE MODEL WITH APPLICATION TO A PROPOSED BRAZILIAN SATELLITE

Nellore Srinivasan Venkataraman and Kondapalli Rama Rao Dec. 1981 13 p refs Presented at the Intern. Symp. on Workshop on the Motion of Planets and Satellites, Sao Paulo, Brazil, Dec. 1981

(INPE-2287-PRE/063) Avail: NTIS HC A02/MF A01

A method to estimate the orbital lifetime of near Earth satellites using the small perturbation theory is presented. A quasidynamic atmospheric model is used by employing a different exospheric temperature every three months. The drag coefficient is calculated using kinetic theory. The results are validated by applying to several known satellites and comparison with the actual lifetime is very good. The method is then applied to a proposed Brazilian Satellite. Author

N82-18273*# National Aeronautics and Space Administration, Washington, D. C.

INTELSAT V-D (F-4) LAUNCH

1982 21 p

(NASA-TM-84133; O-491-203-82-04) Avail: NTIS HC A02/MF A01 CSCL 22B

Plans for the Intelsat 5D (F4) satellite launch are presented. The spacecraft and its subsystems are described and the mission is summarized. The Atlas Centaur launch vehicle is also described. S.L.

N82-18274*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

LAUNCH MISSION SUMMARY: INTELSAT 5 (F4) ATLAS/CENTAUR-58

22 Feb. 1982 14 p refs

(NASA-TM-84132; KSC-GP-15-26) Avail: NTIS HC A02/MF A01 CSCL 22B

The launch vehicle, spacecraft, and mission are described. Information relative to launch windows, flight plan, trajectory, and radar and telemetry coverage are included with brief sequence of flight events. A.R.H.

N82-18275*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

LARGE SPACE SYSTEMS TECHNOLOGY, 1981
William J. Boyer, comp. Mar. 1982 430 p refs Presented at Third Annual Technical Review, Hampton, Va., 16-19 Nov. 1981
(NASA-CP-2215-Pt-1; L-15096) Avail: NTIS HC A19/MF A01 CSCL 22B

A total systems approach including structures, analyses, controls, and antennas is presented as a cohesive, programmatic plan for large space systems. Specifically, program status, structures, materials, and analyses, and control of large space systems are addressed. For individual titles, see N82-18276 through N82-18304.

N82-18276*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Material Div.
THE EFFECTS OF ELECTRON AND GAMMA RADIATION ON EPOXY-BASED MATERIALS
R. E. Fornes, J. D. Memory, R. D. Gilbert, and E. R. Long, Jr. *In its* Large Space Systems Technol., 1981 Mar. 1982 p 27-36 Prepared in cooperation with North Carolina State Univ., Raleigh (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

Specimens of graphite/epoxy composites and epoxy resins were exposed to electron and gamma radiation, followed by mechanical property and fundamental measurements. Measurement techniques included: scanning electron microscopy, X-ray diffraction analysis, and electron spin resonance spectroscopic analysis. Results indicate little or no change in flexural properties of miniature specimens of a graphite/epoxy composite and no change in failure mode at the fiber-resin interface and in the crystallinity of the fiber and the resin. Some doubt in the observation of stable flexural properties is cast by electron paramagnetic resonance spectra of a relatively large number of radiation-generated radicals. These generally lead to a change in cross-linking and in chain-scissioning which should alter mechanical properties. J.M.S.

N82-18277*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
BASIC PHYSICAL AND CHEMICAL PROCESSES IN SPACE RADIATION EFFECTS ON POLYMERS
E. Kamaratos, J. W. Wilson, C. K. Chang, and Y. J. Xu *In its* Large Space Systems Technol., 1981 Mar. 1982 p 37-58 refs Prepared in cooperation with Christopher Newport College and Old Dominion Univ. (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

The effects of space ionizing radiation on polymers is investigated in terms of operative physical and chemical processes. A useful model of charged particle impact with a polymer was designed. Principle paths of molecular relaxation were identified and energy handling processes were considered. The focus of the study was on energy absorption and the immediately following events. Further study of the radiation degradation of polymers is suggested. M.D.K.

N82-18278*# Jet Propulsion Lab., Cclifornia Inst. of Tech., Pasadena. Energy and Materials Research Section.
PULSED RADIOLYSIS OF MODEL AROMATIC POLYMERS AND EPOXY BASED MATRIX MATERIALS
Amitava Gupta, Joven Moacanin, Renty Liang, and Den Coulter *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 59-65 (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

Models of primary processes leading to deactivation of energy deposited by a pulse of high energy electrons were derived for epoxy matrix materials and poly[I-vinyl naphthalene]. The basic conclusion is that recombination of initially formed charged states is complete within 1 nanosecond, and subsequent degradation chemistry is controlled by the reactivity of these excited states. Excited states in both systems form complexes with ground state molecules. These excimers or exciplexes have their characteristics emissive and absorptive properties and may decay to form separated pairs of ground state molecules, cross over to the triplet manifold or emit fluorescence. ESR studies and chemical analyses subsequent to pulse radiolysis were performed in order to estimate bond cleavage probabilities and net reaction rates. The energy deactivation models which were proposed to interpr these data have led to the development of radiation stabilizatio criteria for these systems. Auth

N82-18279*# National Aeronautics and Space Administratio Langley Research Center, Hampton, Va.
THE EFFECTS OF MICROCRACKING ON THE THERMA EXPANSION OF GRAPHITE-EPOXY COMPOSITES
David E. Bowles *In its* Large Space Systems Technol., 198 Mar. 1982 p 67-79 refs (For primary document see N82-1827 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

A study of the effects of thermal environment and microcrack ing in graphite epoxy composites was made. Research indicate that microcracking does affect the thermal expansion of composite laminates. The amount of reduction in thermal expansion was function of the crack density. A maximum reduction of ap proximately 25% occurred in a quasi-isotropic specimen with crack density of 2.05 mm 1 in the 90 deg plies. Laminate analysis with appropriate reductions in E sub 2 and Alpha sub 2 of the damaged plies appears to be capable of modeling the observed M.D.K.

N82-18280*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THERMAL EXPANSION OF GRAPHITE-EPOXY BETWEEN 116 K AND 366 K
John S. Short, Michael W. Hyer, David E. Bowles, and Stephen S. Tompkins *In* is Large Space Systems Technol., 1981 Mar. 1982 p 81-92 ref Prepared in cooperation with Virginia Polytechnic Institute and State Univ. (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

A Priest laser interferometer was developed to measure the thermal strain of composite laminates. The salient features of this interferometer are that: (1) it operates between 116 K and 366 K; (2) it is easy to operate; (3) minimum specimen preparation is required; (4) coefficients of thermal expansion in the range of 0-5 micro epsilon/K can be measured; and (5) the resolution of thermal strain is on the order of micro epsilon. The thermal response of quasi-isotropic, T300/5208, grahite-epoxy composite material was studied with this interferometer. The study showed that: (1) for the material tested, thermal cycling effects are negligible; (2) variability of thermal response from specimen to specimen may become significant at cryogenic temperatures; and (3) the thermal response of 0.6 cm and 2.5 cm wide specimens are the same above room temperature. M.D.K.

N82-18281*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
FINITE ELEMENT THERMAL-STRUCTURAL MODELING OF ORBITING TRUSS STRUCTURES
Earl A. Thornton, Jack Mahaney, and Pramote Dechaumphai *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 93-108 refs (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

A description of an integrated finite element (FE) thermal-structural approach for accurate and efficient modeling of large space structures is presented. A geometric model with a common discretization for all analyses is employed. It uses improved thermal elements and the results from the thermal analysis directly in the structural analysis without any intervening data processing. The differences between the conventional FE approach as implemented in large programs and an integrated FE approach currently under development are described. Considerations for thermal modeling of truss members is discussed and three thermal truss finite elements are presented. The performance of these elements was evaluated for typical truss members neglecting joint effects. A simple truss with metallic joints and composite members was studied to evaluate the effectiveness of the approach for realistic truss designs. A study of the effects of aluminum joints on the thermal deformations of a simple, plane truss with composite members showed that joint effects may be significant. Further study is needed to assess the role of joint effects on the deformation of large trusses. M.D.K.

N82-18282*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Structures and Dynamics Div.

VIBRATION AND BUCKLING STUDIES OF PRETENSIONED STRUCTURES c75

W. Keith Belvin *In its* Large Space Systems Technol., 1981 Mar. 1982 p 109-121 (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

Results of analyses and tests of a simple pretensional structure are presented. Linear finite element analysis correlated well with experimental small amplitude vibration data. The buckling and vibration behavior of a pretensional stayed column was studied in detail. The bifurcation buckling load was also predicted accurately. Postbuckling behavior of the column was unusual and results in a post buckling restoring force of only 1/64 the bifurcation buckling load. Interaction between lateral accelerations and compressive load creates isolated stay slackening at loads above 50 percent of the buckling load. Further research will be required to fully understand their impact on the use of pretensioned structures as large space structures. M.D.K.

N82-18283*# Idaho Univ., Moscow. Dept. of Engineering Science.

VIBRATION DAMPING CHARACTERISTICS OF GRAPHITE/EPOXY COMPOSITES FOR LARGE SPACE STRUCTURES

R. F. Gibson *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 123-132 refs (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

Limited data on extensional and flexural damping of small specimens of graphite/epoxy and unreinforced epoxy resin were obtained. Flexural damping was measured using a forced vibration technique based on resonant flexural vibration of shaker excited double cantilever specimens. Extensional damping was measured by subjecting similar specimens to low frequency sinusoidal oscillation in a servohydraulic tensile testing machine while plotting load versus extensional strain. Damping was found to vary slowly and continuously over the frequency range 0.01 - 1000 Hz, and no drastic transitions were observed. Composite damping was found to be less than neat resin damping. Comparison of small specimen damping values with assembled column damping values seems to indicate that, for those materials, material damping is more important than joint damping. The data reported was limited not by the test apparatus, but by signal conditioning and data acquisition. It is believed that filtering of the strain gage signals and the use of digital storage with slow playback will make it possible to extend the frequency and amplitude ranges significantly. M.D.K.

N82-18284*# California Inst. of Tech., Pasadena. Div. of Engineering.

THE POTENTIAL OF NONPERIODIC TRUSS STRUCTURES FOR SPACE APPLICATIONS

K. C. Park (Lockheed Palo Alto Research Lab.) and J. M. Winger *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 133-143 (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

In order to assess the dynamic characteristics of truss structures made of the nonperiodic lattices, a cantilever truss beam was analyzed for vibrations. In addition, three additional lattice configurations were also constructured along with two beams made of tetrahedrons. The relative frequency variations of the six cantilever truss beams for their first mode were examined. To make the comparison meaningful, the beam length, the number of lattice joints and the total weight were chosen to be identical within 2 percent differences. The frequencies of the four nonperiodic truss beams varied over 60 percent while those of the two beams of tetrahedron lattices only about 13 percent. Such wide frequency variations of the proposed nonperiodic truss beams indicate that the introduction of nonperiodic lattices could be effectively used to improve the controllability of steady state vibration as well as improved wave dispersion characteristics. T.M.

N82-18285*# Boeing Aerospace Co., Seattle, Wash.

IAC LEVEL 'O' PROGRAM DEVELOPMENT

R. G. Vos *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 145-157 (For primary document see N82-18275 09-15)
(Contract NAS5-25767)
Avail: NTIS HC A19/MF A01 CSCL 22B

The current status of the IAC development activity is summarized. The listed prototype software and documentation was delivered, and details were planned for development of the level 1 operational system. The planned end product IAC is required to support LSST design analysis and performance evaluation, with emphasis on the coupling of required technical disciplines. The long term IAC effectively provides two distinct features: a specific set of analysis modules (thermal, structural, controls, antenna radiation performance and instrument optical performance) that will function together with the IAC supporting software in an integrated and user friendly manner; and a general framework whereby new analysis modules can readily be incorporated into IAC or be allowed to communicate with it. T.M.

N82-18286*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

IAC CONTROL SYSTEM ANALYSIS DEVELOPMENT

Harold P. Frisch *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 159-167 refs (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

The MultiOptimal Differential Equation Language (MODEL) is described. It provides a means for generating numerical solutions to systems of differential equations using a digital computer. The notation of this language is similar to that usually used in describing physical systems by differential equations. Thus, the learning process is simplified, programming becomes easier, and debugging is more readily accomplished. Programs written in the MultiOptimal Differential Equation Language are machine translated into FORTRAN 4 code which is optimal in several respects. The interactive version of MODEL makes use of interactive system routines so that the user may observe the solution as it is being generated and interact with the program in a manner similar to that associated with analog simulation. The DISCOS-Control version of the MODEL simulation language is used to describe the control system for a plant which is modelled by the DISCOS program. DISCOS plant variables may be referenced in the control system description and all the sensor signals, coupling torques, momentum devices and external loads are automatically linked to the DISCOS plant model. T.M.

N82-18287*# Martin Marietta Corp., Denver, Colo.

LARGE ADVANCED SPACE SYSTEMS (LASS) COMPUTER-AIDED DESIGN PROGRAM ADDITIONS

C. E. Farrell *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 169-177 (For primary document see N82-18275 09-15)
(Contract NAS1-1644)
Avail: NTIS HC A19/MF A01 CSCL 22B

The LSS preliminary and conceptual design requires extensive iteractive analysis because of the effects of structural, thermal, and control intercoupling. A computer aided design program that will permit integrating and interfacing of required large space system (LSS) analyses is discussed. The primary objective of this program is the implementation of modeling techniques and analysis algorithms that permit interactive design and tradeoff studies of LSS concepts. Eight software modules were added to the program. The existing rigid body controls module was modified to include solar pressure effects. The new model generator modules and appendage synthesizer module are integrated (interfaced) to permit interactive definition and generation of LSS concepts. The mass properties module permits interactive specification of discrete masses and their locations. The other modules permit interactive analysis of orbital transfer requirements, antenna primary beam n, and attitude control requirements. T.M.

N82-18288*# Astro Research Corp., Carpinteria, Calif.

SEQUENTIAL DEPLOYMENT OF TRUSS STRUCTURES

John M. Hedgepeth *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 179-192 (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

The geometry investigated most intensively was the triangular tetrahedral truss. A square type truss having the same topology was also investigated. The tetrahedral truss is composed of surface struts and core members. In the deployable form, the entire truss is viewed as being made up of a number of parallel truss ribs connected to each other by interrib struts and members. The packaging efficiency of the truss was evaluated. T.M.

N82-18289*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

MOBILE WORK STATION CONCEPT FOR ASSEMBLY OF LARGE SPACE STRUCTURES (ZERO GRAVITY SIMULATION TESTS)

Walter L. Heard, Jr., Harold G. Bush, Richard E. Wallsom, and J. Kermit Jensen *In its* Large Space Systems Technol., 1981 Mar. 1982 p 193-204 refs Prepared in cooperation with Kentron International, Inc. (For primary document see N82-18275 09-15)

Avail: NTIS HC A19/MF A01 CSCL 22B

The concept presented is intended to enhance astronaut assembly of truss structure that is either too large or complex to fold for efficient Shuttle delivery to orbit. The potential of augmented astronaut assembly is illustrated by applying the result of the tests to a barebones assembly of a truss structure. If this structure were assembled from the same nestable struts that were used in the Mobile Work Station assembly tests, the spacecraft would be 55 meters in diameter and consist of about 500 struts. The struts could be packaged in less than 1/2% of the Shuttle cargo bay volume and would take up approximately 3% of the mass lift capability. They could be assembled in approximately four hours. This assembly concept for erectable structures is not only feasible, but could be used to significant economic advantage by permitting the superior packaging feature of erectable structures to be exploited and thereby reduce expensive Shuttle delivery flights. T.M.

N82-18290*# Grumman Aerospace Corp., Bethpage, N.Y.

ORBITER BASED CONSTRUCTION EQUIPMENT

C. J. Goodwin *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 205-217 (For primary document see N82-18275 09-15)

Avail: NTIS HC A19/MF A01 CSCL 22B

Many orbiter based activities need equipment to hold a payload steady while it is being worked on. This work may be construction, updating, repair, services, check out, or refuerling operations in preparation for return to Earth. The Handling and Positioning Aid (HPA) is intended for use as general purpose equipment. The HPA provides a wide choice of work station positions, both immediately above the orbiter cargo bay and beyond. It can act in a primary docking role and, if required, can assist actively in the berthing process. From an analysis of ten reference missions, it was determined that two types of HPA mobility are needed; a tilt table, which simply swings out of the cargo bay, pivoting about an athwartships y axis, and an articulated arm. Illustration of the aid are provided. T.M.

N82-18291*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

DEPLOYABLE PLATFORM SYSTEMS DEVELOPMENT

R. E. Jewell *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 219-233 (For primary document see N82-18275 09-15)

Avail: NTIS HC A19/MF A01 CSCL 22B

The long range objective is to achieve technology readiness for one or more deployable platform systems by 1986. Engineering plans and approaches to meet this goal are presented in outline form. L.F.M.

N82-18292*# Martin Marietta Corp., Denver, Colo.

TECHNOLOGICAL NEEDS OF ADVANCED EARTH-OBSERVATION SPACECRAFT

A. L. Brook *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 235-240 (For primary document see N82-18275 09-15)

Avail: NTIS HC A19/MF A01 CSCL 22B

An outline of the type of Earth observations needed is presented. The characteristics of a 120 meter by 60 meter microwave radiometer are discussed along with those of supplementary instruments. L.F.M.

N82-18293*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

LSS CONTROL TECHNOLOGY

A. F. Tolivar *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 241-247 (For primary document see N82-18275 09-15)

Avail: NTIS HC A19/MF A01 CSCL 22B

Control for Large Space Systems is discussed. Emphasis is placed on platform control and antenna control. L.F.M.

N82-18294*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

CONTROL OF LARGE SPACE ANTENNAS: WRAP-RIB-HOOP/COLUMN

Yu-Hwan Lin *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 249-281 refs (For primary document see N82-18275 09-15)

Avail: NTIS HC A19/MF A01 CSCL 22B

Control work for large space antenna systems is discussed. Included are the wrap-rib and hoop/column antenna concepts for communications and radiometry. L.F.M.

N82-18295*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SPATIAL, HIGH-ACCURACY, POSITIONING-ENCODING SENSOR (SHAPES) FOR LARGE SPACE SYSTEM CONTROL APPLICATIONS

J. M. McLauchlan *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 283-296 (For primary document see N82-18275 09-15)

Avail: NTIS HC A19/MF A01 CSCL 22B

The Spatial, High-Accuracy, Position-Encoding Sensor is a controls sensor suitable for the determination of the static shape and vibrational motion of large space structures and similar systems and for the determination of position and velocity in rendezvous and docking. It uses a combination of electro-optical techniques to measure the three-dimensional coordinates distributed over the structure at reading rates high compared to the rates at which the coordinates are changing. The technical approach is that of measuring the distance to and the direction of points on the structure from a single sensor head. Many points can be measured simultaneously from a single head without significantly increasing the complexity of the system. L.F.M.

N82-18296*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

CONTROL TECHNOLOGY DEVELOPMENT

David B. Schaechter *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 297-311 refs (For primary document see N82-18275 09-15)

Avail: NTIS HC A19/MF A01 CSCL 22B

The main objectives of the control technology development task are given in the slide below. The first is to develop control design techniques based on flexible structural models, rather than simple rigid-body models. Since large space structures are distributed parameter systems, a new degree of freedom, that of sensor/actuator placement, may be exercised for improving control system performance. Another charecteristic of large space structures is numerous oscillatory modes within the control bandwidth. Reduced-order controller design models must be developed which produce stable closed-loop systems when combined with the full-order system. Since the date of an actual large-space-structure flight is rapidly approaching, it is vitally important that theoretical developments are tested in actual hardware. Experimental verification is a vital counterpart of all current theoretical developments. L.F.M.

N82-18297*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

LSS REFERENCE PLATFORM CONTROL

Rance S. Edmunds *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 313-333 (For primary document see N82-18275 09-15)

Avail: NTIS HC A19/MF A01 CSCL 22B

The long range objective of this task is to develop basic technology in the design, mechanization, and analysis of control systems for large flexible space structures. The focus of the FY'81 platform control effort was on the pointing control problems associated with multiple independently controlled experiment packages operating simultaneously on a single platform. Particular emphasis was placed on obtaining a quantitative comparison of controller performance with and without base motion compensation. L.F.M.

N82-18298*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

A STUDY OF AUTONOMOUS RENDEZVOUS AND DOCKING SYSTEMS

J. D. Michael *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 335-344 refs (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

An overview of activities in the automatic rendezvous and docking area is presented. A representative mission scenario is covered. A statement of the problem is made and the requirements for the extraction of relative attitude and position data are delineated. A systems block diagram is included and the integral functions which go to make up an autonomous docking system is described. A system was simulated, and the digital simulation is described along with some representative results of a system based a laser ranging device as the sensor. A television camera as the ranging sensor was also considered, one video based automatic docking scheme is discussed along with some representative results. S.L.

N82-18299*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

A DISTURBANCE ISOLATION CONTROLLER FOR THE SOLAR ELECTRIC PROPULSION SYSTEM FLIGHT EXPERIMENT

H. B. Waites *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 345-361 refs (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

A disturbance isolation controller (DIC) is developed for a simplified model of the solar electric propulsion system (SEPS) flight experiment which consists of a rigid Sperry gimbal torquer (AGS) mounted to a rigid orbiter and the SEPS solar array (rigid) end mounted to the AGS. The main purpose of the DIC is to reduce the effects of orbiter disturbances which are transmitted to the flight experiment. The DIC uses an observer, which does not require the direct measurement of the plant inputs, to obtain estimates of the plant states and the rate of the plant states. The state and rate of state information is used to design a controller which isolates disturbances from specified segments of the plant, and for the flight experiment, the isolated segment is the SEPS solar array. S.L.

N82-18300*# Bendix Corp., Teterboro, N. J. Test Systems Div.

MODULAR ATTITUDE CONTROL OF A LARGE SPACE PLATFORM

F. D. Chichester *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 363-370 refs (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

The modular attitude control of a large space platform is studied using a three axis five body model of a flexible spacecraft. Three degree of freedom hinges are considered. A three axis four body model of a truss and a three axis ten body model of a space platform are presented. A state variable rotational dynamics model and a multilevel state variable model are shown. A decomposed performance index and decomposed Hamiltonian are also presented. A subproblem hierarchy for hybrid multilevel LQR attitude control of a three axis model is described. S.L.

N82-18301*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SYSTEMS IDENTIFICATION TECHNOLOGY DEVELOPMENT FOR LARGE SPACE SYSTEMS

E. S. Armstrong *In its* Large Space Systems Technol., 1981 Mar. 1982 p 371-374 refs (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

A methodology for synthesizing systems identification, both parameter and state, estimation and related control schemes for flexible aerospace structures is developed with emphasis on the Maypole hoop column antenna as a real world application. Modeling studies of the Maypole cable hoop membrane type antenna are conducted using a transfer matrix numerical analysis approach. This methodology was chosen as particularly well suited for handling a large number of antenna configurations of a generic type. A dedicated transfer matrix analysis, both by virtue of its specialization and the inherently easy compartmentalization of the formulation and numerical procedures, is significantly more efficient not only in computer time required but, more importantly, in the time needed to review and interpret the results. S.L.

N82-18302*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

CONFIGURATIONAL AND SYSTEM REQUIREMENTS FOR CONTROL OF LARGE SPACE SYSTEMS

L. W. Taylor, Jr. *In its* Large Space Systems Technol., 1981 Mar. 1982 p 375-388 (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

Control of large space systems, modeling, and control difficulties are discussed. Ground based analysis of spaceflight data are presented to determine structural dynamics characteristics for the purpose of revising control laws, and to trim the surface contour. Systems identification for adaptive control and automatic surface control are also considered. S.L.

N82-18303*# Honeywell Systems and Research Center, Minneapolis, Minn.

INTEGRATED CONTROLS/STRUCTURES STUDY OF ADVANCED SPACE SYSTEMS

C. S. Greene and T. B. Cunningham *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 389-412 refs (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

A cost tradeoff is postulated for a stiff structure utilizing minimal controls (and control expense) to point and stabilize the vehicle. Extra costs for a stiff structure are caused by weight, packaging size, etc. Likewise, a more flexible vehicle should result in reduced structural costs but increased costs associated with additional control hardware and data processing required for vibration control of the structure. This tradeoff occurs as the ratio of the control bandwidth required for the mission to the lowest (significant) bending mode of the vehicle. The cost of controlling a spacecraft for a specific mission and the same basic configuration but varying the flexibility is established. S.L.

N82-18304*# Lockheed Missiles and Space Co., Sunnyvale, Calif.

ACTIVE CONTROL OF SPACE STRUCTURES: PROOF OF CONCEPT EXPERIMENT

J. A. Breakwell *In* NASA. Langley Research Center Large Space Systems Technol., 1981 Mar. 1982 p 413-428 (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

Modern control theory easily works with multiple input/multiple output systems. Two types of systems which fall into this category are flexible systems, where many measurements and several actuators are necessary to provide control over bending behavior, and articulated systems which consist of several rigid bodies connected together by pivoting connections. In this latter case, multiple controls are implemented as torquers at the joints. S.L.

N82-18305# Office of Technology Assessment, Washington, D. C.

SOLAR POWER SATELLITES, SUMMARY

Aug. 1981 22 p
(OTA-E-145) Avail: NTIS HC A02/MF A01

The energy potential of the solar power satellite (SPS) was assessed. The preliminary nature of SPS technology was taken into account by comparing four alternative SPS systems across a broad range of issues: their technical characteristics long term energy supply potential, international and military implications, environmental impacts, and institutional effects. The SPS options were also compared to potentially competitive energy technologies in order to identify how choices among them might be made. In addition, a set of Federal research and funding options were developed to address the central questions and uncertainties identified in the report. S.L.

N82-18306# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

TONE RECEIVER FOR SATELLITE POSITION DETERMINATION [RECEPTOR DE TONS PARA LOCALIZACAO DE SATELLITES]

Celso Macedo deAndrade and Aydano B. Carleial Jul. 1981 19 p refs In FORTUGUESE; ENGLISH abstract Presented at the 33rd Ann. Meeting of SBPC, Salvador, Bahia, Brazil, 8-15 Jul. 1981

(INPE-2159-RPE/378) Avail: NTIS HC A02/MF A01

The receiver has the function of processing the ranging signal, composed of tones in 40, 160, 800, 4000, and 20000 Hz, according to the NASA standard. This signal originates on the ground and is retransmitted back by the satellite. The processing consists of separating the tones, which jointly modulate the carrier, and comparing their phases with the phases of the corresponding original tones, transmitted from the ground. Tone separation is accomplished by second-order PLLs, which operate as narrowband filters. From each phase comparison results a signal with pulses modulated in width by the phase difference between the two waves in question. The five measured values are forwarded by the receiver to another apparatus, which computes the distance from these data. T.M.

N82-18307# Alabama Univ. in Huntsville. School of Science and Engineering.

IMPLEMENTATION OF AN OVERLAID VERSION OF P2 SIMULATION

Steven Mann and David Cobb Redstone Arsenal, Ala. Army Missile Command Jul. 1981 19 p

(Contract DAAH01-81-D-A006)

(AD-A108592; DRSMI/RD-81-18-TR) Avail: NTIS HC A02/MF A01 CSCL 16/2

The techniques for implementing a very large PERSHING II digital simulation on a Perkin Elmer minicomputer are discussed in this report. The simulation was broken into subunits and overlaid. A summary is given on the software requirements for operating the simulation. Author (GRA)

N82-18308# Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.

STATUS REPORT ON THE AERONAUTICAL RESEARCH INSTITUTE OF SWEDEN VERSION OF THE MISSILE AERODYNAMICS PROGRAM LARV, FOR CALCULATION OF STATIC AERODYNAMIC PROPERTIES AND LONGITUDINAL AERODYNAMIC DAMPING DERIVATIVES. PART 1: THEORY

Erling Weibust 1981 169 p refs

(Contract F-K-80123-80-004-21-001)

(FFA-TN-AU-1661-Pt-1) Avail: NTIS HC A08/MF A01

Improvements to a missile aerodynamics program which enable it to (a) calculate aerodynamic coefficients as input for a flight mechanics model, (b) check manufacturers' data or estimate performance from photographs, (c) reduce wind tunnel testing, and (d) aid optimization studies, are discussed. Slender body theory is used for longitudinal damping derivatives prediction. Program predictions were compared to known values. Greater accuracy is required in the estimation of drag due to excrescences on actual missile configurations, the influence of a burning motor, and nonlinear effects in the stall region. Prediction of pressure centers on wings and on bodies in presence of wings must be improved. Author (ESA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N82-18309*# Boeing Co., Seattle, Wash.

SURVEY OF MULTI-FUNCTION DISPLAY AND CONTROL TECHNOLOGY

R. J. Spiger, R. J. Farrell, and M. H. Tonkin [1982] 79 p refs

(Contract NAS9-16445)

(NASA-CR-167510; D180-26864-1) Avail: NTIS HC A05/MF A01 CSCL 22B

The NASA orbiter spacecraft incorporates a complex array of systems, displays and controls. The incorporation of discrete dedicated controls into a multi-function display and control system (MFDCS) offers the potential for savings in weight, power, panel space and crew training time. The technology applicable to the development of a MFDCS for orbiter application is surveyed. Technology thought to be applicable presently or in the next five years is highlighted. Areas discussed include display media, data handling and processing, controls and operator interactions and the human factors considerations which are involved in a MFDCS design. Several examples of applicable MFDCS technology are described. T.M.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-18310*# Massachusetts Inst. of Tech., Cambridge. Space Systems Lab.

A DYNAMIC MEASURE OF CONTROLLABILITY AND OBSERVABILITY FOR THE PLACEMENT OF ACTUATORS AND SENSORS ON LARGE SPACE STRUCTURES

Wallace E. VanderVelde and Craig R. Carignan Jan. 1982 55 p refs

(Grant NAG1-126)

(NASA-CR-168520; SSL-2-82) Avail: NTIS HC A04/MF A01 CSCL 22B

The degree of controllability of a large space structure is found by a four step procedure: (1) finding the minimum control energy for driving the system from a given initial state to the origin in the prescribed time; (2) finding the region of initial state which can be driven to the origin with constrained control energy and time using optimal control strategy; (3) scaling the axes so that a unit displacement in every direction is equally important to control; and (4) finding the linear measurement of the weighted 'volume' of the ellipsoid in the equicontrol space. For observability, the error covariance must be reduced toward zero using measurements optimally, and the criterion must be standardized by the magnitude of tolerable errors. The results obtained using these methods are applied to the vibration modes of a free-free beam. A.R.H.

N82-18311*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DESIGN PRACTICES FOR CONTROLLING SPACECRAFT

CHARGING INTERACTIONS
N. John Stevens 1982 21 p refs Presented at the 20th Aerospace Sci. Meeting, Orlando, Fla., 11-14 Jan. 1982; sponsored by AIAA
(NASA-TM-82781; E-1112) Avail: NTIS HC A02/MF A01 CSCL 22B

A design guidelines handbook prepared to provide criteria for assessing and minimizing spacecraft charging interactions is described. An evaluation philosophy of analyzing specific satellite designs in a substorm environment specification with NASCAP is proposed. Criteria for possible discharges are given and a technique for computing the discharge transients is outlined. The charging of a three axis stabilized satellite is examined to illustrate the philosophy. Possible discharge locations are found and transients computed. The effect of changing selected surface coatings is evaluated and found to substantially reduce charging levels. J.M.S.

N82-18312*# Essex Corp., Alexandria, Va.
THE DESIGN, FABRICATION AND INSTALLATION OF CABLE ROUTING MOCKUPS IN SUPPORT OF SPACELAB 2 Final Report
23 Dec. 1981 6 p
(Contract NAS8-34127)
(NASA-CR-161975; H-81-06) Avail: NTIS HC A02/MF A01 CSCL 22B

From flight and mockup drawings of Spacelab 2 (SL 2) experiments and hardware, shop ready mockup drawings were produced. Floor panels were the first items considered for fabrication. Cold plate and orthogrid mockups were designed and fabricated. Experiment and other hardware mockups were fabricated of aluminum or plywood, depending on size and configuration. Eighty-three cable routing bracket mockups were fabricated of aluminum and delivered for painting. N.W.

N82-18313# TRW Defense and Space Systems Group, Redondo Beach, Calif.
ACOSS EIGHT (ACTIVE CONTROL OF SPACE STRUCTURES), PHASE 2 Final Technical Report, May 1980 - Apr. 1981
Ralph P. Iwens, Robert J. Benhabib, and Frank C. Tung Griffiss AFB, N.Y. RADC Sep. 1981 184 p refs
(Contracts F30602-80-C-0198; AF Proj. C654; ARPA Order 3654)
(AD-A108629; TRW-36296-6001-UT-00-PH-2; RADC-TR-81-242) Avail: NTIS HC A09/MF A01 CSCL 13/1

This effort addresses three areas of active structure control/vibration control: (1) Stability ensuring designs in the presence of modal truncation/inaccurate structural models using a method based on the positivity of operators; (2) On-orbit parameter identification using the maximum likelihood method; and (3) Trade-offs between model reference adaptive control and fixed gain control with and without on-orbit parameter identification and system tuning, developed a stability ensuring design methodology which does not rely on modal truncation, has only low sensitivity to the exact knowledge of the structures model and, with some modifications, can be extended to non-linear systems. The method yields good performance, but is not necessarily optimal. The maximum likelihood method of parameter identification was studied. Parameter data collected on-orbit could be used to up-date the control model and improve performance. An alternative to explicit parameter identification and subsequent system tuning is direct adaptive control. Trade-offs between parameter identification and tuning versus adaptive controls were coordinated and the results are presented. Author (GRA)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-18314* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LOW THRUST MONOPROPELLANT ENGINE Patent
John D. Kuenzly, inventor (to NASA) (TRW, Inc., Redondo Beach, Calif.) Issued 15 Sep. 1981 5 p Filed 20 Dec. 1978 Supersedes N79-15151 (17 - 06, p 0707) Continuation of abandoned US Patent Appl. SN-819029, filed 25 Jul. 1977 Sponsored by NASA
(NASA-Case-GSC-12194-2; US-Patent-4,288,982; US-Patent-Appl-SN-971474; US-Patent-Appl-SN-819029; US-Patent-Class-60-200R; US-Patent-Class-60-39.46M) Avail: NTIS Avail: US Patent and Trademark Office CSCL 21H

The engine has a conventional body and nozzle configuration. The monopropellant fuel is fed into the thruster with dual injection tubes via an injector shell with dual spray jets. The spray jets are positioned generally opposed to each other. A heater screen pack combination thermally decomposes the fuel after injection into the combustion chamber of the thruster. NASA

N82-18315*# Martin Marietta Aerospace, Denver, Colo.
PRIMARY PROPULSION/LARGE SPACE SYSTEM INTERACTION STUDY Final Report, Sep. 1979 - Dec. 1980
J. V. Coyner, R. H. Dergance, R. I. Robertson, and J. V. Wiggins Dec. 1981 358 p refs
(Contract NAS3-21955)
(NASA-CR-165277; MCR81-504) Avail: NTIS HC A16/MF A01 CSCL 21H

An interaction study was conducted between propulsion systems and large space structures to determine the effect of low thrust primary propulsion system characteristics on the mass, area, and orbit transfer characteristics of large space systems (LSS). The LSS which were considered would be deployed from the space shuttle orbiter bay in low Earth orbit, then transferred to geosynchronous equatorial orbit by their own propulsion systems. The types of structures studied were the expandable box truss, hoop and column, and wrap radial rib each with various surface mesh densities. The impact of the acceleration forces on system sizing was determined and the effects of single point, multipoint, and transient thrust applications were examined. Orbit transfer strategies were analyzed to determine the required velocity increment, burn time, trip time, and payload capability over a range of final acceleration levels. Variables considered were number of perigee burns, delivered specific impulse, and constant thrust and constant acceleration modes of propulsion. Propulsion stages were sized for four propellant combinations: oxygen/hydrogen, oxygen/methane, oxygen/kerosene, and nitrogen tetroxide/monomethylhydrazine, for pump fed and pressure fed engine systems. Two types of tankage configurations were evaluated, minimum length to maximize available payload volume and maximum performance to maximize available payload mass. S.L.

N82-18316*# Lockheed Missiles and Space Co., Huntsville, Ala. Advanced Fluid Mechanics Section.
IMPROVEMENT OF ROCKET ENGINE PLUME ANALYSIS TECHNIQUES Final Report
Sheldon D. Smith Jan. 1982 85 p refs
(Contract NAS9-16256)
(NASA-CR-167516; LMSC-HREC-TR-D784753) Avail: NTIS HC A05/MF A01 CSCL 21H

A nozzle plume flow field code was developed. The RAMP code which was chosen as the basic code is of modular construction and has the following capabilities: two phase with two phase transonic solution; a two phase, reacting gas (chemical equilibrium reaction kinetics), supersonic inviscid nozzle/plume solution; and is operational for inviscid solutions at both high and low altitudes. The following capabilities were added to the code: a direct interface with JANNAF SPF code; shock capturing

finite difference numerical operator; two phase, equilibrium/frozen, boundary layer analysis; a variable oxidizer to fuel ratio transonic solution; an improved two phase transonic solution; and a two phase real gas semiempirical nozzle boundary layer expansion.
S.L.

N82-18317# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Mechanics and Surface Interactions Branch.
EXACT INVOLUTE BODIES OF REVOLUTION Interim Technical Report, Jun. 1979 - Jun. 1980
Nicholas J. Pagano May 1981 53 p refs
(AF Proj. 2419)
(AD-A108659; AFWAL-TR-80-4152) Avail: NTIS HC A04/MF A01 CSCL 21/3

Involute construction is an approach used in contemporary rocket nozzle technology for the fabrication of exit cones and other bodies of revolution and consists of laminating identical composites sheets of uniform thickness along curved surfaces, called involute surfaces. In this work, we shall derive the exact solution for these surfaces, which guarantees that the volume of the body being generated is precisely filled, with no gaps or overlaps. We also present the equations of the developed surface, or ply pattern, a formulation of the kinematics of the fabrication debulking process, and an experimental validation of the theoretical work.
GRA

N82-18318# Thiokol Corp., Huntsville, Ala.
ADVANCED AIR LAUNCHED MISSILE MOTOR DESIGNED METHODS Final Report, 21 Jan. 1980 - 4 Sep. 1981
G. P. Roys Sep. 1981 46 p refs
(Contract F04611-80-C-0016; AF Proj. 3148)
(AD-A108634; U-81-17A) Avail: NTIS HC A03/MF A01 CSCL 21/8

This report is the final report of a three-phase project whose objective was to formulate a computer code to perform detailed preliminary designs of solid propellant rocket motors. All major components and performance of a motor are mathematically modeled using source dimensions and characteristics. A direct pattern search non-linear optimization scheme based on the Hooke and Jeeves algorithm is employed to establish motor characteristics that optimize any one of several performance parameters. Constraints imposed during the optimization process are basic performance requirements, design constraints and operating limits. Decision variables during optimization are propellant formulation, propellant burn rate, propellant grain dimensions, nozzle dimensions, and pressure vessel dimensions. Provisions are made for easily inserted user-defined models of several characteristics.
Author (GRA)

N82-18319# Thiokol Corp., Huntsville, Ala.
USER'S MANUAL FOR SOLID PROPULSION OPTIMIZATION CODE (SPOC). VOLUME 1: TECHNICAL DESCRIPTION Progress Report, 28 Mar. 1980 - 21 Aug. 1981
G. P. Roys Aug. 1981 244 p refs 3 Vol.
(Contract F04611-80-C-0016; AF Proj. 3148)
(AD-A108224; U-81-4457A; AFRPL-TR-81-70-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 21/8

A user's manual for a computer code that performs detailed preliminary designs of solid propellant rocket motors is presented. All major components and performance of a motor are mathematically determined using source dimensions and characteristics. A direct pattern search nonlinear optimization scheme based on the Hooke and Jeeves algorithm is employed to establish motor characteristics that optimize any one of several performance parameters. Decision variables during optimization are propellant formulation, propellant burn rate, propellant grain dimensions, nozzle dimensions, and pressure vessel dimensions. Provisions are made for easily inserted user defined models of several characteristics. Constraints imposed during the optimization process are performance requirements, design constraints, and operating limits.
Author

N82-18320# Thiokol Corp., Huntsville, Ala.
USER'S MANUAL FOR SOLID PROPULSION OPTIMIZATION CODE (SPOC). VOLUME 2: USER'S GUIDE Special Report, Feb. 1980 - Aug. 1981
G. P. Roys Aug. 1981 211 p 3 Vol.
(Contract F04611-80-C-0016; AF Proj. 3148)
(AD-A108225; U-81-4457B; AFRPL-TR-81-70-Vol-2) Avail: NTIS HC A10/MF A01 CSCL 21/8

The input and output dictionaries and their accompanying illustrations are presented along with other input instructions that are needed to execute the code. The user supplies a starting condition - an initial design - and all associated information needed to evaluate that design. These data are read in through a series of input namelists. The initial design is evaluated in the executive subroutine COMP and the results are printed. Then the print control is turned off and optimizer routine (PATSH) is called, which in turn makes multiple calls to COMP to evaluate the design with PATSH generated changes in values of user-specified parameters. Once an optimized design is reached, the print control is turned on and a final pass through COMP gives a complete description of the final design. The analyses performed in SPOC are: (1) grain geometric validation, (2) nozzle geometric validation, and (3) propellant thermochemistry.
S.L.

N82-18321# Thiokol Corp., Huntsville, Ala.
USER'S MANUAL FOR SOLID PROPULSION OPTIMIZATION CODE (SPOC). VOLUME 3: PROGRAM DESCRIPTION Special Report, Feb. 1980 - Aug. 1981
G. P. Roys Aug. 1981 28 p
(Contract F04611-80-C-0016; AF Proj. 3148)
(AD-A108226; U-81-4457C; AFRPL-TR-81-70-Vol-3) Avail: NTIS HC A03/MF A01 CSCL 21/8

The solid propulsion optimization code performs detailed preliminary designs of a large variety of solid propellant rocket motors. Dimensions of the propellant grain, nozzle, and pressure vessel are adjusted by the code, along with propellant formulation and burn rate, to produce a motor design that satisfies performance requirements and design constraints, and that has been optimized with respect to a user selected parameter. The subroutine descriptions and flow charts are presented. Cross-indices of common statements, subroutines and call statements are also included.
Author

N82-18322# European Space Agency, Paris (France).
THEORETICAL CONSIDERATIONS OF BORON COMBUSTION IN DUCTED ROCKETS
Dirk Meinkoehn and Juergen Bergmann Oct. 1981 55 p refs
Transl. into ENGLISH from "Theoretische Ueberlegungen zur Borverbrennung im Kombinationsantrieben", Rept. DFVLR-FB-80-26 DFVLR Hardthausen am Kocker, West Germany, 1980
(ESA-TT-703; DFVLR-FB-80-26) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 15,10

The use of elemental boron as a fuel component for a ducted rocket motor design, consisting of a primary gas generator and an air breathing secondary chamber for the afterburning of the boron-rich exhaust from the primary chamber, is investigated. The primary chamber is conceived as a hybrid gas generator with nitric acid as the oxidizer and a solid fuel containing a high percentage of elemental boron. This design concept is characterized by the inherent advantage of a possible thrust modulation via the control of the oxidizer flow. The investigation shows that boron combustion ignition and satisfactory combustion efficiency require high gas temperatures. This can be achieved by primary combustion of a fraction of the total boron fuel.
Author (ESA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-18323# Florida Univ., Gainesville. Dept. of Chemistry.
STUDIES RELATING TO THE SYNTHESIS OF MONOMETHYLHYDRAZINE BY CHLORAMINATION AND PROBLEM RELATING TO THE PROTECTION OF THE ENVIRONMENT FROM THE VAPORS OF 1, 1-DIMETHYLHYDRAZINE, MONOMETHYLHYDRAZINE AND HYDRAZINE Final Report, 1 Oct. 1979 - 30 Jun. 1981
Harry H. Sisler and Milap A. Mathur 30 Sep. 1981 8 p
(Grant AF-AFOSR-0007-80; AF Proj. 2303)

(AD-A108369; AFOSR-81-0769TR) Avail: NTIS HC A02/MF A01 CSCL 07/3

The synthesis of monomethylhydrazine was successfully achieved by reacting solutions of hydroxylamine-O-sulfonic acid with methylamine in diglyme. The synthesis of 1,1-dimethylhydrazine was carried out in a similar manner with dimethylhydrazine. A mechanism for the formation of formaldehyde dimethylhydrazone by the reaction of dimethylamine and chloramine was proposed. A study was conducted on the oxidation of monomethylhydrazine and 1,1-dimethylhydrazine by oxygen. Author (GRA)

24 COMPOSITE MATERIALS

Includes laminates.

N82-18324 Pennsylvania State Univ., University Park.

DYNAMIC MECHANICAL PROPERTIES OF SOME WOOD-POLYMER COMPOSITE MATERIALS Ph.D. Thesis

Gregory Richard Moore 1981 109 p

Avail: Univ. Microfilms Order No. 8129191

A method was developed for impregnating small specimens of whole wood and some reconstituted wood products with undiluted bisphenol A-based epoxy resin containing a curing agent. This process was used to impregnate yellow-poplar (Liriodendron tulipifera L.) sapwood and untempered dry-process hardboard. A detailed analysis of the dynamic mechanical properties of these impregnated materials was made for the temperature range from 0 through 100 C. The composition and mechanical properties of the impregnant were varied by changing the concentration of the metaphenylenediamine curing agent. This influenced the properties of the composite, particularly the internal friction. In all cases examined, the rule of mixtures resulted in high estimates for the internal friction and low estimates for the apparent dynamic modulus. A modified form of the rule of mixtures, which accounted for estimated strain energy sharing effects, produced better agreement between the observed and predicted internal friction results for the impregnated samples. Dissert. Abstr.

N82-18325*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AN ASSESSMENT OF BUFFER STRIPS FOR IMPROVING DAMAGE TOLERANCE OF COMPOSITE LAMINATES AT ELEVATED TEMPERATURE

C. A. Bigelow Dec. 1981 14 p ref

(NASA-TM-83257) Avail: NTIS HC A02/MF A01 CSCL 11D

Buffer strips greatly improve the damage tolerance of graphite/epoxy laminates loaded in tension. Graphite/polyimide buffer strip panels were made and tested to determine their residual strength at ambient and elevated (177 C) temperature. Each panel was cut in the center to represent damage. Panels were radiographed and crack-opening displacements were recorded to indicate fracture, fracture arrest, and the extent of damage in the buffer strip after arrest. All panels had the same buffer strip spacing and width. The buffer strip material was 0 deg S-glass/PMR-15. The buffer strips were made by replacing narrow strips of the 0 deg graphite plies with strips of the 0 deg S-glass on either a one-for-one or a two-for-one basis. Half of the panels were heated to 177 + or - 3 C before and during the testing. Elevated temperature did not alter the fracture behavior of the buffer configuration. J.M.S.

N82-18326*# Wyoming Univ., Laramie. Composite Materials Research Group.

MICROMECHANICAL PREDICTIONS OF CRACK PROPAGATION AND FRACTURE ENERGY IN A SINGLE FIBER BORON/ALUMINUM MODEL COMPOSITE

Donald F. Adams and Jayant M. Mahishi Feb. 1982 65 p refs

(Grant NsG-3217)

(NASA-CR-168550; UWME-DR-201-101-1) Avail: NTIS HC A04/MF A01 CSCL 11D

The axisymmetric finite element model and associated computer program developed for the analysis of crack propagation in a composite consisting of a single broken fiber in an annular sheath of matrix material was extended to include a constant displacement boundary condition during an increment of crack propagation. The constant displacement condition permits the growth of a stable crack, as opposed to the catastropic failure in an earlier version. The finite element model was refined to respond more accurately to the high stresses and steep stress gradients near the broken fiber end. The accuracy and effectiveness of the conventional constant strain axisymmetric element for crack problems was established by solving the classical problem of a penny-shaped crack in a thick cylindrical rod under axial tension. The stress intensity factors predicted by the present finite element model are compared with existing continuum results. S.L.

N82-18327*# Boeing Commercial Airplane Co., Seattle, Wash.

A STUDY OF THE EFFECTS OF LONG-TERM EXPOSURE TO FUELS AND FLUIDS ON THE BEHAVIOR OF ADVANCED COMPOSITE MATERIALS Final Report

E. Y. Tanimoto Aug. 1981 40 p ref

(Contract NAS1-12428)

(NASA-CR-165763; D6-41185-9) Avail: NTIS HC A03/MF A01 CSCL 11D

The periodic testing and evaluation of graphite/epoxy and Kevlar/epoxy material systems after subjecting test specimens to prolonged exposure to several laboratory-controlled environments deemed typical of normal aircraft operations is discussed. It is noted that specimen immersion in water or water-based fluids resulted in the greatest effect on the mechanical properties tested. Also, the environmental fluids showed a tendency to affect Kevlar/epoxy systems at an earlier exposure period than the graphite/epoxy systems. Results also indicate mechanical property strength retention generally being lower for the Kevlar/epoxy systems when compared to the corresponding graphite/epoxy systems in similar environments, after prolonged exposure. B.W.

N82-18328# Army Materials and Mechanics Research Center, Watertown, Mass. Polymer Research Div.

MITIGATION OF CONDUCTIVE FIBER RELEASE BY SELECTED COATINGS Final Report

Stanley E. Wentworth and Abram O. King Sep. 1981 14 p refs

(DA Proj. 1L1-62105-AH-84)

(AD-A108270; AMMRC-TR-81-47) Avail: NTIS HC A02/MF A01 CSCL 07/4

Several polymeric coatings have been evaluated, by means of a technique utilizing thermogravimetric analysis and scanning electron microscopy, as to their effectiveness in preventing the release of conductive fibers from a graphite/epoxy composite subjected to a thermaloxidative environment. The coatings examined included a conventional commercial paint, a conventional Mil Spec flame-retardant paint, an experimental poly (aryloxyphosphazene)-based flame-retardant paint, and an experimental high temperature-resistant polyphenylquinoxaline (PPQ). It was concluded that the PPQ offered considerable promise for mitigating fiber release although work on formulation development is required for optimum effect. It was also concluded that the poly(aryloxyphosphazene) coated directly onto the fibers prior to their incorporation into the composite was an equally promising approach provided that the resultant degradation in mechanical properties can be circumvented. GRA

N82-18329# Ashland Chemical Co., Columbus, Ohio.

IMPROVED GRAPHITE FIBER ADHESION Final Technical Report, 10 Sep. 1979 - 11 Jun. 1981

G. Gynn, R. N. King, S. F. Chappell, and M. L. Deviney Wright-Patterson AFB, Ohio AFWAL Sep. 1981 122 p refs

(Contract F33615-79-C-5060; AF Proj. 2419)

(AD-A108233; AFWAL-TR-81-4096) Avail: NTIS HC A06/MF A01 CSCL 11/4

Several different commercial graphite fibers were characterized as to surface chemistry by XPS analysis, radiotracer analysis, thermal desorption/mass spectrometry, and surface energetics via contact angle measurements. These fibers were then treated by selective oxidation and devolatilization. Various interphase resins were then electrodeposited on the fibers. Composites were made from three matrix resins using the electrodeposited fibers and tested before and after exposure to moisture aging. No improvement in shear strength due to the electrodeposited interphase resins was noted. Author (GRA)

N82-18330# Universal Energy Systems, Inc., Dayton, Ohio.
A DIGITAL ALGORITHM FOR COMPOSITE LAMINATE ANALYSIS, FORTRAN Final Report, 3 Jul. 1980 - 1 Jun. 1981
Som R. Soni Wright-Patterson AFB, Ohio AFWAL Sep. 1981 86 p refs
(Contract F33615-79-C-5129)
(AD-A108201; AFWAL-TR-81-4073) Avail: NTIS HC A05/MF A01 CSCL 11/4

A FORTRAN computer code for the solution of composite materials problems is presented. The computer program can conduct the point stress analysis of general laminates and hybrid laminates. The effect of hygrothermal and mechanical loads on the strength of composite laminates can be studied. Analytical formulas based on the lamination theory were used. Input and output parameters are explained in detail. The algorithm is written in an easily understandable format. At the most, the program can take care of eight materials and twenty plys. For problems containing more materials and plys, the corresponding dimensions are to be increased in the main program and related subroutines. Required material properties can be used by giving a corresponding material property identification number in the layers data card. These quantities are given in SI units. If the results are desired in English units (i.e., Psi, etc.), a unit identification number not equal to 1(-2), has to be used. GRA

N82-18331# Cambridge Univ. (England). Dept. of Engineering.
THE CONSTRUCTION AND USE OF TOUGHNESS MAPS IN A FRACTURE ANALYSIS OF THE MICROMECHANICS OF A COMPOSITE FAILURE
J. K. Wells and P. W. R. Beaumont Feb. 1981 30 p refs
(Grant AF-AFOSR-3644-78)
(PB82-113523; CUED/C-MATS/TR-74-1981;
ISSN-0309-6505) Avail: NTIS HC A03/MF A01 CSCL 11D

Analytical expressions are presented which predict the debonding and pull out lengths observed in brittle fiber composites. These characteristic lengths are combined with models of four toughening mechanisms to calculate the work of fracture of a composite. GRA

N82-18332# Cambridge Univ. (England). Dept. of Engineering.
FAILURE OF FIBROUS COMPOSITES. PART 1: STRESS CONCENTRATION, CRACKS AND NOTCHES. PART 2: TOUGHNESS
Peter W. R. Beaumont 1981 21 p refs Submitted for publication
(PB82-113531; CUED/C-MATS/TR-78-1981;
ISSN-0309-6505) Avail: NTIS HC A02/MF A01 CSCL 11D

A fibrous composite containing a notch or hole in monotonic loading exhibits premature cracking at stresses significantly lower than the ultimate strength; strength; interfacial shear cracking, delamination or splitting, fiber fracture, matrix cracking and so forth. The formation of a damaged region is due to the concentration of localized tensile and shear stresses close to the notch front. The precise mode of failure depends upon the orientation of fibers and stacking geometry of the laminate, it is also sensitive to the properties of the matrix and fiber matrix interface; and to the stress state and environment. The micromechanisms of crack extension in various classes of fibrous composites and includes models to account for the origins of toughness are surveyed. Author (GRA)

N82-18333# Cambridge Univ. (England). Dept. of Engineering.
MICROMECHANISMS OF FRACTURE AND HYPOTHERMAL AGING OF FIBROUS COMPOSITES Final Report, 1 Aug. 1978 - 31 Dec. 1980
Peter W. R. Beaumont 28 Feb. 1981 73 p refs
(Grant AF-AFOSR-3644-78; AF Proj. 2307)
(PB82-121369; CUED/C-MAT/TR-76-181) Avail: NTIS HC A04/MF A01 CSCL 11D

The micromechanisms of crack extension of carbon fibers, glass fibers, and hybrid composites containing glass fibers, and carbon fibers in epoxy and polyester resins were studied. A new collection of failure data based on observations of fibers debonding snapping and pulling out was summarized in cumulative probability diagrams and analyzed using Weibull distribution parameters. This data, together with models of failure processes and information of work of fracture, is used to construct fracture mechanism diagrams. These diagrams, together with the Weibull parameters may help in distinguishing between mechanisms of fracture give guidance in selecting a material system and in isolating aging and environmental effects. Author (GRA)

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-18334 California Univ., Berkeley.
SOOT RADIATION FROM DIFFUSION FLAMES Ph.D. Thesis
Siu-Chun Lee 1981 111 p
Avail: Univ. Microfilms Order No. 8200178

A dispersion model for the optical constants of soot in hydrocarbon flames was established on the basis of a rigorous consideration of the electronic band structure and the dispersion constants. The dispersion constants of hydrocarbon soot were determined from this model in conjunction with in-situ flame transmission data in the visible and infrared ranges, thus truly reflecting that of soot in flames. It is shown that the soot optical properties are rather insensitive to temperature changes at elevated temperatures. However, the room temperature optical properties, representative of soot in smoke, exhibit appreciable deviation from the high temperature values. Soot particles in flames are usually polydisperse and their sizes and volume fractions may be determined from flame transmission data in the visible range by assuming a size distribution. The effect of soot shape on soot radiation from flames and smoke was examined. It is realized that soot particles always conglomerate into different shapes, while the limiting shapes are spheres and long chains modeled as infinite cylinders. Dissert. Abstr.

N82-18335 Pennsylvania State Univ., University Park.
PHYSICOCHEMICAL PROPERTIES OF DIESEL PARTICULATE MATTER Ph.D. Thesis
Mark McCauley Ross 1981 129 p
Avail: Univ. Microfilms Order No. 8129208

The sorption of selected compounds onto Diesel particulate matter generated by two different engines was studied using two methodologies. A dynamic technique, gas-solid chromatography, was employed to measure heats of adsorption at low coverage. Effects of particle pretreatments and varying adsorbate coverages on the apparent heats of sorption were also investigated. A static technique of measuring adsorption isotherms by a volumetric methodology was used to determine B.E.T. surface areas, pore size distributions, and heats of adsorption as a function of surface coverage. Electron microscopy was used to measure mean particle diameters and external surface areas. The electron paramagnetic resonance (EPR) signal of the particles was monitored. EPR spectrometry was shown to be a convenient method of distinguishing between particulate samples from different engines and operating conditions and of following certain adsorbate/adsorbent interactions. Dissert. Abstr.

N82-18336 California Univ., Berkeley.
COMPETING REACTION CHANNELS IN IR LASER INDUCED UNIMOLECULAR REACTIONS Ph.D. Thesis
Michael Robert Berman 1981 246 p
Avail: Univ. Microfilms Order No. 8200019

The competing reaction channels in the unimolecular decomposition of two molecules, formaldehyde and tetralin were studied. A TEA CO2 laser was used as the excitation source in all experiments. The dissociation of D2CO was studied by infrared multiphoton dissociation (MPD) and the small-molecule nature of formaldehyde with regard to MPD was explored. The effect of collisions in MPD were probed by the pressure dependence of the MPD yield and IR fluorescence from multiphoton excited D2CO. The wavelength and power dependence of MPD were also studied. The unimolecular decomposition of tetralin was studied by MPD and SiF4 sensitized pyrolysis. Dissert. Abstr.

N82-18337 California Univ., Berkeley.
MULTIPHOTON DISSOCIATION AND THERMAL UNIMOLECULAR REACTIONS INDUCED BY INFRARED LASERS Ph.D. Thesis
Hai-Lung Dai 1981 233 p
Avail: Univ. Microfilms Order No. 8200071

Multiphoton dissociation (MPD) of ethyl chloride was studied using a tunable 3.3 micron laser to excite CH stretches. The absorbed energy increases almost linearly with fluence, while for 10 micron excitation there is substantial saturation. Much higher dissociation yields were observed for 3.3 micron excitation than for 10 micron excitation, reflecting bottlenecking in the discrete region of 10 micron excitation. Resonances in MPD yields vs frequency in the 3.3 micron region match the position and shape of peaks in the fundamental, as narrow as 0.4/cm and first and second overtone absorption spectra. Transitions through the discrete levels are all at or nearly resonant. Anharmonicity is compensated by the presence of five CH stretch modes. Overtone spectra show that line broadening already occurs at the v sub CH = 2 level and that v sub CH = 3 is clearly in the quasicontinuum. The resonant nature of the excitation allows the rate equations description for transitions in the quasicontinuum and continuum to be extended to the discrete levels. Dissert. Abstr.

N82-18338 Illinois Univ. at Urbana-Champaign.
SELECTIVE JET PLATING Ph.D. Thesis
Tan-Jen Chen 1981 204 p
Avail: Univ. Microfilms Order No. 8127565

The use of an unsubmerged impinging jet system for selective plating is proposed. A theoretical analysis, which accounted for the charge transfer, mass transfer, and ohmic resistance effects, was developed to predict the current distributions along the cathode. Three electrochemical systems were employed in an experimental jet plating cell to demonstrate the validity of the model. The current distributions were measured with controlled variation of jet Reynolds number, nozzle-to-cathode distance, solution specific conductivity, and reactant concentration. Upon demonstrated to be valid, the theoretical model was used to predict the cell performance under a wide range of parameter values. Dissert. Abstr.

N82-18339 Princeton Univ., N. J.
THE THEORY AND APPLICATION OF TEMPERATURE PROGRAMMED DESORPTION IN THE STUDY OF UNSUPPORTED IRON AND IRON-COPPER FISCHER-TROPSCH SYNTHESIS CATALYSTS Ph.D. Thesis
Effiong Etukudo Ibok 1981 254 p
Avail: Univ. Microfilms Order No. 8126072

The shape index method is proposed for the analysis of temperature programmed desorption spectra. A criterion for estimating diffusional influences in TPD from porous systems is also proposed. Unsupported iron and iron-copper catalysts were studied by the adsorption and temperature programmed desorption of CO and CO2. And the effect of potassium and carbon additives on the adsorption and TPD of these gases was investigated. The reported spectra are net thermal conductivity responses. Based on an X-ray/SEM study, a model is proposed according to which the surface layers become depleted of copper during pretreatment. The relevance of all these findings to the Fischer-Tropsch synthesis is discussed. Dissert. Abstr.

N82-18340 Minnesota Univ., Minneapolis.
EXPERIMENTAL AND THEORETICAL STUDIES ON GAS CYCLONE SEPARATORS OPERATING AT HIGH EFFICIENCY Ph.D. Thesis
Thinh Van Tran 1981 161 p
Avail: Univ. Microfilms Order No. 8126034

It was shown that wall friction has negligible effect on particle motion, but dust particles on the wall move much more slowly than the surrounding gas, due to crowding. It was found that re-entrainment of particles in the region near the cone apex of a cyclone is a significant factor affecting collection efficiency of low and moderate efficiency cyclones. A theory on the secondary flow along the cone wall was developed. Short circuit flow on the top of a cyclone was also studied. The effect of this flow on efficiency was also studied. The secondary flow velocity was found to be dependent on inlet geometry and is of order of 15% that of the main flow. A simplified theory was developed to give the flow field in gas cyclones. It was shown that the particle volume fraction inside the dust spiral on a cyclone wall is of the same order as the emulsion phase in fluidized systems. Dissert. Abstr.

N82-18341 Louisiana State Univ. and A&M Coll., Baton Rouge.
FREQUENCY RESPONSE ANALYSIS OF DISTILLATION COLUMN INTERACTION Ph.D. Thesis
Chien Wang 1981 338 p
Avail: Univ. Microfilms Order No. 8126983

A dynamic pressure model of multicomponent distillation is developed in the frequency domain. The model consists of a set of linearized overall and component balances, enthalpy balance, pressure relationship, hydraulic equation and equilibrium relationships for each tray, the condenser and the reboiler of a general column. A numerical method consisting of total scaled pivoting Gaussian elimination with the method of residues is worked out for solving the model in the frequency domain to obtain all of the desired transfer functions. As a result, this analysis can be useful in defining the control problem and predicting interaction difficulties. The computer program developed can be used to study the effect of different model simplifying assumptions. The models studied were pressure model, enthalpy model and quimolar overflow model. A steady state program and a mechanical design program were also developed. Dissert. Abstr.

N82-18342# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Earth Sciences Branch.
IDENTIFYING AND DETERMINING HALOCARBONS IN WATER USING HEADSPACE GAS CHROMATOGRAPHY
Daniel C. Leggett Oct. 1981 17 p refs
(Proj. CWIS-31281)
(AD-A108345; CRREL-SR-81-26) Avail: NTIS HC A02/MF A01 CSCL 07/4

Since the discovery that chloroform and other haloforms are produced during water chlorination, methods have been needed for their routine analysis. This report describes the application of the multiple equilibration headspace technique for the determination of halocarbons in water. This method has certain advantages over solvent extraction and direct injection techniques, including greater sensitivity because of the favorable gas/liquid distribution ratios. It is simpler and faster than purge and trap and resin sorption methods and gives more information about compound indentity than single headspace analysis because gas/liquid distribution ratios are determined experimentally. The method is absolute, unlike solvent extraction, resin sorption, purge and trap, and conventional headspace analysis, which require standard additions to correct for incomplete recovery. The use of the technique to analyze chlorinated water samples for haloforms revealed a potential problem in their analysis. Haloforms continued to form for 24 hours, even after destruction of chlorine residuals with thiosulfate. Maximum haloform concentrations were observed in undechlorinated samples only after a 48 hour aging period. GRA

N82-18343# National Bureau of Standards, Washington, D.C. Chemical and Biodegradation Processes Group.
THE USE OF ELEMENT-SPECIFIC DETECTORS COUPLED WITH HIGH-PERFORMANCE LIQUID CHROMATOGRAPHS Interim Technical Report
K. L. Jewett and F. E. Brinckman 4 Nov. 1981 47 p refs
Submitted for publication
(Contract N00014-81-F-0013; NR Proj. 083-471)
(AD-A108539) Avail: NTIS HC A03/MF A01 CSCL 07/4

Element-specific detectors (ESDs) provide an excellent means of determining the molecular character and elemental composition of complex column effluents when used in tandem with HPLC systems. General purpose flame and electrothermal AA units

along with inductively coupled and direct current plasma detectors are discussed in terms of the inherent advantages, difficulties and detection limits associated with using such systems. Other, more limited ESDs, such as flame photometric detectors are also compared. The HPLC-ESD interface remains the largest hurdle to increased utilization of this new analytical probe and attempts to solve or minimize this problem are reviewed. Recent applications involving HPLC-ESD systems illustrate the important role that these detectors can and will play in solving a wide variety of specification problems with biological, environmental, and energy-related matrices. Over 100 literature citations are provided.
Author (GRA)

N82-18344# Naval Research Lab., Washington, D. C. Lab. for Computational Physics.

WEAK AND STRONG IGNITION. 1: NUMERICAL SIMULATIONS OF SHOCK TUBE EXPERIMENTS

E. S. Oran, T. R. Young, J. P. Boris, and A. Cohen (Ballistic Research Labs.) 7 Dec. 1981 37 p refs
(RR0130144; ZF43451001)
(AD-A108363; NRL-MR-4664) Avail: NTIS HC A03/MF A01 CSCL 21/2

Detailed one-dimensional calculations were performed to simulate weak and strong ignition in reflected shock tube experiments in hydrogen-oxygen-argon mixtures. It is found that the experiment and simulations agree well in the strong ignition case studied. In the weak ignition case, the simulations show the same qualitative behavior as the experiment. Here ignition starts at a distance away from the reflecting wall at a time much earlier than the calculated chemical induction time. This latter effect is shown to arise because of the sensitivity of the chemical induction time to fluctuations in the calculation. In the calculations these fluctuations arise from small numerical inaccuracies. In experiments, they can arise from a number of sources including nonuniformities in the incident shock wave leading to nonuniform reflection, thermal conduction to the walls, and interactions with boundary layers.
Author (GRA)

N82-18345# Naval Research Lab., Washington, D. C. Surface Chemistry Branch.

QUANTITATIVE CHROMATOGRAPHIC ANALYSES OF N-PHENYL-ALPHA-NAPHTHYLAMINE AND N-PHENYL-BETA-NAPHTHYLAMINE Interim Report

P. J. Sniegoski 4 Dec. 1981 14 p refs
(AD-A108362; NRL-MR-4704) Avail: NTIS HC A02/MF A01 CSCL 07/4

Three convenient chromatographic methods were developed for the quantitative analysis of N-phenyl-beta-naphthylamine in samples of N-phenyl-alpha-naphthylamine. The TLC method makes use of dipropylene glycol impregnated silica gel plates. XE-60 is utilized in the GC method, and a column packed with NH 210 micrometers is used in the LC separation. Analyses were carried out on various commercial samples of N-phenyl-alpha-naphthylamine that were to be used as an antioxidant in aircraft engine lubricants.
Author (GRA)

N82-18346# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.

ELECTRON ENERGY LOSS SPECTROSCOPY OF GALLIUM ARSENIDE AND OTHER MATERIALS Annual Progress Report, 1 Jul. 1980 - 30 Jun. 1981

Margaret H. Weiler 10 Nov. 1981 17 p
(Contract F49620-79-C-0176; AF Proj. 2306)
(AD-A108657; AFOSR-81-0800TR) Avail: NTIS HC A02/MF A01 CSCL 07/4

This report describes the construction and testing of a new electron energy loss spectrometer to study the band structure of GaAs and other materials using the inelastic scattering of 230keV electrons. Substantial progress has been made towards the realization of a working experiment in high-energy electron energy loss spectroscopy, with which to study the electronic states in GaAs and other materials. In the following sections we give details of our progress in the major components of the project: electron optics, electronics, high-voltage terminal, sample preparation, and data reduction.
GRA

N82-18347# Michigan State Univ., East Lansing. Dept. of Chemistry.

SOME COMPARISONS BETWEEN THE ENERGETICS OF ELECTROCHEMICAL AND HOMOGENEOUS ELECTRON-TRANSFER REACTIONS

Michael J. Weaver and Joseph T. Hupp 23 Nov. 1981 35 p refs Submitted for publication
(Contract N00014-79-C-0670)
(AD-A108195; TR-8) Avail: NTIS HC A03/MF A01 CSCL 07/4

Some conceptual relationships between the kinetics of corresponding electrochemical and homogeneous redox processes are discussed and applied to experimental data for suitable outer-sphere reactions in order to illustrate the utility of electrochemical kinetics for gaining some fundamental insights into the energetics of electron-transfer processes. It is pointed out that electrochemical kinetics and thermodynamics measurements as a function of temperature and electrode potential yield direct information on the shapes of the potential-energy surfaces and free energy barriers for individual redox couples. Comparisons between kinetics parameters for corresponding electrochemical and homogeneous exchange reactions show reasonable agreement with the predictions of the conventional 'weak overlap' model for several aquo redox couples, but exhibit substantial disagreement for couples containing amine and related ligands. These latter discrepancies may arise from the closer approach of the amine reactants to the electrode surface compared with the strongly solvated aquo complexes. A comparison is also made between the effects of varying the thermodynamic driving force upon the kinetics of related electrochemical and homogeneous reactions. It is shown that the apparent discrepancies seen between the predictions of the harmonic oscillator model and experimental data for some highly exoergic homogeneous reactions may be related to the anomalously small dependence of the rate constant upon overpotential observed for the electrooxidation of aquo complexes. This behavior seems most likely to be due to a marked asymmetry of the reactant and product free energy barriers for these half reactions.
GRA

N82-18348# Naval Weapons Center, China Lake, Calif.

ENERGY CONTRIBUTIONS ASSOCIATED WITH COMBUSTION INSTABILITY Annual Progress Report, 1 Oct. 1980 - 30 Sep. 1981

H. B. Mathes 30 Sep. 1981 9 p ref
(AD-A108137) Avail: NTIS HC A02/MF A01 CSCL 21/2

The investigation of new and novel laboratory test techniques for determining the acoustic energy contributions of burning propellants will be pursued. Emphasis will be on methods that provide a more direct measurement than presently employed. Initial effort will be focused on methods for directly determining the response of solid propellant combustion to incident acoustic pressure waves. If successful, the method, or methods for pressure-coupled measurement will be modified to provide direct velocity-coupled response measurements. These methods are expected to lower the cost of characterizing the acoustic combustion response of solid propellant formulations of interest to the Navy and to provide improved accuracy of measurement.
GRA

N82-18349# Naval Weapons Center, China Lake, Calif.

FUEL-RICH PLUME COMBUSTION Annual Progress Report, 1 Oct. 1980 - 30 Sep. 1981

K. C. Schadow, M. J. Lee, and K. C. Wilson 30 Sep. 1981 7 p refs
(AD-A108136) Avail: NTIS HC A02/MF A01 CSCL 21/2

Experiments are being performed using an axisymmetric gas generator ramjet. Axial and radial profiles of pressure, velocity, turbulence intensity, temperature, and species concentration are being determined using non-interference optical diagnostic techniques (laser Doppler velocimeter (LDV)) and intrusive probes. The experimental data are being compared with analytical models developed by Science Application, Inc. (SAI) under an Air Force Office of Scientific Research (AFOSR) contract. An axisymmetric, 5-inch diameter laboratory ramjet combustor was built and checked out. Experiments were initiated using (1) an LDV and a hot-wire anemometer for velocity and turbulence intensity measurements, (2) coated thermocouples for temperature measurement, and (3) a gas chromatograph for analysis of gas samples.
GRA

N82-18350# California Univ., Irvine. Combustion Lab.
MECHANISMS OF EXHAUST POLLUTANTS AND PLUME FORMATION IN CONTINUOUS COMBUSTION Annual Report, 1 Mar. 1980 - 28 Feb. 1981
G. S. Samuelsen Mar. 1981 16 p
(Grant AF-AFOSR-3586-78; AF Proj. 2308)
(AD-A109059; UCI-ARTR-81-03; AFOSR-81-0814TR) Avail: NTIS HC A02/MF A01 CSCL 21/2

During this period, emphasis has been placed on the construction, evaluation, and operation of a two-color laser anemometry (LA) system. Detailed velocity and turbulence intensity measurements have also been acquired in a water analog of the opposed jet configuration, and are scheduled for the centerbody configuration. Application of the numerical code to this case was initiated during the present reporting period for both the opposed jet and centerbody configurations, and the results are being checked with the experimental data as they become available. High-speed photography has been employed in both the combustor and hydrodynamic facilities to study the swirl and non-swirl performance of the centerbody configuration, and to optimize the design. Techniques have been developed (dyes in the hydrodynamic system and smoke in the combustor) to visually record the penetration and dynamics of the fuel jet. The NO probe experiments have addressed the effect of potentially resistant materials, and a refined experiment for the introduction of water and low concentrations of hydrocarbons typical of turbine emission has been completed. Data provide guidelines for the materials and temperature limits to employ in the measurement of NO(x). GRA

N82-18351# Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
SOLVATION OF SOME NON-METALS IN LIQUID LITHIUM AND SODIUM
N. A. Rumbaut Jun. 1980 21 p refs
(BLG-536) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

Equations are presented which relate the thermodynamic activity of dissolved nonmetals (H, C, O and N) to their chemical concentration in liquid lithium and sodium. DOE

N82-18352# Peabody-Gordon-Piatt, Inc., Winfield, Kans.
DIRECT COMBUSTION OF INDUSTRIAL DRY, COMPOSITE WASTE IN SUSPENSION Final Report, 1 Apr. 1978 - 31 Aug. 1981
L. G. Desmon and G. J. Hottinger Aug. 1981 101 p refs
(Contract DE-AC03-78ET-13148)
(DE81-030679; DOE/ET-13148/T1) Avail: NTIS HC A06/MF A01

The objectives of this project are to: identify classifications of industrial sites producing sufficient industrial wastes to satisfy ongoing energy requirements for a refuse boiler and develop the technology necessary for acceptance by industry of systems fired by solid refuse-derived fuels in suspension-type burners. Fifteen industrial sites were identified. A full-scale combustion test facility was designed, built and installed at the Peabody Gordon-Piatt Plant in Winfield, Kansas. Ten ton samples of waste from 5 sites were brought to the test facility, prepared as fuels, and burned. Results of these combustion tests are presented. DOE

N82-18353# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
THREE-STAGE MASS SPECTROMETER FOR ISOTOPIC ANALYSIS OF RADIONUCLIDES IN ENVIRONMENTAL SAMPLES
J. E. Halverson Sep. 1981 14 p refs
(Contract DE-AC09-76SR-00001)
(DE82-001739; DP-1611) Avail: NTIS HC A02/MF A01

A three-stage mass spectrometer was constructed for isotopic analysis of several radioactive as well as stable elements at environmental levels. The spectrometer is interfaced to a digital computer, which controls the operation of the spectrometer, accumulates data, reduces data, and prints a final result. The spectrometer has demonstrated the capability of measuring the isotopic composition of plutonium samples as small as 0.005 picogram and has an abundance sensitivity greater than 10 to the 8th power. DOE

N82-18354# Texas A&M Univ., College Station. Dept. of Physics.
HYPERFINE STRUCTURE AND ISOTOPE-SHIFT MEASUREMENTS OF SHORT-LIVED ELEMENTS BY LASER SPECTROSCOPY Progress Report, 1 Jan. 1980 - 31 Aug. 1981
Hans A. Schuessler Sep. 1981 13 p refs
(Contract DE-AS05-80ER-10578)
(DE82-001999; DOE/ER-10578/1; RF-82-4(4228)) Avail: NTIS HC A02/MF A01

Numerical studies of the trapping of continuous ion beams injected into various ion traps, and the trapping of the pulsed ion beams injected into a radio frequency ion trap are reported. A plasma ion source and a radio frequency ion trap were constructed. A laser system for the spectroscopy of stored ions was developed, and experiments with quartz cells a high temperatures were made. DOE

N82-18355# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATIONS BY MEANS OF LASER FLUORESCENCE SPECTROSCOPY OF THE SYSTEM (A/SUPER 1/CAPITAL SIGMA/SUPER PLUS/-X/SUPER 1/CAPITAL SIGMA/SUPER PLUS/) OF LI(F)D [LASERFLUORESZENZSPEKTROSKOPISCHE UNTERSUCHUNGEN AN DEM (A/SUPER 1/ CAPITAL SIGMA/SUPER PLUS/-X/SUPER 1/CAPITAL SIGMA/ SUPER PLUS/)-SYSTEM VON (F)LID]
Bernd Fiedler Oct. 1980 62 p refs In GERMAN
(MPIS-19/1980; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 12,15

Laser fluorescent spectroscopic measurements of molecular rotation and oscillation parameters of the electronic original state of the molecule LiD are discussed. The spectra were registered by photoelectric photometry. The following items are examined: (1) apparatus, production of 7LiD spectra, reference systems, production of the calibration spectra; (2) measurements, photographic recording, identification and measurement of the spectral lines, calculation of wavelength; (3) molecular rotation and vibration, parameters of the X-state. Transl. by E.A.K.

N82-18356# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
MODE SELECTIVE VIBRATIONAL ENERGY TRANSFER IN METHYLFLUORIDE Ph.D. Thesis - Georg-August Univ. [MODENSELEKTIVE GUNG IN METHYLFLUORID]
Roland Stender May 1981 100 p refs In GERMAN
(MPIS-6/1981; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,90

The influence of reaction speed on vibration energy transfer in molecules and overcoming energy barriers and their contribution to the reactions was studied. In slow relaxation processes the unequal weight distribution caused by lasers remains longer, so that most of the excited molecules cause a reaction which gives high production output and compared to thermal drop obtains a higher reaction speed. Characteristics of CH3F molecules, determination of excitation degree, experimental build up, and evaluation of fluoride measurements for CH3F without inert gas are discussed. Transl. by E.A.K.

N82-18357# Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.
DEFECTS CHARACTERIZATION AND DIMENSIONING BY MEANS OF THE ULTRASOUND SPECTROSCOPY [DIMENSIONAMENTO E CARATTERIZZAZIONE DI DIFETTI MEDIANTE SPETTROSCOPIA ULTRASONORA]
M. Certo, G. Redondi, and F. Tonolini 1981 19 p ref In ITALIAN Presented at 12th Convention sulle Prove non Distruttive, Rapallo, Italy, 2-4 Mar. 1981
(CISE-1695) Avail: NTIS HC A02/MF A01

A method for measuring defects based on the frequency and deconvolution of ultrasonic echoes is described. Wide band sounds are placed in contact with the specimen at various angles of incidence. The analysis of the echoes is performed in a compact and portable instrument which determines the shape and depth of defects. The orientation of a plane defect can be determined. Laboratory investigations of real and artificial defects are described.

and industrial applications of the technique suggested.
Transl. by J.D.H.

N82-18358# SumX Corp., Austin, Tex.
FEASIBILITY OF PHOTOCATALYTIC OXIDATION FOR WASTEWATER CLEAN-UP AND REUSE Progress Report, 4 Mar. - 31 Mar. 1981
Gary R. Peyton and David W. DeBerry 1981 55 p refs
(Contract DI-14-34-0001-9425)
(PB82-108457; W81-05701; OWRT-C-90152-R(9425)(1))
Avail: NTIS HC A04/MF A01 CSCL 07D

A feasibility study was conducted on a new treatment technology for the destruction of pollutant compounds in wastewater. The process uses solar energy to drive an oxidant which is photocatalyzed at the surface of a semiconductor powder. The process was investigated particularly for water clean-up prior to industrial resuse, because of its non-energy-intensive nature. Five compounds (chloroform, dimethylamine, methanol, phenol, and ammonia) were used as model substrates, and removal at several pH values, using three different semiconductor (TiO2 ZnO, and Fe2O3) was investigated the laboratory, using a xenon lamp to simulate solar radiation. While Fe2O3 was found to be ineffective, both ZnO and TiO2 catalyzed the removal of all compounds.
GRA

N82-18359# Notre Dame Univ., Ind. Radiation Chemistry Data Center.
OPTICAL SPECTRA OF NONMETALLIC INORGANIC TRANSIENT SPECIES IN AQUEOUS SOLUTION
Gordon L. Hug 1981 169 p refs Prepared for National Standard Reference Data System
(PB82-109141; NSRDS-NBS-69; LC-80-606826) Copyright. Avail: NTIS HC A08/MF A01 CSCL 07D

Optical absorption spectra are presented for 77 nonmetallic, inorganic radicals and radical ions, produced by radiolysis or photolysis in aqueous solution. This atlas results from the compilation, evaluation, and replotting of spectra from the literature. Additional information is included such as extinction coefficients, initial chemical conditions, methods of transient generation and spectral acquisition, references, mechanisms of transient formation and notes on dosimetry.
GRA

N82-18360# Intermountain Forest and Range Experiment Station, Ogden, Utah.
EVALUATION OF MEGATARD 2700: A PROPOSED NEW FIRE RETARDANT SYSTEM
Charles W. George and Cecilia W. Johnson Aug. 1981 28 p refs
(PB82-108515; FSGTR/INT-112) Avail: NTIS HC A03/MF A01 CSCL 21B

A proposed new fire retardant system uses an ammonium sulfate based concentrate to which a gum thickener (with or without coloring) is added as the solution is delivered to the aircraft. Attention is given to the physical and chemical characteristics and performance of the final retardant solution. Suggestions are presented for potential product improvement and recommendations are made for further evaluation and a cost-to-benefit analysis.
GRA

N82-18361# Technische Hogeschool, Delft (Netherlands).
AMMOXIDATION OF TOLUENE AND XYLENES TO NITRILES
Johannes Jacobus Joseph denRidder 1981 136 p refs
(PB82-105420) Avail: NTIS HC A07/MF A01 CSCL 07D

The kinetics and mechanism of the ammoxidation of toluene and xylene were investigated. Two different types of catalysts were used in order to examine what similarities existed between the catalyst and, in particular, whether similar or different mechanisms occurred.
GRA

N82-18362# Monsanto Research Corp., Dayton, Ohio.
POTENTIAL ATMOSPHERIC CARCINOGENS, PHASE 2/3: ANALYTICAL TECHNIQUE AND FIELD EVALUATION Final Report, Nov. 1978 - Oct. 1980
D. S. West, F. N. Hodgson, J. J. Brooks, D. G. DeAngelis, A. G. Desai, and C. R. McMillin Jun. 1981 267 p refs
(Contract EPA-68-02-2773)
(PB82-102476; EPA-600/2-81-106; MRC-DA-1078) Avail: NTIS HC A12/MF A01 CSCL 07D

A sampling system was developed to collecting 20 significant probable or possible atmospheric carcinogens from ambient air. The sampling system is based on a combination of solid sorbent materials arranged in series. Air samples are drawn through this system using a pump. The system was evaluated in sampling trips. Results for the analyses for the 20 selected compounds are broad scan data are presented. Analyses were accomplished using thermal desorption of the sorbent materials followed by capillary column gas chromatography/mass spectrometry (GC/MS). A multidetector capillary column GC system having a conventional flame ionization detector, a N-P flame ionization detector, a photoionization detector and an electron capture detector was also used.
GRA

N82-18363# Gulf South Research Inst., New Orleans, La.
DEVELOPMENT OF NOVEL POROUS SUBSTRATES FOR ULTRAFILTRATION, DESALINATION AND WATER RECLAMATION, PART 2 Final Report
Israel Cabasso 5 May 1981 69 p refs
(Contract DI-14-34-0001-9517)
(PB82-103920; W81-05352; OWRT-C-90264-D(9517)(1))
Avail: NTIS HC A04/MF A01 CSCL 07D

Porous, synthetic polymer substrates were developed as support components for composite desalination membranes. The selected material was methyl-brominated poly(bromophenylene oxide), or M-PPO, a hydrophobic polymer readily formulated and cast into large, flat-sheet membranes. Morphological characterization of M-PPO substrates by scanning electron microscope revealed the spongelike matrix structure. Dried substrates could be rewetted by using a wetting agent. Preparation of composite membranes involved deposition of a dense, ultrathin, permselective layer on the porous substrate. Two successful approaches were in the in situ polycondensation of two reactive prepolymers to the substrate surface, and the direct application of a dilute polymer solution.
GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-18364 Illinois Univ. at Urbana-Champaign.
AN EXPERIMENTAL DETERMINATION OF THE EFFECT OF CYCLIC STRESS ON VOID GROWTH IN ULTRA-HIGH-PURITY ALUMINUM DURING SIMULTANEOUS 800 MeV PROTON IRRADIATION Ph.D. Thesis
Walter Frank Sommer 1981 91 p
Avail: Univ. Microfilms Order No. 8127695

The theory that edge dislocations, set into oscillatory motion by an applied cyclic stress, would 'sweep up' excess radiation produced vacancies that would otherwise produce void growth was tested. Post-irradiation examination by transmission electron microscopy gave results qualitatively consistent with the theory. The simulation potential of the 800 MeV proton for CTR 14 MeV neutron effects is favorable, especially since 800 MeV protons yield large amounts of transmutation product gases such as hydrogen and helium. The large experimental volume at LAMPF greatly facilitated use of large, complicated hardware, relative to what can be considered for the core of a fission reactor. In addition, the flux of protons is contained in a directable beam which can be controlled to irradiate only the sample material.
Dissert. Abstr.

N82-18365 California Univ., Berkeley.
THE SURFACE PROPERTIES AND FLOTATION OF RARE EARTH MINERALS Ph.D. Thesis
Pradip 1981 222 p
Avail: Univ. Microfilms Order No. 8200241

The related flotation chemistry of bastnaesite are minerals is examined. The Hallimond tube and Denver cell flotation tests together with the adsorption and electrokinetic studies are described. The synthesis and the surface-chemical characterization of the mineral bastnaesite is also studied. Electrokinetic investigations of bastnaesite, barite, and calcite in the presence of added flotation reagents revealed that under flotation conditions in the plant, calcite is positively charged, bastnaesite negatively charged whereas barite surface is being converted into barium carbonate. The addition of soda ash and lignin sulfonate depressant is, though, crucial in controlling flotation, the selective adsorption of chemisorbing fatty acids (tall oil) at high temperature is the key to successful beneficiation of this ore. The preliminary studies and laboratory scale flotation tests on the bastnaesite ore indicate that alkyl hydroxamates are very promising collectors for the beneficiation of ores such as those that occur at Mountain Pass. Dissert. Abstr.

N82-18366 Ohio State Univ., Columbus.

STUDIES ON PLASTIC INSTABILITY, NOTCH DEFORMATION AND HYDROGEN EFFECTS IN SPHEROIDIZED STEEL Ph.D. Thesis

Oliver Amanze Onyewuenyi 1981 293 p
Avail: Univ. Microfilms Order No. 8129071

Detailed studies on the mechanics of deformation and crack initiation at a U-notch in spheroidized AISI 1090 steel were conducted both with and without cathodically charged hydrogen. For large scale plasticity at a U-notch root, the principal plastic strain distribution does not follow a hyperbolic law, but may be described in the form epsilon sub 2 = P sub 1 exp (P sub 2 x/rho) where P sub 1 and P sub 2 are functions of plastic bend angle. The region of maximum strain gradient may be approximated by epsilon sub 2 = 0.08(1 + x*/rho) where x*/rho represents the process zone size for each plastic bend angle. Analysis of notch surface deformation patterns shows that surface instabilities form at a critical strain that is in fair agreement with predictions based on bifurcation analysis. Plastic instability initiates first at the notch surface in the form of instability bands independent of the presence of voids. Surface microcracks initiate within the instability bands. Crack initiation in the notch root process zone is characterized by the opening and extension of surface microcracks along characteristic slip lines accentuated by the extent of localized void profusion beneath the notch root. Dissert. Abstr.

N82-18367 Illinois Inst. of Tech., Chicago.

KINETICS OF CRACK INITIATION AND PROPAGATION IN METAL-INDUCED EMBRITTLEMENT OF 4140 STEEL BY INDIUM Ph.D. Thesis

Henry Hang-Ling An 1981 122 p
Avail: Univ. Microfilms Order No. 8200480

Metal induced embrittlement (MIE) of 4140 steel by indium was studied using delayed failure tensile tests. The temperature and stress dependence of the kinetics of crack initiation and crack propagation in both liquid metal induced and solid metal induced cracking were examined in the same system for the first time in MIE using electrical potential drop measurements along the indium covered portion of the sample gage length to record the start and progress of cracking, and also through fractographic observations. Crack propagation in SMIE (solid metal induced embrittlement) was found to have rates and an activation energy indicating that the process is rate controlled by the surface self diffusion of indium on the crack surface. In contrast, crack propagation in LMIE (liquid metal induced embrittlement) is believed to be a process involving transport of the indium by bulk liquid flow. Crack initiation was thermally activated, and in both LMIE and SMIE the apparent activation energy was the same within experimental error. Dissert. Abstr.

N82-18368*# Westinghouse Electric Corp., Pittsburgh, Pa.

EVALUATION OF PRESENT THERMAL BARRIER COATINGS FOR POTENTIAL SERVICE IN ELECTRIC UTILITY GAS TURBINES Final Report

R. J. Bratton, S. K. Lau, and S. Y. Lee Jul. 1982 161 p refs
Sponsored in part by Electric Power Research Inst.
(Contract NAS3-21377)
(NASA-CR-165545; Rept-81-9D6-NASAC-R3) Avail: NTIS HC A08/MF A01 CSCL 11F

The resistance of present-day thermal barrier coatings to combustion gases found in electric utility turbines was assessed. The plasma sprayed coatings, both duplex and graded types, were primarily zirconia-based, although a calcium silicate was also evaluated. Both atmospheric burner rig tests and high pressure tests (135 psig) showed that several present-day thermal barrier coatings have a high potential for service in gas turbines burning the relatively clean GT No. 2 fuel. However, coating improvements are needed for use in turbines burning lower grade fuel such as residual oil. The duplex ZrO2.8Y2O3/NiCrA1Y coating was ranked highest and selected for near-term field testing, with Ca2SiO4/NiCrA1Y ranked second. Graded coatings show potential for corrosive turbine operating conditions and warrant further development. The coating degradation mechanisms for each coating system subjected to the various environmental conditions are also described. B.W.

N82-18369*# California Univ., Santa Barbara. Quantum Inst.

AN INVESTIGATION OF THE KINETICS FOR HYDROGEN CHEMISORPTION ON IRON METAL SURFACES Final Report, Apr. 1977 - Mar. 1980

Mickey R. Shanabarger Mar. 1980 33 p refs
(Grant NsG-2222)
(NASA-CR-168555) Avail: NTIS HC A03/MF A01 CSCL 11F

A quasi-isothermal approach was used to study the kinetics of hydrogen and hydrogen sulfide chemisorption onto iron film in an effort to understand the environmental degradation of steels. The coverage of chemisorbed hydrogen or chemisorbed sulfur was observed as a function of time for fixed conditions of substrate temperature. Auger electron spectroscopy was used to observe the sulfur and chemisorption-induced resistance change was employed to monitor hydrogen coverage. To compare the results obtained from studying the kinetics by two different techniques, the kinetics of oxygen chemisorption onto iron films was also studied. A reaction model utilized to interpret the H2/Fe2 chemisorption kinetics was applied to data from an earlier study on the desorption kinetics for H2 chemisorbed onto nickel films in the vicinity of the Curie temperature of the film. This analysis permitted a separation of the gross desorption process into individual components so that the influence of the magnetic phase transition on the rate constants could be determined. A.R.H.

N82-18370*# TRW, Inc., Cleveland, Ohio. Materials Technology Lab.

DEVELOPMENT OF MATERIALS AND PROCESS TECHNOLOGY FOR DUAL ALLOY DISKS Final Report

James M. Marder and Charles S. Kortovich Oct. 1981 188 p refs
(Contract NAS3-21351)
(NASA-CR-165224; TRW-ER-8001-F) Avail: NTIS HC A09/MF A01 CSCL 11F

Techniques for the preparation of dual alloy disks were developed and evaluated. Four material combinations were evaluated in the form of HIP consolidated and heat treated cylindrical and plate shapes in terms of elevated temperature tensile, stress rupture and low cycle fatigue properties. The process evaluation indicated that the pe-HIP AF-115 rim/loose powder Rene 95 hub combination offered the best overall range of mechanical properties for dual disk applications. The feasibility of this dual alloy concept for the production of more complex components was demonstrated by the scale up fabrication of a prototype CFM-56 disk made from this AF-115/Rene 95 combination. The hub alloy ultimate tensile strength was approximately 92 percent of the program goal of 1520 MPa (220 ksi) at 480 C (900 F) and the rim alloy stress rupture goal of 300 hours at 675 C (1250 F)/925 MPa (134 ksi) was exceeded by 200 hours. The low cycle fatigue properties were equivalent to those exhibited by HIP and heat treated alloys. There was an absence of rupture notch sensitivity in both alloys. The joint tensile properties were approximately 85 percent of the weaker of the two materials (Rene 95) and the stress rupture properties were equivalent to those of the weaker of the two materials (Rene 95). Author

N82-18371# San Fernando Labs., Pacoima, Calif.

INVESTIGATION OF THE CNTD MECHANISM AND ITS EFFECT ON MICROSTRUCTURAL PROPERTIES OF SiC AND AlN Final Report

Deepak G. Bhat and Rodney M. Panos (Litton Industries, Woodland Hills, Calif.) Sep. 1981 188 p refs
(Contract F49620-79-C-0041; AF Proj. 2306)
(AD-A108581; AFOSR-81-0748TR) Avail: NTIS HC A09/MF A01 CSCL 11/6

The report describes the development of a CNTD process for silicon carbide. Following earlier work on resistance-heated substrate, attempts were made to develop a furnace process for CNTD SiC. High temperature flexure testing of SiC-coated graphite bend bars showed that the CNTD SiC was superior to other conventional SiC materials over the whole range of temperatures tested. Problems were encountered in attaining uniformity and repeatability of the material. All deposits tested showed a two-phase structure of Si and SiC. Highly variable compressive surface stresses were observed by XRD techniques. Attempts to develop a CNTD process for AlN were not successful. However, grain refinement and improvement in physical properties were achieved when AlN deposits were 'doped' with Si. The electrical and thermal properties of CVD AlN were comparable to other AlN materials. The IR transmittance characteristics were found to be inferior, possibly due to impurities in the deposit.

Author (GRA)

N82-18372# Atomic Energy Research Establishment, Harwell (England). Materials Development Div.

THE OXIDATION OF DILUTE IRON-SILICON ALLOYS ((Si) < OR = 1w/o) IN CARBON DIOXIDE

P. T. Moseley, G. Tappin, and J. C. Riviere Feb. 1981 14 p refs
(AD-A108328; AERE-R-10042; HL81/515) Avail: NTIS HC A03/MF A01 CSCL 11/6

The manner in which silicon, present as a minor alloy constituent, modifies the oxidation of iron in CO2/1% CO at 500 C has been studied. Increasing amounts of silicon progressively reduce the oxidation rate within the range (Si) = 0-1w/o and a variety of physical techniques have been used to examine oxidized specimens in pursuit of the origins of this beneficial influence. The scale forming on the alloys is composed of two layers in each of which iron is present as Fe3O4. The inner layer of scale contains silicon at approximately the same level (on a volume % basis) as the original metal while the outer scale appears to contain no silicon. The boundary between the two layers is also marked by an abrupt change in grain size and in texture of the Fe3O4. At the boundary between the alloy and the scale there develops a thin layer of nonferrous material in which the concentration of silicon is increased by more than an order of magnitude above that in the bulk alloy. This layer also includes a substantial accumulation of carbon which is thought to derive from carbon oxide gases which have penetrated to the base of the scale before taking part in the oxidation reaction.

GRA

N82-18373# Battelle Columbus Labs., Ohio.

MECHANICAL-PROPERTY DATA CT 91-T7E69 ALUMINUM, POWDER METALLURGY PRODUCT

Sep. 1981 10 p refs
(Contract F33615-80-C-5168)
(AD-A108710) Avail: NTIS HC A02/MF A01 CSCL 11/6

CT 91-T7E69 aluminum alloy is a powder metallurgy product of Alcoa. The material was received as two 1-1/2 inch thick x 4-1/2 inch wide x 4 foot lengths. The CT 91 aluminum was received in the T7E69 condition. This temper was designed to have good static strength and fatigue resistance. Results of these tests show higher tensile, shear, and fatigue data as compared to the T7E70 temper while giving lower fracture toughness values.

GRA

N82-18374# Illinois Univ. at Urbana-Champaign, Urbana. Dept. of Metallurgy and Mining Engineering.

THE EFFECT OF HYDROGEN ON THE SOLID SOLUTION STRENGTHENING AND SOFTENING OF NICKEL

J. Eastman, F. Heubaum, T. Matsumoto, and H. K. Birnbaum Nov. 1981 34 p refs
(Contract N00014-75-C-1012)
(AD-A108654) Avail: NTIS HC A03/MF A01 CSCL 11/6

The effects of hydrogen on the plastic deformation of nickel and nickel-carbon alloys were studied using plastic deformation techniques over a wide range of strain rates at about 300 K. The emphasis of the study was on the behavior at very low strains and low strain rates. Hydrogen was introduced as a solute element by quenching from a gaseous H2 atmosphere or by testing in a gaseous H2 atmosphere. The behavior of a number of different purities of nickel with hydrogen additions was examined. The most significant impurity element seemed to be C and this element was varied over a wide composition range by annealing in different atmospheres. Both solution softening and solution strengthening was observed depending on the amount of H in solution relative to the amount of C in solution. The nature of this solution softening is discussed. Author (GRA)

N82-18375# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Dept.

SHIPBOARD EXPOSURE TESTING Progress Report

E. J. Jankowsky and S. J. Ketcham 9 Sep. 1981 30 p refs
(AD-A108146; NADC-81075-60) Avail: NTIS HC A03/MF A01 CSCL 11/6

An effort is underway to correlate results of accelerated laboratory corrosion tests with actual shipboard exposure of aircraft materials. This report compares results of corrosion tests of a series of aluminum alloys with varying degrees of exfoliation resistance exposed on the flight decks of nuclear and conventional carriers. Results of exposure of laser hardening paints, water displacing paint, aluminum/aluminum oxide and graphite/epoxy composites are also described. Additionally, results of initial laboratory tests are given.

Author (GRA)

N82-18376# Naval Research Lab., Washington, D. C. Structural Integrity Branch.

COMPARISON OF NOTCH-STRESS WITH STRAIN-CONTROLLED LOW CYCLE FATIGUE OF ALPHA-BETA TITANIUM ALLOYS Interim Report

J. M. Krafft and G. R. Yoder 4 Dec. 1981 13 p refs
(AD-A108548; NRL-MR-4697) Avail: NTIS HC A02/MF A01 CSCL 11/6

Prior studies of the present authors provided two different tests of low cycle fatigue endurance of the same set of titanium alloys. Strain controlled push-pull deformation of axial specimens covered crack initiation life of up to 1000 cycles. Notch stress controlled tensile load cycling extended the range to 1 million cycles. All of Ti-6Al-4V, the test materials varied in oxygen content and in effective grain size. The results could not be compared directly because of the disparity in the controlling variables; strain and stress excursions respectively. It is found that both kinds of data form a consistent set if the total stress excursion is used as a basis of comparison, except for cases of overly high notch loading. The earlier strain-controlled results were modeled by a cumulative cyclic creep strain criterion for crack initiation. This criterion appears to embrace also the notch stress results, thus providing a promising means for extrapolating fatigue data.

Author (GRA)

N82-18377# Naval Research Lab., Washington, D. C. Mechanics of Materials Branch.

EFFECTS OF MICROSTRUCTURE AND FREQUENCY ON CORROSION-FATIGUE CRACK GROWTH IN Ti-8Al-1Mo-1V AND Ti-6Al-4V Final Report

G. R. Yoder, L. A. Cooley, and T. W. Crooker 8 Dec. 1981 18 p refs
(RR0220148)
(AD-A108361; NRL-MR-4678) Avail: NTIS HC A02/MF A01 CSCL 11/6

Fatigue crack growth studies were conducted on Ti-8Al-1Mo-1V and Ti-6Al-4V alloys in 3.5% NaCl aqueous solution. Each alloy was studied in two microstructural conditions and at two cyclic frequencies. The Ti-8Al-1Mo-1V was heat treated to produce a fine grained duplex anneal microstructure and a coarse grained Widmanstatten microstructure resulting from a beta anneal. The two microstructural conditions for the Ti-6Al-4V were an as received mill anneal and a beta anneal. The two cyclic frequencies were 01. and 5.0 Hz. Crack growth rates in air were found to be significantly reduced as a result of microstructural modifications associated with the beta anneal heat treatment. Although the salt water environment significantly accelerated crack growth rates for both alloys, this same ranking of fatigue crack growth resistance persisted in the present study. Both mirostructures of the Ti-6Al-4V alloy exhibited a frequency crossover effect. Out of plane cracking was observed in both alloys in the beta annealed condition. The effects of varying degrees of out of plane cracking on apparent crack growth rates are noted.

Author (GRA)

N82-18378# Delaware Univ., Newark.
RADIATION EFFECTS IN AMORPHOUS METALLIC ALLOYS Progress Report, 1 Feb. 1981 - 31 Jan. 1982
R. B. Murray, J. J. Kramer, and D. G. Onn Sep. 1981 30 p refs
(Contract DE-AC02-80ER-10571)
(DE82-001603; DOE/ET-10571/4) Avail: NTIS HC A03/MF A01

The possible role of phosphorus segregation in radiation-induced changes in the magnetic properties of amorphous metallic alloys in the series Fe/sub x/Ni/sub 80-x/P/sub Y/B/sub 20-y/ (20 less than or equal to x less than or equal to 40; 0 less than or equal to y less than or equal to 14) was investigated. It is concluded that phosphorus segregation is, at most, only partially responsible for the observed increase in Curie temperature following irradiation, whereas phosphorus segregation may be largely responsible for the introduction of X-ray scattering centers by irradiation. Static domain studies, performed using the Bitter technique, suggest that both irradiation and annealing result in structural rearrangement, i.e., stress-relief anneal. TEM studies indicate no change in the amorphous structure before and after irradiation. The electrical resistivity of irradiated samples shows a temperature dependence at low temperatures somewhat different from that of virgin material. DOE

N82-18379# Atomic Energy of Canada Ltd., Chalk River (Ontario). Nuclear Lab.
EFFECT OF THERMAL CYCLING ON THE MOVEMENT OF THE ALPHA Zr/ALPHA Zr-2.5 WT PERCENT Nb ALLOY
B. Cox and V. C. Ling May 1980 27 p refs
(AECL-6883) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

A piece of CW Zr-2.5 wt% Nb alloy pressure tube was hydrided at one end in 40 g/L LiOH solution at 573 K (after nickel-plating that end). The result was a solid hydride layer 0.6 mm thick plus approximately 130 ppm hydrogen in the core under the nickel plate. Thermal cycling under conditions similar to those likely to be experienced during a reactor trip did not cause any significant movement of the (-)+hydride/(-) phase boundary along the tube for up to 2688 cycles from 573 to 523 K. Supercharging of the core was observed in the nickel-plated area. Conclusions concerning the origin of the hydrogen in the nickel-plated area, and the factors controlling the supercharging process are given. DOE

N82-18380# Central Inst. for Industrial Research, Blindern (Norway).
CHARACTERIZATION OF THE MICROSTRUCTURE OF STABILIZED ZIRCONIA USED ON DIESEL-ENGINE COMPONENTS
Ingard Kvernes 1980 22 p ref
(Contract DE-AC03-79ET-15324)
(DE81-029303; DOE/ET-15324/T2) Avail: NTIS HC A02/MF A01

Stabilized ZrO2 coatings have lowered the metal temperature and protected the coated parts against corrosion and thermal load. A coated value compared to an uncoated one shows upt to 500 C less metal temperature at normal load. The tested piston (3000 h) does not show any areas of ceramic coating loss at all, but the valve shows loss of a part of the ceramic coating in an area in the center of the valve plate after 500 h. This area corresponds to the diameter of the valve stem and may be due to the temperature distribution. Metallographic examination showed no base metal deterioration. This demonstrated that local coating loss will not necessarily result in damage to metal components. Results have shown that consideration should be given to improve the spraying technique, tailored coating and graded layers regarding temperature stresses in the base metal. It is also believed that a treatment after the coating process will be of advantage. DOE

N82-18381# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany). Abt. Metallische.
REPLACING MILLED DRAWN ALUMINUM PIECES BY PRECISION FORGED ONES [ERSATZ VON FRAESTEILEN AUS GERECKTEN ALUMINIUMPLATTEN DURCH GENAUSCHMIEDETEILE]
K.-H. Rendigs 1981 52 p refs In GERMAN Presented at DGM Hauptversammlung, Baden-Baden, West Germany, 9-12 Jun. 1981
(V-2158) Avail: NTIS HC A04/MF A01

The application of semifinished precision ground plates in precision forging construction is discussed. The following tests were performed: precipitate sample tests; sliding angles and mechanical properties; hardware; spring supports; structural member tests of age beams; static structural tests; a comparison of the qualitative and aerodynamic tests. Transl. by E.A.K.

N82-18382# European Space Agency, Paris (France).
THE INFLUENCE OF COMPOSITION ON THE STRUCTURE AND MECHANICAL PROPERTIES OF THE COMPOUND NiAl
Michel-Jean Lequeux Nov. 1981 205 p refs Transl. into ENGLISH of "Influence de l'Ecart a la Stoechiometrie sur la Structure et les Proprietes Mecanique du Compose NiAl", Rept. ONERA-Publ-1980-3 ONERA, Paris 1981 Original report in FRENCH previously announced as N81-32559
(ESA-TT-700; ONERA-Publ-1980-3) Avail: NTIS HC A10/MF A01

Nickel vacancies on the aluminum rich side and substitutional Ni atoms on the nickel rich side are efficient strengtheners of the NiAl compound. Results show that above 54% Ni the substitutional Ni atoms can precipitate leading to a Ni2Al phase. An hexagonal structure with omega type distortion is discussed for this ordered phase. The critical temperature for ordering of Ni2Al is around 920 K. No precipitation is obtained between 50% and 54% Ni. In this range of compositions the yield stress of polycrystals was measured for temperatures going from 300 to 1250 K. Three stages are found in the sigma-T curves and discussed. Author (ESA)

N82-18383# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
INVESTIGATION OF A GALVANIC SEPARATED ALUMINUM COATING AS SURFACE LAYER PROTECTION FOR HIGH STRENGTH STEEL [UNTERSUCHUNG GALVANISCH ABGESCHIEDENER ALUMINIUMUEBERZUEGE ALS OBERFLAECHENSCHUTZ FUER HOCHFESTE STAEHLE]
W. Wittich, R. Suchentrunk, and H. Kellerer 1976 7 p refs Reprint from Metall Intern. Zeitschr. fuer Tech. u Wirschi, V. 10,30, 1976 p 943-947 In GERMAN; ENGLISH summary
(NBB-BB-486-O) Avail: NTIS HC A02/MF A01

The various possibilities for the electrodeposition of aluminum are discussed and the optimal process is selected high strength steel specimens are coated with aluminum by this process. Corrosion tests show that galvanic aluminum has probably good suitability for the surface protection of steels. J.M.S.

N82-18384# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Beitriebsbereich.
FULLY GALVANIC FABRICATION OF COMPLEX FORMS [VOLLGALVANISCHE HERSTELLUNG KOMPLIZIERTER FORMEN]
O. Tuscher and R. Suchentrunk 1981 6 p Reprint from Metalloberflaeche; v. 32, no. 2, 1978 In GERMAN Presented at 15th DGLR Jahrestagung, Bad Kissingen, West Germany, 28-30 Sep. 1977
(MBB-BB-489-O) Avail: NTIS HC A02/MF A01

The fabrication of complicated self supporting structures, by depositing thick galvanic copper or nickel thin films on a premolded electroplated core is discussed. The galvanic technique needs exact duplication, especially when producing high frequencies, when the necessary waveguides and emission horns are needed. By employing proper screening extremely light weight structure are produced. Proper techniques are demonstrated by waveguide antennas. True reproduction at low weight is shown while only attached on one side since no shifting of focal point is allowed. Transl. by E.A.K.

N82-18385# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
HIGH TEMPERATURE COATINGS FOR GAS TURBINES: A REVIEW
A. J. A. Mom Jan. 1981 60 p refs In DUTCH; ENGLISH summary Presented at Corrosiedag 1980, Ede, Netherlands, 23 Oct. 1980

(NLR-MP-81003-U) Avail: NTIS HC A04/MF A01

The use of oxidation and corrosion resistant coatings in high temperature sections of aircraft gas turbines, marine gas turbines, and industrial gas turbines is discussed. The present state of the art and expected developments are pointed out. Different types of coatings (diffusion coatings, metallic overlays and ceramic coatings) and their properties are considered. Different techniques for the application of coatings are reviewed. In particular, the buildup, composition and structure of Al diffusion coatings and metallic overlays are described, including the effect of structure and composition on mechanical properties. Selection criteria for coatings in gas turbines are reevaluated, stressing service life, while presently available commercial coatings are assessed.
Author (ESA)

N82-18386# Centre Technique des Industries Mecaniques, Senlis (France).
FRICTION COEFFICIENT OF FLAME SPREAD MATERIALS Final Report [FROTTEMENT DE MATERIAUX PROJETES A CHAUD]
F. Mortier and B. Bourgouin May 1981 47 p In FRENCH
(CETIM-12-DO-71) Avail: NTIS HC A03/MF A01

The friction behavior of various flame sprayed coatings was determined in order to rationalize the choice of coating material vis a vis application. The coating materials tested were divided into three categories: metals and metallic alloys (NiAl, Mo, CoCrBW, NiCrBSi); metallic carbides (CW, TiC); and oxides (CrZO3, AlZO3 + SiOZ). A wheel on plane tribometer was used. Two surface finishing techniques were employed: diamond wheel grinding and a superfinishing technique. Besides a tabular account of the friction properties of the different coatings, results are shown which highlight the superfinishing process. Author (ESA)

N82-18387# Centre Technique des Industries Mecaniques, Senlis (France).
CHARACTERIZING HEAT TREATMENT INSTALLATIONS Final Report [CONTROLE DES INSTALLATIONS DE TRAITEMENTS THEMIQUES]
F. Rohart and A. Brucele Apr. 1981 177 p refs In FRENCH
(CETIM-12-G-199) Avail: NTIS HC A09/MF A01

The CETIM heat treatment facility is presented and its application in materials science is discussed. Problems encountered in the use of the installation are cited and remedies are proposed. Heat treatment can be either superficial (cementation, nitriding) or in-depth (annealing, tempering quenching, isothermal treatment). The equipment and furnaces are described. Studies reveal that the principal causes of uncertainty in heat treatment tests are insufficient temperature control of materials, reactivity between the environment and test specimens, and poor understanding of the laws governing heating and cooling of specimens.
Author (ESA)

N82-18388 Illinois Inst. of Tech., Chicago.
TEXTURE DEVELOPMENTS ASSOCIATED WITH ABNORMAL GRAIN GROWTH IN LOW CARBON STEEL SHEET Ph.D. Thesis
Chin-Fong Chang 1981 298 p
Avail: Univ. Microfilms Order No. 8200412

The phenomenon of abnormal grain growth in a low carbon aluminum killed steel sheet was investigated with special reference to the development of texture. The standard treatment sequences included: (1) hot band rapidly heated to 704 C and annealed for 5 hours to give AlN precipitation; (2) cold rolled 70%; (3) rapidly heated to 871 C and decarburized for 2 1/2 hours in a 90% moist argon-10% hydrogen atmosphere; (4) annealed at 871 C for 2-20 hours in a 62% argon-35% hydrogen atmosphere. The influence of a range of variables was investigated, the nature of the surface layer, the dew point, the decarburization temperature, and the heating rate. The surface layer of the hot band with finer grain size has been found to be critical to the development of abnormal grain growth. The growth kinetics show that the development of the (110) 001 texture is not a nucleation effect but results from the preferential growth characteristics of this orientation. The kinetic analysis also indicates that (110) 001 grains have a higher mobility than non (110) 001 grains, and that this appears to be associated with the pre-exponential term in the mobility equation. Dissert. Abstr.

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-18389* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CARBORANYLCYCLOTRIPHOSPHAZENES AND THEIR POLYMERS Patent
Harry R. Allcock (Pennsylvania State Univ., University Park), John P. OBrien (Pennsylvania State Univ., University Park), Angelo G. Scopelianos (Pennsylvania State Univ., University Park), and Larry L. Fewell, inventors (to NASA) (Pennsylvania State Univ., University Park) Issued 8 Sep. 1981 4 p Filed 12 Mar. 1980 Supersedes N80-21533 (18 - 12, p 1552) Sponsored by NASA
(NASA-Case-ARC-11176-1; US-Patent-4,288,585; US-Patent-Appl-SN-129799; US-Patent-Class-528-4; US-Patent-Class-528-168; US-Patent-CLass-528-6; US-Patent-Class-528-7; US-Patent-Class-568-2; US-Patent-Class-568-4; US-Patent-Class-568-5; US-Patent-Class-528-399) Avail: US Patent and Trademark Office CSCL 07C

Carboranyl-substituted polyphosphazenes are prepared by heat polymerizing a carboranyl halocyclophosphazene at 250 C for about 120 hours in the absence of oxygen and moisture. The cyclophosphazene is obtained by allowing a lithium carborane, e.g., the reaction product of methyl-o-carborane with n-butyllithium in ethyl ether, to react with e.g., hexachlorocyclotriphosphazene at ambient temperatures and in anhydrous conditions. For greater stability in the presence of moisture, the chlorine substituents of the polymer are then replaced by aryloxy or alkoxy groups, such as CF3CH2O. The new substantially inorganic polymers are thermally stable materials which produce a high char yield when exposed to extreme temperatures, and can thus serve to insulate less heat and fire resistant substances.
Official Gazette of the U.S. Patent and Trademark Office

N82-18390*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
REUSABLE THERMAL CYCLING CLAMP Patent Application
William J. Debnam, Jr., Archibald L. Fripp, and Roger K. Crouch, inventors (to NASA) Filed 17 Nov. 1981 10 p
(NASA-Case-LAR-12868-1; US-Patent-Appl-SN-322321) Avail: NTIS HC A02/MF A01 CSCL 11A

A reusable metal clamp was developed for retaining a fused quartz ampoule during temperature cycling in the range of 20 C to 1000 C. A compressible graphite foil with a high radial coefficient of thermal expansion is interposed between the fused quartz ampoule and the metal clamp to maintain a snug fit between these components at all temperature levels in the cycle.
NASA

N82-18391# Technische Hogeschool, Delft (Netherlands).
BIREFRINGENCE AND STRESS IN POLYMER MELTS UNDER SHEAR AND EXTENSION Ph.D. Thesis
J. A. vanAken 10 Sep. 1981 88 p refs
Avail: NTIS HC A05/MF A01

The investigation of the shear flow behavior of polymer melts using the flow birefringence technique is described. The apparatus and the rheological equations employed are described. J.D.H.

N82-18392# Laboratory for Electronic Development of the Armed Forces, Oegstgeest (Netherlands).
MEASUREMENT OF THE DIELECTRIC CONSTANT OF CERAMIC Al2O3 SUBSTRATES [METING VAN DE DIELECTRISCHE CONSTANTE VAN KERAMISCHE - Al2O3 - SUBSTRATEN]
J. vanStaaden and J. H. M. Strijbos 9 May 1980 27 p refs In DUTCH
(LEOK-TR-1980-04; TDCK-75059) Avail: NTIS HC A03/MF A01

A method to determine the dielectric constant of ceramic Al2O3 substrate is described. Measurements are based on the cavity resonance. Fringing is subdivided in dispersion and final effects in which dispersion affects the dielectric constant more than the final effect. A measuring method based on closed cavity resonance measurements is presented. The dielectric constant in open cavity resonance is also determined. Transl. by E.A.K.

N82-18393# Pennsylvania Univ., Philadelphia. Dept. of Physics.
PHOTOEXCITATIONS IN POLYACETYLENE Interim Technical Report
L. Lauchland, S. Etemad, T.-C. Chung, H. J. Heeger, and Alan G. MacDiarmid 11 Nov. 1981 46 p refs Submitted for publication
(Contract N00014-81-K-0648)
(AD-A107831; LSMR-TR-81-12) Avail: NTIS HC A03/MF A01 CSCL 07/5

The results of experimental studies of photoluminescence and photoconductivity in cis- and trans-(CH)x are presented. For cis-(CH)x, we find recombination luminescence in the scattered light spectrum at 1.9 eV, near the interband absorption edge. The luminescence turns on sharply for excitation energies greater than 2.05 eV, implying a Stokes shift of 0.15 eV. Studies of the temperature dependence (T more than or equal to 7 K) show no loss of luminescence intensity even at temperatures as high as 300 K. Isomerization of the same sample quenches the luminescence; we find no indication of luminescence near the interband absorption edge of trans-(CH)x even at temperatures as low as 7K. These results are discussed in the context of parallel phototransport studies. The quenching of the luminescence upon cis-trans isomerization is concurrent with the appearance of a large photoconductive response. The photoconductivity in trans-(CH)x has a threshold at 1.0 eV, well below the interband absorption edge at 1.5 eV, implying the presence of states deep inside the gap. The observation of luminescence in cis-(CH)x, but not in trans-(CH)x; and the observation of photoconductivity in trans-(CH)x, but not in cis-(CH)x provide confirmation of the proposal that solitons are the photogenerated carriers. In trans-(CH)x, the degenerate ground state leads to free soliton excitations, absence of band edge luminescence, and photoconductivity. In cis-(CH)x the non-degenerate ground state leads to confinement of the photogenerated carriers, absence of photoconductivity, and to the observed recombination luminescence. Author (GRA)

N82-18394# Advanced Mechanical Technology, Inc., Newton, Mass.
HARD-ON-HARD (CERAMIC) LONG-LIFE SEALS AND RIDERS FOR CRYOGENIC COOLERS Final Report, Jun. 1979 - Oct. 1980
Forest J. Carignan and Alan I. West Wright-Patterson AFB, Ohio AFWAL Aug. 1981 63 p refs
(Contract F33615-79-C-5029; AF Proj. 2402)
(AD-A108646; AFWAL-TR-81-4060) Avail: NTIS HC A04/MF A01 CSCL 11/2

A reciprocating pin-on-plate apparatus was designed and constructed for the testing of friction and wear characteristics of ceramic materials. The machine was specifically constructed to conduct tests at cryogenic temperatures in a pressurized (300 psig maximum) helium atmosphere. Cryogenic testing was not accomplished but 17 ceramic materials were screened at room temperature in 15 psig helium. As a result of the screening tests, the materials were rank ordered according to their wear, and friction coefficients were tabulated. Several ceramics performed as well or better than fluorogold, a currently used seal material. Recommendations were made concerning additional materials to be tested and the materials characterizations needed for data analysis. Author (GRA)

N82-18395# Air Force Weapons Lab., Kirtland AFB, N. Mex.
SURFACE STATISTICS INVESTIGATIONS Final Report
Richard A. House, II Oct. 1981 45 p refs
(AD-A108234; AFWL-TR-81-40) Avail: NTIS HC A03/MF A01 CSCL 11/2

Results are reported of two investigations on surface structural properties of optical glasses. One project dealt with surface profiling analyses of a set of fused silica samples which had previously been laser damage tested. The other project had to do with the roughening of polished quartz and BK7 glasses by extended periods of ultrasonic cleaning. Author (GRA)

N82-18396# Johns Hopkins Univ., Baltimore, Md.
QUANTUM CHEMICAL INVESTIGATIONS OF THE MECHANISM OF CATIONIC POLYMERIZATION AND THEORETICAL PREDICTION OF CRYSTAL DENSITIES AND DECOMPOSITION PATHWAYS OF ENERGETIC MOLECULES Annual Summary Report, 1 Oct. 1980 - 30 Sep. 1981
Joyce J. Kaufman 15 Oct. 1981 61 p
(Contract N00014-80-C-0003)
(AD-A108520; TR-2) Avail: NTIS HC A04/MF A01 CSCL 20/10

Quantum chemical calculations on the large molecules are made with programs which also incorporate several desirable options for calculation on large molecules. There are two-major steps in the polymerization of cyclic ethers, the initiation step proportional to basicity and ring strain of the cyclic ether and the propagation step, attributed to the electrophilicity of the propagating carbocation. Electrostatic molecular potential contour maps generated from ab-initio MODPOT/VRDDO calculation basicities of these ethers and their propensity to undergo cationic polymerization. Calculations are made on the cyclic ethers and on the proton attack on these ethers to get a coherent overview of the initation problem. These maps also indicate good copolymer coordinates. These maps form a semiquantitative guide to the ease of polymerizability of energetic cyclic ethers. GRA

N82-18397# Wisconsin Univ. - Madison. Dept. of Chemical Engineering.
PROPERTIES OF MULTIPHASE POLYURETHANE SYSTEMS Final Report, 1 Jul. 1980 - 30 Jun. 1981
Stuart L. Cooper Aug. 1981 42 p
(Contract N00019-80-C-0367)
(AD-A108519) Avail: NTIS HC A03/MF A01 CSCL 11/9

The influence of morphology on the structure-property relationships of polyvinylchloride-polyurethane blend systems was studied. Studies on blends of a segmented polyether polyurethane ET-38-1 with PVC were carried out utilizing differential scanning calorimetry (DSC), Rheovibron, stress-strain, infrared peak positions studies, and infrared dichroism experiments. As determined from DSC and Rheovibron data, THF-dioxane solution casting and melt processed samples are incompatible while THF solution casting produced a partially compatible polyurethane-PVC blend. However, similar uniaxial stress-strain data on all three series of samples indicate substantial polyether (soft segment of polyurethane) plasticization effect upon PVC, and therefore all of the blends can be considered as mechanically compatible. This produces useful blend systems of satisfactory mechanical properties with the PVC acting as a polyurethane stiffening agent. Such blends also exhibit improved flammability characteristics which are inherent to the PVC component. This is especially valuable in foamed elastomer or plastic applications. GRA

N82-18398# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Macromolecular Science.
IMPROVED MOISTURE RESISTANCE OF FIBER-REINFORCED PLASTIC Final Report, 1 Jul. 1978 - 30 Sep. 1981
Jack L. Koenig Dec. 1981 186 p refs
(Contract DAAG29-80-C-0236; Grant DAAG29-78-G-0148)
(AD-A109190; ARO-14740.4-MS) Avail: NTIS HC A09/MF A01 CSCL 11/9

The text of seven papers is included: (1) Improved Moisture Resistance of Fiber-Reinforced Plastic (An Introduction); (2) The Structure of Aminofunctional Silane Coupling Agents: Part 1: gamma-Aminopropyltriethoxysilane and its Analogues; (3) Spectroscopic Characterization of the Matrix-Silane Coupling Agent Interface in Fiber-Reinforced Composites; (4) Interfacial Strength Studies of Fiber-Reinforced Composites; (5) Comparison of Primary and Secondary Aminosilane Coupling Agents in Anhydride-Cured Epoxy Fiberglass Composites; (6) Chemical Reactions Occurring at the Interface of Epoxy Matrix and Aminosilane Coupling Agents in Fiber-Reinfored Composites; (7) Magic-Angle Cross Polarization Carbon-13 NMR Study of Aminosilane Coupling Agents on Silica Surfaces. GRA

N82-18399# European Space Agency, Paris (France).
DETERMINATION OF THE HIGH TEMPERATURE STRENGTH OF CERAMIC. DISCUSSION OF TESTING TECHNIQUES: FLEXURAL AND TENSILE TESTS, CREEP

TESTS WITH FLEXURAL AND TENSILE LOAD
Werner Gebhard Oct. 1981 24 p refs Transl. into ENGLISH from "Die Ermittlung der Warmfestigkeit keramischer Werkstoffe. Diskussion der Pruefmethoden: Biege- u. Zugfestigkeit, Kriechen unter Biege- u. Zugbelastung". Rept. DFVLR-Mitt-81-03 DFVLR, Cologne, Jan. 1981
(ESA-TT-715; DFVLR-Mitt-81-03) Avail: NTIS HC A02/MF A01; DFVLR, Cologne DM 8,90

High temperature strength of ceramic materials was determined within the service temperature range of an automobile gas turbine. For the use of ceramics as construction materials in gas turbine assemblies, results for flexural and tensile behavior are of varying consequence. In particular for turbine blades, centrifugal force at the blade root entrains forces that can cause large mechanical strain. Test apparatus is described, and test philosophy for the characterization of creep is discussed. The stress exponent n of secondary creep rate is specified from flexural and tensile creep tests, and the n data of different ceramic materials is presented. Author (ESA)

N82-18400# Bureau of Mines, Tuscaloosa, Ala.
HIGH-TEMPERATURE CORROSION RESISTANCE OF CERAMIC MATERIALS
T. A. Clancy 1981 37 p refs
(PB82-104399; BM-IC-8843) Avail: NTIS HC A03/MF A01 CSCL 11B

The Bureau of Mines reviewed and assessed the literature on corrosion resistance of ceramic materials. Corrosive conditions were categorized as: (1) acids and aqueous solutions, (2) glass and slag/metal melts, and (3) gases. Information on the corrosion resistance of ceramic materials, generally, is disseminated by many sources, each of which is interested in specific corrosive environments. Based on this survey, it was noted that (1) the development of standardized tests is needed to study solution-type corrosion of ceramics, (2) slag/melt corrosion data are the most comprehensive of the available data, and (3) better definition of corrosion mechanisms in gaseous environments is needed. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-18401* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
USE OF GLOW DISCHARGE IN FLUIDIZED BEDS Patent
Theodore Wydeven (San Jose State Univ., Calif), Peter C. Wood (San Jose State Univ., Calif.), Edward V. Ballou (San Jose State Univ., Calif.), and Leroy A. Spitze, inventor (to NASA) (San Jose State Univ., Calif.) Issued 1 Dec. 1981 6 p Filed 26 Oct. 1979 Supersedes N80-11326 (18 - 02, p 0185) Sponsored by NASA
(NASA-Case-ARC-11245-1; US-Patent-4,303,961; US-Patent-Appl-SN-088663; US-Patent-Class-361-230; US-Patent-Class-239-690; US-Patent-Class-361-226) Avail: US Patent and Trademark Office CSCL 21D

Static charges and agglomerization of particles in a fluidized bed systems are minimized by maintaining in at least part of the bed a radio frequency glow discharge. This approach is eminently suitable for processes in which the conventional charge removing agents, i.e., moisture or conductive particle coatings, cannot be used. The technique is applied here to the disproportionation of calcium peroxide diperoxyhydrate to ield calcium superoxide, an exceptionally water and heat sensitive reaction.
Official Gazette of the U.S. Patent and Trademark Office

N82-18402*# SRI International Corp., Menlo Park, Calif.
OXIDATION AND FORMATION OF DEPOSIT PRECURSORS IN HYDROCARBON FUELS Final Report
S. E. Buttrill, Jr., Frank R. Mayo, Bosco Lan, G. A. St.John, and David Dulin Jan. 1982 26 p refs
(Contract NAS3-22510)
(NASA-CR-165534; PYU-2115) Avail: NTIS HC A03/MF A01 CSCL 21D

A practical fuel, home heating oil no. 2(Fuel C), and the pure hydrocarbon, n-dodecane, were subjected to mild oxidation at 130 C and the resulting oxygenated reaction products, deposit precursors, were analyzed using field ionization mass spectrometry. Results for fuel C indicated that, as oxidation was initially extended, certain oxygenated reaction products of increasing molecular weights in the form of monomers, dimers and some trimers were produced. Further oxidation time increase resulted in further increase in monomers but a marked decrease in dimers and trimers. This suggests that these larger molecular weight products have proceeded to form deposit and separated from the fuel mixture. Results for a dodecane indicated that yields for dimers and trimers were very low. Dimers were produced as a result of interaction between oxygenated products with each other rather than with another fuel molecule. This occurred even though fuel molecule concentration was 50 times, or more greater than that for these oxygenated reaction products. Author

N82-18403# Naval Surface Weapons Center, White Oak, Md.
DESCRIPTION OF HOT SPOTS ASSOCIATED WITH LOCALIZED SHEAR ZONES IN IMPACT TESTS Research Report, Oct. 1979 - Sep. 1980
C. Stephen Coffey and Ronald W. Armstron 21 Oct. 1981 22 p refs
(AD-A108542; NSWC/TR-80-499) Avail: NTIS HC A02/MF A01 CSCL 19/1

A heat sensitive film technique has been employed to give spatial resolution to the observation of 'hot spots' in the impact deformation of soft ionic or molecular crystals and in crystal-filled polymer composites. The temperature of these 'hot spots' is estimated to exceed 250 C for even modest impact loads. The heating is interpreted to depend on local shear deformation. The rise in temperature associated with the movement of a number of equally-spaced dislocations is reexamined. An additional multiplicative effect for the temperature rise due to the dislocation number is obtained if the dislocations are released as a pile-up avalanche from an internal obstacle. This rise in temperature carries over to the association of localized heating of 'hot spots' with cracking within polymers because of the equivalence in the continuum approximation of a dislocation pile-up and a physical crack. Two reasons for the heating effect being especially important at cracking sites are that they are typified by the largest internal concentrations of stress which the material can bear before local fracture occurs, and, in so doing, the new crack surfaces supply a ready 'sink' for the dissipation of the internal energies at the tips of shear zones. GRA

N82-18404# Naval Weapons Center, China Lake, Calif.
DECOMPOSITION AND INTERACTION OF PROPELLANT INGREDIENTS Annual Progress Report, 1 Oct. 1980 - 30 Sep. 1981
K. J. Kraeutle and T. L. Boggs 30 Sep. 1981 7 p refs
(AD-A108135) Avail: NTIS HC A02/MF A01 CSCL 21/9

The program utilizes a wide variety of experimental methods as well as theoretical studies in specific areas such as burn rate modeling. These methods have been well documented in numerous presentations, publications, and patents. They allow the study of catalyzed and uncatalyzed decomposition of propellant oxidizers, binders, and metal fuels, and the evaluation of combustion characteristics, combustion performance, and combustion stability of experimental and production lot propellants. Where required, established test methods are modified or new methods are developed to meet specific needs such as in particle size analysis or ingredient modification. In-house or commercial analytical capabilities are employed whenever feasible or promising. The interpretation of results is facilitated by limiting the number of sample and test parameters as much as possible and by rigorous control of test variables. In the process, new options for tailoring of propellant combustion behavior, new propellant systems, and quality control of ingredients are evolved. Author (GRA)

N82-18405# Societe Europeenne de Propulsion, Bordeaux (France). Div. Structures et Controle Thermique.
EVALUATION OF A THERMAL RESPONSE TEST FOR ELECTROPYROTECHNICAL DEVICES: SUMMARY [EVALUATION DE L'ESSAI DE REPONSE THERMIQUE DES

DISPOSITIFS ELECTROPYROTECHNIQUES: RAPPORT DE SYNTHESES DES TRAVAUX]
P. Thebault Paris ESA 20 Jan. 1981 152 p refs In FRENCH Original contains color illustrations
(Contract ESTEC-3380/77)
(TP-15225/80; ESA-CR(P)-1467) Avail: NTIS HC A08/MF A01

The testing of electroexplosive devices, used for firing propellants, was investigated. Theory reveals the possibility of characterizing thermal response by two parameters relative to the heat transfer coefficient of the filament/propellant contact region and calorific capacity of the pyrotechnical interface. An electronic test apparatus was built which delivers an impulse current, rectangular waveform between 0.5 and 2 A of variable duration from 1 to 89 msec. Using the apparatus, experiments were carried out with normal and known-to-be defective initiators. Results show that the apparatus is suitable for measuring the theoretically identified parameters and that the test method is valid.
Author (ESA)

N82-18406# Dynecology, Inc., Harrison, N.Y.
ADAPTATION OF THE SIMPLEX GASIFICATION PROCESS TO THE COCONVERSION OF MUNICIPAL SOLID WASTE AND SEWAGE SLUDGE
J. C. Arbo, D. P. Glaser, M. A. Lipowicz, R. B. Schulz, and J. L. Spencer Apr. 1981 54 p Sponsored in part by EPA
(PB82-112418; NYSERDA-81-6) Avail: NTIS HC A04/MF A01 CSCL 21D

The combining of coal with biomass and sewage sludge in varying ratios to form simplex briquettes to be fed into gasifiers was examined. The use of biomass sewage sludge and municipal solid wastes permit the use of Eastern-caking coals in commercial medium Btu gasifiers. The results found that many of the 225 experimental briquette formulations meet required structural integrity prevent the clumping and fusing that have hindered effective gasification of this type of coal; and meet storage criteria. The briquettes developed, if commercially available, could convert an urban disposal problem into an energy resource permitting the use of less expensive and more readily available Eastern coal.
GRA

N82-18407# Gilbert (Glen A.) and Associates, Inc., Reading, Pa.
COMPARISON OF COAL BASED SYSTEMS: MEDIUM-BTU GAS VERSUS SNG FOR INDUSTRIAL APPLICATIONS Final Report
Michael D. Peterik 1 May 1981 202 p refs
(Contract GRI-5014-310-0195)
(PB82-117383; GRI-80/0056) Avail: NTIS HC A10/MF A01 CSCL 21D

Production and total system economics of fuel gas from coal for industrial use were analyzed. It was found that low-Btu gas offers industry certain cost advantages over higher heat content fuel gases in specific applications, but that its use will be characterized by small scale on-site systems. Intermediate Btu gas (IBG), on the other hand, offers an incentive for gas industry involvement because of potential cost reduction to industry through a regional, centralized, utility owned system. Synthetic natural gas costs, benefiting from economics of scale and plant siting, offer industry the lowest cost alternative for the majority of systems studied.
Author (GRA)

N82-18408# National Center for Resource Recovery, Washington, D. C.
DENSIFICATION OF REFUSE-DERIVED FUELS: PREPARATION, PROPERTIES AND SYSTEMS FOR SMALL COMMUNITIES Final Report
Jay Campbell and Marc L. Renard Sep. 1981 163 p refs
(Grant EPA-R-804150)
(PB82-103904; EPA-600/2-81-188) Avail: NTIS HC A08/MF A01 CSCL 21D

Densified refuse derived fuel (d-RDF) is produced by compacting refuse derived fuel into agglomerated pieces sufficiently cohesive to sustain storage and handling. The use of this d-RDF product as a substitute for coal in spreader stroke boilers is a developing resource recovery alternative. The operation, performance and product characteristics of a waste shredding and densification subsystem for production of d-RDF from air classified light fraction is investigated and a technical and economic evaluation of d-RDF facilities for small communities is presented.
GRA

N82-18409# Cornell Univ., Ithaca, N. Y. Center for Radiophysics and Space Research.
STUDIES RELATED TO THE DEEP EARTH GAS Final Report, Sep. 1979 - Dec. 1980
Thomas Gold, Elizabeth Bilson, and Steven Soter 8 May 1981 40 p refs
(GRI Proj. 5014-363-0205)
(PB82-103821; GRI-80/0066) Avail: NTIS HC A03/MF A01 CSCL 21D

The origin of terrestrial hydrocarbons, principally methane and petroleum and the importance of the abiogenic methane component in natural gas, which originates at much greater depth than the organic methane, from meteoritic carbonaceous matter accumulated in the mantle at the time of the Earth's formation. Experiments include: (1) inverse cracking designed to study the conditions for methane addition to petroleum hydrocarbons; (2) isotope analysis of methane was samples collected in geopressured wells, tectonically active regions, and seeps of possibly abiogenic origin; and (3) construction and testing of a ground gas pressure monitoring unit to be used for the investigation of the relationship of Earth outgassing and tectonic processes.
GRA

N82-18410# California Univ., Berkeley. Dept. of Mechanical Engineering.
FUNDAMENTAL CONSIDERATIONS FOR PREPARING DENSIFIED REFUSE DERIVED FUEL Final Report
George J. Trezek, George M. Savage, and Daniel B. Jones Sep. 1981 59 p refs
(Grant EPA-R-805414)
(PB82-101668; EPA-600/2-81-180) Avail: NTIS HC A04/MF A01 CSCL 21D

A series of pilot scale tests were conducted to determine the effects of various parameters on the densification of refuse derived fuel. The experiments included a series of bench scale experiments involving a single die arrangement, as well as larger scale studies in which a commercial pellet mill was used. The bench scale tests (tests in which the pellets were individually formed), were conducted both to provide data needed for an analysis of the basis dynamics of pellet formation and as an aid in the interpretation of results obtained with the pellet mill. The energy required to overcome die friction was studied independently of the energy consumed in material deformation and compression. The specific effects of die length, diameter, and taper were determined.
GRA

N82-18411# Midwest Research Inst., Kansas City, Mo.
COMPARATIVE STUDY OF AIR CLASSIFIERS Final Report
Vern Hopkins, Bruce W. Simister, and George M. Savage (Cal Recovery Systems, Inc.) Sep. 1981 294 p refs Sponsored in part by Naval Civil Engineering Labs.
(Contract EPA-68-03-2730)
(PB82-106121; EPA-600/2-81-221) Avail: NTIS HC A13/MF A01 CSCL 21D

The results of field tests of seven different air classifier systems are presented. The systems are compared in regard to their capacity to handle refuse and separate it into a heavy fraction and a light fuel fraction; their ability to concentrate lights in the light fraction and heavies in the heavies fraction as compared to the infeed; the quality of the light fraction for refuse derived fuel; the yield of combustibles from the infeed that are collected in the light fraction; the consumption of air required to handle a given quantity of infeed; and costs (engineering, capital, and operation and maintenance) per unit weight of refuse infeed at design capacity. Tests were run on each classifier at three airflow rates and at 5 to 10 refuse infeed rates. Procedures used to run these tests are given, and treatment of samples taken from light and heavy fraction streams is outlined.
GRA

N82-18412# Environmental Protection Agency, Ann Arbor, Mich. Control Technology Assessment and Characterization Branch.
GASOLINE EQUIVALENT FUEL ECONOMY DETERMINATION FOR ALTERNATE AUTOMOTIVE FUELS

Craig A. Harvey Aug. 1981 41 p refs
(PB82-120072; EPA/AA/CTAB/PA/81-16) Avail: NTIS HC A03/MF A01 CSCL 21D

Some basis for a decision on the most appropriate methodology for calculating the gasoline equivalent fuel economy of a vehicle that uses fuel other than gasoline is provided. Once this methodology is determined, it will provide vehicle manufacturers with a way to gauge the effects of alternative marketing options on their average fuel economy. GRA

N82-18413# Ohio Dept. of Natural Resources, Columbus. Water Planning Unit.
SOUTH POINT GASOHOL PROJECT: A WATER ASSESSMENT STUDY
Carrie J. Groves, David Denig-Chakroff, and Arthur F. Woldorf May 1981 50 p refs
(Contract WR20424491)
(PB82-111485) Avail: NTIS HC A03/MF A01 CSCL 21D

Section 13 of the Federal Non-nuclear Energy Research and Development Act of 1974 provides for water assessment reports to be prepared by the Water Resources Council on commercial applications of energy technologies which may have a significant impact on water resources. A summary of the principal findings of the study are reported: (1) a description of the project, (2) water supply availability (3) an analysis of surface-water and ground-water resources with special attention given to potential water quantity/quality impacts of the project and (4) environmental and socio-economic effects of potential water resources impacts. GRA

N82-18414# West Virginia Univ., Morgantown.
AN ECONOMIC ANALYSIS OF COAL SUPPLY IN THE OHIO RIVER BASIN ENERGY STUDY REGION
Walter P. Page Oct. 1981 83 p refs
(Grant EPA-R-805585)
(PB82-113341; EPA-600/7-81-162) Avail: NTIS HC A05/MF A01 CSCL 21D

Using the energy and fuel demand model developed for the Ohio River Basin Energy Study (ORBES) region (all of Kentucky, most of West Virginia, substantial portions of Illinois, Indiana and Ohio and southwestern Pennsylvania), coal production levels were projected. A separate research effort allocated the tonnage to producing districts by mine and coal type. The coal supply work focused on identifying the coal supply districts that have historically served the ORBES region and estimating the resource depletion costs associated with expanded levels of coal production between 1974 and 2000. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-18415 Georgia Inst. of Tech., Atlanta.
FINITE-ELEMENT FORMULATION FOR THE ANALYSIS OF INTERFACES, NONLINEAR AND LARGE DISPLACEMENT PROBLEMS IN GEOTECHNICAL ENGINEERING Ph.D. Thesis
Adolfo E. Zeevaert 1980 285 p
Avail: Univ. Microfilms Order No. 8124300

A mathematical formulation to model the behavior under load of a reinforced soil system, where a fabric is placed over a soft soil and covered with stone for use as a temporary haul road is discussed. This approach is used to improve the behavior of temporary roadways, particularly where very soft soils are encountered. The stress distribution and the load-deformation characteristics of the soil-fabric system for varying geometries and material properties are defined. Included in the mathematical formulation are such features as: nonlinear behavior of the soil and fabric materials, friction parameters of the interface, tension characteristics of the fabric materials, large displacements in finite deformation, 'no tension' conditions of the cohesionless materials, and yielding of plastic materials. The mathematical model is a more complete approximation of the actual fabric-soil system than is presently available. Dissert. Abstr.

N82-18416# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario). Div. of Building Research.
MANUAL ON PHYSICO-CHEMICAL STRENGTHENING OF FREEZING AND THAWING SOILS
1981 99 p Transl. into ENGLISH of "Rukovodstvo po Tekhnol. Fiz.-Khim. Ukrepleniya Promerzayushchikh i Ottaivayushchikh Gruntov" N.M. Gersevanov Sci. Res. Inst. (USSR), Moscow, 1977 p 1-68
(NRC/CNR-TT-1978; ISSN-0077-5506) Avail: NTIS HC A05/MF A01

The planning and execution of work on preconstruction improvement of the construction characteristics of perennially and seasonally frozen soils which are to be used as bases for buildings and structures are presented. Instructions for carrying out foundation excavations, for preventing frost heaving of soils and heaving of foundations under winter freezing conditions are included. Thawing of seasonally and perennially frozen soils with the aid of electric power and chemical agents when the temperature is both above and below zero, and also compaction and heave stabilization of such soils are discussed. S.L.

N82-18417# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Applied Research Branch.
FOUNDATIONS OF STRUCTURES IN POLAR WATERS
Edwin J. Chamberlain Oct. 1981 18 p refs Sponsored in part by Geological Survey
(AD-A108344; CRREL-SP-81-25) Avail: NTIS HC A02/MF A01 CSCL 13/13

Artificial islands and gravity- and pile-founded towers used for the exploration and production of petroleum resources in the Alaskan Beaufort Sea will be affected by conditions not found in more temperate waters. The force of sea ice, the thawing of subsea permafrost, and seasonal freezing and thawing all may cause failure of the foundations of these structures. To ensure the stability of foundations and fill structures, special precautions must be taken in selecting sites and evaluating the engineering properties of sea bed and fill materials. Author (GRA)

N82-18418# Aeronautical Research Labs., Melbourne (Australia).
PERFORMANCE ANALYSIS OF VAPOUR CYCLE COOLING SYSTEMS
Brian Rebbechi, John L. Fowler, Neil J. Repacholi, and Gordon L. Collins Mar. 1981 50 p refs
(AD-A108254; ARL/MECH/ENG/NOTE-386) Avail: NTIS HC A03/MF A01 CSCL 13/1

The performance of several different configurations of vapor cycle cooling systems, using automotive-type components, has been experimentally determined. Performance of the individual components has also been analysed and presented in a form appropriate for assessing the suitability of their application to other system types. Author (GRA)

N82-18419# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsberetch.
ELECTROFORMING OF SPACE AND AIRCRAFT STRUCTURES
R. Suchentrunk 1981 9 p refs
(MBB-BB-491-O) Avail: NTIS HC A02/MF A01

Application of electroforming, a production technique for complicated structures, to aircraft and spacecraft structures and components is addressed. The process of electrodeposition is described and the advantages of the electroformed structures are highlighted. Materials suitable for the mandrels and for electrodeposition are discussed emphasizing preferred properties. J.M.S.

N82-18420# Centre Technique des Industries Mecaniques, St. Etienne (France).
EXPLORATORY STUDY ON MANUAL DRILLING [ETUDE EXPLORATOIRE DU PERCAGE MANUEL]
J. P. Faurie May 1981 12 p In FRENCH
(CETIM-1-6E-0-60) Avail: NTIS HC A02/MF A01

Using a common, handheld electric drill, the suitability of this tool to drilling 2, 4, 6, 8, 10, and 13mm dia holes in 20mm thick sheet steel was determined. Given an operator whose pushing ability is limited (approximately 30 daN), whether or not the torque and speed of the drill are well adapted to the job was studied. Although the results are inconclusive (wide dispersion in measurements), a norm for job suitability is foreseen for portable drills. Author (ESA)

N82-18421# Centre Technique des Industries Mecaniques, St. Etienne (France).

EXPLORATORY STUDY ON A UNIVERSAL WORKSHOP Final Report [ETUDE EXPLORATOIRE ATELIERS FLEXIBLES]

M. Jubin Jul. 1981 112 p refs In FRENCH
(CETIM-1-4N-12-9) Avail: NTIS HC A06/MF A01

The flexibility of the industrial workshop in performing a variety of fabrication jobs is considered. The relatively large amount of production time which is lost due to too much (production line) or too little (single jobber) machine specificity is cited. A best possible compromise between productivity and job flexibility is sought. An automated universal workshop is proposed. The individual fabrication units are described, taking machine tool manufacture as an example. The control system and materials handling system are depicted. Generalization to most mechanical construction tasks is regarded as feasible. Author (ESA)

N82-18422# Battelle Pacific Northwest Labs., Richland, Wash.

PHYSICAL AND CHEMICAL CHARACTERISTICS OF SYNTHETIC ASPHALT PRODUCED FROM LIQUEFACTION OF SEWAGE SLUDGE Final Report, Sep. 1979 - Apr. 1981

J. M. Donovan, T. R. Batter, R. K. Miller, and R. P. Lottman (Idaho Univ., Moscow) Oct. 1981 67 p refs
(Grant EPA-R-806790)
(PB82-119082; EPA-600/2-81-242) Avail: NTIS HC A04/MF A01 CSCL 13B

Direct thermochemical liquefaction of primary undigested municipal sewage sludge was carried out to produce a low molecular weight steam volatile oil, a high molecular weight synthetic asphalt, and a residual char cake. The latter product is capable of supplying the thermal energy requirements of the conversion process. The steam volatile oil has immediate value as a synthetic fuel oil. The synthetic asphalt may prove to be a useful cement for paving or for fuel or coking stock. The thermochemical liquefaction process should be capable of operating technically and in an environmentally acceptable manner in conjunction with many existing waste water treatment facilities. The overall feasibility of the process depends on the value of the oil and synthetic asphalt products as petroleum replacements, and on the costs associated with disposal of sludge. GRA

N82-18423# Cambridge Univ. (England). Dept. of Engineering.

COLLAPSE LIMIT STATES OF REINFORCED EARTH RETAINING WALLS

M. D. Bolton and P. L. R. Pang (Allott and Lomax) 1981 67 p refs
(PB82-113515; CUED/D-SOILS/TR-102-1981; ISSN-0309-7439) Avail: NTIS HC A04/MF A01 CSCL 08M

The use of systems of earth reinforcement or anchorage is gaining in popularity. It therefore becomes important to assess whether the methods of design which were adopted for such constructions represent valid predictions of realistic limit states. Confidence can only be gained with regard to the effectiveness of limit state criteria if a wide variety of representative limit states were observed. Over 80 centrifugal model tests of simple reinforced earth retaining walls were carried out, with the main purpose of clarifying the nature of appropriate collapse criteria. Collapses due to an insufficiency of friction were shown to be repeatable and therefore subject to fairly simple limit state calculations. GRA

N82-18424# Cambridge Univ. (England). Dept. of Engineering.

PMATRX: AN ALGORITHM FOR TRANSFORMING N-DIMENSIONAL DATA INTO PLOTTED CURVES

C. M. Szalwinski 1981 34 p Sponsored in part by the Transport and Road Research Lab. and the Ford of Brittain Trust
(PB82-114463; CUED/D-SOILS/TR-110-1981; ISSN-0309-7439) Avail: NTIS HC A03/MF A01 CSCL 08M

An algorithm - PMATRX - for the plotting of different aspects of a soils stress-strain history is presented. Several histories can be described on the same reference frame. Each frame relates 2 variables of an n-variable history. The complete plot consists of a matrix of such frames. An example of PMATRX's use on the Cambridge University IBM/370 is provided. Programmer's documentation is included as an Appendix. The algorithm can serve either-along or as a post-processor to data-generation programs. GRA

N82-18425# Electricity Council Research Centre, Capenhurst (England).

THE CAPENHURST WESTAIR HIGH TEMPERATURE HEAT PUMP DRYER

J. L. Driscoll, M. P. Bertinat, F. G. Drakesmith, J. T. Griffith, D. L. Hodgett, F. W. Sharman, R. Stirling, I. Strutt, B. J. Taylor, and R. H. Johnson Jun. 1981 27 p
(PB82-116690; ECRC/R-1440) Avail: NTIS HC A03/MF A01 CSCL 13A

The Capenhurst Westair High Temperature Heat Pump Dryer is an efficient electrical system for batch convection drying of solids such as timber. The use of a heat pump enables heat from the water evaporated to be recovered and re-used in the dryer. Energy requirements can be reduced by up to two thirds with significant savings in running costs. Capenhurst has progressed heat pump drying technology so that products can now be dried at temperatures up to 80 C. A 9 kilowatt packaged heat pump unit utilizing this technology was produced through a program of joint research and development with Westair Dynamics Ltd. The Capenhurst Westair Dryer, its development and the benefits of using the system for drying timber and other products, is described. GRA

N82-18426# Intermountain Forest and Range Experiment Station, Ogden, Utah.

PATTERN: A SYSTEM FOR LAND MANAGEMENT PLANNING

Richard J. Barney and Toni Rudolph Aug. 1981 13 p refs
(PB82-101452; FSRN-INT-318) Avail: NTIS HC A02/MF A01 CSCL 13B

The planning assistance through technical evaluation of relevance numbers system is described. It is a procedure for identifying and ranking key factors in land management decisions. The technique is applied to a hypothetical example. GRA

N82-18427# Notre Dame Univ., Ind.

CANDE-1980: BOX CULVERTS AND SOIL MODELS Final Report, Nov. 1978 - Oct. 1980

M. G. Katona, P. D. Vittes, Ch. H. Lee, and H. T. Ho May 1981 218 p refs
(Contract DOT-FH-11-9406)
(PB82-102393; FHWA/RD-80/172) Avail: NTIS HC A10/MF A01 CSCL 13B

The CANDE computer program, introduced in 1976 for the structural design and analysis of buried culverts, is extended and enhanced in this work effort to include options for automated finite element analysis of precast, reinforced concrete box culverts, and new nonlinear soil models. User input instructions for the new options, now operative in the CANDE-1980 program, are provided in the appendix of this report along with example input/output data. GRA

N82-18428# Bureau of Mines, Tuscaloosa, Ala.

CERAMIC ROADWAY AGGREGATES WITH IMPROVED POLISH AND WEAR RESISTANCE Final Report, Mar. 1977 - Dec. 1980

Arthur V. Petty, Jr. Aug. 1981 107 p refs
(PB82-103987; FHWA/RD-81/136) Avail: NTIS HC A06/MF A01 CSCL 13C

Synthetic ceramic aggregates having high wear- and polish-resistance were developed. Three hundred aggregate compositions, incorporating a variety of low-cost 'waste' materials were evaluated. Aggregates were produced using conventional ceramic processing techniques and fired at temperatures ranging from 900-1,500 C. British Wheel and L. A. Abrasion tests were used for initial screening of the aggregates. These data, raw material costs, availability, and energy requirements, were used to select nine compositions for circular track tests. Economic evaluations showed that present production costs, based on a 1,000 ton-per-day operation ranged from $10 to $120 per ton

of material produced. Guyana bauxite was used as a standard.
GRA

N82-18429# Stanford Univ., Calif. Earthquake Engineering Center.

PROBABILISTIC AND HAZARD ANALYSIS FOR PORE PRESSURE INCREASE IN SOILS DUE TO SEISMIC LOADING

G. W. Clough and Jean-Lou Chameau May 1981 246 p refs Sponsored in part by Geological Survey
(Grants NSF PFR-80-07083; NSF ENV-77-17834)
(PB82-122417; NSF/CEE-81038) Avail: NTIS HC A11/MF A01 CSCL 08M

The likelihood of pore pressure build-up during an earthquake is evaluated. Methods for pore pressure development and liquefaction are reviewed and the behavior of cohesionless soils in cyclic loading are investigated. A probabilistic pore pressure model using laboratory data; the probabilistic development of pore pressure using an effective stress model; and a probabilistic pore pressure analysis and seismic hazard evaluation are described.
GRA

N82-18430# Stanford Univ., Calif. Earthquake Engineering Center.

THEORY AND APPLICATION OF EXPERIMENTAL MODEL ANALYSIS IN EARTHQUAKE ENGINEERING

Helmut Krawinkler and Piotr D. Moncarz Jun. 1981 4 p refs
(Grants NSF ENV-77-1444; NSF ENV-75-20036)
(PB82-122409; NSF/CEE-81037) Avail: NTIS HC A02/MF A01 CSCL 13M

The feasibility and limitations of small-scale model studies in earthquake engineering and practice are summarized. Emphasis is placed on dynamic modeling theory; a study of the mechanical properties of model materials; the development of model construction techniques; and an evaluation of the accuracy of prototype response prediction through model case studies on components and simple structures. Materials for modeling of steel and reinforced concrete structures are examined with regard to cyclic load effects. Systematic material testing procedures were developed. Problems encountered in the construction of models are identified. Research demonstrates that model analysis can be used in to obtain quantitative information on the seismic behavior of complex structures.
GRA

N82-18431# Council for Scientific and Industrial Research, Pretoria (South Africa).

THE 2ND SEMINAR ON EFFICIENT METAL FORMING AND MACHINING

1980 252 p refs Proceedings of Conf. held at Pretoria, 18 Nov. 1980
(PB82-109745; CSIR-S-234; ISBN-0-7988-2015-2) Avail: NTIS HC A12/MF A01 CSCL 13H

Metalspinning, shear and flow forming are discussed. Optimized machining is surveyed. Automatic tool wear compensation is addressed. Ceramic coatings for wear resistance are covered. Creep grinding using diamond wheel is presented. Economics of numerical control machining are reported. Amber Boron Nitride and its industrial application is discussed. Wear resistant coatings on hard metal are described. The explosive hardening of metals is examined. The selection of machining parameters using Amborite on hard ferrous material is discussed. Drawing and wall ironing of metal cans is investigated. Economical cutting with the CO2 gas laser is presented. Developments in the deep drawing of a cylindrical cup are considered. Training black machinist is reviewed. The role of investment casting in modern engineering practices is covered. Cold forming of internal threads is included. High speed steel cutting tools are described. Hot forging is summarized.
N.W.

N82-18432# Transport and Road Research Lab., Crowthorne (England). Materials Div.

HOT ROLLED ASPHALT: EFFECT OF BINDER PROPERTIES ON RESISTANCE TO DEFORMATION

F. A. Jacobs 1981 22 p refs
(PB82-122664; TRRL-LR-1003; ISSN-0305-1293) Copyright. Avail: Issuing Activity CSCL 13C

Those properties of binders that most affect the resistance to deformation of rolled asphalt are discussed. Thirteen binders were studied and mixtures containing them were subjected to design tests and the wheel tracking test. These laboratory mechanical tests show that, within the range of binders tested, significant improvements in resistance to deformation can be achieved over a range of high road temperatures by increasing the softening point of the binder, irrespective of its penetration at 25 C.
Author (GRA)

N82-18433# Connecticut Dept. of Transportation, Wethersfield. Bureau of Highways.

ENERGY EQUIVALENTS FOR SELECTED PAVEMENT MATERIALS: THEIR PRODUCTION AND PLACEMENT Final Report, Dec. 1978 - Mar 1981

Keith R. Lane Mar. 1981 105 p refs Prepared in cooperation with FHWA, Washington, D.C.
(Proj. HPR-569)
(PB82-121187; FHWA-CT-81-4; Rept-569-F-81-4) Avail: NTIS HC A06/MF A01 CSCL 13C

Energy requirements for selected pavement surfaces are discussed. Energy requirements for hot-mixed bituminous recycling and portland cement concrete recycling projects are presented along with conventional pavement methods. Energy requirements for conventional thin surface treatments are also discussed. Environmental analyses involving both air and noise quality measurement are included for various recycling and conventional paving options.
GRA

N82-18434# Federal Highway Administration, Washington, D.C. Materials Div.

PROPERTIES OF PORTLAND CEMENT CONCRETES CONTAINING POZZOLANIC ADMIXTURES

D. D. Simmons, T. J. Pasko, Jr., and W. R. Jones Apr. 1981 52 p refs
(PB82-120965; FHWA/RD-81/184) Avail: NTIS HC A04/MF A01 CSCL 13C

A laboratory comparison was made of the properties of a concrete containing no pozzolan with several mixtures containing pozzolans. Used were a natural pozzolan (Lassenite), two fly ashes of different fineness and low carbon and an amorphous silica fume dust from a metal-producing plant. One cement, one coarse crushed limestone aggregate, and one fine river aggregate were used. Replacing a faster reacting binder with a slower one, produced lower early strengths and adversely affected the properties which are highly dependent on strength. The measures of durability were greatly affected by the air contents and aging or treatment prior to exposure. The amorphous silica fume dust increased the early strengths of a fly ash mixture.
GRA

N82-18435# National Bureau of Standards, Washington, D.C. National Engineering Lab.

ANALYSIS OF THERMAL STRESSES IN INTERNALLY SEALED CONCRETE BRIDGE DECKS Final Report, Jul. 1977 - Dec. 1979

S. George Fattal, Timothy A. Reinhold, and Bruce Ellingwood Apr. 1981 119 p refs Sponsored by the Federal Highway Administration
(PB82-122868; FHWA/RD-80/085) Avail: NTIS HC A06/MF A01 CSCL 13B

A structural model was developed for use with a finite element program to predict thermal stresses which result from the application of heat to the concrete decks of highway bridges. The decks are heated to obtain an internally sealed concrete so as to better protect the reinforcement from deicer induced corrosion. Simple decks were first studied to determine the sensitivity of the solutions to various modeling assumptions. Two full scale bridge decks were also analyzed for which the temperature distributions are predefined on the basis of field data. The model will provide a helpful tool which will enable future field measurements to be planned more selectively. It will also provide insight on means for improving the heat treatment process so as to minimize cracking damage.
GRA

N82-18436# Texas Univ. at Arlington. Center for Transportation Research.

ANALYSIS OF POST-TENSIONED GIRDER ANCHORAGE ZONES

W. C. Stone and J. E. Breen Jun. 1981 174 p refs Prepared in cooperation with the Federal Highway Administration, Austin, Tex.

(PB82-122268; CTR-3-5-77-208-1; FHWA/TX-81/13-208-1; RR-208-1) Avail: NTIS HC A08/MF A01 CSCL 13B

Several large thin-webbed box girders, with post-tensioned anchorage zones experienced large cracks along the tendon path in the anchorage zones at the design stressing load. Cracking provides a path for penetration of moisture and salts and thus presents a potential corrosion and frost damage threat. Such cracking negates the use of prestressed concretes. An extensive literature review which documents the state of the art in anchorage zone analysis behavior, and design recommendations is summarized. The general utilization of a three dimensional finite element program, PUZGAP3D, for analysis of the complex anchorage zone region is outlined. The program was used to study straight and curved tendon paths. GRA

N82-18437# National Bureau of Standards, Boulder, Colo. National Engineering Lab.

PRELIMINARY GUIDELINES FOR CONDITION ASSESSMENT OF BUILDINGS BEING CONSIDERED FOR SOLAR RETROFIT

Frank H. Lerchen, James H. Pielert, and Phillip T. Chen Jul. 1981 142 p refs Sponsored by DOE
(PB82-113259; NBSIR-81-2289) Avail: NTIS HC A07/MF A01 CSCL 13A

A general description of methods currently available for condition assessment of the structural heating, ventilating, and air conditioning (HVAC); electrical and plumbing systems of an existing building are reported. The feasibility of rehabilitation for solar retrofit is determined. GRA

N82-18438# West Virginia Univ., Morgantown.

ECONOMIC LOSSES IN THE COLUMBUS SMSA DUE TO LONG-RANGE TRANSPORT OF AIRBORNE RESIDUALS IN THE OHIO RIVER BASIN ENERGY STUDY REGION

Walter P. Page and John M. Gowdy Oct. 1981 129 p refs
(Grant EPA-R-805585)
(PB82-110735; EPA-600/7-81-161) Avail: NTIS HC A07/MF A01 CSCL 13B

Central Ohio is an area where the long range transport of air pollutants is a problem, and a relatively small increase in pollution emitted from sources within the standard metropolitan statistical area (SMSA) could cause the area to violate federal primary standards for sulfur doxide and particulates. The potential loss in economic product to the Columbus SMSA is estimated by calculating the difference in economic output between the projected increase in potential output possible under existing air quality regulations without additional background pollution from new out of area fossil fuel power plants, and the projected increased in output possible when this additional source of pollution is taken into account. Estimated losses are provided for seven different ORBES scenarios. GRA

N82-18439# West Virginia Univ., Morgantown.

ESTIMATING REGIONAL LOSSES TO AGRICULTURAL PRODUCERS FROM AIRBORNE RESIDUALS IN THE OHIO RIVER BASIN ENERGY STUDY REGION, 1976-2000 Final Report

Walter P. Page, James Ciecka (DePaul Univ., Chicago, Ill.), and Gary Arbogast Oct. 1981 157 p refs
(Grants EPA-R-805585; EPA-R-805588)
(PB82-113879; EPA-600/7-81-164) Avail: NTIS HC A08/MF A01 CSCL 13B

Monetary losses to agricultural producers from airborne residuals in the ORBES region (all of Kentucky, most of West Virginia, southwestern Pennsylvania, and substantial portions of Illinois, Indiana and Ohio) are considered. Results are reported for three energy development scenarios--a base case; a case assuming non-compliance with state implementation plans (SIPs); and a high electrical energy growth case. Two different analyses are provided, one based on nominal load emissions from ORBES-region utilities and the other based on peak load emissions. GRA

N82-18440# Indiana Univ. at Bloomington.

OHIO RIVER BASIN ENERGY STUDY: LAND USE AND TERRESTRIAL ECOLOGY Final Report

J. C. Randolph and William W. Jones Sep. 1981 177 p refs
(Grant EPA-R-805609)
(PB82-110347; EPA-600/7-81-062) Avail: NTIS HC A09/MF A01 CSCL 13B

Land use and terrestrial ecology data and analyses for the Ohio River Basin Energy Study (ORBES) region consisting of all of Kentucky, most of West Virginia, and substantial portions of Illinois, Indiana, Ohio, and Pennsylvania is presented. This 122 million acre region has a variety of land uses, which are summarized. Also discussed is the terrestrial ecology of the region (climate, physiography, soils, flora, fauna, and ecosystem dynamics). For the various ORBES energy development scenarios, land use conversion due to energy-related use was calculated, and impacts on terrestrial ecology were determined by application of the terrestrial ecosystem assessment methodology developed for ORBES. GRA

N82-18441# Illinois Univ. at Chicago Circle, Chicago.

ELECTRICAL GENERATING UNIT INVENTORY 1976-1986: ILLINOIS, INDIANA, KENTUCKY, OHIO, PENNSYLVANIA AND WEST VIRGINIA

Steven D. Jansen Sep. 1981 94 p
(Grant EPA-R-805588)
(PB82-112194; EPA-600/7-81-057) Avail: NTIS HC A05/MF A01 CSCL 13B

The ORBES region consists of all of Kentucky, most of West Virginia, substantial parts of Illinois, Indiana, and Ohio, and southwestern Pennsylvania. The inventory lists installed electrical generating capacity in commercial service as of December 1, 1976, and scheduled capacity additions and removals between 1977 and 1986 in the six ORBES states (Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia). The following information is included for each electrical generating unit: unit ID code, company index, whether point or industrial ownership, plant name, whether inside or outside the ORBES region, FIPS county code, type of unit, size in megawatts, type of megawatt rating, status of unit, data of commercial operation, scheduled retirement date, primary fuel, alternate fuel, type of cooling, source of cooling water, and source of information. GRA

N82-18442# Illinois Univ. at Chicago Circle, Chicago.

THE OHIO RIVER BASIN ENERGY FACILITY SITING MODEL. VOLUME 2: SITES AND ON-LINE DATES

Gary L. Fowler, Robert E. Bailey, Steven D. Jansen, J. C. Randolph, W. W. Jones, and Steven I. Gordon Sep. 1981 145 p Prepared in cooperation with Indiana Univ., Bloomington
(Grants EPA-R-805589; EPA-R-805609; EPA-R-805588)
(PB82-112111; EPA-600/7-81-043-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 13B

The siting model developed for the Ohio River Basin Energy Study, and specifically designed for regional policy analysis is included. The region includes 423 counties in an area that consists of all of Kentucky and substantial portions of Illinois, Indiana, Ohio, Pennsylvania, and West Virginia. Detailed schedules of county-level sites and on-line dates for coal-fired and nuclear-fueled generating unit additions for each ORBES scenario are included. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-18443* National Aeronautics and Space Administration. Pasadena Office, Calif.

METHOD FOR SHAPING AND AIMING NARROW BEAMS Patent

Richard C. Heyser, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 1 Sep. 1981 9 p Filed 7 Nov. 1979 Supersedes N80-12256 (18 - 03, p 0313)
(NASA-Case-NPO-14632-1; US-Patent-4,287,578; US-Patent-Appl-SN-092143; US-Patent-Class-367-88; US-Patent-Class-367-102; US-Patent-Class-367-100) Avail: US Patent and Trademark Office CSCL 17B

A sonar method and apparatus is discribed which utilizes a linear frequency chirp in a transmitter/receiver having a correlator to synthesize a narrow beamwidth pattern from otherwise broadbeam transducers when there is relative velocity between the transmitter/receiver and the target. The chirp is so produced in a generator in bandwidth, B, and time, T, as to produce a time bandwidth product, TB, that is increased for a narrower angle. A replica of the chirp produced in a generator is time delayed and Doppler shifted for use as a reference in the receiver for correlation of received chirps from targets. This reference is Doppler shifted to select targets preferentially, thereby to not only synthesize a narrow beam but also aim the beam in azimuth and elevation.

Official Gazette of the U.S. Patent and Trademark Office

N82-18444* McDonnell-Douglas Astronautics Co., St. Louis, Mo.

ULTRAMICROWAVE COMMUNICATIONS SYSTEM, PHASE 3 Final Report

23 Oct. 1981 132 p refs
(Contract NAS9-15617)
(NASA-CR-167519; MDC-E2461) Avail: NTIS HC A07 CSCL 17B

The ultramicrowave communications system program investigated the feasibility of a solid state system that meets the projected space to space requirements, while using the advantages of the 100 to 200 GHz band. The program successfully demonstrated a laboratory model of a high frequency communications system operating between 100 to 200 GHz. In the process, vendor claims for performance specifications of discrete components were evaluated, and a window was provided into system design and integration problems. S.L.

N82-18445 Ohio State Univ., Columbus.

EFFECTS OF ATMOSPHERIC TURBULENCE ON MICROWAVE AND MILLIMETER WAVE SATELLITE COMMUNICATIONS SYSTEMS Ph.D. Thesis

Daniel Manoharan Jothiraj Devasirvatham 1981 230 p
Avail: Univ. Microfilms Order No. 8128988

A model of the microwave and millimeter wave link in the presence of atmospheric turbulence, with emphasis on satellite communications systems is described. The analysis is based on standard methods of statistical theory. Effects of turbulence on the received wave are studied using the Kolmogorov, Von Karman, and Gaussian models, and compared. An equivalent structure constant is also defined for the latter. A generalized theory of the aperture antenna in turbulence is formulated. The uniform and tapered circular aperture antennas are specifically evaluated for any arbitrary angle of arrival of the wave in the main beam, and related to each other. Receivers are classed as synchronous and asynchronous. The signal measured by each class is described. Using experimental results, an equivalent atmosphere, homogeneously turbulent over the propagation path, with appropriate parameters, is shown to be suitable for prediction of long term average behavior. Dissert. Abstr.

N82-18446 Ohio State Univ., Columbus.

A FOUR-PHASE MODULATION SYSTEM FOR USE WITH AND ADAPTIVE ARRAY Ph.D. Thesis

Jack H. Winters 1981 248 p
Avail: Univ. Microfilms Order No. 8129119

The use of four-phase modulation in a communication system with an adaptive array is discussed. A system is described that provides protection against both conventional (i.e., noise and CW) and smart (in particular, repeat) jamming with rapid acquisition of the signal at the receiver. Four-phase modulation techniques and how they can be used with an adaptive array are discussed. Reference signal generation for the LMS adaptive array is discussed for these modulation techniques. A communication system is then described that uses one of these modulation techniques. The four-phase signal consists of two orthogonal biphase signals. One signal contains a short code for rapid acquisition. The other contains a long code for protection against smart jammers. A several step signal acquisition technique is also described for the system. The short code timing is first acquired by sliding correlation method. The system is then analyzed theoretically. Dissert. Abstr.

N82-18447 Royal Signals and Radar Establishment, Malvern (England).

IMPEDANCE OF MONOPOLE ANTENNAS ON VEHICLES BY MOMENT METHODS

D. J. Brammer 23 Sep. 1981 12 p refs
(RSRE-MEMO-3414; BR81100) Copyright. Avail: Issuing Activity

The accuracy with which impedance is calculated was investigated by checking NEC 1 predictions against theoretical and experimental literature data for an idealized shape. A copper model was measured using a network analyzer. Good results are obtained if: large changes are avoided in dimension between element length in the monopole and element length or patch size in modeled surface; and capacitance values needed to adjust impedances to their idealized values are found.

Author (ESA)

N82-18448# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

DETERMINATION OF THE FIELD SCATTERED BY AN AXIALLY INCIDENT PLANE WAVE [DETERMINACAO DO CAMPO ESPALHADO POR UM PARABOLOIDE, DEVIDO A UMA ONDA PLANA AXIALMENTE INCIDENTE]

L. B. T. Cividanes and C. E. Santana Jul. 1981 39 p refs In PORTUGUESE; ENGLISH summary
(INPE-2179-NTE/175) Avail: NTIS HC A03/MF A01

The application of the geometrical theory of diffraction (GTD) to the determination of the electromagnetic field scattered by a paraboloidal reflector under axial plane wave illumination is described. The method of calculation is illustrated through applications to a small antenna (D = 50 lambda) and to a large one (D = 400 lambda). It is shown that the GTD is very accurate and fast in calculating the scattering by a paraboloidal reflector in its focal region. As compared to the more traditional methods of calculation, namely the geometrical and physical optics, the GTD offers marked improvement and advantage. T.M.

N82-18449*# North Carolina State Univ., Raleigh. Dept. of Electrical Engineering.

COMPUTER PREDICTION OF DUAL REFLECTOR ANTENNA RADIATION PROPERTIES

Christos Christodoulou Nov. 1981 138 p refs
(Grant NsG-1588)
(NASA-CR-165114) Avail: NTIS HC A07/MF A01 CSCL 20N

A program for calculating radiation patterns for reflector antennas with either smooth analytic surfaces or with surfaces composed of a number of panels. Techniques based on the geometrical optics (GO) approach were used in tracing rays over the following regions: from a feed antenna to the first reflector surface (subreflector); from this reflector to a larger reflector surface (main reflector); and from the main reflector to a mathematical plane (aperture plane) in front of the main reflector. The equations of GO were also used to calculate the reflected field components for each ray making use of the feed radiation pattern and the parameters defining the surfaces of the two reflectors. These resulting fields form an aperture distribution which is integrated numerically to compute the radiation pattern for a specified set of angles. T.M.

N82-18450# Committee on Science and Technology (U. S. House).

NASA SPACE COMMUNICATIONS PROGRAM

Washington GPO 1982 25 p Presented by the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 97th Congr., 2nd Sess., Feb. 1982
(GPO-85-553) Avail: Subcommittee on Space Science and Applications

A summary of NASA's space communications research and development program is provided. NASA's role in space communications, particularly in the 30/20 Gigahertz research and development program is discussed. How NASA should plan for space communications beyond 1990, and how NASA can best distribute public information concerning space communications is also discussed. R.J.F.

N82-18451# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

LINK AVAILABILITY IN SATELLITE TELECOMMUNICATION SUBJECT TO CORRELATED RAIN ATTENUATION AT THE GROUND TERRAIN

Aydano B. Carleial and Janio Kono Nov. 1981 22 p refs Presented at IEEE Intern. Conf. on Commun.
(INPE-2280-PRE/058) Avail: NTIS HC A02/MF A01

A link model for satellite telecommunication is presented, and the problem of link outage due to signal strength attenuation caused by rain in the two propagation paths (Earth-to-space and space-to-Earth) is considered. A joint probability density for up-path and down-path losses is used for computation of link availability by numerical integration of the density over the region of the plane that corresponds to satisfactory telecommunication. It is shown that correlation between the marginal probability densities for the two path losses can have a significant effect on link availability for SCPC networks. The importance of this result lies in the fact that, in satellite networks with a large number of thin-route users, ground terminals are sometimes so close to each other that rain events and rates of rainfall at their sites cannot be assumed independent. Author

N82-18452# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

COMPUTER IMPLEMENTATION OF A PROGRAM FOR THE ANALYSIS OF CIRCULAR REFLECTORS USING THE GEOMETRIC THEORY OF DIFFRACTION [IMPLEMENTACAO EM COMPUTADOR DE UM PROGRAMA PARA ANALISE DE REFLETORES CIRCULARES USAN DO TEORIA GEOMETRICA DE DDIFRACAO]

Benjamim daSilva Medeiros Galvao and Carlos Alberto Iennaco Miranda Jun. 1981 71 p refs In PORTUGUESE; ENGLISH abstract Presented at the 33rd Ann. Meeting of SBPC, Salvador, Bahia, Brazil, 8-15 Jul. 1981
(INPE-2132-RPE/356) Avail: NTIS HC A04/MF A01

The total field radiated by a circularly symmetric parabolic reflector, including effects of scattering of cylindrical struts and blockage by the feed horn is calculated. A combination of aperture integration method and geometrical theory of diffraction is used for the calculation of the total field. An analysis of the off principal plane patterns is carried out, in order to study the scattering effects of the struts in the sidelobes. This program has the capability to plot each field component of the total field. S.L.

N82-18453# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

A DOUBLE-BALANCED MIXER FOR 2 GHz [MISTURADOR DUPLAMENTE BALANCEADO PARA 2 GHZ]

Eduardo Antonio Parada Tude and Lucio Baptista Trannin Cividanes Jul. 1981 11 p refs In PORTUGUESE; ENGLISH abstract Presented at the 33rd Ann. Meeting of SBPC, Salvador, Bahia, Brazil, 8-15 Jul. 1981 Original contains color illustrations
(INPE-2150-RPE/371) Avail: NTIS HC A02/MF A01

The design and construction of the mixer and of a microstripline filter are described. The mixer and filter are intended to upconvert a signal of 75 MHz, +10 dBm to an IF, signal at 1995 MHz. The mixer output signal will feed an earth station transmitter. In order to function with this high input level, the mixer was built with four pairs of Schottky diodes, each pair connected, in series to a star configuration. The coupling of the signals to the diodes is accomplished through a strip-line balanced line hybrid coupler. Strip-line baluns are used to connect the balanced line hybrid to the unbalanced 50 ohms ports. Using conventional glass-encapsulated diodes, the mixer exhibited a dB conversion loss, and the measured 1 dB compression point was +10 dBm. T.M.

N82-18454# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

RADIOMETRIC STUDIES OF THE HEAT ISLAND [ESTUDOS RADIOMETRICOS DA ILHA DE CALOR]

Magda Adelaide Lombardo, Antonio Eduardo Costa Pereira, Gilberto Camera Neto, and Luiz Alberto Vieira Dias Jul. 1981 9 p refs IN PORTUGUESE; ENGLISH abstract Presented at the 33rd Ann. Meeting of SBPC, Salvador-Bahia, Brazil, 8-15 Jul. 1981
(INPE-2156-RPE/375) Avail: NTIS HC A02/MF A01

The influence of the 'heat island' in the atmospheric transmittance and in the contrast of thermal images was studied. The transmittance and contrast were calculated for a real atmospheric and for an atmosphere with a simulated heat island. As a result of these calculation, it was possible to verify that the influence of the heat island in the transmittance and in the contrast were analogous. N.W.

N82-18455# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

A NEW EXTERNAL LIMIT TO THE CAPACITY OF INTERFERENCE CHANNELS [UM NOVO LIMITANTE EXTERNO A CAPACIDADE DO CANAL COM INTERFERENCIA]

Aydano Barreto Carleial Jul. 1981 20 p refs In PORTUGUESE; ENGLISH abstract Presented at the 33rd Ann. Meeting of SBPC, Salvador, Bahia, Brazil, 8-15 Jul. 1981
(INPE-2162-RPE/380) Avail: NTIS HC A02/MF A01

An interference channel is a communication network where two senders communicate with two receivers through a shared medium, in such a way that the flow of information over the first link (from the first sender to the first receiver) can impair the flow over the second link, and vice versa. If R1 and R2 are the rates of information transmission over the first and second link, respectively, the channel's capacity region is the set of pairs (R1,R2) which are jointly achievable in reliable communications. The problem of determining the capacity region has been solved only in some special cases, in particular in strong interference cases. A new outer bound on the capacity region of the Gaussian interference channel is demonstrated by means of the technique involving degradation of a modified channel by added noise. In those cases where the interference is of medium intensity, which in practice, are more common than strong interference cases, the new bound is significantly, tighter than previously known outer bounds. J.M.S.

N82-18456# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

RELATIONAL DATA BANK FOR BURROUGHS COMPUTERS [BANCO DE DADOS RELACIONAL PARA COMPUTADORES BURROUGHS]

Paulo Cesar Pereira Guerra, Jose Oscar Machado Alexandre, Olga Maria deOliveira, Flavio Roberto Dias Velasco, and Celso deRenna-Souza Jun. 1981 27 p In PORTUGUESE; ENGLISH summary Presented at the 14th National Cong. on Informatics SUCESU, Sao Paulo, Brazil, Oct. 1981
(INPE-2116-RPE/340) Avail: NTIS HC A03/MF A01

The RELATIONAL SYSTEM's languages designed for Burroughs' machines (series B7000/B6000) are introduced. The RELATIONAL SYSTEM was conceived to implement multipurpose relational data bases in the Burroughs' environment, using the DBMS software package, DMS-II, as a support tool. It offers to users a high-level nonprocedural query language, called SEQUEL2/QS, and usual languages as COBOL, ALGOL, and PL/I. J.M.S.

N82-18457# Martin Marietta Corp., Orlando, Fla.

LOS SELECTIVE FADING AND AN/FRC-170(V) RADIO HYBRID COMPUTER SIMULATION PHASE A REPORT Interim Report, Feb. - Sep. 1981

M. Keith Klukis, Thomas I. Lyon, and Randall Walker Sep. 1981 131 p
(Contract DCA100-81-C-0016)
(AD-A108747; OR-16956) Avail: NTIS HC A07/MF A01 CSCL 09/2

This report documents results of the first phase of modeling, simulation and study of the dual diversity AN/FRC-170(V) radio and frequency selective fading line of sight channel. Both hybrid computer and circuit technologies were used to develop a fast, accurate and flexible simulation tool to investigate changes and proposed improvements to the design of the AN/FRC-170(V) radio. In addition to the simulation study, a remote hybrid computer terminal was provided to DCEC for interactive study of the modeled radio and channel. Simulated performance of the radio for Rayleigh, line of sight two ray channels, and additive noise are included in the report. Author (GRA)

N82-18458# Mission Research Corp., Santa Barbara, Calif.

THEORY OF EMP COUPLING IN THE SOURCE REGION Final Report, 1 Feb. 1979 - 28 Feb. 1980

Conrad L. Longmire and James L. Gilbert 28 Feb. 1980

216 p refs
(Contract DNA001-79-C-0186)
(AD-A108751; MRC-R-546; DNA-5687F) Avail: NTIS
HC A10/MF A01 CSCL 20/14

This report presents methods, primarily analytical, for calculating the coupling of EMP to systems in the source region. The first chapter discusses Maxwell's equations and units. The second chapter presents an adequate model for the impedance of soils, and discusses causality and reality conditions on solutions in the domain of complex variables. The third chapter is a survey of EMP sources and fields for surface bursts. The remaining chapters discuss coupling to short buried conductors, long buried conductors, short vertical conductors in the air, and long elevated conductors.
Author (GRA)

N82-18459# Pacific-Sierra Research Corp., Santa Monica, Calif.
INTEGRAL EQUATION APPROACH TO THE PROPAGATION OF LOW-FREQUENCY GROUNDWAVES OVER IRREGULAR TERRAIN. 2: TWO-DIMENSIONAL TERRAIN FEATURES AND ELEVATED RECEIVERS Final Technical Report, Oct. 1979 - May 1981
E. C. Field, Jr., S. Gayer, and B. Ambrosio Griffiss AFB, N.Y. RADC Oct. 1981 69 p refs
(Contract F19628-78-C-0088; AF Proj. 2304)
(AD-A108578; PSR-1113; RADC-TR-81-287) Avail: NTIS
HC A04/MF A01 CSCL 20/14

This report presents solutions of the one- and two-dimensional integral equations that describe groundwave propagation. Considered are the effects of: (1) terrain irregularities that are narrower than a Fresnel zone, and (2) receiver elevations. The results define the condition under which the simpler one-dimensional equation can be used, as well as those that demand the more complicated two-dimensional form. A frequency of 100 kHz is assumed throughout, although certain results are easily scaled to other frequencies. It is well known that the one-dimensional equation is invalid unless the terrain is nearly uniform across a Fresnel zone. It has been found that for obstacles narrower than about 10 km and typical path-lengths the one-dimensional equation erroneously predicts propagation anomalies that (1) are independent of width, and therefore too large, and (2) diminish too slowly at long distances. Considerable error can be incurred by applying the one-dimension equation to moderately sized terrain features. For example, for a path-length of 500 km, that equation overstates by a factor of four unless the diameter approaches a Fresnel zone width-which exceeds 10 km for long propagation paths. Even for wide obstacles, the one-dimensional formulation neglects reflection and interference phenomena.
GRA

N82-18460# Pacific-Sierra Research Corp., Santa Monica, Calif.
CALCULATION OF IONOSPHERIC CONDUCTIVITY PROFILES BY INVERTING VLF/LV REFLECTIONS DATA. 1: ISOTROPIC PROPAGATION Final Technical Report, Oct. 1979 - May 1981
R. E. Warren, E. C. Field, Jr., and C. R. Warber Griffiss AFB, N.Y. RADC Oct. 1981 63 p refs
(Contract F19628-78-C-0088; AF Proj. 2304)
(AD-A108577; PSR-1114; RADC-TR-81-286) Avail: NTIS
HC A04/MF A01 CSCL 04/1

This report presents an iterative method for inverting VLF/LF ionosounding data to obtain ionospheric conductivity profiles. The relationship between the detail that can be realized in the calculated profile and the quality and quantity of the reflection data is given explicitly. Only altitudes below about 70 km where the propagation can be assumed isotropic are considered, although the method can be extended to anisotropic propagation. The method is demonstrated by applying it to two qualitatively different ionospheric models: a strong SPE disturbance and a C-layer exhibiting a well-defined conductivity peak. Ground-level reflection data contain information only about those heights from which significant energy is returned. The calculated profiles agree well with the true profiles over the height range where the strongest reflections occur, and break down outside of that range. The solutions converge toward the true profiles despite the use of initial estimates that contain no information about the true ionospheric structure. The height resolution actually achieved for the two examples is much better than the theoretically predicted limit.
Author (GRA)

N82-18461# IIT Research Inst., Chicago, Ill.
AN ASSESSMENT OF THE MAGNITUDE OF ELECTROMECHANICAL FAILURES OCCURING WITHIN AIR FORCE COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE (C3I) SYSTEMS Final Report, 1 Aug. 1980 - 31 May 1981
John E. Short Oct. 1981 42 p
(Contract F30602-78-C-0281; AF Proj. 2338)
(AD-A108203; RADC-TR-81-267) Avail: NTIS
HC A03/MF A01 CSCL 17/2

The failure of mechanical or electromechanical components in systems and equipment does not have a direct bearing upon the operational reliability and the logistic support costs. The basic objective of this assessment was to obtain and review all readily available historical and statistical data on selected C3I systems and components. The second was to obtain through structured but informal discussions the opinions and observations of qualified experts in each phase of system planning, research, development, acquisition, operations and logistic support of C3I systems.
GRA

N82-18462# Institute for Defense Analyses, Arlington, Va. Science and Technology Div.
A SURVEY OF THE LIMITS ON RADAR IMAGING Final Report
Irvin W. Kay Oct. 1981 63 p refs
(Contract MDA903-79-C-0202)
(AD-A108598; AD-E500447; IDA-P-1586;
IDA/HQ-81-23521) Avail: NTIS HC A04/MF A01 CSCL 17/9

Theoretical limits on the performance of millimeter-wave radar imaging systems is explored. Recognition by shape and, as far as possible, identification of military targets on the ground is their purpose. It is concluded that, with the possible exception of synthetic aperture radar, such systems, using antennas of a practical size, cannot provide adequate resolution for imaging, as defined in the ordinary sense, tank-size targets over ranges of tactical interest. Target characteristics that effect image quality, the image quality needed for target recognition and identification, and the theoretical relations between optical system parameters and image properties such as depth of field and resolution are considered. Also considered are the appropriateness of various definitions of resolution that appear in the literature, distinctions that must be made between extended targets and point targets, and differences between coherent and incoherent illumination with respect to resolution. The possibility of improving image quality, particularly resolution, with the aid of superresolution techniques and apodization is also discussed. It also estimates possible reduction in the number of elements in a large antenna array using an optimum array thinning distribution of the elements.
GRA

N82-18463# Rome Air Development Center, Griffiss AFB, N.Y.
TEST AND EVALUATION OF REDUCED RATE MULTIPLEXERS Report, Jan. - Dec. 1980
John Evanowsky Aug. 1981 38 p refs
(AF Proj. 2157)
(AD-A108202; RADC-TR-81-163) Avail: NTIS
HC A03/MF A01 CSCL 17/2

This report contains the results of a test and evaluation utilizing commercially available Reduced Rate Multiplexers performed by RADC's Digital Communication Experimental Facility (DICEF) in support of DCA/DCEC. Unlike previous work in this area, the subject program considered the effect of an analog telecommunications channel prior to digitization by a Continuously Variable Slope Delta Modulation (CVSD) encoder. The major conclusion drawn from this evaluation is the fact that a system incorporating a 32 KB/S CVSD in tandem with a conventional analog telephone channel of relatively poor quality can support 2400 B/S modem transmission.
GRA

N82-18464# Rome Air Development Center, Griffiss AFB, N.Y.
TM/TE POLARIZATION RATIOS IN A SAMPLE OF 30 kHz SFERICS RECEIVED AT ALTITUDES FROM 0 TO 70 km
R. P. Harrison, E. A. Lewis, J. B. Donohoe (Megapulse, Inc.), and J. E. Rasmussen Aug. 1981 17 p refs
(AF Proj. 4600)
(AD-A108182; RADC-TR-81-235) Avail: NTIS

HC A02/MF A01 CSCL 20/14

A rocket-borne payload, carrying both veritcal and horizontal magnetic dipole antennas and receiving instrumentation, was flown from Wallops Island, Virginia, to observe the Transverse Electric (TE) and Transverse Magnetic (TM) polarization components of individual sferics at 30 kHz. During the 2-1/2 min flight to apogee at 96 km, 293 individual sferics were observed. Upon applying corrections for difference in azimuthal antenna patterns, it was concluded that the TM noise fields were larger than the TE fields by about 15 dB near the ground, and approximately equal at 60 km. Author (GRA)

N82-18465# Rome Air Development Center, Griffiss AFB, N.Y.
MEASUREMENTS OF ANTENNA PULSE RESPONSE
Paul R. Caron Jul. 1981 53 p
(AF Proj. 4600)
(AD-A108181; RADC-TR-81-224) Avail: NTIS
HC A04/MF A01 CSCL 09/1

A technique for obtaining the pulse response of antennas utilizing steady-state measurements on a Scientific-Atlanta 2020 antenna range is described. The method involves making wideband frequency measurements, both amplitude and phase, centered about the defined carrier frequency and transforming the data to low frequency. This result is multiplied by the complex Fourier Transform of a pulse (the modulating pulse) utilizing Fast-Fourier-Transforms and the inverse FFT yields the desired pulse response. All computations are done on the 2020 System Computer (Hp 21 MX Series 1000). Techniques for eliminating the frequency response of system components are described. The technique essentially treats the antenna on a 'transfer function' basis. Therefore, results are presented on the response of a transmission line system and this is compared with theory. Finally, results on the pulse response of various antennas are presented. Author (GRA)

N82-18466# Analysis and Technology, Inc., North Stonington, Conn.
EVALUATION OF TWO AN/APS-94 SIDE-LOOKING AIRBORNE RADAR SYSTEMS IN THE DETECTION OF SEARCH AND RESCUE TARGETS Interim Report, Jan. 1978 - Aug. 1981
S. R. Osmer, N. C. Edwards, Jr., G. L. Hover, and T. J. Mazour Aug. 1981 163 p refs
(Contract DTCG39-80-C-80052)
(AD-A108404; USCG-D-64-81) Avail: NTIS
HC A08/MF A01 CSCL 17/9

Side-Looking Airborne Radar (SLAR) detection data were gathered in conjunction with four visual detection experiments designed to improve search planning guidance contained in the National Search and Rescue Manual. HC-130 aircraft, equipped with either the Airborne Oil Surveillance System (AOSS) or SLAR/radar image processor (SLAR/RIP) configuration of the AN/APS-94C or D SLAR, conducted controlled searches for life rafts, small boats, and 41- to 95-foot Coast Guard vessels in Block Island Sound or open ocean. Using a microwave tracking system and SLAR data, the positions of searchers and targets were accurately reconstructed to facilitate the verification of detections on SLAR films or video tape. These data were used to evaluate the effects of environmental and controllable parameters on SLAR detection of the various target types. Target size/composition search altitude, swell height, wind speed, and humidity/precipitation were found to have a significant influence of SLAR detection performance. Upper-bound lateral range curves and sweep widths for SLAR search are included. Real-time performance tests for AN/APS-94D SLAR and system performance tests for new SLARs (AN/APS-131) are recommended. GRA

N82-18467# Army Test and Evaluation Command, Fort Huachuca, Ariz.
ENGINEERING INTELLIGIBILITY TESTING OF VOICE COMMUNICATION EQUIPMENT Final Report
19 Nov. 1981 15 p refs Supersedes MTP-6-2-521
(AD-A108138; TOP-6-2-521; MTP-6-2-521) Avail: NTIS
HC A02/MF A01 CSCL 17/2

Engineering test methods and procedures for evaluating the intelligibility of voice communication equipment are described. Two types of testing, phonetically balanced word list testing and automatic testing by means of the Voice Intelligibility Analysis System are addressed. GRA

N82-18468# Air Force Geophysics Lab., Hanscom AFB, Mass. Aerospace Instrumentation Div.
DEVELOPMENT OF A LOW DATA RATE REPEATER Final Report
Hans Laping and C. Rice, ed. 30 Jan. 1981 26 p refs
(AF Proj. 7659)
(AD-A108154; AFGL-TR-81-0019; AFGL-IP-298) Avail: NTIS
HC A03/MF A01 CSCL 17/2

This report describes a 40 MHz to S-Band data repeater developed to increase the radio horizon for high altitude scientific balloon flights launched from Holloman AFB in New Mexico. Author (GRA)

N82-18469# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Ice Engineering Research Branch.
ELECTROMAGNETIC SUBSURFACE MEASUREMENTS
Arnold M. Dean, Jr. Oct. 1981 24 p
(Proj. CWIS-31350)
(AD-A108192; CRREL-SR-81-23) Avail: NTIS
HC A02/MF A01 CSCL 17/9

In 1974, personnel at the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) began using an impulse radar system to profile accumulations of ice forms. The system was modified for effective use as a profiling system in a ground or airborne configuration, in certain high-noise environments. The system can penetrate fresh water and media with a high water content. Frazil and brash ice accumulations with approximately 50% water were profiled to a depth of 25 to 35 ft. As a result of the CRREL modifications, the system has found extensive and varied applications as a low-level remote sensing tool. Applications include profiling ice accumulations (including ice jams), river beds, sheet ice, permafrost, subsurface ice masses, river bank revetments through air-entrained water, snow covers, sea ice, icebergs, and peat bogs. Limited laboratory work has also shown that the impulse radar system may be able to detect oil and gas under sea ice. Selected applications and data are presented. Since it was used mainly for research, the CRREL system needs further development to make it useful to operational units. Additional development of hardware and software is recommended. GRA

N82-18470# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ONE CLASS OF OPTIMUM LINEAR EQUALLY SPACED ANTENNA ARRAYS WITH SUMMARY OF DIFFERENCE RADIATION PATTERNS
B. M. Minkovich 6 Nov. 1981 32 p refs Transl. into ENGLISH from Antenny (USSR), 1970 p 3-17
(AD-A108176; FTD-ID(RS)T-1135-81) Avail: NTIS
HC A03/MF A01 CSCL 20/14

One Class of Optimum Linear Equally Spaced Antenna Arrays with Summary or Difference Radiation Patterns--Translation. GRA

N82-18471# Strategic Air Command, Offutt AFB, Nebr. Aircraft Engineering Div.
AN/ALQ-135 TAIL WARNING SYSTEM FOLLOW-ON OPERATIONAL TEST AND EVALUATION Final Report
Vincent M. Jenkins 23 Nov. 1981 5 p
(AD-A108348; SAC/LGME-P-405) Avail: NTIS
HC A02/MF A01 CSCL 15/3

This is a study of the reliability and maintainability of the tail warning system (TWS) AN/ALQ-153. This TWS is a solid state pulsed Doppler radar designed to provide warning and initiate countermeasures against threats attacking from the tail of B-52G/H aircraft. Author (GRA)

N82-18472# Naval Research Lab., Washington, D. C. Center for Space Research.
MULTIPATH VLF PROPAGATION EFFECTS ON CORRELATION RECEIVERS
Francis J. Kelly, J. P. Hauser, H. M. Beck, and F. J. Rhoads 18 Sep. 1981 52 p refs
(AD-A108408; NRL-8521) Avail: NTIS HC A04/MF A01 CSCL 20/14

The effect of electromagnetic propagation at very low frequency in the Earth ionosphere waveguide can distort wideband communication waveforms and produce a splitting of the correlation peak of the received signal at a model interference null where multipath signals arrive out of phase. Propagation from an inclined dipole antenna trailed behind an orbiting aircraft can cause split correlation pattern to fluctuate throughout the orbit period. For the case of an MSK (minimum-shift-keying) signal format, expressions and graphs are given for the correlation vector, as a function of receiver synchronization time and aircraft flight direction.
Author (GRA)

N82-18473# Syracuse Univ., N. Y. Dept. of Electrical and Computer Engineering.
ELECTROMAGNETIC COUPLING TO A CONDUCTING BODY OF REVOLUTION WITH A HOMOGENEOUS MATERIAL REGION
Joseph R. Mautz and Roger F. Harrington Griffiss AFB, N.Y. RADC Jul. 1981 66 p refs
(Contract F30602-79-C-0011; AF Proj. 2338)
(AD-A108395; RADC-TR-81-202) Avail: NTIS
HC A04/MF A01 CSCL 20/3

A numerical solution for electromagnetic coupling to a perfectly conducting body of revolution with a loss-free homogeneous material region is developed. The material region is exposed by a rotationally symmetric aperture in the conducting body. Application of the equivalence principle introduces an unknown electric current on the surface of the conducting body, and both an unknown equivalent electric current and an unknown equivalent magnetic current in the aperture. These currents satisfy the integral equations obtained by annihilating the tangential components of the electric field on the surface of the conducting body and by enforcing continuity of the tangential components of the electric and magnetic fields across the aperture. These integral equations are solved numerically by means of the method of moments. Numerical results are presented for four different conducting bodies, each of which has a dielectric region and is excited by an axially incident plane wave. The computer program used to calculate these currents allows for the more general case of oblique incidence.
GRA

N82-18474# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
MULTIPLE ACCESS COMMUNICATION: THE FINITE USER POPULATION PROBLEM Ph.D. Thesis
Michael Gene Hluchyj Nov. 1981 146 p refs
(Contract N00014-75-C-1183; ARPA Order 3045)
(AD-A108337; LIDS-TH-1162) Avail: NTIS
HC A07/MF A01 CSCL 17/2

The multiple access problem is one of organizing a population of users so that they may efficiently share the resources of a single communication channel. This problem is examined under the modeling assumptions of a finite user population and a time slotted channel with limited feedback. Techniques of schemes for coordinating the transmissions of users are called multiaccess protocols. Simple relationships among common steady state measures of protocol performance (including throughput and average delay) are derived. It is shown that the performance measures are equivalent in the sense that (1) each may be expressed as a simple function of any one of the others and (2) a protocol which is optimal with respect to any one measure is optimal with respect to the others. The derived relationships are also used in the performance analysis of perfect scheduling and TDMA. Four related classes of multiaccess protocols are defined, examined, and an optimal protocol is characterized. The optimization problem is formulated as a Team problem for three classes. Using results from Markov decision theory, optimal window protocols are derived for the cases of two and three users.
GRA

N82-18475# Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Science.
QUEUEING ANALYSIS OF A SHARED VOICE-DATA LINK Ph.D. Thesis
Daniel Uri Friedman Nov. 1981 165 p refs
(Contract N00014-75-C-1183; ARPA Order 3045)
(AD-A108336; LIDS-TH-1161) Avail: NTIS
HC A08/MF A01 CSCL 17/2

We consider a link shared by some number of off-hook phone callers and a data queue. The allocation of capacity to voice and data depends on the level of speaker activity (number of talkspurt). A Markov chain model is adopted for this activity, and the resulting data queue performance is analyzed.
Author (GRA)

N82-18476# Lincoln Lab., Mass. Inst. of Tech., Lexington.
A PROPAGATION EXPERIMENT INVOLVING REFLECTION AND DIFFRACTION
M. Littleton Meeks 26 Oct. 1981 25 p refs
(Contract F19628-80-C-0002; ARPA Order 3724)
(AD-A108644; CMT-18; ESD-TR-81-289) Avail: NTIS
HC A02/MF A01 CSCL 17/9

Measurements of propagation at a frequency of 1090 MHz over terrain that produces specular reflection and knife-edge diffraction are in good agreement with model calculations that use images to represent the effect of reflection. A hill covered with a pine forest formed the diffracting mask, and an airport area formed the reflecting surface. Agreement between measurements and model calculations required that the diffracting knife-edge be located at treetop level. Optimum propagation into the shadow region was obtained when a maximum in the reflection-lobe pattern coincided with the mask angle.
Author (GRA)

N82-18477# Nebraska Univ., Lincoln. Dept. of Mathematics.
TRANSIENT FIELDS PRODUCED IN HETEROGENEOUS BODIES BY ELECTROMAGNETIC PULSES Final Report, 8 May - 30 Sep. 1980
Robert J. Krueger Brooks AFB, Tex. SAM Oct. 1981 82 p refs
(Contract F33615-78-D-0629; AF Proj. 7757)
(AD-A108500; SAM-TR-80-12) Avail: NTIS
HC A05/MF A01 CSCL 20/14

An exact analytical technique for determining induced electromagnetic fields in a one dimensional medium is developed. The incident field, which impinges normally on the medium, is an electromagnetic pulse of arbitrary shape and duration. The medium is of finite depth and can have arbitrarily specified and nonconstant permittivity and conductivity. This analytical result is implemented in a computer program called HATS (High Accuracy Temporal Solution), which is virtually free of numerically dispersion. Several sample problems are formulated and then solved via this program. Appendix B supplies a manual that details use of the program and includes a source listing of HATS, sample input, and plots.
Author (GRA)

N82-18478# California Univ., Los Angeles.
THEORETICAL AND EXPERIMENTAL INVESTIGATION OF SOME SLOT ANTENNA ARRAY PROBLEMS Final Technical Report, 1 Feb. 1979 - 7 Mar. 1981
R. S. Elliott, N. G. Alexopoulos, G. Franceschetti, P. J. Contoyannis, and P. Park Griffiss AFB, N.Y. RADC Oct. 1981 122 p refs
(Contract F19628-79-C-0069; AF Proj. 2305)
(AD-A108566; RADC-TR-81-232) Avail: NTIS
HC A06/MF A01 CSCL 09/5

The effect of metallic fences on mutual coupling between slots of a slot antenna is studied. A model solution has been obtained whereby the fence is modelled as a thin half elliptic cylinder. This model allows for thickness to be taken into account and provides exact solutions to mutual impedance computations. The geometrical theory of diffraction has been adopted to analyze an exceedingly thin fence, when the slot antennas are not too close to the fence. Design procedures for longitudinal and traverse stripline-fed slots have been developed. A design procedure for such slot arrays requires knowledge of the mutual coupling relation as well as the self-impedance properties of a slot. Preliminary design equations are reported in this document.
Author (GRA)

N82-18479# Centre de Recherches en Physique de l'Environnement Terrestre et Planetaire, Orleans (France). Dept. GES.
WAVE NORMAL DIRECTIONS AND WAVE DISTRIBUTION FUNCTIONS FOR GROUND BASED TRANSMITTER SIGNALS OBSERVED ON GEOS 1
F. Lefeuvre, T. Neubert (Danish Research Inst.), and M. Parrot

Mar. 1981 75 p refs Sponsored by Danish Natural Science Research Council, CNRS and NSF
(CRPE-NT-99) Avail: NTIS HC A04/MF A01

Methods for determining the wave normal direction of electromagnetic wave fields observed in space from the simultaneous measurement of part or all of six wave components are assessed. Crossproduct method, Means's method, and maximum entropy method predictions are compared for 7 nearly successive 1 sec whistler mode pulses at 10.2 and 11.33 kHz observed onboard Geos 1. Signal to noise ratio, stationarity, degree of polarization, and polarization value are considered. For plane wave signals, signal to noise ratio is the key parameter for the crossproduct method. For highly polarized waves, polarization value deduced from a spectral matrix, is the key parameter for Means's method and the maximum entropy method. Wave type does not greatly influence results. Methods based on the spectral matrix are subject to estimation errors, but must be used if the electromagnetic field is of the plane wave type and the signal to noise ratio is high. Author (ESA)

N82-18480# Ferranti Ltd., Bracknell (England).
ANALOGUE SAR SIGNAL PROCESSING: BREADBOARD DESIGN, IMPLEMENTATION, EVALUATION AND COMPONENT SPECIFICATION Final Report
K. M. Harvey, M. A. B. Hugues, C. Lambert, D. W. Sergeant, and D. W. Cruse Paris ESA Mar. 1981 158 p refs
(Contract ESA-3400/77/NL-HP(SC))
(ESA-CR(P)-1463; Rept-3976-ISSUE-1) Avail: NTIS HC A08/MF A01

The architecture, design and implementation of prefilter/subaperture filter and azimuth correlator breadboards of an onboard satellite SAR system are described. The signal generation and output data logging units used in tests are presented. The prefilter frequency response was tested by passing sinusoidal signals of varying frequency through the filter. A linearity test and a simulated point target chirp signal test were performed. The azimuth correlator was tested using a point target, a ramp, and a hole (zero reflectivity block in the center of a reflective background). Results show that charge coupled devices (CCD) are suitable for satellite applications, but given the advent of technologies, such as switched capacitor filters, a mixed approach (with CCD used only for imaging and programmable transversal filters) is advocated. Author (ESA)

N82-18481# Thomson-CSF, Meudon-la-Foret (France). Dept. Espace-Satellites.
STUDY OF SYNTHETIC APERTURE RADAR IN 2D - 2FS OPERATION OVER THE OCEAN Final Report
Paris ESA 5 Mar. 1981 25 p
(Contract ESA-4586/81/F-DD(SC))
(ESA-CR(P)-1475) Avail: NTIS HC A02/MF A01

Synthetic aperture radar operation (imaging mode) for the European Remote Sensing program is considered. The 2D - 2FS function consists in operating in a low power mode (100 W RF) for 1.5 sec every 15 sec in order to image patches on the sea surface of 5 km by 5 km every 100 km, with the 5 km squares in the center of the beam. The data stream needs to be buffered such that a continuous (300 kbit/sec) data stream is delivered. The impact of such a mode on hardware, especially in terms of mass and power consumption, was studied. Results show that the 2D - 2FS option requires minor changes. One additional dispersive line and one additional box, containing the added hardware for data handling, are necessary. This represents 7 kg more (with redundancy) for payload. The average power consumption in wave mode becomes 150 W
Author (ESA)

N82-18482# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Apparate.
SIMULATION OF MODERN RADAR APPARATUS IN FULL MISSION FLIGHT AND TACTIC SIMULATORS [SIMULATION MODERNER RADARANLAGEN IN FULL-MISSION-FLUG- UND TAKTIKSIMULATOREN]
G. Werner 7 May 1981 23 p In GERMAN Presented at DGLR Symp., 20-21 May 1981
(MBB-UA-585-81-O; DGLR-81-103) Avail: NTIS HC A02/MF A01

Simulation of modern radar equipment on a full mission flight and tactics simulator are described. Implementation of hardware and software is illustrated by digital radar systems for landmasses, tornado flight simulation, and tactics simulator.
Transl. by E.A.K.

N82-18483# European Space Agency, Paris (France).
VOLUMETRIC PATTERN PREDICTION OF ANTENNAS ON AIRCRAFT USING THE GEOMETRICAL THEORY OF DIFFRACTION Ph.D. Thesis - Kaiserslautern Univ.
Thomas Jank Oct. 1981 146 p refs Transl. into ENGLISH of "Bestimmung des raeumlichen Strahlungsdiagramms von Antennen auf Flugzeugen mittels des geometrischen Beugungstheorie", Rept. DFVLR-FB-80-01 DFVLR, Oberpfaffenhofen, West Germany, Nov. 1979
(ESA-TT-677; DFVLR-FB-80-01) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 29,90

High frequency radiation patterns of aircraft dipole and slot antennas are calculated using the geometrical theory of diffraction (GTD). A mathematical model of an aircraft is presented. Arbitrary pattern sections are obtained by solving the ray tracing problem for rays which contribute significantly to the total field. Storage techniques and integration methods for the ray tracing problem (a boundary value problem) are discussed. Comparison with measured results obtained from physical models validate the use of the GTD and model. Author (ESA)

N82-18484# European Space Agency, Paris (France).
THE INFLUENCE OF THE ATMOSPHERE ON MICROWAVE RADIOMETRIC MEASUREMENTS IN THE 10 GHz TO 400 GHz FREQUENCY RANGE
Juergen Preissner Sep. 1981 52 p refs Transl. into ENGLISH of "Einfluss der Atmosphaere auf mikrowellenradiometrische Messungen im Frequenzbereich von 10 GHz bis 400 GHz" Rept. DFVLR-Mitt-80-16 Oberpfaffenhofen, West Germany, Sep. 1980 54 p
(ESA-TT-706; DFVLR-Mitt-80-16) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 11,30

The influence of the atmosphere on the brightness temperature of ground based objects, the reflectivities of which are known, is discussed. Attenuation caused by atmospheric gases and hydrometeors (rain, fog, clouds, snow) is described in detail. Given this attenuation, a computer program for the radiometric transfer equation was compiled. The possibility of determining the brightness temperature for any object on the ground and for any position of the sensor is shown. The brightness temperature was computed for 38 different frequencies in the range of 10 GHz to 400 GHz, for two viewing angles (zero and 60 deg), for six different heights of the sensor between 100 and 8000 m, for 19 different weather conditions, and for 41 different reflectivities of objects. The results are presented as diagrams. Author (ESA)

N82-18485# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Hochfrequenztechnik.
A REVIEW OF SATELLITE COMMUNICATION AND PROPAGATION EXPERIMENTS FOR FREQUENCIES ABOVE 10 GHz
Palavalli Naranaiah Radhakrishnaiah Setty (Indian Space Research Organization, Ahmedabad) Nov. 1980 163 p refs
(DFVLR-Mitt-81-08) Avail: NTIS HC A08/MF A01. DFVLR, Cologne DM 33,50

The effects of constituents of the atmosphere, such as hydrometeors and gases, which attenuate, scatter, depolarize, and phase distort electromagnetic radiation are considered. Satellite communication and propagation experiments, using onboard beacons and/or transponders, provide data for modeling these effects as a function of meteorological parameters. Pertinent experiments are reviewed, emphasizing innovations in experiment configurations and spacecraft hardware. These are: ATS 5 and 6 propagation and communication experiments; satellite 19 and 28 GHz beacon propagation experiment; Communication Technology Satellite experiments; ETS-2 propagation experiment; SIRIO propagation and communication experiment; and OTS communication and propagation experiments. The Japanese satellite experimental program is also covered. Author (ESA)

N82-18486# Helsinki Univ. of Technology, Otaniemi (Finland). Radio Lab.

ON THE ELECTROMAGNETIC PLANE WAVE SCATTERING FROM A WIRE GRID WITH RHOMBIC CELLS

V. Akimov and P. Pesari 1979 12 p refs
(Rept-S-114; ISBN-951-751-703-3)
HC A02/MF A01 Avail: NTIS

The reflection coefficients from a wire grid with rhombic cells located over the ground were derived, including the cross polarized components. The cells of the grid were assumed to be small compared with the free space wavelength, and the spacing between the grid and the ground was assumed to be larger than the dimension of the cells. Some numerical results are presented to illustrate the effects of various parameters. The method of averaged boundary conditions was used for the derivation.
Author (ESA)

N82-18487# Helsinki Univ. of Technology, Otaniemi (Finland). Radio Lab.

ON THE QUASI-TEM MODES IN GENERAL MULTICONDUCTOR TRANSMISSION LINES

Ismo V. Lindell 1980 14 p refs
(Rept-S-118; ISBN-951-752-076-X)
HC A02/MF A01 Avail: NTIS

The general inhomogenous shielded N-conductor transmission line is considered and several properties for the quasi-TEM modes were derived. The concept of quasi-TEM was deduced through an asymptotic series expansion of the fields. Conditions for the propagation constant and for the construction of the field are presented. The problem is shown to be reduced to two static two-dimensional boundary value problems. The concepts of propagating modes and impedance modes were introduced and shown not to be the same in the general case. The special cases of propagating impedance modes are discussed and shown to exist under certain symmetry conditions of the multiconductor line.
Author (ESA)

N82-18488# Helsinki Univ. of Technology, Otaniemi (Finland). Radio Lab.

ASYMPTOTIC HIGH FREQUENCY MODES OF HOMOGENEOUS WAVEGUIDE STRUCTURES WITH IMPEDANCE BOUNDARIES

Ismo V. Lindell 1980 21 p refs
(Rept-S-120; ISBN-951-752-182-0)
HC A02/MF A01 Avail: NTIS

Homogeneous waveguides with both isotropic and anisotropic impedance boundaries were considered. Asymptotic high frequency mode properties were derived systematically. Several expressions showing the orthogonality properties of the asymptotic high frequency fields were deduced and duality transformations satisfying certain requirements were considered. Self-dual solutions corresponding to the two duality transformations are demonstrated and stationary functionals are constructed. An explicit formula for the calculation of the asymptotic attenuation coefficient for the general waveguide is given, isotropic and anisotropic boundaries being considered separately. Attenuation properties of a corrugated waveguide are used as an example.
Author (ESA)

N82-18489# Helsinki Univ. of Technology, Otaniemi (Finland). Radio Lab.

BACKGROUND VARIATIONS IN MILLIMETER WAVE TELESCOPES DUE TO THE RADOME STRUCTURE

Martty Tiun and Seppo Urpo 14 Aug. 1980 8 p Presented at URSI Symp. on Millimeter Wave Technol., Grenoble, France, 1980
(Rept-S-121; ISBN-951-752-183-9)
HC A02/MF A01 Avail: NTIS

The difference between measured and theoretical standard deviations of atmospheric fluctuations in radome covered telescopes used in dual beam radio source flux measurements is discussed. The main reason for this increased deviation is shown to be background noise from the telescope surroundings, which is reflected from the radome frame. A so-called synchronous tracking method is introduced for eliminating the effect of the background. A higher tapering of the feed horn is possible, but lowers the total efficiency of the telescope. Author (ESA)

N82-18490# Research Inst. of National Defence, Linkoeping (Sweden). Radio Lab.

RADIO EQUIPMENT FOR PROPAGATION EXPERIMENTS AT THE FREQUENCIES 11, 18, AND 36 GHz [RADIOUTRUSTNING FOER VAAGUTBREDNINGSUNDERSOEKNINGAR VID FREKVENSERNA 11,18 OCH 36 GHz]

Bernt Danielsson and Lennart Nilsson May 1981 87 p refs
In SWEDISH
(FOA-A-30027-E2; R1-1014/81)
HC A05/MF A01 Avail: NTIS

A program which tests the suitability of frequencies above 10 GHz for telecommunications is described. Atmospheric and climatic effects are studied. Output is unmodulated CW on seven frequencies, received simultaneously at one site. In 4 cases the intensities of the horizontally and vertically polarized components are recorded separately, giving 11 receiver channels. One single and one dual polarization antenna are used. The tests run for three years. No permanent damage should result from operation at ambient indoor temperatures > 50 C; 100% humidity; and AC voltage variation from 0% to 120% of nominal. No results are available.
Author (ESA)

N82-18491# Science Research Council, Chilton (England).

THREE DIMENSIONAL FIELD COMPUTATION

C. W. Trowbridge 1981 10 p refs
(PB82-107160; RL-81-054) Avail: NTIS HC A02/MF A01
CSCL 20C

Recent research work carried out at Rutherford and Appleton Laboratories into the Computation of Electromagnetic Fields is summarized. The topics covered include algorithms for integral and differential methods for the solution of 3D magnetostatic fields, comparison of results with experiment and an investigation into the strengths and weaknesses of both methods for an analytic problem. The paper concludes with a brief summary of the work in progress on the solution of 3D eddy currents using differential finite elements.
GRA

N82-18492# National Telecommunications and Information Administration, Annapolis, Md.

SPECTRUM RESOURCE ASSESSMENT IN THE 2300-2450 MHz BAND

Robert T. Watson Sep. 1981 70 p refs
(PB82-115452; NTIA/Rept-81-78)
HC A04/MF A01 CSCL 17B Avail: NTIS

Spectrum resource assessment of the 2300-2450 MHz band is presented. Information rules and allocations, technical standards, frequency assignments, system characteristics and deployment, and an evaluation of applicable compatibility analyses are included. Present spectrum management techniques and associated problems and issues were identified by considering the interaction of the various systems for the allocated services. Recommendations were provided to exclude the amateur service and high power airborne radars from the 2310-2390 MHz band to assure compatibility with telemetry systems. Continuing study of the proposed Satellite Power System was also recommended. GRA

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-18493* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

APPARATUS FOR DAMPING OPERATOR INDUCED OSCILLATIONS OF A CONTROLLED SYSTEM Patent

John W. Edwards and John W. Smith, inventors (to NASA)
Issued 3 Nov. 1981 13 p Filed 29 Feb. 1980 Supersedes N80-20488 (18 - 11, p 1409)
(NASA-Case-FRC-11041-1; US-Patent-4,298,833;
US-Patent-Appl-SN-126064; US-Patent-Class-318-561;
US-Patent-Class-318-620; US-Patent-Class-318-621;
US-Patent-Class-318-622) Avail: US Patent and Trademark Office CSCL 09C

Flight control-related apparatus for damping operator induced oscillations of a controlled system responding to an operator controlled signal is described. The device utilizes a lag-lead filter for frequency and amplitude estimation of the control input, and a rectification and smoothing filter for producing a signal proportional to the absolute value of the frequency and amplitude estimate for use in suppression of the control system output signal. In one embodiment, this is accomplished by computing a correction signal in a correction generating section. In a second embodiment, a second rectification and smoothing filter produces a signal proportional to the absolute value of the controlled input signal. A ratio of the outputs of the first and second rectification and smoothing filters is then used in a generator to generate a gain factor k sub q for the control system to reduce the gain of the output signal of the control system, thereby to provide a damped control output signal without rate limiting the controlled element.

Official Gazette of the U.S. Patent and Trademark Office

N82-18494* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
POWER CONVERTER Patent
James M. Black, inventor (to NASA) Issued 3 Nov. 1981 7 p
Filed 29 Jun. 1979 Supersedes N79-27395 (17 - 18, p 2399)
(NASA-Case-FRC-11014-1; US-Patent-4,298,926;
US-Patent-Appl-SN-053652; US-Patent-Class-363-132;
US-Patent-Class-363-61; US-Patent-Class-363-17;
US-Patent-Class-331-113R) Avail: US Patent and Trademark Office CSCL 09A

A dc-to-dc converter employs four transistor switches in a bridge to chop dc power from a source, and a voltage multiplying diode rectifying ladder network to rectify and filter the chopped dc power for delivery to a load. The bridge switches are cross coupled in order for diagonally opposite pairs to turn on and off together using RC networks for the cross coupling to achieve the mode of operation of a free running multivibrator, and the diode rectifying ladder is configured to operate in a push-pull mode driven from opposite sides of the multivibrator outputs of the ridge switches. The four transistor switches provide a square-wave output voltage which as a peak-to-peak amplitude that is twice the input dc voltage, and is thus useful as a dc-to-ac inverter.

Official Gazette of the U.S. Patent and Trademark Office

N82-18495 Dayton Univ., Ohio.
SINGLE PHASE PERMANENT MAGNET SYNCHRONOUS MOTORS Ph.D. Thesis
William Urban Borger 1981 259 p refs
Avail: Univ. Microfilms Order No. 8127849

A generalized technique was developed which permits simulation of unsymmetrical machinery. The technique allows for unbalanced stator voltages, with artibrary displacement angles, independent phase parameters, machine resistances which are functions of frequency, switching of phase voltages (opening and closing) as required and switching of starting circuits as functions of motor rpm. A 1-phase induction machine was studied in detail. Synchronization was studied for a 2-phase permanent-magnet motor running on 1 phase. Synchronization for this same motor was also studied assuming load connection via a spring type coupling. In addition to synchronization studies, a minor effort was undertaken to determine machine behavior during load application and removal. The machine studied in the synchronization effort was also analyzed in the load application/removal studies. Dissert. Abstr.

N82-18496 Ohio State Univ., Columbus.
FABRICATION AND CHARACTERIZATION OF OHMIC CONTACTS MADE WITH GOLD ON HEAVILY TIN DOPED N TYPE SURFACE LAYERS IN GALLIUM ARSENIDE Ph.D. Thesis
Timothy Lee Deeter 1981 212 p
Avail: Univ. Microfilms Order No. 8128986

The fabrication of non-alloyed, ohmic Au-GaAs contacts was studied. Experimental data on contact resistivity and current-voltage response was compared with theoretical predictions to determine the applicability of the tunneling Schottky barrier model to the analysis of ohmic contacts. Non-alloyed, tunneling contacts were fabricated by evaporating Au onto an n-type layer with a high dopent surface concentration made by diffusing Sn into a GaAs wafer. The value of dopant surface concentration was determined using an Irvin curve and a measurement of diffused layer resistivity. Schottky barrier height was determined from the current-voltage response of the contact. Values of surface concentration and barrier height were used to calculate theoretical values of contact resistivity to which experimental data was compared. It was found that the Schottky barrier model incorporating electron tunneling can accurately characterize non-alloyed contact performance implying that tunneling responsible for contact ohmicity. Dissert. Abstr.

N82-18497 Old Dominion Univ., Norfolk, Va.
A METHOD OF MODELING MULTIRATE TWO-DIMENSIONAL RECURSIVE DIGITAL FILTERS Ph.D. Thesis
Albert Peter Gerheim 1981 74 p
Avail: Univ. Microfilms Order No. 8128306

A method of modeling two dimensional sampled data systems with two sampling rates in each dimension is presented and applied to the problem of synthesizing two dimensional velocity filters using one dimensional prototypes and multirate concepts. The modeling method includes the replacement of scalar z-transforms of signals by vectors of polynomials, and the replacement of scalar z-transforms of impulse responses by matrices of polynomials. The synthesis of velocity filters is accomplished through the use of coordinate transformations in the z-transform domain which skew the omega (sub 1)-omega (sub 2) axes on the unit bidisc. The filters synthesized using these methods operate at sampling rates higher than the input and output data rates. The process of interpolating the input to accommodate the increase in sampling rates is analyzed in the frequency domain. This overall methodology is applied to the synthesis of fan filters of arbitrary order. Simple synthesis and realization methods are given. Dissert. Abstr.

N82-18498 California Univ., Berkeley.
SILICON MESFETS Ph.D. Thesis
Cornelis Dietwin Hartgring 1981 175 p
Avail: Univ. Microfilms Order No. 8200129

The potential of silicon metal-semiconductor field effect transistors (MESFETs) as a high-speed low-power integrated circuit technology is investigated. The device physics of submicron MESFETs and the modeling of their characteristics is emphasized. Two device models are derived, one of which was implemented in the integrated circuit simulation program SPICE2 and is now publicly available. The circuit techniques in the MESFET technology are investigated by means of SPICE2 simulations and experimental divide-by-two and ring oscillator circuit performances. The optimum circuit techniques are applied in the design of some LSI circuits: a 1 x 1K bit static shift register and parallel multipliers (8 x 8 bit and 10 x 10 bit). Their experimental and simulated performances are presented. The silicon MESFET technology is compared to the MOSFET and bipolar technologies for both present device dimensions and scaled-down ones. Dissert. Abstr.

N82-18499 California Univ., Berkeley.
PERFORMANCE OF FIR ADAPTIVE FILTERS USING RECURSIVE ALGORITHMS Ph.D. Thesis
Michael Latham Honig 1981 357 p
Avail: Univ. Microfilms Order No. 8200139

Adaptive digital filters used for speech and data processing are investigated. The algorithms use either a least mean square recursively in time. Only the all-zero transversal and lattice filter structures are considered. A geometric or Hilbert space formalism is used to derive the LMS lattice, LS lattice, and 'Fast' Kalman algorithms in a cohesive manner. Convergence properties of the LMS adaptive lattice filter are discussed. A deterministic model for multistage convergence is described which gives filter coefficient mean-values an output mean squared error as functions of time. The model is then extended to the LMS and LS lattice joint process estimators and to the 'Fast' Kalman algorithm. In each case calculated curves obtained from the model are compared with simulation results. The performance of each adaptive predictor in the context of adaptive differential pulse code modulation of speech is compared. Dissert. Abstr.

N82-18500 California Univ., Berkeley.
CHARGE CIRCUITS FOR ANALOG LSI Ph.D. Thesis
Robert Howard McCharles 1981 129 p
Avail: Univ. Microfilms Order No. 8200198

Large Scale Integration (LSI) reduced the cost of digital circuits, but had less effect on the cost analog circuits. A charge circuit, a clocked analog circuit which reduces these difficulties is discussed. A clock is used as a reference for time-dependant functions. A clocked analog inverter is a charge circuit similar to a digital gate. Any analog function can be implemented using analog storage and clocked analog inverters. Charge circuits were designed from algorithmic representations of desired functions allowing the use of self-correcting algorithms for improved accuracy. This reduced the need for trimming. A suitable technology for implementing charge circuits is MOS technology. A promising application is in analog-to-digital converters using recursive implementations. Error correcting algorithms can be applied to improve the accuracy of recursive (or cyclic) analog-to-digital converters. It is possible to construct such a converter as CMOS technology with greater than 12-bits of accuracy and a conversion time of less than 200 microseconds. Such a converter would have an active die area of 3 mm. square or less using present-day layout rules.

Dissert. Abstr.

N82-18501 California Univ., Berkeley.
A UNIFIED CAD MODEL FOR MOSFETS Ph.D. Thesis
Sally Liu 1981 262 p
Avail: Univ. Microfilms Order No. 8200190

The operation of metal oxide semiconductor field effect transistors was analyzed, emphasizing the effects of quantum-mechanical statistics, the joining of strong- and weak-inversion regions and the modeling of small-geometry devices. Numerical evaluation of the drain current, channel conductance etc., based upon quantum-mechanical statistics, demonstrates that quantum-mechanical statistics alone do not result in a significant deviation from the classical prediction of these device characteristics within practical operational voltage ranges. Program TWIST was developed to simulate the characteristics of weak inversion and weak-injection punchthrough by solving the two-dimensional Poisson equation. The results of two-dimensional simulations establish the relationship between the drain-induced lowering of the surface barrier and the punch-through. The onset voltage of the punchthrough is derived from a quasi one-dimensional Poisson equation. To model small geometry devices, a semi-empirical model, MOS3, was developed and installed into the circuit simulation program SPICE2.G.

Dissert. Abstr.

N82-18502 California Univ., Berkeley.
JUMP BEHAVIOR OF CIRCUITS AND SYSTEMS Ph.D. Thesis
Sosale Shankara Sastry 1981 115 p
Avail: Univ. Microfilms Order No. 8200262

With particular reference to circuits, the jump behavior, that is, the seemingly discontinuous change in state of systems driven by constrained (or implicitly defined) dynamics is studied, i.e., $x = f(x,y), 0 = g(x,y)$. To be specific, dynamics of a circuit are defined implicitly by specifying the velocities (time derivatives) of capacitor voltages and inductor currents as well as the nonlinear resistive and Kirchhoff constraints that the branch voltages and currents must satisfy. These constraints represent a constraint manifold over the base space of capacitor voltages and inductor currents. The process of integrating the circuit dynamics to obtain the transient response of the circuit consists of 'lifting' the specified velocities to a vector field on the constraint manifold ('lifting' is the inverse operation of projecting). Lifting may not, however, be possible at points of singularity of the projection map, from the constraint manifold to the base space. A way of resolving these singularities, consistent with the interpretation that the constraint manifold is a degeneration of very fast or singularly perturbed dynamics is proposed.

Dissert. Abstr.

N82-18503 Royal Aircraft Establishment, Farnborough (England).
A DESIGN FOR A 32-CHANNEL MULTIPLEXER
P. F. Martinson 26 Jan. 1981 35 p refs
(RAE-TM-RAD-NAV-145; BR77700) Copyright. Avail: Issuing Activity

A time scan analog system multiplexer used for recording data during flight trials of unmanned aircraft navigation sensors is described. The 32 inputs are buffered, then multiplexed in groups of 8 onto 4 lines. These four are multiplexed onto one line and the signal passes through the output buffer to the recorder. Aircraft attitude, heading and height are recorded. Signals from a camera and a kinetheodolite tracking system are synchronized. Operating conditions were simulated using a helicopter. Noise and drift are due to the recorder. The multiplexer copes well with signals of several kHz bandwidth (raw data) and signals of a few Hz bandwidth (processed data, test signals). It can be used with any multitrack tape recorder having an FM recording format on at least two tracks. It can be converted for use in a digital telemetry system.

Author (ESA)

N82-18504 Defence Research Information Centre, Orpington (England).
NUMERICAL SIMULATION OF DIODE RECTIFIER BRIDGES: APPLICATION OF A NEW METHOD TO THE BRUSHLESS EXCITATION SYSTEM
L. Baes, M. S. Garrido, and F. Labrique Oct. 1981 14 p refs
Transl. into ENGLISH from "Simulation numerique des ponts redresseurs a diodes application d'une methode originale au systeme d'excitation brushless". Can. Commun. and Power Conf., Montreal, 1976 p 269-272 Conf. held in Montreal, Quebec, 20-22 Oct. 1976
(DRIC-T-6478; BR80788) Copyright. Avail: Issuing Activity

A diode bridge rectifier simulation method is presented which unites the advantages of using a single system of nonlinear differential equations with the description of the source and load solely by their conditional variables. The bridge is compared to a network of nonlinear resistors whose values, always finite, are deduced from the values of the sole conditional variables of the source and the load. A simple numerical integration program suitable for analyzing sudden transients in which the source impedances play an important part is derived. It performs well when applied to the asynchronous operation of a brushless excitation alternator.

Author (ESA)

N82-18505 Royal Aircraft Establishment, Farnborough (England). Radio and Navigation Dept.
A GENERAL PURPOSE INTERFACE BUS (GPIB)
A. M. Benson 19 Jun. 1981 25 p refs
(RAE-TM-RAD-NAV-168; BR79940) Copyright. Avail: Issuing Activity

The use of the Fairchild 96LS488 integrated circuit in the design of a GPIB interface for use with a desktop computer is illustrated. Circuits which convert GPIB data into parallel binary coded decimal data and provide facility for hardware interrupts are described. The interface transmits and receives data. Digital data are sent to a digital to analog converter. The analog output was amplified by a control unit and used to drive a rate table as part of a test facility for ring laser gyroscopes. A standard interface card is attached to the sending computer and the converter. The interface is easy to install and operates efficiently.

Author (ESA)

N82-18506*# Westinghouse Electric Corp., Pittsburgh, Pa.
HIGH VOLTAGE POWER TRANSISTOR DEVELOPMENT Final Report, Nov. 1979 - Sep. 1981
P. L. Hower 30 Oct. 1981 54 p refs
(Contract NAS3-21949)
(NASA-CR-165547; Rept-81-9F5-HTRAN-R5) Avail: NTIS HC A04/MF A01 CSCL 09A

Design considerations, fabrication procedures, and methods of evaluation for high-voltage power-transistor development are discussed. Technique improvements such as controlling the electric field at the surface and preserving lifetimes in the collector region which have advanced the state of the art in high-voltage transistors are discussed. These improvements can be applied directly to the development of 1200 volt, 200 ampere transistors. M.D.K.

N82-18507*# Pennsylvania State Univ., University Park. Dept. of Electrical Engineering.
SECONDARY ELECTRON EMISSION FROM A CHARGED DIELECTRIC IN THE PRESENCE OF NORMAL AND OBLIQUE ELECTRIC FIELDS M.S. Thesis
Bahram Javidi Feb. 1982 110 p refs
(Grant NsG-3166)

(NASA-CR-168558) Avail: NTIS HC A06/MF A01 CSCL 09C

The secondary electron emission coefficient was obtained for a FEP-Teflon dielectric charged with monoenergetic electrons normally incident upon the surface of the specimen. Measurements of secondary emission coefficient were done for normal and oblique incidence with different primary beam energies in the presence of normal and oblique electric fields. A collimated probing beam was directed to different points on the surface of the specimen and the released or accumulated charge was monitored using an electrometer. The measured data for different probing beam energies, different impact points and different angles of incidence were plotted vs. impact energy and impact point. Data analyzed by computer simulations to find the potential distribution on the surface of the specimen and the electric field around it, is presented and discussed. M.D.K.

N82-18508*# Pennsylvania State Univ., University Park. Dept. of Electrical Engineering.
MAPPING OF ELECTRICAL POTENTIAL DISTRIBUTIONS WITH CHARGED PARTICLE BEAMS Final Report, Nov. 1977 - Feb. 1982
James W. Robinson Feb. 1982 61 p refs
(Grant NsG-3166)
(NASA-CR-168556) Avail: NTIS HC A04/MF A01 CSCL 09C

Methods for measuring electrostatic potentials on and near dielectric surfaces charged to several kilovolts are studied. Secondary emission from those charged dielectrics is measured. Candidates for potential measurement include the induced charge, from which potential is calculated; the trajectory endpoints of either high or low energy particles traversing the region near the surface; trajectory impact on the surface; and creating ions at points of interest near the surface. Some of the methods require computer simulations and iterative calculation if potential maps are to be generated. Several approaches are described and compared. A method using a half-cylinder as a test chamber and low-energy probing beams is adapted for the measurement of seconary emission. N.W.

N82-18509# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AN ACTIVE FILTER FOR THE SIMULTANEOUS REALIZATION OF SEVERAL TRANSFER FUNCTIONS
Plinio Tissi Jan. 1982 10 p refs Submitted for publication
(INPE-2298-PRE/069) Avail: NTIS HC A02/MF A01

A low-pass filter which can realize a generic transfer function, after multipliers and one summer are included, is described. The resulting filter is canonical, since it utilizes a number of capacitors that equals the degree of the transfer function. T.M.

N82-18510# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SMALL SIGNAL DESIGN OF A DIELECTRIC RESONATOR STABILIZED OSCILLATOR
Paulo Mello Marshall and Carlos Eduardo Santana Dec. 1981 14 p refs Submitted for publication
(INPE-2285-PRE/061) Avail: NTIS HC A02/MF A01

The design of a dielectric resonator stabilized oscillator based on small signal scattering parameters is presented. A cylindrical dielectric resonator, magnetically coupled to a terminated microstrip line, is the principal element of the high Q tuning network connected to the input port of a feedback unstabilized transistor. Advantages of this configuration over the output band-stop resonator oscillator are the inhibition of the frequency tuning hysteresis phenomena and the larger tuning range. Accuracy of the design is verified by the performance of a 5430 MHz test oscillator. Tuning range, spectrum, and temperature characteristics are presented and discussed. Author

N82-18511# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FM MODULATORS USING A PHASE LOCKED LOOP [MODULADORES DE FM USANDO PEASE-LOCKED-LOOP]
Wilton Jose Fleming Dec. 1981 62 p refs In PORTUGUESE; ENGLISH abstract
(INPE-2293-NTE/177) Avail: NTIS HC A04/MF A01

The use of the phase locked loop as a frequency synthesizer was studied as well as its possibilities as an FM modulator. The noise characteristics of the circuit were also investigated. A.R.H.

N82-18512# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STABILIZED MICROWAVE OSCILLATOR FOR A DIELECTRIC RESONATOR [OSCILADOR DE MICROONDAS ESTABILIZADO POR UM RESSOADOR DIELECTRICO]
Paulo Mello Marshall and Carlos Eduardo Santana Jun. 1981 39 p refs IN PORTUGUESE; ENGLISH abstract Presented at the 33rd Ann. Meeting of SBPC, Salvador, Bahia, Brazil, 8-15 Jul. 1981
(INPE-2123-RPE/347) Avail: NTIS HC A03/MF A01

The design and construction details of a microwave oscillator stabilized by a cylindrical dielectric resonator are presented. The resonator is coupled with the output port of a bipolar transistor and acts as a band-stop filter. The design is based on the experimental evaluation of the coupling between the resonator and a microstrip line, and on the scattering parameters specified for the bipolar transistor. At 3200 MHz the oscillator shows low FM noise and no spurious oscillations. The oscillating frequency has a 50 MHz mechanical tuning band and a temperature stability of about 9 ppm/C in the range 25-50 C. These characteristics together with the ease of mechanical constuction, fit this type of oscillator for application as a local oscillator in a great variety of microwave receivers. Author

N82-18513# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A 10 MHz 60 DEG PM DEMODULATOR [DEMODULADOR PM 60 DEG EM 10 MHZ]
Paulo Adabo Jul. 1981 16 p refs In PORTUGUESE; ENGLISH abstract Presented at the 33rd Ann. Meeting of SBPC, Salvador-Bahia, Brazil, 8-15 Jul. 1981
(INPE-2157-RPE/376) Avail: NTIS HC A02/MF A01

A demodulator for digitally phase modulated signals is followed by an integrator that works as a phase detector. The circuit has a visual detector that indicates the presence or absence of the carrier. This circuit was tested and presented a good performance with the transmitter operating in the continuous mode. Author

N82-18514# Siemens A.G., Berlin (West Germany).
TEST SETUPS FOR THE DEVELOPMENT OF HIGH VOLTAGE CIRCUIT BREAKERS FOR HIGH SHORT CIRCUIT CAPACITIES Final Report, Aug. 1980
Rudolf Patzelt, Wolfgang Ruhnau, and Egon Zemann Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 104 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-194; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21,90

A number of test setups and procedures are described for measuring and simulating the current and voltage conditions prevailing in short circuit breakers designed to interrupt short circuit currents from 80 to 100 kA. A synthetic test circuit was successfully developed, using the principles of both voltage and current injection. A capacitance current injection procedure allows for the establishment of the influence of iron in the magnetic circuit on the prospective transient recovery voltage of the breaker. Methods for measuring the post-arc current are indicated, and developed meshed grid and tube shunts are described. Synthetic test circuits are presented which are suitable for testing the capacitive switching capabilities of breakers. Author (ESA)

N82-18515# General Electric Co., Pittsfield, Mass. Electronic Systems Div.
ELECTRICAL CHARACTERIZATION AND SPECIFICATION OF SPECIAL PURPOSE LINEAR MICROCIRCUITS Final Technical Report, 24 Aug. 1978 - 1 Oct. 1980
John S. Kulpinski, Louis Carrozza, Theodore Simonsen, Donald VanAlstyne, Larry Deluca, John Dunn, Robert Mossman, Daniel Mui, Jamie Schwehr, and George Smith Griffiss AFB, N.Y. RADC Jun. 1981 494 p

(Contract F30602-78-C-0195; AF Proj. 2338)
(AD-A108247; RADC-TR-81-74) Avail: NTIS
HC A21/MF A01 CSCL 09/5

This technical report is divided into chapters covering specific device types with electrical characterization, test methodology and results discussed. The following device types/families were characterized with the resulting slash sheets depicted: Adjustable Positive Voltage Regulators; Adjustable Negative Voltage Regulators; BiFet Operational Amplifiers; Multiple BiFet Operational Amplifiers; Voltage References; Programmable Voltage References; 12 Bit A/D Converters; 12 Bit D/A converters; and Sample/Hold Amplifiers. Samples of data sheets, histograms, and plots, are included in this report.
GRA

N82-18516# Hughes Aircraft Co., Torrance, Calif.
RELIABILITY INVESTIGATION OF LOW NOISE GaAs FETs Final Technical Report, 31 Aug. 1978 - 31 Aug. 1980
Lawrence S. Bowman and W. Tarn Griffiss AFB, N.Y. RADC Jul. 1981 87 p refs
(Contract F30602-78-C-0295; AF Proj. 2338)
(AD-A108396; HAC-W-43413; RADC-TR-81-181) Avail: NTIS
HC A04/MF A01 CSCL 09/1

The objective of the program was to assess the reliability and operating life characteristics of low noise, small signal, microwave, n-channel, gallium arsenide (GaAs), metal epitaxial semiconductor field effect transistors (MESFETs) with a Schottky-barrier gate, and to identify associated failure mechanisms with notice to the supplier that the devices would be used in a testing program sponsored by the Department of Defense and that results would be reported to the Government. The FETs obtained represented a broad cross section of currently available devices, and included both gold-based and aluminum gate metallizations with gate lengths nominally from 0.5 microns to 1.2 microns.
GRA

N82-18517# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Avionics Lab.
MEASURED PULSE TRANSFER CHARACTERISTICS OF HIGH IMPEDANCE MICROSTRIP LINES Final Report, Mar. 1979 - Mar. 1980
David G. McLaine Apr. 1981 58 p refs
(AF Proj. 6096)
(AD-A108266; AFWAL-TR-80-1160) Avail: NTIS
HC A04/MF A01 CSCL 09/1

Theoretical and experimental results of the propagation and coupling characteristics of fast risetime (50-150 ps) digital pulses on high impedance (100 ohm) microstrip lines are presented. Theoretical microstrip design equations are discussed and the significance of dispersion analyzed. Five mil lines on 35 mil alumina substrates were fabricated using standard thick film technology. Various line lengths, coupled line lengths, and coupled line spacings were analyzed to determine pulse degradation effects and the coupling coefficients between lines.
Author (GRA)

N82-18518# Federal Aviation Administration, Washington, D.C.
ELECTRONIC EQUIPMENT, GENERAL REQUIREMENTS
22 Jun. 1981 63 p Supersedes FAA-G-2100/1b, FAA-G-2100/2a, FAA-G-2100/3a, FAA-G-2100/4b and FAA-G-2100/5a
(AD-A108388; FAA-G-2100C; FAA-G-2100/1b;
FAA-G-2100/2a; FAA-G-2100/3a; FAA-G-2100/4b;
FAA-G-2100/5a) Avail: NTIS HC A04/MF A01 CSCL 09/3

This specification covers the general requirements for the design and construction of ground electronic equipment. This specification establishes the ambient conditions within which equipment must operate satisfactorily and reliably; the general material, the process for selection and application of parts, and the tests for ground electronic equipment. Requirements applicable to individual equipments shall be as specified in the individual equipment specifications.
Author (GRA)

N82-18519# State Univ. of New York at Albany. Dept. of Chemistry.
CHRONOAMPEROMETRIC TRANSIENTS AT THE STATIONARY DISK MICROELECTRODE
Tadeusz Hepel and Janet Osteryoung 30 Nov. 1981 37 p refs Submitted for publication
(Contract N00014-79-C-0682; NR Proj. 056-715)
(AD-A108567; TR-7) Avail: NTIS HC A03/MF A01 CSCL 09/1

Chronoamperometric transients for diffusion controlled reactions at stationary platinum and gold microelectrodes have been examined. The results are compared with those predicted theoretically for hemispherical electrodes and for disk electrodes. The hemispherical model was found to describe the current-time transients only qualitatively, while excellent agreement was obtained between the theory for a stationary disk and data for the hexacyanoferrate (II)/(III) redox reaction. Equations for mass transport to a stationary disk electrode derived earlier form the basis for graphical methods of analysis of a single current-time transient which permit the simultaneous determination of two of the three parameters electrode radius, diffusion coefficient, and concentration. A plot of I vs 1/sq. rt. t has the advantage of simplicity. A logarithmetic analysis (log I-log t) requires data over a greater time range but offers advantages in characterizing electrode geometry. The effects of surface irregularities and electrode sphericity are also discussed.
Author (GRA)

N82-18520# Virginia Univ., Charlottesville. Dept. of Physics.
SUPERCONDUCTING ELECTRONICS Final Technical Report, 1 Jul. - 31 Dec. 1980
Bascom S. Deaver, Jr. and Robert J. Mattauch 1981 20 p refs
(Contract N00014-77-C-0440)
(AD-A108402) Avail: NTIS HC A02/MF A01 CSCL 20/3

The objectives of the research have been (1) to design, fabricate, and test Josephson mixers for use at frequencies greater than 100 GHz, (2) to fabricate and characterize various types of microbridges, particularly ones on semiconductor substrates which may exhibit measurable interaction with the substrate and (3) to measure the microwave properties of some NbN SQUIDs. Progress made on all of these topics is summarized and references to publications reporting the results in more detail are presented.
GRA

N82-18521# Lincoln Lab., Mass. Inst. of Tech., Lexington.
RESTRUCTURABLE VLSI PROGRAM Semiannual Technical Summary, 1 Apr. 1980 - 31 Mar. 1981
Peter E. Blankenship 31 Mar. 1981 61 p refs
(Contract F19628-80-C-0002; ARPA Order 3797)
(AD-A108276; ESD-TR-81-153) Avail: NTIS
HC A04/MF A01 CSCL 09/5

The main objective of the Lincoln Restructurable Very Large Scale Integration (RVLSI) Program is to develop methodologies for designing whole-wafer-scale systems with complexities approaching a million gates. In our approach, we envisage a modular style of architecture comprising an array of cells embedded in a regular interconnection matrix. Ideally, the cells should consist of only a few basic types. The interconnect matrix is a fixed pattern of metal lines augmented by a complement of programmable switches or links. Conceptually, the links could be either volatile or nonvolatile. They could be of an electronic nature such as a transistor switch, or could be permanently programmed through some mechanism such as a laser. The present main thrust of the current RVLSI Program is toward laser-formed interconnect. The link concept offers the potential for a highly flexible, restructurable type of interconnect technology which could be exploited in a variety of ways. For example, logical cells or subsystems found to be faulty at wafer probe time could be permanently excised from the rest of the wafer. The flexible interconnect could also be used to 'jump around' faulty logic and tie in redundant cells judiciously scattered around the wafer for this purpose. Also, the interconnect could be tailored to a specific application in order to minimize electrical degradations and performance penalties caused by unused wiring.
GRA

N82-18522# Michigan Univ., Ann Arbor. Electron Physics Lab.
SIMULATION OF PULSED IMPATT OSCILLATORS AND INJECTION-LOCKED AMPLIFIERS Interim Report, Jun. 1980 - Feb. 1981
R. K. Mains, G. I. Haddah, and D. F. Peterson Wright-Patterson AFB, Ohio AFWAL Oct. 1981 45 p refs
(Contract F33615-77-C-1132; AF Proj. 2002)
(AD-A108483; TR-151; AFWAL-TR-81-1177) Avail: NTIS
HC A03/MF A01 CSCL 09/5

A method for simulating the dynamic behavior of pulsed IMPATT oscillators using a quasi-static approximation is presented. The method used to characterize the IMPATT diode is explained. A particular circuit model is used which models the cylindrical cavity power combining circuit. The overall device-circuit interaction technique is outlined. Simulation results for a high-low, single-drift X-band GaAs IMPATT are presented. The method presented here can be employed for any type of IMPATT device. The pulsed oscillator properties of double-drift IMPATT diode structures are presently being investigated. Author (GRA)

N82-18523# Naval Research Lab., Washington, D. C. UV Measurements Branch.
A MICROCIRCUIT FOR SPACE APPLICATIONS Interim Report
S. R. Highley 4 Dec. 1981 9 p
(RR0330243)
(AD-A108286; NRL-MR-4672) Avail: NTIS HC A02/MF A01 CSCL 09/5

The need to reduce the volume of an electronic circuit package led to the development of a unique hybrid circuit package. Several problems were encountered during design, construction, and testing; and solved, producing a functional design with the final system package size about 1/5 that required for standard packaging. GRA

N82-18524# Pennsylvania State Univ., University Park. Applied Research Lab.
STRUCTURE OF A MULTIBEAM ADAPTIVE SPACE-TIME PROCESSOR
L. H. Sibul and Guy R. L. Sohie 30 Jul. 1981 19 p refs
(Contract N00024-79-C-6043)
(AD-A108352; ARL/PSU/TM-81-156) Avail: NTIS HC A02/MF A01 CSCL 09/3

It is shown that an adaptive multi-input, multi-output space-time processor (beamformer and filter) consists of a multi-input, multi-output adaptive processor and a nonadaptive beamsteering operator. The adaptive processor is determined by the spatial and temporal properties of the noise field; whereas, the beamsteering operator is determined a priori by the desired beamsteering directions. In this structure, the multichannel adaptive processor is common to all the desired beamsteering directions. Author (GRA)

N82-18525# Polytechnic Inst. of New York, Brooklyn. Microwave Research Inst.
BASIC RESEARCH IN ELECTRONICS (JSEP) Annual Report, 1 Apr. 1980 - 31 Mar. 1981
Arthur A. Oliner 30 Sep. 1981 120 p refs
(Contract F49620-80-C-0077; AF Proj. 2305)
(AD-A108502; POLY-MRI-1415-81; AFOSR-81-0775TR) Avail: NTIS HC A06/MF A01 CSCL 09/5

This annual report presents a summary of the scientific progress and accomplishments on research projects funded by the Joint Services Electronics Program (JSEP) for the contract period from 1 April 1980 through 31 March 1981. It does not contain information regarding accomplishments on research projects funded in other ways. The Joint Services Electronics Program at the Polytechnic is the core of interdisciplinary research in electronics encompassing programs in the Departments of Electrical Engineering, Physics and Chemistry under the aegis of the Microwave Research Institute. The research encompassed by this program is grouped under three broad categories: Electromagnetics, Solid State and Information Electronics. The detailed projects (work units) comprising the complete program are listed in the Table of Contents. In addition to the progress, we include for each of the work units the publications during the past year resulting from the research, and some of the recent interactions with the DOD or industry or other academic institutions. At the front of this Annual Report we present our Report on Significant Scientific Accomplishments, and at the end we append a comprehensive list of all the journal publications and conference proceedings during the period from August 1, 1980 to the present, arranged alphabetically according to the name of the first author. Author (GRA)

N82-18526# California Univ., Berkeley. Electronics Research Lab.
JOINT SERVICES ELECTRONICS PROGRAM Annual Progress Report, 1 Sep. 1980 - 31 Aug. 1981
D. J. Angelakos 30 Sep. 1981 144 p refs
(Contract F49620-79-C-0178)
(AD-A108347; UCB/ERL-81/1; AFOSR-81-0850TR) Avail: NTIS HC A07/MF A01 CSCL 09/5

An annual report of the JSEP (Joint Services Electronics Program) in Electromagnetics, Solid State Electronics, Materials and Devices, Quantum Electronics and Information Sciences is presented. Partial contents include: Electromagnetic Scattering by Multiple Targets and Targets in Multiple Media; Hot-Electron Injection and Trapping at Si/Insulator Interfaces; Molecular Beam Epitaxy and Its Applications to Studies of Materials Aspects of Microstructure Engineering; Study of Effects Limiting Realization of Far-Submicron Superconductive Electronic Structures; Research on Electronic Systems Composed of Polymer Films and Planar Si Devices for Transducer Applications; Millimeter and Infrared Heterodyne Mixing and Detection, and Computer Optimization of Electronic Circuits. GRA

N82-18527# Atomic Energy Research Establishment, Harwell (England). Instrumentation and Applied Physics Div.
OPERATING EXPERIENCE WITH THE HARWELL THERMO-MECHANICAL GENERATORS
E. H. Cooke-Yarborough Jun. 1980 14 p refs
(AERE-R-9829) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries also available from HMSO, £2

The Stirling-cycle thermomechanical generator (TMG) provides small amounts of electrical power continuously over long periods, while requiring much less fuel than other power sources running from hydrocarbon fuel or radioisotopes. Two of these 25 watt generators, fuelled by propane, have been used to power the UK National Buoy on two successive missions. A total of more than three years experience at sea has now been accumulated. In addition, a 60 watt version has provided the power for a major lighthouse for more than a year. An early development version of the Thermo-mechanical Generator, adapted to run from the heat of a radioisotope source, was loaded with strontium 90 titanate in October 1974 and has run continuously in the laboratory ever since. The improvements and changes found necessary in the course of 90,000 generator-hours of running time are described, and the improvements in operational performance and reliability which have resulted are outlined. DOE

N82-18528# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Uebertragungstechnik und Elektroakustik.
A DESCRIPTIVE LANGUAGE FOR THIN FILM CONDUCTORS [CBDL/1: EINE BESCHREIBUNGSSPRACHE FUER FLACHLEITERPLATTEN]
Gerhard Rueckle Feb. 1981 40 p refs In GERMAN
(IND-FB-107) Avail: NTIS HC A03/MF A01

The proposed programming language CBDL/1, which simplifies the computerized design of printed circuit boards is examined. In the development of CBDL/1 the requirements for highest comfort and greater failure safety for the operator and easier calculation implementation for the CAD-developer are considered. Transl. by E.A.K.

N82-18529# Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.
HIGH CONCENTRATION IN GaAs PHOTOVOLTAIC SYSTEMS [L'ALTA CONCENTRAZIONE NEI SISTEMI FOTOVOLTAICI AL GaAs]
G. Guarini 1981 12 p refs In ITALIAN Presented at Giornate di Studio su Conversione Fotovoltaica dell'Energia Solare, Milan, 4-5 Jun. 1981
(CISE-1713) Avail: NTIS HC A02/MF A01

The feasibility of a spectral separation method for increasing the efficiency of photovoltaic cells is considered. The technical state of the art of GaAs cells is reviewed. The structure of a 100 Wp high concentration system, comprised of a matrix of Fresnel lenses with as many spectral filters and pairs of cells is described. Operating results are analyzed. Transl. by J.D.H.

N82-18530# Thomson-CSF, Saint Egreve (France). Div. Tubes Electroniques.
TESTS CONCERNING TECHNOLOGICAL PROBLEMS WITH

CHARGE TRANSFER ELECTRON MULTIPLIERS Final Report [ESSAIS CONCERNANT LES PROBLEMES TECHNOLOGIQUES LIES AUX DISPOSITIFS INTENSIFICATEURS A TRANSFERT DE CHARGE]
M. Blamoutier and S. Veron Paris ESA 24 Nov. 1980 29 p refs In FRENCH
(Contract ESTEC-2865/76/NL-AK)
(TDI/1.1851/80; Rept-2368-I; ESA-CR(P)-1464) Avail: NTIS HC A03/MF A01

Diverse design problems of an electron multiplier tube with video output were analyzed. A structure where a charge transfer matrix under bombardment replaces the output screen was considered. The matrices THX 1115 and 1130 were developed. Thin structure fabrication techniques were explored. Tube and matrix support mock-ups were built and tested. The mechanical strength of the structure remains problematic. The matrix is shown compatible with its environment. However an operational engineering model was not obtained, preventing determination of performance characteristics. Author (ESA)

N82-18531# Elettronica S.R.L., Rome (Italy). Optoelectronics Div.
EVALUATION OF LINEAR ARRAYS OF INFRARED DETECTORS FOR THE 1.5 TO 5 MICRON RANGE
C. Corsi, G. Marangoni, S. deVito, and C. Damato Paris ESA Sep. 1980 79 p
(Contract ESTEC-3979/79/NL-PP(SC))
(RT-80/198; ESA-CR(P)-1473) Avail: NTIS HC A05/MF A01

Linear and two-dimensional IR arrays based on ion beam technology and compatible with integrated circuit (IC) technology were tested. Outstanding optoelectronic characteristics are achieved. These characteristics permit analog/digital conversion to the first level of the reading subunit, overcoming the problem of ultralow noise preamplifiers connected to each individual sensing element. Further improvements include capability of manufacturing IR detector arrays with no blind element and no dark space, and compatibility with silicon IC technology and multilayer structure capability. Research shows arrays to be suitable for pushbroom satellite application. Author (ESA)

N82-18532# Messwandler-Bau G.m.b.H., Bamberg (West Germany).
SF6 PLASTIC FILM INSULATED OUTDOOR BUSHING FOR METALCLAD SWITCHGEAR OPERATING AT SYSTEM VOLTAGES OF 420 kV AND ABOVE Final Report
Hermann Dietz Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 64 p refs In GERMAN and ENGLISH
(Contract BMFT-ET-4081-A)
(BMFT-FB-T-81-172; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,50

In replacement of conventional oil-paper bushings, a type of SF6 insulated bushing with polypropylene plastic film dielectricum was developed for outdoor operation of metalclad switchgear. Such bushings have the advantage of the conformity of the insulation with that of the matching switchgear and of the nonflammability of the SF6 gas. The choice of the plastic film, the winding technique, the thermal and dielectrical test program, and the high voltage long-term test program are described. Series production of a 420 kV bushing is under way and research specimens for 525 kV were successfully tested. Author (ESA)

N82-18533# Helsinki Univ. of Technology, Otaniemi (Finland). Radio Lab.
MIXING WITH A SQUID AT MILLIMETER WAVES
Pekka Somervuo 1979 15 p refs
(Rept-S-117; ISBN-951-752-075-1) Avail: NTIS HC A02/MF A01

The construction of a millimeter wave mixer using a SQUID type point contact Josephson junction is described and a simplified analysis of the mixing is given. Experimental results showed that at 33 GHz the measured conversion loss with external pumping was 8 dB using an intermediate frequency (IF) of 900 MHz. With fourth harmonic pumping a conversion gain of 10 dB was achieved at 35 GHz. In all experiments strong noise levels were measured at IF. In order to improve noise properties a mixer construction based on magnetometer principles is proposed. Author (ESA)

N82-18534*# Arizona Univ., Tucson.
THE CONFERENCE ON HIGH TEMPERATURE ELECTRONICS
D. J. Hamilton (LASL), J. B. McCormick, W. J. Kerwin, and J. A. Narud 1981 134 p refs Conf. presented at Tucson, Ariz., 25-27 Mar. 1981; sponsored by NASA, IEEE Industrial Electronics and Control Instrumentation Council, IEEE Solid State Circuits Council, DOE, Nuclear Regulatory Commission, NSF and LASL
(NASA-CR-168505; PB82-114414; NSF/ECS-81007; IEEE-81CH1658-4) Avail: NTIS HC A07/MF A01 CSCL 09C

The status of and directions for high temperature electronics research and development were evaluated. Major objectives were to (1) identify common user needs; (2) put into perspective the directions for future work; and (3) address the problem of bringing to practical fruition the results of these efforts. More than half of the presentations dealt with materials and devices, rather than circuits and systems. Conference session titles and an example of a paper presented in each session are (1) User requirements: High temperature electronics applications in space explorations; (2) Devices: Passive components for high temperature operation; (3) Circuits and systems: Process characteristics and design methods for a 300 degree QUAD or AMP; and (4) Packaging: Presently available energy supply for high temperature environment. GRA

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

N82-18535 Minnesota Univ., Minneapolis.
COAGULATION AND DEPOSITION OF ULTRAFINE AEROSOLS IN TURBULENT PIPE FLOW Ph.D. Thesis
John Erwin Brockmann 1981 246 p
Avail: Univ. Microfilms Order No. 8125936

The simultaneous coagulation and diffusion of ultrafine particles (diameter < 0.02 micrometer) in turbulent pipe flow was studied with emphasis on the aerosol measuring instruments used. Calibration data for the TSI continuous flow condensation nucleus counter are given. A diffusion battery constructed of layers of metal screens is described as well as a sample extraction and dilution system (SEDS) designed to sample a high concentration of ultrafine particles with low characterized particle losses and minimal change in the size distribution due to coagulation. A simplified model for simultaneous Brownian coagulation and diffusional deposition of a free molecule aerosol in turbulent tube flow is presented. The model specifically addresses the case where the effects of both coagulation and deposition are important and the simplifying assumption of pure coagulation or pure deposition cannot be made. Dissert. Abstr.

N82-18536 Colorado State Univ., Fort Collins.
A TIME DEPENDENT FLOW MODEL FOR THE INNER REGION OF A TURBULENT BOUNDARY LAYER Ph.D. Thesis
Ho-Chen Chien 1981 154 p
Avail: Univ. Microfilms Order No. 8126422

Response of the flow variables to external driving forces is nonlinear for shear flows. For the turbulent boundary layer case, surface shear stress fluctuation of magnitude as great as the mean value are observed. A model which incorporates a discrete time dependent solution for the inner region of the turbulent boundary layer is proposed. The model requires stochastic averaging of the time dependent solution to account for the random aspect of the flow. The physical model for the flow near the surface is based on the bursting cycle observed in the inner region of a turbulent boundary layer. Localized pressure gradients created in the valleys of the large scale structures of the outer region of the flow are assumed to be the origin of the bursting process. This model treats the sweep motion as an impulsively started flow over a flat plate. An averaging technique is demonstrated to predict the important features of the surface shear stress. Dissert. Abstr.

N82-18537 California Univ., Berkeley.
INSTRUMENTATION FOR IMAGING OF FLUID FLOW USING NUCLEAR MAGNETIC RESONANCE WITH AN EXAMPLE OF ONE-DIMENSIONAL FLOW IMAGING Ph.D. Thesis
Joel Libove 1981 145 p
Avail: Univ. Microfilms Order No. 8200185

A new method for producing one-dimensional images (projections) showing average flow velocities of fluids in pipes, using Nuclear Magnetic Resonance (NMR) is presented. Images of this type have potential applications in hydrodynamic studies of flow structures, and in studies of blood flow in the human body. The spin echo signals measure fluid velocity and obtain the spatial flow distribution. In the technique, different regions of the sample are irradiated in rapid succession. The result is a 'multiple echo' signal whose magnitude, over time, is the spatial profile of proton density, and whose phase at a given time indicates the average flow velocity at a given position. Special NMR apparatus which was designed and constructed for testing this technique is discussed in detail. Also, a theoretical analysis of the technique is presented, followed by experimental results showing a flow profile for a known arrangement of tubes of flowing water. Dissert. Abstr.

N82-18538 Minnesota Univ., Minneapolis.
THERMAL HYDRAULIC STABILITY OF FLOW IN PARALLEL CHANNELS Ph.D. Thesis
Hossein Pournourbakhsh 1981 225 p
Avail: Univ. Microfilms Order No. 8125997

The thermal hydraulic stability of flow in parallel channels is investigated. A numerical (finite difference) calculational program for analyzing both steady state and transient steam water flows in a heated channel with a prescribed axial heat flux is presented. The model is based on a one dimensional drift velocity formulation of the two phase flow conservation equations, including the effects of radial distribution of void and thermal nonequilibrium between the vapor and liquid phases. Attention is given to flow regimes so as to more properly define the use of available correlations for the constitutive equations. The analysis is extended to superheat regions. Heat effects due to tube walls are included in the analysis. Steady state as well as stability predictions are compared to available experimental results. Dissert. Abstr.

N82-18539 Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.
SOME RECENT DEVELOPMENTS IN AERONAUTICAL FLUID MECHANICS
E. G. Broadbent 6 Mar. 1981 36 p refs Presented at 23rd British Theoret. Mech. Colloq., Bradford, England, 6-9 Apr. 1981
(RAE-TM-Aero-1894; BR78251) Copyright. Avail: Issuing Activity

The state of the art in the calculation of the inviscid flow field of a wing at transonic speeds, the calculation of the viscous boundary layer (including the wake, interaction with shocks, and the treatment of high lift devices) and the application of vortex flows to the adoption of strakes was reviewed. The inclusion of shock coefficients and coordinate transformations increase transonic field calculation accuracy for inviscid flow, but shock equations remain extremely time consuming. Advances in boundary layer calculation include second order methods which allow for wall curvature, second order Reynolds stresses, and a pressure gradient normal to the wall. Navier-Stokes equation solving by time marching is successful for simple geometries. Analysis methods which include leading edge vortices are required in order to understand strake effects. Author (ESA)

N82-18540*# Old Dominion Univ., Norfolk, Va. Dept. of Mathematical Sciences.
BURGERS APPROXIMATION FOR TWO-DIMENSIONAL FLOW PAST AN ELLIPSE Progress Report, 26 May - 26 Nov. 1981
J. Mark Dorrepaal Feb. 1982 27 p refs
(Grant NAG1-197)
(NASA-CR-168552) Avail: NTIS HC A03/MF A01 CSCL 20D

A motivation is given for studying Burgers flow and a solution technique is outlined which works equally well for Oseen or Burgers flow past a circular cylinder. The separation behind the cylinder, the drag experienced by the cylinder, and asymptotic behavior far from the cylinder are described. It is shown that the predictions of Burgers flow near the cylinder provide a substantial improvement over those of Oseen flow. Finally, the equations of motion for Burgers flow past an ellipse are formulated and solved. A.R.H.

N82-18541# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THERMAL RESISTANCE OF CONVECTIVELY COOLED PLATES WITH APPLIED HEAT FLUX AND INTERNAL HEAT GENERATION
Nellore Srinivasan Venkataraman, Humberto Pontes Cardoso, and Olavo Bueno deOliveiraFilho Dec. 1981 24 p refs Submitted for publication
(INPE-2291-PRE/066) Avail: NTIS HC A02/MF A01

The conductive heat transfer in a rectangular plate with internal heat generation, with one end convectively cooled and a part of the opposite end subjected to external heat flux, is considered. The remaining part of this end as well as the other two sides are thermally insulated. Both uniform and nonuniform internal heat generation are considered. For the case of uniform heat generation an analytical solution has been found, and for the nonuniform case a finite difference numerical solution is presented. The variation of the thermal resistance with Biot modulus, the plate geometry, the internal heat generation parameter and the type of profile of internal heat generation is discussed. Author

N82-18542# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THERMAL RESISTANCE OF A CONVECTION COOLED FLAT PLATE WITH A NONUNIFORM APPLIED HEAT FLUX AND INTERNAL GENERATION OF CONSTANT HEAT [RESISTENCIA TERMICA DE UMA PLACA PLANA RESFRIADA POR CONVECCAO COM FLUXO DE CALOR APLICADO NAO-UNIFORME E GERACAO INTERNA DE CALOR CONSTANTE]
Nellore Srinivasan Venkataraman, Olavo Bueno DeOliveira Filho, and Humberto Pontes Cardoso Jun. 1981 27 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SPBC, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2131-RPE/355) Avail: NTIS HC A03/MF A01

The two dimensional conductive heat transfer in a rectangular plate with constant internal heat generation and with two opposite sides insulated, the third subjected to convective cooling by a fluid at a constant temperature and a portion of the remaining end subjected to an arbitrary heat flux distribution is analyzed. This type of problem has applications in the design of solar collector plates, the mounting plates of electronic banks, in some heat exchangers, and in thermal control of satellites. It is observed that the nondimensional thermal resistance can be expressed as a function of the nondimensional plate thickness and contact width, the Biot number, and the ratio of the total internal heat generation to the total heat flux. As was expected, if the thermal resistance resulting from one-dimensional heat conduction is subtracted from the total thermal resistance, the resulting value will still be dependant on the internal heat generation. J.M.S.

N82-18543# Science Applications, Inc., McLean, Va.
SPECTRAL MODEL PREDICTIONS OF MEAN-SQUARE-SHEAR DISTORTION RATES Technical Report, 20 Nov. 1980 - 7 May 1981
Walt Grabowski and Fred C. Newman 7 May 1981 23 p refs
(Contracts N00014-81-C-0084; N00014-81-C-0075)
(AD-A108211; SAI-82-485-WA) Avail: NTIS HC A02/MF A01 CSCL 20/4

It is possible to use a simple shear spectral model to produce some estimates of the mean-square velocity difference over given values of delta z. The distortion of a fluid region (a wake cross section, say) of dimension L is clearly due to velocity differences over delta z equal to L and smaller. The behavior of velocity differences over delta z with a simple model for the shear spectral density function is explored. Author (GRA)

N82-18544# SRI International Corp., Arlington, Va.
DRAG REDUCTION AND ADAPTIVE BOUNDARY CONDITIONS
C. Callan and K. Case Nov. 1981 63 p refs
(Contract MDA903-78-C-0086; ARPA Order 2504)
(AD-A108609; SRI-JSR-81-17) Avail: NTIS
HC A04/MF A01 CSCL 20/4

This report considers the problem of increasing the maximum speed at which the boundary layer of a body in water can remain in laminar flow. It is shown that substantial improvement can be made by modifying the boundary conditions of the linear stability problem. The concern of affecting the turbulence itself to reduce drag is not addressed. Author (GRA)

N82-18545# Iowa State Univ. of Science and Technology, Ames. Engineering Research Inst.
PREDICTION OF LAMINAR-TO-TURBULENT BOUNDARY LAYER TRANSITION IN AXIAL-FLOW TURBOMACHINERY Interim Report, 1 Oct. 1980 - 30 Sep. 1981
Charles E. Kluck Sep. 1981 73 p refs
(Grant AF-AFOSR-0004-81; AF Proj. 2307)
(AD-A108642; ISU-ERI-AMES-82030; TCRL-21;
AFOSR-81-0806TR) Avail: NTIS HC A04/MF A01 CSCL 13/11

Current analytical studies regarding the laminar-to-turbulent boundary layer transition process, including relevant analysis of laminar separation, and analytical and experimental studies concerning parametric effects on transition pertinent to axial-flow turbomachine blade rows are reviewed. These include the effects of pressure gradient, freestream turbulence, surface roughness, heat transfer, and combined effects. Finally, the work of various authors who established data correlations for transition on axial-flow turbomachine blade rows is evaluated. Predictive equations and charts were presented as a reference guide for determining the transition region on blades. Additionally, equations for calculating transitional boundary layer growth are presented. Author (GRA)

N82-18546# Rhode Island Univ., Kingston.
STABILITY ANALYSIS OF THE COMPRESSIBLE, ADIABATIC, SIMILAR BOUNDARY LAYER EQUATIONS (LOWER BRANCH) Final Report, 1 May 1980 - 30 Apr. 1981
G. R. Verma, W. I. Hankey, and S. J. Scherr May 1981 53 p refs
(Grant AF-AFOSR-0150-80; AF Proj. 2307)
(AD-A108507; AFOSR-81-0782TR) Avail: NTIS
HC A04/MF A01 CSCL 20/4

In a previous report, the authors analyzed the stability of the lower branch solutions of the incompressible (M sub infinity = 0) Falkner-Skan boundary layers. This report extends this work by including the effect of Mach number M sub infinity on the stability of adiabatic case. Author (GRA)

N82-18547# Tel-Aviv Univ. (Israel). Dept. of Fluid Mechanics and Heat Transfer.
ON THE RELATIONSHIP BETWEEN TRANSITIONAL AND FULLY TURBULENT SHEAR FLOW Annual Report, 1 Mar. 1980 - 31 Mar. 1981
I. Wygnanski 31 May 1981 169 p refs
(Grant AF-AFOSR-3275-77; AF Proj. 2307)
(AD-A108367; AFOSR-81-0764TR) Avail: NTIS
HC A08/MF A01 CSCL 20/4

Pulsating flow of air in a straight smooth pipe was investigated experimentally. The period of forcing ranged from 0.5 sec to 5 sec which resulted in the change in the non-dimensional frequency parameter alpha = r sq root of w/nu of 4.5 to 15. The introduction of periodic surging had no effect on the time mean quantities. The present data was compared in detail with the theory of Uchida (1956) in the laminar flow regime. The time dependent components at the forcing frequency were presented by the radial distribution of amplitude and phase. An integral momentum equation in a time dependent flow requires a force triangle to be maintained at any instant. The triad of forces are: pressure, inertia and shear. All terms of the force balance equation were measured independently providing a good check of data. The measured turbulent characteristics of the flow, including the RMS values of the velocity fluctuations, Reynolds stress and short-time power spectra are dependent on the phase of the forced oscillations. The radial distribution of the phase angle of velocity is qualitatively different in laminar and turbulent flows. In order to explain this difference the concept of a relaxation time of the turbulent flow was employed. Transitional flow in a boundary layer is also briefly discussed. Author (GRA)

N82-18548# Colorado Univ. at Boulder. Dept. of Mechanical Engineering.
ANALYTICAL PREDICTION OF TURBULENT HEAT TRANSFER PARAMETERS Annual Report, 1 Oct. 1980 - 30 Sep. 1981
Adrian Bejan Dec. 1981 60 p refs
(Contract N00014-79-C-0006; NR Proj. 097-431;
RR0240302)
(AD-A109024; CUMER-81-3; AR-1) Avail: NTIS
HC A04/MF A01 CSCL 20/4

The objective of this research effort is to construct a purely theoretical foundation for the phenomenon of turbulent heat transfer. In this first annual report, the current methodology of theoretical research is reexamined critically. The report outlines in three self-standing units (papers) the new theoretical viewpoint that turbulence is the result of inviscid flow buckling. This viewpoint leads to first examples of theoretical prediction of turbulence parameters, for instance, the transition to turbulence, the flapping motion of turbulent jets, the frequency of vortex shedding and the meandering and mixing mechanism of thermal plumes. Author (GRA)

N82-18549# Imperial Coll. of Science and Technology, London (England). Centre for Computational Fluid Mechanics, Heat Transfer and Combustion.
A GENERAL COMPUTER PROGRAM FOR FLUID-FLOW, HEAT-TRANSFER AND CHEMICAL-REACTION PROCESSES
D. B. Spalding Sep. 1980 37 p refs Presented at Intern. FEM-Congr., Baden-Baden, West Germany, 17-18 Nov. 1980
(HTS/81/10) Avail: NTIS HC A03/MF A01

A code for parabolic, hyperbolic, or elliptical numerical integration is described. It consists of a series of closely linked computer codes and can be used to solve steady state problems or to simulate a transient process, e.g., a pipe break in a nuclear power plant. Finite domain equations are formulated in a fully implicit manner so that steady state problems can be solved expeditiously. The size of the time step in transient problems was determined by the speed of the physical events simulated. One, two, or three dimensions can be handled. Author (ESA)

N82-18550# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
EXPERIMENTAL MODEL STUDIES OF A HYDRAULIC RAM WITH SPECIAL EMPHASIS ON THE VELOCITIES IN THE RAM TUBE [EXPERIMENTELLE UNTERSUCHUNGEN AN EINEM MODELL EINES HYDRAULISCHEN WIDDERS UNTER BESONDERER BERUECKSICHTIGUNG DER GESCHWINDIGKEITEN IM WIDDERROHR]
Martin Basfeld Dec. 1980 129 p refs In GERMAN
(MPIS-28/1980; ISSN-0436-1199) Avail: NTIS
HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,55

The velocity of the ram tube to make it accessible for production in pattern flows examining human circulation was investigated. A simplified theory of the function of the hydraulic ram was developed using the Navier-Stokes equation for a square rubbing component for one dimensional flows. The influence of the valve movement on the ram efficiency is evaluated. The difference between the significance of the influences on the ram model as opposed to the technical ram is discussed. E.A.K.

N82-18551# European Space Agency, Paris (France).
AN INTEGRAL EQUATION FOR THE VELOCITY FIELD OF

IRROTATIONAL FLOWS AROUND BLUNT BODIES

Barbara Schmitt-vonSchubert Oct. 1981 28 p refs Transl. into ENGLISH from "Integralgleichung fuer das Geschwindigkeitsfeld drehungsfreier Stroemungen um stumpfe Koerper", Rept. DFVLR-FB-80-25 Goettingen, West Germany
(ESA-TT-702; DFVLR-FB-80-25) Avail: NTIS HC A01/MF A01; DFVLR, Cologne DM 7.30

An integral equation which characterizes the velocity of the stationary flow around blunt bodies is derived. The flow is assumed irrotational, i.e., only such discontinuity surfaces occur for which this assumption remains valid. The behavior of the integral equation at such a discontinuity surface is discussed. The solution of the equation is shown similar to the solution of a wall flow equation. Author (ESA)

N82-18552# Ferngas Nordbayern G.m.b.H., Bamberg (West Germany).

REPORT ON THE EXPERIENCES WITH THE GAS COMPRESSION HEAT PUMP SYSTEM OF THE SCHOOL AND SPORTS CENTER AT ALTENKUNSTADT Final Report, Dec. 1980

Fritz Tscherter Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 109 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-175; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,10

Three years of operation of a 1200 kw natural gas boiler system supplemented by a 800 kw gas heat pump system are evaluated and the savings in primary energy are assessed. Setup, control system and measuring instrumentation are described. The proximity of a river allows an hybrid operation whereby 100% of the heat is produced by the gas powdered heat pump for any river temperature above 3 C whereas below that temperature the gas boiler takes over completely. Annual heat pump heating figures between 1.66 and 1.72 were obtained, thus yielding a saving in primary energy between 36% and 47%, in good agreement with the design values. The cost analysis shows that the savings thus achieved cover the operating costs specific to the heat pump. Author (ESA)

N82-18553# Thermo Electron Corp., Waltham, Mass.

OPEN-CYCLE VAPOR COMPRESSION HEAT PUMP Annual Progress Report, 1980

Ravi Sakhuja and Frederick E. Becker 5 May 1981 54 p
(Contract GRI-5011-342-0094)
(PB82-110503; TE4224-243-81; GRI-80/0064) Avail: NTIS HC A04/MF A01 CSCL 13A

Recovery and upgrading of low-grade steam or waste heat sources offers a great potential of energy conservation. Thermo Electron is developing an open cycle vapor compression steam heat pump to meet this objective. The system utilizes excess low-pressure steam or that produced from an industrial excess heat source with a waste heat boiler and compresses this steam to the desired pressure level for process use. The compressor is driven by a prime mover such as a gas turbine, gas engine, etc. The prime mover exhaust heat also can be recovered to generate additional process steam. The fuel consumption of this system can be as low as 30 to 50 percent in comparison to a direct-fired boiler over the expected range of process conditions. Simple payback periods as low as one year can be achieved. GRA

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-18554 Illinois Univ. at Urbana-Champaign.

APPLICATIONS OF MULTI-PINHOLE GAMMA CAMERA COLLIMATION TO TOMOGRAPHY AND IMAGE ENHANCEMENT Ph.D. Thesis

David Ronald Simpson 1981 148 p
Avail: Univ. Microfilms Order No. 8127692

Multi-pinhole gamma camera collimation was introduced in the field of emission tomography. This collimation process simultaneously produces several images covering a limited angular range, which may then be recombined to obtain tomographic slices of the object imaged. A possible method for improving the images obtained by this technique by combining two multi-pinhole views taken 90 deg apart was investigated. Collimators were designed and built both for tomography and imaging tablet disintegration, and computer programs were written to reconstruct the images by simple backprojection and by filtered backprojection. The use of multi-pinhole collimators to image the disintegration of tablets in vivo was clearly demonstrated. Phantom tests done in vitro were capable of imaging defects as small as 5 sq mm, while images made with real tablets both in vitro and in vivo readily showed the onset and progress of the tablet disintegration. Dissert. Abstr.

N82-18555 Royal Aircraft Establishment, Farnborough (England).

THE EFFECT OF ATMOSPHERIC TURBULENCE ON AIR TO GROUND PHOTOGRAPHY

J. G. Ballantyne 18 May 1981 31 p refs
(RAE-TR-81065; RAE-IT-173; BR80525) Copyright. Avail: Issuing Activity

The theory of optical effects of atmospheric turbulence is summarized and the derivation of an equation relating the modulation transfer function of an optical path through the atmosphere to a weighted integral of the structure constant of refractive index along that path is outlined. Methods of estimating the structure constant from meteorological parameters are discussed and FORTRAN subroutines for evaluating the integral and estimating the modulation transfer function of the path under any required conditions are given. High aperture optical systems are considered preferable because they permit shorter exposures, thereby reducing or eliminating turbulent image movement. Author (ESA)

N82-18556*# National Aeronautics and Space Administration, Washington, D. C.

SPECTRAL TRANSFORMATION IN THE SOFI COMPLEX FOR PROCESSING PHOTOGRAPHIC IMAGES ON THE ES COMPUTER, PART 1

A. S. Debabov and D. A. Usikov Jun. 1979 22 p refs Transl. into ENGLISH of Rept. Pr-394 Inst. of Space Research, Moscow, 1978 p 1-20 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-75632-Pt-1; PR-394) Avail: NTIS HC A02/MF A01 CSCL 14E

A description is given of three programs catalogued in the form of object modules in the library of a system for processing photographic images computer. PFT is the subprogram of the multi-dimensional BPF of real-valued information, in the operative computer memory. INRECO is a subprogram-interface between the real and complex formats for representing two-dimensional spectra and images. FFT2 is a subprogram for calculating the correlation functions of the image using the previous subprograms. T.M.

N82-18557*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SPATIAL ENERGY DISTRIBUTION Patent Application

Thomas J. Lash, inventor (to NASA) Filed 2 Oct. 1981 10 p
(NASA-Case-LAR-12631-1; US-Patent-Appl-SN-308008) Avail: NTIS HC A02/MF A01 CSCL 14B

A system is described in which an X-Y recorder (translator) is modified to automatically scan a detector in a plane perpendicular to the beam of a tunable diode laser to obtain a spatial energy distribution of the beam. The recording pen of a second X-Y recorder is moved in synchronism with the detector and records the output of the detector. Consequently, a recording is made by the second recorder that represents the energy distribution of the beam in the plane scanned by the detector. A step signal is applied to the translator and recorder to move the detector and the recording pen in the Y-direction and is also applied to the X-input of recorder to skew the recording to make it appear to be three-dimensional. NASA

N82-18558# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

SYSTEM FOR STABILIZATION AND POINTING OF A STRATOSPHERIC BALLOON-BORNE TELESCOPE [SISTEMA PARA ESTABILIZACAO E APONTAMENTO DE TELESCOPIO EMBARCADO EM BALAO AESTRATOSFERICO]

Paulo Donato Allemand Borges, Cesar Celeste Ghizoni, and Carlos de Oliveira Lino Jun. 1981 9 p refs In PORTUGUESE; ENGLISH abstract Presented at the 2nd Natl. Meeting on Automation, Salvador, Brazil, 8-15 de Jul. 1981
(INPE-2103-RPE/330) Avail: NTIS HC A02/MF A01

A control system for pointing and stabilization of an infrared radiometer to be flown in stratospheric balloon missions was developed and built. This system permitted the azimuth stabilization and orientation of the entire scientific platform, on which all missions subsystems were assembled, as well as the elevation of the longitudinal axis of the telescope alone. The classical control philosophy with linear and angular position and velocity sensors is used. The control reference was supplied by an on-board microcomputer, via telecommand. A flight in November 1980 produced a one degree accuracy in the elevation control loop and a quite acceptable stabilization in azimuth for the requirements of that mission. Author

N82-18559*# Aerojet Electrosystems Co., Azusa, Calif.

A 16 X 16 ELEMENT EXTRINSIC SILICON DETECTOR ARRAY

Dec. 1981 53 p refs
(Contract NAS2-10792)
(NASA-CR-166285; Rept-6152) Avail: NTIS HC A04/MF A01 CSCL 14B

Two bismuth-doped silicon accumulation-mode charge-injection device (AMCID) infrared detector arrays are studied. The geometry and composition of the arrays, and a description of the cold and warm electronics components of the system are described. Instructions for setting up and operating the array system, plus results of a functional test, are included. B.W.

N82-18560# Accumetrics Corp., Cambridge, Mass.

APPLIED RESEARCH AND DEVELOPMENT OF FALLING-SPHERE DENSITOMETERS PAYLOADS OF IMPROVED DESIGN Final Report, Jan. 1979 - Aug. 1981

Donald H. Fryklund Aug. 1981 66 p
(Contract F19628-79-C-0058; AF Proj. 6690)
(AD-A108316; AC-267; AFGL-TR-81-0233) Avail: NTIS HC A04/MF A01 CSCL 14/2

Four complete falling-sphere densitometer systems were designed and launched, with generally satisfactory results, at three locations: New Mexico, Sweden, and Alaska. The task included the provision and launch responsibility for the nose cones and ejection systems for all densitometers and the provision and launch responsibility for two unique support units for the payloads flown in Sweden. Refinements were made to improve system accuracy in the calibration and data reduction techniques for the Z-axis channels of the sphere. The Z-axis amplifiers were modified to improve their performance. A wide-band accelerometer was designed and integrated into the sphere system to provide for a high resolution instrument to enable small-scale wind and turbulence studies of the high-altitude atmosphere. The sphere was reintegrated to provide for a more powerful transponder and a PCM-ranging system. A study was made to reassess the sphere configuration to reduce its gross weight. Design changes will reduce this weight by 1 lb. Additional volume was recovered for future expansion in the sphere instrumentation. GRA

N82-18561# Delta Information Systems, Inc., Jenkintown, Pa.

ERROR PROCESSING TECHNIQUES FOR THE MODIFIED READ FACSIMILE CODE Final Report

Richard A. Schaphorst Washington National Communication System Sep. 1981 52 p refs
(Contract DCA100-80-C-0233)
(AD-A108608; NCS-TIB-81-9) Avail: NTIS HC A04/MF A01 CSCL 09/4

The purpose of this Technical Information Bulletin is to evaluate the relative effectiveness of four different 'error processing techniques' for the Modified READ code. The four different techniques which are investigated are listed below in order of increasing complexity of implementation: Print White (PW); Print Previous Line (PPL); Print Previous Line/White (PLW); and Normal Decode/Previous Line (NDPL). The analysis is performed by means of computer simulation. A total of 72 computer runs were performed at different combinations of CCITT test document, vertical resolution, K-factor and source of transmission errors. The performance of four candidate techniques is measured by both objective and subjective procedures. The quantitative analysis is accomplished using the Error Sensitivity Factor (ESF) which represents the average number of incorrect pels in the output document caused by a transmission error. The subjective analysis is based upon viewing actual error-contaminated images generated in the simulation process. The quantitative performance of the Print White technique was found to be significantly poorer than the other three. The ESP of the PW, under the conditions analyzed, was found to be 56.3, while the average of the other three is 46.1. The error performance of the PLW approach was found to be subjectively superior to the Print White technique and comparable to the Previous Line technique. The NDPL has superior legibility and shows promise for improved overall error performance. Author (GRA)

N82-18562# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

PRELIMINARY DESIGN OF A HYDRAULIC POWER SUPPLY FOR A LAMINAR JET ANGULAR RATE SENSOR

T. R. Small, W. O. Wilkinson, F. F. Mark, and R. A. Makofski Adelphi, Md. HDL Nov. 1981 45 p refs
(Contract N00024-78-C-5384; DA Proj. 1L1-62120-AH-25)
(AD-A108729; HDL-CR-80-384-2) Avail: NTIS HC A03/MF A01 CSCL 14/2

The preliminary design of a hydraulic power supply for a laminar jet angular rate sensor is described. The requirements upon which this design was based are that the power supply provide stable pressure and flow rates (of the order of 10 psi and 1 l min) over the military temperature range (-60 F to 180 F). Reliability, safety, small size, and low cost are also factors that were considered. State-of-the-art equipment and passive control are specified. Also presented are test plans for measuring the performance of the proposed power supply and a limited literature review of potential hydraulic fluids. Author (GRA)

N82-18563# Maryland Univ., College Park. Computer Vision Lab.

ON CONNECTIVITY PROPERTIES OF GRAYSCALE PICTURES

Azriel Rosenfeld Sep. 1981 17 p refs
(Grant AF-AFOSR-3271-77; AF Proj. 2304)
(AD-A108602; TR-1097; AFOSR-81-0796TR) Avail: NTIS HC A02/MF A01 CSCL 14/5

A grayscale digital picture is called 'connected' if it has only one connected component of constant gray level that is maximal, i.e., not adjacent to any component of higher gray level. This note establishes some equivalent conditions for connectedness, and also defines a grayscale generalization of the genus in terms of sums of local property values. Author (GRA)

N82-18564# British Aerospace Dynamics Group, Bristol (England). Space and Communications Div.

IMAGING MICROWAVE RADIOMETER. PHASE A STUDY. VOLUME 1: EXECUTIVE SUMMARY Final Report

C. R. Francis Paris ESA Jul. 1980 50 p refs Prepared in cooperation with Dornier-Werke G.m.b.H., Friedrichshafen, West Germany, B and W Electronik and Tech. Univ. of Denmark Original contains color illustrations
(Contract ESA-4243/80/F-CG(SC))
(ESS/SS-1006; ESA-CR(P)-1468) Avail: NTIS HC A03/MF A01

An imaging microwave radiometer, a passive microwave instrument proposed for inclusion in the sensor payload of the Coastal Ocean Monitoring Satellite System (COMSS) spacecraft, was studied. The instrument detects microwave radiation at 5 frequencies in the range 6.8 to 36.5 GHz, each at vertical

and horizontal polarization, and has an optional facility for measurements at 90 GHz. Results show that the instrument meets the experiment requirements proposed by ESA and meets the accommodation constraints of the COMSS payload.
Author (ESA)

N82-18565# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATION ON THE FUNCTIONING OF GOLD-TIN SUPERCONDUCTING FILMS FOR THE MEASUREMENT OF SECONDARY SONIC SHOCK WAVES IN He2 FLOW [UNTERSUCHUNGEN UEBER DIE FUNKTIONSWEISE VON SUPRALEITENDEN GOLD-ZINN-FILMEN ZUR MESSUNG VON SECOND SOUND-STOSSWELLEN IN He2-STROEMUNGEN]
Till Schmeling May 1981 53 p refs In GERMAN
(MPIS-8/1981; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,75

The function of evaporated gold-tin superconducting films to detect second sound signals was investigated. It is shown that by annealing of the critical probe current can be lowered and at the same time the sensitivity of the probe at low temperatures can be increased. E.A.K.

N82-18566# Ford Aerospace and Communications Corp., Newport Beach, Calif. Aeronutronic Div.
A WATER VAPOR MONITOR USING DIFFERENTIAL INFRARED ABSORPTION
Darrel E. Burch and David S. Goodsell Sep. 1981 36 p refs
(Contract EPA-68-02-3238)
(PB82-114422; EPA-600/2-81-162) Avail: NTIS HC A03/MF A01 CSCL 14B

A water vapor monitor was developed with adequate sensitivity and versatility for a variety of applications. Two applications are the continuous monitoring of water in ambient air and the measuring of the mass of water desorbed from aerosol filters. The sample gas may be held static, or flow continuously through the 56 cc sample cell, temperature controlled at 45 C. Infrared energy from a tungsten-iodide bulb passes through a rotating filter wheel and the sample cell to a PbS detector. The infrared beam passes through the sample gas twice to produce a total optical path of 40 cm. The infrared beam passes alternately through two semicircular narrow bandpass filters. Absorption by the water vapor in the sample produces a 30-Hz modulation of the detector signal that is proportional to the water concentration. The maximum concentration that can be measured accurately is approximately 5%. GRA

N82-18567# Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.
AN INEXPENSIVE PHOTOELECTRIC REMOTE TILT METER Final Report
James D. Bergen Nov. 1980 5 p ref
(PB82-103649; FSRN-PSW-347) Avail: NTIS HC A02/MF A01 CSCL 14B

An inexpensive remote reading level capable of indicating and recording tilt components can be assembled from a photoresister and indicator lamp aligned in a tube containing a mercury surface. The device is useful to determine corrections needed for readings of meteorological equipment mounted on portable towers or in aircraft. GRA

N82-18568# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.
DEVELOPMENT OF A MULTIDETECTOR PETROLEUM OIL IN WATER MONITOR Final Report, May 1978 - Jan. 1981
Robert W. Melvold Sep. 1981 90 p refs
(Contract EPA-68-03-2648)
(PB82-105206; EPA-600/2-81-206) Avail: NTIS HC A05/MF A01 CSCL 14B

A prototype petroleum oil-in-water monitoring system that continuously measures oil (whether free, suspended, dissolved, or emulsified) in water carrying a variety of potential interfering substances was developed. An extensive desk-top survey of commercially available oil monitors was carried out. Three devices were selected for thorough laboratory evaluation: (1) Sigrist Fluorescence Monitor Model FLJ, (2) CE Invalco D.O.W. Monitor, and (3) Horiba OCMA-25 Oil Content Monitor. The construction of a flow loop and its operation, the installation of the selected detectors in the breadboard system, the development of a data retrieval system, the calibration methodology employed, the initial checkout of the detectors, and the extensive multidetector evaluation of each detector's performance for quantifying petroleum oil in the presence of impurities and other interferents are described. GRA

N82-18569# Science Research Council, Chilton (England). Physics Apparatus Group.
A HIGH RESOLUTION, HIGH COUNTING RATE BIDIMENSIONAL, MWPC IMAGING DETECTOR FOR SMALL ANGLE X-RAY DIFFRACTION STUDIES
J. E. Bateman, J. F. Connolly, E. C. Sawyer, and R. Stephenson 1981 25 p refs
(PB82-120866; RL-81-053) Copyright. Avail: Issuing Activity CSCL 14B

The performance of a 40,000 sq mm X-ray imaging multiwire proportional chamber gamma camera with applications in small angle X-ray diffraction and scattering is reported. With quantum energies of about 8 keV, high spatial resolution with a capability for data taking at about, or > 350 kHz is reported. The detection efficiency is about 75% and the detector operates as a sealed unit with a long lifetime. GRA

N82-18570# National Bureau of Standards, Washington, D.C.
DIMENSIONS: VOLUME 65, NUMBER 5
Jul. 1981 29 p refs
(PB82-120387; NBS-DIM-65-5) Avail: NTIS HC A03/MF A01 CSCL 14B

Short summaries of major technical developments, highlights of work in progress, major speeches and statements by Bureau management, and a listing of NBS publications are featured. The table of contents for the current issue is as follows: Getting More for less; Preserving the past; NBS Research forges strong link with industry; NEW NBS instrument monitors electromagnetic radiation; Verification procedures for federal interface standards; Hybrid planar-cylindrical scanning technique; Spin dependent-mean free paths; New SRM aids detection of PAH's; Copper 'Benchmark' SRM's available; Conferences; Publications; and Newsbriefs. GRA

N82-18571# National Bureau of Standards, Washington, D.C. National Engineering Lab.
MATERIALS FOR INSTRUMENTATION FOR FOSSIL ENERGY TECHNOLOGIES. A REVIEW AND PROGRAM PLAN OF RESEARCH AND DEVELOPMENT NEEDS
H. P. R. Frederikse, P. K. Schenck, G. R. Burns, R. R. Dils, and J. R. Whetstone Sep. 1981 135 p refs
(Contract EA-77-A-01-6010)
(PB82-116229; NBSIR-81-2348) Avail: NTIS HC A07/MF A01 CSCL 14B

The materials problems related to instrumentation for Fossil Energy Facilities are reviewed. Requirements for measurement of process parameters (flow, temperature, pressure, chemical composition), of construction material properties, and of fuel characteristics are discussed. The main part of the report is a suggested program plan for pertinent materials R&D. Short descriptions of the various Fossil Energy Processes, listing of present research activities, and a set of 6 case studies are presented in an appendix. GRA

N82-18572# National Bureau of Standards, Washington, D.C. National Engineering Lab.
MEASUREMENT AND EVALUATION METHODS FOR AN ANGULAR ACCELEROMETER Final Report, 1 Aug. - 30 Dec. 1980
John D. Ramboz Aug. 1981 75 p refs
(Contract DOT-HS-9-021931A)
(PB82-115973; NBSIR-81-2337) Avail: NTIS HC A04/MF A01 CSCL 14B

A transducer which measures angular acceleration along one axis was investigated to assess three of its performance characteristics, viz., sensitivity factor, amplitude linearity, and response to linear (non-angular) input accelerations. Accelerometer specifications and response theory are presented. Test philosophy and methodology are discussed along with measurement results. Tests were conducted over a frequency range from 1.5 to 100 Hz and an acceleration range from 64 to 5000 rad/square second. Generally, the performance observed was in agreement with the manufacturer's preliminary specifications. GRA

N82-18573# Geological Survey, Reston, Va. Water Resources Div.
MULTI-SALINE SAMPLE DISTILLATION APPARATUS FOR HYDROGEN ISOTOPE ANALYSES: DESIGN AND ACCURACY Water Resources Investigations
Afifa Afifi Hassan Apr. 1981 10 p refs
(PB82-115460; USGS/WRD/WRI-81-086) Avail: NTIS HC A02/MF A01 CSCL 14B

A distillation apparatus for saline water samples was designed and tested. Six samples may be distilled simultaneously. The temperature was maintained at 400 C to ensure complete dehydration of the precipitating salts. Consequently, the error in the measured ratio of stable hydrogen isotopes resulting from incomplete dehydration of hydrated salts during distillation was eliminated. GRA

N82-18574# Radian Corp., Durham, N.C.
HERL BIOLOGICAL EXPOSURE CHAMBER CONCEPTUAL DESIGN
R. M. Parks Oct. 1981 49 p
(Contract EPA-68-02-3171)
(PB82-114646; EPA-600/2-81-234) Avail: NTIS HC A03/MF A01 CSCL 14B

Because of the current interest in biotesting of potentially hazardous air pollutants, biological exposure chambers that can be used to expose test organisms to the secondary aerosol effluent of the MARC (Mobile Aerosol Reaction Chamber) were designed. The conceptual design of the biological exposure chambers is described along with the chamber design and rationale behind that design. The connecting of the biochambers to the MARC is also discussed. GRA

N82-18575# Colorado School of Mines, Golden. Dept. of Physics.
SMALL SIZE-RANGE EXTENSION OF AN OPTICAL PARTICLE COUNTER Final Report, Oct. - Mar. 1981
James T. Brown, Jr. Aug. 1981 20 p refs
(Grant EPA-R-807089)
(PB82-103523; EPA-600/2-81-144) Avail: NTIS HC A02/MF A01 CSCL 14B

The object of the study was to improve the small particle sensitivity and resolution of a white light optical particle counter. The particular counter chosen for study was the model 208 manufactured by Climet Instruments. GRA

N82-18236*# Institut d'Aeronomie Spatiale de Belgique, Brussels.
GRILLE SPECTROMETER
M. Ackerman and A. Girard (ONERA) *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14B

N82-18237*# Centre National de la Recherche Scientifique, Paris (France). Service d'Aeronomie.
WAVES IN THE OH EMISSIVE LAYER
M. Herse *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 2 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14E

N82-18239*# European Space Conference, Paris (France).
METRIC CAMERA EXPERIMENT
M. Reynolds *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14E

N82-18250*# Laboratoire d'Aerothermique du C.N.R.S., Meudon (France).
VERY WIDE FIELD CAMERA
G. Courtes *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14E

N82-18252*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ACTIVE CAVITY RADIOMETER
R. C. Willson *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14B

N82-18263*# Clinical Research Centre, London (England).
PERSONAL MINIATURE ELECTROPHYSIOLOGICAL TAPE RECORDER
H. Green *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 2 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14E

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-18576 California Univ., Berkeley.
SEMICONDUCTOR INJECTION LASERS WITH A CIRCULAR RESONATOR: A STUDY OF GaAs-(GaAl)As DIELECTRIC WAVEGUIDES AND THEIR INCORPORATION INTO A LASER RESONATOR Ph.D. Thesis
Andrew Shuh-Huei Liao 1981 195 p
Avail: Univ. Microfilms Order No. 8200184

A semiconductor injection laser with a circular resonator for integrated optics applications is studied. Electromagnetic wave propagation in dielectric rectangular waveguides is analyzed by means of an improved approximate analysis. The effect of the index difference and the aspect ratio on the modal configuration of a dielectric rectangular waveguide is examined. Propagation characteristics of both straight and curved GaAs-(GaAl)As high mesa waveguides are investigated. Field distribution, propagation constant and radiation losses of the guided modes are determined. Dissert. Abstr.

N82-18577*# Old Dominion Univ., Norfolk, Va. School of Sciences and Health Professions.
THEORETICAL STUDIES OF SOLAR-PUMPED LASERS Progress Report, 16 Jul. 1981 - 15 Jan. 1982
Wynford L. Harries Feb. 1982 29 p refs
(Grant NsG-1568)
(NASA-CR-168554; PTR-82-2) Avail: NTIS HC A03/MF A01 CSCL 20E

Solar-pumped lasers were investigated by comparing experimental results from pulse experiments with steady state calculations. The time varying behavior of an IBr laser is studied. The analysis is only approximate, but indicates that conditions occurring in a pulsed experiment are quite different from those at steady state. The possibility of steady-state lasing in an IBr laser is determined. The effects of high temperatures on the quenching and recombination rates are examined. Although uncertainties in the values of the rate coefficients make it difficult to draw firm conclusions, it seems steady state running may be possible at high temperatures. S.L.

N82-18578*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPACE LASER POWER TRANSMISSION SYSTEM STUDIES
M. D. Williams, ed. and E. J. Conway, ed. Feb. 1982 210 p refs Symp. held in Hampton, Va., 14-15 Oct. 1981
(NASA-CP-2214; L-15030) Avail: NTIS HC A10/MF A01 CSCL 20E

Power transmission by laser technique is addressed. Space to Earth and space to space configurations are considered. For individual titles, see N82-18579 through N82-18586.

N82-18579*# Ball Aerospace Systems Div., Boulder, Colo.
PRELIMINARY STUDY ON THE USE OF LASERS FOR THE TRANSMISSION OF POWER

In NASA. Langley Research Center Space Laser Power Transmission System Studies Feb. 1982 p 15-32 (For primary document see N82-18578 09-36)
Avail: NTIS HC A10/MF A01 CSCL 20E

The use of lasers in space is outlined. Possibilities and ideas are presented. The economic payoff of lasers in space in supplying energy for the Earth is considered. Possible operational advantages and economies for the user of space to space energy transmission are addressed. The development of large space power stations to beam energy to Earth is discussed. Applications on Earth and comparisons with microwave systems are emphasized. N.W.

N82-18580*# Schafer (W. J.) Associates, Inc., Arlington, Va.
A STUDY TO SURVEY NASA LASER APPLICATIONS AND IDENTIFY SUITABLE LASERS FOR SPECIFIC NASA NEEDS
In NASA. Langley Research Center Space Laser Transmission System Studies Feb. 1982 p 33-44 refs (For primary document see N82-18578 09-36)
Avail: NTIS HC A10/MF A01 CSCL 20E

All potential applications of high power lasers which might, in particular, use the JPL copper-halide laser under development were considered for study. A wide range of applications were identified with strong emphasis on remote sensing applications. Power beaming and laser propulsion were also identified as major areas of interest to NASA. N.W.

N82-18581*# Schafer (W. J.) Associates, Inc., Arlington, Va.
INVESTIGATION OF POSSIBILITIES FOR SOLAR-POWERED HIGH-ENERGY LASERS IN SPACE
In NASA. Langley Research Center Space Laser Power Transmission System Studies Feb. 1982 p 45-56 (For primary document see N82-18578 09-36)
Avail: NTIS HC A10/MF A01 CSCL 20E

Solar pumped lasers were investigated. The literature was reviewed for possible solar laser candidates from optical pumping experiments. A baseline CO electric discharge laser system was shown to be technically feasible. The most promising direct solar pumped laser was identified to be CF3I. Using the 'STAG' solar laser concept and CF3I, it was found that such a system could be weight competitive with the baseline CO laser system. N.W.

N82-18582*# Mathematical Sciences Northwest, Inc., Bellevue, Wash.
DESIGN INVESTIGATION OF SOLAR-POWERED LASERS FOR SPACE APPLICATIONS
In NASA. Langley Research Center Space Laser Power Transmission System Studies Feb. 1982 p 77-84 (For primary document see N82-18578 09-36)
Avail: NTIS HC A10/MF A01 CSCL 20E

The feasibility of using solar powered continuous wave (CW) lasers for space power transmission was investigated. Competing conceptual designs are considered. Optical pumping is summarized. Solar pumped Lasant type lasers are outlined. Indirect solar pumped lasers are considered. N.W.

N82-18583*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
UTILITY AND TECHNOLOGY FOR A SPACE CENTRAL POWER STATION
Paul F. Holloway and L. Bernard Garrett *In its* Space Laser Power Transmission System Studies Feb. 1982 p 85-122 refs Presented at the Second AIAA Conf. on Large Space Platforms, Feb. 1981 (For primary document see N82-18578 09-36)
Avail: NTIS HC A10/MF A01 CSCL 20E

The technological and economical impacts of a large central power station in Earth orbit on the performance and cost of future spacecraft and their orbital-transfer systems are examined. It is shown that beaming power to remote users cannot be cost-effective if the central power station uses the same power generation system that would be readily available for provision of on-board power. Laser transmitters/receivers to make central power stations feasible are considered. The cost-effectiveness of meeting Earth-orbiting spacecraft electrical demands from a central power station was analyzed, indicating that this application cannot justify the investment required for the central station. Key technology needs which must be met to enable a viable central power station in the future are identified. N.W.

N82-18584*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
LASER ROCKET SYSTEM ANALYSIS
In NASA. Langley Research Center Space Laser Power Transmission System Studies Feb. 1982 p 123-134 refs (For primary document see N82-18578 09-36)
Avail: NTIS HC A10/MF A01 CSCL 20E

Potential national space transportation budget savings offered by laser rocket systems are considered. Orbital payload transportation costs, requiring 15 MW laser power space based or 37.5 MW ground based, are reduced by a factor of 2.4. The SPS orbital transportation costs, requiring 490 MW laser power space based or 1000 MW ground based, are reduced by factors up to 7. Technology advancement is indicated for the laser, thruster, large lightweight adaptive mirror, and pointing and tracking. N.W.

N82-18585*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
LASER POWER CONVERSION SYSTEM ANALYSIS
In NASA. Langley Research Center Space Laser Power Transmission System Studies Feb. 1982 p 145-158 refs (For primary document see N82-18578 09-36)
Avail: NTIS HC A10/MF A01 CSCL 20E

Orbit to orbit and orbit to ground laser power conversion systems and power transfer are discussed. A system overview is presented. Pilot program parameters are considered: SLPS assumptions are listed, a laser SPS overview is presented, specifications are listed, and SLPS costs are considered. N.W.

N82-18586*# Mathematical Sciences Northwest, Inc., Bellevue, Wash.
SPACE LASER POWER TRANSMISSION
In NASA. Langley Research Center Space Laser Power Transmission System Studies Feb. 1982 p 165-174 refs (For primary document see N82-18578 09-36)
Avail: NTIS HC A10/MF A01 CSCL 20E

Proposed laser transmission applications are reviewed. Technologies for laser power transmissions are assessed. Feasible laser mission systems are set out. Components by wavelength are summarized. Feasible space to space laser power transmission systems are summarized. Space laser transmitter masses for 1 MW and 100 KW output power are summarized. N.W.

N82-18587# Mathematical Sciences Northwest, Inc., Bellevue, Wash.
INVESTIGATION OF A 460 nm XeF LASER Final Report
C. H. Fisher Jun. 1981 86 p refs
(Contract N00014-78-C-0343; NR Proj. 395-568)
(AD-A108132; MSNW-1136) Avail: NTIS HC A05/MF A01 CSCL 20/5

The rare gas halide lasers have been extensively developed into efficient, high energy lasers operating in the near ultraviolet region of the spectrum. Until recently, most of the development in XeF had concentrated on the B>X transition at 350 micrometers. There is an even longer wavelength transition in XeF, the C-A continuum band at 460 micrometers. This transition has had several advantages over the shorter wavelength transitions in existing XeF and KrF lasers, including tunability and optimum atmospheric and aquatic transmission. The purpose of this program was to demonstrate lasing on the C-A transition of XeF and to gather the kinetic data necessary to optimize the laser performance. Author (GRA)

N82-18588# Physical Sciences, Inc., Woburn, Mass.
HIGH TEMPERATURE IN ABSORPTION MEASUREMENTS Final Report, 15 Aug. 1980 - 30 Jun. 1981
Robert H. Krech and Evan R. Pugh Edwards AFB, Calif. Air Force Rocket Propulsion Lab. Sep. 1981 64 p refs
(Contract F04611-80-C-0042)
(AD-A108601; PSI-TR-279; AFRPL-TR-81-79) Avail: NTIS HC A04/MF A01 CSCL 20/5

The temperature dependence of the absorption coefficient of water vapor was measured to determine the feasibility of using water vapor as a molecular seed to couple 10.6 micrometer CO2 laser radiation into a propellant for use in a high performance laser heated rocket thruster. A series of shock tube experiments ware performed to determine the temperature dependence of the absorption coefficient of water vapor at high temperatures on the P(16), P(18) and P(20) 10.6 micrometer CO2 laser transitions. Measurements were made behind both incident and reflected shock waves encompassing a temperature range from 600 K to 3700 K at pressures from 1 to 40 atmospheres in 2, 5, and 10 mole percent water vapor in argon gas mixtures. Within the spectral range (944 to 948 cm) covered, no significant variation in the absorption coefficient was observed as a function of laser wavelength, water concentration, total pressure, or collision partner. Observations suggest that the water lines are sufficiently broadened to act as a continuum absorber under conditions to be found in a laser-heated rocket thruster. The measured laser high temperature absorption coefficients are 50 percent lower than the values obtained from the Ludwig empirical curve fit to low resolution data. GRA

N82-18589# General Electric Co., Syracuse, N.Y. Electronics Lab.
PULSED HETERODYNE CO2 LASER/SCANNER SYSTEM
G. B. Jacobs Sep. 1981 46 p
(Contract F19628-80-C-0184; AF Proj. 6670)
(AD-A108186; SCIENTIFIC-1; AFGL-TR-81-0262) Avail: NTIS HC A03/MF A01 CSCL 17/5

Ten micron heterodyne laser radar offers a new type of remote sensor that can add significantly to our characterization and understanding of the atmosphere. For example, accurate range resolved measurements of air velocity via the Doppler of aerosol backscatter to distances of tens of kilometers will yield a better understanding of wind shear. This report describes the design of an operational laser radar trailer facility to permit these measurements. This is a design evaluation report intended to aid the government in judging the capability of our design to meet the government's requirements. The system is to incorporate the high pulse repetition frequency, high power electron beam injection CO2 laser developed earlier by the General Electric Company. The system is to be assembled in a trailer to be supplied by the government and will permit hemispherical scanning with a laser beam of less than .002 degrees beamwidth. Author (GRA)

N82-18590# IBM Research Lab., San Jose, Calif.
LASER HOLE BURNING SPECTROSCOPY: A HIGH RESOLUTION PROBE OF MOLECULAR ENVIRONMENTS Final Report, 1 Jun. 1979 - 1 Jun. 1981
R. M. Macfarlane and R. M. Shelby 1 Jun. 1981 57 p refs
(Contract F49620-79-C-0108; AF Proj. 2303)
(AD-A108549; AFOSR-81-0790TR) Avail: NTIS HC A04/MF A01 CSCL 20/5

Laser induced hole burning in optical absorption bands of low temperature solids was investigated mechanisms for population hole burning, the interactions with the environment which limit the hole widths and the use of hole burning for ultra high resolution spectroscopy were emphasized. Examples of hole burning in new classes of materials are presented. Hole recovery was used to determine nuclear spin lattice relaxation rates in praseodymium doped crystals. For allowed optical transitions (e.g., singlet states of zinc porphyrin, dibromoindigo and color centers in alkali halides). For longer lived optical levels in crystalline materials, e.g., those containing rare Earth ions, the hole widths are narrower and are limited by dynamical interactions with surrounding nuclei. In amorphous materials such as europium doped silicate glass, hole widths are much broader, limited by low frequency tunneling motions. Hole burning measurements were complemented by time domain coherent transient (photon echo, and optical free decay) measurements of homogeneous linewidths. E.A.K.

N82-18591# Naval Research Lab., Washington, D. C. Lab. for Computational Physics.
WAVELENGTH SCALING FOR REACTOR-SIZE LASER FUSION TARGETS Interim Report
J. H. Gardner and S. E. Bodner 10 Dec. 1981 16 p refs
(Contract DE-AI08-79DP)
(AD-A108547; NRL-MR-4623) Avail: NTIS HC A02/MF A01 CSCL 18/1

The symmetric implosion of pellet shells will require sideways thermal transport smoothing of any laser intensity nonuniformities. A scaling law shows a surprisingly strong laser wavelength dependence for this smoothing mechanism; it places a large premium on the use of longer wavelength near-infrared lasers. This smoothing requirement conflicts with the advantages of shorter laser wavelengths for controlling deleterious plasma instabilities. Author (GRA)

N82-18592# Rochester Univ., N. Y. Dept. of Physics and Astronomy.
COMPETITION EFFECTS IN LASERS Final Report, 1 Oct. 1980 - 30 Sep. 1981
L. Mandel Nov. 1981 11 p refs
(Grant AF-AFOSR-0026-81; AF Proj. 2301)
(AD-A108658; AFOSR-81-0804TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

This Final Report describes research. The first two-time photoelectric correlation measurements of a ring laser were completed during this period, which demonstrated the effect of mode competition in modifying the characteristics of a laser. Theoretical quantum treatments of a two-mode ring laser, and of a laser with coupled transitions were completed, and phase transition effects in a laser exhibiting optical bistability, and one with a saturable absorber, were investigated. The research resulted in four publications in the scientific literature, and 11 lectures describing various aspects of the research were presented at scientific meetings and research seminars. These are all listed in the report. GRA

N82-18593# Stanford Univ., Calif. Lab. of Physics.
LASER PHYSICS AND LASER SPECTROSCOPY Final Technical Report, Jan. 1980 - Feb. 1981
R. L. Byer Jul. 1981 41 p refs
(Grant AF-AFOSR-0144-80; AF Proj. 2301)
(AD-A108374; GL-3298) Avail: NTIS HC A03/MF A01 CSCL 20/5

Accomplishments are summarized for the following areas: (1) stimulated Raman frequency conversion; (2) single frequency Nd:YAG by injection locking; (3) transient injection locking; and (4) improved resonator design using the radial birefringent element. Work initiated in single crystal fiber growth and in laser ionization mass spectroscopy is also discussed. GRA

N82-18594# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
STUDY OF LASER CREATED METAL VAPOUR PLASMAS Annual Technical Report, 1 Oct. 1980 - 30 Sep. 1981
R. M. Measures Sep. 1981 87 p refs
(Grant AF-AFOSR-0057-80; AF Proj. 2301)
(AD-A108588; AFOSR-81-0789TR) Avail: NTIS HC A05/MF A01 CSCL 20/5

Laser resonance saturation represents a powerful new form of interaction that can lead at high densities to extremely rapid and efficient coupling of laser energy into both gases and plasmas. A comprehensive experimental facility and a theoretical program for studying these interactions in alkali-vapors was developed. Preliminary calculations have suggested that laser resonance saturation could lead to extensive ground level burnout of certain kinds of atoms or ions and that this could lead to the creation of a ground level inversion in these species. This approach could lead to the development of short wavelength lasers of high quantum efficiency. Author (GRA)

N82-18595# Maryland Univ., College Park. Dept. of Electrical Engineering.
INVESTIGATION OF COLD CATHODES FOR LONG LIFE CO SUB 2 WAVEGUIDE LASERS Annual Summary Report
U. Hochuli Nov. 1981 17 p
(Contract N00014-79-C-0312)
(AD-A108692) Avail: NTIS HC A02/MF A01 CSCL 20/5

Within a year's time the life of the 1.5W CO2 waveguide laser was extended from 1500 hours to over 8000 hours. After this period some loose, sputtered cathode material is still found in the laser. This situation can not be tolerated for lasers used in the field. Discharge tube observations indicate that other cathode materials exist that seem to produce sputtering products with better wall adhesion properties. Author (GRA)

N82-18596# Naval Research Lab., Washington, D. C. Plasma Theory Branch.
FORMULATION OF NORMALIZED NON-LINEAR FREE ELECTRON LASER EQUATIONS Interim Report
C. M. Tang and P. Sprangle 9 Dec. 1981 43 p refs
(ARPA Order 3817)
(AD-A108358; NRL-MR-4670) Avail: NTIS HC A03/MF A01 CSCL 20/5

The general non-linear self-consistent equations describing the Free electron laser (FEL) in the steady state amplifying configuration is derived with the space charge effects and all the efficiency enhancement schemes: (1) a spatially varying wiggler amplitude and/or period and (2) a d.c. electric field E sub DC (z) = (-(del phi sub DC)/del z)e-carat sub z. All the efficiency enhancement schemes are shown to be somewhat equivalent. For a variable period magnetic wiggler, the FEL equations can be appropriately normalized to a three parameter set of coupled equations. All operating regimes are covered by these normalized equations. The condition for space charge to be unimportant is given. In the absence of the space charge effects, the three parameter set of equations reduces to a two parameter set. The inclusion of additional efficiency enhancement schemes increases the number of parameters to describe the FEL. Curves showing the efficiency, radiation amplitude and growth rate will be presented. Author (GRA)

N82-18597# Colorado Univ. at Boulder.
LASER SPECTROSCOPY OF SOLID STATE ELECTROLYTES Final Report, 1 Oct. 1976 - 30 Sep. 1981
James F. Scott 9 Dec. 1981 6 p refs
(Grant AF-AFOSR-3105-77; AF Proj. 2301)
(AD-A108981; AFOSR-81-0862TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

Optical spectroscopy and electrical and thermal measurements are described on the solid state electrolytes ('superionic conductors') such as silver tungstate and related compounds. Author (GRA)

N82-18598# Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.
QUASI-ELASTIC LASER LIGHT DIFFUSION [DIFFUSIONE QUASI ELASTICA DI LUCE LASER]
M. Giglio 1981 14 p refs In ITALIAN Presented at Assoc. Ital. di Sci. e Technol. delle Macromolecole, Gargnano, Italy, 25-29 May 1981
(Contract CNR/CISE-80-02017.95)
(CISE-1711) Avail: NTIS HC A02/MF A01

Spectroscopy of the fluctuations in intensity of laser light diffusion is considered. The autocorrelation, or power, spectrum of the fluctuations in intensity is measured and its relation to fluctuations in electromagnetic field intensity analyzed mathematically. The experimental apparatus is described. J.D.H.

N82-18599# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
PULSED AND CW SEMICONDUCTOR LASER RANGE FINDING FOR SPACE FLIGHT APPLICATIONS [GEPULSTE UND CW-HALBLEITERLASER-ENTFERNUNGSMESSER FUER RAUMFAHRTANWENDUNGEN]
S. Manhart, T. Helldorsson, G. Sepp, and D. Siemsen 1981 13 p ref Partly in GERMAN and ENGLISH Presented at Laser 81, June 1981
(MBB-UA-563-81-O) Avail: NTIS HC A02/MF A01

The application of a radar range equation and the operational possibilities of the semiconductor laser range finder in space flights was demonstrated. Pulse recordings and phase measurements were analyzed for performance and specific advantages and disadvantages on different mission tasks. It is disclosed that for the detection and macroscopic measurements of reflector targets a pulsed laser system with pulse time measurments, and for the precision range finding a modulated continuous wave laser with phase measurement are the preferred methods. A concept in which both measuring methods, together with a biaxial visibility scanning are integrated into units of measurement is presented. Transl. by E.A.K.

N82-18600# European Space Agency, Paris (France).
MEASUREMENTS OF LIDAR BACKSCATTERING FROM CLOUDS Thesis - Fachhoschule, Munich
Egmont Wolff Oct. 1981 75 p refs Transl. into ENGLISH of "Lidar - Rueckstreumessungen an Wolken", Rept. DFVLR-Mitt-80-12 DFVLR, Oberpfaffenhofen, West Germany, Jul. 1980 95 p
(ESA-TT-689; DVFLR-Mitt-80-12) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 17

The operating principles, main elements (laser and detectors) and theoretical characteristics of the system are described. On-line data acquisition facilities are discussed. Two telescopes are used simultaneously to receive the parallel and perpendicular components of the polarized cloud backscatter signatures. Details are given on calibrating the system and on how to distinguish between ice and water clouds from polarization measurements. Polarization and multiple scattering effects are discussed. Author (ESA)

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-18601* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MOVING BODY VELOCITY ARRESTING LINE Patent
Reid A. Hull, inventor (to NASA) Issued 8 Dec. 1981 4 p Filed 28 Dec. 1979 Supersedes N80-18399 (18 - 09, p 1145)
(NASA-Case-LAR-12372-1; US-Patent-4,304,320; US-Patent-Appl-SN-108107; US-Patent-Class-188-371; US-Patent-Class-57-906; US-Patent-Class-244-110C; US-Patent-Class-280-805) Avail: US Patent and Trademark Office CSCL 13I

The arresting of a moving body is improved through the use of steel cables that elongate to absorb the kinetic energy of the body. A sleeve surrounds the cables, protecting them from chafing and providing a failsafe energy absorbing system should the cables fail.
Official Gazette of the U.S. Patent and Trademark Office

N82-18602 Rensselaer Polytechnic Inst., Troy, N. Y.
A COMPLETELY DEFORMABLE TIMOSHENKO BEAM TYPE SLIDER CRANK MECHANISM Ph.D. Thesis
Gabriel O. Amazigo 1981 177 p
Avail: Univ. Microfilms Order No. 8200456

The dynamic response of an elastic slider crank mechanism was investigated. The crank and connecting rod are assumed to deform axially and flexurally. The flexural vibrations include shear deformation and rotary inertia according to the theory of S. P. Timoshenko. External force was applied to the rigid slider which travels in presence of dynamic friction between two parallel, deformable and/or rigid, guides. R. D. Mindlin and L. E. Goodman's method for time dependent boundary conditions (forced vibrations) was applied at the fixed and pinned connections of the mechanism. All the pinned connections are assumed to be frictionless. One of the advantages of the procedure presented is that it can be applied to, and/or extended to, a more complex linkage. Dissert. Abstr.

N82-18603*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
JT9D CERAMIC OUTER AIR SEAL SYSTEM REFINEMENT PROGRAM Progress Report, Jan. 1979 - Feb. 1981
W. O. Gaffin 27 Jan. 1982 84 p refs
(Contract NAS3-20630)
(NASA-CR-165554; PWA-5515-165) Avail: NTIS HC A05/MF A01 CSCL 11A

The abradability and durability characteristics of the plasma sprayed system were improved by refinement and optimization of the plasma spray process and the metal substrate design. The acceptability of the final seal system for engine testing was demonstrated by an extensive rig test program which included thermal shock tolerance, thermal gradient, thermal cycle, erosion, and abradability tests. An interim seal system design was also subjected to 2500 endurance test cycles in a JT9D-7 engine. T.M.

N82-18604*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRECISION RECIPROCATING FILAMENT CHOPPER Patent Application
Austin D. McHatton, Arthur L. Newcomb, Jr., and Gregory Schlugge, inventors (to NASA) (Bionetics Corp., Hampton, Va.) Filed 17 Nov. 1981 10 p
(NASA-Case-LAR-12584-2; US-Patent-Appl-SN-322313) Avail: NTIS HC A02/MF A01 CSCL 13I

A chopper for cutting multifilament line is disclosed in which the pull-pull motion of a double edged sliding blade, driven by dual solenoids, provides a chop on each motion. The line is fed by a pair of rollers with one roller being driven. The chopped line length and chop rate are independently controlled. A jet airstream is provided to dispense chopped lengths of line. NASA

N82-18605# Laboratorium Elektronische Ontwikkelingen voor de Krijgsmacht TNO, Oegstgeest (Netherlands).
ANALYSIS AND DESIGN OF HYDRAULIC SERVOSYSTEMS FOR THE IMPROVEMENT OF PULSED MACHINERY FOR THE ARMY [ANALYSE EN ONTWERP VAN HYDRAULISCHE SERVOSYSTEMEN IN HET KADER VAN DE VERBETERING VAN EEN PULSATORINSTALLATIE VAN DE KONINKLIJKE LANDMACHT]
S. J. Uitterdijk 1980 44 p refs In DUTCH; ENGLISH summary
(TDCK-75058; TR-1980-03) Avail: NTIS HC A03/MF A01

The principal behavior of a linear hydraulic motor is analyzed and the manner in which related control systems, applied in various kinds of feedback, can be developed is described. Author

N82-18606# Science Research Council, London (England).
RESEARCH IN TRIBOLOGY AND BEARINGS
Chris Stanton and Harry Chalis 1980 55 p
(PB82-106923; ISBN-0-901660-39-6) Avail: NTIS HC A04/MF A01 CSCL 13I

A cross section of recent and current research in tribology and bearings is reported. The results range from the discovery of basic principles, the essential foundations on which future development will be built, to the directly practical and usable processes and design information. The projects have been grouped, all aspects of tribology are interrelated while it is emphasized that materials and lubrication are vital in the design of bearings and vice versa are implicated. Design and development are implicated on materials, and materials and lubrication. GRA

N82-18607# Cambridge Univ. (England). Dept. of Engineering.
MIXTURE MOTION IN AN ENGINE CYLINDER
H. Daneshyar and D. E. Fuller 1981 44 p refs
(PB82-121146; CUED/A-THERMO/TR-15-1981; ISSN-0309-6513) Avail: NTIS HC A03/MF A01 CSCL 21G

A hot-wire anemometer was used to measure the gas velocity in an engine model. The calibration law used gave excellent calibrations in wind tunnels when the wire temperature and the air density were varied. Analogue signals (pressure, anemometer output, trigger pulse) from the instrumentation of the engine model were recorded on magnetic tape. A series of computer programs were developed to sample the analogue signals from the tape and to calculate and plot the instantaneous velocities and their means and standard deviations over many engine cycles, the mean velocity and the turbulence intensity, over a period of a cycle, and their means and standard deviations over many cycles. GRA

N82-18608# Cambridge Univ. (England).
EFFECTS OF WELD ECCENTRICITY ON LONGITUDINAL SHRINKAGE
M. P. Wong 1981 68 p refs
(PB82-121153; CUED/S-STRUCT/TR-89-1981; ISSN-0309-7447) Avail: NTIS HC A04/MF A01 CSCL 13E

The effects of weld eccentricity on longitudinal shrinkage are investigated. Tests on a total of 31 single-pass weld specimens were conducted in 5083 aluminum, with the aim of studying how shrinkage takes place in welded plates. The results were compared with the new theoretical work. The specimens were prepared with either in-plane or out-of-plane weld eccentricity, or both. GRA

N82-18609# Cambridge Univ. (England). Dept. of Engineering.
SHRINKAGE EFFECTS IN BUTT WELDS IN 5083 ALUMINIUM
W. P. Wong 1981 54 p refs
(PB82-121138; CUED/D-STRUCT/TR-91-1981; ISSN-0309-7447) Avail: NTIS HC A04/MF A01 CSCL 13E

Experimental work carried out at Cambridge, for the A.M.T.E., on shrinkage effects in butt welds in 5083 aluminum are described in detail. Both unbacked and backed butt welds were investigated. Measurements were mainly conducted on longitudinal weld shrinkage. Simple formulae were obtained for calculating the tendon force in single and multipass butt welds. GRA

N82-18610# Cambridge Univ. (England). Dept. of Engineering.
SHRINKAGE EFFECTS IN BEAD-ON-PLATE WELDS IN 5083 ALUMINIUM
M. P. Wong 1981 71 p refs
(PB82-114596; CUED/D-STRUCT/TR.88-1981; ISSN-0309-7447) Avail: NTIS HC A04/MF A01 CSCL 13E

Experimental work on weld shrinkage effects in 5083 aluminum plates in thickness of 8 and 12 mm are described in detail. The procedure was to lay a central weld down each specimen and measure both longitudinal and transverse shrinkages. Only single- and multi-pass bead-on-plate welds are given in the report. GRA

N82-18611# Cambridge Univ. (England). Dept. of Engineering.
SHRINKAGE EFFECTS IN T-FILLET WELDS IN 5083 ALUMINUM
M. P. Wong 1981 46 p refs
(PB82-114570; CUED/D-STRUCT/TR-92-1981; ISSN-0309-7447) Avail: NTIS HC A03/MF A01 CSCL 13E

Experimental work on shrinkage effects in T-fillet welds in 5083 aluminum is described in detail. The validity of tendon force concept when applied to welded T-sections was investigated. A simple formula was developed to predict mean compressive residual stresses at the flange of a two-pass T-fillet joint. Reasons were suggested for the cause of randomness of stress gradient direction in the web (stiffener), as measured in stiffened panels. GRA

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-18612*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
METAL HONEYCOMB TO POROUS WIREFORM SUBSTRATE DIFFUSION BOND EVALUATION
A. Vary, P. E. Moorhead, and D. R. Hull 1982 12 p refs
Presented at the Spring Conf. of the Am. Soc. for Nondestructive Testing, Boston, 22-25 Mar. 1982
(NASA-TM-82793; E-959) Avail: NTIS HC A02/MF A01 CSCL 14D

Two nondestructive techniques were used to evaluate diffusion bond quality between a metal foil honeycomb and porous wireform substrate. The two techniques, cryographics and acousto-ultrasonics, are complementary in revealing variations of bond integrity and quality in shroud segments from an experimental aircraft turbine engine. S.L.

N82-18613*# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
ULTRASONIC INPUT-OUTPUT FOR TRANSMITTING AND RECEIVING LONGITUDINAL TRANSDUCERS COUPLED TO SAME FACE OF ISOTROPIC ELASTIC PLATE Final Report
James H. Williams, Jr., Hira Karagulle, and Samson S. Lee
Washington, D.C. NASA Feb. 1982 29 p refs
(Grant NsG-3210)

(NASA-CR-3506) Avail: NTIS HC A03/MF A01 CSCL 14D

The quantitative understanding of ultrasonic nondestructive evaluation parameters such as the stress wave factor were studied. Ultrasonic input/output characteristics for an isotropic elastic plate with transmitting and receiving longitudinal transducers coupled to the same face were analyzed. The asymptotic normal stress is calculated for an isotropic elastic half space subjected to a uniform harmonic normal stress applied to a circular region at the surface. The radiated stress waves are traced within the plate by considering wave reflections at the top and bottom faces. The output voltage amplitude of the receiving transducer is estimated by considering only longitudinal waves. Agreement is found between the output voltage wave packet amplitudes and times of arrival due to multiple reflections of the longitudinal waves. E.A.K.

N82-18614# Rockwell International Science Center, Thousand Oaks, Calif.
PROCEEDINGS OF THE DARPA/AFWAL REVIEW OF PROGRESS IN QUANTITATIVE NONDESTRUCTIVE EVALUATION Final Report, 1 Oct. 1979 - 1 Jan. 1981
R. Bruce Thompson and P. M. Beckham Wright-Patterson AFB, Ohio AFWAL Sep. 1981 608 p refs Conf. held in La Jolla, Calif., 14-18 Jul. 1980
(Contract F33615-80-C-5004; AF Proj. 2418)
(AD-A108741; SC5250.22FR; AFWAL-TR-81-4080) Avail: NTIS HC A99/MF A01 CSCL 20/1

The edited transcripts of the DARPA/AF Review of Progress in the Interdisciplinary Program for Quantitative Nondestructive Evaluation (NDE) held on July 14-18, 1980, at Scripps Institution of Oceanography, La Jolla, California are presented in this document. Several key topics form the core of these presentations and discussions. They include retirement for cause, quantitative ultrasonics, acoustic emission, electromagnetic techniques, and the reliability of NDE techniques for metals, ceramics, and composites. It is believed that this document provides a reasonable summary of NDE research and development currently underway. Author (GRA)

N82-18615# Rome Air Development Center, Griffiss AFB, N.Y.
BAYESIAN RELIABILITY TESTS MADE PRACTICAL
Anthony Coppola Jul. 1981 66 p
(AF Proj. 2338)
(AD-A108150; RADC-TR-81-106) Avail: NTIS HC A04/MF A01 CSCL 14/4

This report provides an understandable, easy to use and believable approach to 'Bayesian' Reliability Testing in order to encourage its practical application. It discusses advantages of the Bayesian approach, guidelines to selecting test risks, procedures for analyzing prior data and methods for structuring test plans. Sample requirements for invoking Bayesian test plans are included. Author (GRA)

N82-18616# Air Force Academy, Colo. Dept. of Mathematical Sciences.
FAILURE-FREE RELIABILITY TESTS Final Report
Nelson S. Pacheco, Salvatore J. Monaco, and Jerry A. Roberts (Davidson College) Sep. 1981 34 p refs
(AD-A108197; USAFA-TR-81-9) Avail: NTIS HC A03/MF A01 CSCL 14/4

A failure-free reliability test is compared with a fixed-time test under a two-parameter Weibull failure distribution. The distribution of the length of the failure-free test is derived, along with conditional failure probabilities for items still operating at the end of the original burn-in time. Graphs are provided for calculating expected test length and conditional failure probabilities. Author (GRA)

N82-18617# Stanford Univ., Calif. Lab. of Physics.
ACOUSTIC MICROSCOPY FOR NONDESTRUCTIVE EVALUATION OF MATERIALS Annual Report, 1 Jul. 1980 - 30 Jun. 1981
C. F. Quate Jul. 1981 60 p refs
(Contract F49620-78-C-0098; ARPA Order 3569; AF Proj. 2306)
(AD-A108423; SU-GL-3295; AFOSR-81-0773TR) Avail: NTIS HC A04/MF A01 CSCL 20/1

This report covers the results of a research program on Acoustic Microscopy directed toward the study of integrated circuits and solid materials. This new type of microscopy permits one to examine microscopic features that are unaccessible in the optical microscope. Thus detail beneath metallization layers as well as the grain boundaries in polished samples can be examined without resorting to chemical etching. Adhesion of thin film is a field where acoustic microscopy will play an important role. Author (GRA)

N82-18618# Middlesex Polytechnique, Enfield (England). Microelectronics Centre.
THE APPLICATION OF CHEMICAL ETCHING TO THE FAILURE ANALYSIS OF SEMICONDUCTOR DEVICES (LITERATURE SURVEY AND PREMILINARY EXPERIMENTS). VOLUME 1: PHASE 1 REPORT
G. P. Shorthouse and J. B. Butcher Paris ESA Oct. 1977 90 p refs 2 Vol.
(Contract ESA-2926/76/NL-HP)
(ESA-CR(P)-1470-Vol-1) Avail: NTIS HC A05/MF A01

The nature and composition of a variety of passivation overcoatings are reviewed including methods of deposition, postdeposition treatment, and properties, such as density and internal stress. The removal of overglazes is considered. Several etchant systems are discussed and etch rate data are presented. Etching mechanisms are explained. The Dry-Ox process is evaluated. This system, utilizing anhydrous hydrogen fluoride, seems the most suitable etching procedure available. Aluminum damage, occurring during device processing, in use, or caused by passivation layer removal, is also discussed along with electrochemical and chemical etching of silicon and of metals. A method for chemical etching analysis of single integrated circuit devices is outlined and techniques for the microscopic examination of junctions are listed. Handling and safety aspects of hydrofluoric acid based etchants are considered. Author (ESA)

N82-18619# Middlesex Polytechnique, Enfield (England). Microelectronics Centre.
THE APPLICATION OF CHEMICAL ETCHING TO THE FAILURE ANALYSIS OF SEMICONDUCTOR DEVICES (EXPERIMENTAL). VOLUME 2: PHASE 2 REPORT
G. P. Shorthouse and J. B. Butcher Paris ESA Jan. 1979 51 p refs 2 Vol.
(Contract ESA-2926/76/NL-HP)
(ESA-CR(P)-1470-Vol-2) Avail: NTIS HC A04/MF A01

The development of an etchant or series of etchants that can be used in the failure analysis of semiconductor devices in order to remove passivating overglazes without causing damage to underlying metal or thermal oxide layers was studied. Various GaAs LED's were decapsulted, the chips removed, and sectioned. The exposed junctions were delineated with dilute nitric acid/iron. Silicon devices were also decapsulated. The nitride passivation layer was removed using and etchant specially formulated to prevent any damage occurring to the underlying metallization. The devices were operated after the nitride removal and voltage contrast scanning electron micrographs of them were produced. The metal layers were removed in a variety of etchants; no satisfactory way was found to remove aluminum from titanium. Author (ESA)

N82-18620# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebereich.
NONDESTRUCTIVE TESTING OF CFRP [ZEROSTOERUNGSFREIE PRUEFUNG VON CFK]
Bilgram and H. Zimmermann 2 Mar. 1981 38 p refs In GERMAN
(MBB-BB-477-81-O) Avail: NTIS HC A03/MF A01

Detectible shortcomings in the development of present carbon fiber reinforced plastics are outlined. The following nondestructive research procedures are reported: (1) new X-ray techniques; (2) ultrasonic testing with controlled, narrow band signals; (3) heat flow procedures of laminates of different thickness; and (4) dielectric analysis on the hardening of carbon fiber reinforced plastics. Transl. by E.A.K.

N82-18621# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
WHAT ENGINEERS SHOULD DO TO ASSURE THE RELIABILITY OF TECHNICAL SYSTEMS [WAS SOLLTE DER

INGENIEUR FUER DIE SICHERHEIT TECHNISCHER SYSTEME TUN]
Wolf-Dieter Pilz 11 May 1981 25 p refs In GERMAN
(MBB-UR-478-81-O) Avail: NTIS HC A02/MF A01

Industrial safety in technical facilities and their implementation are examined. The following topics are discussed: safety aspects of facility policies; present situation of technical safety in operation methods; proposal for a procedural safety method; evaluation of safety conditions; introduction of a general users model; basic considerations; criteria for safety methods in production establishments; logistic of users schedule. Transl. by E.A.K.

N82-18622# Centre Technique des Industries Mecaniques, Senlis (France).
INSPECTION INTEGRATED WITH FABRICATION Final Report [CONTROLE INTEGRE A LA FABRICATION]
Rivenez, Flambard, and Bossuat Mar. 1981 66 p In FRENCH
(CETIM-15-H-194) Avail: NTIS HC A04/MF A01

The automation of nondestructive flaw detection, simultaneous with the machining of a part, was studied. Ultrasonic inspection techniques were used. Results from a number of fabrication processes (turbine shafts, bearing racetracks, large forged parts) confirm the feasibility of this concept. However, the reliability of these inspection procedures and the capability of nonspecialist personnel to carry them out remain in question. Author (ESA)

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N82-18623 California Univ., Berkeley.
THE RESPONSE OF SOLIDS TO ELASTIC/PLASTIC INDENTATION TO ADHESION MEASUREMENTS Ph.D. Thesis
Shu-Sheng Chiang 1981 143 p
Avail: Univ. Microfilms Order No. 8200053

Indentation plasticity and indentation fracture are analyzed. The analysis permits relations to established between material properties (notably hardness, yield strength and elastic modulus) and the magnitudes of the indentation and plastic zone. The predictions demonstrated are fully consistent with observations performed on a wide range of materials. The indentation stress fields are also adapted to generate predictions of indentation fracture thresholds for the three dominant crack types: radial, median and lateral cracks. The predictions are generally consistent with experimental observations. The indentation method was applied to determine the adhesion of interfaces between thin films and substrates. This method provides a quantitative measure of the interface fracture resistance and has the advantage of simplicity and reproducibility. The method was demonstrated for a range of ZnO/Si systems and the adhesion was correlated with acoustic properties. Dissert. Abstr.

N82-18624 California Univ., Berkeley.
TIME DOMAIN VIBRATION TESTING TECHNIQUES IN STOCHASTIC ENVIRONMENT: MODEL REFERENCE ADAPTIVE SYSTEM APPROACH Ph.D. Thesis
Saad Abdel-Rahman Zaghlool 1981 108 p
Avail. Univ. Microfilms Order No. 8200316

Digital schemes for the implementation of time domain vibration testing techniques which are capable of coping with the stochastic nature of their data were studied. The schemes may either employ one shot, accumulative or recursive solution strategies and they appear to have high noise rejection performance and yield consistent and accurate results. Families of recursive algorithms which have fast rate of convergence and are based upon an integral adaption mechanism with constant of decreasing gain and may, or may not, include proporational adaption mechanism are emphasized. Tested recursive algorithms are: series-parallel are emphasized. Tested recursive algorithms are: series-parallel instrumental variable parallel modified parallel extended parallel, extended least square, combined series-parallel/parallel and autoregressive moving average algorithm. The analysis procedure is presented in a unified approach, and makes use of sampled time data of a structure performing free or forced vibration with only finite number of modes excited. Dissert. Abstr.

N82-18625 Illinois Univ. at Urbana-Champaign.
STATIC AND DYNAMIC ANALYSIS OF AXIALLY LOADED WIRE ROPES Ph.D. Thesis
Gary James Butson 1981 107 p
Avail: Univ. Microfilms Order No. 8127559

The static and dynamic behavior of axially loaded wire rope were investigated. The longitudinal, torsional and transverse displacements are determined for a rope which is initially straight in the reference configuration and loaded by an axial force and twisting moment. The static response of wire rope is analyzed using a recently developed technique in which the individual wires in a rope are examined. The effect of friction between adjacent wires on the nonlinear response is determined for the simplest wire rope geometry. The dynamic behavior of wire rope is analyzed for small displacements about the static equilibrium position. Solutions for some initial value problems for suspended wire ropes are determined by means of a Laplace transform with a numerical inversion technique. Solutions for the natural modes of vibration of taut rope are found by an eigenvalue approach. Dissert. Abstr.

N82-18626*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GENERAL DESCRIPTION OF NESTABLE COLUMN STRUCTURAL AND ASSEMBLY TECHNOLOGY
Harold G. Bush and Walter L. Heard, Jr. Dec. 1981 16 p refs
(NASA-TM-83255) Avail: NTIS HC A02/MF A01 CSCL 20K

The superior packaging characteristics of nestable column structural elements make this concept attractive for application to missions space shuttle missions requiring large and/or high stiffness, or complex structures. Photographs depict investigations pursued relative to defining structural and assembly technology using these structural elements. The neutral buoyancy facility assembly simulation tests and the large space structure mobile work station are featured. A.R.H.

N82-18627# Technische Hogeschool, Delft (Netherlands).
AN INVESTIGATION OF SHIP PROPELLER FATIGUE Ph.D. Thesis
Hendrik Pieter Egbert Helle [1982] 211 p refs
Avail: NTIS HC A10/MF A01

Fatigue is a major failure cause in controllable pitch propellers, and practically the only cause in fixed pitch monobloc propellers. Two different types of causes are responsible for fatigue failure. Incidental causes are usually due to misuse or improper repairs, for instances, welding in critical areas or insufficiently annealed weldments. A systematic failure due to inherent weakness occurs when a number of aggravating fatigue factors coincide, such as an unusually high dynamic blade load and an exceptionally large undetected casting defect in a critical area plus one or two unfavourable production factors (low materials strength, high residual stresses). The fatigue failure risk of a propeller that enters operation, is determined therefore by its design stress and the quality control procedure it has been subjected to. S.L.

N82-18628# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
A COMPILATION OF STRESS INTENSITY FACTOR SOLUTIONS FOR FLAWED FASTENER HOLES Final Report, Jun. 1978 - Aug. 1981
A. F. Grandt, Jr. and T. E. Kullgren (US Air Force Academy) Nov. 1981 86 p refs
(AF Proj. 2307; AF Proj. 2418)
(AD-A108753; AFWAL-TR-81-4112) Avail: NTIS HC A05/MF A01 CSCL 20/1

Several sets of stress intensity factor solutions are provided for through-the-thickness, corner, and surface flawed holes. Results are given for both remote tensile and crack face pressure loading. It is suggested that the crack face pressure solutions can be used with the linear superposition method to analyze many other practical crack problems. The superposition technique is demonstrated with several sets of example calculations. Author (GRA)

N82-18629# Iowa Univ., Iowa City. Coll. of Engineering.
DYNAMIC ANALYSIS AND DESIGN OF CONSTRAINED MECHANICAL SYSTEMS Interim Report, period ending Nov. 1978
Edward J. Haug, Roger A. Wehage, Ronald R. Beck (Missouri Univ. -Rolla), and N. C. Barman Warren, Mich. Army-Tank Automotive Command 12 Jun. 1981 57 p refs
(Contract DAAK30-78-C-0096)
(AD-A108685; U-of-Iowa-50; TACOM-TR-12588) Avail: NTIS HC A04/MF A01 CSCL 20/11

A method for formulating and automatically integrating the equations of motion of quite general constrained dynamic systems is presented. Design sensitivity analysis is also carried out using a state space method that has been used extensively in structural design optimization. Both dynamic analysis and design sensitivity analysis and optimization are shown to be well-suited to application of efficient sparse matrix computational methods. Numerical integration is carried out using a stiff numerical integration method that treats mixed systems of differential and algebraic equations. A computer code that implements the method of planar systems is outlined and a numerical example is treated. The dynamic response of a classical slider-crank is analyzed and its design is optimized. Author (GRA)

N82-18630# Iowa Univ., Iowa City. Coll. of Engineering.
DESIGN SENSITIVITY ANALYSIS AND OPTIMIZATION OF CONSTRAINED DYNAMIC SYSTEMS Interim Report, period ending Jun. 1979
N. C. Barman, Edward J. Haug, and Ronald R. Beck (Missouri Univ. -Rolla) Warren, Mich. Army Tank Automotive Command 16 Jun. 1981 180 p refs
(Contract DAAK30-78-C-0096)
(AD-A108684; U-of-Iowa-56; TACOM-TR-12587) Avail: NTIS HC A09/MF A01 CSCL 20/11

In this report, the technical objective is the derivation of a systematic and unified theory and organization of a corresponding general computer program for the design of constrained dynamic systems by judicious selection of the most suitable methods from the following branches of mathematics and mechanics: (a) Optimization Methods, (b) Rigid Body Mechanics, (c) Numerical Integration Methods, and (d) Matrix Manipulation Methods. Accordingly, a method of formulating and automatically integrating the equations of motion and design sensitivity adjoint equations for general constrained dynamic systems is presented. Design sensitivity analysis is carried out using a state-space method that has previously been used for design optimization of linear structural systems. Application of efficient sparse matrix computational methods is shown to be suitable for both dynamic and design sensitivity analyses and for interactive strained system is treated with three degrees of freedom. Algebraic equations prescribing constraints between various bodies are then written and a Lagrangian formulation is used to write the dynamical equations of motion for each body of the system. A stiff predictor-corrector numerical integration (GEAR) algorithm is used for numerical integration of mixed systems of nonlinear differential equations of motion and algebraic equations of constraint (together with spring-damper relations and other user-supplied equations). GRA

N82-18631# Iowa Univ., Iowa City. Coll. of Engineering.
GENERALIZED COORDINATE PARTITIONING IN DYNAMIC ANALYSIS OF MECHANICAL SYSTEMS Final Report, period ending Dec. 1980
Roger A. Wehage, Edward J. Haug, and Ronald R. Beck (Missouri Univ. -Rolla) Warren, Mich. Army Tank-Automotive Command 16 Jun. 1981 197 p refs
(Contract DAAK30-78-C-0096; DAAG29-79-C-0221)
(AD-A108683; U-of-Iowa-75; TACOM-TR-12590) Avail: NTIS HC A09/MF A01 CSCL 20/11

A computer-based method for formulation and efficient solution of nonlinear, constrained differential equations of motion is developed for planar mechanical systems. Nonlinear holonomic constraint equations and differential equations of motion are written in terms of a maximal set of Cartesian generalized coordinates, to facilitate the general formulation of constraints and forcing functions. A Gaussian elimination algorithm with full pivoting decomposes the constraint Jacobian matrix, identifies dependent variables, and constructs an influence coefficient matrix relating variations in dependent and independent variables. This information is employed to numerically construct a reduced system of differential equations whose solution yields the total system dynamic response. A numerical integration algorithm with positive-error control, employing a predictor-corrector algorithm with variable order and step-size, is developed that integrates for only the independent variables, yet effectively determines dependent variables. A general method is developed for dynamic analysis of systems with impulsive forces, impact, discontinuous constraints, and discontinuous velocities. This class of systems includes discontinuous kinematic and geometric constraints that characterize backlash and impact within systems. GRA

N82-18632# Iowa Univ., Iowa City. Coll. of Engineering.
KINEMATIC ANALYSIS OF MECHANICAL SYSTEMS Interim Report, period ending Dec. 1979
Rajiv Rampalli, Edward J. Haug, and Ronald R. Beck (Missouri Univ. - Rolla) Warren, Mich. Army Tank-Automotive Command 16 Jun. 1981 68 p refs
(Contract DAAK30-78-C-0096)
(AD-A108682; U-of-Iowa-60; TACOM-TR-12589) Avail: NTIS HC A04/MF A01 CSCL 20/11

It is intended in this report to develop a method of kinematically analyzing mechanical systems. A computer code that automatically generates a set of nonlinear equations describing the system and solves them, is developed. To demonstrate the accuracy and effectiveness of the method to be developed herein, five sample problems have been solved. While all the sample problems solved are closed-loop mechanical systems, the method described here need not be confined to closed loop mechanical systems or to mechanical systems at all. In fact, the method is applicable to any system whose motion is to be described, provided adequate constraints can be incorporated into the code by the user. Examples of such systems are electro-mechanical systems with relays, switches, etc. Given the topology of a system, the necessary inputs, the method is capable of computing velocities, positions, accelerations and constraint forces on the system. GRA

N82-18633# Southwest Research Inst., San Antonio, Tex.
FATIGUE MICROCRACK BEHAVIOR UNDER THE INFLUENCE OF SURFACE RESIDUAL STRESSES Interim Report 1 Aug. 1980 - 31 Aug. 1981
John E. Hack and Gerald R. Leverant 30 Oct. 1981 77 p refs
(Contract N00014-78-C-0674)
(AD-A108691) Avail: NTIS HC A05/MF A01 CSCL 20/11

Direct observations of the surface crack opening displacement (SCOD) of surface microcracks (2c to approximately 400 microns) have been made on samples of 4140 and HY-130 steels under both cyclic and static loading conditions. Preliminary observations indicate that small cracks which reside entirely within the zone of shot-peen-induced compressive residual stress remain completely closed, even at applied loads approaching the bulk yield stress in HY-130. Results of SCOD measurements on HY-130 specimens which were cycled in an aqueous 3.5% NaCl solution show a large reduction in SCOD (effective delta K) due to a wedging open of the crack by oxides on the crack faces. As far as we know, the results of these near-threshold, low R-ratio tests represent the first direct observations of oxide wedging effects in microcracks and are consistent with independent data for large crack behavior. Predictions using the analytical approach developed earlier in this program give excellent correlation with experimental observations in 4140 steel in the absence of surface residual stresses. Similar analyses are currently being conducted for HY-130. In addition, a boundary-integral program for the direct calculation of crack face displacements is being used to determine complete crack opening profiles in the presence of a surface residual stress gradient. Author (GRA)

N82-18634# Naval Ship Research and Development Center, Bethesda, Md. Structures Dept.
MODELING TECHNIQUES FOR ANALYSIS OF STIFFENED SHELL STRUCTURES, USING COMPUTER PROGRAM ADINA Final Report

Thomas A. Giacofci Nov. 1981 29 p refs
(SF43400001)
(AD-A108728; DTNSRDC-81/070) Avail: NTIS HC A03/MF A01 CSCL 13/3

The beam element available in computer program ADINA is inadequate for transient analysis of eccentrically stiffened shell structures, particularly when the lateral stability of the stiffener is of concern. As an alternative to modeling shell stiffeners with numerous continuum or transition elements, a stiffener modeling technique based on the multipoint constraint option in ADINA is presented. This technique leads to significant reductions in the number of elements and solution degrees of freedom needed for accurate stiffener modeling, yet allows inclusion in the analysis of effects of out-of-plane web distortion, longitudinal warping, and torsion. Stiffeners having various cross sectional geometries and boundary conditions were modeled, and predicted response correlates well with experimental data. The approach is of practical significance for large stiffened shell problems, especially nonlinear analysis. Author (GRA)

N82-18635# Chicago Univ., Ill. Dept. of Geophysical Sciences.

EXPLICIT SOLUTION OF THE INVERSE PROBLEM FOR A VIBRATING STRING

Victor Barcilon Nov. 1981 24 p refs
(Contract N00014-76-C-0034; NR Proj. 041-476)
(AD-A108133) Avail: NTIS HC A02/MF A01 CSCL 20/11

The problem of reconstructing the density rho(x) of a vibrating string of length L from the knowledge of two spectra (lambda n)1 to infinity and (microns n) 1 to infinity is considered. The method of construction relies (I) on a formula for rho at an arbitrary point x=l in terms of the spectra (lambda n (l)) 1 to infinity and (microns n (l)) 1 to infinity associated with the natural frequencies of vibration of the portion (l, L) of the original string and (II) on a set of first order differential equations for (lambda n(l))1 to infinity and (micron n (l)) 1 to infinity. The density is deduced by integrating these equations of the spectra and substituting in the above mentioned formula. GRA

N82-18636# Dayton Univ., Ohio.

DETERMINATION CRACK TIP FIELD PARAMETERS FOR ELASTIC-PLASTIC MATERIALS VIA AN ESTIMATION SCHEME Interim Report, Nov. 1979 - Nov. 1980

T. Weerasooriya and J. P. Gallagher Wright-Patterson AFB, Ohio AFWAL Jul. 1981 82 p refs
(Contract F33615-78-C-5184; AF Proj. 2418)
(AD-A108267; UDR-TR-80-132; AFWAL-TR-81-4044) Avail: NTIS HC A05/MF A01 CSCL 11/9

This report reviews the theoretical basis of an estimation scheme which appeared in the literature. A computer program was written for estimating the elastic-plastic fracture mechanics parameters for five different crack geometries. The parameters evaluated are J-integral, load-line displacement, and crack mouth opening displacement. Included in the report are the program listing and an example of an input and output. Author (GRA)

N82-18637# Atomic Energy of Canada Ltd., Chalk River (Ontario). Metallurgical Engineering Branch.

DEMONSTRATION OF CRACK GROWTH BY DELAYED HYDROGEN CRACKING IN THE ROLLED JOINTS OF Zr-2.5% Nb PRESSURE TUBES

C. E. Ells and J. H. vanderKuur Mar. 1980 26 p refs In ENGLISH; FRENCH summary
(AECL-6853) Avail: NTIS (US sales only) HC A03/MF A01

Delayed hydrogen cracking in cold-worked Zr-2.5 wt% Nb pressure tubes was examined in rolled-joint assemblies in tests closely simulating the power reactor conditions. The experiments were designed to demonstrate that the tube failures in Pickering were due to delayed hydrogen cracking. Most features of the failures in Pickering were reproduced, and the growth of artificial defects occurred at stress intensity factors and crack velocities quite consistent with both laboratory experiments on small specimens and the experience at Pickering. DOE

N82-18638# Atomic Energy of Canada Ltd., Chalk River (Ontario). Nuclear Lab.

ELASTIC STRESSES IN U-SHAPED BELLOWS

P. Janzen May 1980 48 p refs
(AECL-6476) Avail: NTIS (US Sales Only)HC A03/MF A01; DOE Depository Libraries

Relations describing the meridional and circumferential elastic stress levels at the root and crown due to external pressure and axial deflection of U-shaped bellows are presented. The derivation is based on a statistical analysis of theoretical data obtained from a finite element analysis of selected bellows configurations. The mathematical formulations and various graphical representations are proposed as aids to bellows design and analysis. DOE

N82-18639# Atomic Energy of Canada Ltd., Chalk River (Ontario).

X-RAY MEASUREMENT OF RESIDUAL STRESS IN METALS AT CHALK RIVER NUCLEAR LABORATORIES

J. E. Winegar Jun. 1980 28 p refs
(AECL-6961) Avail: NTIS (US Sales Only)HC A03/MF A01; DOE Depository Libraries

X-ray diffraction was used at CRNL to measure residual stress in metals. The basic principles of stress measurement and factors affecting accuracy of measurement are reviewed. The technique and equipment described were developed at CRNL to give reliable measurements. Accuracy of measurement is achieved by using fixed-count step-scanning and by computer analysis of intensity data using a cubic spline curve smoothing routine. Specific reference is made to the measurement of residual stress in Inconel-600 and Incoloy-800 boiler tubing. Because it measures stress in thin surface layers, the X-ray method can also be used to measure the depth profile of stresses. As there are no standardized procedures for measuring residual stress, this report will be useful both to those unfamiliar with the measurement of residual stress and to those already making such measurements in other laboratories. DOE

N82-18640# Centre National d'Etudes Spatiales, Toulouse (France). Dept. Structures.

METHODOLOGY OF UNIAXIAL TRANSIENT VIBRATION TEST FOR SATELLITES Final Report

B. Boissin, A. Girard, and J.-F. Imbert Paris ESA 10 Jun. 1981 20 p refs
(Contract ESTEC-4160/79/NL-AK)
(CNES-81/CT/PRT/SST/SM/194; ESA-CR(P)-1474) Avail: NTIS HC A02/MF A01

Realistic data for thrust transient, launch vehicle, and satellite characteristics are defined. Dynamic response analysis is performed based on a survey of current methods. For most of the low frequency dynamic flight environment of a satellite, transient testing minimizes the risk of under or overtesting inherent to conventional sine testing. As feasibility of such tests on uniaxial electrodynamic shakers was recently proved, the problem is now the dependance of the test specification on possible variations of launch vehicle and satellite dynamic characteristics. Possible variations of parameters are discussed and a sensitivity analysis is performed. It is found that frequency variations have the greatest influence and must be considered simultaneously. A numerical procedure is developed to compute a worst shock spectrum envelope. Alternatives for transient testing are recommended, including an improved shock synthesis technique, compared to sine testing. Author (ESA)

N82-18641# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsberecih.

INVESTIGATION OF THE STRENGTH OF GALVANIC DEPOSITS

W. Wittich, K. Butter, and R. Suchentrunk 1981 8 p refs In GERMAN
(MBB-BB-487-O) Avail: NTIS HC A02/MF A01

The development of the basic condition for galvanoplastic production of different kinds of highly refractory material combinations is discussed. Structural members with extremely high thermodynamic and static loading capacity are finished from partially unconventional combinations of materials. Special finishing techniques were developed which can applied to aerospace technology. Transl. by E.A.K.

N82-18642# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.

BOND STRENGTH OF GALVANIC COATINGS UNDER

THERMAL STRESS FROM THE EXAMPLE OF GALVANIC FORMING [HAFTFESTIGKEIT GALVANISCHER UEBERZUEGE UNTER THERMISCHER BELASTUNG AM BEISPIEL DER GALVANOFORMUNG]
O. Tuscher and R. Suchentrunk 1981 11 p refs Reprint from Galvanotech., v. 8, no. 69, 1978 In GERMAN
(MBB-BB-488-O) Avail: NTIS HC A02/MF A01

The application of galvanic coating in the production of compacting systems for base metals is discussed. Production for manufacturing of galvanic metal compacting systems are described. The characteristics of galvanic coating are intermitently partially very high in loading through, pull, pressure, or shearing stress. Uses for this coating technique are described. The work is applied to basic research in different projects in aerospace sciences and energy technology. Transl. by E.A.K.

N82-18643# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Geschaeftsbereich Datenverarbeitung und Organisation.
NASEDIT: THE INTERACTIVE NASTRON EDITOR
Brunner 4 Jun. 1981 50 p Presented at NASTRAN Users' Conf., 3-4 Jun. 1981
(MBB-Z-2-81-O) Avail: NTIS HC A03/MF A01

An interpreting and finite element mesh creating program was developed. The program generates a plot and helps the user make his input small and transparent, allows modifications to any part of the input of NASTRAN, and has a structure similar to NASTRAN. This program, NASEDIT, is described. This is, what NASEDIT does. J.M.S.

N82-18644# Centre Technique des Industries Mecaniques, Senlis (France).
RESPONSE OF A STRUCTURE SOLICITED BY DISPLACEMENTS IMPOSED ON A PART OF ITS EDGE Final Report [REPONSE D'UNE STRUCTURE EXCITEE PAR DES DEPLACEMENTS IMPOSE SUR UNE PARTIE DE SA FRONTIERE]
C. Seon Jun. 1981 60 p In FRENCH
(CETIM-11-L-182) Avail: NTIS HC A04/MF A01

A computation method is presented which allows for the introduction of nonstationary displacements in the calculation of modal response. The method is adapted to the existing structural analysis computer programs PASD and BASMOD. Calculation simulations for an undamped beam were run. Results are satisfactory and a user manual for the program is given. Author (ESA)

N82-18645# Chalmers Univ. of Technology, Goteborg (Sweden). Inst. foer Byggnadsstatik.
NONLINEAR ELASTIC BEAMS, FRAMES AND STRUCTURAL ANALYSIS [OLINJAERT ELASTISKA BALKAR OCH RAMAR MED ANALYTISKT BESKRIVNA ELEMENTSAMBAND]
Kjell Mattiasson and Lennart Aagaardh 1 Apr. 1978 60 p refs In SWEDISH
(CTH-R-31/1979; ISBN-91-540-2983-X) Avail: NTIS HC A04/MF A01

A rapid calculation method for beams and frames undergoing large deformations, when the relations between force and deformation are nonlinear, but reversible, is discussed. A computer program is described. The use of this method, based on nonlinear beam theory, is subject to the hypotheses: (1) displacements and instability factors, such as buckling, are not accounted for, and (2) the structure is considered to be flat and made of elements assembled together in nodes where the deformations are measured. The method is compared with numerical techniques. The method can be used for the calculation of beams, frames and arches made of steel, aluminum alloys and other strain-hardened materials. Author (ESA)

N82-18646# Illinois Univ. at Urbana-Champaign. Dept. of Engineering.
RESPONSE OF REINFORCED CONCRETE PLATE-COLUMN CONNECTIONS TO DYNAMIC AND STATIC HORIZONTAL LOADS. APPENDICES E TO H
Denby G. Morrison and Mete A. Sozen Apr. 1981 330 p refs
(Grant NSF PFR-78-16318)
(PB82-101544; Structural-Res-Ser-490-App-E-H; UILU-ENG-8-1-2004-App-E-H; NSF/CEE-81025) Avail: NTIS HC A15/MF A01 CSCL 13B

The response of interior reinforced concrete plate column connections was studied. Variables included reinforcement ratio and the amount of superimposed vertical load. The eight specimens had certain common characteristics. The reinforcement layout in the slab was isotropic. Static tests provide information on the influence of the change in reinforcement ratio and the amount of superimposed vertical load on the response to horizontal loading. An analysis model (the grid model) was developed to interpret the results from the statically tested specimens. The specimens are dynamic tests to obtain data on the response of the specimens, the observed hysteresis, and calculated damping. GRA

N82-18647# Dynamics Technology, Inc., Torrance, Calif.
EARTHQUAKE RESPONSE OF SEA-BASED STORAGE TANKS BY A HYBRID ELEMENT METHOD-THEORY AND COMPUTER ANALYSIS
Shih-Chi Lee and D. R. Ko Mar. 1981 214 p refs
(Grants NSF PFR-78-09886; NSF PFR-79-19949)
(PB82-104993; DT-7814-2; NSF/CEE-81026) Avail: NTIS HC A10/MF A01 CSCL 13J

An effective method for the linear analysis of dynamic response of submerged underwater oil storage tanks to loadings of earthquake excitations is presented. The tank is axisymmetric in shape and has a flexible wall/roof. A general hybrid-finite element solution procedure was formulated. Contribution from the hydrodynamic interaction to the coupled motion is obtained by solving the Laplace equation with the appropriate boundary conditions, which includes a match to the exterior farfield pressure representation to simplify the computational process. The effects of fluids surrounding and inside the tank are studied. It is demonstrated that these effects are significant to the tank earthquake response analysis. GRA

N82-18648# Queensland Univ., Brisbane (Australia). Dept. of Civil Engineering.
INELASTIC BEAM BUCKLING EXPERIMENTS
P. F. Dux and S. Kitipornchai May 1981 44 p refs
(PB82-103292; RR-CE24) Avail: NTIS HC A03/MF A01 CSCL 20K

A series of experiments on the buckling of simply supported laterally continuous I beams in the inelastic range are described. Nine beams were tested in three groups of three, each group having a different predominant moment gradient. Points of load application were prevented from moving laterally and twisting. Measurements of geometrical and material imperfections are included in the report. Results of a number of subsidiary experiments such as plastic moment and stub column tests are also presented. The results add to the small amount of test data presently available on such beams and provide a comparison with theoretical predictions. In particular, support is shown for the theoretical curves of Nethercot and Trahair and for the current trend to multiple design curves based on moment gradient. GRA

N82-18649# Sydney Univ. (Australia). Civil Engineering Labs.
LOWER BOUND EQUILIBRIUM DESIGN OF SLABS
Reginald G. Smith and M. I. Struct Jan. 1981 46 p refs
(PB82-105263; R-383) Avail: NTIS HC A03/MF A01 CSCL 20K

Collapse moment fields are computed using a 'zero-torsion' orthogonal elastic beam grillage with a flexibility approach. The method is extended to enable slabs of nonuniform thickness and the influence of attached walls and columns to be taken into account. This is achieved by using a stiffness method to evaluate the flexibility coefficients for a beam strip with rotational and linear spring constraints. The simultaneous equations for the patch loading distribution are easily composed by a matrix algorithm and the original difficulty of 'free edges' is catered for by the concept of hypothetical vertical springs of small stiffness. GRA

N82-18650# Sydney Univ. (Australia). Civil Engineering Labs.
DISTORTIONAL BUCKLING OF THIN-WEB BEAM COLUMNS

Mark A. Bradford and Nicholas S. Trahair Nov. 1980 60 p refs
(PB82-105271; R-380) Avail: NTIS HC A04/MF A01 CSCL 20K

An approximate finite element method of analysis is developed for the distortional buckling of beam columns of general cross section. The member consists of a flexible web, to which is connected two rigid flange assemblies of arbitrary shape which remain undistorted during buckling. The method permits an economic computer analysis to be made of elastic distortional buckling of members under various conditions of loading, end support and restraint. The method is also used to demonstrate the effects of web distortion on the elastic buckling of lipped channel beams under moment gradient. GRA

N82-18651# Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
DYNAMIC STRUCTURAL ANALYSIS BY ANALOG SIMULATION M.S. Thesis
Leonard M. Napolitano, Jr. Jun. 1981 100 p refs
(PB82-110677; R81-18) Avail: NTIS HC A05/MF A01 CSCL 20K

The derivation of a topologically equivalent electrical analog for a given structure is presented and its use in the analysis of structural dynamics is explored. Starting from simple structural and electrical elements, the models become more complex with the simulation of material and geometric nonlinearities. Two- and three-dimensional truss elements as well as an elemental beam model are developed. The modeling of structural damping and the construction of analogous tuned mass dampers for experimental simulation testing are presented. A trial simulation was run using a newly developed analog computer called a Parity Simulator with excellent results. The advantages of real time simulation as compared to time step digital computerbased simulation as well as future developments in real time simulation are discussed. GRA

N82-18149# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.
THE MEASUREMENT OF THE MOBILITY OF STRUCTURES AT ACOUSTIC FREQUENCIES
Susan M. Damms *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 21 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

42 GEOSCIENCES (GENERAL)

N82-18652*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ANALYSIS OF UV PROTECTION REQUIREMENTS AND TESTING OF CANDIDATE ATTENUATORS FOR THE HALOE OPTICAL INSTRUMENT
John E. Nealy, William K. Goad, and D. Michele Heath Dec. 1981 29 p refs
(NASA-TM-83247) Avail: NTIS HC A03/MF A01 CSCL 14B

Results of calculations are presented which simulate photolytic processes occurring in HALOE gas calibration cells exposed to extra-terrestrial solar ultraviolet photons. These calculations indicate that significant photolysis takes place in two of the sapphire-enclosed cells over the exposure periods of the proposed mission. A subsequent laboratory investigation is also described in which a high-voltage discharge hydrogen light source is used in conjunction with a vacuum ultraviolet spectrograph. The UV emission from this lamp was used to expose two candidate UV attenuators (ZnSe and coated Ge) to ascertain their suitability as UV filters while maintaining original infrared optical properties. Both materials were found to be effectively opaque to vacuum UV radiaton and suffered no adverse effects regarding their infrared transmissivity. Author

N82-18653# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE CENTRATLAN AEROGEOPHYSICAL OPERATION IN THE REGION OF THE MID-ATLANTIC RIDGE. INPE PARTICIPATION [OPERACAO CENTRATLAN-AEROGEOFISICA DA REGIA DA CORDILHEIRA MESO-ATLANTICA. PARTICIPACAO DO INPE]
Jose Marques daCosta and Carlos Alberto Steffen Jun. 1981 19 p In PORTUGUESE; ENGLISH summary
(INPE-2142-RPE/364) Avail: NTIS HC A02/MF A01

Brazilian participation in Operation CENTRALAN, a scientific cooperative effort, is presented. The objective of CENTRALAN is to study the physiographical, geological, and geographical aspects of the Mid-Atlantic Ridge. Author

N82-18654# Scripps Institution of Oceanography, La Jolla, Calif.
OCEANOGRAPHIC AND METEOROLOGICAL CONDITIONS IN THE NORTH PACIFIC Technical Report, Jun. - Nov. 1978
S. Pazan and J. Bytof Dec. 1981 60 p refs
(Contract N00014-80-C-0440)
(AD-A108754; SIO-REF-81-39) Avail: NTIS HC A04/MF A01 CSCL 04/2

Since 1976, four reports on oceanographic and meteorological conditions in the North Pacific have been produced by the NORPAX Data Program covering the period from June, 1976 through May, 1978. This is the fifth in the series, and covers the period from June, 1978 through November, 1978. This issue contains: contour maps of monthly meaned Fleet Numerical Oceanographic Central (FNOC) air temperature, sea temperature, wind speed, wind direction, surface vapor pressure, and 700 mb height; NORPAX Data Management calculated wind stress, wind stress curl, wind shear velocity cubed, sensible heat flux, latent heat flux; and objectively analyzed TRANSPAC (Trans Pacific) temperatures at discrete depths. GRA

N82-18655# Lamont-Doherty Geological Observatory, Palisades, N. Y.
INTERPRETATION OF EQUATORIAL HYDROGRAPHIC, NUTRIENT ELEMENT AND RADIOISOTOPE DATA Final Report
W. S. Broecker Feb. 1981 8 p
(Contract DE-AS02-79EV-10243)
(DE82-001699; DOE/EV-10243/1) Avail: NTIS HC A02/MF A01

A year-long study of the sigma CO2, alkalinity, nutrient element, and CO2 partial pressure relationships along the 150 deg W longitude from Tahiti to Hawaii is reported. The objective is to improve the understanding of the CO2 flux from the equatorial Pacific to the atmosphere. Detailed spatial and annual pictures of the distribution of the measured chemical species are expected. T.M.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography*.

N82-18656 Old Dominion Univ., Norfolk, Va.
USAGE AND LIMITATIONS OF CHARACTERISTIC VECTOR ANALYSIS OF REMOTE SENSING MULTISPECTRAL DATA FOR THE IDENTIFICATION AND QUANTIFICATION OF WATER QUALITY PARAMETERS Ph.D. Thesis
Theodore A. Talay 1981 394 p
Avail: Univ. Microfilms Order No. 8128308

Characteristic vector analysis is investigated to determine how it resolves total radiance signals measured by a remote sensor into eigenvectors and associated scalar coefficients and their relationships to the identification and quantification of the in situ water constituents. Technique operation is checked against a progression of hypothetical test cases and a limited number of laboratory data sets. Under ideal conditions, characteristic vector analysis has the potential of identifying and quantifying individual constituents in water, even when in mixtures, with a minimum of surface truth data. Exact constituent identification, using characteristic vectors, and quantification, by scaling a scalar coefficients, is possible when the study constituents have a linear radiance concentration relationship, superimpose linearly in mixtures, and the measured radiance spectra are devoid of noise and atmospheric effects. As these conditions are relaxed, technique limitations and inexact solutions are encountered. Dissert. Abstr.

N82-18657 Royal Aircraft Establishment, Farnborough (England). Space Dept.

AUTOMATIC RELOCATION OF GROUND CONTROL POINTS IN LANDSAT IMAGERY

A. H. Benny 5 Jun. 1981 37 p refs

(RAE-TR-81071; RAE-Space-598; BR80598) Copyright. Avail: Issuing Activity

A computer program which relocates ground control points (GCP), used in the geometric transformation of satellite pictures is discussed. The GCP's are first located manually on the image and a map. A transformation matrix enables image locations to be converted to map references. For subsequent images, the identity of a first GCP and an indication (not necessarily precise) of its position in the new image enable a spiral search to locate that GCP and then all the others. Accuracy of + or - 0.4 pixel is obtained for LANDSAT pictures. For similar seasons, proportion relocated approaches 100%. In worst cases (6 months difference between images, with snow in the second) 60% is achieved. Author (ESA)

N82-18658*# Foster-Miller Associates, Inc., Waltham, Mass.

AUTOMATED LONGWALL GUIDANCE AND CONTROL VERTICAL CONTROL SUBSYSTEM, VOLUME 1 Final Report

W. Ronald Griffiths, Martin Smirlock, James Aplin, Roger B. Fish, and David Fish 31 Jan. 1982 161 p 2 Vol.

(Contract NAS8-33591)

(NASA-CR-161969; NAS7946-Vol-1) Avail: NTIS HC A08/MF A01 CSCL 08I

A design, fabrication, and implementation of a horizon control of a longwall shearer was performed. This equipment was tested and demonstrated aboveground. This hardware was also installed on a longwall face. The feasibility of providing horizon control for a shearer was demonstrated aboveground. The feasibility of retrofitting the necessary sensors in a survivable manner was demonstrated underground. Subsequent field tests of a specific component, the natural background sensor, at a western location demonstrated the particular usefulness of this device on a wider application basis. Author

N82-18659*# Foster-Miller Associates, Inc., Waltham, Mass.

AUTOMATED LONGWALL GUIDANCE AND CONTROL VERTICAL CONTROL SUBSYSTEM, VOLUME 2 Final Report

W. Ronald Griffiths, Martin Smirlock, James Aplin, Roger B. Fish, and David Fish 31 Jan. 1982 404 p 2 Vol.

(Contract NAS8-33591)

(NASA-CR-161970; NAS7946-Vol-2) Avail: NTIS HC A18/MF A01 CSCL 08I

Software documentation and a computer program listing for a horizon control of a longwall shearer are presented. N.W.

N82-18660*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SEASAT DATA UTILIZATION PROJECT Final Report

G. H. Born, D. N. Held, D. B. Lame, R. G. Lipes, D. R. Montgomery, P. J. Rygh, and J. F. Scott 30 Sep. 1981 62 p refs

(NASA-CR-168557; Rept-622-233) Avail: NTIS HC A04/MF A01 CSCL 05B

During the three months of orbital operations, the satellite returned data from the world's oceans. Dozens of tropical storms, hurricanes and typhoons were observed, and two planned major intensive surface truth experiments were conducted. The utility of the Seasat-A microwave sensors as oceanographic tools was determined. Sensor and geophysical evaluations are discussed, including surface observations, and evaluation summaries of an altimeter, a scatterometer, a scanning multichannel microwave radiometer, a synthetic aperture radar, and a visible and infrared radiometer. N.W.

N82-18661# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

REGRESSION TYPE MATHEMATICAL MODELS OF THE INTERACTION OF METEOROLOGY AND AGRICULTURAL PRODUCTIVITY. OBJECTIVES, USES AND OPERATIONAL PROBLEMS [MODELOSMATEMATICOS DAS INTERACOES VARIAVEIS METEOROLOGICAS/PRODUTIVIDADE AGRICOLA - OBJETIVOS, USOS E PROBLEMAS OPERACIONALS]

Fausto Carlos deAlmeida Jun. 1981 6 p refs In PORTUGUESE; ENGLISH summary Presented at the 2nd Brazilian Cong. on Agrometeorology, Pelotas, Rio Grande do Sul, Brazil, 5-10 Jul. 1981

(INPE-2117-RPE/341) Avail: NTIS HC A02/MF A01

Mathematical models of the interactions of meteorological variables and agricultural productivity are reviewed. The ideas contained in each model are illustrated. The results of using the model and problems of use in relation to the applicability of the models for developing an objective system for forecasting harvests are considered. J.D.H.

N82-18662# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

A MODEL FOR ESTIMATING THE PRODUCTIVITY OF CORN IN THE STATES OF SAO PAULO [UM MODELO PARA ESTIMAR A PRODUCTIVIDADEE DO MILHO NO ESTADO DE SAO PAULO]

Walter Celaschi and Fausto Carlos deAlmeida Jun. 1981 6 p refs In PORTUGUESE; ENGLISH summary Presented at the Brazilian Congr. on Agrometeorol. Pelotas, Rio Grande do Sul, Brazil, 5-10 Jul. 1981

(INPE-2118-RPE/342) Avail: NTIS HC A02/MF A01

A comparison of regression type crop-yield models for corn in the state of Sao Paulo, Brazil is presented. Technology trends up to the 3rd power and daily climatic variables grouped in monthly intervals and crop-dependent critically evaluated intervals are considered. A model using the cubic technology trend and the resultants weighted means in the critical intervals (defined at the 1% level) showed the best result R2 = 0.925 and sigma = 122 kg/Ha. Author

N82-18663*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

SPECTRAL ALBEDOS OF MIDLATITUDE SNOWPACKS

Bhaskar Choudhury Nov. 1981 41 p refs Submitted for publication

(NASA-TM-83858) Avail: NTIS HC A03/MF A01 CSCL 08L

Spectral albedos of impure-nonhomogeneous snowpacks, typical of midlatitudes, from 400 to 2200 nm were modeled through a numerical solution of the radiative transfer equation in the two-stream approximation. Discrete depth-dependent values of density, grain size and impurity concentration were used to characterize the snowpacks. The model is for diffuse incident radiation, and the numerical method is based on doubling and invariant imbedding. The effect of soot impurities on snowpack albedos is illustrated when a snowpack is several centimeters deep and soot reduces the albedos at visible wavelengths, however, when a snowpack is only a few centimeters deep, soot may increase the albedos at visible wavelengths. By adjusting soot content and snow grain size, good quantitative agreement with some observations at the Cascade Mountains (Washington) and at Point Barrow (Alaska) are obtained; however, the model grain sizes are found to be fifty to four hundred percent larger than the measured values. For satellite snowcover observations, a model for effective albedo of partially snow-covered areas was developed and compared with some NOAA-2 observations of the southeastern United States. T.M.

N82-18664*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

GROUND-TRUTH OBSERVATIONS OF ICE-COVERED NORTH SLOPE LAKES IMAGED BY RADAR

W. F. Weeks Oct. 1981 24 p refs Prepared in cooperation with CRREL, Hanover, N.H.

(NASA-TM-84127; AD-A108342; CRREL-81-19) Avail: NTIS HC A02/MF A01 CSCL 08/8

Field observations support the interpretation that differences in the strength of radar returns from the ice covers of lakes on the North Slope of Alaska can be used to determine where the

lake is frozen completely to the bottom. An ice/frozen soil interface is indicated by a week return and an ice/water interface by a strong return. The immediate value of this result is that SLAR (side-looking airborne radar) imagery can now be used to prepare maps of large areas of the North Slope showing where the lakes are shallower or deeper than 1.7m (the approximate draft of the lake ice at the time of the SLAR flights). The bathymetry of these shallow lakes is largely unknown and is not obvious from their sizes or outlines. Such information could be very useful, for example in finding suitable year-round water supplies.
Author (GRA)

N82-18665# Defense Mapping Agency, Washington, D.C. ADP Production Programs Div.
DEFENSE MAPPING AGENCY DIGITAL DATA BASE EVOLUTION
Francis M. Mirkay Nov. 1981 20 p
(AD-A108327) Avail: NTIS HC A02/MF A01 CSCL 08/2

The Defense Mapping Agency (DMA) has massive amounts of MC&G digital data holdings resulting from programs to support DoD advanced weapons systems and automated map and chart production. The digital data is used to support the DoD and NATO countries as well as internal DMA production. DMA requires a digital data base to maintain, store, retrieve, compare, and report on this MC&G digital data. This paper addresses current DMA efforts that will evolve into an on line interactive, distributed, networked data base system and its associated environment for data handled by HQ DMA and the DMA Production Centers.
Author (GRA)

N82-18666# Defense Mapping Agency Aerospace Center, St. Louis, Mo. Cartographic Data Div.
ICFITG: A PROGRAM FOR INTERACTIVE CONTOURING FROM AN IRREGULAR TRIANGULAR GRID
Robert F. Brown and Harold Moellering (Ohio State Univ.) Dec. 1981 17 p refs
(AD-A108515) Avail: NTIS HC A02/MF A01 CSCL 08/2

The computer program Interactive Contouring from an Irregular Triangular Grid (ICFITG) allows the program user to make judgements during the preparation or modification of an isarithmic map. This is accomplished interactively through the use of virtual images and devices, character commands and responses, and audio signals such that the cartographer can make decisions that affect the outcome of the final map while the program is executing. It is interactive computer graphics that form the link between the speed and repetitive processing power of the computer and the decision making power of the cartographer. The computer program ICFITG incorporates a contouring algorithm which is based on the formation of an irregular triangular grid. The use of such an algorithm ensures that the original control points lie on the surface and allows provisions to be included that give respect to surface characteristics such as breaklines. Based on research conducted at the Ohio State University, the combination of an irregular triangular grid contouring algorithm and interactive computer graphics results in a fast, flexible and easy to use computer contouring program.
Author (GRA)

N82-18667# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
AUTOMATED SLOPE GENERATION USING RASTER TECHNOLOGY
Michael P. Lee Dec. 1981 12 p refs
(AD-A108700) Avail: NTIS HC A02/MF A01 CSCL 08/2

The Sci-Tex Response 250 Mapping System has been in production at the Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC) for the past two years. Initially acquired for foreign chart modification and color separation, this cartographic system has had a significant impact in rapid response situations. Recent gains in slope generation have further enhanced the capabilities of this automated tool. Author (GRA)

N82-18668# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
APPLICATIONS OF THE DoD WORLD GEODETIC SYSTEM: THE 1972 CHARTING BY THE USE OF A SEMIAUTOMATED SYSTEM Final Technical Report
Donald Wirak 26 Jan. 1981 13 p refs Presented at the Technol. Exchange Week, Computer Appl. Session, Balboa, Panama, Jan. 1982
(AD-A108326) Avail: NTIS HC A02/MF A01 CSCL 08/5

DMA has a semi-automated system that is used to evaluate the horizontal datum of maps and charts for geodetic accuracy. Geodetic control descriptions in the DMAHTC library of holdings are used to make this evaluation. The computer system gives geodetic shifts to source maps, surveys, and charts. The chart is compiled from a panel base with the WGS-72 shifts applied. The final color proof of the chart is evaluated and checked to see if it is on the WGS-72 datum. Several charts will be exhibited and explained from a cartographic point of view as to how they were placed on WGS-72 datum. The exhibited charts are new charts of the Panama Canal and the Pacific coast of Panama. Examples of how the program was used to improve the geodetic accuracy of the charts on the last stage of compilation will be exhibited.
Author (GRA)

N82-18669# Eurospace, Paris (France).
EXAMINATION OF THE OPERATIONAL PROSPECTS FOR REMOTE SENSING Final Report [EXAMEN DES PERSPECTIVES OPERATIONNELLES DE LA TELEDETECTION]
Eleonora Ambrosetti Paris ESA Dec. 1980 305 p refs In FRENCH
(Contract ESA-4080/79/F-FC(SC))
(ESA-CR(P)-1476) Avail: NTIS HC A14/MF A01

European remote sensing activities are reviewed while development and utilization trends are identified. Existing and planned satellite systems are described. Remote sensing applications are listed by country in the European Economic Community. Cartography, geology, agriculture, silviculture, and land and water resources management are mentioned among other user disciplines. Applications are summarized in three categories: terrestrial, maritime, and coastal. Although maritime and coastal uses of remote sensing data are less well developed than terrestrial applications, economic, social and political benefits which can be accrued by Europe are sure to provide a strong incentive to continuing development. Author (ESA)

N82-18670# World Meteorological Organization, Geneva (Switzerland). Rapporteur on Sediment Transport.
MEASUREMENT OF RIVER SEDIMENTS
1981 69 p refs
(WMO-561; OHR-16; ISBN-92-63-10561-8) Avail: NTIS MF A01; print copy available at WMO, Geneva

Samples and remote sensing techniques for measuring sediment discharge in alluvial rivers are reviewed, noting that the simplest as well as sophisticated methods are not mutually exclusive. It is demonstrated that, in many cases, the optimum means for systematic sediment measurement is a combination of traditional and advanced methods and instruments. Areas where further improvement is needed, e.g., automation and telemetering as well as the international standardization of water pollution aspects of sediment monitoring, are indicated. Author (ESA)

N82-18671# World Meteorological Organization, Geneva (Switzerland).
FLASH FLOOD FORECASTING
A. J. Hall 1981 49 p refs
(WMO-577; OHR-18; ISBN-92-63-10577-4) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 6

The problem of flash floods is reviewed and basic flash flood forecasting techniques, warning systems, and non-real time solutions to flash flooding are discussed. Data sources for flash flood forecasting are identified, including radar, satellites and quantitative precipitation forecasting. Flash flood forecasting can be based on meteorological, hydrological, meteorological-hydrological or dam break techniques. The design and establishment of flash flood warning systems, ranging from simple networks and procedures to sophisticated computerized automatic systems are described. The success of a flash flood warning system is measured by public response to warnings, the saving of life, and reduction of damage to property. Community involvement is evaluated, indicating the complex interactions among agencies, information dissemination subsystems and the public. Flood plain zoning, and basin management and the construction of engineering works are considered. The limitations and advantages of flood damage reduction measures are also analyzed. Author (ESA)

N82-18672# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
OBSERVATIONS WITH AN IMAGING 35 GHz RADIOMETER OF TERRAIN IN MALMSLATETT, JULY 1980
Gunnar Stenstroem and Ain Sume Oct. 1981 39 p refs
Original contains color illustrations
(FOA-C-30240-E1/E3) Avail: NTIS HC A03/MF A01

Microwave emission of militarily important terrain was studied, using Dicke radiometer measurements around an air traffic control tower. The radiometer has a 60 cm parabolic Cassegrain antenna, controlled through a desk top computer, which also manages the data sampling and recording. The radiometric images were color-coded and presented on-line on a TV monitor. A selected part of the scenery was monitored once every hour in order to examine time variations of the observed antenna temperature and their correlation with day-to-night and meteorological changes. The significance of reflected, cold sky radiation in smooth surfaces (metals, plastics, roads) is demonstrated, resulting in a contrast with the less reflective surroundings. Author (ESA)

N82-18673# Geological Survey, Albany, N.Y. Water Resources Div..
USE OF FLOW-DURATION CURVES TO EVALUATE EFFECTS OF URBANIZATION ON STREAMFLOW PATTERNS ON LONG ISLAND, NEW YORK Final Water-Resources Investigations
Keith R. Prince 1981 25 p refs Prepared in cooperation with Nassau County Dept. of Public Work, N.Y. and Suffolk County Dept. of Health Services, N.Y.
(PB82-114307; USGS/WRD/WRI/81-083;
USGS/WRI-80-114) Avail: NTIS HC A02/MF A01 CSCL 08H

The change of streamflow patterns on Long Island over the last three decades in response to eastward population growth and urbanization was examined. Flow duration curves for nine streams in Nassau and Suffolk Counties indicate that, during this time, streams in urbanized areas increased peak flows and decrease base flows, whereas streams in sparsely populated areas show little or no change. The increase in peak flows reflects the greater volume of storm runoff from impermeable surfaces such as roads, parking lots, and roofs. It is found that the decrease in base flows is a result of the lowering of ground water levels, principally by sanitary sewerage and extensive pumping for public water supply. GRA

N82-18674# Institute of Hydrology, Wallingford (England).
SOIL PHYSICAL PROCESSES OF GROUNDWATER RECHARGE THROUGH INDIAN BLACK COTTON SOILS
M. G. Hodnett and J. P. Bell Apr. 1981 40 p refs
(PB82-112137; Rept-77) Avail: NTIS HC A03/MF A01 CSCL 08H

Soil physical studies were carried out in the black cotton soil areas of the Betwa Basin, Central India, to assess their role in partitioning monsoon rainfall into runoff and groundwater recharge. The regional and annual variations of soil moisture were studied first, followed by studies of the soil water flow mechanisms at representative sites. The studies suggested that significant recharge is possible only in the shallow soil areas, where structured clay/silts directly overlie the weathered basalt surface aquifer. GRA

N82-18675# Geological Survey, Indianapolis, Ind. Water Resources Div.
GROUND-WATER RESOURCES OF THE WHITE RIVER BASIN, MADISON COUNTY, INDIANA Final Water-Resources Investigations
Wayne W. Lapham Jun. 1981 122 p refs Prepared in cooperation with Indiana State Dept. of Natural Resources
(PB82-109844; USGS/WRD/WRI/81-084; USGS/WRI-81-35)
Avail: NTIS HC A06/MF A01 CSCL 08H

The ground-water resources of the White River basin in and near Madison County, Indiana were investigated by mapping the aquifers, estimating their hydraulic properties, determining the distribution of potentiometric head in the aquifers, and estimating some of the components of the ground-water budget from data collected in the field. This information was used to construct and calibrate a five-layer, digital ground-water flow model. The model, constructed and calibrated to ground-water level and seepage data collected during the study, simulates conditions for the autumn of 1976. The model was used to provide estimates of ground-water potential in terms of yield, drawdown, and depletion in streamflow. GRA

N82-18676# Geological Survey, Raleigh, N. C. Water Resources Div.
AN OBSERVATION-WELL NETWORK CONCEPT AS APPLIED TO NORTH CAROLINA Final Water Resource Investigation, 1977 - 1979
M. D. Winner, Jr. Mar. 1981 68 p refs Prepared in cooperation with North Carolina Dept. of Natural Resources and Community Development
(PB82-106089; USGS/WRD/WRI/81-082; USGS-WRI-81-13)
Avail: NTIS HC A04/MF A01 CSCL 08H

A statewide observation well program for North Carolina based on four networks of observation wells with different objectives was proposed. These networks are referred to as (1) climatic effects network; (2) terrain effects network; (3) local effects network, and (4) area effects network. The characteristics of each network are related to natural and manmade stresses in aquifers, and the areas and hydrogeologic units in North Carolina where these networks are needed are identified. GRA

N82-18677# Association of Bay Area Governments, Berkeley, Calif.
AREAWIDE STORMWATER POLLUTION ANALYSIS WITH THE MACROSCOPIC PLANNING (ABMAC) MODEL. PART 1: DOCUMENTATION AND APPLICATION. PART 2: USER'S MANUAL Final Report, Jun. 1978 - Nov. 1980
Yoram J. Litwin, John A. Lager, and William G. Smith Sep. 1981 198 p refs
(Grant EPA-R-806357)
(PB82-107947; EPA-600/2-81-223) Avail: NTIS HC A09/MF A01 CSCL 08H

The model is intended for use by local engineers and planners, and is adaptable for mini-computer applications. The model is designed to simulate runoff caused by rainfall, storage and treatment balances and to assess the magnitude of runoff and storage withdrawals. GRA

N82-18678# Illinois Natural History Survey, Urbana.
A STRESS FUNCTION FOR EVALUATING STRATEGIES FOR WATER QUALITY MANAGEMENT Final Report, Sep. 1977 - Mar. 1980
Warren U. Brigham and Donald L. Hey (Hey, Donald L. and Associates) Sep. 1981 104 p refs
(Grant EPA-R-805614)
(PB82-109828; EPA-600/2-81-217) Avail: NTIS HC A06/MF A01 CSCL 08H

The relationship between biological communities and the physical and chemical conditions in the aquatic environment was investigated. Seasonal patterns and the duration and probability of occurrence of chemical conditions and physical events were established via computer modelling. An instantaneous measure of stress was calculated by summing the decimal fractions of the 96-hr lethal concentrations (for bluegills) of each of 21 separate toxicants. Stress functions were computed for several locations in a test watershed in northeastern Illinois. GRA

N82-18679# Indiana Univ., Bloomington. School of Public and Environmental Affairs.
A LAND USE ANALYSIS OF EXISTING AND POTENTIAL COAL SURFACE MINING AREAS IN THE OHIO RIVER BASIN ENERGY STUDY REGION
Daniel E. Willard, Michael A. Ewert, Mary Ellen Hogan, and Jeffrey D. Martin Apr. 1981 136 p refs
(Contract EPA-R-805588)
(PB82-105172; EPA-600/7-81-066) Avail: NTIS HC A07/MF A01 CSCL 08I

The land use changes resulting from the surface mining of coal in the Ohio River Basin, which depend on the distribution of the coal, the economic attractiveness of the coal demand, rigor and effectiveness of regulatory mechanisms, and the resilience of the existing ecosystems are reported. The three levels of coal demand assumed are taken from ORBES scenarios.

The study analyzes existing industrial and governmental data on distribution, availability, and extraction of strippable coal. The history of reclamation enforcement and compliance is examined, and several potential land use results of the Federal Surface Mining Control and Reclamation Act of 1977 are analyzed. All of these factors are compared to existing patterns of topography, agriculture, and forestry. GRA

N82-18680# Kentucky Univ., Lexington. Inst. for Mining and Minerals Research.
COAL MINE SITING FOR THE OHIO RIVER BASIN ENERGY STUDY
Donald A. Blome Sep. 1981 180 p refs
(Grant EPA-R-805590)
(PB82-108119; EPA-600/7-81-116) Avail: NTIS HC A09/MF A01 CSCL 08I

In part 1, an overview of the ORBES region coal industry is presented. (The region consists of all of Kentucky, most of West Virginia, and substantial portions of Illinois, Indiana, Ohio, and Pennsylvania). Topics include coal production, mine types, reserves, selected coal properties, coal markets, employment, working conditions, wages, and quality of life. In part 2, the procedures for siting coal mines under the ORBES energy development scenarios are set forth. The coal mine siting analysis projects at the county level the number and type of new coal mines that would be opened in the ORBES region through the year 2000 under various scenario conditions and constraints. Among these conditions and constraints are the locational siting pattern of additional power plants in each scenario, the total coal production specified for the year 2000 by the ORBES energy demand model, and the sources of high and low sulfur coal, by mine type, specified by the ORBES coal supply analysis. GRA

N82-18681# Geological Survey, Menlo Park, Calif.
WATER RESOURCES DATA FOR CALIFORNIA. VOLUME 3: SOUTHERN CENTRAL VALLEY BASINS AND THE GREAT BASIN FROM WALKER RIVER TO TRUCKEE RIVER Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Sep. 1981 445 p Prepared in cooperation with California Dept. of Water Resources
(PB82-117003; USGS/WRD/HD-81/077) Avail: NTIS HC A19/MF A01 CSCL 08H

Water resources data for the 1980 water year for California consists of records of stage, discharge, gage height, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; water levels and water quality of wells. This report contains discharge records for 185 gaging stations; stage and contents for 39 lakes and reservoirs; gage height records for 2 lakes; water quality for 62 stations; water levels for 56 observation wells. Eleven crest stage partial record stations and one water quality partial record stations are included. GRA

N82-18682# Geological Survey, Charleston, W. Va. Water Resources Div.
WATER RESOURCES DATA FOR WEST VIRGINIA, WATER YEAR 1980 Annual Water-Data Report, 1 Oct. 1979 - 30 Sep. 1980
Jul. 1981 484 p refs
(PB82-111634; USGS/WRD/HD-80/072;
USGS-WDR-WV-80-1) Avail: NTIS HC A21/MF A01 CSCL 08H

Tables show stage, discharge, and water quality of streams and springs; stage and contents of lakes and reservoirs; and water levels in wells. Discharge records for 117 gaging stations; stage only records for 8 gaging stations; stage and contents for 8 lakes and reservoirs; contents for 1 reservoir; change in contents for 1 reservoir; water quality for 101 gaging stations; and water levels for 37 observation wells are presented. Five crest stage partial-record stations, and 1 low-flow partial record station are included along with additional water data collected at various sites, not part of the systematic data collections program. GRA

N82-18683# Geological Survey, Menlo Park, Calif. Water Resource Div.
WATER RESOURCES DATA FOR CALIFORNIA. VOLUME 1: COLORADO RIVER BASIN, SOUTHERN GREAT BASIN FROM MEXICAN BORDER TO MONO LAKE BASIN AND PACIFIC SLOPE BASINS FROM TIJUANA RIVER TO SANTA MARIA RIVER Annual Water-Data Report, 1 Oct. 1979 - 30 Sep. 1980
Edward J. Jones, Verrie F. Pearce, Jay R. Foulk, James R. Mullen, Wallace F. Shelton, and Linda R. Zeitz Aug. 1981 473 p refs Prepared in cooperation with California State Dept. of Water Resources 4 Vol.
(PB82-116997; USGS/WRD/HD-81/075;
USGS-WDR-CA-80-1) Avail: NTIS HC A20/MF A01

Water resources data for the 1980 water year for California presented consist of (1) discharge records for 174 gaging stations; (2) stage and contents for 18 lakes and reservoirs; (3) water quality for 51 stations; and (4) water levels for 165 observations wells. GRA

N82-18684# Geological Survey, Menlo Park, Calif. Water Resources Div.
WATER RESOURCES DATA FOR CALIFORNIA. VOLUME 4: NORTHERN CENTRAL VALLEY BASINS AND THE GREAT BASIN FROM HONEY LAKE BASIN TO OREGON STATE LINE Annual Water-Data Report, 1 Oct. 1979 - 30 Sep. 1980
Kay L. Spiegl, Julia A. Schulenburg, Nancy A. Gilligan, Lisa A. Redmond, Barbara J. Symonds, Dorothy E. Maltby, and Karen Downing Sep. 1981 468 p refs Prepared in cooperation with California State Dept. of Water Resources 4 Vol.
(PB82-117011; USGS/WRD/HD-81/078) Avail: NTIS HC A20/MF A01 CSCL 08H

Discharge records for 199 gaging stations; stage and contents for 34 lakes and reservoirs; precipitation data for stations; water quality for stations; water levels for 54 observation wells, and water quality data for 26 wells are presented along 16 crest-stage partial record stations and 7 low flow partial record stations. GRA

N82-18685# Pennsylvania State Univ., University Park. Dept. of Mineral Engineering.
CABLES FOR FACE EQUIPMENT STANDARDIZATION OF REQUIREMENTS Final Open File Report, 1 Aug. 1977 - 1 Apr. 1981
R. Stefanko, C. Bise, G. Luxbacher, and K. Katen 1 Jun. 1981 49 p refs
(Contract DI-BM-H0-377043)
(PB82-113820; BM-OFR-135-81) Avail: NTIS HC A03/MF A01 CSCL 08I

Cable protection, circuit breakers, and high voltage cable couplers are discussed. Laboratory and analytical studies were conducted in the three areas to determine proper circuit breaker settings, cable sizes, and coupler performance. Also, an extensive field monitoring program was established to relate in-mine experience to laboratory findings. Further, various pieces of equipment were designed for laboratory testing, particularly in the area of cable reeling and unreeling. GRA

N82-18240*# European Space Conference, Paris (France).
MICROWAVE REMOTE SENSING EXPERIMENT
G. Dieterle *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 14B

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-18686* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SOLAR ENERGY CONTROL SYSTEM Patent

James R. Currie, inventor (to NASA) Issued 8 Dec. 1981 9 p Filed 20 Nov. 1979 Supersedes N80-17544 (18 - 08, p 1023)
(NASA-Case-MFS-25287-1; US-Patent-4,304,219; US-Patent-Appl-SN-098570; US-Patent-Class-126-422; US-Patent-Class-126-429; US-Patent-Class-126-430) Avail: US Patent and Trademark Office CSCL 10A

A solar energy control system for a hot air type solar energy heating system wherein thermocouples are arranged to sense the temperature of a solar collector, a space to be heated, and a top and bottom of a heat storage unit is disclosed. Pertinent thermocouples are differentially connected together, and these are employed to effect the operation of dampers, a fan, and an auxiliary heat source. In accomplishing this, the differential outputs from the thermocouples are amplified by a single amplifier by multiplexing techniques. Additionally, the amplifier is corrected as to offset by including as one multiplex channel a common reference signal.

Official Gazette of the U.S. Patent and Trademark Office

N82-18687* National Aeronautics and Space Administration, Washington, D. C.
ENERGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES, ISSUE 31
Oct. 1981 356 p
(NASA-SP-7043(31)) Avail: NTIS HC A16/MF A01 CSCL 10B

This bibliography lists 1111 reports, articles, and other documents introduced into the NASA scientific and technical information system from July 1, 1981 through September 30, 1981. T.M.

N82-18688*# Gilbert/Commonwealth, Reading, Pa.
MAGNETOHYDRODYNAMICS (MHD) ENGINEERING TEST FACILITY (ETF) 200 MWe POWER PLANT. CONCEPTUAL DESIGN ENGINEERING REPORT (CDER). VOLUME 4: SUPPLEMENTARY ENGINEERING DATA
Sep. 1981 548 p refs
(Contract DEN3-224; DE-AI01-77ET-10769)
(NASA-CR-165452-Vol-4; DOE/NASA/0224-1-Vol-4) Avail: NTIS HC A23/MF A01 CSCL 10B

The reference conceptual design of the Magnetohydrodynamic Engineering Test Facility (ETF), a prototype 200 MWe coal-fired electric generating plant designed to demonstrate the commercial feasibility of open cycle MHD is summarized. Main elements of the design are identified and explained, and the rationale behind them is reviewed. Major systems and plant facilities are listed and discussed. Construction cost and schedule estimates, and identification of engineering issues that should be reexamined are also given. The latest (1980-1981) information from the MHD technology program are integrated with the elements of a conventional steam power electric generating plant. Supplementary Engineering Data (Issues, Background, Performance Assurance Plan, Design Details, System Design Descriptions and Related Drawings) is presented. M.D.K.

N82-18689*# Applied Solar Energy Corp., City of Industry, Calif.
DEVELOPMENT OF THIN WRAPAROUND JUNCTION SILICON SOLAR CELLS Final Report, Sep. 1980 - Nov. 1981
F. Ho and P. A. Iles Nov. 1981 43 p refs
(Contract NAS3-22228)
(NASA-CR-165570) Avail: NTIS HC A03/MF A01 CSCL 10A

The state of the art technologies was applied to fabricate 50 micro thick 2x4 cm, coplanar back contact (CBC) solar cells with AMO efficiency above 12%. A requirement was that the cells have low solar absorptance. A wraparound junction (WAJ) with wraparound metallization was chosen. This WAJ approach avoided the need for very complex fixturing, especially during rotation of the cells for providing adequate contacts over dielectric edge layers. The contact adhesion to silicon was considered better than to an insulator. It is indicated that shunt resistance caused by poor WAJ diode quality, and series resistance from the WAJ contact, give good cell performance. The cells developed reached 14 percent AMO efficiency (at 25 C), with solar absorptance values of 0.73. Space/cell environmental tests were performed on these cells and the thin CSC cells performed well. The optimized design configuration and process sequence were used to make 50 deliverable CBC cells. These cells were all above 12 percent efficiency and had an average efficiency of ~13 percent. Results of environmental tests (humidity-temperature, thermal shock, and contact adherence) are also given. E.A.K.

N82-18690*# United Technologies Corp., South Windsor, Conn. Power Systems Div.
LOW NO SUBx HEAVY FUEL COMBUSTOR CONCEPT PROGRAM. PHASE 1A: COAL GAS ADDENDUM Final Report, 29 Jun. - Oct. 1981
Thomas Rosfjord and Richard Sederquist Jan. 1982 43 p refs
(Contract DEN3-149; DE-AI01-77ET-13111)
(NASA-CR-165577; DOE/NASA/0149-2; GTR-3932) Avail: NTIS HC A03/MF A01 CSCL 10B

The performance and emissions from a rich-lean combustor fired on simulated coal gas fuels were investigated using a 12.7-cm diameter axially-staged burner originally designed for operation with high heating value liquid fuels. A simple, tubular fuel injector was substituted for the liquid fuel nozzle; no other combustor modifications were made. Four test fuels were studied including three chemically bound nitrogen-free gas mixtures with higher heating values of 88, 227, and 308 kj/mol (103, 256 and 349 Btu/scf), and a 227 kj/mol (258 Btu/scf) heating value doped with ammonia to produce a fuel nitrogen content of 0.5% (wt). Stable, ultra-low nitrogen oxide, smoke-free combustion was attained for the nitrogen-free fuels. Results with the doped fuel indicated that less than 5% conversion of NH3 to nitrogen oxide levels below Environmental Protection Agency limits could be achieved. In some instances, excessive CO levels were encountered. It is shown that use of a burner design employing a less fuel-rich primary zone than that found optimum for liquid fuels would yield more acceptable CO emissions. A.R.H.

N82-18691*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTAL STUDY OF AN INTEGRAL CATALYTIC COMBUSTOR: HEAT EXCHANGER FOR STIRLING ENGINES
Daniel L. Bulzan 1982 20 p refs Presented at the 1982 Intern. Congr. and Exposition, Detroit, 22-26 Feb. 1982; sponsored by SAE
(Contract DE-AI01-77CS-51040)
(NASA-TM-82783; DOE/NASA/51040-36) Avail: NTIS HC A02/MF A01 CSCL 10A

The feasibility of using catalytic combustion with heat removal for the Stirling engine to reduce exhaust emissions and also improve heat transfer to the working fluid was studied using spaced parallel plates. An internally air-cooled heat exchanger was placed between two noble metal catalytic plates. A preheated fuel-air mixture passed between the plates and reacted on the surface of the catalyzed plates. Heat was removed from the catalytic surface by radiation and convection to the aircooled heat exchangers to control temperature and minimize thermal nitrogen oxide emissions. Test conditions were inlet combustion air temperatures from 850 to 900 K, inlet velocities of about 10 m/s, equivalence ratios from 0.5 to 0.9, and pressures from 1.3x10 to the 5th power to 2.0x10 to the 5th power Pa. Propane fuel was used for all testing. Combustion efficiencies greater than 99.5 percent were measured. Nitrogen oxide emissions ranged from 1.7 to 3.3 g NO2/kg fuel. The results demonstrate the feasibility of the concept and indicate that further investigation of the concept is warranted. A.R.H.

N82-18692*# Lincoln Lab., Mass. Inst. of Tech., Lexington.
GaAs SHALLOW-HOMOJUNCTION SOLAR CELLS Final Report
John C. C. Fan 30 Jun. 1981 52 p refs
(NASA Order C-46566-D)
(NASA-CR-165579) Avail: NTIS HC A04/MF A01 CSCL 10A

The feasibility of fabricating space resistant, high efficiency, light weight, low cost GaAs shallow homojunction solar cells for space application is investigated. The material preparation of ultrathin GaAs single crystal layers, and the fabrication of efficient GaAs solar cells on bulk GaAs substrates are discussed.

Considerable progress was made in both areas, and conversion efficiency about 16% AMO was obtained using anodic oxide as a single layer antireflection coating. A computer design shows that even better cells can be obtained with double layer antireflection coating. Ultrathin, high efficiency solar cells were obtained from GaAs films prepared by the CLEFT process, with conversion efficiency as high as 17% at AMI from a 10 micrometers thick GaAs film. A organometallic CVD was designed and constructed. B.W.

N82-18693*# Structural Composites Industries, Inc., Azusa, Calif.

DESIGN, EVALUATION, AND FABRICATION OF LOW-COST COMPOSITE BLADES FOR INTERMEDIATE-SIZE WIND TURBINES Final Report

Oscar Weingart Sep. 1981 210 p refs
(Contracts DEN3-100; DE-AI01-79ET-20320)
(NASA-CR-165342; DOE/NASA/0100-1; SCI-81520) Avail: NTIS HC A10/MF A01 CSCL 10A

Low cost approaches for production of 60 ft long glass fiber/resin composite rotor blades for the MOD-OA wind turbine were identified and evaluated. The most cost-effective configuration was selected for detailed design. Subelement and subscale specimens were fabricated for testing to confirm physical and mechanical properties of the composite blade materials, to develop and evaluate blade fabrication techniques and processes, and to confirm the structural adequacy of the root end joint. Full-scale blade tooling was constructed and a partial blade for tool and process tryout was built. Then two full scale blades were fabricated and delivered to NASA-LeRC for installation on a MOD-OA wind turbine at Clayton, New Mexico for operational testing. Each blade was 60 ft. long with 4.5 ft. chord at root end and 2575 lbs weight including metal hub adapter. The selected blade configuration was a three cell design constructed using a resin impregnated glass fiber tape winding process that allows rapid wrapping of primarily axially oriented fibers onto a tapered mandrel, with tapered wall thickness. The ring winder/transverse filament tape process combination was used for the first time on this program to produce entire rotor blade structures. This approach permitted the complete blade to be wound on stationary mandrels, an improvement which alleviated some of the tooling and process problems encountered on previous composite blade programs. Author

N82-18694*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ASSESSMENT OF STEAM-INJECTED GAS TURBINE SYSTEMS AND THEIR POTENTIAL APPLICATION

Robert J. Stochl Feb. 1982 21 p refs
(NASA-TM-82735; E-1047) Avail: NTIS HC A02/MF A01 CSCL 10B

Results were arrived at by utilizing and expanding on information presented in the literature. The results were analyzed and compared with those for simple gas turbine and combined cycles for both utility power generation and industrial cogeneration applications. The efficiency and specific power of simple gas turbine cycles can be increased as much as 30 and 50 percent, respectively, by the injection of steam into the combustor. Steam-injected gas turbines appear to be economically competitive with both simple gas turbine and combined cycles for small, clean-fuel-fired utility power generation and industrial cogeneration applications. For large powerplants with integrated coal gasifiers, the economic advantages appear to be marginal. T.M.

N82-18695*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

THERMODYNAMIC LIMITS FOR SOLAR ENERGY CONVERSION BY A QUANTUM-THERMAL HYBRID SYSTEM

C. E. Byvik, A. M. Buoncristiani, and B. T. Smith Nov. 1981 20 p refs Prepared in cooperation with Christopher Newport Coll.
(NASA-TM-83229) Avail: NTIS HC A02/MF A01 CSCL 10A

The limits are presented fo air mass 1.5 conditions. A maximum conversion efficiency of 74 percent is thermodynamically achievable for the quantum device operating at 3500 K and the heat engine in contact with a reservoir at 0 K. The efficiency drops to 56 percent for a cold reservoir at approximately room temperature conditions. Hybrid system efficiencies exceed 50 percent over receiver temperatures ranging from 1400 K to 4000 K, suggesting little benefit is gained in operating the system above 1400 K. The results are applied to a system consisting of a photovoltaic solar cell in series with a heat engine. T.M.

N82-18696*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

THE ULTIMATE EFFICIENCY OF PHOTOSENSITIVE SYSTEMS

A. M. Buoncristiani, C. E. Byvik, and B. T. Smith Dec. 1981 22 p refs Prepared in cooperation with Christopher Newport Coll.
(Grant NsG-1514)
(NASA-TM-83230) Avail: NTIS HC A02/MF A01 CSCL 10A

These systems have in common two important but not independent features: they can produce a storable fuel, and they are sensitive only to radiant energy with a characteristic absorption spectrum. General analyses of the conversion efficiencies were made using the operational characteristics of each particular system. An efficiency analysis of a generalized system consisting of a blackbody source, a radiant energy converter having a threshold energy and operating temperature, and a reservoir is reported. This analysis is based upon the first and second laws of thermodynamics, and leads to a determination of the limiting or ultimate efficiency for an energy conversion system having a characteristic threshold. T.M.

N82-18697*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

THERMODYNAMIC LIMITS TO THE EFFICIENCY OF SOLAR ENERGY CONVERSION BY QUANTUM DEVICES

A. M. Buoncristiani, C. E. Byvik, and B. T. Smith (Christopher Newport College, Va.) Nov. 1981 14 p refs
(NASA-TM-83228) Avail: NTIS HC A02/MF A01 CSCL 10A

The second law of thermodynamics imposes a strict limitation to the energy converted from direct solar radiation to useful work by a quantum device. This limitation requires that the amount of energy converted to useful work (energy in any form other than heat) can be no greater than the change in free energy of the radiation fields. Futhermore, in any real energy conversion device, not all of this available free energy in the radiation field can be converted to work because of basic limitations inherent in the device itself. A thermodynamic analysis of solar energy conversion by a completely general prototypical quantum device is presented. This device is completely described by two parameters, its operating temperature T sub R and the energy threshold of its absorption spectrum. An expression for the maximum thermodynamic efficiency of a quantum solar converter was derived in terms of these two parameters and the incident radiation spectrum. Efficiency curves for assumed solar spectral irradiance corresponding to air mass zero and air mass 1.5 are presented. T.M.

N82-18698*# DHR, Inc., Washington, D.C.

MARKET ASSESSMENT OF PHOTOVOLTAIC POWER SYSTEMS FOR AGRICULTURAL APPLICATIONS IN NIGERIA Final Report

David Staples, Henry Steingrass, and James Nolfi (ARD, Inc., Burlington, Vt.) Oct. 1981 115 p refs
(Contracts DEN3-180; DE-AI01-79ET-20485)
(NASA-CR-165511; DOE/NASA/0180-4; C4100-50) Avail: NTIS HC A06/MF A01 CSCL 10A

The market potential for stand-alone photovoltaic systems in agriculture was studied. Information is presented on technical and economically feasible applications, and assessments of the business, government and financial climate for photovoltaic sales. It is concluded that the market for stand-alone systems will be large because of the availability of captial and the high premium placed on high reliability, low maintence power systems. Various specific applications are described, mostly related to agriculture. R.J.F.

N82-18699# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

I-V CHARACTERIZATION OF SOLAR CELLS [CARACTERIZ-

ACAO I-V DE CELULAS SOLARES]
Nelson Veissid, R. Renvaud, and F. J. Fonseca Jun. 1981 12 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador, Brazil, 8-15 Jul. 1981 Submitted for publication
(INPE-2141-RPE/363) Avail: NTIS HC A02/MF A01

Equivalent circuits were analysed and then I-V characteristics obtained from different solar cells were compared with those from the circuits. The measures were obtained under natural conditions and under artificial conditions (solar simulator made of easily obtained light sources and several filters). The identification of components in the equivalent circuit, together with the theory of photovoltaic conversion, is very important in the optimization of the cell design. A numeric method for determination of the series resistance is proposed. T.M.

N82-18700# Friends of the Earth, San Francisco, Calif.
ENERGY POLICIES FOR RESILIENCE AND NATIONAL SECURITY Final Report
Amory B. Lovins and L. Hunter Lovins Oct. 1981 322 p refs
(Contract DCPA01-79-C-0317)
(AD-A108263) Avail: NTIS HC A14/MF A01 CSCL 15/3

The vulnerabilities of the U.S. energy system to accidental or deliberate disruptions are analyzed generically and specifically and shown to be disturbingly large. Since they arise from reliance on highly centralized technologies, increasing such reliance is likely to increase national energy vulnerability. A more efficient, diverse, dispersed, renewable energy system is shown to be inherently more resilient, to make major failures impossible, and to be compatible with consistent adherence to free-market principles. Author (GRA)

N82-18701# Central Wayne County Sanitation Authority, Dearborn Heights, Mich.
FEASIBILITY STUDY ON ENERGY RECOVERY AND COGENERATION FROM AN EXISTING MUNICIPAL INCINERATOR, PHASE 1 Final Report
Jul. 1981 458 p refs
(Contract DE-FG01-79CS-20232)
(DE82-001143; DOE/CS-20232/1) Avail: NTIS HC A20/MF A01

A feasibility study of recovering and converting incinerator waste heat energy into steam and electricity for use in the facility with excess electricity being sold to the local utility was made. Energy recovery would be accomplished by retrofitting each furnace with a waste heat boiler and producing steam for heating and for driving steam turbine electric generators. Preliminary designs economic analyses, and financial plans were prepared. The quantity of municipal refuse was identified and the electric revenues needed for project justification were calculated. For the purpose of obtaining accurate design data, field tests were carried out on the actual refuse and combustion process. DOE

N82-18702# Exxon Research and Engineering Co., Linden, N.J. Advanced Energy Systems Lab.
CONCEPTUAL DESIGN OF A SOLAR COGENERATION FACILITY INDUSTRIAL PROCESS HEAT. VOLUME 2: APPENDICES Final Report, 30 Sep. 1980 - 14 Aug. 1981
Patrick Joy, Martin Brzeczek, Harold Seilestad, Carl Silverman, and George Yenatchi Jul. 1981 412 p Prepared in cooperation with Badger Energy, Inc., Cambridge, Mass., and Martin Marietta Aerospace, Denver, Colo., and Pacific Gas and Electric Co., San Ramon, Calif.
(Contract DE-AC03-80SF-11438)
(DE82-001576; DOE/SF-11438/T1-Vol-2) Avail: NTIS HC A18/MF A01

The cogeneration facility systems specification defines the characteristics, and design and environmental requirements for the facility and the performance, characteristics and economic data for the solar additions as well as design data for the existing facility. Climatological data are presented for the site. GRA

N82-18703# Nebraska Univ., Lincoln.
MONITORING OF THERMAL STRATIFICATION OF THE STORAGE TANK OF THE MABEL LEE HALL SOLAR-HOT-WATER FACILITY Final Technical Report, 15 Oct. 1979 - 30 Nov. 1980
E. E. Anderson May 1981 37 p refs
(Contract DE-AC02-79CS-30247)
(DE82-002110; DOE/CS-30247/1) Avail: NTIS HC A03/MF A01

Measurements of temperatures and heat inputs for a large liquid solar storage unit were obtained with sufficient spatial and temporal resolution to permit verification of numerical models. Fourteen tests were conducted on the Mabel Lee Hall solar facility. During each two-day test, forty temperatures and three heat inputs were measured every 15 minutes. All the data were reported to DOE and are available for confirmation of numerical models of liquid solar storage units. Examination of the results of five of the tests including charging, discharging and simultaneous charge-discharge operational modes indicate that stratification was maintaind in the tank. The data also show that several natural circulation modes develop depending upon the manner in which the system was operated. DOE

N82-18704# Ecole Polytechnique, Montreal (Quebec). Center de Developpement Technologique.
CALCULATION OF THERMODYNAMIC EQUILIBRIA IN THE CARBONATE FUEL CELL. VOLUME 1. TASK 1: BINARY TERNARY AND QUARTERNARY PHASE DIAGRAMS CONTAINING Li(+), Na(+), K(+), CO3(-), SO3(-) AND OH(-) Final Report
A. D. Pelton, C. W. Bale, P. L. Lin, M. L. Saboungi, and M. Blander 31 Aug. 1981 182 p refs Prepared in cooperation with Argonne National Lab. 2 Vol.
(Contract DE-AC02-79ET-15416)
(DE82-000690; DOE/ET-15416/2-Vol-1) Avail: NTIS HC A09/MF A01

All available phase diagram and thermodynamic data on the eighteen binary systems containing Li(), Na(), K(), SO4(2+), and OH(+) have been collected and critically assessed. A set of self consistent thermodynamic parameters describing the free energies of all known compounds, solid solutions, and liquid solutions in the binary systems has been formulated. The phase diagrams have been calculated, and estimated error limits of all diagrams are given. Fourteen ternary phase diagrams containing Li(), Na(), K(), SO4(2+), CO3(2+) and OH(+) have been calculated from the assessed data for their binary subsystems with the aid of the Conformal Ionic Solution Theory. Comparison with experimental data is made where experimental diagrams are available and small ternary parameters are added where necessary. All calculated ternary phase diagrams are presented as polythermal projections of liquidus surfaces, and estimated error limits are given for each system. DOE

N82-18705# Ecole Polytechnique, Montreal (Quebec). Centre de Development Technologique.
CALCULATION OF THERMODYNAMIC EQUILIBRIA IN THE CARBONATE FUEL CELL, VOLUME 2. TASK 2: EQUILIBRIA BETWEEN THE CARBONATE ELECTROLYTE AND THE C-H-O-S GAS PHASE. TASK 3: VAPOUR PRESSURES AND THE VOLITISATION OF THE ALKALI SPECIES Final Report
C. W. Bale, A. D. Pelton, J. Melancon, M. L. Saboungi, and M. Blander 31 Aug. 1981 72 p refs Prepared in cooperation with Argonne National Lab. 2 Vol.
(Contract DE-AC02-79ET-15416)
(DE82-000689; DOE/ET-15416/2-Vol-2) Avail: NTIS HC A04/MF A01

A complete thermodynamic analysis has been performed upon eleven selected fuel feeds obtained after various pretreatment processes. The equilibrium partial pressures of some 34 gaseous species have been computed for each of the fuels at the anode inlet and outlet (75% hydrogen utilization). The complex gaseous equilibria of the fuels have been graphically represented with the aid of Gibbs ternary C-H-O composition triangles. The influence of temperature and pressure upon carbon deposition in the anode compartment has been determined and graphically presented. The effect of water addition upon carbon formation and upon free hydrogen production has been evaluated. The influence of sulfur impurities upon the gaseous equilibria in both electrode compartments and upon the chemical stability of the Ni/NiO electrodes has been assessed. DOE

N82-18706# Westinghouse Research and Development Center, Pittsburgh, Pa.

HIGH-TEMPERATURE, SOLID-OXIDE-ELECTROLYTE FUEL-CELL POWER-GENERATING SYSTEM Quarterly Report, 1 Dec. 1980 - 28 Feb. 1981

22 Mar. 1981 60 p refs
(Contract DE-AC02-80ET-1709)
(DE82-002095; DOE/ET-17089/T2) Avail: NTIS HC A04/MF A01

Porous support tube work was directed at reducing the firing temperature, where electrically heated furnaces that enable better zone temperature control can be utilized. Work on the air electrode for the FEA cell design concentrated on modifying the lanthanum manganite, to enhance its conductivity while matching its thermal expansion to that of the other fuel cell components. The thermal expansion and electrical resistivity of LaO 5CaO 5MnO3 were determined. An initial FBA cell was fabricated. Although its performance was below that of the cells in the series cell stack arrangement, it did prove that fabrication of all fuel cell components (including the interconnection) can be accomplished in this cell design. Analytical measurements on an actual HTSOE cell stack resulted in the use of the differential resistance ((RADIAL)V/(RADICAL)I) to isolate voltage losses under operating conditions, envisaged for the HTSOE fuel cell generator. DOE

N82-18707# Service de la Programmation de la Politique Scientifique, Brussels (Belgium).

NATIONAL ENERGY RESEARCH AND DEVELOPMENT PROGRAM [PROGRAMME NATIONAL DE RECHERCHE-DEVELOPPEMENT DANS LE DOMAINE DE L'ENERGIE]

1980 23 p In FRENCH
Avail: NTIS HC A02/MF A01

This bibliography cites 24 reports generated by a program designed to study the national energy system, possibilities for energy conservation, and the use of new energy sources in Belgium. Topics covered include a mathematical model of the energy system; social impacts; regional aspects; the energy infrastructure; compatibilities, energy consumption in buildings and industries; the use of solar energy; heat recovery and storage; and the use of fossil fuels. Transl. by A.R.H.

N82-18708# Technische Hogeschool, Delft (Netherlands). Lab. for Thermal Power Engineering.

CYCLE: A GENERAL COMPUTER CODE FOR THERMODYNAMIC CYCLE COMPUTATIONS. STUDIES OF COGENERATION IN DISTRICT HEATING SYSTEMS

J. A. Miedema Sep. 1981 272 p refs
(WTHD-135) Avail: NTIS HC A12/MF A01

Computer programs which determine the energy consumption of heat power units, calculate the energy consumed by large scale district heating systems, compute the energy consumption per unit heat (f factor), and estimate the effect of dual purpose units on energy production/consumption of a regional scale power network were developed. District heating systems were assessed, using the programs. Systems with steam and gas units have lowest f factors. Regional power production efficiency is influenced by dual purpose units. The influence must be calculated for each case separately. Accurate computation of the f factor is urged since it is directly linked to the benefits/cost ratio. Author (ESA)

N82-18709# Technische Hogeschool, Delft (Netherlands). Sectie Koudetechniek en Klimaartregeling.

INDOOR CLIMATE, OUTDOOR CLIMATE, AND ENERGY CONSUMPTION. AN APPROACH TO THE CALCULATION OF THE EFFECT OF THE OUTDOOR AND INDOOR CLIMATE ON THE ENERGY CONSUMPTION IN BUILDINGS, BASED ON METHODS OF STATISTICAL ANALYSIS

A. H. C. vanPaassen Oct. 1981 123 p refs
(WTHD-137) Avail: NTIS HC A06/MF A01

Mathematical models of the thermal system were developed, including the thermal behavior of the building, the outdoor climate and the heating, ventilation and air conditioning (HVAC) system. The thermal behavior of the building is characterized by the response factor method. A stochastic model describes outdoor climate characteristics. A short reference year, consisting of data from 16 days/season, is used as a standard input data set for hour by hour simulations of thermal systems associated with the building. Yearly energy consumption is determined by combining a probability matrix, based on the statistical properties of the weather, with an energy matrix, found by calculating the energy consumption of the HVAC system for all possible combinations of the temperature and humidity of the outdoor air and the load of the building. Results agree closely with measured values and computing time is greatly reduced. Author (ESA)

N82-18710# Technische Hochschule, Aachen (West Germany). Lehrauftrag Leistungsreaktoren.

RAILWAY TRANSPORT OF LOW TEMPERATURE HEAT FROM LARGE POWER STATIONS BY MEANS OF ALTERNATIVE HEAT CARRIERS AND WATER Final Report

Gerardus Luchtman and Theo Bracke Bonn Bundesministerium fuer Forschung und Technology Nov. 1981 165 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technology
(BMFT-FB-T-81-145; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 32,60

The feasibility of railway transport of liquid and solid heat carriers in tank cars so as to replace pipeline transport of small to medium large heat loads was investigated. The typical characteristics of railway transport were analyzed and all essential technical and economical variables were integrated in a transport model. Over 1000 complex chemical compounds were evaluated for their suitability as heat carriers. Of these, three ammonia compounds are considered as promising. Considering, however, that complicated and expensive facilities are needed for heat transfer to and from ammonia, water is identified as the better choice. Results, based on 1975 transport prices, show that railway heat transport becomes competitive for heat loads above 50 to 100 MW and transport distances over 20 km. Author (ESA)

N82-18711# Stuttgart Univ. (West Germany). Abt. Heizung-Lueftung-Klimatechnik.

MODEL OF SEASONAL HEAT STORAGE Final Report

Wilhelm Adae and Dieter Striebel Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 237 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-176; ISSN-0340-7608) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 40,30

A model of the thermal behavior of large flat seasonal storage reservoirs which includes all parameters influencing the temperature distribution was developed and compared with experiment in order to provide a comprehensive basis for the dimensioning and design of displacement storage reservoirs. Heat transfer by conduction and by various convective flows at the side walls and the fluid surface were included in a numerical one-dimensional model of the stagnant reservoir and the results were compared with measured temperature distributions. The influence of charging and decharging on the stability of the thermocline was investigated by visualization of the flow and mixing processes and by temperature measurements. Model calculations of the mixing losses indicate that the mixing is nearly compensated by conduction when the reservoir charging time exceeds 1000 hr approximately. Author (ESA)

N82-18712# Vereinigte Elektrizitaetswerke Westfalen A.G., Dortmund (West Germany). Hauptnereich Maschinentechnik.

CONSTRUCTION AND OPERATION OF A ONE TON PER HOUR PILOT PLANT FOR THE VEW COAL CONVERSION PROCESS Final Report, Feb. 1981

Juergen Poller Bonn Bundesministerium fuer Forschung und Technology Nov. 1981 57 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technology
(BMFT-FB-T-81-177; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 12,20

The pilot plant is based on airblown partial gasification in an entrained reactor. Results show that at temperatures of about 1450 C, 55% to 65% of the feed coal, and 70% to 80%

of the sulfur can be converted into product gas. The quality of the low BTU gas is sufficient for application in the combined gas-stream turbine process. Extensive knowledge is also gained concerning gas accompanying pollutants and the behavior of different brickwork materials in the reactor environment. The acquired data allows proper dimensioning of a prototype plant.
Author (ESA)

N82-18713# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
A 100 kWe SOLAR THERMAL POWER PLANT IN KUWAIT, PHASE 1 Final Report, Jun. 1980
Guenther Schmidt, Peter Schmid, Dietmar Wolf, and Helmut Zewen Bonn Bundesministerium fuer Forschung und Technology Oct. 1981 47 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technology
(BMFT-FB-T-81-178; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,10

The assembly and test program of the main system components of the solar thermal power station are described. The installation is of the solar farm type and uses highly concentrating rotational symmetric paraboloid mirrors to achieve high efficiencies and Rankine cycle operating temperatures as high as 350 C. The working medium is toluene. Performance tests show proper functioning of the tracking system of the collectors, of the coneshaped absorbers and of the energy conversion system, including all control loops. Author (ESA)

N82-18714# Maschinenfabrik Augsburg-Nuernberg A.G., Munich (West Germany).
CONSTRUCTION AND TESTING OF A TEST STAND FOR SOLAR CELLS AND CONCENTRATING COLLECTORS Final Report, Apr. 1980
Heinz Pfeiffer Bonn Bundesministerium fuer Forschung und Technology Nov. 1981 131 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technology
(BMFT-FB-T-81-179; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 27,70

A hibrid system consisting of photovoltaic cells and parabolic concentrators was built and tested in order to study the possible cost reduction of photovoltaic systems by concentration of sunlight. The test stand comprises four parabolic tracking reflectors, a cooling circuit, electrical and thermodynamical instrumentation and an electrical water pump as a load. The solar cells are mounted in the focal line of the collectors on a cooling channel designed for optimal heat transfer and their uniform illumination is carefully adjusted. The photovoltaic generator delivers electrical energy with 9.3% efficiency at 25 C. In the hybrid regime the thermal efficiency attains 45% at a temperature of 90 C, and the electrical efficiency 6%. Author (ESA)

N82-18715# Metallgesellschaft, A.G., Frankfurt am Main (West Germany).
DEVELOPMENT OF SELECTIVE SOLAR ABSORBERS ON THE BASIS OF ALUMINUM ROLL-BOND HEAT EXCHANGERS Final Report, Jun. 1980
Manfred Moeller Bonn Bundesministerium fuer Forschung und Technology Nov. 1981 44 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technology
(BMFT-FB-T-81-183; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9,25

A deposition technique comparable to two-stage anodizing and especially suited for solar absorber panels, using roll-bond Al 99.5 and AlMnZr alloys as a substrate, was developed. The coating is of the nickel structure filter type and provides average solar absorptivity values of 94% and thermal emission values of 14%. The setup of a production plant capable of coating surfaces up to 2 sq m is described as well as the development of corrosion resistent hermetically sealed collectors. By means of an appropriate surface treatment the same corrosion resistance was achieved for absorbers mounted in ventilated collectors. Author (ESA)

N82-18716# Metallgesellschaft, A.G., Frankfurt am Main (West Germany). Metall-Lab.
AIRTIGHT COLLECTOR CASINGS Final Report
Manfred Moeller Bonn Bundesministerium fuer Forschung und Technology Oct. 1981 71 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technology
(BMFT-FB-T-81-184; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,20

The gas space between absorber and cover plates is hermetically sealed by means of a permanent elastic seal of the polysulfide or polyisobutylene type. The absorber-glass bond fits into a special frame to be manufactured and mounted industrially for easy assembly with titanium-zinc roof structures. The latter is made of prefabricated parts that can easily be joined by soldering. Adequate protection against penetration of rain, water, snow, and dust is provided for. The flat roof mounting is so designed that no boring through the cover is needed for fixing. Test results show high efficiency and long service life.
Author (ESA)

N82-18717# Dornier-Werke G.m.b.H. Friedrichshafen (West Germany).
DEVELOPMENT OF SELECTIVE SOLAR ABSORBERS ON THE BASIS OF ALUMINUM ROLL-BOND HEAT EXCHANGERS Final Report, Dec. 1979
Werner Scherber and Bernhard Schroeder Bonn Bundesministerium fuer Forschung und Technology Oct. 1981 105 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technology
(BMFT-FB-T-81-186; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22,30

A deposition technique for selective coatings akin to two-stage anodizing and especially suited for aluminum solar absorber panels was developed. The coating consists of tiny, velvet-like arranged nickel whiskers and provides a solar absorptivity as high as 94% and a low thermal emissivity of 12% to 17%. The coating technique, the production setup, and the test program are described. The coating proves to be resistent to humidity cycle testing and may be used in ordinary ventilated collectors. After production in a pilot production plant of about 10,000 roll-band panels with outstanding optical quality, homogeneity and long-term stability, a series production plant with a 7 m bath length was started. Author (ESA)

N82-18718# AEG-Telefunken, Wedel (West Germany). Fachbereich Neue Technologien, Raumfahrt.
DEVELOPMENT AND TESTS OF EXPERIMENTAL SOLAR GENERATORS FOR CONCENTRATING SYSTEMS Final Report, Mar. 1981
Hans Gochermann and Hubert Muehle Bonn Bundesministerium fuer Forschung und Technology Oct. 1981 34 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technology
(BMFT-FB-T-81-193; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,20

Terrestrial photovoltaic generators were developed for integration into a hybrid system designed to demonstrate cost reduction of photovoltaic systems by concentration of sunlight. The photovoltaic cells consist of monocrystalline silicon, n-p type, 5 by 5 sq cm large and 0.35 mm thick. The antireflection layer is made of TiOx and the contact system of passivated Ti(Pd)Ag. Usage of low ohmic materials and decrease of contact resistance by deeper n-diffusion allows for maintaining cell efficiency almost constant for intensities up to 0.2 W per sq cm. The layout of several hybrid systems using parabolic reflectors is given and the mounting of the solar cells is illustrated. Author (ESA)

N82-18719# Aeronautical Research Inst. of Sweden, Stockholm.
A TWO DIMENSIONAL STUDY OF THE MAXIMUM POWER THAT CAN BE OBTAINED FROM A WIND TURBINE IN A WIND SHEAR LAYER
Bo C. A. Johansson Apr. 1981 59 p refs
(FFA-134; ISSN-0081-5640) Avail: NTIS HC A04/MF A01; Aeronautical Research Inst. of Sweden, Stockholm Kr 70

Betz's stream tube theory for the maximum power that can be obtained from a wind turbine in a uniform flow is extended to two dimensions. The undisturbed velocity field (allowed to vary arbitrarily vertically) and the location of the wind turbine are given. The maximum power is calculated by calculus of variations. For common wind velocity profiles, the maximum power is only slightly larger than the power, which is obtained by a constant relative wind speed retardation equal to Betz's retardation, while for a linear velocity profile there is a considerable difference. Author (ESA)

N82-18720# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
MEASUREMENTS OF WAKE INTERACTION EFFECTS ON THE POWER OUTPUT FROM SMALL WIND TURBINE MODELS
Per-Henrik Alfredsson and Jan-Aake Dahlberg 4 Jul. 1981 62 p refs
(Contracts NE-5061-013; NE-5061-014)
(FFA-TN-HU-2189-Pt-5; ISSN-0081-5640) Avail: NTIS HC A04/MF A01

Power interference between two and three wind turbine models in a wind tunnel at four different ambient turbulence conditions was measured in order to assess turbine drag effects. Maximum power coefficient is 0.35 with a corresponding thrust coefficient of 0.85 at a tip speed ratio of 4. Flow visualization with small spacing between the turbines (2 x D) and power interaction measurements show that the presence of a downstream turbine affects the upstream turbine wake. By traversing a turbine across the wake of an upstream turbine, a chart of constant power lines (iso power lines) was established for the four ambient flow conditions. The power measurements in the wake can be used to estimate the overall efficiency of a limited array of wind turbines. Author (ESA)

N82-18721# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
ICING PROBLEMS FOR WIND TURBINES. SUMMARY OF STUDIES PERFORMED DURING WINTER SEASON 1980/81
Anders Gustafsson, Tord Kvick, and Staffan Meijer (Swedish Meteorological and Hydrological Inst.) 6 Oct. 1981 30 p refs Prepared in cooperation with Sydkraft AB
(Contract NE-5061-014)
(FFA-TN-HU-2262-Pt-4) Avail: NTIS HC A03/MF A01

The significance of an ice detector signal which shuts down a wind energy conversion system, not equipped with deicers, was studied. Correlations between the detector signal, meteorological parameters and ice buildup on the blades were investigated. Theoretical and field study data were used. Visual checks followed icing signals but little ice was observed since icing mostly occurred at night. The data are inadequate to enable conclusions to be drawn. Time lag between signals and visual observation must be shortened. Data must be collected when icing is expected, even if there is no signal. Author (ESA)

N82-18722# National Mechanical Engineering Research Inst., Pretoria (South Africa). Heat Mechanics Div.
EXPERIMENTAL INVESTIGATION OF HEAT AND MASS TRANSFER RATES IN REGENERATING TYPE SOLAR COLLECTOR
A. Johannsen Apr. 1981 31 p refs
(PB82-112244; CSIR-ME-1705; ISBN-0-7988-1475-6) Avail: NTIS HC A09/MF A01 CSCL 10A

Heat and mass transfer rates and air pressure drop in a regenerating type solar collector over the range of operating conditions expected in a real system were measured in a laboratory. The existence of analogy between heat and mass transfer in the collector was confirmed. GRA

N82-18723# Institute for Telecommunication Sciences, Boulder, Colo.
ELECTROMAGNETIC COMPATIBILITY ANALYSIS FOR A SATELLITE POWER SYSTEM RECEIVING SITE IN THE MOJAVE DESERT
E. L. Morrison, W. B. Grant, and E. J. Lutton Jun. 1981 86 p refs Sponsored in part by DOE
(PB82-100710; NTIA/Rept-81-78) Avail: NTIS HC A05/MF A01 CSCL 10B

The Satellite Power System (SPS) as a source of baseline electrical power was evaluated. The SPS program develops an initial understanding of the technical feasibility, the economic practicality, and the social and environmental acceptability of the SPS concept. Electromagnetic compatibility (EMC) of an SPS with existing and planned electromagnetic and electronic systems is illustrated. A methodology is developed for rectenna site EMC analysis and impact evaluation. GRA

N82-18724# National Bureau of Standards, Washington, D.C. Center for Building Technology.
ENERGY MANAGEMENT AND CONTROL SYSTEMS (EMCS) USER SATISFACTION STUDY
Gary W. Dickinson Aug. 1981 20 p refs Sponsored in part by DOE, Washington, D.C.
(PB82-103656; NBSIR-81-2346) Avail: NTIS HC A02/MF A01 CSCL 13A

A study of 86 energy management and control systems (EMCS) was made. Users' satisfaction and perceived system reliability was determined. GRA

N82-18725# Booz-Allen and Hamilton, Inc., Bethesda, Md.
EVALUATION OF RESIDENTIAL AND COMMERCIAL SOLAR/GAS HEATING AND COOLING TECHNOLOGIES. VOLUME 1: PROGRAM OVERVIEW Final Report, Dec. 1979 - Jan. 1981
Alan S. Hirshberg, Steven A. Haas, and Alan S. Jacobsen Dec. 1980 64 p 2 Vol.
(Contract GRI-5014-345-0280)
(PB82-103647; GRI-79/0105.1) Avail: NTIS HC A04/MF A01 CSCL 13A

The technologies and economics of solar/gas systems for application in the single-family residential market and in the small (individual building) commercial market were evaluated. The effects of solar industry maturity on system cost and the impact of solar incentives and natural gas price uncertainties on solar/gas system economics were studied. Projected solar/gas systems with advanced conventional gas equipment such as pulse combustion furnaces are discussed. GRA

N82-18726# Booz-Allen and Hamilton, Inc., Bethesda, Md.
EVALUATION OF RESIDENTIAL AND COMMERCIAL SOLAR/GAS HEATING AND COOLING TECHNOLOGIES, VOLUME 2 Final Report, Dec. 1979 - Jan. 1981
Alan S. Hirshberg, Steven A. Haas, and Alan S. Jacobsen Dec. 1980 287 p 2 Vol.
(Contract GRI-5014-345-0280)
(PB82-103654; GRI-79/0105.2) Avail: NTIS HC A13/MF A01 CSCL 13A

The economics of the most cost-effective solar/gas hybrid systems against a range of advanced gas-fired space conditioning equipment, including both conventional gas furnaces and pulse combustion gas furnaces were analyzed. In addition, the economic comparison considered improvements in performance and cost reduction for both solar/gas systems and advanced gas-fired equipment. GRA

N82-18727# National Bureau of Standards, Washington, D.C. Center for Building Technology.
CRITERIA FOR THE INSTALLATION OF ENERGY CONSERVATION MEASURES Final Report
Heinz R. Trechsel and Shelia J. Launey (DOE, Washington, D.C.) Jul. 1981 207 p refs Sponsored in part by DOE, Washington, D.C.
(PB82-104712; NBS-SP-606; LC-81-600055) Avail: NTIS HC A10/MF A01 CSCL 13A

Standard installation practices were developed to assist in assuring the effectiveness and safety of energy conservation measures. The criteria are being used by DOE to develop training manuals for installers, inspectors, and energy auditors. Issues that were considered in the development of the standards: moisture and building retrofit, attic ventilation, electrical wiring, recessed and surface-mounted fixtures, the use of diagnostic tools (infrared thermography, air change rate, and window air leakage measurements), and product certification are discussed. The products covered are loose-fill, batts and blankets, rigid foam boards, UF foam and reflective insulations, window devices, caulks and sealants, water heater insulation, oil burner replacements, and vent dampers. GRA

N82-18728# National Bureau of Standards, Washington, D.C. Center for Building Technology.

PERFORMANCE OF THE NORRIS COTTON FEDERAL OFFICE BUILDING FOR THE FIRST 3 YEARS OF OPERATION Final Building Sciences Series

James E. Hill, William B. May, Jr., Thomas E. Richtmyer, Jacqueline Elder, Robert L. Tibbott, Gary T. Yonemura, Charles M. Hunt, and Phillip T. Chen Aug. 1981 143 p refs Sponsored in part by DOE, Washington, D.C.

(PB82-105487; NBS-BSS-133; LC-81-600082) Avail: NTIS HC A07/MF A01 CSCL 13A

The Norris Cotton Federal Office Building, designed to demonstrate a number of energy saving concepts, is discussed. Some of the major energy conserving features of the building are the use of solar collectors; heavy masonry construction with exterior insulation; small overall window area; heat recovery from heat pumps, chillers, a natural gas-powered engine/generator, and the ventilation system; modular boilers; thermal storage tanks; and a variety of energy conserving lighting systems. GRA

N82-18729# National Bureau of Standards, Washington, D.C. Center for Building Technology.

FEDSOL: PROGRAM USER'S MANUAL AND ECONOMIC OPTIMIZATION GUIDE FOR SOLAR FEDERAL BUILDING PROJECTS Final Report

Jeanne W. Powell and Richard C. Rodgers, Jr. Aug. 1981 113 p refs Prepared in cooperation with Rodgers (Richard C.), Jr. Sponsored in part by DOE

(PB82-107012; NBSIR-81-2342) Avail: NTIS HC A06/MF A01 CSCL 13A

A user's manual for the FEDSOL computer program is provided. The FEDSOL program determines the economically optimal size of a solar energy system for a user-specified building, location, system type, and set of economic conditions; it conducts numerous breakeven and sensitivity analyses; and it calculates measures of economic performance as required under the Federal Rules. The economic model in the program is linked with the SLR (solar load ratio) design method developed to predict the performance of active systems. The economics portion of the program can, however, be used apart from the SLR method, with performance data provided by the user. Author

N82-18730# KVB, Inc., Minneapolis, Minn.

EMISSIONS AND EFFICIENCY PERFORMANCE OF INDUSTRIAL COAL STOKER FIRED BOILERS Final Report, Aug. 1977 - Nov. 1979

P. L. Langsjoen, J. O. Burlingame, and J. E. Gabrielson Jul. 1981 347 p refs Prepared in part by American Boiler Manufacturers Association

(Contracts EPA-IAG-D7-E681; EF-77-C-01-2609)

(PB82-115312; EPA-600/7-81-111A) Avail: NTIS HC A15/MF A01 CSCL 13A

Measurements of 18 coal stoker boilers including spreader stokers, mass fired overfeed stokers, and mass fired underfeed stokers are reported. Particulate loading is largely dependent on stoker type and degree of flyash reinjection. It increases with heat release rate, but can be controlled with proper use of overfire air in many cases. Nitric oxide increases with excess air and grate heat release rate. Overfire air, as it exists in current boiler designs, does not affect NOx. Relationships between operating variables and measured emissions and efficiency are also reported. GRA

N82-18731# Midland-Ross Corp., Toledo, Ohio. Thermal Systems Technical Center.

INDUSTRIAL BURNER AND PROCESS EFFICIENCY PROGRAM Annual Report, Jan. - Dec. 1980

S. R. Huebner and S. N. Prakash Mar. 1981 96 p refs (GRI Proj. 5011-342-0148)

(PB82-115486; GRI-80/0059; Rept-1228) Avail: NTIS HC A05/MF A01 CSCL 13A

A laboratory prototype burner which is compatible with a FM (frequency modulation) combustion control system where temperature control is accomplished by regulating the ratio of burner on-time to burner off-time was developed. This multifuel (natural gas and No. 2 fuel oil) high velocity burner is capable of repeated pulse ignition at maximum rated capability (1 million Btu-hour) with preheated air (from ambient to 1100F). A digital control in the FM mode was developed. Experimental data from tests in a laboratory furnace indicated that when applied to a batch type thermal process where appreciable turndown is presently obtained by excess air operation, the FM combustion system provides improvements in process fuel efficiency and gains in productivity. Author

N82-18732# Carltech Associates, Columbia, Md.

GEOTHERMAL ENERGY MARKET STUDY ON THE ATLANTIC COASTAL PLAIN: TECHNICAL FEASIBILITY OF USE OF EASTERN GEOTHERMAL ENERGY IN VACUUM DISTILLATION OF ETHANOL FUEL

J. Carl Uhrmacher Apr. 1981 35 p refs Prepared for APL, Laurel, Md.

(Contracts EX-78-A38-1008; DE-AI01-79FT-27025; N00024-81-C-5301)

(PB82-123001; JHU/APL/QM-81-066) Avail: NTIS HC A03/MF A01 CSCL 07A

The application of modest temperature geothermal water in combination with a vacuum system for the distillation of fuel grade ethanol is analyzed. The case analyzed was for geothermal water temperatures typical of what might be found on the Atlantic Coastal Plain, i.e., 150 F, and a vacuum of 130 mm Hg, i.e., currently in use in a farm scale vacuum distillation system in Ohio. GRA

N82-18733# National Oceanic and Atmospheric Administration, Washington, D. C.

COMMERCIAL OCEAN THERMAL ENERGY CONVERSION (OTEC) LICENSING FINAL ENVIRONMENT IMPACT STATEMENT Final Environmental Impact Statement

Jul. 1981 284 p refs

(PB82-117532; NOAA-81082705) Avail: NTIS HC A13/MF A01 CSCL 10B

The effects of licensing commercial ocean thermal energy conversion (OTEC) development on human activities and the atmospheric, marine and terrestrial environments are identified and assessed. Alternate regulatory approaches for mitigating adverse environmental impacts associated with siting, design, and operation of commercial OTEC plants are evaluated, and the preferred regulatory alternative identified. Author (GRA)

N82-18734# Illinois Univ. at Chicago Circle, Chicago.

ENERGY CONSUMPTION PATTERNS: ILLINOIS, INDIANA, KENTUCKY, OHIO, PENNSYLVANIA, AND WEST VIRGINIA (1975)

James P. Hartnett and Jan L. Saper Apr. 1981 80 p refs (Grant EPA-R-805588)

(PB82-101478; EPA-600/7-81-066) Avail: NTIS HC A05/MF A01 CSCL 10A

Energy consumption data for the year 1975 for the states of Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia, as well as for the United States as a whole is presented. Energy use is examined both by consuming sector and by fuel source. The principal components of each sector are described briefly, and detailed comparisons are made among national, six-state, and individual state consumption patterns for 1975. Preliminary estimates are given for total energy consumption in the United States, the six states, and individual states for the years 1976, 1977, and 1978. GRA

N82-18735# Purdue Univ., Lafayette, Ind.

OHIO RIVER BASIN ENERGY STUDY: SOCIAL VALUES AND ENERGY POLICY

Harry R. Potter and Heather J. Norville Apr. 1981 152 p refs Prepared in cooperation with Ohio River Basin Energy Study

(Grants EPA-R-806451; EPA-R-805585)

(PB82-101494; EPA-600/7-81-053) Avail: NTIS HC A08/MF A01 CSCL 10A

American social values and their relationship to energy production and use within the the Ohio River Basin area are identified and analyzed. The major topics are (1) an overview of social values and energy policy, (2) an identification of values implicit in the Ohio River Basin Energy Study scenarios, (3) a secondary analysis of survey data, and (4) a discussion of variations in social values by social and demographic characteristics. GRA

N82-18736# West Virginia Univ., Morgantown. Bureau of Business Research.
AN ECONOMIC ANALYSIS OF THE ELECTRIC UTILITY SECTOR IN THE OHIO RIVER BASIN REGION
Patrick C. Mann and Tom S. Witt Apr. 1981 106 p refs Prepared in cooperation with Ohio River Basin Energy Study
(Grant EPA-R-805585)
(PB82-103268; EPA-600/7-81-047) Avail: NTIS HC A06/MF A01 CSCL 10A

The potential effects of different pricing mechanisms on capacity requirements, load factors, and fuel costs are discussed, with particular attention paid to their implications for the Ohio River Basin Region. Two sets of estimates for various elasticities of demands are presented. Regulatory policy and its effect upon electricity demand and pricing are studied. GRA

N82-18737# Kentucky Univ., Lexington.
A BASELINE ASSESSMENT OF COAL INDUSTRY STRUCTURE IN THE OHIO RIVER BASIN ENERGY STUDY REGION
David S. Walls, Dwight B. Billings, Mary P. Payne, and Joe F. Childers, Jr. Apr. 1981 581 p refs Prepared in cooperation with Ohio River Basin Energy Study
(Grant EPA-R-805585)
(PB82-103615; EPA-600/7-81-058) Avail: NTIS HC A25/MF A01 CSCL 10A

Detailed information is provided on coal production and employment by county, the consumption and distribution of coal, the ownership structure of the coal industry, coal land and mineral ownership, operator associations and unions in the coal industry, and projections of coal development. The emphasis is on the six ORBES states (Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia), but information also is provided on the coal industry in the other eastern states and the western states when relevant. GRA

N82-18738# West Virginia Univ., Morgantown.
WEST VIRGINIA BASELINE
Vincent P. Cardi, ed., Charles Baer, Anna Graham, Thomas Hall, Dennis Rankin, and Thomas J. Sweet Apr. 1981 491 p refs Prepared in cooperation with Ohio River Basin Energy Study Original contains color illustrations
(Grant EPA-R-805585)
(PB82-103672; EPA-600/7-81-050) Avail: NTIS HC A21/MF A01 CSCL 10A

Baseline information on West Virginia is provided. The topics covered are terrestrial ecology, aquatic ecology, geology and climatology, socioeconomics, and a legal analysis of institutional accountability. The hydrology, water quality, endangered species, and clean streams of five river basins are described. GRA

N82-18739# West Virginia Univ., Morgantown. Bureau of Business Research.
ENERGY CONSUMPTION IN THE OHIO RIVER BASIN ENERGY STUDY REGION, 1974, BY END USER AND FUEL TYPE
Walter P. Page Apr 1981 66 p refs Prepared in cooperation with Ohio River Basin Energy Study
(Grant EPA-R-805585)
(PB82-104811; EPA-600/7-81-048) Avail: NTIS HC A04/MF A01 CSCL 10A

Energy consumption as of 1974 is calculated for the Ohio River Basin region (substantial parts of Illinois, Indiana, and Ohio, all of Kentucky, most of West Virginia, and southwestern Pennsylvania). Substate energy consumption information is obtained at the Bureau of Economic Analysis (BEA) level and aggregated across BEA areas for an approximation to the Ohio River Basin Energy Study (ORBES) region; a set of factors is applied to allocate partial BEA area energy consumption to the ORBES portion of a given BEA area. Comparisons also are made between regional energy consumption and energy consumption in the six-state area and the United States. GRA

N82-18740# Illinois Univ. at Chicago Circle, Chicago.
THE OHIO RIVER BASIN ENERGY FACILITY SITING MODEL. VOLUME 1: METHODOLOGY
Gary L. Fowler, Robert E. Bailey (Ohio State Univ., Columbus), Steven I. Gordon (Ohio State Univ., Columbus), Steven D. Jansen, J. C. Randolph (Indiana Univ., Bloomington), and W. W. Jones (Indiana Univ., Bloomington) Apr. 1981 196 p refs
(Grants EPA-R-805588; EPA-R-805589; EPA-R-805609)
(PB82-102591; EPA-600/7-81-042) Avail: NTIS HC A09/MF A01 CSCL 10B

The siting model developed for ORBES is specifically designed for regional policy analysis. The region includes 423 counties in an area that consists of all of Kentucky and substantial portions of Illinois, Indiana, Ohio, Pennsylvania, and West Virginia. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-18741*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LIMS INSTRUMENT PACKAGE (LIP) BALLOON EXPERIMENT: NIMBUS 7 SATELLITE CORRELATIVE TEMPERATURE, OZONE, WATER VAPOR, AND NITRIC ACID MEASUREMENTS
Robert B. Lee, III, Bruce W. Gandrud (National Center for Atmospheric Research), Donald E. Robbins (NASA. Johnson Space Center), Laurence C. Rossi (NASA. Wallops Flight Center), and Nigel R. W. Swann (National Physical Lab., London) Feb. 1982 41 p refs
(NASA-TM-83259) Avail: NTIS HC A03/MF A01 CSCL 13B

The Limb Infrared Monitor of the Stratosphere (LIMS) LIP balloon experiment was used to obtain correlative temperature, ozone, water vapor, and nitric acid data at altitudes between 10 and 36 kilometers. The performance of the LIMS sensor flown on the Nimbus 7 Satellite was assessed. The LIP consists of the modified electrochemical concentration cell ozonesonde, the ultraviolet absorption photometric of ozone, the water vapor infrared radiometer sonde, the chemical absorption filter instrument for nitric acid vapor, and the infrared radiometer for nitric acid vapor. The limb instrument package (LIP), its correlative sensors, and the resulting data obtained from an engineering and four correlative flights are described. E.A.K.

N82-18742# Princeton Univ., N. J. Dept. of Chemical Engineering.
GAS-SURFACE INTERACTIONS IN CRYOGENIC WHOLE AIR SAMPLING Final Report, 1 Nov. 1976 - 31 Mar. 1980
J. M. Calo, R. J. Fezza, and E. J. Dineen May 1981 418 p refs
(Contract F19628-77-C-0071; AF Proj. 6687)
(AD-A108255; AFGL-TR-81-0162) Avail: NTIS HC A18/MF A01 CSCL 20/12

Physico-chemical phenomena associated with in-situ cryogenic whole air sampling of stratospheric species are examined. Condensation phenomena on disks of various materials, cooled by a mechanical, helium cycle refrigerator, and subsequent thermal desorption behavior were studied using quadrupole mass spectrometry and NO chemiluminescence. Strong, spurious 'first' condensations in the 200-250 K temperature range were observed. This phenomenon is attributed to water vapor contamination of the surface resulting in supersaturation and condensate growth initiation by surface nucleation. Desorption spectra of binary cryofrosts and of the pure components revealed significant levels of interaction between species in the cryofrost. These results preclude chromatographic cryo-fractionation as a reliable technique for whole air sample and analysis. Reactions which occur during cryofrost regeneration were studied via temperature programmed and flash desorption. Surprisingly persistent disproportionation of NO occurred with conversions of nearly 50 percent upon desorption of NO containing cryofrosts. Rapid ozone recombination and oxidation of NO to NO2 by ozone are also reported. GRA

N82-18743# Bolt, Beranek, and Newman, Inc., Canoga Park, Calif.

INCORPORATION OF ENVIRONMENTAL IMPACT INDICES INTO NOISEMAP Final Report

Harry Seidman Wright-Patterson AFB, Ohio Air Force Aerospace Medical Research Labs. Nov. 1981 33 p refs
(Contract F33615-79-C-0516; AF Proj. 7231)
(AD-A108616; BBN-4444; AFAMRL-TR-81-31) Avail: NTIS HC A03/MF A01 CSCL 20/1

NOISEMAP and the General Purpose Contouring Program (GPCP) were modified to be compatible with the SITE II demographic data base and software program. This means that population and socioeconomic status information from census tract tapes can be routinely obtained for noise contour areas generated using NOISEMAP. NOISEMAP Version 4.1 identifies to all users this new demographic overlay capability and the recent (Feb 80) update of the military aircraft noise data base (NOISEMAP) that revised the algorithm for predicting sound duration as a function of propagation distance. Author (GRA)

N82-18744# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 5.

INVESTIGATION ON AIR SAMPLES FROM THE SUBMARINE SJOEHUNDEN, AUGUST 1979 [UNDERSOEKNING AV LUFTPROVER FRAAN UBAATEN SJOEHUNDEN, AUGUSTI 1979]

L.-H. Andersson, A. Braend-Persson, B. Gelin, A. Linnarson, and G. Ringqvist Oct. 1981 61 p refs In SWEDISH
(FOA-C-54035-H1) Avail: NTIS HC A04/MF A01

Hydrocarbon and aerosol concentrations in a submarine during a dive were investigated. Oil particles and gaseous hydrocarbons, due to an oil leak and kitchen fumes, were detected. Heavy metals did not occur, except small amounts of copper and zinc. In some cases fibers were found, possibly asbestos. In many cases textile fibers were found. In most of the filters, carbon particles and traces of evaporated seawater were present. The submarine atmospheric dust content is not dangerous to the crew's health. Author (ESA)

N82-18745# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 5.

INVESTIGATIONS ON AIR SAMPLES FROM THE SUBMARINE NAECKEN, AUGUST 1980 [UNDERSOEKNING AV LUFTPROVER FRAAN UBAATEN NAACKEN, AUGUSTI 1980]

Aasa Braend-Persson, Allan Linnarson, and Goesta Ringqvist Oct. 1981 37 p refs In SWEDISH
(FOA-C-54036-H1) Avail: NTIS HC A03/MF A01

Hydrocarbon pollution of the atmosphere in a submarine was investigated, and aerosol density was measured. A small oil leak was noticed as well as intake of diesel exhaust during snorkelling. The hydrocarbon concentration was low; provided these components are limited to hydraulic fluids, lubricating oils, or kitchen fumes, the recorded concentration probably is not dangerous to health. Dust particle density is lower than that of a house. Author (ESA)

N82-18746# Arkansas-White-Red Basins Inter-agency Committee, Amarillo, Tex.

PLANNING PROCESS STUDY: ARKANSAS-WHITE-RED RIVER BASINS

Jul. 1981 93 p refs Sponsored in part by Water Resources Council, Washington, D.C.
(PB82-111584) Avail: NTIS HC A05/MF A01 CSCL 13B

In an effort to properly scope the study and to assess the need for regional planning itself, State input was sought and received to determine the major water resources problems existing in the region. The major problems identified were inadequate ground and surface water supplies, degraded surface water quality and flooding of related lands. Author (GRA)

N82-18747# Ohio River Basin Commission, Cincinnati.

EXECUTIVE SUMMARY OF THE CUMBERLAND RIVER BASIN REGIONAL PLAN: WATER AND RELATED LAND RESOURCES REPORT

Jun. 1981 25 p Sponsored in part by Water Resources Council
(PB82-111519) Avail: NTIS HC A02/MF A01 CSCL 13B

A regional water resources management plan for the Cumberland River Basin in Virginia, Kentucky, and Tennessee is described. A comprehensive assessment of project needs, problems, and programs is made. GRA

N82-18748# National Oceanic and Atmospheric Administration, Ann Arbor, Mich. Environmental Research Lab.

AN EQUILIBRIUM MODEL FOR THE PARTITIONING OF SYNTHETIC ORGANIC COMPOUNDS: FORMULATION AND CALIBRATION

Brian J. Eadie May 1981 47 p refs
(PB82-116682; NOAA-TM-ERL-GLERL-35; NOAA-81081903) Avail: NTIS HC A03/MF A01 CSCL 06F

An equilibrium toxic organic distribution model has been designed. This simple model, needing only information on the contaminants, water solubility, and vapor pressure, yields useful information on the distribution of environmentally persistent organic contaminants. The model was calibrated for total DDT in three ecosystems: a representative coastal regime, Lake Michigan, and a global system. There are some discrepancies between model output and available data; while the model calibrated well for the coastal regime and the Lake Michigan ecosystem, it failed for the global ecosystem. This is presumably because of the uneven application of DDT and the large biomass of terrestrial plants, which are relatively uncontaminated. Owing to its low vapor pressure, DDT has not and will not come to a global equilibrium. GRA

N82-18749# National Academy of Sciences - National Research Council, Washington, D. C.

ENERGY AND THE FATE OF ECOSYSTEMS: STUDY OF NUCLEAR AND ALTERNATIVE ENERGY SYSTEMS. SUPPORTING PAPER 8

Oct. 1980 420 p refs
(PB82-113747; ISBN-0-309-03098-6; LC-80-83687) Avail: NTIS HC A18/MF A01 CSCL 06F

The Ecosystem Impacts Resource Group of the Risk and Impact Panel has attempted to identify the unresolved energy policy decisions whose future resolution will have the greatest effect in determining the fate of vulnerable ecosystems, and to assess the likelihood and consequences of undersirable modifications of these systems. GRA

N82-18750# Teknekron, Inc., McLean, Va.

ASSESSMENT OF FUTURE ENVIRONMENTAL TRENDS AND PROBLEMS: INDUSTRIAL USE OF APPLIED GENETICS AND BIOTECHNOLOGIES Final Report

Robert H. Zaugg and Jeff R. Swarz Sep. 1981 169 p refs
(Contract EPA-68-02-3638)
(PB82-118951; EPA-600/8-81-020) Avail: NTIS HC A08/MF A01 CSCL 06C

The proposed study is to be a technological assessment of genetic engineering as it applies to commercial industries and its potential effects on the environment. This includes a detailed literature review and state of the art analysis of genetic engineering, an analysis of how applied genetics will affect public health and public welfare, its probable impact on the environmental policies and an analysis of knowledge gaps, including identification of inadequacies of analytical methods and techniques. Additionally, the socioeconomic impact of genetic engineering on commercial industry will be examined. The approach will include a literature review of five key industrial sectors: Pharmaceutical and Cosmetic, Industrial Chemical, Energy, Food Manufacturing and Preservation, and Mining. Areas that will be examined at length include: Environment and Populations, Government Policy, and Technology. GRA

N82-18751# Radian Corp., Austin, Tex.

ENVIRONMENTAL ASSESSMENT, SOURCE TEST AND EVALUATION REPORT: LURGI (KOSOVO) MEDIUM-Btu GASIFICATION Final Report, Mar. 1976 - Mar. 1981

K. W. Lee, W. S. Seames, R. V. Collins, K. J. Bombaugh, and G. C. Page Aug. 1981 325 p refs
(Contracts EPA-68-02-3137; EPA-68-02-2147)
(PB82-114075; EPA-600/7-81-142) Avail: NTIS HC A14/MF A01 CSCL 13B

An environmental data acquisition program involving a commercial scale, medium Btu, Lurgi gasification plant in the Kosovo region of Yugoslavia is described. The objective of the program was to characterize potential environmental problems associated with coal gasification in a Lurgi plant. The primary conclusion of the environmental assessment mode is that the process exhibits a significant potential for pollution. All discharge streams are potential vehicles for pollutant transfer from the process to the environment. The streams with the highest priority for control based on their potential for adverse health effects in the three discharge media, are the H2S rich waste gas, phenolic wastewater, and heavy tar. GRA

N82-18752# Westinghouse Electric Corp., Pittsburgh, Pa. Research and Development Center.

TESTING AND ANALYSIS OF A WET-DRY CROSSFLOW COOLING TOWER. VOLUME 1: TEST PROGRAM AND RESULTS Final Report, Jul. 1977 - May 1981

D. L. Ayers, M. R. Hogan, A. E. Hiber, and R. A. Luchata Jul. 1981 186 p refs Prepared in cooperation with Tennessee Valley Authority, Chattanooga
(PB82-103771; TVA/OP/EDT-81/47A-Vol-1; EPA-600/7-81-106A-Vol-1) Avail: NTIS HC A09/MF A01 CSCL 13A

The test program and performance analysis of a single cell mechanical draft wet/dry cooling tower are discussed. Performance data and results on mass transfer, heat transfer, fluid flow plume formation, and acoustic characteristics for comparison with models/theories were obtained. Correlations are presented for the wet fill mass transfer coefficient, wet fill water loss, Colburn j-factor for the finned tubes, and fan efficiency of the following water loading in the tubes, air loading over the fins, log mean humidity difference, outlet water temperature, Reynolds number, and air flow rate. Acoustic data are fitted to a series of curves for each of the eight octave bands. GRA

N82-18753# TRW, Inc., Redondo Beach, Calif. Environmental Engineering Div.

EMISSIONS ASSESSMENT OF CONVENTIONAL STATIONARY COMBUSTION SYSTEMS: SUMMARY REPORT Final Report, Sep. 1976 - Jul. 1981

C. C. Shih and A. M. Takata Sep. 1981 77 p refs
(Contract EPA-68-02-2197)
(PB82-109414; EPA-600/7-81-003D) Avail: NTIS HC A05/MF A01 CSCL 13B

Results of a characterization of multi-media emissions from 39 source categories of conventional stationary combustion systems are reported. In the assessment, existing emissions data were first examined to determine the adequacy of the data base. This was followed by a measurement program to fill identified data gaps. Emissions data obtained from the sampling and analysis program were combined with existing emissions data to provide estimates of emission levels, and to define the need for additional data. Study results indicate that flue gas emissions of NOx, SO2, and particulate matter from the 39 source categories account for approximately 86, 66, and 36%, respectively, of the emissions of these pollutants from all stationary sources. Additionally, flue gas emissions of sulfates and several trace elements from coal- and oil-fired combustion sources also require further attention. GRA

N82-18754# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).

NATO/CCMS PILOT STUDY ON DISPOSAL OF HAZARDOUS WASTES, PHASES 1 AND 2 Final Report

Apr. 1981 71 p refs
(PB82-114562; NATO/CCMS-122) Avail: NTIS HC A04/MF A01 CSCL 13B

The objectives of the pilot study are defined as follows: (1) to define and analyze technical, organizational and regulating ways and means for the proper disposal of hazardous wastes, (2) to compile and evaluate various management approaches to the solution of the hazardous waste problem, and (3) to draw conclusions from the previous analysis and work out recommendations where possible. The conclusion, after seven years of intensive work, is that the pilot study is thus far the most comprehensive and effective international effort in the area of hazardous waste management. Author (GRA)

N82-18755# Florida Univ., Gainesville. Water Resources Research Center.

EFFECT OF OXIDATION OF SOIL ORGANIC MATTER ON WATER QUALITY: ROLE OF NITRIFICATION AND DENITRIFICATION

Robert L. Tate, III and Richard E. Terry Apr. 1981 94 p refs
(Contract DI-14-34-0001-9063;OWRT Proj. B-041-FLA)
(PB82-103946; W81-05354; OWRT-B-041-FLA(2)) Avail: NTIS HC A05/MF A01 CSCL 08M

Since mineral nitrogen produced in Histosols has a significant effect on regional water quality, nitrification and denitrification and the effect of the physical and chemical environment on these reactions were studied in Pahokee muck, a drained Histosol. Highest potential denitrification rates were detected in cultivated fields. These rates were about 3-fold that of a soil from a fallow field. Nitrite accumulated in low concentrations in the soils as a result of denitrification. Denitrification was limited by carbon in uncultivated soils, but not in the soils from the sugarcane or grass fields. Oxygen was limiting to denitrification in drained soils since during flooding the denitrification capacity and denitrification populations increased, while soil nitrate levels decreased about 80 percent. GRA

N82-18756# Mason and Hanger-Silas Mason Co., Inc., Leonardo, N. J.

PERFORMANCE TESTING OF FOUR SKIMMING SYSTEMS Final Report

Henry W. Lichte, Michael K. Breslin, Gary F. Smith, Douglas J. Graham (PA Engineering), and Robert W. Urban (PA Engineering) Sep. 1981 92 p refs
(Contract EPA-68-03-2642)
(PB82-101353; EPA-600/2-81-189) Avail: NTIS HC A05/MF A01 CSCL 13B

Performance tests were conducted at an oil and hazardous simulated environmental test tank on four commercial oil spill cleanup devices: the Sapiens Sirene skimming system, the Oil Mop remote skimmer, the Troll/Destroll skimming system, and the Versatile Bennett arctic skimmer. The objective of the test program was to evaluate skimmer performance in collecting oil floating on water using several wave conditions, tow speeds, and skimmer operating parameters. Author

N82-18757# Scott Environmental Technology, Inc., San Bernardino, Calif.

INVENTORY OF EMISSIONS FROM MARINE OPERATIONS WITHIN THE CALIFORNIA COASTAL WATERS Final Report

W. C. Kelly, L. R. Reckner, and G. D. Maines 26 Jun. 1981 222 p refs
(Contract ARB-A6-209-30)
(PB82-105099; Rept-2581-01-0681; ARB-R-81/40) Avail: NTIS HC A10/MF A01 CSCL 13B

The magnitude of air polluting emissions from marine vessels and marine related activities in the coastal waters and ports of California is studied. Major sources of emissions included the operation of marine engines and auxiliary power plants; the transport, handling, storage and transfer of petroleum and petroleum products, and the ballasting and lightering associated with tanker vessel operations. The record of activity of every commercial vessel operating in the waters of California was traced and the emissions were calculated for each activity of these vessels. The average daily emissions were - NOx 41.4 tons per day (tpd), CO 8.3 tpd, SO2 79.2 tpd, hydrocarbons 21.5 tpd, and particulates 7.6 tpd. GRA

N82-18758# General Electric Co., St. Petersburg, Fla. Energy Systems Programs Dept.

STUDY OF AUTOMATIC CONTROL SYSTEM TO MAINTAIN CONSTANT PERCENTAGE SO2 RETENTION IN A PRESSURIZED FBC Final Report, Sep. 1979 - Dec. 1980

K. J. Daniel, S. D. Finnigan, and R. M. Reinstrom Sep. 1981 174 p refs
(Contract EPA-68-02-3131)
(PB82-110693; EPA-600/7-81-154) Avail: NTIS HC A08/MF A01 CSCL 13B

The Clean Air Act amendments of 1977 indicate that future emission standards for SO2 should be based on a percentage reduction (comparing sulfur emissions with sulfur feed). In a PFB, sulfur feed (coal sulfur content, feed rate) and sulfur removal effectiveness (sorbent reactivity, feed rate) vary continually during operation. A transient model of a PFB plant was developed.

validated, and used to assess automatic control options. The preferred control option identified in the assessment would continuously monitor the sulfur content in the feed coal, and would adjust the sorbent feed rate to maintain a constant sorbent-calcium/coal-sulfur-feed ratio. Such a system would minimize, but not eliminate, the need for excess sorbent feed to ensure that the PFB did not exceed the specified percentage SO2 reduction on a 30-day average. GRA

N82-18759# Texas Dept. of Water Resources, Austin.
GROUND-WATER FOR THE SALT BASIN, EAGLE FLAT, RED LIGHT DRAW, GREEN RIVER VALLEY, AND PRESIDIO BOLSON IN WESTERNMOST TEXAS
Donald E. White, Joseph S. Gates, James T. Smith, and Bonnie J. Fry Oct. 1980 103 p Prepared in cooperation with Geological Survey, Austin, Tex.
(PB82-105289; TDWR/R-259) Avail: NTIS CSCL 13B

Ground water data was collected in the Texas basins west of the Pecos River drainage area and northwest of the Big Bend country. The basins included are, from east to west: Presidio Bolson, Salt Basin, Green River Valley, Eagle Flat, and Red Light Draw. The data collection program consisted of an inventory of all major irrigation, municipal supply, and industrial wells; selected stock and domestic wells; and selected springs. The data covers parts of Hudspeth, Culberson, Jeff Davis, and Presidio Counties. Maps and tables show locations of wells and springs; records, including water levels; and chemical analysis. Author (GRA)

N82-18760# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air Quality Planning and Standards.
COMPILATION OF AIR POLLUTANT EMISSION FACTORS (INCLUDING SUPPLEMENTS 1-7), SUPPLEMENT 12
Apr. 1981 192 p refs
(PB82-101213; AP-42-ED-3-Suppl-1-7/12) Avail: NTIS HC A09/MF A01 CSCL 13B

Revised or updated emissions data are presented for dry cleaning; surface coating; storage of organic liquids; solvent degreasing; graphic arts; consumer/commercial solvent use; sulfuric acid; beer making; ammonium sulfate; primary aluminum; secondary aluminum; gray iron foundries; steel foundries; secondary zinc; asphaltic concrete; and asphalt roofing. The NEDS source classification codes and emission factor listing, and table of lead emission factors are presented. GRA

N82-18761# Meteorology Research, Inc., Santa Rosa, Calif.
CHARACTERIZATION OF SCRUBBED AND UNSCRUBBED POWER PLANT PLUMES Final Report, Jun. 1980 - Apr. 1981
Gregory R. Markowski, Jeffrey L. Stith, and L. Willard Richards Jun. 1981 60 p refs
(Contract EPA-68-02-3418)
(PB82-101346; EPA-600/3-81-041) Avail: NTIS HC A04/MF A01 CSCL 13B

Airborne measurements of scrubbed and unscrubbed plumes were made under the SCRUB program. The flight program and methodology of the SCRUB program and results of the analysis of the data gathered during the flight program are presented. The analysis results cover plume chemistry, primary aerosol, aersol size distributions; and aerosol formation rates among the scrubbed and mixed plumes. Little difference was seen in photochemical aerosol and sulfate formation in the scrubbed and unscrubbed plumes. However, measurement noise and plume mixing may have obscured moderate differences. The submicron primary emissions from the scrubbed unit were only about 14 percent of those from the unscrubbed unit. GRA

N82-18762# Teknekron, Inc., Waltham, Mass.
EVALUATION OF POINT SOURCE DISPERSION MODELS Final Report
Michael T. Mills, Roger Calazza, David D. Hergert, and David A. Lynn Sep. 1981 274 p refs
(Contract EPA-68-02-3192)
(PB82-121062; EPA-450/4-81-032) Avail: NTIS HC A12/MF A01 CSCL 13B

Two Gaussian point source dispersion models were evaluated by use of hourly meteorological, air quality, and emissions data collected at four power plant monitoring networks. Two versions of the EPA CRSTER model, CRSTER (Turner) and CRSTER (Irwin), were evaluated. CRSTER (Turner) is the current EPA CRSTER Model which used the so called Pasquill-Gifford-Turner (P-G-T) dispersion curves. CRSTER (Irwin) is a modification of the model based upon Irwin's horizontal and vertical dispersion curves. These models differ only in the choice of horizontal and vertical plume dispersion coefficients (sigma (y) and sigma (z)) and wind profile coefficients. Author

N82-18763# Environmental Protection Agency, Washington, D.C. Municipal Wastewater Research Committee.
MUNICIPAL WASTEWATER: RESEARCH STRATEGY SUPPLEMENT, 1981-1985
Jul. 1981 241 p
(PB82-120106; EPA-600/9-81-032) Avail: NTIS HC A11/MF A01 CSCL 13B

The requirements for Research and Development support of Program Office activities are identified. Both short-term requirements and research responses and long-range research planning are presented. These plans are based on current perceptions of research necessary to address anticipated problems or technology needs over the next five years. T.M.

N82-18764# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.
SOLAR ENERGY FOR POLLUTION CONTROL Final Report, 1 Jun. - 31 Oct. 1978
P. Overly and C. Frankling Oct. 1981 103 p refs
(Contract EPA-68-03-2567; EPA Proj. 7396)
(PB82-116658; FR-80-39/EE; EPA-600/7-81-166) Avail: NTIS HC A06/MF A01 CSCL 13B

A study was conducted to determine which existing or emerging pollution control processes are best suited to make use of solar energy input and to determine the potential benefits of such applications. Pollution control processes were matched with compatible solar energy systems, resulting in the following four combinations: anaerobic digestion/flat-plate collector; anaerobic digestion/parabolic trough concentrator; baghouse heating/parabolic trough concentrator; SOX scrubbing/parabolic trough concentrator. GRA

N82-18765# Academy of Natural Sciences of Philadelphia, Pa. Dept. of Limnology.
AN INVESTIGATION OF CHEMISTRY AND TOXICITY OF OZONE-PRODUCED OXIDANTS AND BROMATE TO SELECTED ESTUARINE SPECIES
Dennis T. Burton and Leonard B. Richardson May 1981 100 p refs
(Grant EPA-R-804683)
(PB82-116351; EPA-600/4-81-040) Avail: NTIS HC A05/MF A01 CSCL 13B

The chemical and biological effects of ozone in estuarine systems was determined. Its suitability as an alternative to chlorine was evaluated. Chemical studies were performed to determine oxidant decay rates and bromate formation in both natural and artificial estuarine water. Ozonation of estuarine or marine waters can produce significant amounts of bromate if the natural levels of ammonia-nitrogen and other competing compounds are low and the initial residual oxidant and bromide concentrations are high. Toxicity studies showed that the concentrations of bromate which theoretically could be formed in an ozonated discharge were not toxic to the early life stages of striped bass (Morone saxatilis) and juvenile spot (Leiostomus xanthurus). A ozone appears to offer few if any, advantages over chlorine in reducing toxicity to estuarine organisms. Author

N82-18766# PEDCo-Environmental, Inc., Cincinnati, Ohio.
EPA UTILITY FGD (FLUE GAS DESULFURIZATION) SURVEY Final Report, Apr. - Jun. 1981
M. Smith, M. Melia, N. Gregory, and R. McKibben Aug. 1981 335 p
(Contract EPA-68-02-3173)
(PB82-115858; EPA-600/7-81-012D) Avail: NTIS HC A15/MF A01 CSCL 13B

A survey of operational and planned domestic utility flue gas desulfurization (FGD) systems, operational domestic particle scrubbers, and Japanese coal-fired utility FGD installations is presented. It summarizes information contributed by the utility industry, system and equipment suppliers, systems designers, research organizations and regulatory agencies. It presents data on system design, fuel characteristics, operating history, and actual performance. Unit by unit dependability parameters are included and problems and solutions associated with the boilers, scrubbers, and FGD systems are discussed. The domestic FDG systems are tabulated alphabetically by development status (operational, under construction, or in the planning stages), utility company, system supplier, process, waste disposal practice, and regulatory class. Author

N82-18767# Pacific Environmental Services, Inc., Santa Monica, Calif.

QUALITY ASSURANCE AUDITS FOR SIP AND NECRMP EMISSION INVENTORIES: NEW YORK AND NEW JERSEY Final Report

L. G. Wayne and J. Cassamassi Aug. 1981 100 p
(Contract EPA-68-02-3511)
(PB82-114273; EPA-902/4-81-002) Avail: NTIS HC A05/MF A01 CSCL 13B

Quality assurance audits were performed covering emission inventories for volatile organic compounds and oxides of nitrogen in the State of New Jersey and in a portion of the State of New York comprising the counties of Rockland, Westchester, Nassau, Suffolk, Bronx, New York, Queens, Kings and Richmond. Point source listings were compared with EPA's RACT directory and with State Industrial Directors to compile list of possibly missing point sources. Methodology involved in segregating point and area sources, in estimating emissions and in seasonal adjustment of the inventories to a typical summer-day basis was reviewed. Area source categories and the methodologies an apportioning factors applied to them were reviewed. Results are extensively tabulated. GRA

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation*.

N82-18768 California Univ., Santa Cruz.

THE ENVIRONMENTAL STRATIGRAPHY AND DEPOSITIONAL SYSTEMS OF THE PRECAMBRIAN (?)-CAMBRIAN CAMPITO FORMATION, EASTERN CALIFORNIA AND WESTERN NEVADA Ph.D. Thesis

Jeffrey Frazer Mount 1980 246 p
Avail: Univ. Microfilms Order No. 8127995

The Campito Formation is a 1300 m thick upper Precambrian(?)Lower Cambrian sequence of siliciclastic rocks that crop out extensively in western Nevada and eastern California. The formation comprises two members: the Andrews Mountain Member and the gradationally overlying Montenegro Member. The Andrews Mountain Member consists of complexely interbedded, dark-colored feldspathic quartzites, siltstones and mudstones. The Montenergro Member is composed mostly of siltstones and mudstones. The Campito lithologies reflect a complex diagenetic and metamorphic history. Most importantly, the abundant magnetite within the rock was produced by metamorphic recrystallization of a preexisting iron oxide phase, probably hematite (?) A transition analysis of the five facies and nine subfacies of the campito formation indicates that two overall depositional systems can be be described as defined by the two members. Dissert. Abstr.

N82-18769 California Univ., Santa Cruz.

SEDIMENTOLOGY AND DIAGENESIS OF BRYOZOAN AND SPONGE-RICH CARBONATE BUILDUPS GREAT BAHAMA BANK Ph.D. Thesis

Deborah Marie Bliefnick 1980 299 p
Avail: Univ. Microfilms Order No. 8123243

On the northern third of the Great Bahama Bank, bryozoans and sponges are prominant constituents (including framebuilders) of Holocene carbonate buildups. These buildups are significant because bryozoans and sponges as framebuilders. These buildups are significant because bryozoans and sponges as framebuilders, whether minor or major, have not previously been reported from the modern world. The bryozoan-rich buildups occur in the main tidal channel that dissects the Joulters Cays ooid sand shoal just north of Andros Island; eight mounds were sampled and examined. The sponge-rich buildups are scattered across the open bank, north and west of Joulters Cays; eleven sites or stations containing sponge mounds were mapped and sampled. Three main facies complexes are delineated in the Joulters Cays buildups: shelf margin, oolite shoal and coral reef. The shelf margin complex consists of two parts: a lithoclast packstone facies and a peloid-foram grainstone facies. The oolite shoal complex is dominated by oomoldic and oolitic grainstones. The coral reef facies complex consists mainly of Porites and Montastrea coral boundstone with lesser amounts of Celleporariid bryozoan and lithothamnioid boundstones. Dissert. Abstr.

N82-18770*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE STRATOSPHERE 1981: THEORY AND MEASUREMENTS

Jan. 1982 514 p refs Workshop on the state of the stratosphere, Hampton, Va., 18-22 May 1981 Sponsored in part by the WMO, FAA, NOAA and UN Environment Program
(NASA-TM-84125; Rept-11) Avail: NTIS HC A22/MF A01 CSCL 04A

Measurements of trace species are compared with theoretical estimates and the similarities and the differences between the two sets of data are discussed. The theoretical predictions are compared with long term trends in both column content and altitude profile of ozone as observed from ground-based and satellite instruments. The chemical kinetics and photochemistry of the stratosphere were reviewed. For individual titles, see N82-18771 through N82-18777.

N82-18771*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

TRACE SPECIES

In its The Stratosphere 1981 Jan. 1982 185 p refs (For primary document see N82-18770 09-46)
Avail: NTIS HC A22/MF A01 CSCL 04A

Tropospheric and stratospheric source gases and their distribution are reported. A comparison of measurements and model calculations for stratospheric gases is presented. T.M.

N82-18772*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MULTIDIMENSIONAL ASPECTS: OZONE, TEMPERATURE AND TRANSPORT

In its The Stratosphere 1981 Jan. 1982 99 p (For primary document see N82-18770 09-46)
Avail: NTIS HC A22/MF A01 CSCL 04A

The capability for obtaining four-dimensional data on stratospheric structure, dynamics, and zone is discussed. Progress in the development of multidimensional models of the stratosphere is reported. The discussion of multidimensional aspects of the stratosphere is divided into four major sections: observations, analysis and interpretation, modeling, and transport of trace species. T.M.

N82-18773*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MODEL PREDICTIONS AND TREND ANALYSIS

In its The Stratosphere 1981 Jan. 1982 56 p (For primary document see N82-18770 09-46)
Avail: NTIS HC A22/MF A01 CSCL 04A

Individual perturbations in atmospheric models are discussed. These are hypothetical perturbations determined by model computation in which it is assumed that one particular input or set of inputs to the model is changed while all others are held constant. The best estimates of past time dependent variations of globally averaged total ozone, and upper tropospheric and stratospheric ozone were determined along with geographical differences in the variations. T.M.

N82-18774*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

CHEMICAL KINETICS AND PHOTOCHEMISTRY

In its The Stratosphere 1981 Jan. 1982 31 p (For primary document see N82-18770 09-46)
Avail: NTIS HC A22/MF A01 CSCL 04A

A compilation of rate constant data for use in stratospheric modeling is presented. The tabulations are divided into two categories: bimolecular and termolecular. Explanations are given for anomalous pressure and temperature dependences. T.M.

N82-18775*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A REFERENCE SOLAR SPECTRAL IRRADIANCE FOR USE IN ATMOSPHERIC MODELING
In its The Stratosphere 1981 Jan. 1982 13 p (For primary document see N82-18770 09-46)
Avail: NTIS HC A22/MF A01 CSCL 04A

The present state of knowledge concerning the absolute magnitude and temporal variability of the solar spectral irradiance is outlined with emphasis on wavelengths relevant to the mesosphere and stratosphere. Reference spectra for the wavelength region 175 to 850 nm are presented including estimates for solar maximum and solar minimum conditions. Values for the Lyman alpha emission are given separately. T.M.

N82-18776*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STRATOSPHERIC INSTRUMENTS AND ANALYSES
In its The Stratosphere 1981 Jan. 1982 26 p (For primary document see N82-18770 09-46)
Avail: NTIS HC A22/MF A01 CSCL 04A

The instruments are divided into two groups, ground based instruments and satellite-borne instruments. The ground based instruments include a Dobson ozone spectrophotometer, a filter ozonometer, and ozonesondes. The satellite-borne instruments include: a backscatter ultraviolet spectrometer, a high resolution infrared radiation sounder, a infrared interferometer spectrometer, a limb radiance inversion radiometer, and multichannel filter radiometer. A list of investigations using stratospheric satellite data is presented. T.M.

N82-18777*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STRATOSPHERIC AEROSOLS AND PRECURSOR GASES
In its The Stratosphere 1981 Jan. 1982 12 p (For primary document see N82-18770 09-46)
Avail: NTIS HC A22/MF A01 CSCL 04A

Measurements were made of the aerosol size, height and geographical distribution, their composition and optical properties, and their temporal variation with season and following large volcanic eruptions. Sulfur-bearing gases were measured in situ in the stratosphere, and studied of the chemical and physical processes which control gas-to-particle conversion were carried out in the laboratory. T.M.

N82-18778# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
IONOSPHERIC PROGRAM [PROGRAMA DE IONOSFERA]
M. A. Abdu Jun. 1981 20 p refs In PORTUGUESE; ENGLISH summary Presented at the 1st Aeronomy Workshop, Brazil-Argentina, Foz do Iguacu, Brazil, 18-20 Jun. 1981
(INPE-2113-RPE/337) Avail: NTIS HC A02/MF A01

This report describes the research areas and activities, experimental and theoretical, of the ionospheric program in INPE. Also included are the publications by the ionospheric group in the last two years. Author

N82-18779# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A SIMULATION OF EQUATORIAL PLASMA BUBBLE SIGNATURES ON THE OI 6300 A NIGHTGLOW MERIDIONAL PROFILE OVER BRAZILIAN LOW LATITUDE
Y. Nakamura, J. H. A. Sobral, and M. A. Abdu Nov. 1981 23 p refs Submitted for publication
(INPE-2260-PRE/042) Avail: NTIS HC A02/MF A01

The [OI] 6300 A nightglow emission measurements carried out by scanning photometers over Cachoeira Paulista show propagating disturbances of the meridional and east-west intensity profiles. The disturbances propagate from north to south and from west to east. It is shown that these disturbances are closely correlated with the occurrence of spread F irregularities observed by ionosonde. Airglow intensity was calculated as a function of zenith angle in the photometer scanning range using electron density profiles perturbed by field aligned plasma bubble, whose vertical velocity and electron density depletion profile were determined from a numerical simulation of the nonlinear Rayleigh Taylor instability under ionospheric conditions that best represented those of the observing period and location. The result shows that, as the field aligned plasma bubbles rises up over the equator, their extremities trace out poleward motion in the low latitude ionosphere which could explain the observed north to south propagation of the airglow intensity valleys. J.M.S.

N82-18780# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
EQUATORIAL SPREAD F INSTABILITY CONDITIONS AS DETERMINED FROM IONOGRAMS
M. A. Adbu, R. T. deMedetros, and J. H. A. Sobral Jan. 1982 12 p refs Sponsored in part by FNDCT
(INPE-2310-PRE/075) Avail: NTIS HC A02/MF A01

Conditions of plasma irregularity (or Spread F) generation under the Rayleigh-Taylor instability mechanism in the nighttime equatorial ionosphere are examined from ionogram data registered over Fortaleza (4 deg S, 38 deg W, mag. dip lat. - 1.7 deg) Brazil for a one year period. The results show that local ionospheric conditions such as the bottomside F region electron density scale length and the ion neutral collision frequency at the base of the layer, at sunset hours, determine the generation of the spread F irregularities over the equator in the post sunset hours. Author

N82-18781# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
H2O MASER SURVEY IN THE MAGNELLANIC CLOUDS
E. Scalise, Jr. and M. A. Braz (Conselho Nacional de Desenvolimento Cientifico e Technologico, San Paulo, Brazil) Nov. 1981 16 p refs Submitted for publication Sponsored in part by FINEP
(INPE-2279-PRE/057) Avail: NTIS HC A02/MF A01

An extensive search for was water vapor maser emission towards the Large and Small Magellanic Clouds is reported. The 6 sub 16 to 5 sub 23 transition of water molecular was detected in two H II regions in LMC (including N159, previously detected) and in two H II regions in SMC. A total of 32 positions was searched in both clouds. The strength of the sources detected are comparable with galactic masers with luminosities L approximately < 0.01 solar L. Author

N82-18782# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THEORETICAL ANALYSIS OF THE REAL AND APPARENT VELOCITIES OF VERTICAL PLASMA DRIFT IN THE EQUATORIAL IONOSPHERE [UMA ANALISE TEORICA DAS VELOCIDADES REAL E APARENTE DE DERIVA VERTICAL DO PLASMA NA IONOSFERA EQUATORIAL]
J. A. Bittencourt and M. A. Abdu Jun. 1981 11 p refs In PORTUGUESE; ENGLISH abstract Presented at the the 33rd Ann. Meeting of SBPC, Salvador-Bahie, Brazil, 8-15 Jul. 1981
(INPE-2143-RPE/365) Avail: NTIS HC A02/MF A01

A theoretical analysis of the distribution of ionization in the low latitude ionosphere, as a function of local time, is presented, using a computer model of the tropical F-region, with special interest in the vertical motions of the ionization. It is shown that during periods, especially after sunset, when the F-layer height is above about 300 km, the apparent vertical displacement velocity of the ionization, determined from ionograms, is the same as the E x B vertical drift velocity, measured from incoherent backscatter radar. Author

N82-18783# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CHARACTERISTICS OF THE 6300 ANGSTROM OI LUMINESCENCE AT A LOW LATITUDE AMERICAN SECTOR [CARACTERISTICAS DA LUMINESCENCIA OI 6300 A EM BAIXA LATITUDE NO SETOR AMERICANO]
Carlos Jose Zamlutti and Jose Humberto Andrade Sobral Jun. 1981 10 p refs In PORTUGUESE; ENGLISH abstract Presented at the 33rd Ann. Meeting of SBPC, Salvador, Brazil, 8-15 Jul. 1981

(INPE-2114-RPE/338) Avail: NTIS HC A02/MF A01

The intensity of the nightglow at Cachoeira Paulista has a typical signature within the meridional plane during the premidnight period. An analysis of extensive measurements at this site reveals oscillations in the nightglow intensity, which perhaps can be explained by ionization transport. Author

N82-18784# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

COMPARATIVE STUDY OF THE ELECTRONIC DENSITY PEAK AND PEAK HEIGHT OF THE F SUB 2 LAYER CALCULATED BY CCIR AND OBSERVED BY CACHOEIRA PAULISTA AND FORTALEZA FOR MAGNETICALLY CALM PERIODS [ESTUDO COMPARATIVO DO PICO DE DENSIDADE ELECTRONICA E DA ALTURA DO PICO DA CAMADA F2 CALCULADOS PELO CCIR E OBSERVADOS PARA CACHOEIRA PAULISTA E FORTALEZA, PARA PERIODOS MAGNETICAMENTE CALMOS]

Eurico Rodrigues dePaula, Ivan Jelinek Kantor, and Mangalathayil Ali Abdu Jun. 1981 15 p refs Presented at the 33rd Ann. Meeting of SBPC, Salvador-Bahia, Brazil, 8-15 Jul. 1981

(INPE-2144-RPE/366) Avail: NTIS HC A02/MF A01

The critical frequency for region F, foF2, and the maximum electron density height, hmF2, predicted by the CCIR model are compared with observed values obtained by ionosondes for March, June, September and December, 1978. The same comparison was also made for the undisturbed days. A better approximation between predicted and observed values for the undisturbed period was observed in the interval of 3 pm to midnight. From midnight to 5 am an inverse trend was observed. Between 5 am and 3 pm the differences were negligible. The diurnal average does not show any improvement between predicted and observed values for the undisturbed days. T.M.

N82-18785# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

HIGH ALTITUDE ATMOSPHERIC PHYSICS PROGRAM [PROGRAMA DE FISICA DA ALTA ATMOSFERICA]

Barclay Robert Clemesha Jun. 1981 16 p refs In PORTUGUESE; ENGLISH summary Presented at the 1st Aeronomy Workshop, Brazil-Argentina, Foz do Iguacu, Brazil, 18-20 Jun. 1981

(INPE-2111-RPE/336) Avail: NTIS HC A02/MF A01

Investigations into the composition, photochemistry, and dynamics of the stratosphere, mesosphere, and thermosphere are described. Programs in laser radar observation, atmospheric luminescence, the equatorial aurora, data acquisition, meteorological radar, and Fabry-Perot interferometry are discussed. The experimental program, interpretation of results, and theoretical studies are described. J.D.H.

N82-18786*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

REPORTS ON CRUSTAL MOVEMENTS AND DEFORMATIONS

Steven C. Cohen and Tim Peck Dec. 1981 141 p

(NASA-TM-83872) Avail: NTIS HC A07/MF A01 CSCL 08G

Studies of tectonic plate motions, regional crustal deformations, strain accumulation and release, deformations associated with earthquakes and fault motion, and micro-plate motion, were collected and are summarized. To a limited extent, papers dealing with global models of current plate motions and crustal stress are included. The data base is restricted to articles appearing in reveiwed technical journals during the years 1970-1980. The major journals searched include: Journal of Geophysical Research (solid earth), Tectonophysics, Bulletin of the Seismological Society of America, Geological Society of America Bulletin, Geophysical Journal of the Royal Astronomical Society, and the Journal of Geology. T.M.

N82-18787*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A COMPLETE X-RAY SAMPLE OF THE HIGH LATITUDE SKY FROM HEAO-1 A-2: log N lo S AND LUMINOSITY FUNCTIONS

G. Piccinotti, R. F. Mushotzky, E. A. Boldt, S. S. Holt, F. E. Marshall, P. J. Serlemitsos, and R. A. Shafer Aug. 1981 51 p refs Submitted for publication

(NASA-TM-82168) Avail: NTIS HC A04/MF A01 CSCL 04A

An experiment was performed in which a complete X-ray survey of the 8.2 steradians of the sky at galactic latitudes where the absolute value of b is > 20 deg down to a limiting sensitivity of < 3.1 x ten to the minus 11th power ergs/sq cm sec in the 2-10 keV band. Of the 85 detected sources 17 were identified with galactic objects, 61 were identified with extragalactic objects, and 7 remain unidentified. The log N - log S relation for the non-galactic objects is well fit by the Euclidean relationship. The X-ray spectra of these objects were used to construct log N - log S in physical units. The complete sample of identified sources was used to construct X-ray luminosity functions, using the absolute maximum likelihood method, for clusters galaxies and active galactic nuclei. M.D.K.

N82-18788# R and D Associates, Marina Del Rey, Calif.

SOIL PROPERTIES OF USSR STRATEGIC AREAS. VOLUME 1: SOIL PROPERTY COMPARISONS FOR SELECTED USSR AND U.S. SOILS Topical Report, 5 Jan. - 1 Dec. 1980

Deane Oberste-Lehn Washington DNA 1 Dec. 1980 113 p refs

(Contract DNA001-80-C-0069)

(AD-A108743; RDA-TR-113206-003-Vol-1; DNA-5701T-1) Avail: NTIS HC A06/MF A01 CSCL 08/7

Soils of USSR strategic areas and the MIDDLE GUST test site were compared to evaluate the validity of using MIDDLE GUST geology as representative of radiation energy absorption for USSR strategic areas. Average Z values were calculated for the USSR and MIDDLE GUST soils using weight and adjusted volumetric methods. Results indicate that porosity and pore water content cause greater variation in the average Z values of these soils than does the mineralogic component, and that method of calculation causes significant differences. To verify the validity of using the MIDDLE GUST test site for radiation energy absorption calculations of USSR strategic areas, it is recommended that the computer codes use the volumetric (not weight) calculation method and that the vegetation in the USSR areas be assessed for its effect on energy coupling into the ground. Author (GRA)

N82-18789# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.

THE GLOBAL Pc 5 EVENT OF 14-15 NOVEMBER 1979

J. F. Fennell, J. R. Ashbridge, D. N. Baker, R. D. Belian, P. R. Higbie, R. D. Zwickl, B. Wilken, and C. W. Arthur 1 Oct. 1981 43 p refs Prepared in cooperation with LASL and Colorado Univ., Boulder

(Contract F04701-81-C-0082)

(AD-A108143; TR-0082(2940-05)-5; SD-TR-81-74) Avail: NTIS HC A03/MF A01 CSCL 04/1

Large amplitude Pc-5 waves with 7-8 minute quasi-periodic variations were observed almost continuously for the forty-eight hours of November 14-15, 1979 by several spacecraft in or near geostationary orbit on the day-side portions of their orbits. The waves were observed as large modulations in both the electron and ion fluxes over a wide range of energies (approximately 1 to 500 keV) by the spacecraft 1976-059, 1977-007, 1979-053, P78-2, and GEOS-2 and as magnetic field peak-to-peak modulations of 15-25 gamma by the P78-2 and GOES-2 and -3 magnetometers. The remarkably long persistence of these waves contrasts substantially with observations of typical flux modulation events which usually last less than one hour and which typically show little modulation of the greater or less than 150 keV proton fluxes. GRA

N82-18790# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Applied Research Branch.

SITE INVESTIGATIONS AND SUBMARINE SOIL MECHANICS IN POLAR REGIONS

Edwin J. Chamberlain Oct. 1981 20 p refs Sponsored in part by Geological Survey

(AD-A108269; CRREL-SR-81-24) Avail: NTIS HC A02/MF A01 CSCL 08/13

Placing oil exploration and production structures offshore in the Alaskan Beaufort Sea will require careful site investigation and evaluation of submarine soil mechanics. Ice-bonded permafrost occurs widely under the Beaufort Sea floor. Its engineering properties are important to the design of offshore structures. Highly overconsolidated clays also occur widely and interfere with access to gravels for constructing artificial islands. Sites should be selected to avoid ice-rich permafrost. Laboratory tests may need to be conducted to determine the potential hazards of thaw consolidation and weakening. GRA

N82-18791# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PROFESSOR M. M. PROTODYAKONOVS STRENGTH COEFFICIENT F OF ROCKS
12 Nov. 1981 40 p Transl. into ENGLISH from the mono. "Voprosy Razrusheniya i Davleniya Gornykh Porod, Ugletekhizdat" Moscow, 1955 p 42-55
(AD-A108209; FTD-ID(RS)T-1293-81) Avail: NTIS HC A03/MF A01 CSCL 08/9

The mechanical properties of rocks play a primary role in mining. The selection of extraction methods, the productivity of a certain method of extraction, the behavior of the roof, and other elements are dependent upon rock mechanics. The development of rock strength coefficients is summarized. T.M.

N82-18792# Northeastern Univ., Boston, Mass. Electronics Research Lab.
DESIGN OF SOUNDING ROCKET PAYLOADS Final Report, 1 May 1976 - 30 Apr. 1981
Richard L. Morin and Lawrence J. OConnor 1 Jul. 1981 72 p refs
(Contract F19628-76-C-0152; AF Proj. 7659)
(AD-A108271; AFGL-TR-81-0235) Avail: NTIS HC A04/MF A01 CSCL 19/7

This report is a summary of work accomplished from 1 May 1976 to 30 April 1981. Contract efforts were in the design, fabrication, testing, and launch support of sounding rocket payloads and related ground support equipment. Specific areas of work related to this report include: payload structures, component packaging, deployment and eject mechanisms, diagnostic components, in-flight sequencing, power systems and control consoles. Also described are electrical and mechanical interfaces with experiments, telemetry systems, attitude control systems, recovery systems and other payload subsystems. GRA

N82-18793# California Univ., Berkeley. Dept. of Geology and Geophysics.
STATE-OF-THE-ART FOR ASSESSING EARTHQUAKE HAZARDS IN THE UNITED STATES. INTERPRETATION OF STRONG GROUND MOTION RECORDS
Bruce A. Bolt Oct. 1981 219 p refs
(Contract DACW39-78-C-0061)
(AD-A108615; WES-MP-S-73-1-17; Rept-17) Avail: NTIS HC A10/MF A01 CSCL 08/11

The main patterns of motions recorded on accelerograms near to the causative fault are described in terms of P and S waves and Love and Rayleigh waves. In order to achieve this, the effects of source dimensions and the physical and kinematic properties of the fault zone are included in the analysis. The two main aims of the work were, first, to make an initial step toward the routine interpretation of the recorded strong ground motions and, as a consequence, to provide a basis which would allow ground motions in future large earthquakes to be predicted. Both aspects of strong -motion seismology are of interest to the engineering profession for the design of critical structures in earthquake country. The research has been based on the detailed study of near-field records obtained in moderate to large earthquakes in the last few decades. Author

N82-18794# Alaska Univ., Fairbanks. Geophysical Inst.
IONOSPHERE RESEARCH Final Report
Robert Hunsucker and Robert Freyman (LASL) 12 Nov. 1981 8 p refs
(Contract DASG60-80-C-0047)
(AD-A108905) Avail: NTIS HC A02/MF A01 CSCL 20/14

The aim of the contract between BMC/ATC and the Geophysical Institute of the University of Alaska (GI/UAF) has been to provide support for Mr. Robert Freyman of Los Alamos National Laboratories (LANL) to conduct investigations of the long-delay-echo (LDE) phenomenon at field sites in the auroral zone. GRA

N82-18795# Chicago Univ., Ill. Dept. of Geophysical Sciences.
AN EXPLICIT METHOD OF SOLUTION OF THE GEOMAGNETIC INDUCTION PROBLEM
Victor Barcilon Nov. 1981 22 p refs
(Contract N00014-76-C-0034; NR Proj. 041-476)
(AD-A109369) Avail: NTIS HC A02/MF A01 CSCL 08/7

The problem of inferring the Earth conductivity as a function of depth from surface measurements of the magnetic field is considered. Two versions of a method analogous to that of Bailey (1970) are presented. The main feature of the method consists in the fact that the conductivity is given explicitly in terms to two auxiliary sequences of functions which are found by integrating a set of first order nonlinear differential equations. Author (GRA)

N82-18796# European Space Agency, Paris (France).
METHODS FOR INTERPRETING ATMOSPHERIC SPECTRAL OBSERVATIONS BY SUN SIGHTING THROUGH THE EARTH LIMB Ph.D. Thesis - Paris, 6 Univ.
Gerard Eichen Nov. 1981 94 p refs Transl. into ENGLISH from "Methodes d'Interpretation d'Observations Spectrales Atmospheriques Effectuees par Visee au Soleil a travers le Limbe Terrestre", Rept. ONERA-NT-1981-2, Paris, 1981 Original report in FRENCH previously announced as N81-27739
(ESA-TT-715; ONERA-NT-1981-2) Avail: NTIS HC A05/MF A01

Measurements of absorption line areas are compared to each other and given examples, e.g. the reconstruction of NO2 profiles. Preference is given to an iterative method which makes the final solution largely independent of the initial vertical profile. A method entirely based on the calculation of synthetic spectra was studied from a theoretical viewpoint. Results of simulated observations assuming nine spectra without noise show that the profile can be recovered even with a zero initial profile. White noise does not affect results significantly. The ability to treat large numbers of spectra suits the method to Spacelab experiments. Author (ESA)

N82-18797# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).
THE PROPERTIES OF IONOSPHERIC SINGLY IONIZED OXYGEN IONS AS OBSERVED IN THE MAGNETOTAIL BOUNDARY LAYER AND NORTHERN PLASMA LOBE
M. Candidi, S. Orsini, and V. Formisano (ESTEC, Noordwijk, Netherlands) Jun. 1981 34 p refs Submitted for publication
(IPS-81-11) Avail: NTIS HC A03/MF A01

The singly ionized oxygen ion beams flowing in the geomagnetic tail low latitude boundary layer and northern plasma lobe were investigated, using the ISEE-2 positive ion experiment. The data analysis shows that the ion velocity gradually increases from the center to the outer regions of the magnetotail, whereas the plasma density decreases the farther one moves away from the center. The temperature of the beaming ions is shown to be anisotropic with respect to the ambient magnetic field. The results clearly identify the E x B filter as the organizer of the flow of these ions after their initial acceleration in the topside ionosphere. Indications are that the acceleration mechanism is a combination of both electrostatic fields parallel to B and resonance with ion cyclotron waves. Author (ESA)

N82-18798# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
ANALYSIS OF GUST STRUCTURE IN THE ATMOSPHERIC BOUNDARY LAYER BY USING CONDITIONAL SAMPLING
Magnus Linde 10 Jun. 1981 29 p refs
(Contracts NE-5061-013; NE-5061-014)
(FFA-TN-HU-2262-Pt-1; ISSN-0081-5640) Avail: NTIS HC A03/MF A01

A conditional sampling scheme used to detect events characterized by a high level of short time variance is assessed for use in detecting gusts. The conditionally sampled average of the longitudinal velocity component exhibits a typical structure, a gust. This structure is similar to the bursts in turbulent boundary layers. The frequency of occurrence and the time scale of the gusts are determined by the same variables as the bursts, i.e., the outer variables free stream velocity and surface layer thickness. The technique was compared with wind measurements carried out at a fixed point. The structure and frequency of gusts are predicted accurately. Author (ESA)

N82-18799# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo. World Data Center A for Solid Earth Geophysics.
CATALOG OF SIGNIFICANT EARTHQUAKES, 2000 B.C. - 1979: INCLUDING QUANTITATIVE CASUALTIES AND DAMAGE
Robert A. Ganse and John B. Nelson Jul. 1981 164 p refs
(PB82-117425; NOAA-81082703; SE-27) Avail: NTIS HC A08/MF A01 CSCL 08K

The Significant Earthquake Catalog includes events from available sources that meet the following criteria: moderate damage or at least 10 deaths, of magnitude 7.5 or greater. For events lacking magnitude, intensity X or greater is the criterion. Many lesser events are also included. The catalog consists of some 2,484 events drawn from more than 100 different sources. The events range in date from 2,000 B.C. through 1979. It lists the following seismological parameters for each event: time, deaths, latitude and longitude, damage, class, depth, references, magnitude/intensity, and geographic location. When a substantial portion of the damage is noted to be associated with a tsunami, the word 'tsunami' is placed in the location column. GRA

N82-18800# Geological Survey, Reston, Va.
ENVIRONMENTAL GEOLOGIC STUDIES ON THE SOUTHEASTERN ATLANTIC OUTER CONTINENTAL SHELF, 1977-1978 Final Open File Report
Peter Popenoe, ed. 1981 435 p refs
(Contract DI-AA551-MU8-13)
(PB82-109265; OPEN-FILE-81-582-A; BLM/YN/SR-81/02)
Avail: NTIS HC A19/MF A01 CSCL 08G

The methods, techniques, instruments, and procedures utilized in accomplishing the study are summarized. The objectives were: (1) to determine the sedimentation rates and processes on the upper slope and inner Blake Plateau; (2) to determine the distribution, areal extent, and nature of geological features supportive of biological communities; (3) to monitor the transport of bottom sediments across the (OCS) Outer Continental Shelf; (4) to determine the concentration levels of chosen trace metals and silica; (5) to study the shelf edge and slope near areas of oil and gas interest; and (6) to determine the depth and rate of sediment mixing. Detailed results are given. GRA

N82-18238*# Centre National de la Recherche Scientifique, Paris (France). Service d'Aeronomie.
INVESTIGATION ON ATMOSPHERIC H AND D THROUGH THE MEASUREMENT OF THEIR LYMAN-ALPHA EMISSIONS
J. L. Bertaux *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 04A

N82-18241*# Tokyo Univ. (Japan).
SPACE EXPERIMENTS WITH PARTICLE ACCELERATORS
Tatsuzo Obayashi *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 04A

N82-18243*# Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
ATMOSPHERIC EMISSION PHOTOMETRIC IMAGING
S. B. Mende *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 04A

N82-18244*# Max-Planck-Institut fuer Aeronomie, Hanover (West Germany).
LOW-ENERGY ELECTRON FLUX AND ITS REACTION TO ACTIVE EXPERIMENTATION OF SPACELAB
K. Wilhelm *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 04A

N82-18245*# Oesterreichische Akademie der Wissenschaften, Vienna. Space Research Inst.
DC-MAGNETIC FIELD VECTOR MEASUREMENT
R. Schmidt *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 2 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 08N

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-18801 Texas A&M Univ., College Station.
PRECIPITATION FIELD AND INTRASTORM FLOW OF SUPERCELL CONVECTIVE STORMS Ph.D. Thesis
Daniel James McMorrow 1981 283 p
Avail: Univ. Microfilms Order No. 8128911

Single-Doppler radar data, when supplemented by surface and upper-air information, provides good estimates of the intrastorm kinematic structure of supercell storms. Spatially derived fields of radial velocity, defined as radial stretching and cross-beam shear, can be used to identify and track major intrastorm kinematic features. These fields can be computed quickly and require neither storm motion information nor a favorable beam-flow alignment. Changes in surface precipitation rates, from isolated and squall line supercells, are reflected in changes in the intrastorm flow inferred from single-Doppler data. Temporal changes in supercell kinematic structure are related to changes in surface rainfall rates. Supercell rainfall in several different environments are presented. The results suggest that changes in surface rainfall rates are related to changes in intrastorm kinematic flow. Dissert. Abstr.

N82-18802 California Univ., Berkeley.
A THREE-DIMENSIONAL WIND MODEL FOR COMPLEX TERRAIN Ph.D. Thesis
Mark Alan Yocke 1981 251 p
Avail: Univ. Microfilms Order No. 8200313

The development, implementation, and application of a three dimensional, complex-terrain wind model are presented. The model is based on the equation of mass continuity and it employs different schemes to parameterize various physical processes that are included in the model's convergence-divergence term. The model equation is written in a conventional Poisson form and then solved numerically usin[illegible] five-point difference approximation with an iterative solution [illegible]cedure. To assess its performance, this model was applied to five complex-terrain situations reveal that the model produced acceptable results, especially considering the uncertainties in wind measurements. Futhermore, the model exhibits no significant tendencies toward overprediction or underprediction. Dissert. Abstr.

N82-18803*# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
AIRCRAFT MEASUREMENTS AND ANALYSIS OF SEVERE STORMS: 1976 FIELD EXPERIMENT Final Report
P. C. Sinclair Feb. 1982 101 p refs
(Grant NsG-5105)
(NASA-CR-158519) Avail: NTIS HC A06/MF A01 CSCL 04B

Severe storm aircraft measurements are documented, as well as the instrumentation and operational features of aircraft mobility capabilities. The measurements and data analyses indicate that the concept of a highly mobile research aircraft capability for obtaining detailed measurements of wind, temperature, moisture, spherics, etc., near and within severe storm systems, forecast 48 hours in advance in a 1000 nm operating radius, is feasible, and was successfully demonstrated. The measurements and analyses reveal several severe storm features and insights with respect to storm air flow circulations and inflow-outflow orientation. Precipitation downdraft air is recirculated back into the updraft core below the scud cloud in both back and front feeder type storms. In a back feeder type storm, the downdraft outflow air ahead of the storm is also recirculated back into the updraft region near cloud base. S.L.

N82-18804# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CONVECTIVE RAINFALL ESTIMATION IN RIO GRANDE DO SUL STATE, BRAZIL: PRELIMINARY RESULTS
Nelson Jesus Ferreira and Leroy E. Spade (National Earth Satellite Service) Nov. 1981 20 p refs
(INPE-2271-RPE/400) Avail: NTIS HC A02/MF A01

Using the Scofield/Oliver technique, convective rainfall estimation was done for five stations, in Rio Grande do Sul State, Brazil. The preliminary results show that this method can be successfully used to estimate convective rainfall in southern Brazil. S.L.

N82-18805# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE USE OF ENVIRONMENTAL SATELLITES FOR FROST MONITORING [O USO DE SATELITES AMBIENTAIS PARA MONITORAMENTO DE GEDAS]
Luiz Carlos Baldicero Molion, Nelson Jesus Ferreira, and Luiz Bylvan meira Filho Jun. 1981 17 p refs In PORTUGUESE; ENGLISH summary Presented at 11th Congr. de Engenharia Agricola, Brasilia, Brazil, 22-27 1981
(INPE-2128-RPE/352) Avail: NTIS HC A02/MF A01

Frost is a hazardous phenomenon for most crops in southern Brazil. A review of the use of remote sensors onboard environmental satellites is presented. Emphasis is given to automatic evaluation of the affected area and to the possibility of short range forecasts two to three hours in advance. J.D.H.

N82-18806# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE EVOLUTION OF METEOROLOGICAL FORECASTING [A EVOLUCAO DE PREVISAO METEOROLOGICA]
Marco A. M. Lemes Jul. 1981 5 p refs In PORTUGUESE; ENGLISH abstract Presented at the 2nd Brazilian Congr. on Agrometeorol. Pelotas, RS, Brazil, 5-10 Jul. 1981
(INPE-2151-RPE/372) Avail: NTIS HC A02/MF A01

A survey of the evolution of the weather forecasting techniques is traced since the beginning of the century, up to the present. Meteorological services which rely on numerical methods and a massive amount of non-conventional data furnished by the meteorological satellites are highlighted. Applications to agriculture are discussed. T.M.

N82-18807*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
WINTER AND SUMMER SIMULATIONS WITH THE GLAS CLIMATE MODEL
J. Shukla, D. Straus, D. Randall, Y. Sud, and L. Marx (Sigma Data Services Corp.) Dec. 1981 275 p refs Submitted for publication
(NASA-TM-83866) Avail: NTIS HC A12/MF A01 CSCL 04B

The GLAS climate model is a general circulation model based on the primitive equations in sigma coordinates on a global domain in the presence of orography. The model incorporates parameterizations of the effects of radiation, convection, large scale latent heat release, turbulent and boundary layer fluxes, and ground hydrology. Winter and summer simulations were carried out with this model, and the resulting data are compared to observations. Author

N82-18808*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CLIMATE OBSERVING SYSTEM STUDIES: AN ELEMENT OF THE NASA CLIMATE RESEARCH PROGRAM: WORKSHOP REPORT
Sep. 1980 154 p refs
(NASA-TM-84040) Avail: NTIS HC A08/MF A01 CSCL 04B

Plans for NASA's efforts in climatology were discussed. Targets for a comprehensive observing system for the early 1990's were considered. A program to provide useful data in the near and mid-term, and a program to provide for a feasibility assessment of instruments and methods for the development of a long-term system were discussed. Climate parameters that cannot be measured from space were identified. Long-term calibration, intercomparison, standards, and ground truth were discussed. R.J.F.

N82-18809# Raytheon Co., Wayland, Mass. Equipment Div.
R AND D EQUIPMENT INFORMATION REPORT: FAULT TOLERANT WEATHER RADAR PROCESSOR Final Report, 1 Jun. 1978 - 16 Oct. 1980
Michael J. Young and Anthony J. Jagodnik, Jr. Mar. 1981 348 p refs
(Contract F19628-78-C-0113; AF Proj. 6670)
(AD-A108253; ER81-4053; AFGL-TR-81-0086) Avail: NTIS HC A15/MF A01 CSCL 17/9

A programmable signal processor which achieves fault tolerance and modularity through distribution of tasks among a number of identical programmable common elements including spares, is described. This processor's design and usage in a meteorological Doppler radar signal processing application is discussed at several levels of detail covering hardware firmware, operating system software, user software, and development aids. Author (GRA)

N82-18810# Science Applications, Inc., Monterey, Calif.
ATLANTIC HURRICANE WIND PROBABILITY FORECASTTING (WINDPA) Final Report
Jerry D. Jarrell Monterey, Calif. Naval Environmental Prediction Research Facility Oct. 1981 23 p refs
(Contract N00228-80-SC-GA08)
(AD-A108756; NEPRF-CR-81-05) Avail: NTIS HC A02/MF A01 CSCL 04/2

The Atlantic Hurricane Wind Probability (WINDPA) program is documented. WINDPA provides the probability of selected Navy and Air Force bases either being struck by an Atlantic Ocean tropical cyclone or receiving winds of at least 30 or 50 kt. The basis for WINDPA estimates is discussed in comparison to a similar western Pacific program (WINDP). WINDPA estimates were subjected to independent reliability testing, the results of which are discussed. GRA

N82-18811# Aeronautical Research Labs., Melbourne (Australia).
LOW LEVEL WIND STUDY, BALD HILLS: THUNDERSTORM SEASON, 1976 - 1977
C. K. Rider, D. J. Sherman, and M. R. Thomson Oct. 1980 511 p refs
(AD-A108207; ARL/STRUC-384; AR-002-237) Avail: NTIS HC A22/MF A01 CSCL 04/2

Contents: Experimental Apparatus and Procedure; Incidence of Thunderstorms; Long Term Wind Speed Statistics; Statistics of Wind Shears; Choice of Incidents; Wind Speed Profiles; Effect of Height, Peak Value Statistics, and Averaging Time; Duration of Shear Bursts; Wind Shear Monitoring as a Landing Aid; and Horizontal Structure of the Wind. GRA

N82-18812# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.
RADAR DETECTION OF TURBULENCE IN THUNDERSTORMS
Alan R. Bohne 31 Mar. 1981 64 p refs
(AF Proj. 6670)
(AD-A108679; AFGL-TR-81-0102; AFGL-ERP-736) Avail: NTIS HC A04/MF A01 CSCL 04/2

Theoretical investigations are undertaken to relate intensity of turbulent air motion to Doppler radar spectrum mean and variance in precipitation environments. Examples of theoretical radar derived turbulence power density spectra and total precipitation motion variance show that effects due to imperfect particle response are significant for turbulence scale lengths less than 250 m. Doppler spectrum variance and estimated eddy dissipation rate (epsilon) are found strongly dependent upon precipitation environment for ranges less than about 20 km, and for cases where the turbulence outer scale length (lambda) is less than 0.5 km. They are also found to be essentially independent of lambda when the maximum pulse volume dimension is less than 1/2 lambda, and independent of range

but strongly dependent on lambda at ranges where the maximum pulse volume dimension is greater than lambda. Estimation of epsilon by radar is shown to be unreliable until a method of remotely determining lambda is found. Nevertheless, classification of turbulence severity (index = cube root of epsilon is possible with only a reasonable guess of lambda. Analyses of aircraft/gust velocity data indicate that thunderstorm turbulence is localized into discrete patches, and that such localization must be accounted for when aircraft gust velocity data undergo power spectrum analysis.
GRA

N82-18813# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.
SHORTRANGE FORECASTING OF CLOUDINESS AND PRECIPITATION THROUGH EXTRAPOLATION OF GOES IMAGERY Final Report
H. Stuart Muench 16 Jul. 1981 48 p refs
(AF Proj. 6670)
(AD-A108678; AFGL-TR-81-0218; AFGL-ERP-750) Avail: NTIS HC A03/MF A01 CSCL 04/2

This report describes the development and testing of an objective technique to forecast cloudiness and precipitation through extrapolation of satellite imagery. By using an objectively determined cloud-motion vector, the technique makes local forecasts of satellite parameters (brightness and IR temperature), with high temporal resolution, using simple linear extrapolation. Algorithms are then used to convert the satellite parameters to total cloud cover, probability of 1-hour precipitation, and presence of low, middle, and high clouds. The test program computed motion vectors and made forecasts out to 7 hours, in half-hour steps, at 30 locations. The program was tested on 12 spring and fall cases, using half-hourly GOES imagery. For periods beyond 2 hours, forecasts of cloud cover and precipitation were markedly better than persistence, while deficiencies in specification hindered short-period performance. Forecasts of cloud layers were worse than persistence due to inadequate specification algorithms. The net results were quite encouraging.
GRA

N82-18814# Air Force Geophysics Lab., Hanscom AFB, Mass. Aeronomy Div.
WIND TUNNEL AND LABORATORY CALIBRATION OF BALLOON-BORNE WIND SENSORS Interim Report
J. H. Brown and R. E. Good 27 Jul. 1981 33 p refs
(AF Proj. 6687)
(AD-A108676; AFGL-TR-81-0219; AFGL-IP-303) Avail: NTIS HC A03/MF A01 CSCL 14/2

Two-low speed wind sensors have been calibrated for measuring the wind speed at an instrument suspended below stratospheric balloons. The low Reynolds number environment was duplicated at the NASA/Ames low-speed MARSWIT wind-tunnel facility, and in a laboratory bell jar. The two new instruments are the time-of-flight instrument that measures the motion of an ion cloud through an open pipe, and the corona anemometer that measures the displacement of an ion beam transversing the air-stream flowing between two plates. The calibrations consist of placing the instruments in a flow stream, and relating the instrument output to the flow-stream velocity. The laboratory calibration is easy to conduct, but is limited to a measurement of internal flow velocity. The wind-tunnel calibration is performed to relate laboratory calibration to freestream conditions.
Author (GRA)

N82-18815# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.
AN AUTOMATED LOW CLOUD PREDICTION SYSTEM Final Scientific Report
Edward B. Geisler 7 Jul. 1981 38 p refs
(AF Proj. 6670)
(AD-A108681; AFGL-TR-81-0191; AFGL-ERP-746) Avail: NTIS HC A03/MF A01 CSCL 04/2

At the Air Force Geophysics Laboratory (AFGL) Weather Test Facility (WTF) at Otis AFB, MA, a network of cloud base height, visibility, and wind measuring instruments were used to explore techniques for the short range prediction of low cloud ceiling. The approach relies upon the use of a hierarchical clustering algorithm to transform the raw cloud base height data into an automated low cloud observation. Four prediction techniques (Regression Estimation of Event Probabilities, Equivalent Markov, climatology, and persistence) yielding probability estimates of low cloud ceiling were evaluated and comparisons made to determine their respective accuracy and reliability. In addition, thresholding techniques were used to convert probability forecasts (unit bias, maximum probability, iterative, and persistence). Analysis of the data collected at the AFGL WTF demonstrates the accuracy and reliability of the automated low cloud prediction system. Regression estimation of event probabilities provided accurate, reliable, high resolution probability forecasts with results superior to climatology, persistence, and Equivalent Markov.
GRA

N82-18816# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 1: NEW ENGLAND REGION Final Report
Jun. 1981 287 p
(Contract DOT-FA79WAI-057)
(AD-A108155) Avail: NTIS HC A13/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Data airports in Cnnecticut, Massachusetts, Main, New Hampshire, Rhode Island, and Vermont are included.
GRA

N82-18817# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS, VOLUME 2. PART A: EASTERN REGION Final Report
Jun. 1981 436 p
(Contract DOT-FA79WAI-057)
(AD-A108156) Avail: NTIS HC A19/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Data on airports in Virginia, Delaware, Maryland, New Jersey, and New York are included.
GRA

N82-18818# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 2, PART B: EASTERN REGION Final Report
Jun. 1981 421 p
(Contract DOT-FA79WAI-057)
(AD-A108157) Avail: NTIS HC A18/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Data on airports in Pennsylvania, Virginia, and West Virginia are included.
GRA

N82-18819# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 3, PART A: SOUTHERN REGION Final Report
Jun. 1981 505 p
(Contract DOT-FA79WAI-057)
(AD-A108158) Avail: NTIS HC A22/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids.
Author (GRA)

N82-18820# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 3, PART B: SOUTHERN REGION Final Report
Jun. 1981 456 p
(Contract DOT-FA79WAI-057)
(AD-A108159) Avail: NTIS HC A20/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Author (GRA)

N82-18821# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 4, PART A: GREAT LAKES REGION Final Report
Jun. 1981 560 p
(Contract DOT-FA79WAI-057)
(AD-A108160) Avail: NTIS HC A24/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Author (GRA)

N82-18822# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 4, PART B: GREAT LAKES REGION Final Report
Jun. 1981 429 p
(Contract DOT-FA79WAI-057)
(AD-A108161) Avail: NTIS HC A19/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Data on airports in Minnesota, Ohio and Wisconsin are included. GRA

N82-18823# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 5, PART A: CENTRAL REGION Final Report
Jun. 1981 316 p
(Contract DOT-FA79WAI-057)
(AD-A108162) Avail: NTIS HC A14/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Author (GRA)

N82-18824# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 5, PART B: CENTRAL REGION Final Report
Jun. 1981 258 p
(Contract DOT-FA79WAI-057)
(AD-A108163) Avail: NTIS HC A12/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. GRA

N82-18825# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 6, PART A: SOUTHWEST REGION Final Report
Jun. 1981 416 p
(Contract DOT-FA79WAI-057)
(AD-A108164) Avail: NTIS HC A18/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. GRA

N82-18826# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 6, PART B: SOUTHWEST REGION Final Report
Jun. 1981 521 p
(Contract DOT-FA79WAI-057)
(AD-A108165) Avail: NTIS HC A22/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. GRA

N82-18827# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 7, PART A: ROCKY MOUNTAIN REGION Final Report
Jun. 1981 387 p
(Contract DOT-FA79WAI-057)
(AD-A108166) Avail: NTIS HC A13/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Author (GRA)

N82-18828# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 7, PART B: ROCKY MOUNTAIN REGION Final Report
Jun. 1981 451 p
(Contract DOT-FA79WAI-057)
(AD-A108167) Avail: NTIS HC A20/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. GRA

N82-18829# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 8: NORTHWEST REGION Final Report
Jun. 1981 432 p
(Contract DOT-FA79WAI-057)
(AD-A108168) Avail: NTIS HC A19/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Author (GRA)

N82-18830# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 9, PART A: WESTERN REGION Final Report
Jun. 1981 386 p
(Contract DOT-FA79WAI-057)
(AD-A108169) Avail: NTIS HC A17/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Author (GRA)

N82-18831# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 9, PART B: WESTERN REGION Final Report
Jun. 1981 365 p
(Contract DOT-FA79WAI-057)
(AD-A108170) Avail: NTIS HC A16/MF A01 CSCL 04/2

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Author (GRA)

N82-18832# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 10, PART A: ALASKAN AND PACIFIC REGIONS Final Report
Jun. 1981 350 p
(Contract DOT-FA79WAI-057)
(AD-A108171) Avail: NTIS HC A15/MF A01 CSCL 04/2

Summary tables and graphic wind roses depicting wind direction and speed under specific ceiling are provided. This data is used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. GRA

N82-18833# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 10, PART B: ALASKAN AND PACIFIC REGIONS Final Report
Jun. 1981 339 p
(Contract DOT-FA79WAI-057)
(AD-A108172) Avail: NTIS HC A15/MF A01 CSCL 04/2

The data are used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. Summary tables and graphic wind roses depicting wind direction and speed under specific ceiling are provided. GRA

N82-18834# National Climatic Center, Asheville, N. C.
WIND-CEILING-VISIBILITY DATA AT SELECTED AIRPORTS. VOLUME 11: VISIBILITY TIME SERIES FOR KEY STATIONS Final Report
Jun. 1981 238 p
(Contract DOT-FA79WAI-057)
(AD-A108177) Avail: NTIS HC A11/MF A01 CSCL 04/2

Data presented in volumes 1-10 are based on 3-hourly observations. 51 key stations were selected for comparison of hourly observations versus 3-hourly observations. Statistical variations were noted in 18 cases for which detailed comparisons are presented. Author (GRA)

N82-18835# National Oceanic and Atmospheric Administration, Boulder, Colo.
DEVELOPMENT OF A CLEAR AIR RADAR TO DETECT METEOROLOGICAL HAZARDS AT AIRPORTS Final Report, 1 Oct. 1978 - 21 Sep. 1981
R. B. Chadwick, K. P. Moran, W. C. Campbell, K. B. Earnshaw, and T. R. Detman 21 Sep. 1981 113 p refs
(Contract ESD-0-0630; AF Proj. 6670)
(AD-A108236; AFGL-TR-81-0268) Avail: NTIS HC A06/MF A01 CSCL 17/9

To be useful in detecting meteorological hazards such as low-level wind shear near airports, a radar must be able to: (1) detect backscatter from both clear air and rain; (2) operate at short ranges and low elevation angles; and (3) measure Doppler frequencies caused by air motion. The development of a radar with these characteristics is described and the results of testing this radar at airports are presented. Special emphasis is placed on the problems of low elevation angle operation and clutter suppression. The importance of proper siting is pointed out. In addition, it is demonstrated that the radar can readily detect the turbulent wakes of large jet aircraft. Author (GRA)

N82-18836# Naval Air Systems Command, Washington, D. C.
US NAVY MARINE CLIMATIC ATLAS OF THE WORLD. VOLUME 9: WORLD-WIDE MEANS AND STANDARD DEVIATIONS
Oct. 1981 355 p refs
(AD-A108222; NAVAIR-50-1C-65-Vol-9) Avail: NTIS HC A16/MF A01 CSCL 04/2

The eight volume series of the U.S. Navy Marine Climatic Atlas of the World has had world-wide acceptance as an authoritative reference for large scale operational planning and applied research. This volume, based on the entire period of record available, resulted from the need to develop an automated quality control scheme for marine observations for use in the revision of the first 5 volumes of Atlas series. This was basically achieved by summarizing, analyzing and digitizing the mean and standard deviation charts that appear in this volume. Author (GRA)

N82-18837# Drexel Univ., Philadelphia, Pa. Dept. of Physics and Atmospheric Science.
EXPERIMENTS IN REGIONAL SCALE NUMERICAL WEATHER PREDICTION INCLUDING USE OF SESAME '79 DATA Final Report
Carl W. Kreitzberg Aug. 1981 10 p
(Contract F49620-79-C-0208; AF Proj. 2310)
(AD-A108372; AFOSR-81-0770TR) Avail: NTIS HC A02/MF A01 CSCL 04/2

This research has as a goal testing of a state-of-the-art mesoscale model using a unique set of meteorological data and to gain insight into the modeling of radiation, clouds, precipitation and boundary layer effects in such models. Development of four dimensional data assimilation schemes and analysis of the sensitivity of the model to horizontal and vertical resolution were also to be accomplished. The four dimensional assimilation was deemphasized, at this time, when it became clear that the sensitivity results differed greatly from storm to storm. Scientific papers have been prepared that demonstrate the usefulness and sensitivity of such models in studying the evolution of meso-alpha (regional or sub-synoptic) and meso-beta (fronts; convection bands) disturbances. Specifically, it is clear that latent heating from convection can greatly alter the wind field on scales of 1,000 km. The first SESAME '79 case, April 10, 11, 1979 that produced the Wichita Falls, TX tornado was unique in that the cyclonic scale could not be predicted from the conventional data. The substantial variation in predictability suggests that considerable emphasis should, in the future, be placed on four dimensional data assimilation. Author (GRA)

N82-18838# Danish Meteorological Inst., Copenhagen.
THE CLIMATE OF DENMARK. SUMMARIES OF OBSERVATIONS FROM LIGHT VESSELS. PART 1: WIND, VISIBILITY, AIR TEMPERATURE CLOUD COVER, AND WEATHER
Agnes Sparre 1981 243 p In ENGLISH and DANISH Original contains color illustrations
(DMI-CLIMATOL-PAPERS-8; ISBN-87-7478-171-5) Avail: NTIS HC A11/MF A01

The seasonal variations in meteorological parameters, especially the annual variation in wind direction and force and the annual variation in visibility are discussed. Conjunction of wind with visibility is mentioned. The number of days with precipitation, with lightning and thunder, with hail, and the seasonal and daily variation in cloud cover and air temperature are reported. Author (ESA)

N82-18839# World Meteorological Organization, Geneva (Switzerland).
MANUAL ON MARINE METEOROLOGICAL SERVICES. (ANNEX 6 TO THE WMO TECHNICAL REGULATIONS)
1981 91 p refs Original contains color photographs
(WMO-558; ISBN-92-63-10558-8) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 23

The regulatory material, dealing essentially with international obligations of Members in providing marine meteorological services relative to the high seas, coastal and offshore areas, and to harbor approaches and ports, is presented. The manual is designed to facilitate cooperation in respect to international coordination of marine meteorological services and to ensure uniformity in the practices and procedures employed. Author (ESA)

N82-18840# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
LONG RANGE LASER ANEMOMETRY WITH PARTICULAR REFERENCE TO WIND POWER DEVELOPMENT
L. Danielsson and E. R. Pike (Royal Signals and Radar Estab., Malvern, England) 6 Oct. 1981 51 p refs Submitted for publication
(Contract NE-5061-014)
(FFA-TN-HU-2262-Pt-3) Avail: NTIS HC A04/MF A01

Literature on atmospheric scattering of visible (Ar+) and IR (CO2) laser beams with transit time and Doppler processing was reviewed. A decision flow diagram for geometrical specifications of wind measurements and comparison tables are provided in order to show which system is best for any given task, e.g., wind generator interaction. When range resolution, flexibility, and economic requirements permit, an IR system is recommended. The economic advantages of time multiplexing are pointed out. Author (ESA)

N82-18841# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
FLORIDA AREA CUMULUS EXPERIMENT (FACE), 1980: OPERATIONAL SUMMARY AND DATA INVENTORY
Jun. 1981 193 p refs
(PB82-113291; NOAA-TM-ERL-OWRM-5; NOAA-81082101) Avail: NTIS HC A09/MF A01 CSCL 04B

The last field year of the confirmation phase of the Florida Area Cumulus Experiment was conducted in 1980 following summer experiments in 1978 and 1979. The purpose of FACE-2 is confirmation of the results of FACE-1, which suggest that dynamic seeding was instrumental in increasing precipitation over a fixed target area. The period for experimentation in 1980 was 16 June through 31 August. During this 77 day period, randomized cloud seeding and other studies were conducted. GRA

N82-18842# Florida State Univ., Tallahassee. Dept. of Meteorology.

COASTAL UPWELLING ECOSYSTEMS ANALYSIS. TECHNICAL REPORT 40: ATLAS OF THE JOINT 2 1976 AIRCRAFT WINDS FOR THE 500 FOOT LEVEL

D. W. Stuart and A. I. Watson Jun. 1981 71 p refs
(Grant NSF OCE-77-27735)
(PB82-113911; FSU-MET-STU-81-3; NSF/IDOE-81-45; NSF/IDOE/CUEA/TR-40) Avail: NTIS HC A04/MF A01 CSCL 04B

Maps of winds at 500 ft are presented for thirteen individual flights using aircraft data gathered during daytime (1000-1600 hours) flights made in March - April as a part of a data analysis program. Details of the data reduction and analysis techniques are discussed. The total wind field is shown by maps of the streamlines and isotachs while the alongshore and onshore components are shown by isotach maps. Maps of the 500 ft winds on the individual flights reveal the flow is generally steady and parallel to the coast but with onshore flow near the mouth of the Ica River. Author (GRA)

N82-18843# Florida State Univ., Tallahassee. Dept. of Meteorology.

COASTAL UPWELLING ECOSYSTEMS ANALYSIS. ATLAS OF THE JOINT 2 1977 AIRCRAFT WINDS FOR THE 500 FOOT LEVEL

D. W. Stuart and G. L. Moody Jul. 1981 71 p refs
(Grant NSF OCE-77-27735)
(PB82-113929; FSU-MET-STU-81-4; NSF/DOE-81-46; NSF/DOE/CUEA/TR-66) Avail: NTIS HC A04/MF A01 CSCL 04B

Maps of winds at 500 ft are presented for twelve (12) individual flights using aircraft data gathered during daytime (1000-1500) hours flights made in March - April - May. Details of the data reduction and analysis techniques are discussed. The total wind field is shown by maps of the streamlines and isotachs while the alongshore and onshore components are shown by isotach maps. Maps of the 500 ft winds on the individual flights reveal that the flow is generally steady and parallel to the coast but with onshore flow near the mouth of the Ica River. Author (GRA)

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-18844# Office of Technology Assessment, Washington, D. C.

TECHNOLOGY AND OCEANOGRAPHY: AN ASSESSMENT OF FEDERAL TECHNOLOGIES FOR OCEANOGRAPHIC RESEARCH AND MONITORING

Jun. 1981 27 p
(OTA-O-142) Avail: NTIS HC A03/MF A01

The status of technologies used to collect data about the ocean and to conduct experiments in the ocean is addressed. Problems and opportunities are analyzed and the Federal agencies and programs charged with conducting oceanic studies and providing the necessary management and hardware systems are examined. Selected national programs directed toward conserving and managing marine fishery resources, developing an oceanographic satellite system investigating the geology and possible resource potential of the continental margins beneath the deep ocean, and developing a climate prediction capability are analyzed. S.L.

N82-18845# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

FILTRATION OF ELEMENTS OF ORBITAL IMAGES CONTAMINATED BY CLOUDS, TO OBTAIN IMPROVED MEASUREMENTS OF THE BLACK BODY TEMPERATURE FOR USE IN OCEANOGRAPHY [FILTRAGEN DE ELEMENTOS DE IMAGENS ORBITALS CONTAMINADAD POR NUVENS, PARA A OBENTCAO DE MEDICOES MELHORADAS DA TEMPERATURA DE CORPO NEGRO, PARA USO EM OCEANOGRAFIA]

Merritt Raymond Stevenson and Hector Manuel Inostroza Villagra Jun. 1981 18 p refs In PORTUGUESE; ENGLISH abstract Presented at the 33rd Ann. Meeting of SBPC, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2121-RPE/345) Avail: NTIS HC A02/MF A01

The inherent problem of the presence of clouds and of cloud contamination in satellite data (pixels) was reviewed. A statistical model is proposed to explain the spatial variability observed in some AVHRR and VISSR data of NOAA-6 and SMS-2 satellites. Basically the approach assumes that the field of view contains different subpopulations, that is to say, surface measurements of unobstructed relatively warm water temperature, partially obscured water with a lower temperature, and clouds with the lowest range of temperature. The equivalent statistical field is obtained by assuming a linear combination of the three (or more) subpopulations where each one of them can be represented by a Gaussian function. A method to eliminate the clouds from the field of view by utilizing the approach where histograms of subsamples contained within larger samples are sequentially evaluated to determine the extent in which the elements of the image are contaminated, is proposed. T.M.

N82-18846# Science Applications, Inc., McLean, Va.

A DYNAMICAL MODEL OF WIND-INDUCED NEAR-INERTIAL MOTIONS Technical Report, Nov. 1980 - Oct. 1981

David M. Rubenstein Nov. 1981 63 p refs
(Contract N00014-81-C-0084)
(AD-A108687; SAI-82-598-WA; OPD-TR-424-81-274-02) Avail: NTIS HC A04/MF A01 CSCL 08/3

A semispectral model of upper ocean inertial motions is developed. The model is solved with a Fourier-Chebyshev expansion in the spatial dimensions, and numerically in time. The model allows the user to specify arbitrary vertical profiles of mean stratification and eddy diffusivity. The model is driven by a wind stress function which is an arbitrary function of time. The model is tested against analytic time-dependent Ekman-layer solutions. The comparisons are excellent. The model is used to simulate the response to a delta-function wind stress impulse. Two cases are presented: one with uniform profiles of stratification and eddy diffusivity, and one with nonuniform profiles. Response functions of wavenumber and frequency are computed for current velocity and shear. The response is shown to be in resonance near the lowest two modes of the internal wave dispersion relation. Author (GRA)

N82-18847# Science Applications, Inc., McLean, Va.

MODELS OF NEAR INERTIAL VERTICAL SHEAR

David M. Rubenstein Nov. 1981 70 p refs
(Contract N00014-81-C-0084)
(AD-A108686; SAI-82-546-WA; OPD-81-274-04) Avail: NTIS HC A04/MF A01 CSCL 08/3

The physics of the interactions between the wind stress, the Ekman layer, and internal waves are reviewed. A general set of equations which describe near-inertial motions are developed. The time dependent behavior of the wind-forced Ekman layer is examined. Then we consider two classes of resonance conditions. The first involves the resonance between the wind field and Ekman pumping, while the second class is the resonance between a propagating Ekman pumping field and the internal wave field. Author (GRA)

N82-18848# Science Applications, Inc., McLean, Va.

STATISTICAL MODELING OF SHEAR IN THE UPPER OCEAN Technical Report, 1 Jan. 1980 - 24 Mar. 1981

Gerald T. Hebenstreit and Walter J. Grabowski 1 Mar. 1981 75 p refs
(Contract N00014-81-C-0084)

(AD-A108212; SAI-82-382-WA) Avail: NTIS HC A04/MF A01 CSCL 20/4

Analysis of upper ocean shear profiles obtained with a free-fall sampling instrument (YVETTE) indicated that, within specific depth regimes and for specified vertical differencing intervals, values of shear-squared might be distributed according to a chi squared probability distribution. An analysis based on several assumptions about the shear field produced a model which showed that a chi squared distribution was physically reasonable. Statistical tests on the profiles led to acceptance of the hypothesis that S squared follows a chi squared distribution with a variance derived from the mean-squared shear in the regime. Further statistical tests showed that the necessary assumptions about the horizontal shear components were statistically reasonable as well as physically reasonable. A trial prediction using a simple linear relationship between mean Brunt-Vaisala frequency in a regime and mean shear-squared, based on a 2m separation, in the regime showed the chi squared model to be a potentially useful tool for area characterizations. GRA

N82-18849# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Experimental Engineering Div.

SUBSEA TRENCHING IN THE ARCTIC

Malcolm Mellor Sep. 1981 38 p refs

(Contract N68305-80-WR-00186)

(AD-A108341; CRREL-81-17) Avail: NTIS HC A03/MF A01 CSCL 13/2

Environmental conditions are described for the continental shelf of the western Arctic, and for the shelf of Labrador and Newfoundland. Special emphasis is given to the gouging of bottom sediments by ice pressure ridges and icebergs, and an approach to systematic risk analysis is outlined. Protection of subsea pipelines and cables by trenching and direct embedment is discussed, touching on burial depth, degree of protection, and environmental impact. Conventional land techniques can be adapted for trenching across the beach and through the shallows, but in deeper water special equipment is required. The devices discussed include hydraulic dredges, submarine dredges, plows, rippers, water jets, disc saws and wheel ditchers, ladder trenchers and chain saws, routers and slot millers, ladder dredges, vibratory and percussive machines, and blasting systems. Consideration is given to the relative merits of working with seabed vehicles, or alternatively with direct surface support from vessels or from the sea ice. Author (GRA)

N82-18850# Oregon State Univ., Corvallis. School of Oceanography.

MESOSCALE STUDIES OF FLOW REGIMES AND FLUXES OF PARTICULATE MATTER IN COASTAL WATERS Annual Progress Report, 1 Apr. 1980 - 30 Sep. 1981

David M. Nelson, Hasong Pak, Lawrence F. Small, and J. Donald V. Zaneveld Sep. 1981 48 p refs

(Contracts EY-76-S-06-2227; DE-AT06-76EV-70029)

(DE82-001740; DOE/EV-70029/15) Avail: NTIS HC A03/MF A01

Progress is reported on the similarity of the Quinault Canyon and the Oregon Coast, suspended particulate matter, thermocline oxygen maxima and coastal upwelling, seasonality in bottom nepheloid layers and overlying waters, and in-situ fluorometer development. Biomass growth was studied by relating it to levels of particulate concentration and composition. DOE

N82-18851# Delaware Univ., Newark.

THE PROPAGATION OF INERTIAL-INTERNAL WAVES IN COASTAL UPWELLING REGIONS Ph.D. Thesis

Walter Robertson Johnson Jun. 1981 313 p refs

(Grant NSF OCE-77-28354)

(PB82-113275; CMS-01-81; NSF/IDOE-81-79) Avail: NTIS HC A14/MF A01 CSCL 08C

Internal tidal and near-inertial-internal waves in a coastal upwelling zone are investigated, in which the mean flow and density field, and their gradients, modified the wave propagation. A theoretical development of internal wave propagation and ray trajectory calculations are discussed, and the results from observations acquired as part of the JOINT II experiments off Peru are given. GRA

N82-18852# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.

HF RADAR MEASUREMENTS OF SURFACE CURRENTS IN THE GERMAN BIGHT DURING MARSEN PHASE 2, PART 2 Technical Memo, 24-28 Sep. 1979

Robin S. Lyons Jul. 1981 31 p refs

(PB82-124553; NOAA-TM-ERL-WPL-75; NOAA-81092904) Avail: NTIS HC A03/MF A01 CSCL 08C

Instantaneous surface currents in the German Bight, measured with an HF radar system (called CODAR) during the marine remote sensing experiment are presented. The data set is from four hour interval sampling. GRA

N82-18853# Woods Hole Oceanographic Institution, Mass. Marine Policy Program.

GEORGES BANK: AN ANNOTATED BIBLIOGRAPHY OF ATLASES, INVENTORIES AND MAP SERIES

Richard L. Price May 1981 75 p refs Sponsored by Mellon (Andrew W.) Foundation and Pew Memorial Trust

(Grant NA80AA-D-00077)

(PB82-107665; WHOI-81-46; NOAA-81073006) Avail: NTIS HC A04/MF A01 CSCL 08J

The bibliography reviews inventory-like studies of the Georges Bank region and presents information on the scope of the work, topics treated, geographic area of concern, and audience. The primary purpose was to evaluate the nature and type of maps used in the works reviewed so the notations include the number of maps, their formats and scales, cartographic quality and base map content. Author (GRA)

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-18854*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

PHYSIOLOGICAL RESPONSES TO PROLONGED BED REST AND FLUID IMMERSION IN MAN: A COMPENDIUM OF RESEARCH (1974 - 1980)

John E. Greenleaf, Lori Silverstein (San Jose State Univ.), Judy Bliss, Vicki Langenheim, Heidi Rosson (California Univ., Davis), and Clinton Chao (California Univ., Berkeley) Jan. 1982 112 p

(NASA-TM-81324; A-8709) Avail: NTIS HC A06/MF A01 CSCL 06S

Water immersion and prolonged bed rest reproduce nearly all the physiological responses observed in astronauts in the weightless state. Related to actual weightlessness, given responses tend to occur sooner in immersion and later in bed rest. Much research was conducted on humans using these two techniques, especially by Russian scientists. Abstracts and annotations of reports that appeared in the literature from January 1974 through December 1980 are compiled and discussed. Author

N82-18855# Ohio State Univ., Columbus. Dept. of Veterinary Pathobiology.

MOLECULAR INTERACTIONS OF HIGH ENERGY FUELS AND JET FUELS WITH ONCOGENIC VIRUSES AND ENDOGENOUS VIRUSES Annual Report, 31 Jul. 1980 - 15 Sep. 1981

James R. Blakeslee, Jr. Oct. 1981 110 p refs

(Contract F49620-80-C-0087; AF Proj. 2312)

(AD-A108377; AFOSR-81-0765TR) Avail: NTIS HC A06/MF A01 CSCL 06/2

The objectives of this research are to develop rapid in-vitro assays to evaluate the carcinogenic potential of chemicals used by the U.S. Air Force. Snyder-Theilen Feline Sarcoma Virus (ST FeSV), quantitatively transforms human skin fibroblasts following second order kinetics. These studies were performed in order to determine whether chemicals altered ST FeSV transformation in a predictable manner and to correlate the alteration with the carcinogenic or non-carcinogenic activity of the text chemical. The results, to date, show diverse carcinogens classed as: aromatic amines, polycyclic hydrocarbons, Aminofluorenes, hydrazines, asbestos and mycotoxins inhibited virus transformation when virus infected cells (2 hours post-infection) were exposed to test chemical, while non-carcinogenic chemicals had no significant effect on transformation. Triton X-100, acetone, petroleum and shale oil derived JP5; RJ5 and diesel fuel, marine, demonstrated non-carcinogenic activity while formaline demonstrated carcinogenic activity. Experiments designed to show the specificity of the antagonistic effect of known carcinogens are reported. Disulfuram inhibits biotransformation of 1,2 symmetrical dimethyl hydrazine (SDMH) metabolites, azomethane to azoxymethane (ultimate carcinogen) thereby preventing carcinogenic effect of the proximate carcinogen SDMH. Detailed methodology required to ascertain effect of chemicals on ST FeSV pro-virus integration and synthesis are presented. GRA

N82-18265*# Pennsylvania Univ., Philadelphia.
NUTATION OF HELIANTHUS ANNUUS IN A MICROGRAVITY ENVIRONMENT
Allan H. Brown *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06C

N82-18267*# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Aachen (West Germany). Abteilung Biophysik.
MICROORGANISMS AND BIOMOLECULES IN SPACE HARD ENVIRONMENT
G. Horneck *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06C

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-18856* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 227, JANUARY 1982
Jan. 1982 66 p
(NASA-SP-7011(227)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 166 reports, articles, and other documents introduced into the NASA scientific and technical information system in December 1981. Author

N82-18857 Royal Aircraft Establishment, Farnborough (England). Engineering Physics Dept.
SCATTER DIAGRAMS BASED ON THE ANTHROPOMETRIC SURVEY OF 2000 ROYAL AIRFORCE AIRCREW (1970/1971)
R. E. Simpson and E. Violet Hartley 10 Feb. 1981 154 p refs
(RAE-TR-81017; RAE-EP-763; BR79375) Copyright. Avail: Issuing Activity

An anthropometric survey was conducted in order to provide information for aircrew clothing, personal equipment and aircraft workspace design purposes. Scatter diagrams of pairs of measurements of value to engineers, ergonomists or clothing designers who require information on the interrelationship between specific measurements are presented. Each subject is represented by a pair of coordinates, x and y, which represent the two measurements considered. Information on the number of subjects to which the diagram relates, means of x and y variate values, correlation coefficient, and regression equations for the x and y variates are given. Functional clothing sizing is based on two control measurements, e.g., stature and chest circumference for one piece coveralls. Author (ESA)

N82-18858*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT: SPACE SHUTTLE PROGRAM. STS-2 POSTFLIGHT MEDICAL OPERATIONS
29 Jan. 1982 23 p
(NASA-TM-84135; E-989-81-02) Avail: NTIS HC A02/MF A01 CSCL 06S

The STS-2 mission presented the NASA medical team with a series of operational problems associated with the potential contamination of the onboard potable water and altered work/rest cycles. The first problem was traced to the inflight malfunctioning fuel cell, while the second was attributed to the modification of in-flight crew timelines in order to maximize the scientific data acquisition. Shortened sleep period, heavy work loads, inadequate time allocation for food preparation and consumption and estimated low water intake, though tolerable for a 54 hour mission, would have been unacceptable for a longer misson. A contingency plan was developed to restructure in-flight time-lines and institute corrective health maintenance procedures in the event that the mission was extended beyond 54 hours. Minor losses of medical data occurred as a result of the shortened mission duration. All phases of the mission required real-time re-evaluation, identification of potential impact on preexisting medical constraints, and development of appropriate recommendations and solutions. The activities required significant coordination among the different teams involved in medical operations. N.W.

N82-18859*# Houston Univ., Tex. Dept. of Chemistry.
ANALYSIS OF VOLATILE METABOLITES IN BIOLOGICAL FLUIDS AS INDICATORS OF PRODROMAL DISEASE CONDITION Final Report
A. Zlatkis Jan. 1982 25 p refs
(Contract NAS9-15882)
(NASA-CR-167513) Avail: NTIS HC A02/MF A01 CSCL 06E

The volatile profile cannot be defined as a single class of substances, rather it is a broad spectrum of materials of different polarities characterized by having a boiling-point in the low to medium range (up to approximately 300 C) and the fact that the compounds are suitable for gas chromatography without derivatization. The organic volatile profiles are very complex mixtures of metabolic byproducts, intermediates, and terminal products of enzymatic degradations composed mainly of alcohols, ketones, aldehydes, pyrazines, sulfides, isothiocyanates, pyrroles, and furans. The concentration of organic volatiles in biological fluids covers a wide range with many important components present at trace levels. The complexity of the organic volatile fraction requires the use of capillary columns for their separation. T.M.

N82-18860# Texas Univ. at Arlington. Dept. of Mathematics.
STATISTICAL TOOLS FOR DETERMINING FITNESS TO FLY Final Report, Sep. 1978 - Mar. 1980
Patrick L. Brockett and Gerald A. Shea Brooks AFB, Tex. School of Aerospace Medicine Sep. 1981 44 p refs
(Contract F33615-78-C-0623; AF Proj. 7755)
(AD-A108599; SAM-TR-81-20) Avail: NTIS HC A03/MF A01 CSCL 12/1

The goal of this project is to use data from regularly scheduled physical examinations to estimate the probability of an event such as a heart attack. This is done via the construction of a mathematical model. A high probability of an event as computed by the model would be evidence of a high risk case. The model developed here, termed the periodic checkup predictive model, is a survival distribution model similar to the proportional hazards model when there is little or no loss to followup and to logistic regression when the object is to predict the occurrence of an event during a fixed interval of time. Author (GRA)

N82-18861# European Space Agency, Paris (France).
EVALUATION OF THE VISUAL ACQUISITION RANGE OF ENROUTE AIR TRAFFIC FROM COCKPIT OBSERVATIONS
Otto Weber Oct. 1981 56 p refs Transl. into ENGLISH from 'Bestimmung der visuellen Auffassreichweite von Verkehrsflugzeugen im Streckenglug aus Beobachtungen im Cockpit', Rept. DFVLR-Mitt-80A-14 DFVLR, Brunswick, West Germany, Sep. 1980 53 p
(ESA-TT-691; DFVLR-Mitt-80-14) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 11,90

Onboard observations and approach lead time measurements are employed. The results of 29 measurement campaigns conducted by airline pilots are analyzed. Evaluation methods are described and problems due to converging courses and large cross track distances in the head-on case are treated. The results for the acquisition range and the apparent size of the intruder derived from this range are discussed. The advantages of anticollision and position lights, vapor trials and air traffic control signals for the acquisition process are demonstrated. Data acquisition improvements are suggested. Author (ESA)

N82-18862# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 5.
RESEARCH PREDICTIONS FOR UNDERWATER ACTIVITIES IN THE 1980'S [FORSKNINGSBEHOV INOM 1980-TALETS UNDERVATTENSVERKSAMHET]
Bo Cassel Oct. 1981 29 p In SWEDISH
(FOA-C-58010-H1) Avail: NTIS HC A03/MF A01

Present developments show that technical equipment compliments the diver's work and makes it easier, but cannot take the place of the diver. In bell diving a depth of 700 m was reached in 1981. Data from North Sea diving under harsh weather conditions were studied and make up, to a certain extent, the background of research and development in the next decade. Oil and gas resources at depths between 300 and 600 m will be exploited at that time. Diving at such depths involves special problems. Safety requirements for divers are addressed. Author (ESA)

N82-18863# Ohio State Univ., Columbus. Coll. of Medicine.
STUDY OF CHLORINE DIOXIDE AND ITS METABOLITES IN MAN
Joseph R. Bianchine, Judith R. Lubbers, Sudha Chauhan, and Judy Miller Sep. 1981 100 p refs
(Grant EPA-R-805643)
(PB82-109356; EPA-600/1-81-068) Avail: NTIS HC A05/MF A01 CSCL 06T

An assessment of the relative safety of chronically administered chlorine water disinfectants in man was undertaken. A rising dose tolerance investigation examined the effects of single dose increasing concentration administration of chlorine disinfectants to normal healthy adult male volunteers. The impact on normal subjects of twelve week daily ingestion of the disinfectants was addressed. Physiological impact was assessed by evaluation of a large battery of qualitative and quantitative tests. In general, the study affirmed the relative safety and tolerance of normal healthy adult males and normal healthy adult male glucose-6-phosphate dehydrogenase deficient individuals to daily twelve week ingestion of 500 mL of chlorine disinfectants at a concentration of 5 mg/L. GRA

N82-18864# Midwest Research Inst., Kansas City, Mo.
HYDROGEN CYANIDE HEALTH EFFECTS Final Report
Bonnie L. Carson, Larry H. Baker, Betty L. Herndon, Harry V. Ellis, III, and Eileen M. Horn Sep. 1981 71 p refs
(Contract EPA-68-03-2928)
(PB82-116039; EPA-460/3-81-026) Avail: NTIS HC A04/MF A01 CSCL 06T

Health effects literature primarily related to inhalation exposures to hydrogen cyanide was collected, evaluated, tabulated and summarized. Approximately 170 documents were collected from computerized and manual literature searches covering the period 1899-1981. Pharmacologists and an M.D. epidemiologist rated the documents according to their applicability to the study and their methodology. The approximately 20 documents considered useful for deriving a range of concern for human exposure to hydrogen cyanide from automotive emissions were tabulated. The 25 pages of tables detail the results of acute and repeated dose testing of mice, rats, guinea pigs, rabbits, cats, monkeys, dogs, goats, donkeys and humans as well as human occupational studies. Most of the documents evaluated are described in an annotated bibliography. GRA

N82-18865# Midwest Research Inst., Kansas City, Mo.
AMMONIA HEALTH EFFECTS Final Report
Bonnie L. Carson, Harry V. Ellis, III, Cecily M. Beall, and Larry H. Baker Sep. 1981 108 p refs
(Contract EPA-68-03-2928)
(PB82-116047; EPA-460/3-81-027) Avail: NTIS HC A06/MF A01 CSCL 06T

Health effects literature primarily related to inhalation exposures to ammonia was collected, evaluated, tabulated, summarized. Appoximately 200 documents were collected fr computerized and manual literature searches covering the per 1886-1981. Pharmacologists and an M.D. epidemiologist ra the documents according to their applicability to the study their methodology. The approximately 50 documents conside useful for deriving a range of concern for human exposure ammonia from automotive emissions were tabulated. 50 pages of tables detail the results of acute, repeated do and chronic testing of bats, mice, rats, guinea pigs, chicke rabbits, cats, monkeys, dogs, turkeys, swine, and humans well as human occupational and accidental studies. Most of documents evaluated are described in an annotated bibliography. G

N82-18255*# Mainz Univ. (West Germany).
EFFECTS OF RECTILINEAR ACCELERATION, OPTOKINET AND CALORIC STIMULI IN SPACE
R. vonBaumgarten *In* NASA. Marshall Space Flight Cent Spacelab Mission 1 Expt. Descriptions Nov. 1981 5 p (F primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

N82-18256*# Massachusetts Inst. of Tech., Cambridge.
VESTIBULAR EXPERIMENTS
L. R. Young *In* NASA. Marshall Space Flight Center Spacel Mission 1 Expt. Descriptions Nov. 1981 5 p (For prima document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

N82-18257*# National Aeronautics and Space Administratio Lyndon B. Johnson Space Center, Houston, Tex.
VESTIBULO-SPINAL REFLEX MECHANISMS
M. F. Reschke *In* NASA. Marshall Space Flight Center Spacel Mission 1 Expt. Descriptions Nov. 1981 2 p (For prima document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

N82-18258*# National Aeronautics and Space Administratio Lyndon B. Johnson Space Center, Houston, Tex.
THE INFLUENCE OF SPACE FLIGHT ON ERYTHROKINETICS IN MAN
Carolyn S. Leach *In* NASA. Marshall Space Flight Cente Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (Fo primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06S

N82-18259*# Freie Univ., Berlin (West Germany). Physiologisches Inst.
MEASUREMENT OF CENTRAL VENOUS PRESSURE AND DETERMINATION OF HORMONES IN BLOOD SERUM DURING WEIGHTLESSNESS
K. Kirsch *In* NASA. Marshall Space Flight Center Spacela Mission 1 Expt. Descriptions Nov. 1981 2 p (For primar document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

N82-18260*# Illinois Univ., Urbana.
EFFECTS OF PROLONGED WEIGHTLESSNESS ON THE HUMORAL IMMUNE RESPONSE OF HUMANS
E. W. Voss, Jr. *In* NASA. Marshall Space Flight Center Spacela Mission 1 Expt. Descriptions Nov. 1981 2 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06S

N82-18261*# Eidgenoessische Technische Hochschule, Zurich (Switzerland).
EFFECT OF WEIGHTLESSNESS ON LYMPHOCYTE PROLIFERATION
Auiusto Cogoli *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

N82-18262*# Rome Univ. (Italy).
THREE-DIMENSIONAL BALLISTOCARDIOGRAPHY IN WEIGHTLESSNESS
A. Scano *In* NASA. Marshall Space Flight Center Spacelab

Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06E

N82-18264*# Stirling Univ. (Scotland).
MASS DISCRIMINATION DURING WEIGHTLESSNESS
Helen Ross *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06S

N82-18266*# State Univ. of New York at Binghamton.
PRELIMINARY CHARACTERIZATION OF PERSISTING CIRCADIAN RHYTHMS DURING SPACE FLIGHT: NEUROSPORA AS A MODEL SYSTEM
Frank W. Sulzman *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06P

N82-18268*# San Francisco Univ., Calif.
RADIATION ENVIRONMENT MAPPING
E. Y. Benton *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06R

N82-18269*# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Aachen (West Germany). Abtelung Biophysik.
ADVANCED BIOSTACK EXPERIMENT
H. Buecker *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 06R

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-18866*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECT OF TACTILE VIBRATION ON ANNOYANCE TO SYNTHESIZED PROPFAN NOISE
Sherman A. Clevenson Dec. 1981 16 p refs Presented at the 102nd Meeting of the Acoust. Soc. of Am., Miami Beach, Fla., 1-4 Dec. 1981
(NASA-TM-83258) Avail: NTIS HC A02/MF A01 CSCL 05H

Design information that maximizes passenger comfort for propfan aircraft is presented. Predicted noise and vibration environments and the resultant passenger acceptability were studied. The effect of high frequency tactile vibration (i.e., greater than 30 Hz) on passenger reactions was analyzed. Passenger reactions to a wide range of noise with and without tactile vibration was studied. The passenger ride quality simulator was employed using subjects who evaluated either synthesized propeller noises only, or these noises combined with seat/arm vibration. The noises ranging from 80-100 dB consisted of a turbulent boundary layer noise with a factorial combination of five blade passage frequencies (50-200 Hz), two harmonic rolloffs, and three tone/noise ratios. It is indicated that passenger reaction (annoyance) to noise is not significantly changed in the presence of tactile vibration. E.A.K.

N82-18867# Illinois Univ., Urbana-Champaign. Engineering-Psychology Research Lab.
TIME-SHARING MANUAL CONTROL AND MEMORY SEARCH: THE JOINT EFFECTS OF INPUT AND OUTPUT MODALITY COMPETITION, PRIORITIES AND CONTROL ORDER
Michael Vidulich and Christopher D. Wickens Dec. 1981 61 p refs
(Contract N00014-79-C-0658; NR Proj. 196-158)
(AD-A108721; EPL-81-4/ONR-81-4) Avail: NTIS HC A04/MF A01 CSCL 05/1

This report addresses some of the issues that must be considered as voice recognition and synthesis (VRAS) technology is integrated into complex man-machine system environments. These issues include the input and output channels demanded by competing activities, task difficulty or workload, the allocation of attention and the nature of the task that - spatial or verbal - will be interfaced with VRAS. The present experiment addresses primarily the first three issues within the framework of multiple resource theory. Ten subjects performed first and second order tracking tasks either alone or concurrently with a Sternberg Memory Search Task with a set size of three letters. In different conditions the memory search task was presented either auditorily (A) or visually (V), and responses were executed with either a speech response (S), or manually (M). These generated four input/output combinations: AS, VS, AM, VM, that could be defined in terms of an increasing degree of resource overlap with the VM tracking task. GRA

N82-18868# Colorado Univ. at Boulder. Inst. of Cognitive Science.
HOW AN UNFAMILIAR THING SHOULD BE CALLED
Patricia Baggett and Andrzej Ehrenfeuch Nov. 1981 33 p refs
(Contract N00014-78-C-0433; NR Proj. 157-422)
(AD-A109179; TR-111-ONR) Avail: NTIS HC A03/MF A01 CSCL 05/10

An empirical method is described to derive good names for unfamiliar objects. Three principles were used in deriving the names: (1) The vocabulary and structure of the names should be within the user's linguistic capacities; (2) the names should be informationally efficient, namely, short, but at the same time unique; and (3) the names should form a classification system. For example, most names have a generic term and one or more modifiers. These principles lead to the following design for creating good names: Step 1: Names are generated by a group of subjects. Step 2: From the names generated by subjects, the experimenter chooses a subset of the names according to the following criteria: (a) the modal name is chosen, namely, if a particular name is generated more often than others, it is chosen; (b) shorter names are preferred; (c) names chosen stay within the classification system provided by the subjects. Step 3: How good the names are is tested by measuring (1) how well people can match the names with the objects they describe; and (2) how well they can recall the names, given the physical objects. Steps 2 and 3 can be iterated; namely, if a given name is poorly matched or recalled, it can be replaced by another generated name and tested again. The method results in names that form a classification system and that are natural, short, well matched with their physical referents and well recalled. GRA

N82-18869# Technische Hogeschool, Delft (Netherlands). Lab. for Measurement and Control.
IDENTIFICATION OF THE ADAPTIVE FEEDBACK OF THE HUMAN MOTOR SYSTEM USING THE RESPONSE DIFFERENCE METHOD (RDM)
Ton Eland Jul. 1981 131 p refs
(WTHD-134) Avail: NTIS HC A06/MF A01

The role of proprioceptive and visual feedback in generating slow, goal directed movements was investigated using a cybernetic model. The physiological structure of the movement control system is reflected by a feedforward path and a parallel feedback loop. Psychological schemata identified in the feedforward path are the internal model of the task, and the internal model of the motor system load. The RDM uses the differences between a routine and a disturbed response to identify the feedback system. The method was tested by computer simulation and a control stick positioning task. Correlation between model and measured results is >0.95. Visual feedback is only used for a continuous readjustment of the proprioceptive position sense. Proprioceptive feedback tuning is dependent of the velocity of the planned movement. The proprioceptive velocity feedback adapts within 130 msec to an increase in the mass which is moved. Proprioceptive feedback does not adapt to a decreasing mass and/or a changing damping of the load. Author (ESA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-18870*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
STS-2 INDUCED ENVIRONMENT CONTAMINATION MONITOR (IECM): QUICK-LOOK REPORT
E. R. Miller, ed. Jan. 1982 76 p refs
(NASA-TM-82457) Avail: NTIS HC A05/MF A01 CSCL 06K

The STS-2/induced environment contamination monitor (IECM) mission is described. The IECM system performance is discussed, and IECM mission time events are briefly described. Quick look analyses are presented for each of the 10 instruments comprising the IECM on the flight of STS-2. A short summary is presented. S.L.

N82-18871*# George Washington Univ., Washington, D.C. Science Communication Div.
BIBLIOGRAPHY ON CARBOHYDRATE SYNTHESIS. SELECTED WORKS, 1861 - 1981
Patricia A. Dufour Jul. 1981 25 p Presented at Workshop on Carbohydrate Synthesis in a Controlled Ecological Life Support System (CELSS), Elkridge, Md., 23-27 Jun. 1981
(Contract NASw-3165)
(NASA-CR-168553) Avail: NTIS HC A02/MF A01 CSCL 07C

International in scope, this bibliography cites 220 articles books, patents, and conference proceedings related to carbohydrate synthesis. The works are listed alphabetically by author in the following categories: (1) experimental and industrial chemistry; (2) space travel and feeding studies; (3) hardware; and (4) general reviews and progress. A.R.H.

N82-18872# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
FLIGHT ERGONOMICS IN THE AIRCRAFT INDUSTRY PERSONNEL-ERGONOMIC DEVELOPMENT [FLUGERGONOMIE IN DER LUFTFAHRTINDUSTRIE MIT BESONDERER BERUECKSICHTIGUNG PERSONAL-ERGONOMISCHER ENTWICKLUNGEN]
Ruediger Seifert 4 Jun. 1981 23 p refs In GERMAN
(MBB-FE-301/S/PUB/44) Avail: NTIS HC A02/MF A01

Management systems applied to evaluate qualitative and quantitative personnel requirements for maintaining the man machine system (MMS) were determined. Qualitative personnel requirements are plant operation, attendance, maintenance/placement of the MMS needed, professional specialty, and job qualification. In quantitative personnel requirement the number of needed manpower is determined for every professional specialty and area. Personnel selection is recommended for activities, special abilities, performance, and skills. Personnel selection should be made according to these criteria. It is concluded that ergonomic measures are necessary in the development process of the MMS. Transl. by E.A.K.

N82-18873# Boeing Aerospace Co., Seattle, Wash. Engineering Technology Div.
HUMAN ENGINEERING PROCEDURES GUIDE Final Report, 2 Apr. - 2 Dec. 1979
Charles W. Geer Sep. 1981 245 p refs
(Contract F33615-79-C-0520)
(AD-A108643; D180-25471-1) Avail: NTIS HC A11/MF A01 CSCL 05/5

Human engineering (HE) procedures during the system acquisition process are presented for the assistance of various Air Force and industry personnel. The guide is divided into three parts. The first part of the guide is introductory material which scopes the effort and defines HE and human factors engineering (HFE). The second part provides guidance to Air Force and industry management. The third, and last part is the largest section and it provides assistance to both Air Force and industry persons assigned direct responsibility for HE. The management portion shows current management aspects of the HE process utilizing directives, specifications, regulations and pamphlets. HE activities are described in general terms of both what should be done and when it should be accomplished. GRA

N82-18874# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Human Factors.
ACTIVITIES OF THE COMMITTEE ON HUMAN FACTORS: OCTOBER 1, 1980 - SEPTEMBER 30, 1981 Annual Summary Report
Robert T. Hennessy 30 Nov. 1981 22 p
(Contract N00014-81-C-0017; NR Proj. 196-167)
(AD-A108606) Avail: NTIS HC A02/MF A01 CSCL 05/1

The Committee on Human Factors was established and held its first meeting in December 1980. The three principal accomplishments of the committee during the reporting period were: (a) identifying critical problems in human factors and formulating preliminary statements defining the nature of these problems and the basic research needed to alleviate these problems; (b) establishing membership and guidelines for a special working group on simulation; and (c) planning the conduct of a workshop on applied methodologies that will identify some methodologies suitable for presentation at a tutorial symposium and other methodologies deserving research support. GRA

N82-18875*# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.
MODELING HUMAN ATTENTION ALLOCATION STRATEGIES WITH COMPETING CRITERIA Final Report, Mar. - Aug. 1981
Thiruvenkatasamy Govindaraj Oct. 1981 22 p refs
(Grant AF-AFOSR-0144-81; AF Proj. 2313)
(AD-A108509; AFOSR-81-0785TR) Avail: NTIS HC A02/MF A01 CSCL 05/8

In supervisory control situations involving multiple human operators, proper cooperation and coordination is essential. In addition to their individual tasks, the operators are jointly responsible for certain tasks. It is usually not clear when and who should take responsibility for the joint tasks. Proper scheduling of tasks and appropriate allocation of resources are necessary for optimal performance, and in some instances, for overall safety. Understanding how multiple operators interact requires the understanding of single operator performance. A model based on Pareto optimality and Fuzzy Set theory was developed for the human operation. An experimental paradigm had been developed earlier to study the human monitor. The scenario used was similar to monitoring the spread of forest fires, and timely identification of threatening conditions. Experiments were conducted based on the paradigm. Results showed that the operators used updates to reduce the uncertainty to a sufficiently low level before starting threat classification. Sites where the probability of damage was close to 0.5 were more difficult to classify. Author

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N82-18876 California Univ., Berkeley.
PERFORMANCE LIMITS OF INTEGRATED CIRCUIT SIMULATION ON A DEDICATED MINICOMPUTER SYSTEM Ph.D. Thesis
Ellis Cohen 1981 182 p
Avail: Univ. Microfilms Order No. 8200059

An investigation was made concerning the performance limits of circuit-level IC simulation on a dedicated microprogrammable minicomputer system. Investigation shows that circuit analysis can be performed successfully with single precision (32-bit) arithmetic through the use of a combination of numerical pivoting, sparse matrix techniques, a generalization of the indefinite admittance matrix, and voltage thresholds in the algorithms controlling convergence. The use of microcode to extend the computer instruction set greatly improves simulation speed by directly and efficiently performing several of the most time-consuming portions of the analysis. These special instructions reduce the memory requirements compared to larger computers. The development of a new IC simulation program, SPUDS, designed to obtain the best possible performance from a specific minicomputer system has resulted. Conclusions are made concerning the suitability of several microprocessor systems for circuit-level simulation. Dissert. Abstr.

N82-18877 Minnesota Univ., Minneapolis.
PERFORMANCE EVALUATION OF A MULTIPLE PROCESSOR SYSTEM WITH SHARED BUSSES Ph.D. Thesis
Pauline Markenscoff 1981 283 p
Avail: Univ. Microfilms Order No. 8125990

The performance of a multiple processor system which is suitable for the solution of real time control problems is studied. Deterministic models are developed for such systems. In the case of a single bus it is proved that after a number of task executions the operation of the system becomes cyclic with a constant cycle time. The speed of convergence to this cyclic state is estimated and an expression for the constant cycle time is derived. The processing power is also evaluated and is proved to be independent of the order in which the processors transmit through the bus. Techniques for partitioning the task to maximize the processing power are proposed. In the case of a multiple bus system two different bus scheduling schemes are proposed. A stochastic model equivalent to the deterministic one is studied. It involves the study of a finite population queue with Poisson arrivals and Poisson service times and a special priority service discipline different from these found in the literature. Both equal and unequal average execution and data transmission times for the different subtasks are analyzed. Dissert. Abstr.

N82-18878 North Carolina Univ. at Chapel Hill.
COORDINATION OF COMPUTATION IN A BINARY TREE OF PROCESSORS: AN ARCHITECTURAL PROPOSAL Ph.D. Thesis
Donald MacDavid Tolle 1981 230 p
Avail: Univ. Microfilms Order No. 8125627

A design is proposed for a cellular computer consisting of many processors, of two kinds, connected in the form of a binary tree. Both machines are intended for the highly parallel execution of the formal functional programming (FFP) languages of Backus. Both machines, storage permitting, take advantage of all the parallelism expressed in a single program and can execute many programs simultaneously. Both machines, furthermore, decompose each primitive FFP operator into more elementary operations, many of which may be executable concurrently. The machine proposed here uses the syntactic structure of an FFP expression to guide the embedding of a syntactic network of nodes in the binary tree of machine cells. Execution of the FFP program is accomplished through operations performed by the embedded network of nodes. As new FFP expressions are produced during execution of the FFP program, corresponding new syntactic networks are automatically and dynamically embedded and used for further execution. A syntax tree language for programming the embedded syntactic networks is specified in some detail. Dissert. Abstr.

N82-18879 Royal Signals and Radar Establishment, Malvern (England).
FLEX FIRMWARE
I. F. Currie, P. W. Edwards, and J. M. Foster Sep. 1981 37 p
(RSRE-81009; BR81061) Copyright. Avail: Issuing Activity

The instruction set and microcoded aspects of the Flex computer are described. A microprogrammed storage allocation scheme enables the computer to understand procedures. A file store with files of arbitrary structure and mode is possible, based on pointers from the backing store or main store. The data pointed to can contain other pointers. The instruction set facilitates the compilation of high level languages. There is no assembly language. Author (ESA)

N82-18880# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PROGRAMMABLE MULTIPLE DIGITAL CASSETTE MEMORY [MEMORIA MULTIPLA DIGITAL CASSETE PROGRAMAVEL]
Juan Sune Perez Jun. 1981 11 p refs In PORTUGUESE; ENGLISH abstract Presented at the 2nd Natl. Meeting on Automation, Salvador, Bahia, Brazil, Jul. 1981
(INPE-2099-RPE/329) Avail: NTIS HC A02/MF A01

The fundamentals of a peripheral equipment model of the magnetic memory type to be configured in computational systems are proprosed. This peripheral equipment consists, in part, of a microcomputer which was designed and constructed to be employed in the dedicated control of up to eight units of digital cassette memory transports. The model and the operational programming of the controller are also presented. S.L.

N82-18881# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A MICROCOMPUTER FOR CONTROL OF DATA COLLECTION PLATFORMS [UM MICROCOMPUTADOR PARA CONTROLE DE PLATAFORMAS DE COLETA DE BADOS]
Jose Bianchi Neto and E. W. Bergamini Jun. 1981 12 p refs In PORTUGUESE; ENGLISH summary Presented at the 2nd Natl. Meeting on Automation, Salvador, Bahia, Brazil, Jul. 1981
(INPE-2104-RPE/331) Avail: NTIS HC A02/MF A01

A microcomputer developed for application in an environmental data collection platform performs functions of data control, acquisition and processing of a self timed data collection platform compatible with the GOES (satellite) system. Block diagrams are presented and the data collection platform is described. Author

N82-18882# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
THE WORLD WIDE MILITARY COMMAND AND CONTROL INFORMATION SYSTEM: PROBLEMS IN INFORMATION RESOURCE MANAGEMENT Report to the Congress of the United States
19 Oct. 1981 77 p
(AD-A108454; GAO/MASAD-82-2) Avail: NTIS HC A05/MF A01 CSCL 09/2

GAO's evaluation of the World Wide Military Command and Control Information System modernization effort showed that continuing problems associated with providing automated support for command and control functions are not being properly addressed by DOD. DOD's efforts are not yet completed; however, the methods employed and progress to date are unlikely to enable the replacement of the World Wide Military Command and Control Information System to meet its intended goals. Further, these efforts are proceeding far too slowly to be considered responsive to the need to improve current system performance. DOD anticipates 10 more years will be necessary to modernize the system. GAO's evaluation of the modernization program shows that substantial changes are needed in the program's management structure before the system can be fully and effectively modified. Author (GRA)

N82-18883# Grumman Aerospace Corp., Bethpage, N.Y. Research Dept.

INVESTIGATION OF LARGE CAPACITY OPTICAL MEMORIES FOR CORRELATOR APPLICATIONS Final Technical Report, 1 Apr. 1978 - 31 Mar. 1981

Kenneth G. Leib and Jay Mendelsohn Oct. 1981 193 p refs
(Contract F49620-78-C-0051; AF Proj. 2305)
(AD-A108555; RE-634; AFOSR-81-0802TR) Avail: NTIS HC A09/MF A01 CSCL 09/2

An investigation of large capacity optical memories was made. The basic memory element, the matched filter, was examined in a number of configurations, including coherent and noncoherent addition, split spectrum, and multiplexed carriers. Three different storage materials were examined: silver halide, dichromated gelatin, and photopolymers. Both thin and thick holographic memories were studied. The matched filters were evaluated using complex terrains such as woodlands, roadsides, and villages in which the principal targets were located. For each terrain and target, the signal to clutter ratio (s/c) was measured. These ranged from 5.5 to 11 dB for the target terrain combinations studied. The complex matched filters that achieved these s/c's were recorded in dichromated gelatin. More than 5 matched filters could be noncoherently added and 15 could be coherently added in the same memory position. Carrier multiplexing could be used to achieve 30 matched filters per memory position. The theoretical limit for memory density of matched filters is 2670 MF/sq cm. Equivalent to 1,000,000 bits of digital data. Modifications of the basic optical matched filter were studied to improve s/c ratio and increase storage density. GRA

N82-18884# Inco, Inc., McLean, Va.

SQL FRONT-END FUNCTIONAL DESCRIPTION

10 Nov. 1981 84 p refs
(Contract N00014-81-C-0808)
(AD-A108508; INCO/UP-1-81-83155-U) Avail: NTIS HC A05/MF A01 CSCL 09/2

The IAIPS (Integrated Automated Intelligence Processing System) SQL Front-End System Functional Description is designed to provide the basis for high-level design specification for system implementation. The outline for this descriptión follows the guidelines specified in the Automated Data Systems Documentation Standards issued in DOD Instruction 7935.1. The Navy's interest in database technology has its foundation in its need to manage and access large amounts of data originating from different sources. The IAIPS program, in support of Naval Intelligence, has the further requirement that this data be available to interactive users in near-real-time. This need is expected to be met, in part, by implementation of the relational database model, ORACLE, which provides a user-oriented interface to the large database currently in use. GRA

N82-18885# Rome Research Corp., N. Y.

LITHO SCANNING TECHNIQUES Final Technical Report, 17 Sep. 1980 - 17 May 1981

Andrew V. Douglas, Thomas V. Edwards, Michael J. Gillote, and Marsha L. Rapke Griffiss AFB, N.Y. RADC Sep. 1981 112 p
(Contract F30602-80-C-0316; AF Proj. 3205)
(AD-A108371; RRC-81-001; RADC-TR-81-229) Avail: NTIS HC A06/MF A01 CSCL 09/2

This effort continued to investigate raster processing techniques, referred to as the Automatic Feature Tracking algorithm, demonstrated to be feasible under previous contract to RADC (F30602-78-C-0313). The current effort considered methods of optimizing the algorithm, determined optimal parameters to track various features, and examined alternate templates for the various features. The goal of this contract was to reduce the processing requirements, and hence the processing time, while preserving the quality of the feature tracking results. In addition to performing the feature tracking, various timing simulations were conducted to demonstrate the processing speed that could be achieved using the existing algorithm and off-the-shelf hardware. The tracking of a symbolized railroad feature could be performed at a rate of approximately ten (10) inches per minute if a computer configuration had the appropriate hardware peripherals. The DeAnza IP-5500 Image Display System and the Floating Point Systems AP-120BF are the devices that could achieve that tracking rate. Alternate hardware was examined with possible changes in the template matching algorithm and the template design to further accelerate processing speed of the feature tracking algorithm. Author (GRA)

N82-18886# CNR, Inc., Needham, Mass.

WIDEBAND HF CHANNEL ANALYZER Final Technical Report, Mar. 1979 - Jan. 1981

George E. Peo and Phillip A. Bello Jan. 1981 56 p
(Contract N00173-79-C-0090)
(AD-A108694) Avail: NTIS HC A04/MF A01 CSCL 14/2

This document is a final report describing a wideband (1 MHz) HF channel analyzer. The Wideband HF Channel Analyzer is a digital signal processor designed to be used for wideband high-frequency radio channel measurement studies. The analyzer contains analog-to-digital converters, a digital pre-processor, a digital correlator array, a digital post-processor and two computer interfaces. To perform a channel measurement experiment, a transmitter at a remote site broadcasts a pseudo-random number (PN) sequence modulated onto a suitable carrier. After complex demodulation at the receiver, the analyzer measures channel delay by correlating the received sequence with its internal reference. Two modes of operation are provided. The Sounder Mode is used to obtain a preliminary characterization of the channel. The Prober Mode is used to more accurately measure the channel delay characteristics. Author (GRA)

N82-18887# Maryland Univ., College Park. Inst. for Physical Science and Technology.

A QUANTITATIVE EVALUATION OF THE FEASIBILITY OF, AND SUITABLE HARDWARE ARCHITECTURE FOR, AN ADAPTIVE PARALLEL FINITE-ELEMENT SYSTEM

Pamela Zave and George E. Cole, Jr. Sep. 1981 46 p refs
(Contract N00014-77-C-0623)
(AD-A108492; BN-971) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper describes an experimental implementation of a design for an adaptive, parallel finite-element system. The implementation was used to simulate the performance of this design on several microprocessor-based multiprocessor architectures. We conclude that it will be possible to build hardware/software finite-element systems which exploit data segmentation to achieve flexibility, modularity, and the ability to process very large problems. Author (GRA)

N82-18888# Lincoln Lab., Mass. Inst. of Tech., Lexington.

DISTRIBUTED SENSOR NETWORKS Semiannual Technical Summary, 1 Oct. 1980 - 31 Mar. 1981

Richard T. Lacoss 31 Mar. 1981 71 p
(Contract F19628-80-C-0002; ARPA Order 3345)
(AD-A108275; ESD-TR-81-210) Avail: NTIS HC A04/MF A01 CSCL 17/1

This Semiannual Technical Summary reports work in the Distributed Sensor Networks program for the period 1 October 1980 through 31 March 1981. Status of the development and deployment of the DSN acoustic test bed and implementation of a real-time DSN capability using the test bed are reported. DSN communication requirements have been reviewed and a preliminary design has been completed for a communication channel structure and for protocols to provide the needed services. Simulation and analytical results have been obtained confirming the performance of the proposed distributed random-access scheme for local broadcast. Progress is reported on design studies directed toward an advanced nodal processor and software design and development efforts directed toward solving problems associated with distributed software systems. Author (GRA)

N82-18889# Oklahoma State Univ., Stillwater. Electronics Lab.

AUTOMATED PCM ENCODER TEMPERATURE TEST

J. W. Spears 15 Aug. 1981 40 p
(Contracts F19628-81-C-0079; F19628-78-C-0033; AF Proj. 7659)
(AD-A108184; SR-1; AFGL-TR-81-0204) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report describes an automated method for testing PCM encoder for performance through use of microcomputer control and analysis of the test results. The microcomputer sequentially applies to known test input voltage to various inputs of the

encoder under test, analyzes the digitally encoded signals from the encoder for a large number of samples, and provides a printout of the test results. A description of computer software and interface hardware necessary for the test is included.
Author (GRA)

N82-18890# California Univ., San Diego. Center for Human Information Processing.

THE DESIGN OF AN INTERFACE TO A PROGRAMMING SYSTEM AND MENUNIX: A MENU BASED INTERFACE TO UNIX (USER MANUAL)

Gary Perlman Nov. 1981 19 p refs
(Contract N00014-79-C-0323; NR Proj. 157-437)
(AD-A108929; Rept-8105) Avail: NTIS HC A02/MF A01 CSCL 09/2

This report consists of two papers on MENUNIX, an experimental interface to the programs and files on the UNIX operating system. In the first paper, I discuss how the decisions about the design of MENUNIX were made: based on my intuitions and user comments, but also on psychological theory and data whenever available. MENUNIX presents both the programs and files of UNIX in two menus from which users can make selections with single keypresses. The FILE menu presents the UNIX file hierarchy that allows users to organize files into directories by subject (e.g., writing and programming). The PROGRAM menu presents UNIX programs in a hierarchy organized into workbenches according to the tasks for which they are used (e.g., writing and programming) much as files can be organized in directories. Special facilities are provided for: finding out about useful commands; using variables to set options, to save commands, and to avoid typing long strings; and for editing strings (including recent commands). The second paper is a tutorial user manual for MENUNIX, in which the features of the program are more fully explained.
Author (GRA)

N82-18891# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.

A RE-USABLE CODE GENERATOR FOR PRIME 50-SERIES COMPUTERS

T. Allen Akin Aug. 1981 40 p refs
(Contract N00014-79-C-0873; GIT Proj. G36-643)
(AD-A108820; GIT-ICS-81/16) Avail: NTIS HC A03/MF A01 CSCL 09/2

This thesis describes the design and implementation of a language-independent reuseable code generator for Prime 400 and 50-Series computers. A code generator is the portion of a compiler that converts an internal representation of the semantics of a program into equivalent machine code. Construction of a code generator requires a major effort, so it should be done as infrequently as possible. One way to make this possible is to build a code generator that may be re-used from compiler to compiler. Several factors influence the design of such a code generator, including the nature of the communications channel between the code generator and the rest of the compiler, the structure of the information passed to the code generator (the 'intermediate form'), the form of output code desired, and finally the limitations of the machine architecture and existing systems software. The code generator implemented processes a high-level, tree-structured intermediate form, performing translation by case analysis and optimization by eliminating redundant load operations. It produces a stream of assembly language source code which may then be assembled, loaded, and executed. Experience with two compiler implementations has shown that the reusable code generator approach is feasibile. However, several improvements in the present code generator would be desirable.
Author (GRA)

N82-18892# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.

A SIMULATION TOOL FOR DISTRIBUTED DATABASES

Nancy D. Griffeth Sep. 1981 32 p refs
(Contract N00014-79-C-0873; GIT Proj. G36-643)
(AD-A108819; GIT-ICS-81/15) Avail: NTIS HC A03/MF A01 CSCL 09/2

An experimental software tool for simulating the behavior of distributed algorithms is proposed. The primary motivation for developing the tool is to study distributed database algorithms. Also, a classification of techniques presently used for distributed database problems of concurrency control and recovery is presented. This classification will be used to reduce the experimentation necessary to compare the performance of alternative algorithms. The study and development of distributed algorithms in general and distributed database algorithms in particular is behavior of distributed systems. Both intuition and present-day analytical tools are inadequate to characterize their behavior. Another barrier to understanding such algorithms is the complexity of their interaction, due to the potential lack of synchronization between nodes of a distributed system. Finally, it is not yet clear what 'good' behaviors are reasonable to expect from a distributed system. As a result, a multitude of algorithms may exist for solving a single problem, but without more experience and analysis, their behavior cannot be well understood or compared. This report describes an approach to providing the experience necessary for understanding the behavior of these algorithms.
Author (GRA)

N82-18893# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.

EFFICIENT FACSIMILE COMMUNICATION WITH COMPUTER CONTROLLED MEMORY SWITCHING [WIRTSCHAFTLICHE FERNSCHREIBKOMMUNIKATION MIT RECHNERGESTEUERTER SPEICHERVERMITTLUNG]

Winfried Bochnig and Juergen Matare 1981 13 p ref Reprint from Korrespondenz in Wandel, 1980 p 60-68 In GERMAN
(Contract GS-82/2371)
(MBB-BB-498-81-O) Avail: NTIS HC A02/MF A01

Decision making policies on the installation of a communication system in a large organization are discussed. Cost analysis, feasibility studies of real factors, and quantifiable volumes, which are future oriented ways of thinking are considered. It is shown that 60% of management problems are caused, as a whole or partially, by faulty communications. The steadily growing volumes of written and verbal information and the joint communication field are considered. Installation of a facsimile copying machine is investigated. The technical development and the practical implications of the text telecommunication is reviewed.
Transl. by E.A.K.

N82-18894# Federal Compiler Testing Center, Falls Church, Va.

HONEYWELL INFORMATION SYSTEMS, ADVANCED FORTRAN RELEASE 1.1 Validation Summary Report

18 Aug. 1981 12 p refs
(PB82-106014; FCVS78-VSR867) Avail: NTIS HC A02/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the Honeywell Level 6 FORTRAN Compiler Version 1.1 (MOD 400 Version 2.1) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 FORTRAN Standard (X3.9-1978). The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies; a section relating the categories of discrepancies to the language; and a detailed listing of disrepancies together with the tests which were failed.
GRA

N82-18895# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.

HEWLETT PACKARD COMPANY HP-3000 SERIES 3, RELEASE A.00.04 INDEXED 1-0 MODULE

2 Sep. 1981 11 p ref
(PB82-106022; FCTC/TR-81/22) Avail: NTIS HC A02/MF A01 CSCL 09B

The FCTC Technical Report for the Indexed I-O module of the Hewlett Packard COBOL II/3000 COBOL Compiler Version A.00.4 (MPE IV Version C.00.01) provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed I-O Module of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This Technical Report is made up of several sections showing the discrepancies found. A companion report (Validation Summary Report CCVS74-VSR810) provides information regarding the validation of the Compiler at the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1).
GRA

N82-18896# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
HEWLETT PACKARD COMPANY HP-3000 SERIES 3, COBOL 2/3000, RELEASE A.00.04 Validation Summary Report
2 Sep. 1981 50 p
(PB82-106030; CCVS74-VSR810) Avail: NTIS
HC A03/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the Hewlett-Packard COBOL II/3000 COBOL Compiler Version A.00.04 (MPE IV Version C.00.01) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low-Intermediate level of FIPS PUB 21-1). The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language, and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-18897# Federal Compiler Testing Center, Falls Church, Va. Software Development Office.
DATAPOINT 6600, COBOL 3.4 Validation Summary Report
2 Sep. 1981 38 p
(PB82-106048; CCVS74-VSR830) Avail: NTIS
HC A03/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the Datapoint 6600 COBOL Compiler Version 3.4 (DOS Version 2.6) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module with X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language, and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-18898# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
IBM CORPORATION IBM 5280 COBOL, RELEASE 3 Validation Summary Report
1 Sep. 1981 44 p
(PB82-106055; CCVS74-VSR845) Avail: NTIS
HC A03/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the IBM 5280 COBOL Compiler Version 3 (IBM 5280 Distributed Data System Version 3.0) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies to each of the Federal levels of the language, and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-18899# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
MICROSOFT, MICROSOFT COBOL V4.40 Validation Summary Report
1 Sep. 1981 48 p
(PB82-106063; CCVS74-VSR825) Avail: NTIS
HC A03/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the Microsoft COBOL Compiler Version 4.40 (CP/M Version 1.3) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language, and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-18900# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
HONEYWELL INFORMATION SYSTEMS, COBOL VERSION 3.0 Validation Summary Report
24 Aug. 1981 64 p
(PB82-106071; CCVS74-VSR865) Avail: NTIS
HC A04/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the Honeywell Level 6/57 COBOL Compiler Version 3.0 (GCOS MOD 400 Version 2.1) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language, and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-18901# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
FRONTIERS IN DATA STORAGE, RETRIEVAL AND DISPLAY. PROCEEDINGS OF A MARINE GEOLOGY AND GEOPHYSICS DATA WORKSHOP
Allen M. Hittelman, ed. Jun. 1981 150 p refs Proceedings of a Marine Geology and Geophys. Data Workshop, Boulder, Colo., 5-7 Nov. 1980 Sponsored in part by NSF, Washington, D.C.
(PB82-100892; NOAA-81071501) Avail: NTIS
HC A08/MF A01 CSCL 09B

Creative ways of meeting the challenges facing the marine data managers were explored. Data are being collected in greater quantities, more sophisticated techniques are being used, the numbers of users and applications are growing, better hardware and software for data handling are becoming available, and there is a great responsibility for applying these data to solve the environmental and resource problems of the nation. GRA

N82-18902# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
IBM CORPORATION: IBM 5280 COBOL, RELEASE 3, INDEXED 1-O MODULE, LEVEL 1
1 Sep. 1981 10 p ref
(PB82-100934; FCTC/TR-81/23) Avail: NTIS
HC A02/MF A01 CSCL 09B

The FCTC Technical Report for the Indexed I-O Module of the IBM 5280 COBOL Compiler Version 3 (IBM 5280 Distributed Data system Version 3) provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed I-O Module of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This Technical Report is made up of several suctions showing the discrepancies found. A companion report (Validation Summary Report CCVS74-VSR845) provides information regarding the validation of the Compiler at the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21.1). GRA

N82-18903# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
IBM CORPORATION: IBM vs FORTRAN RELEASE 1 (5748-FO3) Validation Summary Report
1 Sep. 1981 12 p
(PB82-100942; FCVS78-VSR871) Avail: NTIS
HC A02/MF A01 CSCL 09B

The Validation Summary Report (VSR) for the IBM VS FORTRAN Compiler Version 1 (5748-F03) (MVS Version 3.8) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 FORTRAN Standard (X3.23-1978). The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies; a section relating the categories of discrepancies to the language; and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-18904# Federal Compiler Testing Center, Falls Church, Va. Software Development Office.
MICROSOFT: MICROSOFT COBOL V4.40, INDEXED I-O MODULE, LEVEL 1
1 Sep. 1981 10 p ref
(PB82-100959; FCTC/TR-81/24) Avail: NTIS HC A02/MF A01 CSCL 09B

The FCTC Technical Report for the Indexed I-O Module of the Microsoft COBOL Compiler Version 4.40 (CP/M Version 1.3) provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed I-O Module of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This Technical Report is made up of several sections showing the discrepancies found. A companion report (Validation Summary Report CCVS74-VSR825) provides information regarding the validation of the Compiler at the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-18905 Ohio State Univ., Columbus.
SELECTING SUFFICIENT SETS OF TEST PATHS FOR PROGRAM TESTING Ph.D. Thesis
Steven Joseph Zeil 1981 143 p
Avail: Univ. Microfilms Order No. 8129127

Many strategies for testing computer programs require the selection of a set of paths along which testing will be conducted. Ideally, a finite set of paths would be chosen, sufficient to detect any error in the program construct being tested. The problem of finding such a set of paths is unsolvable. The existence of such a set cannot be guaranteed. However, when the set of possible functions forms a vector space, it may be possible to characterize the set of errors which escape detection for a given test path. Such a characterization permits the comparison of candidate paths for use in testing, and guarantees the existence of a finite sufficient set of test paths. If predicate interpretations are guaranteed to be linear functions, then the number of paths required to reliably test any predicate is no larger than m + n, where m is the number of inputs to the program and n the umber of variables. If the set of program computations is linear, then no more than n(m + n + 1) paths would be required to test a block of computations. These characterizations provide a theoretically rigorous means of evaluating proposed test paths. Dissert. Abstr.

N82-18906 Duke Univ., Durham, N. C.
NUMERICAL TECHNIQUES FOR INVERSE PROBLEMS Ph.D. Thesis
Charles Mark Aulick 1981 97 p
Avail: Univ. Microfilms Order No. 8129834

An overview of three major categories of inverse problem solution techniques, and a common framework in which to compare and analyze them is presented. A finite-dimensional, discrete model which may prove useful in describing many types of inverse problems in different application areas is examined. Once an inverse problem has been reduced to solving the matrix equation Fh = sigma where F and sigma are given, and sigma is subject to measurement error, various techniques may be used to define and calculate a solution. Regularization is one method which may be used. An approach is formulated for generating regularizing functions, from which many different classical methods may be shown to be derivable in a simple fashion. A statistical approach may be used to solve the problem, by viewing the vectors h and sigma as random vectors. Another approach is to restrict the solution space, which may be thought of as finite Fourier analysis. Dissert. Abstr.

N82-18907 Ohio State Univ., Columbus.
A METHODOLOGY FOR THE EVALUATION OF LANGUAGES FOR THE DEVELOPMENT OF INFORMATION SYSTEM PERFORMANCE MODELS Ph.D. Thesis
Jan Alexander Aitken 1981 211 p
Avail: Univ. Microfilms Order No. 8128951

A strategy was developed which can be used to assist the information system analyst/modeler in evaluating alternative languages for use in developing performance models of computer-based information systems and in choosing the most appropriate language based on the applicability of language capabilities to problem modeling requirements and the availability of modeler skills and resources. The language evaluation strategy provides: (1) approaches to the characterization of the modeling requirements of a particular information system design/analysis problem, the modeler resources available to perform the modeling task, and the features and capabilities of a modeling language relative to its support for information system modeling; (2) measures for language evaluation; and (3) a methodology for evaluating candidate modeling languages based on their applicability to particular information system modeling requirements. Dissert. Abstr.

N82-18908 California Univ., Berkeley.
SYNTAX ORIENTED ANALYSIS OF THE RUN TIME PERFORMANCE OF PROGRAMS Ph.D. Thesis
Luis Felipe Cabrera 1981 206 p
Avail: Univ. Microfilms Order No. 8200042

The problem of finding efficient ways to determine, given the values for the input variables, the values of various performance indices associated with a program is investigated. The dynamic profile of the program is reproduced. Using the profile together with a data base of program performance information enables us to find the actual values of most of the desired performance indices. Several kinds of performance representations of programs are described which express the profile equations of the program. It is shown that it is possible to represent the profile equations by program performance formulae, whose evaluation time is linear in the length of their expressions. This is easily seen to be the best one can hope to obtain. It is seen that for compute bound sequential programs, the running time of the skeleton can be substantially shorter than that of running an instrumented version of the original program. Examples are presented which show that the running time of the skeleton need not be linear in the length of its text and in some cases is very close to the running time of the actual program. Dissert. Abstr.

N82-18909 Texas Univ. at Arlington.
TWO APPROACHES TO DEADLOCK IN DISTRIBUTED SYSTEMS Ph.D. Thesis
Laura Myers Haas 1981 76 p refs
Avail: Univ. Microfilms Order No. 812863

Deadlock occurs when a set of processes is unable to proceed because each process needs to communicate with another member of the set, and no two processes in the set are waiting to communicate with each other. Two possible approaches to deadlock, detection and prevention are investigated. In the area of detection, a distributed deadlock detection algorithm is proposed. The algorithm is proven correct. It is proven both to detect all deadlocks which might occur and not to falsely detect deadlocks which do not exist. The algorithm applies the Dijkstra-Scholten algorithm for detecting termination of diffusing computations over static graphics to the dynamic structure of a wait for graph. In the area of prevention, a methodology for using a deadlock absence proof technique is developed. Dissert. Abstr.

N82-18910 Illinois Univ. at Urbana-Champaign.
THE HUMAN AS A CONSTRAINED OPTIMAL TEXT EDITOR Ph.D. Thesis
John Maynard Hammer 1981 89 p
Avail: Univ. Microfilms Order No. 8127600

The editing of thirty users--ten on each of three editors--was collected by monitoring all terminal input and output. The data was divided into a derivation and a validation data set. The ten different users' problems in the derivation data were solved with the constrained optimal model. Keystrokes in excess of this solution were categorized as feedback requests, inappropriate command selection, or human error. These categories were iteratively refined and then frozen for analysis of the validation data. The model--a constrained optimal solution plus the descriptive categories--explained 85 to 95 percent of the keystrokes in both data sets. Significant differences among editors

were found in the percentage of keystrokes due to feedback requests and in the ratio of optimal to constrained optimal performance. In addition, several recommendations were developed for improving the human factors of text editors.
Dissert. Abstr.

N82-18911 Michigan Univ., Ann Arbor.
COMPUTATIONAL MODELING OF EVOLUTIONARY LEARNING Ph.D. Thesis
Roberto Raul Kampfner 1981 182 p
Avail: Univ. Microfilms Order No. 8125143

A conceptual model of evolutionary learning in the brain, namely, M. Conrad's evolutionary selection circuits model, is studied using a constructive experimental approach involving computational modeling and simulation. In the conceptual model, networks of formal (enzymatic) neurons develop adaptations based on a process similar to evolution by variation and selection. The behavior of such networks can be changed by modifying the firing properties of the neurons they contain. The firing properties of such neurons are controlled by macromolecules (called excitases) which catalyze events leading to impulse formation in response to specific patterns of dendritic inputs. A basic version of the learning algorithm was developed which yields an effective performance. Simulation experiments on the learning of pattern classification tasks indicated that single neuron networks learn this type of task more efficiently than redundant networks do. Some simulations indicated that learning tasks interpreted as motor control processes are handled efficiently by the learning algorithm.
Dissert. Abstr.

N82-18912 Illinois Univ. at Urbana-Champaign.
SELF-CHECKING PROGRAMS: AN AXIOMATIC APPROACH TO THE VALIDATION OF PROGRAMS BY THE USE OF ASSERTIONS Ph.D. Thesis
Ali Mili 1981 190 p
Avail: Univ. Microfilms Order No. 8127645

The development and investigation of a methodology for program design and verification is discussed. The design part is described by a step-wise refinement process. The verification part is described by a set of Induction Rules. The distinguishing feature of this methodology is that it produces programs which are not proven to be correct but to have a property that is weaker than correctness: The Self-Checking Property. The self-checking Property is based on a systematic of assertions and is defined as follows: A program is said to be self-checking if and only if it can be proved that any time it is executed on some input data and all assertions return True when they are checked for, then the output obtained is correct. An example of design and verification of a self-checking program performing Gaussian elimination is shown. It is stressed that very little effort is needed for the verification of its self-checking property.
Dissert. Abstr.

N82-18913 Illinois Univ. at Urbana-Champaign.
TOPICS IN COMPUTATIONAL GEOMETRY Ph.D. Thesis
Kenneth Jay Supowit 1981 187 p
Avail: Univ. Microfilms Order No. 8127711

Analyses of algorithms and complexity results for certain geometrical problems are presented. The problems of finding a minimum weighted matching and a minimum traveling salesman tour of n points in a square in the plane are considered. The performance of certain fast heuristics for these two problems is analyzed. The computation of the relative neighborhood graph of a finite set V of n points in Euclidean space is then addressed. Various geometric covering problems are considered; in particular, problems whose input is a finite set of points in Euclidean space and whose output is a set of balls whose union contains the input points. A heuristic technique is described that can be applied to a wide class of covering problems, among them the smallest bomb problem, the smallest enclosing circular problem, and the largest empty circle problem. Finally, several point covering problems are shown to be NP-hard, including the k-police station problem.
Dissert. Abstr.

N82-18914*# Walla Walla College, College Place, Washington. School of Engineering.
STUDY OF HIGH SPEED COMPLEX NUMBER ALGORITHMS Final Report
Rodney Heisler [1981] 44 p refs
(Contracts NAS5-25994; NAS5-22563)
(NASA-CR-166743) Avail: NTIS HC A03/MF A01 CSCL 09B

A method of evaluating the radiation integral on the curved surface of a reflecting antenna is presented. A three dimensional Fourier transform approach is used to generate a two dimensional radiation cross-section along a planer cut at any angle phi through the far field pattern. Salient to the method is an algorithm for evaluating a subset of the total three dimensional discrete Fourier transform results. The subset elements are selectively evaluated to yield data along a geometric plane of constant. The algorithm is extremely efficient so that computation of the induced surface currents via the physical optics approximation dominates the computer time required to compute a radiation pattern. Application to paraboloid reflectors with off-focus feeds in presented, but the method is easily extended to offset antenna systems and reflectors of arbitrary shapes. Numerical results were computed for both gain and phase and are compared with other published work.
Author

N82-18915*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN AUTOMATED DATA MANAGEMENT/ANALYSIS SYSTEM FOR SPACE SHUTTLE ORBITER TILES
Gary L. Giles and Maria Ballas Jan. 1982 92 p refs
(NASA-TM-83261) Avail: NTIS HC A05/MF A01 CSCL 09B

An engineering data management system was combined with a nonlinear stress analysis program to provide a capability for analyzing a large number of tiles on the space shuttle orbiter. Tile geometry data and all data necessary of define the tile loads environment accessed automatically as needed for the analysis of a particular tile or a set of tiles. User documentation provided includes: (1) description of computer programs and data files contained in the system; (2) definitions of all engineering data stored in the data base; (3) characteristics of the tile anaytical model; (4) instructions for preparation of user input; and (5) a sample problem to illustrate use of the system. Description of data, computer programs, and analytical models of the tile are sufficiently detailed to guide extension of the system to include additional zones of tiles and/or additional types of analyses
A.R.H.

N82-18916# Softech, Inc., Waltham, Mass.
THE JOVIAL (J73) WORKBOOK, VOLUMES 1 THROUGH 6 Interim Report, Dec. 1979 - Oct. 1981
Griffiss AFB, N.Y. RADC Nov. 1981 299 p
(Contract F30602-79-C-0040; AF Proj. 2022)
(AD-A108527; RADC-TR-81-333-Vol-1-2-3-4-5-6) Avail: NTIS HC A13/MF A01 CSCL 05/9

The JOVIAL (J73) Workbook is only one portion of a self-instructional JOVIAL (J73) training course. In addition to the programmed-learning primer/workbooks, are video taped lectures. The workbooks are formatted to consist of fifteen segments bound in three volumes covering each particular language capability. A video tape lecture was prepared for each workbook segment. This course is taught in two parts. Part 1 contains twelve segments in Volumes 1 and 2 of the workbook; Simulation results for a high-low, single-drift X-GaAs IMPATT are presented. The method presented here can be employed for any type of IMPATT device. The pulsed oscillator properties of double-drift IMPATT diode structures are presently being investigated.
Author (GRA)

N82-18917# Softech, Inc., Waltham, Mass.
THE JOVIAL (J73) WORKBOOK, VOLUMES 10 THROUGH 12 Interim Report, Dec. 1979 - Oct. 1981
Griffiss AFB, N.Y. RADC Nov. 1981 306 p
(Contract F30602-79-C-0040; AF Proj. 2022)
(AD-A108528; RADC-TR-81-333-Vol-10-11-12) Avail: NTIS HC A14/MF A01 CSCL 05/9

This workbook is only one portion of a self instructional JOVIAL training course and is intended for use with Tape 10 of the JOVIAL (J73) Video Course. Directives are presented for providing supplemental information to the compiler for module linkage, optimization register control, listing options and other miscellaneous functions. Each directive is discussed along with its placement. GRA

N82-18918# Softech, Inc., Waltham, Mass.
THE JOVIAL (J73) WORKBOOK, VOLUMES 13 THROUGH 16 Interim Report, Dec. 1979 - Oct. 1981
Griffiss AFB, N.Y. RADC Nov. 1981 121 p
(Contract F30602-79-C-0040; AF Proj. 2022)
(AD-A108529; RADC-TR-81-333-Vol-13) Avail: NTIS HC A06/MF A01 CSCL 05/9

The JOVIAL (J73/C) programming language takes the JOVIAL (J73) language and extends it with features designed primarily for communications programming. These extensions are introduced with specific attention given to items, statements, table declarations, subroutines, built in functions and directives. Exercises are also provided where appropriate. Intended for use with Tape 13 of the JOVIAL (J73) Video Course, the workbook elaborates upon and reinforces concepts and language rules introduced in the video tape. GRA

N82-18919# Performance Measurement Associates, Inc., Vienna, Va.
EFFECT OF AUTOMATIC PROCESSING ON SPECIFICATION OF PROBLEM SOLUTIONS FOR COMPUTER PROGRAMS Technical Report, 1 Sep. 1979 - 1 Mar. 1981
Edward M. Connelly, Robert F. Comeau, and Pamela Johnson Mar. 1981 125 p refs
(Contract N00014-79-C-0739; RR0420901)
(AD-A108570; PMA-81-361) Avail: NTIS HC A06/MF A01 CSCL 09/2

The ability of computer users to specify problem solutions with the help of example solutions was investigated as a function of the user's background and experience, various levels of processing and various levels of problem complexity. Two participant groups (programmers and bookkeepers/accountants) working with three levels of problem complexity and three levels of processor complexity were used. The experiment task employed in this study required specification of a logic for selection of a Navy Task force. The results showed that specification of problem solutions by example-solutions led to low rates of errors-of-commission. Further, the rate of errors-of-omission was significantly affected by the degree of generalization of the example inputs by the automatic processor. The results also suggested that the strategy used in developing the example solutions may be a significant factor in the generation of accurate problem solution specificaions. GRA

N82-18920# Naval Research Lab., Washington, D. C. Computer Science and Systems Branch.
A-7E SOFTWARE MODULE GUIDE Interim Report
K. H. Britton and D. L. Parnas 8 Dec. 1981 36 p refs
(AD-A108649; NRL-MR-4702) Avail: NTIS HC A03/MF A01 CSCL 09/2

This document describes the basic organization of NRL's version of the A-7E onboard flight software. The report describes a structure in which modules have been designed in accordance with the Information Hiding Principle. Because of the larger number of modules that result when this principle is applied, the modules are arranged in a hierarchy. The hierarchy should simplify the task of a maintenance programmer assigned to make a specific modification. The document also describes the principles used in the design of the software. It is intended to be useful both as a guide to the A-7E software and as a model for those developing other software systems. Author (GRA)

N82-18921# Maryland Univ., College Park. Dept. of Computer Science.
A HEURISTIC FOR DERIVING LOOP FUNCTIONS
Douglas D. Dunlop and Victor R. Basili Oct. 1981 54 p refs
(Contract F49620-80-C-0001; AF Proj. 2304)
(AD-A108660; TR-1115; AFOSR-81-0793TR) Avail: NTIS HC A04/MF A01 CSCL 09/2

The problem of analyzing an initialized loop and verifying that the program computes some particular function of its inputs is addressed. A heuristic technique for solving these problems is proposed which appears to work well in many commonly occurring cases. The use of the technique is illustrated with a number of applications. A hierarchy of initialized loops is suggested which is based on the 'effort' required to apply this methodology in a deterministic (i.e., guaranteed to succeed) manner. It is explained that in any case, the success of the proposed heuristic relies on the loop exhibiting a 'reasonable' form of behavior. An informal categorization of such programs is made which is based on two opposing problem solving strategies. It is suggested that our heuristic is naturally suited for use on programs in one of these categories. Author (GRA)

N82-18922# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
A PROGRAM TESTING ASSISTANT
David Chapman Nov. 1981 25 p refs
(Contract N00014-80-C-0505)
(AD-A108147; AI-M-651) Avail: NTIS HC A02/MF A01 CSCL 09/2

This paper describes the design and implementation of a program testing assistant which aids a programmer in the definition, execution and modification of test cases and executes them automatically when appropriate. It modifies test cases to preserve their usefulness when the program they test undergoes certain types of design changes. The testing assistant acts as a fully integrated part of the programming environment and cooperates with existing programming tools, including a display editor, compiler, interpreter, and debugger. Author (GRA)

N82-18923# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CARRIER RECOVERY SYSTEM FOR MODEM APPLICATIONS WITH DIGITAL PROCESSING USING PSK OR DPSK MODULATION [SISTEMA DE RECUPERACAO DE PORTADORA PARA APLICACAO EM MODEMS COM PROCESSAMENTO DIGITAL UTILIZANDO MODULACAO DOS TIPOS PSK OU DPSK]
Leon Lonneux, Mario Mammoli, and Eduardo Whitaker Bergamini Jun. 1981 12 p Presented at the 2nd Natl. Automation Meeting, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2095-RPE/325) Avail: NTIS HC A02/MF A01

A conventional digital processor, programmed with efficient algorithms, can be used as specialized signal processors which present a high degree of integration. Block diagrams of a PSK modulator and demodulator, and the basic algorithms utilized in the recovery of the signal carrier are presented. S.L.

N82-18924# Fiorello, Shaw and Associates, Vienna, Va.
ANALYZE USER GUIDE Final Report
Sep. 1981 113 p refs
(Contract DE-AC01-80EI-11975)
(DE82-001323; DOE/EIA-11975/T2) Avail: NTIS HC A06/MF A01

ANALYZE is an interactive system for analyzing models built for input to mathematical programming systems. Specifically, ANALYZE was designed to assist analysts in managing large-scale linear programming models. In addition to permitting examination and detection of error conditions in LP models that might lead to infeasibilities, ANALYZE can tell the analyst what information was put in the model, and what results are implied by the information in the model. This manual describes the commands available in ANALYZE, key algorithms used by the system, and descriptions of system usage. DOE

N82-18925# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
AN APPLICATION OF PARALLEL COMPUTATION TO SEQUENTIAL COMPUTATION: THE PROBLEM OF COST-EFFECTIVE RESOURCE ALLOCATION
Nimrod Megiddo (Tel-Aviv Univ.) Mar. 1981 14 p refs
Sponsored in part by Control Data
(PB82-108739; TWISK-202) Avail: NTIS HC A02/MF A01 CSCL 09B

A class of problems is demonstrated where good parallel algorithms become useful for designing efficient sequential algorithms. In particular, Valiant's parallel sorting algorithm is applied in the design of an algorithm for the problem of cost-effective resource allocation. GRA

N82-18926# National Bureau of Standards, Washington, D.C. Center for Programming Science and Technology.

PROCEEDINGS OF THE NBS/IEEE/ACM SOFTWARE TOOL FAIR Final Report
Raymond C. Houghton, Jr., ed. Oct. 1981 241 p refs Fair held at San Diego, Calif., 10-12 Mar. 1981; sponsored by IEEE Computer Soc. and SIGSOFT ACM
(PB82-112392; NBS-SP-500-80; LC-81-600109) Avail: NTIS HC A11/MF A01 CSCL 09B

Presentations made by each demonstrator at the San Diego Tool Fair are summarized. The San Diego Tool Fair was a first-of-its-kind demonstration of software engineering tools at a major conference. Each summary includes a short description of the tool, a scenario of the demonstration, a list of references, background on the demonstrators, sample output, and a page of miscellaneous data obtained from the NBS Software Tools Database. The appendix provides a cross reference to the features of the tools.
GRA

62 COMPUTER SYSTEMS

Includes computer networks.

N82-18927 Dayton Univ., Ohio.
SYSTEM CONTROL PROCEDURE DEVELOPMENT FOR A DISTRIBUTED MICROCOMPUTER NETWORK FOR AVIONICS UTILIZING A NON-RESPONSIVE TIME-DIVISION MULTIPLEXED BUS AS THE INTER-COMPUTER COMMUNICATION LINK Ph.D. Thesis
Dieter Josef Schiller 1981 310 p
Avail: Univ. Microfilms Order No. 8127850

Commercially available bit slice microprocessors in a totally distributed network are used for avionic systems. By dedicating microcomputers to perform various avionic functions and placing these microcomputers close to the sensors with which they interact, system capability is sharply increased due to parallel processing and reduced bus traffic. The bus loading is further reduced by employing the broadcast mode which permits multiple receivers for each message. The system design philosophy is described along with the detailed description of the bus control interface unit. The flow charts for the normal operation of the local executive, the global executive and the actual code for both executives are presented. Tests were constructed to exercise every possible mode of operation of the executive. A description of these tests is provided. Fault detection and fault recovery procedures are emphasized.
Dissert. Abstr.

N82-18928 Pennsylvania Univ., Philadelphia.
PROCEDURE BASED GENERALIZED INTERACTIVE SYSTEMS Ph.D. Thesis
Dan Reed Olsen, Jr. 1981 283 p
Avail: Univ. Microfilms Order No. 8127067

A language for writing interactive systems that are independent of the applications that they service is described. Two general interactive processers were designed based on the GINTAC language. The first is a general expression parser. The command languages of several timesharing systems could be implemented using it. The second interactive processer supports a graphical interaction. It provides automatic menu generation, function button management and automatic user feedback. The picking of objects from a display screen can be used to specify operands for expressions. In addition, it is shown how the strong typing of the expressions can resolve ambiguity that occurs when pointing at heirarchicly defined pictures. This system can be used to implement several graphical applications drawn from the literature. These two systems serve only to demonstrate this technique not to define the full extent of its capabilities.
Dissert. Abstr.

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

N82-18929# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
OPTIMAL CONTROL OF AN M/G/1 QUEUEING SYSTEM [CONTROLE OTIMO DE UMA FILA M/G/1]
Fernando Augusto Silva Marins and Paulo Renato deMorais Jul. 1981 13 p refs In PORTUGUESE; ENGLISH summary Presented at the 14th Brazilian Symp. on Operations Res., Vitoria ES, Brazil, 13-14 Oct. 1981
(INPE-2139-RPE/362) Avail: NTIS HC A02/MF A01

The optimal control of the arrival and service processes of an M/G/1 queueing system is studied. Based on the residual workload, at each instant of time a decision has to be made whether to maintain the facility open and use a determined service rate or to close it and attend the queue at a higher rate. The reward structure includes rewards associated with each one of the two possible services rates and a holding cost proportional to the residual workload. An optimal control policy which maximizes the long run expected average return is investigated.
S.L.

N82-18930# Defense Mapping Agency Aerospace Center, St. Louis, Mo.
MATRIX DATA ANALYSIS: COLOR/B AND W CODING IS NOT ALWAYS ENOUGH Interim Report, 1976 - 1981
Marshall B. Faintich 1981 6 p refs
(AD-A108406) Avail: NTIS HC A02/MF A01 CSCL 09/2

The Defense Mapping Agency produces digital data bases that describe the physical appearance of the surface of the Earth. These data bases include, but are not limited to, terrain elevation, culture including landscape characteristics, and vertical features. This data is collected from digitized source maps, from optically or digitally correlated stereopairs of photographic imagery, and from digital multi-spectral sensor data. A dramatic impact has been made in the ability to analyze these digital data bases by applying state-of-the-art digital image technology processing and display concepts. These include a variety of color and/or black and white displays of not only intensity/color coded matrix data, but also image processed data using specialized convolution filters, texture discrimination, and special color representation techniques. In addition, computer generated imagery from these data bases serve as a final analysis tool.
Author (GRA)

N82-18931# Defense Mapping Agency Aerospace Center, St. Louis, Mo.
PROFILING SENSITIVITY TO IMAGE QUALITY Final Report
Dennis E. Moellman Oct. 1981 21 p refs
(AD-A108405) Avail: NTIS HC A02/MF A01 CSCL 09/2

This paper reports results from a study conducted by the Defense Mapping Agency (DMA) to determine the sensitivity of terrain profiling accuracy to input image quality. The study was accomplished by building a set of stereo test models over a test site; exercising those test models with current instruments; reducing the resultant profile data and comparing the results to existing ground control for the test site. The test models were produced from a single model by repeated steps of photographic enlargement, reduction and resolution degradation. The resultant 25 test models represented all combinations of five specific image scales and resolutions. The instruments were operated in both manual and automatic correlation modes. As a consequence the results portray the interdependence of profile accuracy with both scale and resolution as well as the effects of both manual and automatic profiling. The results also provide insight into the behavior of automatic correlation when approaching and exceeding the instrument's theoretical minimum resolution threshold.
Author (GRA)

N82-18932# SRI International Corp., Menlo Park, Calif. Artificial Intelligence Center.
DISTRIBUTED ARTIFICIAL INTELLIGENCE
Nils J. Nilsson 25 Mar. 1981 13 p refs
(Contract N00014-80-C-0296; SRI Proj. 1350)
(AD-A108734) Avail: NTIS HC A02/MF A01 CSCL 06/4

This report examines a number of advanced military information processing problems that entail computational tasks distributed over space. Communicational restrictions and other factors in these applications make it appropriate to consider networks of loosely coupled distributed artificial-intelligence (DAI) systems. Among the important conceptual difficulties of designing such networks is the problem of representing and using information about what one part of the network 'believes' about another part. We consider in some detail various aspects of this problem and briefly describe some potential solutions. GRA

N82-18933# SRI International Corp., Menlo Park, Calif. Artificial Intelligence Center.
PLAN SYNTHESIS: A LOGICAL PERSPECTIVE
Stanley J. Rosenchein Mar. 1981 21 p refs
(Contract N00014-80-C-0296)
(AD-A108733) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper explores some theoretical issues of robot planning from the perspective of propositional dynamic logic. A generalized notion of 'progression' and 'regression' of conditions through actions is developed. This leads to a bidirectional single-level planning algorithm which is easily extended to hierarchical planning. Multiple pre/post-condition pairs, complex (conjunctive, disjunctive) goals, goals of maintenance and prevention, and plans with tests are all handled in a natural way. The logical framework is used to clarify gaps in existing 'nonlinear' and 'hierarchical' planning strategies. Author (GRA)

N82-18934# Naval Research Lab., Washington, D. C. Radar Analysis Branch.
A PRF SORTER BASED ON LIST MANIPULATION TECHNIQUES Interim Report
J. O. Coleman 20 Nov. 1981 62 p refs
(XF12151104)
(AD-A108365; NRL-8514) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report describes a program that uses list processing techniques to sort pulses into sequences uniformly spaced in time, a process referred to as PRF sorting. The detailed discussion of the program's operation is based on a LISP implementation that functions on a demonstration level. A listing of a PASCAL version capable of operation on real data is also given. The unique feature of the algorithm used here is the ability to postpone the decision to assign a pulse to a particular existing pulse train. This is achieved by duplicating the existing pulse train and assigning the pulse to one of the two resulting pulse trains. Both pulse trains are then carried in the system, with equal status, until eventually a decision is made as to which is correct. The list structures used, native to LISP, prevent the duplication of pulse trains from resulting in unreasonable storage requirements. Author (GRA)

N82-18935# Naval Research Lab., Washington, D. C. Systems Research Branch.
ON DIGITAL PROCESSING VIA PDQ FACTORIZATION
P. Bey and C. C. Yang 30 Nov. 1981 14 p refs
(RR0140241)
(AD-A108364; NRL-MR-4669) Avail: NTIS HC A02/MF A01 CSCL 05/8

In this preliminary report, we present a computer program called MAT for implementing the PDQ factorization for digitized images of large pictorial data bases. Within a mini-computer, particular emphasis has been placed on the study of the efficiency of the algorithm in the storage and process of the images. Author (GRA)

N82-18936# Maryland Univ., College Park. Computer Vision Lab.
SYNTHESIS OF TEXTURES USING SIMULTANEOUS AUTOREGRESSIVE MODELS
R. Chellappa Jul. 1981 36 p refs
(Grant AF-AFOSR-3271-77; AF Proj. 2304)
(AD-A108584; TR-1082; AFOSR-81-0795TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

Experimental results of synthesis of some real textures using a class of spatial interaction models known as simultaneous autoregressive (SAR) models are given. The role of statistical inference methods in texture modeling is emphasized. Author (GRA)

N82-18937# Maryland Univ., College Park. Dept. of Mathematics.
QUALITATIVE TEXTURE DISCRIMINATION
Benjamin Kedem Oct. 1981 31 p refs
(Grant AF-AFOSR-3171-77; AF Proj. 2304)
(AD-A108582; TR-1117; AFOSR-81-0792TR) Avail: NTIS HC A03/MF A01 CSCL 05/8

This paper investigates a set of features termed higher-order crossings for texture analysis. A general discrimination procedure is proposed based on statistics derived from sequential linear filters followed by a clipping operator, and the usefulness of this procedure in discrimination of texture fields is demonstrated. Author (GRA)

N82-18938# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
COMPUTATIONAL APPROACHES TO IMAGE UNDERSTANDING
Michael Brady Oct. 1981 189 p refs
(Contract N00014-80-C-0505)
(AD-A108191; AI-M-653) Avail: NTIS HC A09/MF A01 CSCL 09/2

Recent theoretical developments in Image Understanding are surveyed. Among the issues discussed are: edge finding, region finding, texture, shape from shading, shape from texture, shape from contour, and the representations of surfaces and objects. GRA

N82-18939# George Washington Univ., Washington, D.C. Inst. for Management Science and Engineering.
A CLOSED QUEUEING NETWORK MODEL FOR MULTI-ECHELON REPAIRABLE ITEM PROVISIONING
Donald Gross, Douglas R. Miller, and Richard M. Soland 30 Jun. 1981 28 p refs
(Contract N00014-75-C-0729)
(AD-A108401; SERIAL-T-446) Avail: NTIS HC A03/MF A01 CSCL 15/5

A closed queueing network model of a two-echelon, repairable item provisioning system is presented. It is desired to find the capacities of the base and depot repair facilities as well as the spares level which together guarantee a specified system service level at minimum cost. The stochastic process and the optimization procedure are of interest. Author (GRA)

N82-18940# Carnegie-Mellon Univ., Pittsburgh, Pa.
FLEXIBLE PARSING Annual Report, 1 Jul. 1980 - 30 Jun. 1981
Philip J. Hayes and Raj Reddy 12 Oct. 1981 16 p refs
(Contract F49620-79-C-0143; AF Proj. 2304)
(AD-A109076; AFOSR-81-0852TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

In the first phase, the implementation of the FlexP parser was completed according to the design described in last year's annual report, and was evaluated through use in a gracefully interacting interface. This application showed: that FlexP was able to parse both grammatical and ungrammatical input according to a simple grammar of pattern-matching rewrite rules, that the bottom-up approach of FlexP was helpful in the case of ungrammatical input, and that a grammar suitable for use by FlexP could be defined in terms natural to the domain of interaction of the interface. However, the experimental use of FlexP also made it clear that FlexP had certain problems, largely due to the uniform nature of its grammar. In the second phase, the set of design choices on which FlexP was based was reviewed to determine if it was possible to resolve the problems that FlexP had without also losing the desirable aspects of its performance. This review led to the replacement of a single parsing strategy based on linear pattern matching with an approach based on multiple construction-specific parsing strategies. This approach was evaluated in a preliminary way through the construction of two small parsers, CASPAR and DYPAR, and was found to show considerable promise. Accordingly, design based on the same approach was begun for a more complete parser for restricted domain natural languages, and for a parser oriented towards an artificial command language of the type common in interactive user interfaces. GRA

N82-18941# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
PROCESSING AND CORRELATION OF DIGITALIZED

IMAGES IN A SPECTRAL RANGE [VERARBEITUNG UND LORRELATION VON DIGITALISIERTEN BILDERN IM SPEKTRALBEREICH]
Hermann Widjaja and H. Rainer Grundmann 14 Aug. 1981 8 p In GERMAN Presented at Colloq. on Theorie und Anwending der Signalverarbeitung, Aachen, 30 Sep. - 2 Oct. 1981
(MBB-UA-596-81-O) Avail: NTIS HC A02/MF A01

Digital methods to solve problems in direct correlations and correlation through two dimensional FFT were examined. Two dimensional signal processing consists of the correlation of two gray tone pictures, which take distinctively different positions, and have different measurement and orientation characteristics. These problems are often solved by real time conditions which occur in many different situations like: conveyor belts automation by industrial robots, signal recognition, tracking of moving objects, plotting from aerial photography, and image processing in medicine. E.A.K.

N82-18942# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 5.
MAN/COMPUTER COMMUNICATION: FROM ARTIFICIAL INTELLIGENCE AND BEHAVIORAL SCIENCE PERSPECTIVES
Lena Linde Oct. 1981 30 p refs
(FOA-C-53005-H2) Avail: NTIS HC A03/MF A01

Literature on artificial intelligence and behavioral aspects of command language interactions and data base systems is reviewed. Computational models of human dialogs, computerized information retrieval, and cognitive models of computerized tasks such as text editing are discussed. Man-computer communication problems are considered from end and miduser perspectives. The difficulty of a formal query language is related to the degree of correspondence between the order of expressing query components in the formal language and the natural cognitive structure of the query components. More planning and knowledge of complex syntactic rules is required for translating an information request into a formal query than for using a command language, e.g., for editing. Author (ESA)

N82-18943# Cambridge Univ. (England). Dept. of Engineering.
ROBUSTNESS IN MULTIVARIABLE CONTROL SYSTEM DESIGN
Anthony Michael Bloch and Ian Postlethwaite 1981 156 p refs
(PB82-121401; CUED/F-CAMS/TR-215-1981;
ISSN-0309-765X) Avail: NTIS HC A08/MF A01 CSCL 12A

The design of linear multivariable feedback systems is examined. The robustness properties of a plant at both its input and output are studied and the ability of these design methods to achieve these important properties are compared. The design methods were applied to several examples of control systems. The robustness properties of a system are those properties due to system feedback. A robust system was good stability and performance properties. In general, a system is robust if good feedback properties are maintained in the face of unstructured uncertainties and perturbations which are not necessarily small, and may be dynamic. GRA

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-18944# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A STOCHASTIC APPROACH TO GLOBAL ERROR ESTIMATION IN THE NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS
Atair Rios Neto and Nei Cardoso Cardenuto Dec. 1981 15 p refs Presented at the Symp. and Workshop, Dyn. of Planets Satellites, Sao Paulo, Brazil, Dec. 1981
(INPE-2290-PRE/065) Avail: NTIS HC A02/MF A01

A stochastic scheme is proposed to estimate the order of magnitude of global errors in the numerical integration of ordinary differential equations initial value problems. A Markov stochastic vector sequence is modeled with variances in each discretization time that constrains the order of magnitude of the global error vector components to be within estimated limits with 99% probability. This is done by properly discretizing the dynamic given by the system first order variational equations and by properly perturbing the dynamics with white noise derived from local estimates of truncation and round off errors. The procedure to implement the scheme when Runge-Kutta embedded formulas of two consecutive orders are used is presented. S.L.

N82-18945# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AXISYMMETRIC TRIANGULAR ELEMENT WITH SIX NODAL POINTS
Santiago Alves Tavares and Delma V. Viola Dec. 1981 17 p refs Submitted for publication
(INPE-2289-PRE/064) Avail: NTIS HC A02/MF A01

A stiffness matrix is developed for an axisymmetric problem using triangular elements with six nodal points, in which the region considered may be discretized by means of lines parallel and perpendicular to the axis of symmetry. In order to analyze its behavior, some examples were executed to compare the results with theoretical values. Author

N82-18946 Syracuse Univ., N. Y.
SOLUTION OF LARGE SETS OF LINEAR EQUATIONS USING CELLULAR ARRAYS Ph.D. Thesis
James Walter Fawcett 1981 227 p
Avail: Univ. Microfilms Order No. 8123899

The decomposition of large, sparsely populated sets of linear algebraic equations, using cellular arrays to achieve parallel and pipelined computation of solutions is addressed. Cellular arrays are regular structures of computing and memory elements with fixed and simple modes of communication and control. These structures are used to execute mathematical operations on arrays of data without specifically programming each of the data manipulations, and to carry out these operations at speeds which would be unattainable with sequential processing methods. The performance of alternate efficient solution procedures are examined by complexity and timing analyses. These procedures entail the use of parallel and pipelined computations, and also use structural properties of the equation sets for which solutions are required. Graph theoretic methods are used to examine techniques for extracting a dense substructure from sparse equation models. This allows the cellular arrays to manipulate blocks and bands of data, which contain all of the model nonzeros, much more efficiently than operating on the model as a whole. Dissert. Abstr.

N82-18947 Texas Univ. at Arlington.
AN ERROR ANALYSIS FOR SINGULAR FINITE ELEMENTS Ph.D. Thesis
John Richard OLeary 1981 297 p
Avail: Univ. Microfilms Order No. 8128668

The question of convergence for the finite element method when singular (crack tip) elements are employed in the construction of the approximation subspace is addressed. A-priori and a-posteriori error estimates are developed for a model boundary value defined over a plane domain with a reentrant corner. The a-priori estimates are given in terms of either the global energy norm or the maximum norm over an interior subdomain. This latter sure allows for the development of error estimates on approximations for the strength intensity factor when obtained as an internal degree of freedom for the singular element. Verification of these results is obtained by extensive numerical experiments on a suitably constructed singular ordinary differential equation. The a-posteriori estimate is obtained in terms of a computationally convenient measure suitable for employment in a self-adaptive mesh refinement scheme. Dissert. Abstr.

N82-18948# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CHANGING THE FUZZY RULE OF DETACHMENT
Orion de Oliveira Silva and Celso de Rennae Souza Nov. 1981 16 p refs Proposed for presentation at 12th Intern. Symp. on Multiple Valued Logic, Paris, May 1982
(INPE-2266-PRE/047) Avail: NTIS HC A02/MF A01

It is noted that the fuzzy 'modus ponens' rule has the counterintuitive property of not reproducing the conclusion when the premise is asserted. A ternary operator is proposed to replace the bounded sum operstor (+ in circle), also allowing for a degree of confidence associated with the implication. Another consistent binary operator is proposed, permitting the association of degrees of confidence to premises and conclusion. M.G.

N82-18949# Maryland Univ., College Park. Dept. of Computer Science.

GENERALIZING SPECIFICATIONS FOR UNIFORMLY IMPLEMENTED LOOPS Ph.D. Thesis

Douglas D. Dunlop and Victor R. Basili Oct. 1981 41 p refs
(Contract F49620-80-C-0001; AF Proj. 2304)
(AD-A108585; TR-1116; AFOSR-81-0791TR) Copyright. Avail: Issuing Activity CSCL 12/1

The problem of generalizing functional specifications for WHILE loops is considered. This problem occurs frequently when trying to verify that an initialized loop satisfies some functional specification, i.e., produces outputs which are some function of the program inputs. The notion of a valid generalization of a loop specification is defined. A particularly simple valid generalization, a base generalization, is discussed. A property of many commonly 'occurring WHILE loops that of being uniformly implemented, is defined. A technique is presented which exploits this property in order to systemically achieve a valid generalization of the loop specification. Two classes of uniformly implemented loops which are particularly susceptible to this form of analysis are defined and discussed. The use of the proposed technique is illustrated with a number of applications. Finally, an implication of the concept of uniform loop implementation for the validation of the obtained generalization is explained. Author (GRA)

N82-18950# IBM Watson Research Center, Yorktown Heights, N.Y.

NUMERICAL METHODS FOR STIFF DIFFERENTIAL EQUATIONS AND JOSEPHSON INTERFEROMETER EQUATIONS Annual Technical Report, 1 Jul. 1980 - 30 Jun. 1981

W. Liniger and F. Odeh 14 Aug. 1981 15 p refs
(Contract F49620-77-C-0088; AF Proj. 2304)
(AD-A108373; AFOSR-81-0768TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Results for stiff differential equation include: (1) For all k > or = 1, the (k-1)-parameter family of all A-contractive k-step formulas of order of accuracy p = 2 was derived for variable steps. A-contractive one-leg methods are guaranteed to be stable for the variable coefficient test problem x(dot) = lambda (t)X with any lambda(t), Re lambda(t) < or = 0, and arbitrary step sequences; (2) A stability theorem was proved for A sub 0-contractive one-leg methods applied to diagonally dominant (but not necessarily monotone) nonlinear systems; (3) A procedure was devised for selecting an A-contractive two-step method at every step of the integration in such a way as to minimize a global error bound; and (4) It was shown that the sets of all A-stable and A-contractive formulas with p = k = 2 can be identified by a local analysis in the transfer or time domain pertaining to slowly varying oscillatory solutions. Results on Josephson equations include: (1) The response of an extended junction to a time-dependent quasi-periodic voltage source was studied analytically; (2) The numerical procedure for studying the response of the two-junction inteferometer was modified to increase its accuracy and efficiency. GRA

N82-18951# Massachusetts Inst. of Tech., Cambridge. Lab. of Computer Science.

RESEARCH IN ALGEBRAIC MANIPULATION Final Report, 1980 - 1981

Joel Moses Sep. 1981 4 p
(Grant AF-AFOSR-0250-80; AF Proj. 2304)
(AD-A108603; AFOSR-81-0797TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Research in the past year has concentrated on algorithms for the integration of algebraic functions, these algorithms are being developed. GRA

N82-18952# Naval Research Lab., Washington, D. C. Airborne Radar Branch.

ALGORITHM FOR THE INVERSE OF A HERMITIAN TOEPILTZ MATRIX Interim Report

Karl Gerlach 27 Nov. 1981 18 p ref
(AD-A108357; NRL-8539) Avail: NTIS HC A02/MF A01 CSCL 12/1

New methods for finding the inverse of a Hermitian Toepiltz matrix and the related problem of solving a system of linear equations are presented. Efficient algorithmic procedures for these methods are listed. Author (GRA)

N82-18953# Florida Univ., Gainesville. Center for Mathematical System Theory.

MATHEMATICAL TECHNIQUES FOR NONLINEAR SYSTEM HISTORY Final Technical Report, 1 Jun. 1976 - 31 May 1981

R. E. Kalman Sep. 1981 15 p
(Grant AF-AFOSR-3034-76; AF Proj. 2304)
(AD-A108370; AFOSR-81-0755TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report deals with research results obtained in the following areas: (1) Finite-dimensional linear system theory by algebraic methods--linear systems over a ring, algebraic methods in the study of feedback, polynomial methods for the study of linear systems, F mod G invarient subspaces; (2) Infinite-dimensional linear systems--realization theory of infinite-dimensional linear systems; (3) Nonlinear system theory--basic properties of polynomial (discrete-time) systems and their realization theory; and (4) Identification problems in economics--study of econometric model building. GRA

N82-18954# George Washington Univ., Washington, D.C. Inst. for Management Science and Engineering.

COMPUTABLE OPTIMAL VALUE BOUNDS AND SOLUTION VECTOR ESTIMATES FOR GENERAL PARAMETRIC NLP PROGRAMS

Anthony V. Fiacco Aug. 1981 38 p refs
(Contract N00014-75-C-0729; Grant NSF ENG-79-06104)
(AD-A108229; SERIAL-T-451) Avail: NTIS HC A03/MF A01 CSCL 12/1

A simple technique is proposed for calculating piecewise-linear continuous global upper and lower parametric bounds on the optimal value of nonlinear parametric programs that have a convex or concave optimal value function. This provides a procedure for calculating parametric optimal value bounds for general nonconvex parametric programs, whenever convex or concave underestimating or overestimating problems can be constructed. For the jointly convex program, this approach leads immediately to the construction of a parametric feasible vector yielding a computable and generally sharper nonlinear optimal value upper parametric bound. Connections and extensions of well-known duality results are developed that lead to constructive interpretations of the bounds results and generally sharper nonlinear parametric lower bounds. Author (GRA)

N82-18955# Centre National de la Recherche Scientifique, Marseilles (France). Centre de Physique Theorique.

SOME PROPERTIES OF THE NON-LINEAR PARTIAL DIFFERENCE EQUATION FOR THE ISING-MODEL CORRELATION FUNCTION

B. M. McCoy and Tai Tsun Wu Jul. 1980 13 p
(Contract DE-AS02-76ER-03227; Grant NSF DMR-79-08556)
(CNRS-CPT-80-P-1226) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

Some basic properties are obtained for the nonliner partial difference equation underlying the spin-spin correlation function of the square two-dimensional Ising model. In particular, a convergent iteractive solution is given for arbitrary boundary conditions, and a version of maximum modulus theorem is derived. DOE

N82-18956# Centre National de la Recherche Scientifique, Marseilles (France). Centre de Physique Theorique.

SPONTANEOUS BREAKDOWN OF CHIRAL SYMMETRY IN SEMI-CLASSICAL METHOD. 1: BOUNDARY CONDITION ON THE PATH INTEGRAL

K. Yoshida Jun. 1980 58 p
(CNRS-CPT-80-P-1217) Avail: NTIS (US Sales Only) HC A04/MF A01; DOE Depository Libraries

It is suggested that the usual path integral representation of Euclidean vacuum amplitude in QCD must be supplemented by the explicity boundary condition corresponding to the spontaneous breaking of chiral SU(N) x SU(N). The analogy with the quantum mechanical example naturally leads to the trial wave function of Nambu and Jona-Lasinio and this in turn gives the starting point for the self-consistent calculation. DOE

N82-18957# Centre National de la Recherche Scientifique, Marseilles (France). Centre de Physique Theorique.
FEYNMAN PATH INTEGRAL AND POISSON PROCESSES WITH PIECEWISE CLASSICAL PATHS
P. Combe Sep. 1980 30 p refs
(CNRS-CPT-80-P-1244) . Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

The existence of a Feynman integral formula for gentle perturbations of harmonic oscillators is proved. This result is extended to a Bose relativistic theory. DOE

N82-18958# Commissariat a l'Energie Atomique, Villeneuve-Saint-Georges (France). Service Mathematiques Appliquees.
USE OF ANGULAR FINITE ELEMENTS FOR THE NUMERICAL ANALYSIS OF TRANSPORT EQUATION
Christian Lecot Jul. 1980 178 p In FRENCH; ENGLISH summary
(CEA-N-2150) Avail: NTIS (US Sales Only) HC A08/MF A01; DOE Depository Libraries

The first order transport equation is numerically solved by using a finite element method to treat angular variables. Several properties that the finite element method must satisfy to solve the problem in the simple case of monodimensional geometry are given. Results obtained are compared with those given by two known codes in the case of bidimensional geometry. DOE

N82-18959# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
THEODOR VON KARMAN AND APPLIED MATHEMATICS [THEODOR VOR KARMAN UND DIE ANGEWANDTE MATHEMATIK]
E. A. Mueller May 1981 19 p refs In GERMAN Presented at DGLR's Conf. on the 100th Anniversary of Theodor von Karman, Aachen, 11 May 1981
(MPIS-9/1981; ISSN-0436-1199) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5,60

The von Karman mathematical theories and their application to technology are outlined. The following topics are discussed: (1) Karman vortex street; (2) mathematics and technology; (3) mathematical methods in engineering; (4) mechanical similarity and turbulence; (5) mechanics of resistance of a moving body in fluids; (6) stability of two row streets of straight and circular vortices; (7) laminar and turbulent friction; (8) integration of differential equations of the laminar interfaces; (9) resistance of slender bodies moving with supersonic velocities. Transl. by E.A.K.

N82-18960# Hochschule der Bundeswehr, Munich. (West Germany). Forschungsschwerpunkt Simulation und Optimierung.
THE LINE METHOD FOR SOLVING PARTIAL DIFFERENTIAL EQUATIONS ENCOUNTERED IN THE LITERATURE [DIE LINIENMETHODE ZUR LOESUNG PARTIELLER DIFFERENTIALGLEICHUNGEN IN DER LITERATUR]
J. Scherer and K. J. Schwenzfeger Sep. 1981 228 p refs In GERMAN
Avail: NTIS HC A11/MF A01

The numerical analysis of partial differential equations in applied mathematics is discussed. A literature overview of the procedures is presented. Two methods for numerical analysis are the differential and the finite element methods. The nonlinearity equations system is applied for important problems of the unknown. The following methods are discussed: Rothe method; longitudinal method; boundary layer theory; hyperbolic geometry; integral relations method and hyperbolic problems; elliptic functions; integrated for standard differential equations. E.A.K.

N82-18961# European Space Agency, Paris (France).
STABILIZATION OF THE NUMERICAL INTEGRATION OF EQUATIONS OF MOTION Ph.D. Thesis - Tech. Univ. Carolo-Wilhelmina, Brunswick
Wolfgang vonGruenhagen Sep. 1981 131 p refs Transl. into ENGLISH from "Zur Stabilisierung der numerischen Integration von Bewegungsgleichungen" Rept. DFVLR-FB-79-14 DFVLR, Brunswick, Nov. 1979
(ESA-TT-676; DFVLR-FB-79-41) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 24,70

Numerical stability is investigated through the numerical integration of motion equations subject to holonomic secondary conditions. The accuracy of the numerical solution is measured by the error in the energy balance. An example of four oscillations shows that in cases having physical instability, the numerical instabilities can be ignored. In systems with a first integral, the way in which numerical perturbations lead to degradation of this integral are described. In good approximations, the perturbations can be taken as constant. When the explicit transformation of a mechanical system to action and angle variables is possible, the Hamiltonian function can be so manipulated that it is linear in the action variables. The equation of motion that results has stable solutions. The example of free symmetric gyroscopes shows that when all the frequencies of the system except one are functions of elements, a complete stabilization can always be carried out through the homogenous Hamiltonian formalism. Author (ESA)

N82-18962# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
SOME DIRICHLET SERIES WHOSE POLES ARE RELATED TO CUSP FORMS
Dennis A. Hejhal 1981 30 p refs
(Grant NSF MCS-78-27377)
(CTH-Math-1981-14) Avail: NTIS HC A03/MF A01

After a detailed analysis of the general case, results are specialized to the case of PSL (Z, Z). Let Gamma/H be a Fuchsian group with finite non-Euclidean area. Consider Gamma as a discrete subgroup of PSL (Z, the set of all real numbers). It is indicated what happens when the resolvent kernel G sub s is integrated along C sub 1 X C sub Z, the C sub j being certain paths in H closely related to hyperbolic elements. Similar manipulations for the case of parabolic C sub j lead to Dirichlet series involving Kloosterman sums. In either case, the essential point is that Dirichlet series whose singularities are closely related to eigenvalues of the Laplacian for Gamma/H are obtained. The number theoretical content of these general techniques provide insight into what happens when one C sub j is taken to be hyperbolic, the other parabolic. It is evident that the cusp forms for PSL (Z, Z) are intimately related to the distribution properties of (y squared) congruent to D mod L for L tends to infinity. Author (ESA)

N82-18963# Cambridge Univ. (England). Dept. of Engineering.
SENSITIVITY OF THE CHARACTERISTIC GAIN LOCI
Ian Postlethwaite Apr. 1981 23 p refs
(PB82-113481; CUED/F-CAMS/TR-213-1981; ISSN-0309-765X) Avail: NTIS HC A02/MF A01 CSCL 12A

It is noted that in the generalized Nyquist stability criterion for linear, time-invariant, multivariable, feedback systems, stability is determined from the characteristic gain loci. The sensitivity of the latter is examined and sets of indices, called sensitivity indices, are introduced which characterize the sensitivity of the loci to small system perturbations. GRA

N82-18964# Cambridge Univ. (England). Dept. of Engineering.
EXISTENCE OF PATCHES BOUNDED BY LINES OF CURVATURE
R. R. Martin 1981 15 p refs
(PB82-114471; CUED/F-CAMS/TR-207-1981; ISSN-0309-765X) Avail: NTIS HC A02/MF A01 CSCL 12A

The expression for the Gauss-Mainardi-Codazzi equations in terms of arc-length along lines of curvature is derived. Using the frame and position matching method the normal and geodesic curvatures replace the first and second fundamental forms in the surface existence problem. The solution of frame matching for an infinitesimal patch and of position matching for an infinitesimal patch are addressed. M.G.

N82-18965# Cambridge Univ. (England). Div. of Control and Management Systems.
ON CERTAIN CONNECTIONS BETWEEN: INFINITE ZEROS OF PROPER RATIONAL MATRICES, DYNAMIC EQUIVALENCE AND THE INTERACTOR
A. I. G. Vardulakis 1981 22 p refs
(PB82-114513; CUED/F-CAMS/TR-211-1981;
ISSN-0309-765X) Avail: NTIS HC A02/MF A01 CSCL 12A

The infinite zero structure (IZS) of full rank, proper, rectangular (p, x, m) rational matrices is examined. Starting with some algebraic definitions regarding the zeros at infinity (and their degrees) of proper rational matrices, it is shown that the IZS of a proper rational matrix describing a linear multivariable system is invariant under state feedback. The dynamic equivalence class (T(s))S of a proper rational matrix T(s) is then considered. Based on the above result, it is shown that the IZS of T(s) and any other rational matrix within the dynamic equivalence class (T(s))S is fully described by a complete abstract invariant of (T(s))S which is known as the interactor: (Xi sub T)(s) of T(s). The above results allow one to interpret the degrees of the infinite zeros of T(s) with p = or < m as observability indices of an irreducible rational matrix T(s) epsilon (T(s))S. GRA

N82-18966# Cambridge Univ. (England). Dept. of Engineering.
AUTOMATIC ELEMENT REORDERING FOR FINITE ELEMENT ANALYSIS WITH FRONTAL SOLUTION SCHEMES
S. W. Sloan and M. F. Randolph 1981 53 p refs
(PB82-115114; CUED/D-SOILS/TR-109-1981;
ISSN-0309-7439) Avail: NTIS HC A04/MF A01 CSCL 12A

A scheme for obtaining an efficient ordering of elements when using the frontal solution method in finite element computations is described. As an introduction, some basic operation counts for a frontal implementation of Gaussian elimination are derived, and a review of alternative approaches to the problem of deriving efficient numberings is given. Attention is confined to finite element meshes where the number of degrees of freedom for each node is approximately constant. It is shown that efficient element orderings may be obtained by first relabelling the nodes, and then relabelling the elements so that the new nodal elimination order is approximately preserved. The algorithm which is based on a minimum front-growth principle, is shown to be suitable for relabelling the nodes. An algorithm for renumbering the elements automatically in a frontal solution procedure is described in detail, and an illustrative FORTRAN 4 implementation, is given. GRA

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-18967 Pennsylvania State Univ., University Park.
THE ANALYSIS OF REPEATED MEASUREMENTS THROUGH TIME Ph.D. Thesis
Philip John Byrne 1981 125 p
Avail: Univ. Microfilms Order No. 8129145

In statistical analyses repeated measures through time on the same experimental unit occur. The assumed structure of a covariance matrix plays an important role in the selection an appropriate test procedure. The first order antedependence model is a model of time dependency which generalizes the first order autoregressive model by relaxing both the assumption of equal variances, and the assumption of equal correlations between all pairs of variables equidistant in time. Several tests regarding the covariance structure are given. Results are subsequently extended to the situation in which a vector of measurements is taken on each experimental unit at each time period. Dissert. Abstr.

N82-18968 Illinois Univ. at Chicago Circle, Chicago.
MULTI-SAMPLE CLUSTER ANALYSIS AND APPROACHES TO VALIDITY STUDIES IN CLUSTERING INDIVIDUALS Ph.D. Thesis
Hamparsum Bozdogan 1981 147 p
Avail: Univ. Microfilms Order No. 8129896

Multi-sample cluster analysis and clustering individuals are studied from an information-theoretic viewpoint via Akaike's Information Criterion (AIC): where L is the maximized likelihood and m is the number of parameters. This criterion combines the maximum value of the likelihood with the number of parameters used in achieving that value. The multi-sample cluster problem is defined, and (AIC) is developed and proposed as a new procedure for the comparison and identification of various collections of groups, profiles, samples, treatments, experimental conditions, or diagnostic classifications. Univariate and multivariate numerical examples of multi-sample cluster analysis on real data sets are presented and the results are compared with those of conventional multiple comparison procedures. The major computer programs for the Normal Mixture Algorithm (NORMIX) are given for convenience. Dissert. Abstr.

N82-18969 Florida State Univ., Tallahassee.
PARTIAL SEQUENTIAL TESTS FOR THE MEAN OF A NORMAL DISTRIBUTION Ph.D. Thesis
Nasser Reza Arghami 1981 131 p
Avail: Univ. Microfilms Order No. 8125865

Partial sequential procedures for testing a null hypothesis about a normal mean are discussed. A procedure is introduced which reduces the expected sample size for all mean values with considerable reductions for values near the null mean value. Theoretical operating characteristic and average sample number functions are derived, and the empirical distribution of the sample size in some special cases is obtained. Tests for the case of unknown variance and a one sided alternative hypothesis are discussed. A partial sequential test procedure is introduced for hypotheses concerned only with the arithmetic mean. An advantage of this procedure is the fact that the transformed observations follow a central t-distribution as distinct from the noncentral t-distribution. The key element in the procedure is that a number of observations is taken initially before any decision is made; subsequent observations are then taken in batches, the sizes of which depend on the estimate for the variance obtained from the initial set of observations. The ideas developed for the partial sequential t-test are extended to develop tests of hypotheses concerning the parameters of a simple linear regression equation, general linear hypotheses and hypotheses about the mean of special cases of the multivariate normal. Dissert. Abstr.

N82-18970 Florida State Univ., Tallahassee.
ON SEQUENTIAL UNBIASED AND BAYES TYPE ESTIMATES OF PARAMETERS IN A CONTINGENCY TABLE Ph.D. Thesis
Cheng-Chung Chen 1981 107 p
Avail: Univ. Microfilms Order No. 8125818

Estimation of the probability parameters in a contingency table with linear and/or log linear constrants on the parameters is discussed. Sequential unbiased estimates of the cell probabilities as well as some Bayes posterior mean type estimates are considered. The problem of sequential unbiased estimation of the parameters in a contingency table with linear and/or log linear contraints is addressed. Multinomial Girschick, Mosteller, and Savage type stopping rules are discussed and the corresponding unbiased estimates based on the minimal sufficient statistic described. The problem of sequential unbiased estimation of the probability parameters in the Bradley Terry model of paired comparisons is studied. Two Bayes type procedures for estimating the multinomial cell probability vector p, in the presence of linear constraints on the parameters are proposed and illustrated with examples. A Bayesian approach to the estimation of parameters in the Bradley-Terry model of paired comparisons is considered. Dissert. Abstr.

N82-18971 Princeton Univ., N. J.
ON SIMPLE ROBUST CONFIDENCE PROCEDURES Ph.D. Thesis
Paul Samuel Horn 1981 500 p
Avail: Univ. Microfilms Order No. 8127748

The use of 't' statistics based on two or four order statistics is explored. The functions of the order statistics used to define the 't' statistics are the hinges. Two 't' statistics based on the hinges are examined. The simpler, pivot-t, is based on two symmetric order statics. The other, bi-pivot-t, uses the hinges when they each involve two order statistics. For each of the 't' statistics appropriate percentage points are computed using Monte Carlo methods. Conservative confidence intervals are constructed. Criteria are defined and used to assess the performance of the confidence procedures based on the 't' statistics. Poly-efficiencies for the 't' statistics are also given. Pooling (borrowing) of denominators is also examined. New methods of pooling extra information about spread, in addition to the traditional root-mean-square, and their effect on the performances of the 't' statistics is also discussed. M.D.K.

N82-18972 Michigan State Univ., East Lansing.
ON ASYMPTOTIC OPTIMALITY OF BAYES EMPIRICAL BAYES ESTIMATORS Ph.D. Thesis
Tze Fen Li 1981 34 p
Avail: Univ. Microfilms Order No. 8126522

In an empirical Bayes decision problem, a prior distribution Lambda is placed on a one-dimensional family G of priors G sub omega, omega an element of Omega, to produce a Bayes empirical Bayes estimator. The asymptotic optimality of the Bayes estimator is established when the support of Lambda is Omega and the marginal distribution H sub omega have monotone likelihood ratio and continuous Kullback-Leibler information number. For the normal case, a simple class of empirical Bayes estimators is constructed that dominate the James-Stein estimator. Here the Bayes estimator is smooth, admissible and asymptotically optimal on G. The rate of convergence to minimum risk is O/n uniformly on G. The results of a Monte Carlo study are presented to demonstrate the favorable risk behavior of the Bayes estimator in comparison with other competitors including the James-Stein estimator. Dissert. Abstr.

N82-18973 Princeton Univ., N. J.
DATA MODIFICATIONS BASED ON ORDER: PUSHBACK; A CONFIGURAL POLYSAMPLING APPROACH Ph.D. Thesis
Katherine Bell Krystinik 1981 131 p
Avail: Univ. Microfilms Order No. 8126073

Pushback estimates are obtained by a preliminary data modification followed by the application of a simple robust estimate. Monte Carlo results are given for different pushback forms. Some forms are shown to have performance close to 90% of that of good biweights for sample size twenty. For a finite sample size the configural sampling and polysampling approach is presented as a way to achieve: (1) an honest minimum attainable variance for a particular sampling situation; (2) an honest maximum attainable polyefficiency in a particular polysituation; and (3) guidance in the modification of a robust estimate with the aim of increasing its polyefficiency. Estimates are calculated based on the configuration and thus this approach should require fewer samples than traditional Monte Carlo methods. The technique also allows for data from one situation to be used as if it were from each of several situations.
Dissert. Abstr.

N82-18974# Iowa Univ., Iowa City. Dept. of Statistics.
REMARKS CONCERNING CHASE'S RESULTS ON TESTING FOR ORDERED ALTERNATIVES
Tim Robertson and F. T. Wright (Missouri Univ. - Rolla) 10 Oct. 1981 18 p refs
(Contracts N00014-80-C-0321; N00014-80-C-0322)
(AD-A108148; U-of-Iowa-75) Avail: NTIS HC A02/MF A01 CSCL 12/1

Chase (Biometrika (1974)) found a good approximation for the chi-bar-square and E-bar-square distributions for an important special case. These distributions are fundamental to the theory of order restricted tests. Chase had in mind the problem of comparing ordered dose levels with a control and considered the case where there are more observations on the control. He obtained a recursive relation for the limiting values of the coefficients in those distributions as the sample size on the control becomes infinite and the other sample sizes remain fixed and equal. His approximation is the result of an interpolation between critical values in this limiting case and critical values in the case where all the sample sizes are equal. Starting with Chase's formula we derive a sharper recursion relation and table the limiting coefficients. This allows one to determine approximate P-values; to use critical values not included in Chase's tables and to apply these approximations to testing problems where other versions of the chi-bar-square and e-bar-square distributions occur. GRA

N82-18975# University Coll., London (England).
RENEWAL TABLES: TABLES OF FUNCTIONS ARISING IN RENEWAL THEORY
Laurence A. Baxter, Ernest M. Scheuer (California State Univ., Northridge), Denis J. McConalogue (Technische Hogeschool, Delft), and Wallace R. Bilschke (Univ. of Southern California, Los Angeles) Sep. 1981 339 p refs
(Contract N00014-75-C-0733; NR Proj. 042-323)
(AD-A108264) Avail: NTIS HC A15/MF A01 CSCL 12/1

The generalized cubic splining algorithm enables us to evaluate recursively-defined convolutions for a wide variety of distribution functions. The algorithm has been applied to evaluate the renewal function, variance function and the integral of the renewal function for five distributions (gamma, inverse Gaussian, lognormal, truncated normal and Weibull) for a wide range of values of the shape parameter. The results of the computations are discussed and a comparison is made with previous tabulations.
Author (GRA)

N82-18976# Wisconsin Univ. - Madison. Dept. of Statistics.
THE COMPUTATION OF LAPLACIAN SMOOTHING SPLINES WITH EXAMPLES
James G. Wendelberger Sep. 1981 68 p
(Contract N00014-77-C-0675; Grant NAG5-128)
(AD-A108746; TR-642) Avail: NTIS HC A05/MF A01 CSCL 12/1

Laplacian Smoothing Splines (LSS) are presented as generalizations of graduation, cubic and thin plate splines. The method of generalized cross validation (GCV) to choose the smoothing parameter is described. GCV is used in the algorithm for the computation of LSS'S. An outline of a computer program which implements this algorithm is presented along with a description of the use of the program. Examples in one, two and three dimensions demonstrate how to obtain estimates of function values with confidence intervals and estimates of first and second derivatives. Probability plots are used as a diagnostic tool to check for model inadequacy. Author (GRA)

N82-18977# Missouri Univ. -Columbia. Dept. of Statistics.
ON TESTING MONOTONE TENDENCIES
Richard L. Dykstra and Tim Robertson (Iowa Univ.) 30 Oct. 1981 27 p refs
(Contracts N00014-78-C-0655; N00014-80-C-0321)
(AD-A108332; TR-80) Avail: NTIS HC A03/MF A01 CSCL 12/1

In certain problems, it may be expected that a regression function has a substantial overall tendency to be monotone and yet we may not be certain that all of the restrictions imposed by a simple order are satisfied. Distribution theory for liklihood ratio tests of homogeneity of a collection of normal means when the collection is 'decreasing on the average' and for testing 'decreasing on the average' as a null hypothesis, is presented. The restriction 'decreasing on the average' is less restrictive than the usual monotone restriction and allows the data to give rise to 'reversals' over short ranges of values of the parameter set. It is closely related to the 'starshaped ordering' restriction. GRA

N82-18978# Iowa Univ., Iowa City. Dept. of Statistics.
ONE-SIDED COMPARISONS FOR TREATMENTS WITH A CONTROL
Tim Robertson and F. T. Wright 10 Sep. 1981 23 p refs
Prepared in cooperation with Missouri Univ., Rolla
(Contracts N00014-80-C-0321; N00014-80-C-0322)
(AD-A108331; TR-78) Avail: NTIS HC A02/MF A01 CSCL 12/1

Distribution theory for likelihood ratio statistics for the comparison of several treatments with a control is discussed. These test statistics account for prior information that the treatments are at least as effective as the control. It is assumed that the sample sizes on the treatments are (approximately) equal and the sample size on the control is at least as large. Normal means are compared under the assumption of a common variance, either known or unknown. The analogous problem for proportions is also considered. Author (GRA)

N82-18979# Ohio State Univ., Columbus. Dept. of Statistics.
RANKING AND SELECTION IN DESIGNED EXPERIMENTS: COMPLETE FACTORIAL EXPERIMENTALS
Edward J. Dudewicz and Baldeo K. Taneja Oct. 1981 25 p refs
(Contract N00014-78-C-0543; NR Proj. 042-403)
(AD-A108188; TR-210R) Avail: NTIS HC A02/MF A01 CSCL 12/11

Over the years, while it was recognized that development for other designs are of great interest, almost all ranking and selection papers have dealt explicitly with the completely randomized design. What is known in other design settings is reviewed and new results on the complete factorial experimental design arc presented. Existing procedures are shown to be vitiated by interaction in such a design. A new procedure which is fully valid even in the presence of unbounded interaction is given. GRA

N82-18980# Ohio State Univ., Columbus. Dept. of Statistics.
OPTIMIZATION IN STATISTICS: AN INTRODUCTION
Jagdish S. Rustagi Oct. 1981 21 p refs
(Contract N00014-78-C-0543; NR Proj. 042-403)
(AD-A108653; TR-249; Rept-9) Avail: NTIS HC A02/MF A01 CSCL 12/1

Optimization techniques play an important role in various areas of statistics. Examples from estimation, nonparametric statistics, design of experiments, samole surveys, multivariate statistical inference, information theory and regression analysis are provided. Author (GRA)

N82-18981# California Univ., San Diego. Dept. of Mathematics.
SMOOTHING SPLINES: REGRESSION, DERIVATIVES AND DECONVOLUTION
John Rice and Murray Rosenblatt Nov. 1981 41 p refs
(Contract N00014-81-K-0003; Grant NSF MCS-79-01800)
(AD-A108631) Avail: NTIS HC A03/MF A01 CSCL 12/1

The statistical properties of a cubic smoothing spline and its derivative are analyzed. It is shown that unless unnatural boundary conditions hold, the integrated squared bias is dominated by local effects near the boundary. Similar effects are shown to occur in the regularized solution of a translation-kernel integral equation. These results are derived by developing a Fourier representation for a smoothing spline. Author (GRA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-18982# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
APPLICATION OF THE ALPHA-BETA PROCEDURE TO DIFFERENTIAL GAMES [UMA APLICACAO DO PROCEDIMENTO ALFA-BETA A JOGOS DIFERENCIAIS]
Julia Leocadia deOliveira, Paulo O. Simoni, and Celso deRenneeSouza Jun. 1981 43 p refs In PORTUGUESE; ENGLISH abstract Presented at the 33rd Ann. Meeting of the SBPC, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2135-RPE/358) Avail: NTIS HC A03/MF A01

Differential games are rewritten as discrete time models, in which the control variables are also discrete and chosen in alternate moves by the two players, using the alpha-beta procedure, generally used in the computer implementation of board games. A relative value V (x sub 1, omega) for the locally optimum game was defined and it was shown that: after I decisions, the difference between states of any two games, started in the same point x, is limited; the difference between the global value of the game and V (x sub 1, omega), is limited. Three differential pursuit games are presented. The results obtained are examined from the point of view of the influence on them of the evaluation functions, and of the search depth. The solutions obtained with the discrete alpha-beta procedure were very close to the analytical solutions, in the two cases where these solutions were known. M.G.

N82-18983# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group: Research Operations.
SUGGESTED MODELS FOR ANALYZING AND FORECASTING DEMAND FOR COMPONENTS OF ARMY VEHICLES
D. J. D. Wijnmalen Sep. 1979 37 p refs In DUTCH; ENGLISH summary
(Contract A78/KL/104)
(PHL-1979-35; TDCK-72841) Avail: NTIS HC A03/MF A01

A computer program concerned with a time series analysis of the demand for vehicle components is described. A number of models are considered which represent common time series patterns, such as trend and seasonal variation. From these models the best fitting model is selected. By extrapolating the fitted model forecasts are made for the demand for vehicle components in one or more future years. The appendices describe the output information of the program and present some results. J.M.S.

N82-18984# Oak Ridge National Lab., Tenn. Engineering Physics Div.
SENSITIVITY THEORY FOR NONLINEAR SYSTEMS. 1: NONLINEAR FUNCTIONAL ANALYSIS APPROACH
Dan G. Cacuci Aug. 1981 30 p refs Sponsored by EPRI
(Contract W-7405-eng-26)
(ORNL/TM-7304; EPRI-RP-1441-1; EPRI-NP-81-19-LD) Avail: NTIS HC A03/MF A01

Concepts of nonlinear functional analysis are employed to investigate the mathematical foundations underlying sensitivity theory. Two alternative formalisms, labeled the forward sensitivity formalism and the adjoint sensitivity formalism, are developed in order to evaluate the sensitivity of the response to variations in the system parameters. The forward sensitivity formalism is formulated in normed linear spaces, and the existence of the Gateaux differentials of the operators appearing in the problem is shown to be both necessary and sufficient for its validity. Although conceptually straightforward and applicable to a considerably wider range of problems, this formalism is computationally expensive to employ. The alternative adjoint sensitivity formalism is considerably more economical from a computational standpoint, but it can only be formulated under more restrictive conditions. In particular, the requirement that operators acting on the state vector and on the system parameters must admit densely defined Gateaux derivatives is shown to be of fundamental importance for the validity of this formalism. DOE

N82-18985# Research Inst. of National Defence, Stockholm (Sweden).
COMPARISON OF U.S. AND SWEDISH AERIAL TARGET VULNERABILITY ASSESSMENT METHODOLOGIES (ATVAM)
Ingrid M. Gyllenspetz and P. H. Zabel 1981 156 p refs Prepared in cooperation with Southwest Research Inst., Houston, Texas
(Contract DAAK11-79-C-0059)
(FOA-Repts-Vol-15-No-4; FOA-B-20034-D8; ISBN-91-7056-059-5; AMSAA-TR-321-Vol-2) Avail: NTIS HC A08/MF A01; Research Inst. of National Defence, Stockholm Kr 38

The Swedish ATVAM was compared with the more complex American one in order to inprove Swedish detailed techniques and assumptions, thereby obviating extensive tests. The economic advantages of the simpler methodology are considered. Computer models of both countries were applied to a bomber. The largest differences between the models are structural kill (not treated in the Swedish model), fragment penetration capability calculation, and the definition and use of damage criteria. The time needed to describe a target is similar. When the Swedish target description is complete it is also ready to be used against any warhead in the computer program which calculates the kill probabilities. The American model requires three computer runs. The models are so integrated that extensive incorporation of features from the other causes unacceptable increases in complexity. Author (ESA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-18986# Technische Hogeschool, Delft (Netherlands).
A FURTHER INQUIRY INTO THE THEORY OF S-TRANSFOR-

MATIONS AND CRITERION MATRICES Ph.D. Thesis
Martien Molenaar 14 Apr. 1981 85 p refs
Avail: NTIS HC A05/MF A01

A study was initiated into which way the 'Delft techniques' can be applied to photogrammetry. Emphasis was put on methods for error detection in aerotriangulation blocks. Gross data errors prevents the convergence of the solution for block adjustments. Because the mathematical relationships for independent model blocks are relatively simple, study was done for this method of adjustment. A preadjustment error detection method is based on a test of the misclosures of condition equations for observations. The transformation elements for these connections are found as a result of the adjustment. An alternative is the connection of models before adjustment by means of S transformations. Therefore, basepoints are chosen in the overlap of two models to be connected. When both models are transformed to that base, condition equations are formulated for other points in the overlap. This approach is complicated and can be avoided for planimetric independent model blocks. For this case, use of complex number algebra makes a simple elimination of transformation elements possible.
S.L.

N82-18987# Pittsburg Univ., Pa. Inst. for Statistics and Applications.
OPTIMIZATION OF FUNCTIONS OF MATRICES WITH APPLICATIONS TO STATISTICAL PROBLEMS Interim Report
C. Radhakrishna Rao Oct. 1981 20 p refs
(Contract F49620-79-C-0161; AF Proj. 2304)
(AD-A108368; TR-81-31; AFOSR-81-0767TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The paper reviews some methods of optimizing functions of vectors and matrices subject to some restrictions and develops techniques for solving them without using the calculus of matrix derivatives. Their application to a number of statistical problems in linear estimation and multivariate analysis is illustrated.
Author (GRA)

N82-18988# Bonn Univ. (West Germany). Inst. of Physikalisches.
WAVE FUNCTION FORMALISMS IN THE CHANNEL COUPLING ARRAY THEORY OF MANY-BODY SCATTERING
F. S. Levin (Brown Univ.) Aug. 1980 35 p refs Sponsored in part by DOE
(BONN-HE-80-15) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

Wave function formalisms corresponding to different channel coupling array transition operators of many-body scattering theory are derived and discussed. The Kouri-Levin transition operators are seen to be in typical Lippmann-Schwinger (L-S) form and allow for the introduction of wave function components in a particularly straightforward way. The Baer-Kouri transition operators are not in L-S form and an alternate procedure is used to derive their corresponding wave function components. In the three-body case, the Kour-Levin operators T sub (jK) obtained from the Faddeev-Lovelace choice of channel coupling array are seen to lead to precisely the Faddeev wave function components. The Baer-Kouri operators are shown to lead to wave function components obeying inhomogeneous equations. These inhomogeneous equations are used to give an alternate explanation of the non-unitary amplitudes obtained in recent calculations based on approximate forms of the Baer-Kouri operators.
DOE

N82-18989# Bonn Univ. (West Germany). Physikalisches Inst.
A MULTI-CLUSTER, N-PARTICLE GENERALIZATION OF THE THREE-PARTICLE FADDEEV WAVE FUNCTION EQUATIONS
F. S. Levin (Brown Univ.) Aug. 1980 43 p refs
(BONN-HE-80-16; ISSN-0172-8733) Avail: NTIS (US Sales Only)HC A03/MF A01; DOE Depository Libraries

It is noted that recent work applying certain forms of many-body scattering theory to problems such as molecular potential energy surfaces and equations for non-equilibrium statistical mechanics indicates that a formulation of the theory based directly on multi-cluster, n-particle, wave function components could be of some utility. Such a formulation is derived using techniques from the Baer-Kouri-Levin-Tobocman and Bencze-Redish-Sloan-Polyzou theories of multi-particle scattering. It is based on components corresponding to the various multi-cluster partitions of an n-particle scattering system and is a generalization of the three-body Faddeev wave function formalism, to which it reduces when n = 3. Except for the full breakup partition, which does not enter the equations, the new components are defined for all possible m-cluster partitions of the n-particles, 2 < or = m < = n - 1. The sum of all the components yields the solution to the Schroedinger equation for scattering and either the Schroedinger equation solution or an easily identified spurious solution in the case of bound states. Both the two-cluster components and two-cluster transition operators are shown to be solutions of equations involving quantities carrying only two-cluster partition labels.
DOE

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-18990# California Univ., Livermore. Lawrence Livermore Lab.
STANDARD TEST CASE RUNS FOR THE EMPULSE MONOPOLE FIELDSOLVER AND CONDUCTIVITY GENERATION MODEL
Frank W. Chambers and David M. Cox 2 Mar. 1981 60 p refs
(Contracts W-7405-eng-48; N60921-80-WR-W0188; ARPA Order 3178)
(AD-A108739; UCID-19213) Avail: NTIS HC A04/MF A01 CSCL 20/1

At the high current beam propagation workshop it was realized that fieldsolver comparisons between working groups should be made for beams with expanded heads such as develop by blowoff and erosion during propagation. To facilitate comparisons of the fieldsolvers while removing the differences due to evolution of the beam during propagation, standard test cases with imposed beam head profiles were suggested. Hence, unambiguous field and conductivity generation calculation comparisons can be made. The field equations solved for this report are derived elsewhere. The plasma generation model includes a direct deposition term, an avalanche ionization term based on experimental data, and a recombination term. Plasma density is related to a scalar conductivity through the momentum transfer collision frequency. The actual coded fieldsolver used for the results in this report was extracted from the EMPULSE II code. The PHOENIX code was constructed to run this fieldsolver and generate the appropriate diagnostic output. Standard test cases are proposed where the beam current density is prescribed at all points in space. This is accomplished using a simple parameterized profile which can represent a cylindrical beam or one with an eroded nose. Four test cases are proposed: PHOENIX results for these cases are presented.
GRA

N82-18991# Naval Research Lab., Washington, D. C.
STEADY STATE NUMERICAL SOLUTION OF MAGNETICALLY INSULATED CHARGE FLOW IN COAXIAL GEOMETRY Interim Report
R. J. Barker and P. F. Ottinger (JAYCOR, Inc., Alexandria, Va.) 8 Dec. 1981 66 p refs Sponsored in cooperation with Defense Nuclear Agency
(Contract ES-77-A-01-6021)
(AD-A108633; NRL-MR-4654) Avail: NTIS HC A04/MF A01 CSCL 20/3

A vectorized, FORTRAN computer program has been written to calculate steady-state electron and ion fluxes as well as radial profiles of the magnetic and electric fields for specific practical radial diode and magnetically insulated vacuum feed line parameters. The numerical formulation is derived in part from the theoretical treatment of the topic by K.D. Bergeron. However, it differs from the treatment in several important respects.

including: a correction in one of the key scaling expressions, a restructuring of the boundary conditions to allow for specific parametric solutions, and a more careful consideration of the regions near the anode and cathode surfaces and near the electron sheath boundary. In deriving these results, analytic approximations for the fields in these 'special' regions were developed. These approximate solutions permitted numerical treatment of the singularities there. Matching the approximations between the regions also provided first-order guesses for the gross steady-state operating characteristics. Author (GRA)

N82-18992# Dayton Univ., Ohio. Magnetics Lab.
HIGH SPEED PERMANENT MAGNET GENERATOR MATERIAL INVESTIGATIONS: RARE EARTH MAGNETS Final Report, 1 Jun. 1979 - 2 Apr. 1981
Herbert F. Mildrum and George A. Graves, Jr. Wright-Patterson AFB, Ohio AFWAL Oct. 1981 140 p refs
(Contract F33615-79-C-2010; AF Proj. 2308)
(AD-A108550; UDR-TR-81-105; AFWAL-TR-81-2096) Avail: NTIS HC A07/MF A01 CSCL 20/3

Permanent magnets with room-temperature energy products of approximately equal to 20-30 MGOe were characterized with a view toward their use in airborne electrical machinery. This report presents the results of an evaluation of commercial sintered rare earth-transition metal magnets potentially suitable for such applications. They include SmCo5, (SmPr)Co5, and modified Sm2Co17, produced by 11 companies worldwide. Extensive magnetic, physical, mechanical, and electrical property engineering data, based on statistically significant numbers of test magnets for each measurement, are presented. Testing procedures, range of evaluation, and test considerations relevant to the application are also identified. Author (GRA)

N82-18993# Illinois Inst. of Tech., Chicago. Dept. of Physics.
THERMAL AND ELECTRICAL PROPERTIES OF SOLIDS AT LOW TEMPERATURES Final Report
Harold Weinstock Sep. 1981 4 p refs
(Contracts DE-AS02-76ER-01629; AT(11-1)-1629)
(DE82-000727; DOE/ER-01629/T1; COO-1629) Avail: NTIS HC A02/MF A01

Information is presented concerning the electrical and thermal conductivity of vanadium; specific heat of palladium; phonon-electron interaction in Pb-Bi alloys; low temperature fast neutron irradiation of A-15 superconductors; and thermal conductivity of damaged MgO. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-18994*# California Univ., Los Angeles. School of Engineering and Applied Science.
THE VELOCITY FIELD NEAR THE ORIFICE OF A HELMHOLTZ RESONATOR IN GRAZING FLOW
Andrew F. Charwat and Bruce E. Walker Mar. 1981 53 p refs
(Grant NsG-3236)
(NASA-CR-168548; UCLA-ENG-81-101) Avail: NTIS HC A04/MF A01 CSCL 20A

Measurement of the time-dependent velocities induced inside and outside the opening of acoustically excited, two-dimensional Helmholtz resonator imbedded in a grazing flow are presented. The remarkably clear structure of the perturbation field which evokes a pulsating source and a coherently pulsating vortex-image pair is described. The simple phenomenological 'lid-model' which correlates the variation in the components of the acoustic impedance with the velocity of the grazing flow is discussed and extended. Author

N82-18995*# Modern Analysis, Inc., Ridgewood, N. J.
STUDY OF CABIN NOISE CONTROL FOR TWIN ENGINE GENERAL AVIATION AIRCRAFT
R. Vaicaitis and M. Slazak Hampton, Va. NASA. Langley Research Center Feb. 1982 147 p refs
(Contract NAS1-16117)
(NASA-CR-165833; MAI-1) Avail: NTIS HC A07/MF A01 CSCL 20A

An analytical model based on modal analysis was developed to predict the noise transmission into a twin-engine light aircraft. The model was applied to optimize the interior noise to an A-weighted level of 85 dBA. To achieve the required noise attenuation, add-on treatments in the form of honeycomb panels, damping tapes, acoustic blankets, septum barriers and limp trim panels were added to the existing structure. The added weight of the noise control treatment is about 1.1 percent of the total gross take-off weight of the aircraft. B.W.

N82-18996*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ANNOYANCE CAUSED BY PROPELLER AIRPLANE FLYOVER NOISE: PRELIMINARY RESULTS
David A. McCurdy and Clemens A. Powell Dec. 1981 35 p refs
(NASA-TM-83244) Avail: NTIS HC A03/MF A01 CSCL 20A

The annoyance response of people to the noise of propeller airplane flyovers was examined. The specific items of interest were: (1) the annoyance prediction ability of current noise metrics; (2) the effect of tone corrections on prediction ability; (3) the effect of duration corrections on prediction ability; and (4) the effect of 'critical band' corrections on the prediction ability of perceived noise level. Preliminary analyses of the data obtained from two experiments are presented. The first experiment examined 11 propeller airplanes with maximum takeoff weights greater than or equal to 5700 kg. The second experiment examined 14 propeller airplanes weighting 5700 kg or less. Also included in each experiment were five different commercial service jet airplanes. Each airplane noise was presented at D-weighted sound pressure levels of 70, 80, and 90 dB to subjects in a testing room which simulates the outdoor acoustic environment. Subjects judged 108 stimuli in the first experiment and 132 stimuli in the second experiment. Perceived noise level predicted annoyance better than A, D, or E-weighted sound pressure level. Corrections for tones greater than of equal to 500 Hz generally improved prediction ability for the heavier propeller airplanes. B.W.

N82-18997# Scripps Institution of Oceanography, La Jolla, Calif.
DIFFERENTIAL SOUND ABSORPTION TECHNIQUE AND EFFECT OF ION-PAIRING AND PRESSURE ON SOUND ABSORPTION IN SEA WATER AND AQUEOUS MIXTURES OF MAGNESIUM SULFATE AND SODIUM CHLORIDE Summary Report
Cheng-chih Hsu 1 Nov. 1981 135 p refs
(Contracts N00014-79-C-0472; N00014-80-C-0674; Grant NSF OCE-78-25123)
(AD-A108569; MPL-U-71/81; SIO-REF-81-34) Avail: NTIS HC A07/MF A01 CSCL 20/1

Sound absorption in the ocean between 5 kHz and 350 kHz is principally due to the relaxation process associated with a pressure dependent chemical reaction of MgSO4. This research has resolved two conflicts regarding the effect of pressure on sound absorption and relaxation frequency due to MgSO4 in sea water and the reduction of sound absorption by the addition of up to 0.6 M NaCl to low concentration (0.02M) solution of NaCl. The reduction of absorption in MgSO4 solution upon the addition of NaCl can be accounted for theoretically by Debye-Huckel theory and by formation of MgCl(+) and NaSO4 ion-pairs. The measured reduction is less than that observed by Kurtze and Tamm, however. At this concentration of MgSO4, the effects of ionic strength and ion-pairing are about equal. The results are consistent with disassociation constants of 0.0062, 0.1, 0.178 for the MgSO4, NaSO4(-) and MgCl(+) ion-pairs, respectively up to 0.12 M NaCl addition. For 0.6M NaCl additions to 0.02 M MgSO4, the absorption results cannot be explained by either simple Debye-Huckel theory, the Johnson and Pytkowicz model of ion-pairing nor the Pitzer approach. The values of maximum absorption per wavelength were determined to an absolute accuracy of about 1% from .000080 to .000016. For the differential absorption measurements in MgSO4 and NaCl mixtures, the measurement accuracy is sufficient for quantitative studies of ion-pairing in electrolyte mixtures, particularly for unsymmetrical salts. GRA

N82-18998# Sperton Electronics, Jackson, Mich.
MODIFIED AMBIENT SEA NOISE INDICATOR WITH AMBIENT NOISE DIRECTIONALITY ESTIMATOR Final Technical Report, 1 Jan. - 31 Aug. 1981
William Ezell 30 Oct. 1981 32 p
(Contract N62269-81-C-0306)
(AD-A108389; SPARTON-7723-A003(F)) Avail: NTIS HC A03/MF A01 CSCL 17/1

The modified Ambient Sea Noise Indicator (ASNI) ID-1872/A MOD which includes an Ambient Noise Directionally Estimator (ANODE) function, provides a comparison of the omnidirectional noise level and the summed noise levels of the two directional channels of a VLAD AN/SSQ-77 sonobuoy when in the ANODE mode. The omnidirectional ASNI absolute noise level can also be read for specific frequencies at the hydrophones of passive omnidirectional sonobuoys without automatic gain control when the modified unit is in the ASNI mode. Passive sonobuoys, located in the sea, will pick up sea noise with pressure-sensitive hydrophones. If the sonobuoy is an AN/SSQ-57, one omnidirectional hydrophone is used. If an AN/SSQ-77 sonobuoy is used, a vertical multielement array of hydrophones provides directional as well as omnidirectional information. The sea noise is transmitted to a receiver in the aircraft. The demodulated signal from the receiver is applied to the indicator. The ASNI and ANODE mode levels are indicated on the front panel meter, which is calibrated in decibels in a 1-Hz band relative to 1 microPascal sq for the omnidirectional noise level and in decibels for the directional channel to omnidirectional channel noise difference. The ambient sea noise levels may be used to plot a graph of ambient sea noise. The ANODE gain may be used to evaluate the effectiveness of the VLAD sonobuoy under various sea states. GRA

N82-18999# Naval Underwater Systems Center, New London, Conn. Surface Ship Sonar Dept.
FRAM 2 SINGLE CHANNEL AMBIENT NOISE STATISTICS
Roger F. Dwyer 25 Nov. 1981 34 p Presented at the 101st Meeting of the Acoust. Soc. of Am. Ottawa (Canada), 19 May 1981
(ZR0000101)
(AD-A108755; NUSC/TD-6583) Avail: NTIS HC A03/MF A01 CSCL 20/1

This document describes the results of a statistical analysis study of FRAM II arctic under-ice ambient noise data. The specific data that were analyzed were recorded on 23-24 April 1980 from a pack ice camp in the Arctic Ocean, located at 86 deg N latitude, 25 deg W longitude. At this location, the bottom depth was approximately 4000 m. The measurement system consisted of a broadband omnidirectional hydrophone, suspended to a depth of 91 m from a sonobuoy located in a lead. Under the influence of arctic currents, the pack ice was slowly moving. This movement caused rifting and cracking of ice, which occurred, at times, throughout the experiments and represented a structured acoustic noise source. Both impulsive and burst noise were identified in the data and were probably created by tensile cracks and rubbing ice masses. GRA

N82-19000# Pennsylvania State Univ., University Park. Applied Research Lab.
EFFECT OF AIR CONTENT ON BROADBAND NOISE MEASUREMENTS IN THE 1.22-m DIAMETER WATER TUNNEL
B. E. Robbins and D. E. Thompson 11 Aug. 1981 18 p
(Contract N00024-79-C-6043)
(AD-A108540; ARL/PSU/TM-81-166) Avail: NTIS HC A02/MF A01 CSCL 20/1

The effect of air content on broadband radiated noise in the 1.22-m diameter water tunnel was investigated. In addition, tunnel operating pressure was also varied. The transmitting hydrophone was positioned in the tail of an axisymmetric body mounted in the test section. Two receiving transducers were used. Both showed a somewhat systematic change in broadband spectral levels with variations in air content up to 11 parts per million and variations in pressure. Author (GRA)

N82-19001# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF THE OUTWARD PROPAGATION OF TIRE NOISE [THEORETISCHE UND EXPERIMENTELLE UNTERSUCHUNGEN ZUR ABSTRAHLUNG VON REIFENLAERM]
O. Bschorr, A. Wolf, and J. Mittmann 30 Apr. 1981 58 p refs In GERMAN
(MBB-BB-483-81-O) Avail: NTIS HC A04/MF A01

Noise propagation caused by tires was measured acoustically. Narrowband analysis shows a linear spectrum which is in complete agreement with the profile grab frequency and harmony. In the zoom spectra unequal profile division caused by sidebands is recognized. The noise propagation caused by body vibration was also measured. The vibration response follows after valve acceleration and deceleration. The real distance and contact free tire surface are free of vibration. The body vibration becomes greater with increased speed, from 30 to 150 m/sec, after which flexural waves stabilize the body. Transl. by E.A.K.

N82-19002# Centre Technique des Industries Mecaniques, Senlis (France).
MEASUREMENT OF THE ABSORPTION PROPERTIES OF ACOUSTIC MATERIALS USED IN THE FABRICATION OF COWLINGS Final Report [MESURE DES PROPRIETES D'ABSORPTION DE MATERIAUX ACOUSTIQUES UTILISES POUR LA REALISATION DE CAPOTAGES]
B. Corlay and G. Delalot Jul. 1981 164 p refs In FRENCH
(CETIM-11-H-265) Avail: NTIS HC A08/MF A01

A wide selection of sound absorbing materials was tested, using the stationary wave tube method, and absorption factors were determined. Results are used to compile a catalog of industrial acoustically absorbant materials which can be employed as interior linings on cowlings for mobile or fixed noisy equipment. Theory that explains the absorptivity of these materials when used alone or in combinations is also presented. Results for low and middle frequency absorption are stressed. Author (ESA)

N82-18146# Southampton Univ. (England).
WIND TUNNEL INVESTIGATION OF HIGH SPEED ROTOR NOISE
H. Tadghighi and I. C. Cheeseman *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 25 p refs
(For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

N82-18149# Westland Helicopters Ltd., Yeovil (England).
PRELIMINARY THOUGHTS ON HELICOPTER CABIN NOISE PREDICTION METHODS
J. S. Pollard *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 14 p refs (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-19003 Texas Univ. at Arlington.
ON THE COMPOSITE STRUCTURE OF ELEMENTARY PARTICLES Ph.D. Thesis
Xerxes Ramyar Tata 1981 192 p
Avail: Univ. Microfilms Order No. 8128697

It is shown that the recombination model associated with modified Kuti-Wiesskopf structure functions provides, within the framework of the quark-parton model, a consistent description of low p sub T particle production in the fragmentation domain of colliding hadrons. The parameters needed to specify the structure functions of the hadrons are all determined from the inclusive single meson production data. The compositeness of particles is then studied from the more fundamental field theoretic point of view. The sense in which a Yakama type interaction may be regarded as equivalent to a four point interaction, with the intermediate boson of the Yakawa theory being regarded as a composite particle, is examined. Irrespective of the bosonic or fermionic nature of the constituents of the four point interaction, the compositeness conditions do not by themselves, ensure the identity of the two theories. It is further shown that the Yukawa interaction may be made to undergo a transmutation into a four point interaction provided certain spectral contributions that occur in the Yukawa theory are explicity omitted. In view of this, it is suggested that all proofs of the equivalence of the four fermion theory with the corresponding Yukawa theory need to be reexamined. Dissert. Abstr.

N82-19004 California Univ., Berkeley.
ALIGNMENT SIGNALS FROM ELECTRONS SCATTERING NEAR AN EDGE FOR ELECTRON BEAM MICROFABRICATION Ph.D. Thesis
Yi-Ching Lin 1981 197 p
Avail: Univ. Microfilms Order No. 8200187

The formation of alignment signals from electrons scattering near topographical silicon features both with and without an electron sensitive polymethyl methacrylate resist layer coating was studied theoretically and experimentally. Monte Carlo calculations based on the continuous slowing down approximation were used to generate basic information about electron backscattering from tapered silicon steps. The accuracy of the Monte Carlo approach for the study of electron backscattering was checked in a detailed comparison with available experimental and theoretical results. The effects of beam parameters, mark geometry, resist coating, and the distribution of backscattered electrons in energy and angle on the quality of alignment signals were studied in detail. In many cases, the alignment signals were characterized through the use of universal curves based on simple analytical scattering models. Dissert. Abstr.

N82-19005# Technische Hogeschool, Delft (Netherlands).
TWO-DIMENSIONAL NUCLEAR MAGNETIC RESONANCE IN LIQUIDS Ph.D. Thesis
Adriaan Bax 26 Nov. 1981 211 p refs
Avail: NTIS HC A10/MF A01

The general aspects of two dimensional NMR spectroscopy are treated using a quantum mechanical description and a pictorial example of a two dimensional experiment. The different types of modulation and the consequences for the resultant line shapes are discussed as well as the effect of digital filtering. Chemical shift spectroscopy, J-spectroscopy, and multiple quantum spectroscopy are considered. A number of experiments all having in common the fact that the only signals observed are those from C-13 nuclei coupled to another C-13 nucleus is described. The much stronger signals from isolated C-13 are suppressed using the properties of multiple quantum coherence. The effectiveness of various two dimensional methods for determining particular MNR parameters is evaluated. Computer and spectrometer facilities for performing two dimensional experiments are assessed. A.R.H.

N82-19006# Mission Research Corp., Albuquerque, N. Mex.
BEAM PROPAGATION EXPERIMENTAL STUDY Interim Report
Carl Ekdahl 9 Apr. 1981 24 p
(Contract F49620-81-C-0016; AF Proj. 2301)
(AD-A108604; AMRC-N-167; AFOSR-81-0739TR) Avail: NTIS HC A02/MF A01 CSCL 20/8

The pressure regime for stable propagation of an intense relativistic electron beam (I > 20 kA, W > 1.5 MeV, t > 20 ns) was determined and the beam-current density distribution was measured using an array of fast-response, subminiature Faraday cups. Experiments were performed on the stabilization of this pre-equilibrated beam when it was extracted into full-density air. Author (GRA)

N82-19007# Rockwell International Corp., Thousand Oaks, Calif. Microelectronics Research and Development Center.
ELECTRONIC TRANSPORT IN ULTRATHIN HETEROSTRUCTURES Final Report, 1 Aug. 1978 - 31 Jul. 1981
P. D. Dapkus Oct. 1981 108 p refs
(Contract N00014-78-C-0711)
(AD-A108390; MRDC40129) Avail: NTIS HC A06/MF A01 CSCL 20/7

A detailed study of the optical and electronic transport studies of ultrathin GaAlAs/GaAs heterostructures is reported. The measurements are reported on GaAlAs multiple quantum well heterostructures (MQW) and superlattices (SL) with layer dimension ranging from 200 to 30 A grown by metalorganic chemical vapor deposition (MOCVD). The measurements show that laser emission from these structures lie 36 meV below the absorption edge, consistent with LO phonon emission. The transport properties of modulation doped superlattices and single heterostructures demonstrate enhanced room temperature and low temperature mobility. Author (GRA)

N82-19008# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
GROWTH OF HgCdTe BY MODIFIED MOLECULAR BEAM EPITAXY Semiannual Technical Report, 1 Mar. - 31 Aug. 1981
J. T. Cheung Sep. 1981 43 p refs
(Contract MDA903-79-C-0188; DARPA Order 3704)
(AD-A108750; SC5202.14SA; SATR-4) Avail: NTIS HC A03/MF A01 CSCL 20/7

Thick Hg sub 1-x Cd sub x Te films (> 5 micron were deposited on CdTe sub x (111) A and other substrates by evaporating either (HgTe) sub 1 x/(CdTe) sub x mixture or Hg sub 1-x Cd sub x Te crystals with a pulsed laser. The films were single phase and stoichiometric. All films showed preferential (111) texture. Electrical properties were characterized by Hall measurements, for a x = 0.3 film after annealing, typical values of carrier concentration and mobility were 1-2 x ten to the 17th power/ccm and 3500-6000 sq cm/Vsec, respectively. GRA

N82-19009# Naval Research Lab., Washington, D. C. Plasma Physics Div.
SIMPLE ANALYSIS OF LIGHT ION BEAM LOSSES IN DEUTERIUM PLASMAS CHANNELS
D. G. Colombant and S. A. Goldstein (Jaycor, Inc.) 16 Nov. 1981 29 p refs
(AD-A108287; NRL-MR-4640) Avail: NTIS HC A03/MF A01 CSCL 20/7

Simple analysis of both ion beam energy losses and beam current density reduction is presented for deuterium plasma channels. It is found that whereas an optimum density may exist for reducing the beam energy losses in the channel, no optimum density can be found to minimize the beam current density reduction. Plasma channel radius effects are then examined. It is found that the total ion beam energy loss is not strongly dependent on the initial channel radius. We conclude that final focusing elements in conjunction with channels initially at rest allow for multiterawatt beams to be transported efficiently to 1 sq cm targets while the channel cross-section can be larger. Author (GRA)

N82-19010# Naval Research Lab., Washington, D. C. Beam Dynamics Group.
DYNAMICS OF AN INTENSE ELECTRON RING IN A MODIFIED BETATRON FIELD Interim Report
P. Sprangle, C. A. Kapetanakos, and S. J. Marsh (Sachs/Freeman Associates, Bowie, Md.) 23 Nov. 1981 28 p refs
(RR0110941)
(AD-A108359; NRL-MR-4666) Avail: NTIS HC A03/MF A01 CSCL 20/7

The dynamics of an intense electron ring confined in a modified betatron magnetic field is considered. The analysis assumes that the electron ring is located near the center of a conducting torus and includes self fields, induced fields from the walls surrounding the ring and toroidal effects. It has been found that the geometric center of the ring can perform circular motion around the minor axis of the torus. Based on this analysis, a scheme is proposed for the injection of an intense electron beam into a modified betatron accelerator. Author (GRA)

N82-19011# New York Univ., N. Y. Dept. of Physics.
THEORETICAL INVESTIGATION OF ATOMIC STRUCTURE AND SCATTERING PROCESSES Summary Questionaire Report, Mar. 1981 - Feb. 1982
Larry Spruch and Leonard Rosenberg Nov. 1981 5 p refs
(Contract N00014-76-C-0317; NR Proj. 393-005)
(AD-A108541) Avail: NTIS HC A02/MF A01 CSCL 07/4

The theory of electron-atom scattering in a laser field has been studied and approximation methods applicable to low frequency laser fields have been developed. A study has been made of the dependence of the binding energy of heavy atoms on the atomic number. This is useful in developing generalizations to Thomas-Fermi theory. Author (GRA)

N82-19012# College of William and Mary, Williamsburg, Va. Dept. of Physics.

A STUDY OF THE COLLISIONAL DYNAMICS FOR COLLISIONS OF UF6(-) ATOMS AND MOLECULES Final Scientific Report, 1 Jul. 1980 - 30 Jun. 1981

R. L. Champion and L. D. Doverspike Aug. 1981 26 p
(Grant AF-AFOSR-0227-80; AF Proj. 2301)
(AD-A108419; U4; AFOSR-81-0762TR) Avail: NTIS HC A03/MF A01 CSCL 07/4

Absolute total cross sections for the collisional decomposition of the negative ion of Uranium Hexafluoride have been measured for laboratory collision energies up to 500 eV. The results have been analyzed with a statistical theory of unimolecular decomposition. By varying the temperature of the carbon surface upon which the negative ions are created, the average initial internal energy in the negative molecular ion can be selected. Experiments performed with 'hot' negative molecular ions indicate larger decomposition cross sections and lower energy thresholds when compared to results for 'cold' negative molecular ions. Author (GRA)

N82-19013# Catholic Univ. of America, Washington, D.C. Vitreous State Lab.

DYNAMICAL NONLINEAR MATERIAL RESPONSE AND FAILURE Interim Technical Report, Oct. 1979 - Jun. 1981

C. J. Montrose, T. A. Litovitz, D. M. Heyes, Joseph H. Simmons, R. K. Mohr, J. J. Kim, S. D. Grant, and S. M. Rekhson 1 Jul. 1981 136 p refs
(Contracts N00014-75-C-0856; N00014-81-K-0291)
(AD-A108822; CUA/VSL-010781) Avail: NTIS HC A07/MF A01 CSCL 11/2

Molecular dynamics (MD) studies of the nonlinear viscoelastic response of Lennard-Jones model liquid and glassy systems have shown that strain-induced structural changes occur at elevated strain rates and are the microscopic origin of such phenomena as shear (viscosity) thinning and stress overshoot. The structural changes result in a limit to the steady state stress that the material can sustain. In terms of them it was possible to develop a framework for describing ductile failure and the ductile-to-brittle transition. The semi-quantitative agreement of the MD results and primary laboratory studies in organic liquids, polymers and inorganic glasses suggests that the microscopic processes observed in the former are occurring in, and can be used to interpret phenomen in. the latter three. Author (GRA)

N82-19014# Commissariat a l'Energie Atomique, Grenoble (France). Service d'Ionique Generale.

CHARGE TRANSFER CROSS-SECTIONS OF ARGON IONS COLLIDING ON ARGON ATOMS

J. Aubert, S. Bliman, N. Chan-Tung, R. Geller, B. Jacquot, and D. VanHoutte Apr. 1980 13 p refs Presented at the 2nd Conf. on Low Energy Beams, Bath, England, 14-17 Apr. 1980
(CEA-CONF-5209) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

A device was built to measure charge changing cross-sections of argon ions colliding on argon atoms. It consists of an E.C.R. ion source (Micromafiios) that delivers argon ions up to charge +13. The ion source potential may be varied from 1 up to 10 kVolts. A first magnet is used to charge analyze the extracted beam. For a given separated charge state, the ion beam is passed in a collision cell whose pressure may be varied. The ions undergoing collisions on the target are analyzed by a second magnet and collected. The pressure is varied in the collision cell in order to check that the single collision condition is satisfied. It is shown that the ions do two types of collisions: charge exchange and stripping whose cross sections are measured. Interpretation of charge exchange is proposed along yet classic theoretical approaches. As to stripping no available theory allows interpretation. DOE

N82-19015# Commissariat a l'Energie Atomique, Gif-sur-Yvette (France). Dept. of Physique des Particules Elementaires.

STUDY OF INCLUSIVE SEMI-LEPTONIC NEUTRAL CURRENT REACTIONS IN NEUTRINO AND ANTINEUTRINO INTERACTIONS BETWEEN 12 AND 200 GeV Ph.D. Thesis - L'Universite de Paris-Sud

Brigitte Devaux Sep. 1980 170 p refs In FRENCH
(CEA-N-2150) Avail: NTIS (US Sales Only) HC A08/MF A01; DOE Depository Libraries

Results obtained in a detailed study of neutral current type reactions: antineutrino + Fe (FEMALE) antineutrino + X using the Neutrino Beam of the SPS at CERN are reported. The detector and beam properties lead to a good knowledge of the resolution and contamination sources. Between 12 and 200 GeV, the ratio of the inclusive cross-sections of neutral to charged current reactions is measured to be Rsub (neutrino) = 0.293 + -0.010 and Rsub (antineutrino) = 0.35 + -0.03. Within the experimental errors, there is no significant variation of ratios with the incoming neutrino energy. The space-time structure of neutral current is dominated by the (V-A) component with a non-zero (V+A) term, up to 4.5 standard deviations. Following Weinberg and Salam model, all results are consistent for a value of sin(2) theta(W) = 0.24 + -0.02. Because of the accuracy, it becomes a reference value for that quantity. DOE

N82-19016# Commissariat a l'Energie Atomique, Gif-sur-Yvette (France). Office des Rayonnements Ionisants.

INVESTIGATIONS ABOUT THE INTERNAL CONVERSION COEFFICIENT FOR TRANSITION ENERGIES NEAR THE THRESHOLD Ph.D. Thesis - L'Universite de Paris-Sud

Nelcy FaraniCoursol Jun. 1980 140 p refs In FRENCH
(CEA-R-5052) Avail: NTIS (US Sales Only) HC A06/MF A01; DOE Depository Libraries

A detailed review of the different theories concerning internal conversion is made. The principal physical parameters and their influence on the calculated conversion coefficients are presented. The results (experimental and theoretical) obtained for the internal conversion coefficients near the threshold (K shell) for the transitions in the nuclei (57) Fe (M1; 14 KeV), up(125m)Te (M1; 35KeV), up(129)mXe (M4; 39 KeV) and sup(93m)Nb (M4; 30 KeV) are presented with the ICC computations for different types of transitions on the 30 and 80 atomic number nuclei. A comparison is made of the different computations and a discussion points out the penetration effect and hole correction which become important at low energy and for high multipolarities. DOE

N82-19017# Australian National Univ., Canberra. Dept. of Nuclear Physics.

ELASTIC AND INELASTIC SCATTERING MEASUREMENTS FOR THE MG-24 PLUS PB-208 AND SI-28 PLUS PB-208 SYSTEMS

J. S. Eck, T. R. Ophel, P. D. Clark, D. C. Weisser, and G. R. Satchler (ORNL) Oct. 1980 28 p refs Submitted for publication Sponsored in part by DOE and NSF
(ANU-P-788) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

The differential cross sections for the elastic and inelastic scattering to the lowest 2(+) states of Mg-24 and Si-28 using Mg-24 and Si-28 beams in conjunction with Pb-20 targets were measured and analyzed. The incident beam energies were 145 MeV for Mg-24 and 162 MeV for Si-28. The measured cross sections were analyzed using coupled channels calculations assuming a rotational model description for the low-lying collective states of Mg-24 and Si-28. The coupled channels calculations are compared with polarization potential calculations in which the experimental B(E2) values are used in both cases. The extracted deformation lengths and deformation parameters are compared to those obtained using similar data with light projectiles, although because of strong Coulomb excitation the present calculations are fairly insensitive to the nuclear deformation parameters. DOE

N82-19018# Australian National Univ., Canberra. Dept. of Nuclear Physics.

ELECTRON VACANCY PRODUCTION IN NEAR-SYMMETRIC COLLISIONS OF 100 MeV COPPER IONS

H. J. Hay, L. F. Pender, and P. B. Treacy Mar. 1981 14 p refs Submitted for publication
(ANU-P-771) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

Using a high-resolution Si(Li) X-ray detector, characteristic K X-rays have with targets of Cr, Fe, Cu, Ge and Se bombarded by 100 MeV Cu ions, equilibrated by passing through carbon. Cross sections for X-ray production, target-to-projectile vacancy-sharing ratios and Ksub(-) to Ksub (ALPHA) ratios, were measured and compared to predictions of molecular-coupling theories. The results show little agreement with existing models based on rotational coupling in molecular-orbital states. DOE

N82-19019# Rice Univ., Houston, Tex.
ELECTRON-SPIN-POLARIZATION EFFECTS IN LOW ENERGY ELECTRON DIFFRACTION, ION NEUTRALIZATION AND METASTABLE ATOM DEEXCITATION AT SOLID SURFACES
G. K. Walters 1981 15 p refs
(Contract DE-AS05-81ER-10817)
(DE82-001179; DOE/ER-10817/1) Avail: NTIS HC A02/MF A01

The development of surface sensitive spectroscopies based on electron spin dependences in electron atom and in surface interactions is discussed. Spin polarization effects in LEED (i.e., PLEED) can be exploited to provide structural information at crystalline surfaces. Nickel (110) has polarization vs. energy profiles that are rich in structure and surprisingly large peak polarizations (approx. 20%). Addition of an ordered tellurium adlayer significantly changes both the PLEED polarization and intensity profiles. Work has begun on construction of a GaAs spin polarized electron source that should provide improved accuracy and data acquisition rates in future PLEED experiments. DOE

N82-19020# North Carolina Univ., Chapel Hill.
RESEARCH ON ATOMIC, MOLECULAR, AND NUCLEAR PHYSICS Progress Report, 1 Dec. 1980 - 30 Nov. 1981
S. M. Shafroth 1981 23 p refs
(Contract DE-AS05-78ER-06027)
(DE82-001175; DOE/ER-06027/13) Avail: NTIS HC A02/MF A01

Experimental progress has involved the study of resonant transfer and excitation (RTE) of electrons from target atoms to highly ionized fast projectiles such as 67 MeV Si(11+), for example, where a resonant transfer is expected to take place. Progress is described on the singles X-ray excitation cross section aspect of this problem. K X-ray production of Si and Ar in collisions with Si (q+) energies ranging from 50 to 88 MeV and charge states 10, 11, 12 was studied. T.M.

N82-19021# Washington Univ., Seattle. Dept. of Physics.
WEAK-INTERACTION EXPERIMENTS AT LOW ENERGIES: RESULTS FROM ATOMIC AND NUCLEAR PHYSICS
E. G. Adelberger 1981 21 p refs
(Contract DE-AC06-76ER-07388)
(DE82-001724; DOE/ER-1388/504) Avail: NTIS HC A02/MF A01

Experimental results in the following areas are reviewed: the parity violating eN force, the parity violating NN force, the (MU) sub e mass, and the electric dipole moment of the neutron. The standard model accounts well for most of the data in atomic and nuclear parity violation. The evidence for a finite neutrino mass suggests that modification to the standard model is required while the neutron electric dipole moment provides a constraint on theories of CP nonconservation. T.M.

N82-19022# Ohio State Univ., Columbus. Dept. of Physics.
CHROMOSTATICS OF TWO-QUARK SYSTEMS
K. A. Milton (Oklahoma State Univ.), William F. Palmer, and Stephen S. Pinsky 1981 22 p refs
(Contract DE-AC02-76ER-01545)
(DE82-001181; DOE/ER-01545/314) Avail: NTIS HC A02/MF A01

An estimate for the mean field potential between two heavy quarks (qq) is studied using chromostatics. To do so, the pseudocolor charge algebra is worked out for the qq system in SU(n) of color. Using the leading logarithm, renormalization, group improved Euclidean action for the gluon fields, it is found the mean field potential depends crucially on the algebraic properties of the sources, and that while the quark antiquark (q anti q) system possesses an at least linear potential, the qq system has infinite energy, and hence is decoupled from the physical spectrum. The physical states exhibit color screening. DOE

N82-19023# Washington Univ., Seattle. Dept. of Physics.
QUARK-GLUON PLASMA AND ULTRA-RELATIVISTIC NUCLEUS-NUCLEUS COLLISIONS
L. McLerran Jun. 1981 28 p refs Presented at the 5th High Energy Heavy Ion Study, Berkeley, Calif., 18-22 May 1981
(Contract DE-AC06-76ER-01388)
(DE81-030321; DOE/ER-01388/860; RLO-1388-860; CONF-8105104-9) Avail: NTIS HC A03/MF A01

A space-time picture of the fragmentation and central regions is presented for extremely high energy head-on heavy nucleus collisions. The energy densities of the matter produced in such collisions are estimated. Speculations concerning the possible formation of a quark-gluon plasma are discussed, as are possible experimental signals for analyzing such a plasma. DOE

N82-19024# Lehigh Univ., Bethlehem, Pa.
ANGULAR SCATTERING AND CHANNELING WIDTHS OF POSITIVE AND NEGATIVE PARTICLES AT MULTI-GeV ENERGIES
M. A. Hasan, A. S. Kanofsky, R. Allen, C. R. Sun (State Univ. of New York, Albany), W. M. Gibson (State Univ. of New York, Albany), I. J. Kim (State Univ. of New York, Albany), G. C. Williams (State Univ. of New York, Albany), R. A. Carrigan, Jr. (Fermi National Accelerator Lab.), B. L. Chrisman (Fermi National Accelerator Lab.), and T. E. Toohig (Fermi National Accelerator Lab.) 1981 55 p refs
(Contract DE-AS02-76ER-02894)
(DE82-002933; DOE/ER-02894/1) Avail: NTIS HC A04/MF A01

An experiment on the channeling of high energy particles (protons, pions, and kaons) through a 2 cm thick germanium crystal is described. Experimental results are presented on the multiple scattering of particles passing in a random direction through a crystal and channeling widths for positive and negative heavy particles. Results are also presented on multiple scattering of channeled high energy particles of 35, 100, and 250 GeV energy through the crystal, compared with multiple scattering of particles passing in a random direction through the crystal. DOE

N82-19025# Massachusetts Inst. of Tech., Cambridge. Neutron Diffraction Lab.
LOW TEMPERATURE AND NEUTRON PHYSICS STUDIES Progress Report, Jun. 1980 - Jul. 1981
Jul. 1981 7 p refs
(Contract DE-AS02-76ER-03342)
(DE82-001573; DOE/ER-03342/9; MIT-3342-9) Avail: NTIS HC A02/MF A01

Experimental research work with the neutron diffraction spectrometers on neutron interferometry and on interferometer applications to fundamental neutron physics is reported. Technical improvements in the interferometer system are described. Preliminary experiments in which the phase difference between two coherent beams caused by interferometer angular motion are reported and theoretical work leading to the interpretation of these motion studies is noted. Calibration studies relating intensity effects to phase gradients introduced into the interferometer, performed with a continuously-variable prism assembly, indicate the presence of anomalous phase effects whose origin is being explored. An Aharonov-Bohm experiment with neutrons is reported in which the coupling between a neutron and the magnetic vector potential is considered. Single and double slit diffraction patterns with neutrons are described. DOE

N82-19026# Minnesota Univ., Minneapolis.
NEAR NEIGHBOR SEPARATIONS OF SURFACE ATOMS Progress Report
1981 18 p refs
(Contract DE-AC02-80ER-10583)
(DE82-002166; DOE/ER-10583/2) Avail: NTIS HC A02/MF A01

The construction phase of the work to develop a technique to measure near neighbor distances of low Z atoms that are adsorbed at solid surfaces is nearly complete. The instrument can measure EXAFS-like secondary yield of high energy electrons. The goal is to then combine the knowledge of these spacings with analysis of electron diffraction data to determine the structure of surfaces. The apparatus that was constructed is described. It became apparent in the course of this work that the instrument would also be well suited for reflection high energy electron diffraction (RHEED), and therefore the applicability of RHEED to studies of surface structure was investigated. Exploratory measurements were made on an existing RHEED system that was available. The conclusion is that RHEED is ideally suited to study the distribution of steps on surfaces. DOE

N82-19027# Science Research Council, Chilton (England).
NEUTRON TRANSPORT FROM TARGETS TO MODERATORS
A. D. Taylor 1981 36 p Presented at a Meeting on Targets for Neutron Beam Spallation Sources, KFA, Juelich, West Germany, 11-12 Jun. 1979
(PB82-106915; RL-81-057) Avail: NTIS HC 03/MF A01 CSCL 20G

The following topics are discussed: boundary conditions for the SNS; the MUSTA experiment; softening of the target spectrum; reflector size; spectral tailoring; spatial distribution, time structure; angular distribution; and target-moderator configuration. GRA

N82-18242*# Centre National d'Etudes des Telecommunications, Bagneux (France).
PHENOMENA INDUCED BY CHARGED PARTICLE BEAMS
C. Beghin *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 20H

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

N82-19028*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ANALYTIC OPTICAL POTENTIALS FOR NUCLEON-NUCLEUS NUCLEUS-NUCLEUS COLLISIONS INVOLVING LIGHT AND MEDIUM NUCLEI
Hari B. Bidasaria and Lawrence W. Townsend (Old Dominion Univ.) Jan. 1982 25 p refs
(NASA-TM-83224) Avail: NTIS HC A02/MF A01 CSCL 20H

Utilizing an optical model potential approximation to the exact nucleus-nucleus multiple-scattering series, optical potentials for nucleon-nucleus and nucleus-nucleus collisions are analytically derived. These expressions are applicable to light and medium cosmic ray nuclei as their single-particle density distributions are analytically determined, without approximation, from their actual harmonic well charge density distributions. Pauli correlation effects are included through the use of a simple Gaussian function to replace the usual expression obtained in the infinite nuclear matter approximation. Author

74 OPTICS

Includes light phenomena.

N82-19029* National Aeronautics and Space Administration. Pasadena Office, Calif.
FIBER OPTIC TRANSMISSION LINE STABILIZATION APPARATUS AND METHOD Patent
George F. Lutes, Jr. (JPL, California Inst. of Technology, Pasadena) and Kam Y. Lau, inventors (to NASA) (JPL, California Inst. of Technology, Pasadena) Issued 1 Sep. 1981 16 p Filed 17 Sep. 1980 Supersedes N80-34250 (18 - 24, p 3352) Sponsored by NASA
(NASA-Case-NPO-15036-1; US-Patent-4,287,606; US-Patent-Appl-SN-188160; US-Patent-Class-455-617; US-Patent-Class-455-610; US-Patent-Class-455-615; US-Patent-Class-455-612) Avail: US Patent and Trademark Office CSCL 20F

A reference signal of RF frequency modulates a 0.85 micrometer wavelength optical transmitter. The output of which passes through a first optical filter and a voltage-controlled phase shifter. The output of the phase shifter is provided to the fiber optic transmission line. At the receiving end of the transmission line, the signal is demodulated and used to modulate a 1.06 micrometer optical transmitter. The signal from the transmitter is provided to the fiber optic transmission line and passes through the voltage-controlled phase shifter to a phase error detector. The phase of the modulation of the 1.06 micrometer wavelength signal is compared to the phase of the reference signal by the phase error detector. A phase control signal related to the phase difference is provided to the voltage controlled phase shifter which alters the phase of both optical signals until a predetermined phase relationship between modulation on the 1.06 micrometer signal and the reference signal is obtained.
Official Gazette of the U.S. Patent and Trademark Office

N82-19030*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HEAT REFLECTING FIELD STOP Patent Application
Wayne A. Massey (TRW Defense and Space Systems Group, Redondo Beach, Calif.) and Dale L. Massey, Inventors (to NASA) (TRW Defense and Space Systems Group, Redondo Beach, Calif.) Filed 30 Oct. 1981 10 p Sponsored by NASA
(NASA-Case-LAR-12443-1; US-Patent-Appl-SN-315582) Avail: NTIS HC A02/MF A01 CSCL 20F

An apertured field stop with a highly reflective surface is described which reflects unwanted rays outside the instrument in order to minimize internal heating. When the reflective field stop is spherically shaped with a radius of curvature equal to the effective focal length of the host optical instrument, rejected rays are reflected back through the light gathering entrance of the instruments. The heat associated with these rejected rays dissipates outside the instrument in the space surrounding entrance orifice. The reflective field stop proves to be a highly effective device for minimizing the internal heat within optical instruments such as space telescopes used to image the Sun and Earth. This invention can be applied to any small field of view optical system that uses a high intensity source radiation as an input. NASA

N82-19031# Harris Corp., Melbourne, Fla. Government Communication Systems Div.
FIBER OPTIC DATA BUS FOR THE AN/GYQ-21(V) Final Technical Report, 23 Jul. 1979 - 23 Oct. 1980
R. E. Dragoo and D. B. Kemsey Griffiss AFB, N.Y. RADC Jun. 1981 261 p
(Contract F30602-79-C-0218; AF Proj. 4519)
(AD-A108394; RADC-TR-81-153) Avail: NTIS HC A12/MF A01 CSCL 17/2

This report describes the application of fiber optic bus technology to the AN/GYQ-21(V) system with the goal of providing for increased separation distances between peripherals and increased long distance data transfer rates. The ring network and the transmissive star network are described as implementable fiber optic busses which can provide for the following enhancements to the 21(V) system: increased separation distances up to 1 kilometer between peripherals and increased long distance data transfer rates up to 60 Mbps. GRA

N82-19032# State Univ. of New York at Albany. Space Astronomy Lab.
EXPERIMENTAL RESULTS OF MULTIPLE SCATTERING Final Report, Mar. 1979 - Jul. 1980
Donald W. Schuerman and Ru. T. Wang Aberdeen Proving Ground Md. Army Armament Research and Development Command Nov. 1981 53 p refs
(Contract DAAG29-79-C-0055)
(AD-A108291; ARCSL-CR-81003) Avail: NTIS HC A04/MF A01 CSCL 20/6

Microwave analog measurements of scattering by ensembles of 2n(n = 1,2,3) interacting spheres are presented. Emphasis is placed on the amplitude and phase measurements of the forward scattered wave as a function of the mutual separation of the spheres and the orientation of the ensembles with respect to the incident beam. A few side scattering and angular distribution measurements indicate the existence of specular scattering at particular array orientations for some of the two-sphere ensembles. A short historical sketch, a description of the experiments, and phenomenological explanations of the results are also given.
GRA

N82-19033# Naval Surface Weapons Center, White Oak, Md.
NITINOL INTERCONNECT DEVICE FOR OPTICAL FIBER WAVEGUIDES Final Report
David Goldstein and John Tydings 1 Jul. 1981 71 p refs
(AD-A108278; NSWC/TR-81-129; NAVSEA-S562-78) Avail: NTIS HC A04/MF A01 CSCL 20/6

Two different interconnect devices for optical fibers have been developed. Each uses the shape memory effect alloy 'NITINOL'. The simpler of the two is of tubular design and accommodates fibers as small as 200 micron diameter. The more complex multi-component design accommodates 125 micron diameter fibers. The complex design is simpler to use, easier to manufacture and lower in cost. It permits less than 1 db loss and is re-matable. A description of NITINOL manufacture is given.
Author (GRA)

N82-19034# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).
THE TIRGO SECONDARY MIRROR MODULATION SYSTEM [SISTEMA DI MODULAZIONE DELLO SPECCHIO SECONDARIO DEL T.I.R.G.O.]
P. Baldetti, F. Bordoni, A. DiGiammarco, and P. Saraceno May 1981 40 p refs In ITALIAN
(IPS-81-8) Avail: NTIS HC A03/MF A01

The modulation system for the secondary mirror of the infrared telescope TIRGO is described. The optimal modulation frequency, the waveforms, absolute and differential modulation, and the mechanical characteristics of the modulator are considered. The mechanics of the actuator, of mounting the mirror, and the optical alignment of the mirror are discussed. The electronics of the system are described, specifically the generator, command electronics, power amplifiers, position sensors, and the protective electronics. The procedure for regulating the position sensors is presented.
Transl. by J.D.H.

N82-18235*# Michigan Univ., Ann Arbor.
AN IMAGING SPECTROMETRIC OBSERVATORY
M. R. Torr *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 4 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 20F

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-19035 Texas Univ. at Arlington.
THEORETICAL ASPECTS OF THE NONLINEAR INTERACTION OF DRIFT-TYPE INSTABILITIES IN A PLASMA Ph.D. Thesis
Paul Willis Terry 1981 180 p
Avail: Univ. Microfilms Order No. 8128698

Various theoretical aspects of plasma turbulence are explored in the context of low frequency drift-type instabilities in toroidally confined plasmas. Of central importance is consideration of the random phase approximation-its role and validity in plasma turbulence theories. Linear theory is first considered to find the criteria for marginal stability of the toroidal ion temperature gradient drift mode. Analytical criteria for the onset of instability giving the dependence on wavenumber, magnetic curvature, and temperature gradient are derived from the drift kinetic equation with the grad-B and curvature drift resonances retained. Three examples of nonlinear theory relevant to drift wave turbulence are then developed to introduce important nonlinear mechanisms and to illustrate the role of the random phase approximation. The question of the validity of the random phase approximation is then addressed by considering the interaction of three electron drift waves. The equations for the exact interaction are derived their properties are examined, and sample numerical solutions are presented.
Dissert. Abstr.

N82-19036# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ON THE SELF-CONSISTENT SOLUTIONS OF PULSAR PLASMA WAVES
Abraham C.-L. Chian Jan. 1982 17 p refs Submitted for publication
(INPE-2302-PRE/071) Avail: NTIS HC A02/MF A01

In the theoretical study of strong pulsar electromagnetic waves in an electron-ion plasma a dynamic parameter relating electron and ion velocities necessarily appears. It is shown that the dynamic parameter is a function of the plasma stream velocity, the wave velocity, the wave amplitude and the electron-ion mass ratio. In order to obtain self-consistency in the solutions, the dynamic parameter must be chosen appropriately when other parameters are specified.
Author

N82-19037# Office of Naval Research, London (England).
THE 4TH INTERNATIONAL TOPICAL CONFERENCE ON HIGH-POWER ELECTRON AND ION-BEAM RESEARCH AND TECHNOLOGY
John R. Neighbours 9 Oct. 1981 16 p Conf. Held at Palaiseau, France, 29 Jun. - 3 Jul. 1981
(AD-A108353; ONRL-C-6-81) Avail: NTIS HC A02/MF A01 CSCL 20/7

The Fourth International Topical Conference on High-Power Electron and Ion-Beam Research and Technology program included electron and ion beam generators, beam transport plasma heating and free electron lasers. This report is principally about foreign research results. It also contains a list of speakers and the topics discussed.
GRA

N82-19038# Air Force Geophysics Lab., Hanscom AFB, Mass.
PRINCIPLES AND APPLICATIONS OF RADIO FREQUENCY IMPEDANCE PROBES Interim Scientific Report
S. T. Lai 27 Jul. 1981 24 p refs
(AF Proj. 7661)
(AD-A108677; AFGL-TR-81-0217; AFGL-ERP-749) Avail: NTIS HC A02/MF A01 CSCL 20/9

The underlying principle of the radio frequency plasma probe is presented. The resonance properties of the probe's equivalent circuit with and without external magnetic field are analyzed. The admittance of the equivalent circuit is shown to possess a pole at the sheath hybrid frequency and a zero at the upper hybrid frequency. The phase of the admittance changes signature to become negative in the range of frequency between the pole and the zero. Some significant experiments using radio frequency plasma probe for ionospheric research are briefly described. GRA

N82-19039# Naval Research Lab., Washington, D. C. Geophysical and Physics Dynamics Branch.
PHYSICAL MECHANISM OF WAVE-PARTICLE RESONANCES IN A CURVED MAGNETIC FIELD
J. D. Huba and J. F. Drake (Science Applications, Inc.) 27 Nov. 1981 24 p refs
(RR0330244)
(AD-A108360; NRL-MR-4668) Avail: NTIS HC A02/MF A01 CSCL 20/9

The physical mechanism of wave-particle resonances in a curved magnetic field is investigated. Specifically, the energy exchange process between a wave and resonant curvature drifting particles is discussed. A general expression for the wave damping/growth rate is derived based upon physical arguments. The theory is applied to the lower-hybrid-drift instability and nonlinear consequences are discussed.
GRA

N82-19040# Fom-Instituut voor Plasmafysica, Rijnhuizen (Netherlands).
EQUILIBRIUM STUDIES OF SKIN LIKE PRESSURE AND CURRENT-DENSITY PROFILES

A. W. Kolfschoten Sep. 1981 54 p refs Sponsored by EURATOM and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (ZWO)
(Rept-81-134) Avail: NTIS HC A04/MF A01

The MHD equilibria which produce hollow pressure and current profiles that evolve into normal Tokamak parabolic profiles following heating pulses were investigated. A computer code for toroidal ideal MHD equilibria, using a Moebius transformation, which maps the plane of the cross section onto a plane in which the magnetic axis coincides with the origin for the coordinate system was applied. The profiles obtained show good agreement with the experimentally measured ones. Hollow profiles enable the plasma to be in an equilibrium state for which the displacement of the magnetic axis in the direction of the inner side of the torus, i.e., a negative displacement. The average toroidal beta values of these plasmas, subject to the restriction that the safety factor q is > 1 everywhere, can be as high as 10%. Author (ESA)

N82-19041# Fom-Instituut voor Plasmafysica, Rijnhuizen (Netherlands).
THE INFLUENCE OF IMPURITIES ON THE DISCHARGE BEHAVIOR IN SPICA Thesis - Utrecht State Univ.
A. F. G. vanderMeer Oct. 1981 70 p refs Sponsored by EURATOM and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (ZWO)
(Rept-81-135) Avail: NTIS HC A04/MF A01

The effect of oxygen and silicon on plasma decay in a screw pinch device is discussed. Plasma current, current displacement, impurity radiation, electron line density, impurity concentrations, and power flux to the wall were measured by optical and magnetic instruments. A snow plow model which incorporates bias field is used to describe the implosion which causes heating. Heating is followed by adiabatic compression. Impurity effect numerical simulation is described. Computer simulation and absolute intensity measurements show oxygen content < 0.1% in standard discharges. With 1% oxygen added, content is > 0.3%. The 0.1% value is a factor of 3 above value from background pressure, indicating that most of the oxygen content is due to plasma-wall interaction, probably during the ringing predischarge. Silicon concentration is < half this value. Author (ESA)

N82-19042# Fom-Instituut voor Plasmafysica, Rijnhuizen (Netherlands).
TIME OF FLIGHT ANALYSIS OF CHARGE EXCHANGE NEUTRAL PARTICLES FROM THE TORTUR 2 PLASMA Thesis - Utrecht State Univ.
H. J. B. M. Brocken Oct. 1981 23 p refs Sponsored by EURATOM and Nederlandse Organisatie voor Zuiver-Wetenscnappelisk Organisatie (ZWO)
(Rept-81-136) Avail: NTIS HC A02/MF A01

A disk chopper for time of flight analysis of fast neutrons was constructed in order to determine ion energy spectra at lower energies than can be obtained by conventional electromagnetic analyzers. The detection system is described and the measurements are analyzed. The influence of reflections of neutrals at the liner wall was important in calculations of the neutral density profile at the plasma edge. The neutral energy spectrum in the lower energy range was strongly enhanced by this effect. High energy ranges were unaffected by reflection effects. Asymptotic slopes can be used for central ion temperature determination. Author (ESA)

N82-19043# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
[ACTIVITIES REPORT OF THE INSTITUTE FOR PLASMA RESEARCH] Annual Report, 1980 [FORSCHUNGSBERICHT 1980]
1980 18 p refs In GERMAN
Avail: NTIS HC A02/MF A01

Activities in fusion research are reviewed. Radio frequency heating of inhomogeneous plasmas, in particular by means of Alfven and whistler waves, was studied theoretically and experimentally. Equilibrium studies of a toroidal theta pinch were extended to low density operation and shock wave heating experiments were performed. Several plasma diagnostic instruments, using both coherent and incoherent scattering of laser beams, were developed and tested at fusion test facilities. Detailed measurements on neutron and fast ion production in a plasma focus device are reported. The spatial and temporal distribution of such emissions allows for the identification of the relevant physical processes. Author (ESA)

N82-18282*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Structures and Dynamics Div.
VIBRATION AND BUCKLING STUDIES OF PRETENSIONED STRUCTURES
W. Keith Belvin *In its* Large Space Systems Technol., 1981 Mar. 1982 p 109-121 (For primary document see N82-18275 09-15)
Avail: NTIS HC A19/MF A01 CSCL 22B

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

N82-19044# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ELECTRON HOPPING ENERGY INFLUENCE ON THE SPECIFIC HEAT AND CONDUCTIVITY OF PHOSPHORUS DOPED SILICON
M. Fabbri, I. C. daCunha Lima, and A. Ferreira daSilva Jan. 1982 23 p refs Submitted for publication
(INPE-2301-PRE/070) Avail: NTIS HC A02/MF A01

The electronic specific heat and the dc conductivity of the uncompensated Si:P are calculated via a previously developed theory for impurity band in semiconductors. The theory is investigated further in order to take into account the effect of correlation, as well as overlap on the electron hopping energy integral via Heitler-London two-particle wave functions. The calculated specific heat and conductivity show rough agreement when compared to the experimental data over a wide range of donor impurity concentration. The comparison with AMO-MT calculation shows a large enhancement due to a stronger electron correlation. The results of the highly-correlated-electron-gas model and inhomogeneity model are shown for comparison. Author

N82-19045 Case Western Reserve Univ., Cleveland, Ohio.
PLASMON EXCITATION IN ALKALINE EARTH METALS Ph.D. Thesis
Isay Krainsky 1981 160 p refs
Avail: Univ. Microfilms Order No. 8200358

Characteristic energy losses (CEL) of electrons with energies from 1 to 500 eV were studied for alkaline earth metals. All materials studied were deposited just before taking measurements in ultrahigh vacuum. To suppress the background created by true secondary electrons three modes of retarding voltage modulation were utilized. Amplitude halfwidth, and intensity of CEL peaks, corresponding to the surface plasmon (SP) excitation were studied as a function of incident angle and primary energy. It was shown that these results can be partially explained using a two model of a surface CEL peak formation (SP excitation before or after the elastic scattering) or the model of direct electron plasmon scattering. Dissert. Abstr.

N82-19046 Pennsylvania State Univ., University Park.
A THEORETICAL STUDY OF PHOTO-FIELD EMISSION FROM A METAL SURFACE Ph.D. Thesis
Satinder Singh Sidhu 1981 101 p
Avail: Univ. Microfilms Order No. 8129214

Theoretical models are developed for the current field-emitted from a metal surface into vacuum when the surface is simultaneously irradiated with light of wavelength longer than the threshold wavelength for ordinary photoemission. The total photo-field current from a single emitter face exhibits two components - one increasingly montonically with field and the other having an oscillatory dependence on it. Different aspects of photo-field emission experiments are analyzed to identify the results of interest, and the effect of the incident photon flux on the temperature of the emitter is assessed. Several approaches to the theoretical study of photo-field emission are examined and it is shown that adaptations of the theory of field emission and of the scattering theory treatment of photoemission give equivalent results if photon absorption probability is assumed to be independent of the initial electron state. Dissert. Abstr.

N82-19047 Colorado State Univ., Fort Collins.
COMPARISON OF TWO-PARTICLE CLUSTER EXPANSIONS FOR b.c.c. SPIN OF 1/2 SYSTEMS Ph.D. Thesis
Richard Joseph Krantz 1981 86 p
Avail: Univ. Microfilms Order No. 8126438

The two particle cluster expansion of the Heisenberg Hamiltonian is reviewed applied to a spin 1/2 lattice. All the standard approximations for ferromagnetism, anti-ferromagnetism of the first kind (AF-11), and anti-ferromagnetism of the second kind (AF-2) are reviewed and shown to have a common basis. A set of approximations which may be applied to systems in which the next near neighbor correlations are the dominant interactions is developed. The free energies and second order zero field transition temperatures for the magnetic phases of interest are derived. This set of approximations is then used to describe the free energy and zero field ordering temperature for the recently proposed uudd phase for b.c.c. He.-3. The possibility of first order transitions between the phases consistent with the high temperature susceptibility is discussed for each approximation. A prescription for adding four-particle exchange to these models is discussed. Dissert. Abstr.

N82-19048 Louisiana State Univ. and A&M Coll., Baton Rouge.
ELECTRON-PHONON SCATTERING RATES IN ANTIMONY: RADIO-FREQUENCY SIZE EFFECT Ph.D. Thesis
Thomas Clifton OHara 1981 76 p
Avail: Univ. Microfilms Order No. 8126971

Temperature dependent radio-frequency size effect measurements were performed on high-purity, single crystal antimony plates at thicknesses of 0.592 mm, 0.347 mm, and 0.238 mm. The natural logs of the amplitudes of the data were found experimentally proportional to T(2) in agreement with previous measurements. However, the data were analyzed according to a model in which the electron-phonon scattering frequencies were proportional to T(3) with the explanation that the T(2) behavior is due to the small pieces of Fermi surface in antimony. The electron-phonon scattering frequencies were determined for both holes and electrons and were found to be highly anisotropic in each case. Copies of the computer programs used in the data analysis are included in Appendix I. Author

N82-19049 State Univ. of New York at Stony Brook.
ZERO SOUND ATTENUATION FROM ORDER PARAMETER FLUCTUATIONS IN LIQUID He-3 Ph.D. Thesis
Vijay Kumar Samalam 1981 138 p
Avail: Univ. Microfilms Order No. 8127112

A microscopic theory to explain the excess attenuation observed was constructed. In this model it is assumed that the fluctuations are few in number and well separated so that they do not interact with each other. The effect of fluctuations on the single particle Green's function was calculated. The density of states changes in the presence of fluctuations in a way that foreshadows the superfluid transition. The language of many body perturbation theory was used to construct a transport like equation that is potentially capable of describing high frequency effects. It is shown that to calculate the fluctuations effects consistently, one must include the effect of fluctuations in the equilibrium functions. Dissert. Abstr.

N82-19050 Louisiana State Univ. and A&M Coll., Baton Rouge.
INHOMOGENEOUS RELATIVISTIC ELECTRON SYSTEMS: A DENSITY FUNCTIONAL FORMALISM Ph.D. Thesis
Munagala Venkata Ramana 1981 144 p
Avail: Univ. Microfilms Order No. 8126974

The correlation energy of an unpolarized relativistic electron gas is numerically calculated by summing ring diagrams due to both the longitudinal and transverse photon contributions. From this a local relativistic correlation potential is deduced which appears in the density functional theory of inhomogeneous systems where relativistic effects make important contributions. The non-relativistic gas results are found to be significant underestimates. A fitted form of the correlation energy and potential were used in a self-consistent calculation of energies of atoms of large Z. Trends of the correlation contribution across the periodic table are evaluated. The role of the Breit interaction in a local approximation is evaluated through self-consistent atomic calculations. It is found that the full transverse interaction is underestimated by about an atomic unit in the systems investigated. The problem of the relativistic spin polarized electron gas is considered. The Green function is deduced and used to calculate the particle density, magnetization, exchange energy and potentials. Dissert. Abstr.

N82-19051 Pennsylvania Univ., Philadelphia.
SOLITONS IN ONE-DIMENSIONAL CHARGE DENSITY WAVE SYSTEMS Ph.D. Thesis
Wu-pei Su 1981 213 p
Avail: Univ. Microfilms Order No. 8127079

Theoretical research on one dimensional charge density wave systems is outlined. A simple coupled electron-photon Hamiltonian is studied including a Green's function approach, molecular dynamics, and Monte Carlo path integral method. As in superconductivity, the nonperturbative nature of the system makes the physical ground states and low energy excitations drastically different from the bare electrons and phonons. Solitons carry quantum numbers which are entirely different from those of the bare electrons and holes. The fractional charge character of the solitons is an example of this fact. Solitons are conveniently generated by doping material with donors or acceptors or by photon absorption. Most predictions of the theory are in qualitative agreement with experiments. The one dimensional charge density wave system has potential technological importance and a possible role in uncovering phenomena which might have implications in relativistic field theory and elementary particle physics. M.D.K.

N82-19052 Illinois Univ. at Urbana-Champaign.
ON A PROPOSAL FOR A CONTINUUM WITH MICROSTRUCTURE Ph.D. Thesis
Douglas John Bammann 1981 71 p
Avail: Univ. Microfilms Order No. 8127546

A model for a continuum with microstructure is further substantiated by identifying the microstructure with dislocations. The continuum is viewed as a superimposed state made up from a perfect lattice state, an immobile dislocation state, and a mobile dislocation state. It is assumed that each state evolves continuously in space-time and transitions from one state to another take place spontaneously according to the balance laws of effective mass and momentum. When plastic strain and yield are identified in terms of the parameters characterizing the dislocation states, familiar flow rules and yield surfaces are produced. The capability of the model to predict not only Tresca and Von-Mises plastic behavior but also phenomena such as Prager's kinematic hardening, different responses in tension and compression, latent hardening, and the Bauschinger effect, is shown. The appropriateness of the equations to model creep, cyclic plasticity, and fatigue, is illustrated. Author

N82-19053# Helsinki Univ. of Technology, Otaniemi (Finland). Dept. of Technical Physics.
POSITRON STUDIES OF POINT DEFECT INTERACTIONS IN METALS Ph.D. Thesis
Asko Vehanen 1981 9 p refs
(SF-02150) Avail: NTIS HC A02/MF A01

The clarification of elementary properties of atomic defects in metals is discussed, with an emphasis on the nature of interactions between various imperfections, especially, in relation to the mechanical behavior of materials. Trapping behavior into extended defects is presented both theoretically and experimentally. A model quantitatively accounts for the observed temperature dependent positron trapping. Very weak, hardly observable trapping is demonstrated and an experimental description of positron detrapping from monovacancies is presented. A strong impurity from vacancy interaction in nickel, where the void growth is nucleated by substitional antimony is shown. S.L.

N82-19054# Technische Hogeschool, Delft (Netherlands).
RADIATION DETECTION WITH POINT-CONTACT JOSEPHSON JUNCTIONS Ph.D. Thesis
Tim Poorter 12 Nov. 1981 89 p refs
Avail: NTIS HC A05/MF A01

The first step toward producing a suitable heterodyne detector, based on a Josephson junction and incorporated in a complete 230 GHz receiver, was taken by placing a point contact Josephson junction in a 0.65 by 1.35 sq mm rectangular waveguide to operate it as a wideband receiver. From the spectral analysis of this response it was found that optimum coupling of radiation always took place from 170 to 200 GHz. To improve the radiation coupling at 230 GHz the waveguide system was scaled geometrically, resulting in a 0.50 by 1.06 mm waveguide. A Josephson mixer constructed with a very thin Niobium whisker as one of the electrodes, measurement indicated, can show a very low mixer noise temperature and a good conversion efficiency at a frequency as high as 200 GHz. N.W.

N82-19055# Technische Hogeschool, Delft (Netherlands).

THE INFLUENCE OF THE SPIN-ROTOR COUPLING OF METHYL GROUPS IN SOLIDS ON THEIR NMR RELAXATION Ph.D. Thesis

Dirk Jacob Ligthelm 24 Sep. 1982 235 p refs
(ISBN-90-6231-090-7) Avail: NTIS HC A11/MF A01

The NMR spin-lattice relaxation due to the hindered rotations of methyl groups around their three-fold axes in solids was studied. The effects of the rotor-phonon interaction on the motions of the groups were studied. There are processes occurring with an average frequency which cause the motions of a methyl group from one potential well to another. The activation energy decreases for decreasing temperatures while the correlation time at infinite temperatures increases. Processes occurring at higher frequencies are responsible for the occurrence of the effective tunnelling splitting which at low temperatures equals the change in free energy if a methyl group goes from A to E symmetry. Tunnel splitting decreases for increasing temperatures. The Zeeman relaxation rate for a powdered sample is discussed. The NMR technique used is described as well as a flow cryostat with which sample temperature can be varied between 5 K and 300 K. The sample can be rotated with a maximal spinning requency of about 100 Hz. The existence of a tunnelling-assisted maxima is demonstrated. A.R.H.

N82-19056# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

ELECTRON AND IMPURITY CORRELATIONS IN DOPED SEMICONDUCTORS

R. Kishore, I. C. daCunhaLima, M. Fabbri, and A. Ferreira daSilva Jan. 1982 17 p refs Submitted for publication
(INPE-2309-PRE/074) Avail: NTIS HC A02/MF A01

The theory for the specific heat of doped semiconductors, described by the Hubbard model with random transfer integral, is studied in the presence of a magnetic field and impurity correlations, incorporated through a hard core pair correlations function. The low temperature specific heat and the zero temperature susceptibility of uncompensated phosphorus doped silicon are calculated as a function of impurity concentration. Both electron and impurity correlations enhance the susceptibility and deenhance the specific heat. The behavior of the relative change in the specific heat due to the magnetic field agrees qualitatively with the low temperatures experimental results. S.L.

N82-19057# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

DIAGONAL AND OFF-DIAGONAL DISORDER IN DOPED SEMICONDUCTORS

I. C. daCunhaLima, M. Fabbri, and A. Ferreira daSilva Dec. 1981 13 p refs Submitted for publication
(INPE-2292-PRE/067) Avail: NTIS HC A02/MF A01

The specific heat and resistivity of phosphorus doped silicon (Si:P) are calculated taking into account both diagonal and off-diagonal disorder. The randomness in V sub ii decreases both the specific heat and conductivity at low intermediate concentrations. Author

N82-19058# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

TWO DIMENSIONAL SUB-BANDS IN ION IMPLANTATION [SUB-BANDAS BIDIMENSIONAIS EM IMPLANTACOES RASAS]

E. Granato Jun. 1981 12 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBRC, Salvador, Brazil, 8-15 Jul. 1981 Submitted for publication
(INPE-2147-RPE/369) Avail: NTIS HC A02/MF A01

Confinement near the surface, produced by shallow ion implantation on opposite type substrates, can lead to the formation of two dimensional subbands in a way similar to what occurs in the inversion layers of MOS devices, and can give rise to a substantial separation of the minima of those subbands. The motion of carriers perpendicular to the surface is quantized by the space charge potential. Approximate analytical solutions for the values of subbands minima are presented assuming a simplified model for the electronic potential. Results for Si implanted with phosphorus are presented. Author

N82-19059# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

PHOTOVOLTAIC DETECTORS FOR INFRARED OPERATION [DETETOR FOTOVOLTAICO CRESCIMENTO DE CRISTAIS JUNCAO P-N]

Chen Ying An and I. N. Bandeira Jun. 1981 7 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador, Bahia, Brazil, 8-15 Jul. 1981 Submitted for publication
(INPE-2146-RPE/368) Avail: NTIS HC A02/MF A01

Lead oxide semiconductors are discussed. They have a composition dependent energy gap which makes them, besides other optical and electrical characteristics, excellent candidates for tuned infrared detection. The results obtained for detectors of Pb(1-x)Sn(x)Te for the 12 micron range are presented. Author

N82-19060# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

ELECTRICAL RESISTIVITY OF P IONS IMPLANTED ON SI [RESISTIVIDADE ELETRICA DE IMPLANTACOES RASAS DE P NO SI]

E. Granato, R. Ranvaud, A. Ferreira daSilva, and I. C. daCunha Lima Jun. 1981 10 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador, Bahia, Brazil, 8-15 Jul. 1981 Submitted for publication
(INPE-2145-RPE/367) Avail: NTIS HC A02/MF A01

A thin layer (nearly 200 A) was produced using low energy implantation of P in Si which, due to the potential barrier of the junction formed, do not allow electrons to escape in the perpendicular direction of the surface. The impurity concentration of this layer was varied using different implantation doses. The resistivity was measured as a function of temperature and concentration in the quasi-two dimensional system so formed in an effort to give evidences on the change of the relative importance of the electric conduction mechanism, connected to the free carriers and impurities. Author

N82-19061# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

ELECTRONIC STATES OF A NEGATIVE ION DONOR IN SEMICONDUCTORS [ESTADOS ELETRONICOS DE UM ION DOADOR NEGATIVO EM SEMICONDUTORES]

A. Ferreira daSilva Jun. 1981 4 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador, Brazil, 8-15 Jul. 1981 Submitted for publication
(INPE-2092-RPE/322) Avail: NTIS HC A02/MF A01

The possibility of the existence of a negative donor ion D(-) in semiconductors in which a donor atom captures one electron like a hydrogen negative ion, was suggested in 1958 by Fritzsche and Lampert. There is a great deal of interest in the D(-) center in various semiconductors such as silicon and germanium. According to Fritzsche, the intermediate concentration range of impurities is characterized by the electrical conductivity with an activation energy in a certain temperature region. A D(-) band (in addition to a lower band D) was considered as the most probable origin for the activation energy. However, few experimental results for clarifying the existence of the D(-) band are reported. The H(-) and 1 sigma sub u (H+H yields H(-) + H(+)) states were investigated and compared with the other calculations. Author

N82-19062# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

EFFECTS OF ELECTRON TRANSFERENCE ENERGY IN

SEMICONDUCTORS [EFEITOS DA ENERGIA DE TRANSFERENCIA DE ELETRONS EM SEMICONDUTORES]
M. Fabbri, A. Farreira daSilva, I. C. daCunha Lima, and R. Kishore Jun. 1981 11 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador Brazil, 8-15 Jul. 1981 Submitted for publication
(INPE-2129-RPE/353) Avail: NTIS HC A02/MF A01

The behavior of impurity in semiconductors is investigated via the electron transfer energy-integral. The resistivity of Ge:Sb is calculated for various types of transfer integral and compared with the experimental results. Neglecting localization effects, the variation of the energy gap Ag between impurity bands is compared with the experimental activation energy e2 of Si:P and Ge:Sb, for different concentrations. A qualitative agreement with the experiment has been found. Author

N82-19063# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ELECTRONIC STRUCTURE OF THE D(-) STATE AND EXCITED DONOR STATES OF GRAIN IMPURITIES IN DOPED SEMICONDUCTORS [ESTRUTURA ELETRONICA DO ESTADO D(-) E ESTADOS DOADORE EXCITRONICOS DE IMPUREZAS RASAS EM SEMICONDUTORES DOPADOS]
A. Farreira daSilva Jun. 1981 8 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador Brazil, 8-15 Jul. 1981 Submitted for publication
(INPE-2115-RPE/339) Avail: NTIS HC A02/MF A01

The previously developed self consistent effective Hartree-Fock Hamiltonian model with a spin polarized potential is applied in order to get correct value for D(-) state in doped semiconductors at very low impurity concentrations. The experimental value E sub D(-) = 0.0555 R (sub y) below the host conduction band was found. Just below the critical impurity concentration, the exciton states and pairs should modify the Mott-Hubbard-Anderson model, according to recent experiments, replacing the upper Hubbard band for those states. The disordered system as well as correlation effects are carried out by simulation on a computer. Author

N82-19064# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PARAMAGNETIC SUSCEPTIBILITY OF PHOSPHORUS DOPED SILICON [SUSCEPTIBILIDADE PARAMAGNETICA NO SILICO DOPADO COM FOSFORO]
I. C. daCunha Lima, R. Kishore, M. Fabbri, and A. Ferreira daSilva Jun. 1981 9 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador, Bahia, Brazil, 8-15 Jul. 1981 Submitted for publication
(INPE-2105-RPE/332) Avail: NTIS HC A02/MF A01

A previously developed self-consistent many body theory for disordered systems was applied to calculate the paramagnetic susceptibility of phosphorus doped silicon. The results at 0 K are compared with the experimental results at low temperature and other calculations. A reasonable agreement with the experiment was found concerning the critical concentration of the impurities when the metal non-metal transition occurs. Author

N82-19065# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CORRELATION IN DOPED SEMICONDUCTORS [CORRELACAO EM SEMICONDUTORES DOPADOS]
Mauricio Fabbri, Antonio Ferreira daSilva, and Ivan Costa daCunha Lima Jun. 1981 12 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador, Bahia, Brazil, 8-15 Jul. 1981
(INPE-2108-RPE/334) Avail: NTIS HC A02/MF A01

Impurity bands were investigated further in order to show how sensitive the resistivity is in n-type doped semiconductors to changes in electron correlation. The effect of correlation as well as overlap on the electron hopping energy integral are taken into account via Heitler-London two particle wave functions. The magnitude of the electron hopping energy integral is reduced. The electron correlation substantially reduces the bandwidth via the cut off of the long range hopping. The impurity level tends to the ionization energy = - 1.0 as Rij yields infinity. The calculated resistivities for Si:P, Ge:Sb and CdS:In when compared to the experimental data present good agreement around and above the impurity critical concentration for the metal-nonmetal transition. The comparison with AMO-MT calculation shows a big enhancement due to a stronger electron correlation. Author

N82-19066# Helsinki Univ. of Technology, Otaniemi (Finland). Dept. of Technical Physics.
NEUTRON SCATTERING STUDIES OF ATOMIC VIBRATION IN NICKEL AND SOLID DIMETHYLACETYLENE Ph.D. Thesis
Kari Tilli 1982 25 p refs
Avail: NTIS HC A02/MF A01

A diffraction study of the Debye-Waller factor in nickel together with a thorough statistical analysis of the experiments and inelastic neutron scattering investigation of the methyl-group rotation in solid dimethylacetylene is presented. Librational motions in dimethylacetylene, accuracy in neutron time-of-flight diffractometry, correlation in the statistical analysis of a reverse Fourier neutron time-of-flight experiment, and neutron powder diffraction studies of the Debye-Waller factor in nickel are discussed. M.D.K.

N82-19067# United Technologies Research Center, East Hartford, Conn.
INFLUENCE OF CONTACT CONDITIONS AND THE CIRCUIT ON SHORT NEGATIVE DIFFERENTIAL MOBILITY SEMICONDUCTING DEVICES Final Report
H. L. Grubin 3 Aug. 1981 132 p refs
(Contract N00014-78-C-0269)
(AD-A108140) Avail: NTIS HC A07/MF A01 CSCL 20/14

The physics and operation of multi-terminal near- and sub-micron length, hot electron semiconductor devices were investigated. Problems studied include: transient overshoot, bias dependence of overshoot, self-excited oscillations, length dependence of negative differential mobility region, and spatial transients in short channel GaAs devices. T.M.

N82-19068# Varian Associates, Palo Alto, Calif. Solid State Lab.
SUBMICRON FETS USING MOLECULAR BEAM EPITAXY Final Report, Aug. 1977 - Sep. 1981
S. Bandy, Y. Chai, R. Chow, T. Gibbs, C. Hooper, C. Nishimoto, and P. Stonestrom Oct. 1981 53 p refs
(Contract N00014-77-C-0655; RF62581001)
(AD-A108556) Avail: NTIS HC A04/MF A01 CSCL 20/7

Using electron-beam exposure and MBE GaAs, FETs have been fabricated with gate lengths of around 0.25 micron. A noise figure of 1.1 dB with an associated gain of 14 dB has been measured at 8 GHz. A new technique to increase the gate cross-sectional area by employing a mushroom gate profile reduced the gate resistance by about a factor of six, but this dramatic reduction in input resistance resulted in only 0.2-0.3 dB improvement in the measured minimum noise figure. Because of this, it is felt that there is a problem of matching such a high Q input with the rather lossy microstrip technique used, resulting in an inaccurate measurement of the noise figure. Author (GRA)

N82-19069# Vermont Univ., Burlington. Dept. of Chemistry.
THE ELECTRICAL PROPERTIES OF Na3Cu4S4, MIXED-VALENCE ONE-DIMENSIONAL METAL
Zbigniew Peplinski, David B. Brown, Timothy Watt, William E. Hatfield, and Peter Day 1 Dec. 1981 20 p refs Prepared jointly with North Carolina Univ. and Oxford Univ. Submitted for publication
(Contract N00014-76-C-0816; NR Proj. 053-617)
(AD-A108517; TR-23) Avail: NTIS HC A02/MF A01 CSCL 20/3

Four probe electrical conductivity measurements from 15-300K demonstrate that the mixed-valence compound Na3Cu4S4 is metallic. Measurements on single crystals reveal that the conductivity is highly anisotropic, with enhanced conductivity parallel to the crystal needle axis, corresponding to pseudo one-dimensional (Cu4S4(3-)) columns in the structure. For single crystals, resistance increases from 1/15000 ohm cm at 300 K to 1/300,000 ohm cm at 15 K. A small, temperature independent magnetic susceptibility is consistent with metallic

behavior. Diffuse reflectance spectra support the formulation of this compound as a Class III B mixed-valence S(2-)/S(-) solid.
GRA

N82-19070# Michigan Univ., Ann Arbor. Electron Physics Lab.

GaAs FET DEVICE MODELING AND PERFORMANCE Interim Report, Feb. 1979 - Feb. 1981

J. R. East and G. I. Haddad Wright-Patterson AFB, Ohio AFWAL Nov. 1981 65 p refs
(Contract F33615-77-C-1132; AF Proj. 2002)
(AD-A108745; TR-152; AFWAL-TR-81-1191) Avail: NTIS HC A04/MF A01 CSCL 09/1

This technical report contains a description of a quasi-two-dimensional model for GaAs FET operation. The model is based on modified expressions for the carrier continuity and Poisson equations in the conducting channel of an FET. The model is compared to full two-dimensional results to determine its accuracy. It is then used to study a variety of operating conditions. The effect of various material and device parameters are also discussed.
Author (GRA)

N82-19071# California Univ., Santa Barbara.

OPTICAL INVESTIGATIONS OF THE RECOMBINATION PROCESSES IN LASER-ANNEALED AND THERMALLY-ANNEALED SEMICONDUCTORS Interim Report, 1 Jul. 1979 - 30 Jun. 1980

James L. Merz Griffiss AFB, N.Y. RADC Sep. 1981 43 p refs
(Contract F19628-79-C-0128; AF Proj. 2306)
(AD-A108627; RADC-TR-81-233) Avail: NTIS HC A03/MF A01 CSCL 20/12

Electron-beam-induced current and low temperature photoluminescence have been used as minority-carrier probes to investigate the perfection of beam-annealed silicon. Results for both laser and electron-beam annealing are reported. For CW laser annealing of ion implantation damage, the range of laser power over which good quality annealed material can be achieved is very limited, and strongly dependent on the substrate temperature during the anneal. At relatively high laser power, Laser-induced damage is observed, and misfit dislocations are introduced for laser power just below that required to melt the substrate. Superior results are obtained with the use of a scanning electron beam for annealing: the range of beam power is broader, and the amount of beam overlap for subsequent scans required to achieve good annealing is less for the electron-beam case compared to the case of laser annealing. Both EBIC and photoluminescence results indicate that the laser-induced damage is produced deeper in the substrate than the implanted layers. Estimates of the lattice displacement resulting from strain after laser annealing are made from the details of the photoluminescence spectra; this lattice displacement is found to be small, corresponding to 0.01% of the lattice constant. Author (GRA)

N82-19072# Cornell Univ., Ithaca, N. Y.

MICROWAVE SEMICONDUCTOR RESEARCH: MATERIALS, DEVICES, CIRCUITS Technical Report, 1 Mar. 1977 - 30 Apr. 1981

L. F. Eastman, C. E. Wood, D. W. Woodard, W. Ku, and J. M. Ballantyne Dec. 1981 69 p refs
(Contract F49620-80-C-0069)
(AD-A108399) Avail: NTIS HC A04/MF A01 CSCL 20/12

The growth and characterization of high purity and chromium doped GaAs and Al, GaAs for buffer layers in high performance GaAs FET's was carried out. Deep level transient spectroscopy was used to measure electron traps in Schottky diodes and GaAs FET's. The investigation of microwave field-effect transistor performance limits set by layer composition and contact geometry was carried out. Critical physical electronics parameters for very high voltage operation of GaAs FET's were determined. The electric field distribution and the parasitic output conductance due to buffer layer current were studied and optimized. The use of MBE tailored doping profiles for improved microwave device operation was studied. GaAs/Al, GaAs selectively doped heterojunctions were grown by MBE and studied for potential use in high performance transistors. High electron mobility (80,000 sq cm/v-s) at 77K was first obtained in this effort, following the optimization of the growth conditions of the Al, GaAs. In addition, high resistivity Al, GaAs buffer layers for power FET's were obtained.
GRA

N82-19073# Atomic Energy Research Establishment, Harwell (England). Theoretical Physics Div.

A MODEL FOR STORED ENERGY IN AMORPHOUS SILICA

G. Tinivella Dec. 1980 13 p refs
(AERE-TP-877) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

The observed saturation value of stored energy in irradiated amorphous silica is too big to be explained by the energy of recombined non-grouped defects. The hypothesis that it can be due to a structural change was tested, and a simple model based on the fluctuation of the atomic distances shows a reasonable agreement with the experimental data.
DOE

N82-19074# Tasmania Univ., Hobart (Australia). Dept. of Physics.

TRANSIENT CAPACITANCE MEASUREMENTS OF DEEP LEVEL DEFECTS INTRODUCED IN BETA-RAY COMPENSATED GERMANIUM BY LONG-TERM ANNEALING AT ROOM TEMPERATURE

S. J. Pearton, A. A. Williams, A. J. Tavendale, and E. M. Lawson Sep. 1980 25 p refs Prepared jointly with Australian Atomic Energy Commission, Lucas Heights
(AAEC/E-501; ISBN-0-642-59698-0) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

Deep level transient spectroscopy (DLTS) was applied to defect centers in beta-ray compensated germanium that was subjected to long-term annealing at room temperature. Deep donor levels were observed for the first time; annealing 675 C for 3 hours increased their concentration in proportion to the free carrier density, indicating stable defect-impurity complexes. Recently irradiated samples from the original material do not show these levels.
DOE

N82-19075# Stanford Univ., Calif. Electronics Lab.

SEMICONDUCTOR MEASUREMENT TECHNOLOGY: THE CAPABILITIES AND LIMITATIONS OF AUGER SPUTTER PROFILING FOR STUDIES OF SEMICONDUCTORS Final Report

S. A. Schwarz, C. R. Helms, W. E. Spicer, and N. J. Taylor (Varian Associates, Palo Alto, Calif.) Sep. 1981 58 p refs
(Contract NBS-5-35944; ARPA Order 2397)
(PB82-120122; NBS-SP-400-67; LC-81-600003) Avail: NTIS HC A04/MF A01 CSCL 20L

Materials characterization is a critical area in current silicon integrated circuit technology. Those techniques that are commonly used incude Auger sputter profiling, X-ray photoelectron spectroscopy, secondary ion mass spectrometry, and Rutherford backscattering. The capabilities and limitations of Auger sputter profiling are considered especially with regard to sensitivity, spatial resolution, depth resolution, and chemical state determination. Although Auger sputter profilling is examined, the results are also applicable to X-ray photoelectron spectroscopy and secondary ion mass spectrometry.
GRA

N82-19076# Atomic Energy Research Establishment, Harwell (England). Theoretical Physics Div.

ON THE CONDITIONS REQUIRED FOR VACANCY LOOP GROWTH IN IRRADIATED METALS AND ALLOYS

M. R. Hayns Jul. 1980 37 p refs
(AERE-R-9810) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

A simple theoretical model is investigated which allows the conditions under which vacancy dislocation loop growth is possible to be examined. This forms an extension of previous work in that bulk defect recombination is not ignored and the effects of vacancy thermal emission are included. While the present work does not provide a kinetic model for vacancy loop growth it was possible to examine the criteria required for stable growth in some detail. The effects of network dislocation density, temperature, damage rate, the influence of other critical sinks, notably voids and grain boundaries, and interstitial dislocation loops were considered. The analog with the growth conditions for cavities as voids is highlighted. A detailed comparison with experiment is not attempted as this is being considered separately. DOE

N82-19077# Tasmania Univ., Hobart (Australia).
TRANSIENT CONDUCTANCE SPECTROSCOPY MEASUREMENTS OF DEFECT STATES IN GAMMA-IRRADIATED N-CHANNEL SILICON FIELD EFFECT TRANSISTORS WITH POSSIBLE GAMMA-DOSEMETER APPLICATIONS
S. J. Pearton, A. J. Tavendale, and A. A. Williams Dec. 1980 14 p refs
(AAEC/E-504) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

A deep level transient capacitance spectroscopy (DLTS) system, modified for the measurement of transient conductance, was used to observe gamma-ray induced defect centers in the gate junction of 2N4416 Si field effect transistors. The defect concentrations increased linearly with gamma-dose in the range 50 kGy to 1 x 10 to the 4th power kGy (5-1000 Mrad) for the common Esub(c) - 0.17 eV level, and in the range 500 kGy to 1 x 10 to the 4th power kGy (50-1000 Mrad) for the levels Esub(c) - 0.22 Ev and Esub(c) - 0.44 eV. Another common level, a hole trap at Esub(v) + 0.42 eV, was the only minority trap observed. The technique may be useful for measuring gamma-fluxes in situations inaccessible to standard dosemeters (e.g., flux-mapping). DOE

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-19078# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RANDOM ANISOTROPY IN ISING SPIN GLASS
M. Cristina Forti, R. Kishore, and I. C. daCunhaLima Nov. 1981 18 p refs Submitted for publication
(INPE-2277-PRE/055) Avail: NTIS HC A02/MF A01

The theory of Ghatak and Sherrington for the Ising spin glass with uniform uniaxial anisotropy were extended for the random uniaxial anisotropy (RUA). The magnitude of the RUA is assumed to fluctuate randomly with Gaussian probability distribution. The susceptibility and the specific heat have been calculated for a system of spin one and zero mean values of the anisotropy and the exchange interaction. It is found that the random fluctuations of the anisotropy produce a cusp in the susceptibility and a broad maximum in the specific heat. Author

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N82-19079*# Hampton Inst., Va.
THE 1981 SUMMER RESEARCH FELLOWSHIP PROGRAM Final Report, 1 Jun. - 7 Aug. 1981
John H. Spencer, comp. Oct. 1981 36 p refs
(Contract NAS1-16455)
(NASA-CR-165814) Avail: NTIS HC A03/MF A01 CSCL 05I

The NASA-Hampton Institute Summer Research Fellowship Program, offering capable scientists and engineers at traditionally black institutions an opportunity to participate in research activities in an environment at the Langley Research Center where basic research is of primary importance is considered. The Summer Research Fellowship Program, specifically designed to assist these faculty members in identifying areas of research which correlate positively with their individual interest and capabilities is discussed. It is also designed to help them to initiate viable research which increases their technical knowledge about how research efforts at their institutions might be increased. Author

N82-19080# Council on Environmental Quality, Washington, D.C.
THE GLOBAL 2000 REPORT TO THE PRESIDENT. ENTERING THE TWENTY-FIRST CENTURY, VOLUME 1
Gerald O. Barney 1981 59 p refs Prepared jointly with the State Dept. 3 Vol.
(PB82-100801) Avail: NTIS HC A04/MF A01; also available in set of 3 report HC E99 as PB82-100793 CSCL 05K

The President's directive establishing the Global 2000 Study called for a study of the probable changes in the world's population, natural resources, and environment through the end of the century and indicated that the Study as a whole was to serve as the foundation of our longer-term planning. To meet the objectives stated in the President's directive, the Global 2000 Study was designed not only to assess probable changes in the world's population, natural resources, and environment, but also, through the study process itself, to identify and strengthen the Government's capability for longer-term planning and analysis. GRA

N82-19081# Council on Environmental Quality, Washington, D.C.
THE GLOBAL 2000 REPORT TO THE PRESIDENT. ENTERING THE TWENTY-FIRST CENTURY, VOLUME 2
Gerald O. Barney 1981 779 p refs Prepared jointly with the State Dept. 3 Vol.
(PB82-100819) Avail: NTIS HC A99/MF A01; also available set of 3 reports HC E99 as PB82-100793 CSCL 05K

The basic plan for the Global 2000 Study was to identify the long-term global models currently used by Government agencies and to establish a set of uniform assumptions so that these models and tools could be used by the agencies' projection experts as a single, internally consistent system. Since the models and tools used are the ones now employed by the agencies in their long-term global analyses, they reflect the present foundation for long-term planning. GRA

N82-19082# Council on Environmental Quality, Washington, D.C.
THE GLOBAL 2000 REPORT TO THE PRESIDENT. DOCUMENTATION ON THE GOVERNMENT'S GLOBAL SECTORAL MODELS: THE GOVERNMENT'S GLOBAL MODEL, VOLUME 3
Gerald O. Barney, ed. 1981 412 p refs Prepared in cooperation with the State Dept. 3 Vol.
(PB82-100827) Avail: NTIS HC A18/MF A01; also available in set of 3 reports HC E99 as PB82-100793 CSCL 05K

This third volume of the Global 2000 Study presents basic information ('documentation' as it is termed by modelers) on the long-term sectoral models used by the U.S. Government to project global trends in population, resources and the environment. These models were the basis of the projections developed for the Global 2000 Study. Each of the sectoral models described in this volume is a Government developed or Government endorsed model. Most of the models were developed directly by Government agencies. Three of the models, the GNP model, the nonfuel minerals demand model, and one of the population models, were developed by non-Governmental organizations, but have been applied or recommended by one or more Government agencies as being the best models available for the particular types of projections they provide. GRA

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-19083*# National Aeronautics and Space Administration, Washington, D. C.
SELLING TO NASA
Oct. 1981 50 p
(NASA-TM-84136; NHB-5100.1D) Avail: NTIS HC A03/MF A01 CSCL 05A

The prospective NASA contractor is provided with information that describes the agency and its procurement practices. Products include ideas, manufacturing capabilities, fabricated components, construction, basic materials, and specialized services. NASA assistance in marketing these and other products is emphasized. Small and minority business enterprises are discussed. The agency's scientific and technical information activities are also discussed. N.W.

N82-19084*# National Aeronautics and Space Administration, Washington, D. C.
NASA POCKET STATISTICS
Jan. 1982 70 p
(NASA-TM-84134) Avail: NTIS HC A04/MF A01 CSCL 05A

NASA program goals ,and objectives, major mission performance, USSR space flights, comparisons of the USA and USSR space records, and selected technical, financial, and manpower data are summarized. N.W.

N82-19085# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensberetch Raumfahrt.
MODERN MANAGEMENT IN CONSTRUCTION INDUSTRY OFFICES [MODERNES MANAGEMENT IN KONSTRUKTIONSBUERO]
B. J. Madauss 1981 38 p refs In GERMAN Presented at Deut. Konstruktionsleitertage 1981 Conf., Duesseldorf, West Germany, 25-26 May 1981
(MBB-UR-493-81-O) Avail: NTIS HC A03/MF A01

Contrasting expectations from management and designers in the construction industry were examined. Ways of problem solving are discussed. It is questioned if the designer can remain a creative problem solver under the pressure of cost effectiveness and time. Transl. by E.A.K.

N82-19086# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriiebsbereich.
COST PROBLEMS IN THE UTILIZATION PHASE OF A WEAPON SYSTEM [KOSTENPROBLEME IN DER NUTZUNGSPHASE DER WAFFENSYSTEME]
Gerd Laube 1981 23 p In GERMAN Presented at Wehrtechnik-Seminar, Bonn, 6-7 Apr. 1981
(MBB-UA-576-81-O) Avail: NTIS HC A02/MF A01

The origins of high material maintenance charges in the utilization of weapon systems, and how these can be reduced considerably through proper integrated logistics management during the development and optimization of the life cycle cost, was investigated. It is shown how up to 30% is saved in material maintenance costs for future systems in further development, more supply, or fast generation shifts. Transl. by E.A.K.

N82-19087# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
EFFECTIVE METHODS FOR OVERALL PROJECT COST REDUCTION [EFFEKTIVE VERFAHREN ZUR GESAMTPROJEKTKOSTEN-REDUZIERUNG]
Bernd-J. Madauss 16 Oct. 1980 26 p refs Partly in GERMAN and ENGLISH Submitted for publication
(MBB-UR-456-80-O) Avail: NTIS HC A03/MF A01

Effective techniques for life cycle cost reduction are discussed. Life cycle cost, or total project cost are: development cost, production, import, operation and if necessary, termination of a system. The total cost analysis for a newly developed system, like airplanes of power plants, is introduced as early as possible to avoid errors, since not only the initial system purchase cost (development and construction), but also the later added expenses are of great importance. Effective measures for total project cost reduction are proposed. Transl. by E.A.K.

N82-19088# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
GROUND WORK FOR PROJECT ORGANIZATION IN DEVELOPMENT PROJECTS: EXPERIENCE IN SPACE FLIGHT [GRUNDSAETZE DER PROJEKTORGANISATION BEI ENTWICKLUNGSPROJEKTEN - ERFAHRUNGEN AUS DER RAUMFAHRT]
Bernd-J. Madauss 13 Jun. 1980 14 p In GERMAN
(MBB-UR-476-81-O) Avail: NTIS HC A02/MF A01

The principles of the project organization in development projects, especially in space technology, were examined. The following topics are discussed: high technological requirements; participation of national and international organizations; contractors; administration; industrial syndicate contracts; mission and responsibility of project management; necessary competence of project management; typical functions of the project organization in R&D projects in space technology; operational project organization; interindustrial project organization. Transl. by E.A.K.

N82-19089# Oxford Univ. (England). Dept. of Engineering Science.
CORPORATE ORGANIZATIONAL DESIGN AND ITS EFFECT ON INNOVATION
Kenneth Abel 1981 77 p refs
(PB82-108903; OUEL-1356/81) Avail: NTIS HC A05/MF A01 CSCL 05A

The factors which appear to influence the success for failure of technology innovation in today's large corporation and highly regulated environment were examined. The following topics are discussed: (1) why new products fail; (2) ventures and venturing; (3) the entrepreneur; (4) the organizational structure of successful innovation corporations; and (5) venture management and matrix concepts and their implementation. GRA

N82-19090# National Science Foundation, Washington, D. C. Div. of Science Resources Studies.
FEDERAL FUNDS FOR RESEARCH AND DEVELOPMENT, VOLUME 29, FISCAL YEARS 1979, 1980 AND 1981 Final Report
Jan. 1981 59 p refs
(PB82-118902; NSF-81-306) Avail: NTIS HC A04/MF A01 CSCL 05A

The report covers Federal agency R&D funding, as shown in the 1981 revised budget. The analysis covers R&D program levels for 1979-81, focusing on relative changes from 1980 to 1981, after the budget revision, with indications of subsequent congressional appropriation actions, where known. It includes data on basic research, applied research, and development; on performers of R&D work (intramural, industrial, university-and-college, etc.); on research by fields of science; and R&D data for 1979 by geographic (State) distribution. The publication includes a section on R&D funding by budget function (national defense, space, health, energy, etc.) in the 1981 budget and in prior years and another section on Federal R&D support to performers since 1955 with special emphasis on university-and-college support. GRA

N82-19091# General Accounting Office, Washington, D. C. Accounting and Financial Management Div.
NON-FEDERAL COMPUTER ACQUISITION PRACTICES PROVIDE USEFUL INFORMATION FOR STREAMLINING FEDERAL METHODS Report to Congress
2 Oct. 1981 34 p refs
(PB82-120924; AFMD-81-104) Avail: NTIS HC A03/MF A01 CSCL 05A

Eighteen non-Federal organizations showed that their managers are committed to using the computer effectively as a tool for achieving business goals. Their strategies and plans provide a framework and operational direction for computer acquisitions. Their practices and procedures are understood, followed, and consonant with normal business practices. GAO found that the 18 organizations studied normally completed computer equipment acquisitions in under a year. The study discusses their practices and procedures. While GAO does not endorse the specific procurement practices, it is believed Federal agencies should consider using the other practices to streamline their acquisition processes within the context of current laws and regulations. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N82-19092# Loughborough Univ. of Technology (England).
FULL TEXT INFORMATION SYSTEMS: A REVIEW AND

ASSESSMENT OF THE TECHNOLOGY M.S. Thesis
John W. T. Smith 1980 150 p refs
Copyright. Avail: Issuing Activity

The technologies and systems that could be used to implement a future full text information system are considered. Systems that can be considered as stand alone full text information systems, each unit capable of serving a limited number of users, are discussed. These are evaluated for their access times, storage capacity, and their ability to be interconnected with other information processing equipment and communication systems. Technologies that could be used to link some of them together to form a large, even global full text information system are discussed. The 'state of the art' of full text information systems is reviewed and three possible scenarios for the development of such systems are advanced. N.W.

N82-19093# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
CONTINUATION OF INFORMATION TRACKS RESEARCH: INVENTOR OF PROSPECTS [VOORTZETTING VAN HET INFORMATIESPOREN ONDERZOEK: INVENTARISATIE VAN PERSPECTIEVEN]
C. A. Benschop and T. DeHeer Aug. 1980 27 p refs In DUTCH
(IWIS-A-80-IN-62-18) Avail: NTIS HC A03/MF A01

An advanced retrospective retrieval system in which the information tracing method is combined with conventional search methods is reported. The current method and its algorithms was investigated which resulted in a new users guide. Possibilities are examined for implementation of large program components. Transl. by E.A.K.

N82-19094# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
COMMON DATA BASE EXPERIMENT: PROGRESS REPORT ON DATA ANALYSIS Progress Report
Gunnel Barkeby, Nils-Olov Bergkvist, Ola Dahlaman, Peder Johansson, Harriet Ohlsson, and Falguni Roy (Bhabha Atomic Research Centre, Bombay) Nov. 1981 78 p refs Presented at Comm. on Disarmament Seismic Expert Group Meeting, Geneva, Aug. 1981
(FOA-C-20431-T1) Avail: NTIS HC A04/MF A01

Bulletins and wave form data from stations linked to an international seismic data bank are presented as a step towards establishing an international verification system. Epicenter locations by array stations prove valuable for the assocation of arrival times and for the definition of events. Estimated depth remains an uncertain source parameter. Data on magnetic tapes are not fully exploited because the lack of standards for tape formats and tape format descriptions makes them difficult to read. Long period data can be extrapolated from short period recordings. Author (ESA)

N82-19095# Mitre Corp., McLean, Va.
THE INTEGRATED LIBRARY SYSTEM (ILS): USER MANUAL
Sandy E. Selander, Elizabeth A. Payne, Gary Freiburger, and Linda B. Brogan Jul. 1981 292 p
(Contract N01-LM-0-3526)
(PB82-114968; NLM/DF-81/003A; NLM/LHC-CR-81-06)
Avail: NTIS HC A13/MF A01 CSCL 05B

The Integrated Library System (ILS) is a minicomputer based library automation system designed to support a full range of technical processing and retrieval activities using a single master bibliographic file (MBF). This document presents a full user manual for all ILS functions that are available in ILS Version 2.0. The text in this document is identical to the online HELP text provided with the ILS software, but has been somewhat reorganized here into a format more suitable for a printed document. GRA

N82-19096# Mitre Corp., McLean, Va.
ARMY LIBRARY CONVERSION: COST ASSESSMENT PLAN
Joan S. Lovelace 1981 37 p ref Sponsored in part by National Library of Medicine, National Institutes of Health, Public Health Service and Dept. of Health and Human Services
(Contract N01-LM-8-4720)
(PB82-120353; WP-79W00237; LHNCBC-CR-81-11) Avail: NTIS HC A03/MF A01 CSCL 05B

A work plan for gathering cost data at the Army Library during conversion of its manual circulation system to the automated circulation module of the Integrated Library System (ILS) is presented. The plan describes the activities to be studied, discusses the costs involved and outlines how these will be collected and reported. GRA

N82-19097# National Oceanic and Atmospheric Administration, Washington, D. C. Environmental Data and Information Service.
DIRECTORY OF THE NOAA LIBRARY AND INFORMATION NETWORK Key to Oceanic and Atmospheric Information Sources
Dec. 1980 26 p refs
(PB82-114869; KOAIS-2; NOAA-81082505) Avail: NTIS HC A03/MF A01 CSCL 05B

The Directory of the NOAA Library and Information Network describes the services provided by NOAA Libraries and Information Centers in the Washington, DC area, at Miami and Coral Gables, FL., and Boulder, CO., and by over 300 other libraries and information centers that serve principal organizational elements of NOAA's major line components. Arrangement is in alphabetical sequence by major line components or major program elements, except for the Environmental Data and Information Service, the Environmental Research Laboratories, and the National Marine Fisheries Service, where organization hierarchy (EDIS and ERL) or geographic locations (NMFS) were considered. GRA

N82-19098# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
ON EMPIRICAL FOUNDATIONS OF INFORMATION SCIENCE Final Report
Pranas Zunde Jul. 1981 654 p refs
(Grant NSF DSI-77-05297)
(PB82-125998; GIT-ICS-81/14) Avail: NTIS HC A99/MF A01 CSCL 05B

Pertinent empirical laws and hypothesis which have been reported in scientific and technical literature were catalogued, described, and analyzed for their dependencies and relations. A body of knowledge derived from empirical observations of information phenomena and representative of information science as a distinct scientific discipline was identified. Concepts such as information value, relevance, aging of information, growth of knowledge, obsolescence, information scatter, productivity of information sources and information flow are considered. Over 300 empirical laws and hypotheses were selected, analyzed, and catalogued. Each of these laws was indexed by a set of terms (keywords) reflecting every significant concept (construct) in the statement of the law or hypothesis. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N82-19099# Strasbourg Univ. (France). Bureau d'Economie Theorique et Appliquee.
THE YEARLY EFFECT OF THE ACTIVITIES OF THE EUROPEAN SPACE AGENCY: ESTIMATION OF TAX REVENUES DUE TO THE ACTIVITIES OF ESA AND OF THE RESULTING GLOBAL SHORT TERM ECONOMIC IMPACT. VOLUME 2: MAIN REPORT [L'INCIDENCE FISCALE DES ACTIVITIES DE L'AGENCE SPATIALE EUROPEENE. ESTIMATION DU RETOUR D'IMOP IMPUTABLE A 'ACTIVITE DE L'ESA ET DE L'IMPACT ECONOMIQUE GLOBAL A COURT TORME DONT IL EST ISSU. VOLUME 2: RAPPORT PRINCIPAL]
Jean-Alain Heraud and Ehud Zusconitch Paris ESA Jan. 1981 80 p In FRENCH
(Contract ESA-3702/78/F-DKR(SC))
(ESA-CR(P)-1472) Avail: NTIS HC A05/MF A01

The effect of ESA activities on the public was evaluated by a two step procedure. The total economic impact of space expenditures was assessed and the supplemental national revenue thus created which returned to the member states by simple fiscal tension was determined. The results prove that macroeconomic benefit obtained by the assembly of member nations from their involvement in ESA activities is substantial. The mean value of the rate of return of taxes shows that space activity represents a self remunerative activity for the public treasury.
A.R.H.

N82-18131# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
PARAMETRIC STUDY OF THE INFLUENCE OF THE ENGINE UPON THE OPERATING COST OF A CIVIL HELICOPTER
Gilbert Beziac, Jean-Pierre Dedieu, and Philippe Cabrit *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 5 p (For primary document see N82-18119 09-01)
Avail: NTIS HC A99/MF A01

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-19100# Air Force Systems Command, Andrews AFB, Md. Office of the Staff Judge Advocate.
PATENT ABSTRACT DIGEST, VOLUME 1 Interim Report
Frank A. Lukasik 30 Apr. 1979 95 p 3 Vol.
(AD-A108672; AFSC-TR-81-65) Avail: NTIS HC A05/MF A01 CSCL 05/2

One page summaries of new technology generated under Air Force programs and protected by issued U.S. patents are presented. Each of the 92 entries consists of a citation, an abstract, and in most cases, a key illustration selected from the patent.
GRA

N82-19101# Air Force Systems Command, Andrews AFB, Md. Office of the Staff Judge Advocate.
PATENT ABSTRACT DIGEST, VOLUME 2 Interim Report
Frank A. Lukasik Mar. 1981 111 p 3 Vol.
(AD-A108673; AFSC-TR-81-66) Avail: NTIS HC A06/MF A01 CSCL 05/2

One page summaries of new technology generated under Air Force programs and protected by issued U.S. patents are presented. Each of the 108 entries consists of a citation, an abstract, and in most cases, a key illustration selected from the patent.
GRA

N82-19102# Air Force Systems Command, Andrews AFB, Md. Office of the Staff Judge Advocate.
PATENT ABSTRACT DIGEST, VOLUME 3 Interim Report
Frank A. Lukasik Sep. 1981 114 p 3 Vol.
(AD-A108674; AFSC-TR-81-67) Avail: NTIS HC A06/MF A01 CSCL 05/2

One page summaries of new technology generated under Air Force programs and protected by issue U.S. patents are presented. Each of the 111 entries consists of a citation, an abstract, and in most cases, a key illustration selected from the patent.
GRA

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation*, and *44 Energy Production and Conversion.*

N82-19103*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Technology Utilization Office.
NASA TECHNOLOGY UTILIZATION HOUSE TECHNICAL SUPPORT PACKAGE SUMMARY OF RESULTS AND HOUSE DESCRIPTION Final Report
Aug. 1979 83 p
(NASA-TM-X-74686) Avail: NTIS HC A05/MF A01 CSCL 13M

The Technology Utilization House (Tech House) was designed and constructed to demonstrate to the building industry and the public the benefits of aerospace technology and other new technology that are presently available or will be in very near future. Use of solar energy, conservation of energy and of water, safety, and security were incorporated in the design of the house. The terms to be incorporated into the house and to assist in the design of the house were evaluated. An architectural engineering team was employed to investigate energy conservation ideas, determine cost effectiveness of new materials and systems, and prepare specifications and drawings for the house. The Tech House was constructed during the spring of 1976. All the systems were monitored to insure proper operation, and data were collected during a one year occupancy. Results obtained during the family live-in period, comments on the acceptance of the various energy-saving systems by the family, and suggestions for improvement of the systems are presented.
N.W.

N82-19104# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
MOBILITY BIBLIOGRAPHY
N. Liston, comp., M. Hutt, comp., and L. White, comp. Nov. 1981 333 p Prepared in cooperation with the International Society for Terrain-Vehicle Systems
(AD-A108228; CRREL-SR-81-29) Avail: NTIS HC A15/MF A01 CSCL 15/5

This bibliography is an international compilation of literature relating to terrain vehicles, amphibious vehicles, snow vehicles, air cushion vehicles, tracked vehicles, wheeled vehicles, and off-road vehicles. It also covers the related subjects of rolling resistance, traction, snow strength measurement, soil strength measurement, terrain analogs, vehicle models, and the overall topic of vehicle mobility. It is not comprehensive but begins at about 1970 and ends in 1980. The European coverage is lacking because much of this material is not accessible by computerized literature searching, which was the mechanism used for compiling this bibliography.
Author (GRA)

N82-19105# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
RELIABILITY METHODOLOGY IN TASK IDENTIFICATION FOR THE DEVELOPMENT OF NEW TRANSPORTATION SYSTEMS [SICHERHEITSMETHODISCNE ARBEITSWEISEN BEI DER ENTWICKLUNG NEUARTIGER VERKEHRSSYSTEME]
Wolf-Dieter Pilz 15 May 1981 26 p refs In GERMAN Presented at 2nd Tech. Zuverlaessigkeit Session, Nuernberg, 13-15 May, 1981
(MBB-UR-473-81-O) Avail: NTIS HC A03/MF A01

The development of new technologies, especially in new tranportation systems, is discussed. Safety engineering and reliability in labor methods are emphasized. The following topics are discussed: the present situation in operation methods; a proposal for a safety methods in labor operations; systematic evaluation of structural conditions; deriving a general action scheme; fundamental considerations; critical safety methods in production engineering; logics of action schemes.
Transl. by E.A.K.

N82-19106# Northwestern Univ., Evanston, Ill. Dept. of Civil Engineering.
INTEGRATING PROJECT WORTHINESS INTO A COST-EFFECTIVENSS FRAMEWORK FOR ALTERNATIVE ANALYSIS
Joseph L. Schofer, Mark A. Turnquist, and Steven E. Polzin Feb. 1981 175 p refs
(Contract UMTA-IL-11-0026)
(PB82-113895; UMTA-IL-0026-81-1) Avail: NTIS HC A08/MF A01 CSCL 13B

The conflicting goals held for alternatives analysis in major capital investments proposed for urban transit systems and the lack of adequate concern in the evaluation for project worthiness, the relationship between monetary benefits and costs of options are discussed. A conceptual framework for integrating cost-effectiveness and worthiness analysis is developed. Some pragmatic limitations of worthiness analysis are discussed. An integrated approach to the evaluation in Alternatives Analysis is presented and related to an interactive graphics computer software system developed for accomplishing this task. GRA

N82-19107# United States Conference of Mayors, Washington, D.C.
URBAN DATA FOR COMPARATIVE ANALYSES OF CITIES
25 Mar. 1981 38 p refs
(Grant HUD-H-5044RG)
(PB82-125675; HUD-0001996) Avail: NTIS HC A03/MF A01 CSCL 13B

A blueprint of the establishment of a national urban data information system is provided. Findings from a survey conducted in 20 cities on information needed to design a statistically valid approach to obtaining comparative data on cities are presented. These data would help in the urban policy decision-making process. Such comparisons also may be used to analyze the 'quality of life' in the urban environment, to describe urban conditions, and to analyze casual connections among various factors. The survey had four purposes: to determine the extent to which localities generate their own data on items used to determine eligibility and allocations of Federal funds; to contrast local data with the most recent Federal statistics; to determine whether Federal programs use different statistics for the same data items; and to obtain suggestions for improving the system by which local and Federal data are used for policymaking decisions regarding the allocation of Federal funds. GRA

N82-19108# International New Towns Association, Hague (Netherlands).
FOURTH ANNUAL COMMUNITY PLANNING AND DEVELOPMENT CHALLENGES: ENERGY, ENVIRONMENT, WATER
Columbia, S.C. Mar. 1981 95 p refs Proceedings of Conf. held in Cairo, 6-14 Oct. 1980
(Grant HUD-H-5371RG)
(PB82-125790; HUD-0002055) Avail: NTIS HC A05/MF A01 CSCL 13B

The Egyptian government's commitment to a massive new towns program was noted. Free standing new towns, solely dependent upon employment growth, were discussed. National energy conservation policies were seen as effective only through price mechanisms. Research and development programs on new technologies were considered more effective on smaller rather than larger scales. Governments were seen as not facing up to the political problems of rapid urbanization. The capacity of the infrastructure of existing cities was seen as not keeping up with growing demand in developing countries. GRA

N82-19109# SRI International Corp., Menlo Park, Calif.
CENTRAL CONTROL SYSTEM SURVEY Final Report, Dec. 1979 - Jun. 1980
Bjorn Conrad, Masami Sakasita, and Marilyn Sanfilippo May 1981 137 p refs Sponsored in part by Bay Area Rapid Transit District
(SRI-Proj. 1529)
(PB82-101981; UMTA-CA-06-0124-81-1) Avail: NTIS HC A08/MF A01 CSCL 13B

The advances in control technology, such as displays, communication systems, control algorithms, and to what extent automation can facilitate rapid transit operations were examined. The survey focused on the central control functions of schedule creation, schedule implementation, schedule maintenance, and failure management. These functions tend to have the most direct impact on system performance. The five properties surveyed were the Chicago Transit Authority (CTA), the Massachusetts Bay Transit Authority (MBTA), the New York City Transit Authority (NYCTA), the Washington Metropolitan Area Transit Authority (WMATA), and the Bay Area Rapid Transit District (BART). GRA

N82-19110# California Dept. of Health Services, Berkeley. Sanitary Engineering Section.
DESIGN OPTIMIZATION OF THE CHLORINATION PROCESS. VOLUME 1: COMPARISON OF OPTIMIZED PILOT SYSTEM WITH EXISTING FULL SCALE SYSTEMS Final Report, Feb. 1977 - Sep. 1979
Endel Snepp and Paul Bao Sep. 1981 135 p refs
(Grant EPA-S-803459)
(PB82-100835; EPA-600/2-81-167-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 13B

Parallel wastewater effluent chlorination studies were done on a mobile optimized chlorination pilot system and the full scale system at eight different treatment plants. Disinfection efficiency was measured by total coliform enumeration and chlorine residual tests. Parallel flow through fish bioassays were also conducted at each location. Achievement of adequate disinfection with minimum use of chlorine, reduction of chlorine induced toxicity, and writing of a design manual were emphasized. All seven of the eight plants studied the optimized pilot plant achieved an equivalent level of disinfection with significantly lower chlorine dosage, in some cases more than 50% lower than the full scale plants. The pilot plant chlorine residuals were also lower by the same proportions. GRA

N82-19111# Soil Conservation Service, Washington, D. C.
WASTEWATER TREATMENT FACILITIES-SLUDGE MANAGEMENT SYSTEM, ALBUQUERQUE, NEW MEXICO Supplemental Draft Environmental Impact Statement
Sep. 1981 266 p refs
(Contract EPA-68-01-5991)
(PB82-117029; EPA-906/9-81-003) Avail: NTIS HC A12/MF A01 CSCL 13B

The City of Albuquerque proposes a sludge management system consisting of sludge thickening and stabilization units at Treatment Plant No. 2, followed by transfer of sludge via pipelines to Montesa Park where the sludge will be mechanically dewatered, dried in a solar greenhouse, disinfected by irradiation with Ceslium-137, and disposed by landspreading on public lands. EPA has evaluated the City's proposal and 13 additional alternatives. GRA

88 SPACE SCIENCES (GENERAL)

N82-19112# Kiel Univ. (West Germany). Inst. fuer Reine und Angewandte Kernphysik.
RELATIVISTIC EFFECTS IN THE SOLAR SYSTEM
Erich R. Bagge 1981 47 p refs
(IFKKI-81/2) Avail: NTIS HC A03/MF A01

The relativistic velocity of the planet Mercury and of starlight as it passes the Sun is addressed. The deviation of the refracted light beam and the orbital velocity of the planet are calculated. For individual titles, see N82-19113 through N82-19114.

N82-19113# Kiel Univ. (West Germany). Inst. fuer Reine und Angewandte Kernphysik.
PART 1: RELATIVISTIC PATHWAY MODIFICATION OF THE PLANETS c91
In its Relativistic Effects in the Solar System 1981 26 p (For primary document see N82-19112 09-88)
Avail: NTIS HC A03/MF A01

It is shown that Mercury's perihelion motion around the Sun, which until now is explicable quantitatively only by General Relativity, can be understood within the framework of the dynamics of Special Relativity. The relativistic dependance of the planet's mass on its velocity is taken into account as well the acceleration terms of the equations of motion. The numeric solution of these equations for the planet Mercury gives a motion of its perihelion which is in good conformity with the observations and with the results of General Relativity. J.M.S.

N82-19114# Kiel Univ. (West Germany). Inst. fuer Reine und Angewanndte Kernphysik.
PART 2: THE DEFLEXION OF STARTLIGHT BY THE SUN c92
In its Relativistic Effects in the Solar System 1981 18 p refs (For primary document see N82-19112 09-88)

Avail: NTIS HC A03/MF A01

It is shown that the deviation of starlight in passing the Sun which until now appears to be explicable only by General Relativity, can be understood as a quasi-classical effect of light refraction. It is only necessary to transfer the formulas for the dielectric polarizability of the vacuum proposed in earlier papers in a physically plausible manner to the case of corresponding polarization effect in gravitational fields. The resulting refraction index for light in gravitational field gives for the Sun a deviation in good conformity with the observations and the results of General Relativity. From these considerations it can be deduced also that the velocity of a horizal light beam at 10000 km above ground level on the Earth has a velocity deficit of 5,730 cm/sec if one compared it with the corresponding velocity at ground level. J.M.S.

N82-19115# Analytic Services, Inc., Arlington, Va. Space Div.

THE PREDICTION OF SATELLITE EPHEMERIS ERRORS AS THEY RESULT FROM SURVEILLANCE SYSTEM MEASUREMENT ERRORS

Bowen Eugene Simmons Aug. 1981 138 p refs
(Contract F49620-77-C-0025)
(AD-A108477; ANSER-SPDN-80-4) Avail: NTIS HC A07/MF A01 CSCL 22/3

This report derives equations predicting satellite ephemeris error as a function of measurement errors of space-surveillance sensors. These equations lend themselves to rapid computation with modest computer resources. They are applicable over prediction times such that measurement errors, rather than uncertainties of atmospheric drag and of Earth shape, dominate in producing ephemeris error. This report describes the specialization of these equations underlying the ANSER computer program, SEEM (Satellite Ephemeris Error Model). The intent is that this report be of utility to users of SEEM for interpretive purposes, and to computer programmers who may need a mathematical point of departure for limited generalization of SEEM. Author (GRA)

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-19116*# Delaware Univ., Newark.

THEORETICAL STUDIES OF THE RS CANUM VENATICORUM STARS Final Report, 1 Jan. 1980 - 31 Dec. 1981

Dermott J. Mullan 23 Feb. 1982 49 p refs
(Grant NAGw-5)
(NASA-CR-168549) Avail: NTIS HC A03/MF A01 CSCL 03A

The activity in RS Canum Venaticorum (CVn) is investigated. Models for chromospheric structure are developed and the role of magnetic fields both in the photosphere as well as in the chromosphere and upper atmosphere are examined. T Tau stars are also studied from the same points of view. The properties of magnetic field loops are used to help understand the atmospheric structure in RS CVn stars. The concepts developed in the case of these stars appear to be applicable over a much broader region of the HR diagram. The absence of stable magnetic loops in the atmospheres of late type giant stars suggests that the atmospheres of RS CVn active components are qualitatively distinct from the solar atmosphere. S.L.

N82-19117*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

LOW-BACKGROUND PERFORMANCE OF A MONOLITHIC InSb CCD ARRAY

J. D. Bregman, J. H. Goebel, C. R. McCreight, and T. Matsumoto Jan. 1982 39 p refs
(NASA-TM-84216; A-8831) Avail: NTIS HC A03/MF A01 CSCL 03A

A 20 element monolithic InSb charge coupled device (CCD) detector array was measured under low background conditions to assess its potential for orbital astronomical applications. At a temperature of 64 K, previous results for charge transfer efficiency (CTE) were reproduced, and a sensitivity of about 2 x 10 to the minus 15th power joules was measured. At 27 and 6 K, extended integration times were achieved, but CTE was substantially degraded. The noise was approximately 6000 charges, which was in excess of the level where statistical fluctuations from the illumination could be detected. A telescope demonstration was performed showing that the array sensitivity and difficulty of operation were not substantially different from laboratory levels. Ways in which the device could be improved for astronomical applications were discussed. Author

N82-19118*# Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.

A PHOTON-COUNTING PHOTODIODE ARRAY DETECTOR FOR FAR ULTRAVIOLET (FUV) ASTRONOMY

G. F. Hartig, H. W. Moos, R. Pembroke, and C. Bowers [1982] 8 p refs
(Contracts NAS5-27000; NAS5-26057; Grant NAGw-16)
(NASA-CR-168551) Avail: NTIS HC A02/MF A01 CSCL 03A

A compact, stable, single-stage intensified photodiode array detector designed for photon-counting, far ultraviolet astronomy applications employs a saturable, 'C'-type MCP (Galileo S. MCP 25-25) to produce high gain pulses with a narrowly peaked pulse height distribution. The P-20 output phosphor exhibits a very short decay time, due to the high current density of the electron pulses. This intensifier is being coupled to a self-scanning linear photodiode array which has a fiber optic input window which allows direct, rigid mechanical coupling with minimal light loss. The array was scanned at a 250 KHz pixel rate. The detector exhibits more than adequate signal-to-noise ratio for pulse counting and event location. A.R.H.

N82-19119# Spectron Development Labs., Inc., Costa Mesa, Calif.

FLOW VELOCITY AND ANGULARITY MEASUREMENTS IN THE FDL TRISONIC GASDYNAMIC FACILITY AND SELF-ADAPTIVE WALL WIND TUNNELS WITH A LASER TRANSIT ANEMOMETER Final Report, Apr. - Nov. 1980

William T. Mayo, Jr., A. E. Smart, R. J. Hermes, and J. D. Trolinger Wright-Patterson AFB, Ohio AFWAL Aug. 1981 143 p refs
(Contract F33615-79-C-3030; AF Proj. 2402)
(AD-A108427; SDL-81-2162-05FR; AFWL-TR-81-3081) Avail: NTIS HC A07/MF A01 CSCL 14/2

The measurement of a backscatter laser transit anemometer was tested in the FDL Trisonic Gasdynamics Facility (TGF) and the nine-inch Self Adapting Wall (SAW) wind tunnel. The tests included flow analysis in the two foot by two foot subsonic, transonic and supersonic test sections as well as the fifteen-inch transonic test section insert all in the TGF. The magnitude and flow angle precisions were as good as 0.3% and 0.3 deg, respectively, as limited by the statistical fluctuations of the data. Calculations indicate that the minimum natural particle size observed in the TGF was approximately 0.2 micron in diameter. Flow speed and angle were mapped about a microfighter flow field in the TGF fifteen-inch transonic test section at Mach number 0.7 and 0.9 to develop a data base for evaluation of the Self Adaptive Wall wind tunnel concept. Measurements were then made to the same model in the FDL nine-inch Self Adaptive Wall wind tunnel. These indicated that the precision of the instrument exceeded the current precision to establish and repeat flow conditions in the tunnel. The SAW results indicated non-uniform particle content of the flow which adversely affected the available angle precision; however, velocity measurements were good. Presentation of the equipment and measurement results of the present project are included. GRA

N82-18249*# California Univ., Berkeley.

FAR ULTRAVIOLET ASTRONOMY USING THE FAUST TELESCOPE

C. S. Bowyer *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 03A

N82-18251*# European Space Technology Center, Delft (Netherlands).

SPECTROSCOPY IN X-RAY ASTRONOMY
R. Andresen *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)
Avail: NTIS HC A08/MF A01 CSCL 03A

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-19120*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EXPERIMENTAL AND THEORETICAL STUDIES OF INTERSTELLAR GRAINS Ph.D. Thesis - Maryland Univ., College Park, 1982
Joseph A. Nuth, III Dec. 1981 260 p refs
(NASA-TM-83883) Avail: NTIS HC A12/MF A01 CSCL 03B

Steady state vibrational populations of SiO and CO in dilute black body radiation fields were calculated as a function of total pressure, kinetic temperature and chemical composition of the gas. Approximate calculations for polyatomic molecules are presented. Vibrational disequilibrium becomes increasingly significant as total pressure and radiation density decrease. Many regions of postulated grain formation are found to be far from thermal equilibrium before the onset of nucleation. Calculations based upon classical nucleation theory or equilibrium thermodynamics are expected to be of dubious value in such regions. Laboratory measurements of the extinction of small iron and magnetite grains were made from 195 nm to 830 nm and found to be consistent with predictions based upon published optical constants. This implies that small iron particles are not responsible for the 220 nm interstellar extinction features. Additional measurements are discussed. R.J.F.

N82-19121# Air Force Geophysics Lab., Hanscom AFB, Mass. Space Physics Div.
A WORST CASE SPACECRAFT ENVIRONMENT AS OBSERVED BY SCATHA ON 24 APRIL 1979
E. G. Mullen, M. S. Gussenhoven, and H. B. Garrett 31 Jul. 1981 38 p refs
(AF Proj. 7661)
(AD-A108680; AFGL-TR-81-0231; AFGL-ERP-751) Avail: NTIS HC A03/MF A01 CSCL 03/2

A survey of data from the first year of the P78-2 SCATHA satellite operations showed that a highest level spacecraft frame charging (phi sub f) both in sunlight (-340 V) and in eclipse > -8 kV) occurred on 24 April 1979. Analysis of the data indicates that if the sunlight charging environment had been present during eclipse, the vehicle would have charged in excess of 15 kV which is above any known charging level observed to date for the SCATHA satellite. Therefore, the environment at the peak of the sunlight charging at approx. 0650 UT 24 April 1979 was chosen for this worst case study. The environment at this time is characterized by an injection of high energy (30-335 keV) electron fluxes whose combined current correlates with phi sub f with a correlation coefficient of 0.95. The fluxes were highly anisotropic, maximizing perpendicular to the magnetic field. The low energy (< 4 keV) electron population had a density < 1/cc and the low energy ions were near background. Author

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-19122*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PLANETARY MAGNETOSPHERES
David P. Stern and Norman F. Ness Oct. 1981 45 p refs Submitted for publication
(NASA-TM-83841) Avail: NTIS HC A03/MF A01 CSCL 03B

A concise overview is presented of our understanding of planetary magnetospheres (and in particular, of that of the Earth), as of the end of 1981. Emphasis is placed on processes of astrophysical interest, e.g., on particle acceleration, collision-free shocks, particle motion, parallel electric fields, magnetic merging, substorms, and large scale plasma flows. The general morphology and topology of the Earth's magnetosphere are discussed, and important results are given about the magnetospheres of Jupiter, Saturn and Mercury, including those derived from the Voyager 1 and 2 missions and those related to Jupiter's satellite Io. About 160 references are cited, including many reviews from which additional details can be obtained. Author

N82-19123*# Howard Univ., Washington, D. C. Dept. of Chemistry.
LABORATORY MEASUREMENTS OF COMETARY PHOTOCHEMICAL PHENOMENA
William M. Jackson 4 Dec. 1981 23 p refs
(Grant NsG-5071; Contract N00014-80-C-0305)
(NASA-CR-168506; AD-A108614; TR-8) Avail: NTIS HC A02/MF A01 CSCL 07/5

Laboratory experiments are described that provide fundamental information about photochemical processes in comets. The yield of cometary radicals such as CN, OH, etc., can be determined as a function of photolyzing wavelength. Quantum state distributions of the internal energy of the cometary radicals can also be measured as a function of wavelength permitting one to define the recoil velocity of the fragments. This type of information supplies the data needed for more elaborate models to interpret the data being obtained on comets. GRA

N82-19113# Kiel Univ. (West Germany). Inst. fuer Reine und Angewandte Kernphysik.
PART 1: RELATIVISTIC PATHWAY MODIFICATION OF THE PLANETS
In its Relativistic Effects in the Solar System 1981 26 p (For primary document see N82-19112 09-88)
Avail: NTIS HC A03/MF A01

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-19124# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Mm- TO cm-WAVELENGTH TIME DELAYS IN SOLAR BURST EMISSION BURST EMISSION AND THE EFFECT OF VARYING MAGNETIC FIELD
J. E. R. Costa and P. Kaufmann Nov. 1981 30 p refs Submitted for publication
(INPE-2278-PRE/056) Avail: NTIS HC A03/MF A01

Certain solar bursts measured in the mm to cm wave range of frequencies present maximum emission not coincident in time. In some cases the emission is delayed towards lower frequencies which is in apparent contradiction with what would be expected in geometries commonly assumed in thermal models. An explanation is given which places the primary source at the top of a magnetic loop, the collisionless fronts formed moving downwards into the solar chromosphere with the addition of time varying magnetic field effects. The explanation predicts observed time delays for wavelengths situated in the optically thin part of the gyrosynchrotron burst emission spectrum. J.M.S.

N82-19125# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
TIME DELAYS IN SOLAR BURSTS MEASURED IN THE mm-cm RANGE OF WAVELENGTHS
P. Kaufmann, J. E. R. Costa, and F. M. Strauss Oct. 1981 36 p refs Submitted for publication Sponsored in part by FINEP and FAPESP

(INPE-2251-PRE/034) Avail: NTIS HC A03/MF A01

Various solar bursts were analysed with high sensitivity (0.03 s.f.u., r.m.s.) and high time resolution (1 ms) at two frequencies in the millimeter wave range (22 GHz and 44 GHz) and with moderate time resolution (100 ms) by a patrol telescope at a frequency in the microwave range (7 GHz). It was found that in most cases burst maximum emission is not coincident in time at those frequencies. Preceding maximum emission can be either at the higher or at the lower frequency. Time delays ranged from about 3 sec to near coincidence, defined within 10 ms. Some complex bursts presented all kinds of delays among different time structures, and sometime nearly uncorrelated time structures. Directional particle accelerations in complex magnetic configurations could be considered, to explain the variety of the dynamic effects. Fastest burst rise times observed of 10ms at 44GHz and 40 ms at 22 GHz, might be associated to limiting formation times of emission sources combined to various absorption mechanisms at the source and surrounding plasma. Author

N82-19126# Helsinki Univ. of Technology, Otaniemi (Finland). Radio Lab.

RESULTS OF SUN MEASUREMENTS AT THE METSAEHOVI RADIO RESEARCH STATION AT 37 GHz (AUTUMN 1978)

Seppo Urpo 1979 46 p refs

(Rept-S-115; ISBN-951-751-905-2) Avail: NTIS HC A03/MF A01

Results of Sun radiation measurements at 8mm (37 GHz), performed with a 13.7m radome covered dish, are presented. Several high resolution maps of the whole Sun were drawn by computer plotter. The development of typical active areas over the course of several days is depicted. Both high temperature and low temperature areas, as compared with the estimated quiet Sun level, were detected. Microwave bursts related with flare activity in the McMath region 15551 were measured. The power spectrum analysis of the large burst reveals quasi-periodic fluctuation. During the 8mm burst, the period of this fluctuation decreased constantly from 2.5 to 2.1 seconds. Maps of the whole Sun, enlargements of active areas and low temperature areas, and plots of spectra are shown. Author (ESA)

N82-19127# Helsinki Univ. of Technology, Otaniemi (Finland). Radio Lab.

SOLAR BURSTS MEASURED AT 8 MM WAVELENGTH

Seppo Urpo and Koistinen Olavi 1980 16 p refs

(Rept-S-122; ISBN-951-752-226-6) Avail: NTIS HC A02/MF A01

About thirty major solar microwave bursts, detected by tracking those active areas expected to produce such bursts, are reported. These were detected using a 14m radio telescope with an 8mm receiver, center frequency 36.8 GHz, and analyzed over a two year period. In order to select promising areas for tracking, maps of solar radiation of 8mm were measured at least once a day by scanning in right ascension and changing the declination between subsequent scans. The center of the selected active region was tracked with the telescope beam (2.4 arc min) to record possible bursts before, during, and after occurrence. Statistics of active region tracking are given and observed microwave bursts are listed. Author (ESA)

N82-19128# Helsinki Univ. of Technology, Otaniemi (Finland). Radio Lab.

DEVELOPMENT OF THE SOLAR ACTIVE REGION 2684 AT 8 MM WAVELENGTH, SEPTEMBER 22 - 27, 1980

Seppo Urpo 1981 11 p Presented at Crimean FBS/SERF Workshop on Solar Maximum Year, Crimea, USSR, Mar. 1981

(Rept-S-123; ISBN-951-752-227-4) Avail: NTIS HC A02/MF A01

Results of the daily monitoring of the solar active region 2684 at 8mm wavelength using a 14m millimeter wave radiotelescope, are discussed. An increase in 8mm radiation to the value of 8 Sfu, and its subsequent rapid decay, are noted. Eight maps of the whole Sun measured on the six days in question, and figures showing the development of the active region 2684, are presented together with results of the three day tracking of the active region. Author (ESA)

N82-18253*# Institut Royal Meteorologique de Belgique, Brussels.

MEASUREMENT OF THE SOLAR CONSTANT

D. Crommelynck *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)

Avail: NTIS HC A08/MF A01 CSCL 03B

N82-18264*# Centre National de la Recherche Scientifique, Paris (France).

SOLAR SPECTRUM FROM 170 TO 3200 NANOMETERS

G. Thuiller *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)

Avail: NTIS HC A08/MF A01 CSCL 03B

N82-19114# Kiel Univ. (West Germany). Inst. fuer Reine und Angewanndte Kernphysik.

PART 2: THE DEFLEXION OF STARTLIGHT BY THE SUN

In its Relativistic Effects in the Solar System 1981 18 p refs (For primary document see N82-19112 09-88)

Avail: NTIS HC A03/MF A01

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-19129# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

V.L.F. IONOSONDE AND LONG-DISTANCE PROPAGATION ANOMALIES PRODUCED BY GALACTIC CEN X-4 X-RAY BURST IN MAY 1979

Liliaus Rizzo Piazza, Pierre Kaufmann, and P. Ramirez Pardo (Inst. de Atividades Espacias, Blumenau SC, Brazil) Oct. 1981 14 p refs Submitted for publication Sponsored in part by FINEP and FAPESD

(INPE-2250-PRE/033) Avail: NTIS HC A02/MF A01

The galactic X-ray source Cen X-4 produced a large outburst in May 1979, measured by Ariel-5 satellite. Low ionosphere group heights measured daily by a V.L.F. ionosonde indicated anomalous lowering of the effective reflection height in good correlation with Cen X-4 burst, as well as an increase in reflection coefficient, larger for larger frequencies. Diurnal V.L.F. phase variations in a long-distance propagation path presented nighttime 3-4 sigma deviations from average in some days during the Cen X-4 bursting period. These results are a suggested confirmation that galactic transient X-ray sources are capable to produce sufficient ionization effects to be detectable as low ionosphere anomalies. Author

N82-18246*# Kiel Univ. (West Germany). Inst. fuer Reine und Angewandte Kernphysik.

ISOTOPIC STACK - MEASUREMENT OF HEAVY COSMIC RAY ISOTOPES

R. Beaujean *In* NASA. Marshall Space Flight Center Spacelab Mission 1 Expt. Descriptions Nov. 1981 3 p (For primary document see N82-18234 09-12)

Avail: NTIS HC A08/MF A01 CSCL 03B

99 GENERAL

N82-19130*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

TECHNOLOGY DEVELOPMENT OF THE SPACE TRANSPORTATION SYSTEM MISSION AND TERRESTRIAL APPLICATIONS OF SATELLITE TECHNOLOGY Annual Report

1981 18 p refs

(NASA-TM-84131) Avail: NTIS HC A02/MF A01 CSCL 05A

The Space Transportation System (STS) is discussed, including the launch processing system, the thermal protection subsystem, meteorological research, sound supression water system, rotating service structure, improved hypergol or removal systems, fiber optics research, precision positioning, remote controlled solid rocket booster nozzle plugs, ground operations for Centaur orbital transfer vehicle, parachute drying, STS hazardous waste disposal and recycle, toxic waste technology and control concepts, fast analytical densitometry study, shuttle inventory management system, operational intercommunications system improvement, and protective garment ensemble. Terrestrial applications are also covered, including LANDSAT applications to water resources, satellite freeze forecast system, application of ground penetrating radar to soil survey, turtle tracking, evaluating computer drawn ground cover maps, sparkless load pulsar, and coupling a microcomputer and computing integrator with a gas chromatograph. N.W.

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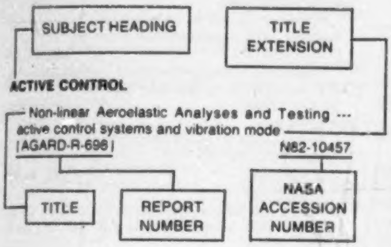

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[NEB-BB-486-O] N82-18383

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[ESA-TT-700] N82-18382

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[AD-A106561] N82-18371

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[AERE-TP-877] N82-19073

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Sedimentology and diagenesis of Bryozoan and sponge-rich carbonate buildups Great Bahama Bank N82-18769

AMPHIBIOUS VEHICLES
Mobility bibliography
[AD-A106228] N82-19104

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Analogue SAR signal processing: Breadboard design, implementation, evaluation and component specification — synthetic aperture radar
[ESA-CR(P)-1463] N82-18480
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Wind tunnel and laboratory calibration of balloon-borne wind sensors
[AD-A106676] N82-18814

ANGLE OF ATTACK
Investigations of the separation behavior on airfoils at high angles of attack, using linear lift theory
[MBB-FE-122/S/PUB/37] N82-18169

ANGULAR DISTRIBUTION
Angular scattering and channeling widths of positive and negative particles at multi-GeV energies
[DE82-002933] N82-19024

ANGULAR VELOCITY
Preliminary design of a hydraulic power supply for a laminar jet angular rate sensor
[AD-A106729] N82-18562
Flow velocity and angularity measurements in the FDL trisonic gasdynamic facility and self-adaptive wall wind tunnels with a laser transit anemometer
[AD-A106427] N82-19119

ANISOTROPY
Random anisotropy in Ising spin glass
[INPE-2277-PRE/055] N82-19078

ANNEALING
Investigation on the functioning of gold-tin superconducting films for the measurement of secondary sonic shock waves in He2 flow
[MPIS-8/1981] N82-18565
Optical investigations of the recombination processes in laser-annealed and thermally-annealed semiconductors
[AD-A106627] N82-19071
Transient capacitance measurements of deep level defects introduced in beta-ray compensated germanium by long-term annealing at room temperature
[AAEC/E-501] N82-19074

ANOMALIES
V.L.F. ionosonde and long-distance propagation anomalies produced by galactic CEN X-4 X-ray burst in May 1979
[INPE-2250-PRE/033] N82-19129

ANTENNA ARRAYS
A survey of the limits on radar imaging
[AD-A106596] N82-18462
Theoretical and experimental investigation of some slot antenna array problems
[AD-A106566] N82-18478

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Systems identification technology development for large space systems N82-18301

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[AD-A106182] N82-18464
One class of optimum linear equally spaced antenna arrays with summary of difference radiation patterns
[AD-A106176] N82-18470
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction
[ESA-TT-677] N82-18483
Study of high speed complex number algorithms — for determining antenna for field radiation patterns
[NASA-CR-166743] N82-18914

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[AD-A106181] N82-18465

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Scatter diagrams based on the anthropometric survey of 2000 Royal Airforce aircrew (1970/1971)
[RAE-TR-81017] N82-18857

ANTIFRICTION BEARINGS
Research in tribology and bearings
[PB82-106923] N82-18606

ANTIMONY
Electron-phonon scattering rates in antimony: Radio-frequency size effect N82-19048

ANTINEUTRINOS
Study of inclusive semi-leptonic neutral current reactions in neutrino and antineutrino interactions between 12 and 200 GeV
[CEA-N-2150] N82-19015

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Quantitative chromatographic analyses of N-phenyl-alpha-naphthylamine and N-phenyl-beta-naphthylamine
[AD-A106362] N82-18345

ANTISEPTICS
Study of chlorine dioxide and its metabolites in man
[PB82-109356] N82-18863

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Dynamics of aircraft antiskid braking systems — conducted at the Langley aircraft landing loads and traction facility
[NASA-TP-1959] N82-18204
APERTURES
Heat reflecting field stop
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APPLICATIONS PROGRAMS (COMPUTERS)
Model characteristics of rotor blades: Finite element approach and measurement by ground vibration test
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Nonlinear elastic beams, frames and structural analysis
[CTH-R-31/1979] N82-18645
Automated longwall guidance and control vertical control subsystem, volume 2 — user manuals (computer programs)
[NASA-CR-161970] N82-18659
AQUIFERS
Ground-water resources of the White River Basin, Madison County, Indiana
[PB82-109844] N82-18675
An observation-well network concept as applied to North Carolina
[PB82-106089] N82-18676
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Theory and application of experimental model analysis in earthquake engineering
[PB82-122409] N82-18430
Performance of the Norris Cotton Federal Office Building for the first 3 years of operation
[PB82-105467] N82-18728
FEDSOL: Program user's manual and economic optimization guide for solar Federal building projects
[PB82-107012] N82-18729
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Flex firmware
[RSRE-81009] N82-18879
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Charge transfer cross-sections of argon ions colliding on argon atoms
[CEA-CONF-5209] N82-19014
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Wind-ceiling-visibility data at selected airports. Volume 9, part A: Western region
[AD-A108169] N82-18830
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A four-phase modulation system for use with and adaptive array N82-18446
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Investigation of crossdeck pendant catapult slot interaction; proposed corrective measures
[AD-A108149] N82-18232
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Plan synthesis: A logical perspective
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ASHES
Properties of Portland cement concretes containing pozzolanic admixtures
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Hot rolled asphalt: Effect of binder properties on resistance to deformation
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ASSESSMENTS
Environmental assessment, source test and evaluation report: Lurgi (Kosovo) medium-Btu gasification
[PB82-114075] N82-18751
ASTRONOMICAL OBSERVATORIES
Far ultraviolet astronomy using the FAUST telescope N82-18249
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On asymptotic optimality of Bayes empirical Bayes estimators N82-18972
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[AD-A108756] N82-18810
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Launch mission summary: INTELSAT 5 (F4) ATLAS/CENTAUR-58
[NASA-TM-84132] N82-18274
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Effects of atmospheric turbulence on microwave and millimeter wave satellite communications systems
N82-18445
The influence of the atmosphere on microwave radiometric measurements in the 10 GHz to 400 GHz frequency range --- and a computer program for determining atmospheric microwave attenuation
[ESA-TT-706] N82-18484
ATMOSPHERIC BOUNDARY LAYER
Analysis of gust structure in the atmospheric boundary layer by using conditional sampling
[FFA-TN-HU-2262-PT-1] N82-18796
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Analysis of UV protection requirements and testing of candidate attenuators for the Haloe optical instrument
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Multidimensional aspects: Ozone, temperature and transport N82-18772
Aircraft measurements and analysis of severe storms: 1976 field experiment
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Methods for interpreting atmospheric spectral observations by Sun sighting through the Earth limb
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The effect of atmospheric turbulence on air to ground photography
[RAE-TR-81065] N82-18555
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A rapid estimation of near Earth satellite lifetimes with quasi-dynamic atmosphere model with application to a proposed Brazilian satellite
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[PB82-121062] N82-18762
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[NASA-TM-84125] N82-18770
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Winter and summer simulations with the GLAS climate model
[NASA-TM-83866] N82-18807
ATMOSPHERIC PHYSICS
Spacelab mission 1 experiment descriptions second edition
[NASA-TM-82448] N82-18234
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[INPE-2111-RPE/336] N82-18785
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Design of sounding rocket payloads
[AD-A108271] N82-18792
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Multidimensional aspects: Ozone, temperature and transport N82-18772
US Navy Marine Climatic Atlas of the World. Volume 9: World-wide means and standard deviations
[AD-A108222] N82-18836
The climate of Denmark. Summaries of observations from light vessels. Part 1: Wind, visibility, air temperature cloud cover, and weather
[DMI-CLIMATOL-PAPERS-8] N82-18838
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Effects of atmospheric turbulence on microwave and millimeter wave satellite communications systems
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ATOMIC EXCITATIONS
Research on atomic, molecular, and nuclear physics
[DE82-001175] N82-19020
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Theoretical investigation of atomic structure and scattering processes
[AD-A108541] N82-19011
Electronic structure of the D(-) state and excited donor states of grain impurities in doped semiconductors
[INPE-2115-RPE/339] N82-19063
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Aircrew restraint and mobility test fixture
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[NASA-TM-83247] N82-18652
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An inexpensive photoelectric remote tilt meter
[PB82-103649] N82-18567
ATTITUDE CONTROL
Large space systems technology, 1981 — conferences
[NASA-CP-2215-PT-1] N82-18275
Modular attitude control of a large space platform
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System for stabilization and pointing of a stratospheric balloon-borne telescope
[INPE-2103-RPE/330] N82-18558

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Semiconductor measurement technology: The capabilities and limitations of Auger sputter profiling for studies of semiconductors
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[AD-A108905] N82-18794
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[AD-A108620] N82-18891
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Three-engine control system for the prototype EH-101 helicopter
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[AD-A108700] N82-18867
Solar energy control system — temperature measurement
[NASA-CASE-MFS-25287-1] N82-18666
Study of automatic control system to maintain constant percentage SO2 retention in a pressurized FBC
[PB82-110683] N82-18758
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[INPE-2104-RPE/331] N82-18881
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[PB82-101961] N82-19109
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Gasoline equivalent fuel economy determination for alternate automotive fuels
[PB82-120072] N82-18412
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Hydrogen cyanide health effects
[PB82-116039] N82-18864
AUTOMORPHISMS
Feynman path integral and Poisson processes with piecewise classical paths
[CNRS-CPT-80-P-1244] N82-18957
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[AD-A108584] N82-18936
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Dynamic and aeroelastic characteristics of complete windturbine systems N82-18128
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Simulation of pulsed IMPATT oscillators and injection-locked amplifiers
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Impact of technology on avionics cost trends
[AD-A108494] N82-18219
Trends in airline avionics
[NLR-MP-80013-U] N82-18220
Integration of complex systems in current and future aircraft projects for the example of avionics
[MBB-UH-18-80-O] N82-18221
Survey of multi-function display and control technology
[NASA-CR-167510] N82-18309
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[AD-A108849] N82-18920
System control procedure development for a distributed microcomputer network for avionics utilizing a non-responsive time-division multiplexed bus as the inter-computer communication link N82-18927
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Prediction of laminar-to-turbulent boundary layer transition in axial-flow turbomachinery
[AD-A108642] N82-18545
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Static and dynamic analysis of axially loaded wire ropes N82-18625
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Investigation of compaction criteria for airport pavement subgrade soils
[AD-A108518] N82-18230

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Background variations in millimeter wave telescopes due to the radome structure
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[AD-A108755] N82-18999
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[NASA-TM-83259] N82-18741
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Electron energy loss spectroscopy of gallium arsenide and other materials
[AD-A108657] N82-18346
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[INPE-2145-RPE/367] N82-19060
Electronic states of a negative ion donor in semiconductors
[INPE-2092-RPE/322] N82-19061
Effects of electron transference energy in semiconductors — germanium antimonides and silicon phosphides
[INPE-2129-RPE/353] N82-19062
Electronic structure of the D(-) state and excited donor states of grain impurities in doped semiconductors
[INPE-2115-RPE/339] N82-19063
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[INPE-2108-RPE/334] N82-19065
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[AD-A108347] N82-18526
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[MBB-BB-483-81-O] N82-19001
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Cavity oscillation in cruise missile carrier aircraft
[AD-A108610] N82-18185
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Shrinkage effects in bead-on-plate welds in 5083 aluminium
[PB82-114596] N82-18610
BEAM CURRENTS
Simple analysis of light ion beam losses in deuterium plasmas channels
[AD-A108287] N82-19009
BEAM INJECTION
Phenomena induced by charged particle beams — experimental design for Spacelab N82-18242
BEAMS (RADIATION)
Method for shaping and aiming narrow beams — sonar mapping and target identification
[NASA-CASE-NPO-14632-1] N82-18443
BEAMS (SUPPORTS)
Nonlinear elastic beams, frames and structural analysis
[CTH-R-31/1979] N82-18645
Distortional buckling of thin-web beam columns
[PB82-105271] N82-18650
Dynamic structural analysis by analog simulation
[PB82-110677] N82-18651
BEAUFORT SEA (NORTH AMERICA)
United States Coast Pilot 9. Pacific and Arctic Coasts Alaska: Cape Spencer to Beufort Sea
[PB82-109562] N82-18201
Foundations of structures in polar waters
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Site investigations and submarine soil mechanics in polar regions
[AD-A108269] N82-18790
BED REST
Physiological responses to prolonged bed rest and fluid immersion in man: A compendium of research (1974 - 1980)
[NASA-TM-81324] N82-18854
BEDS (PROCESS ENGINEERING)
Comparative study of air classifiers
[PB82-106121] N82-18411
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[AECL-6476] N82-18638
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Transient capacitance measurements of deep level defects introduced in beta-ray compensated germanium by long-term annealing at room temperature
[AAEC/E-501] N82-19074
BETATRONS
Dynamics of an intense electron ring in a modified betatron field
[AD-A108359] N82-19010
BIBLIOGRAPHIES
Energy: A continuing bibliography with indexes, issue 31
[NASA-SP-7043(31)] N82-18667
National energy research and development program — bibliography of belgian scientific and technical reports N82-18707
Georges Bank: An annotated bibliography of atlases, inventories and map series
[PB82-107665] N82-18653
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 227. January 1982
[NASA-SP-7011(227)] N82-18656
Bibliography on carbohydrate synthesis. Selected works, 1861 - 1981
[NASA-CR-168553] N82-18671
Patent Abstract Digest, volume 1
[AD-A108672] N82-19100
Patent Abstract Digest, volume 2
[AD-A108673] N82-19101
Patent Abstract Digest, volume 3
[AD-A108674] N82-19102
Mobility bibliography
[AD-A108228] N82-19104
BINDERS (MATERIALS)
Hot rolled asphalt: Effect of binder properties on resistance to deformation
[PB82-122664] N82-18432
BIOASSAY
HERL biological exposure chamber conceptual design
[PB82-114646] N82-18574

BIOASTRONAUTICS
Spacelab mission 1 experiment descriptions second edition
[NASA-TM-82448] N82-18234
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[PB82-116351] N82-18765
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 227. January 1982
[NASA-SP-7011(227)] N82-18856
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[DE82-001740] N82-18850
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[AD-A108829] N82-18690
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Man/computer communication: From artificial intelligence and behavioral science perspectives
[FOA-C-53005-H2] N82-18942
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[PB82-120824] N82-19091
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[PB82-120106] N82-18763
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[MBB-BB-498-81-O] N82-18993
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[MBB-UR-476-81-O] N82-19088
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Manual on marine meteorological services. (Annex 6 to the WMO Technical Regulations) — of the World Meteorological Organization
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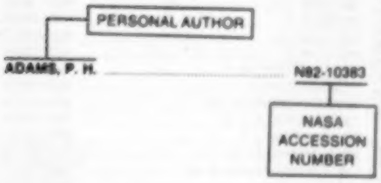

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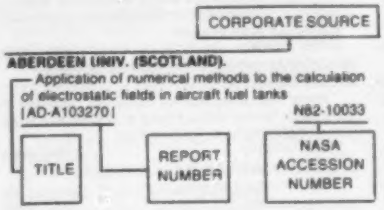
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Manual on physico-chemical strengthening of freezing and thawing soils
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Geothermal energy market study on the Atlantic coastal plain: Technical feasibility of use of eastern geothermal energy in vacuum distillation of ethanol fuel
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Feasibility study on energy recovery and cogeneration from an existing municipal incinerator, phase 1
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CENTRE D'ETUDE DE L'ENERGIE NUCLEAIRE, MOL (BELGIUM).

Solvation of some non-metals in liquid lithium and sodium
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CENTRE DE RECHERCHES EN PHYSIQUE DE L'ENVIRONNEMENT TERRESTRE ET PLANETAIRE, ORLEANS (FRANCE).

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CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, MARSEILLES (FRANCE).

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CHALMERS UNIV. OF TECHNOLOGY, GOTEBORG (SWEDEN).

Nonlinear elastic beams, frames and structural analysis
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Small size-range extension of an optical particle counter
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COMMISSARIAT A L'ENERGIE ATOMIQUE, GRENOBLE (FRANCE).

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COMMISSARIAT A L'ENERGIE ATOMIQUE, VILLENEUVE-SAINT-GEORGES (FRANCE).

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COMMITTEE ON ARMED SERVICES (U. S. HOUSE).
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A review of satellite communication and propagation experiments for frequencies above 10 GHz
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DEUTSCHE GESELLSCHAFT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).
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Compilation of air pollutant emission factors (including supplements 1-7), Supplement 12
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Municipal wastewater: Research strategy supplement, 1981-1985
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The design, fabrication and installation of cable routing mockups in support of Spacelab 2
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EUROPEAN SPACE CONFERENCE, PARIS (FRANCE).

Spacelab mission 1 experiment descriptions second edition
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EXXON RESEARCH AND ENGINEERING CO., LINDEN, N.J.

Conceptual design of a solar cogeneration facility industrial process heat. Volume 2: Appendices
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FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.

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FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.

Honeywell information systems, advanced FORTRAN release 1.1
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Hewlett Packard company HP-3000 series 3, COBOL 2/3000, release A.00.04
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IBM corporation IBM 5280 COBOL, release 3
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Honeywell information systems, COBOL, version 3.0
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IBM corporation: IBM 5280 COBOL release 3, indexed 1-O module, level 1
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IBM corporation: IBM vs FORTRAN release 1 (5748-FO3)
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Microsoft: Microsoft COBOL V4.40, indexed I-O module, level 1
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Properties of Portland cement concretes containing pozzolanic admixtures
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FERNGAS NORDBAYERN G.M.B.H., BAMBERG (WEST GERMANY).

Report on the experiences with the gas compression heat pump system of the school and sports center at Altenkunstadt
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FERRANTI LTD., BRACKNELL (ENGLAND).

Analogue SAR signal processing: Breadboard design, implementation, evaluation and component specification
[ESA-CR(P)-1463] N82-18480

FIORELLO, SHAW AND ASSOCIATES, VIENNA, VA.

ANALYZE user guide
[DE82-001322] N82-18924

FLORIDA STATE UNIV., TALLAHASSEE.

Coastal upwelling ecosystems analysis. Technical report 40: Atlas of the JOINT 2 1976 aircraft winds for the 500 foot level
[PB82-113911] N82-18842

Coastal upwelling ecosystems analysis. Atlas of the JOINT 2 1977 aircraft winds for the 500 foot level
[PB82-113929] N82-18843

Partial sequential tests for the mean of a normal distribution N82-18969

On sequential unbiased and Bayes type estimates of parameters in a contingency table N82-18970

FLORIDA UNIV., GAINESVILLE.

Studies relating to the synthesis of monomethylhydrazine by chloramination and problem relating to the protection of the environment from the vapors of 1, 1-dimethylhydrazine, monomethylhydrazine and hydrazine
[AD-A108369] N82-18323

Effect of oxidation of soil organic matter on water quality: Role of nitrification and denitrification
[PB82-103946] N82-18755

Mathematical techniques for nonlinear system history
[AD-A108370] N82-18953

FOM-INSTITUUT VOOR PLASMAFYSICA, RIJNHUIZEN (NETHERLANDS).

Equilibrium studies of skin like pressure and current-density profiles
[REPT-81-134] N82-19040

The influence of impurities on the discharge behavior in SPICA
[REPT-81-135] N82-19041

Time of flight analysis of charge exchange neutral particles from the TORTUR 2 plasma
[REPT-81-136] N82-19042

FORD AEROSPACE AND COMMUNICATIONS CORP., NEWPORT BEACH, CALIF.

A water vapor monitor using differential infrared absorption
[PB82-114422] N82-18586

FOSTER-MILLER ASSOCIATES, INC., WALTHAM, MASS.

Automated longwall guidance and control vertical control subsystem, volume 1
[NASA-CR-161969] N82-18658

Automated longwall guidance and control vertical control subsystem, volume 2
[NASA-CR-161970] N82-18659

FREIE UNIV., BERLIN (WEST GERMANY).

Measurement of central venous pressure and determination of hormones in blood serum during weightlessness N82-18259

FRIENDS OF THE EARTH, SAN FRANCISCO, CALIF.

Energy policies for resilience and national security
[AD-A108263] N82-18700

G

GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.

Potential reductions in aircraft operation and maintenance costs by using thrust computing support equipment
[AD-A108463] N82-18207

The world wide military command and control information system: Problems in information resource management
[AD-A108454] N82-19062

Non-Federal computer acquisition practices provide useful information for streamlining Federal methods
[PB82-120924] N82-19081

GENERAL ELECTRIC CO., CINCINNATI, OHIO.

Three-engine control system for the prototype EH-101 helicopter
[AEBG-9/81-1568L] N82-18136

GENERAL ELECTRIC CO., PITTSFIELD, MASS.

Electrical characterization and specification of special purpose linear microcircuits
[AD-A108247] N82-18516

GENERAL ELECTRIC CO., ST. PETERSBURG, FLA.

Study of automatic control system to maintain constant percentage SO2 retention in a pressurized FBC
[PB82-110693] N82-18756

GENERAL ELECTRIC CO., SYRACUSE, N.Y.

Pulsed heterodyne CO2 laser?scanner system
[AD-A108186] N82-18589

GEOLOGICAL SURVEY, ALBANY, N.Y.

Use of flow-duration curves to evaluate effects of urbanization on streamflow patterns on Long Island, New York
[PB82-114307] N82-18673

GEOLOGICAL SURVEY, AUSTIN, TEX.

Ground-water for the Salt Basin, Eagle Flat, Red Light Draw, Green River Valley, and Presidio Bolson in westernmost Texas
[PB82-105269] N82-18759

GEOLOGICAL SURVEY, CHARLESTON, W. VA.

Water resources data for West Virginia, water year 1980
[PB82-111634] N82-18682

GEOLOGICAL SURVEY, INDIANAPOLIS, IND.

Ground-water resources of the White River Basin, Madison County, Indiana
[PB82-109844] N82-18675

GEOLOGICAL SURVEY, MENLO PARK, CALIF.

Water resources data for California. Volume 3: Southern Central Valley Basins and the Great Basin from Walker River to Truckee River
[PB82-117003] N82-18681

Water resources data for California. Volume 1: Colorado River Basin, Southern Great Basin from Mexican Border to mono Lake Basin and Pacific Slope Basins from Tijuana River to Santa Maria River
[PB82-116997] N82-18683

Water resources data for California. Volume 4: Northern Central Valley Basins and the Great Basin from Honey Lake Basin to Oregon state line
[PB82-117011] N82-18684

GEOLOGICAL SURVEY, RALEIGH, N. C.

An observation-well network concept as applied to North Carolina
[PB82-106069] N82-18676

GEOLOGICAL SURVEY, RESTON, VA.

Multi-saline sample distillation apparatus for hydrogen isotope analyses: Design and accuracy
[PB82-115460] N82-18573

Environmental geologic studies on the southeastern Atlantic Outer Continental Shelf, 1977-1978
[PB82-109295] N82-18800

GEORGE WASHINGTON UNIV., WASHINGTON, D.C.

Bibliography on carbohydrate synthesis. Selected works, 1961 - 1981
[NASA-CR-168553] N82-18671

A closed queueing network model for multi-echelon repairable item provisioning
[AD-A108401] N82-18939

Computable optimal value bounds and solution vector estimates for general parametric NLP programs
[AD-A108229] N82-18954

GEORGIA INST. OF TECH., ATLANTA.

Finite-element formulation for the analysis of interfaces, nonlinear and large displacement problems in geotechnical engineering N82-18415

A re-usable code generator for PRIME 50-series computers
[AD-A108620] N82-18891

A simulation tool for distributed databases
[AD-A108619] N82-18892

On empirical foundations of information science
[PB82-125898] N82-19096

GILBERT/COMMONWEALTH, READING, PA.
Magnetohydrodynamics (MHD) Engineering Test Facility (ETF) 200 MWe power plant. Conceptual Design Engineering Report (CDER). Volume 4: Supplementary engineering data
[NASA-CR-165482-VOL-4] N82-18688
GILBERT (GILEN A.) AND ASSOCIATES, INC., READING, PA.
Comparison of coal based systems: Medium-BTU gas versus SNG for industrial applications
[PB82-117383] N82-18407
GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
Orbiter based construction equipment N82-18290
Investigation of large capacity optical memories for correlator applications
[AD-A108555] N82-18683
GULF SOUTH RESEARCH INST., NEW ORLEANS, LA.
Development of novel porous substrates for ultrafiltration, desalination and water reclamation, part 2
[PB82-100820] N82-18363

H

HAMPTON INST., VA.
The 1981 Summer Research Fellowship Program
[NASA-CR-165814] N82-19079
HARRIS CORP., MELBOURNE, FLA.
Fiber optic data bus for the AN/GYQ-21(V)
[AD-A108384] N82-19081
HELSINKI UNIV. OF TECHNOLOGY, OTANIEMI (FINLAND).
On the electromagnetic plane wave scattering from a wire grid with rhombic cells
[REPT-S-114] N82-18486
On the quasi-TEM modes in general multiconductor transmission lines
[REPT-S-118] N82-18487
Asymptotic high frequency modes of homogeneous waveguide structures with impedance boundaries
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Background variations in millimeter wave telescopes due to the radome structure
[REPT-S-121] N82-18489
Mixing with a SQUID at millimeter waves
[REPT-S-117] N82-18533
Positron studies of point defect interactions in metals
[SF-02150] N82-19053
Neutron scattering studies of atomic vibration in nickel and solid dimethylacetylene N82-19086
Results of Sun measurements at the Metsaehovi radio research station at 37 GHz (Autumn 1978)
[REPT-S-115] N82-19126
Solar bursts measured at 8 mm wavelength
[REPT-S-122] N82-19127
Development of the solar active region 2684 at 8 mm wavelength, September 22 - 27, 1980
[REPT-S-123] N82-19128
HINDUSTAN AERONAUTICS LTD., BANGALORE (INDIA).
Automatic generation of equations for rotor-body systems with dynamic inflow for a priori ordering schemes N82-18152
HOCHSCHULE DER BUNDESWEHR, MUNICH. (WEST GERMANY).
Dynamic and aeroelastic characteristics of complete windturbine systems N82-18128
The line method for solving partial differential equations encountered in the literature N82-18980
HONEYWELL SYSTEMS AND RESEARCH CENTER, MINNEAPOLIS, MINN.
Integrated control design techniques
[AD-A108223] N82-18224
Integrated controls/structures study of advanced space systems N82-18303
HOUSTON UNIV., TEX.
Analysis of volatile metabolites in biological fluids as indicators of prodromal disease condition
[NASA-CR-167513] N82-18869
HOWARD UNIV., WASHINGTON, D. C.
Laboratory measurements of cometary photochemical phenomena
[NASA-CR-168506] N82-19123
HUGHES AIRCRAFT CO., CANOGA PARK, CALIF.
Analysis of Built-In-Test (BIT) false alarm conditions
[AD-A108752] N82-18217
HUGHES AIRCRAFT CO., TORRANCE, CALIF.
Reliability investigation of low noise GaAs FETs
[AD-A108386] N82-18516
HUGHES HELICOPTERS, CULVER CITY, CALIF.
Design philosophy of the Hughes model 600 helicopter N82-18140

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I.A.M. RINALDO PIAGGIO, FINALE LIGURE (ITALY).
Engine superficial temperature and infrared signature N82-18136
IBM RESEARCH LAB., SAN JOSE, CALIF.
Laser hole burning spectroscopy: A high resolution probe of molecular environments
[AD-A108549] N82-18590
IBM WATSON RESEARCH CENTER, YORKTOWN HEIGHTS, N.Y.
Numerical methods for stiff differential equations and Josephson interferometer equations
[AD-A108373] N82-18850
IDAHO UNIV., MOSCOW.
Vibration damping characteristics of graphite/epoxy composites for large space structures N82-18263
IIT RESEARCH INST., CHICAGO, ILL.
An assessment of the magnitude of electromechanical failures occuring within Air Force Command, Control, Communications and Intelligence (C3I) systems
[AD-A108203] N82-18461
ILLINOIS INST. OF TECH., CHICAGO.
Kinetics of crack initiation and propagation in metal-induced embrittlement of 4140 steel by indium N82-18367
Texture developments associated with abnormal grain growth in low carbon steel sheet N82-18388
Thermal and electrical properties of solids at low temperatures
[DE82-000727] N82-18969
ILLINOIS NATURAL HISTORY SURVEY, URBANA.
A stress function for evaluating strategies for water quality management
[PB82-109828] N82-18676
ILLINOIS UNIV. AT CHICAGO CIRCLE, CHICAGO.
Electrical generating unit inventory 1976-1986: Illinois, Indiana, Kentucky, Ohio, Pennsylvania and West Virginia
[PB82-112194] N82-18441
The Ohio River Basin Energy Facility siting model. Volume 2: Sites and on-line dates
[PB82-112111] N82-18442
Energy consumption patterns: Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia (1975)
[PB82-101478] N82-18734
The Ohio River Basin energy facility siting model. Volume 1: Methodology
[PB82-102591] N82-18740
Multi-sample cluster analysis and approaches to validity studies in clustering individuals N82-18968
ILLINOIS UNIV. AT URBANA-CHAMPAIGN.
Selective jet plating N82-18336
An experimental determination of the effect of cyclic stress on void growth in ultra-high-purity aluminum during simultaneous 800 MeV proton irradiation N82-18364
Applications of multi-pinhole gamma camera collimation to tomography and image enhancement N82-18554
Static and dynamic analysis of axially loaded wire ropes N82-18625
Response of reinforced concrete plate-column connections to dynamic and static horizontal loads. Appendices E to H
[PB82-101544] N82-18646
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Self-checking programs: An axiomatic approach to the validation of programs by the use of assertions N82-18912
Topics in computational geometry N82-18913
On a proposal for a continuum with microstructure N82-19052
ILLINOIS UNIV. AT URBANA-CHAMPAIGN, URBANA.
The effect of hydrogen on the solid solution strengthening and softening of nickel
[AD-A108854] N82-18374
ILLINOIS UNIV., URBANA.
Effects of prolonged weightlessness on the humoral immune response of humans N82-18880
ILLINOIS UNIV., URBANA-CHAMPAIGN.
Time-sharing manual control and memory search: The joint effects of input and output modality competition, priorities and control order
[AD-A108721] N82-18867
IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
A general computer program for fluid-flow, heat-transfer and chemical-reaction processes
[HTS/81/10] N82-18549
INCO, INC., MCLEAN, VA.
SQL Front-End functional description
[AD-A108509] N82-18884
INDIANA STATE DEPT. OF NATURAL RESOURCES, INDIANAPOLIS.
Ground-water resources of the White River Basin, Madison County, Indiana
[PB82-109844] N82-18675
INDIANA UNIV. AT BLOOMINGTON.
Ohio River Basin energy study: Land use and terrestrial ecology
[PB82-110347] N82-18440
INDIANA UNIV., BLOOMINGTON.
The Ohio River Basin Energy Facility siting model. Volume 2: Sites and on-line dates
[PB82-112111] N82-18442
A land use analysis of existing and potential coal surface mining areas in the Ohio River Basin Energy Study region
[PB82-105172] N82-18679
INSTITUT D'AERONOMIE SPATIALE DE BELGIQUE, BRUSSELS.
Grille spectrometer N82-18236
INSTITUT FUER FLUGMECHANIK, BRUNSWICK (WEST GERMANY).
Helicopter rotor downwash: Results of experimental research at the DFVLR-rotor test stand and their comparison with theoretical results N82-18156
Evaluation of the helicopter low airspeed system LASSIE N82-18172
INSTITUT ROYAL METEOROLOGIQUE DE BELGIQUE, BRUSSELS.
Measurement of the solar constant N82-18253
INSTITUTE FOR DEFENSE ANALYSES, ARLINGTON, VA.
C-5A austere airfield operational utility evaluation. Phase 2: Operation on unpaved soil surfaces following rainfall
[AD-A108507] N82-18208
A survey of the limits on radar imaging
[AD-A108598] N82-18462
INSTITUTE FOR PERCEPTION RVO-TNO, SOESTERBERG (NETHERLANDS).
The Link-Hiles driver training simulator for tracked vehicles: The effect of method and duration of training on the transfer of training
[IZF-1980-28] N82-18226
INSTITUTE FOR TELECOMMUNICATION SCIENCES, BOULDER, COLO.
Electromagnetic compatibility analysis for a satellite power system receiving site in the Mojave Desert
[PB82-100710] N82-18723
INSTITUTE OF HYDROLOGY, WALLINGFORD (ENGLAND).
Soil physical processes of groundwater recharge through Indian black cotton soils
[PB82-112137] N82-18674
INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
An on board supervisory system for applications in space missions
[INPE-2097-RPE/327] N82-18216
An adaptive satellite orbit estimation scheme using an analytical approach and a dynamical model compensation technique
[INPE-2304-PRE/072] N82-18270
A rapid estimation of near Earth satellite lifetimes with quasi-dynamic atmosphere model with application to a proposed Brazilian satellite
[INPE-2287-PRE/069] N82-18272
Tone receiver for satellite position determination
[INPE-2159-RPE/378] N82-18306
Determination of the field scattered by an axially incident plane wave
[INPE-2179-NTE/175] N82-18448

Link availability in satellite telecommunication subject to correlated rain attenuation at the ground terrain
[INPE-2290-PRE/058] N82-18451
Computer implementation of a program for the analysis of circular reflectors using the geometric theory of diffraction
[INPE-2132-RPE/366] N82-18452
A double-balanced mixer for 2 GHz
[INPE-2160-RPE/371] N82-18453
Radiometric studies of the heat island
[INPE-2158-RPE/375] N82-18454
A new external limit to the capacity of interference channels
[INPE-2162-RPE/380] N82-18455
Relational data bank for Burroughs computers
[INPE-2116-RPE/340] N82-18456
An active filter for the simultaneous realization of several transfer functions
[INPE-2298-PRE/069] N82-18509
Small signal design of a dielectric resonator stabilized oscillator
[INPE-2295-PRE/061] N82-18510
FM modulators using a phase locked loop
[INPE-2293-NTE/177] N82-18511
Stabilized microwave oscillator for a dielectric resonator
[INPE-2123-RPE/347] N82-18512
A 10 MHz 60 deg PM demodulator
[INPE-2157-RPE/376] N82-18513
Thermal resistance of convectively cooled plates with applied heat flux and internal heat generation
[INPE-2291-PRE/066] N82-18541
Thermal resistance of a convection cooled flat plate with a nonuniform applied heat flux and internal generation of constant heat
[INPE-2131-RPE/355] N82-18542
System for stabilization and pointing of a stratospheric balloon-borne telescope
[INPE-2103-RPE/330] N82-18558
The centratlan aerogeophysical operation in the region of the Mid-Atlantic ridge. INPE participation
[INPE-2142-RPE/364] N82-18653
Regression type mathematical models of the interaction of meteorology and agricultural productivity. Objectives, uses and operational problems
[INPE-2117-RPE/341] N82-18661
A model for estimating the productivity of corn in the States of Sao Paulo
[INPE-2118-RPE/342] N82-18662
I-V characterization of solar cells
[INPE-2141-RPE/363] N82-18669
Ionospheric program
[INPE-2113-RPE/337] N82-18778
A simulation of equatorial plasma bubble signatures on the OI 6300 A nightglow meridional profile over Brazilian low latitude
[INPE-2260-PRE/042] N82-18779
Equatorial spread F instability conditions as determined from ionograms
[INPE-2310-PRE/075] N82-18780
H2O maser survey in the magnellanic clouds
[INPE-2279-PRE/057] N82-18781
Theoretical analysis of the real and apparent velocities of vertical plasma drift in the equatorial ionosphere
[INPE-2143-RPE/365] N82-18782
Characteristics of the 6300 angstrom OI luminescence at a low latitude American sector
[INPE-2114-RPE/338] N82-18783
Comparative study of the electronic density peak and peak height of the F sub 2 layer calculated by CCIR and observed by Cachoeira Paulista and Fortaleza for magnetically calm periods
[INPE-2144-RPE/366] N82-18784
High altitude atmospheric physics program
[INPE-2111-RPE/336] N82-18785
Convective rainfall estimation in Rio Grande do Sul State, Brazil: Preliminary results
[INPE-2271-RPE/400] N82-18804
The use of environmental satellites for frost monitoring
[INPE-2128-RPE/352] N82-18805
The evolution of meteorological forecasting
[INPE-2151-RPE/372] N82-18806
Filtration of elements of orbital images contaminated by clouds, to obtain improved measurements of the black body temperature for use in oceanography
[INPE-2121-RPE/345] N82-18846
Programmable multiple digital cassette memory
[INPE-2099-RPE/329] N82-18880
A microcomputer for control of data collection platforms
[INPE-2104-RPE/331] N82-18881
Carrier recovery system for modem applications with digital processing using PSK or DPSK modulation
[INPE-2095-RPE/326] N82-18883
Optimal control of an M/G/1 queueing system
[INPE-2139-RPE/362] N82-18889
A stochastic approach to global error estimation in the numerical solution of ordinary differential equations
[INPE-2290-PRE/065] N82-18944
Axisymmetric triangular element with six nodal points
[INPE-2289-PRE/064] N82-18945
Changing the fuzzy rule of detachment
[INPE-2266-PRE/047] N82-18948
Application of the Alpha-Beta procedure to differential games
[INPE-2135-RPE/358] N82-18982
On the self-consistent solutions of pulsar plasma waves
[INPE-2302-PRE/071] N82-19036
Electron hopping energy influence on the specific heat and conductivity of phosphorus doped silicon
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Electron and impurity correlations in doped semiconductors
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Diagonal and off-diagonal disorder in doped semiconductors
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Time delays in solar bursts measured in the mm-cm range of wavelengths
[INPE-2251-PRE/034] N82-19125
V.L.F. ionosonde and long-distance propagation anomalies produced by galactic CEN X-4 X-ray burst in May 1979
[INPE-2250-PRE/033] N82-19129

INSTITUUT TNO VOOR BOUWMATERIALEN EN BOUWCONSTRUCTIES, DELFT (NETHERLANDS).
Investigation into the utility of some quick setting cements for runway repair
[B-80-157/80.7.0157] N82-18225

INSTITUUT TNO VOOR WISKUNDE, INFORMATIEVERWERKING EN STATISTIEK, THE HAGUE (NETHERLANDS).
Continuation of information tracks research: Inventor of prospects
[IWIS-A-80-IN-82-18] N82-19093

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION, OGDEN, UTAH.
Evaluation of Megatard 2700: A proposed new fire retardant system
[PB82-108515] N82-18380
PATTERN: A system for land management planning
[PB82-101452] N82-18426

INTERNATIONAL NEW TOWNS ASSOCIATION, HAGUE (NETHERLANDS).
Fourth Annual Community Planning and Development Challenges: Energy, Environment, Water
[PB82-125790] N82-19109

INTERNATIONAL SOCIETY FOR TERRAIN-VEHICLE SYSTEMS, HANOVER, N.H.
Mobility bibliography
[AD-A108226] N82-19104

IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.
Prediction of laminar-to-turbulent boundary layer transition in axial-flow turbomachinery
[AD-A108642] N82-18645

IOWA UNIV., IOWA CITY.
Dynamic analysis and design of constrained mechanical systems
[AD-A108685] N82-18629
Design sensitivity analysis and optimization of constrained dynamic systems
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ISTITUTO DI RICERCA E TECNOLOGIA PER LO STUDIO DEL PLASMA NELLO SPAZIO, FRASCATI (ITALY).
The properties of ionospheric singly ionized oxygen ions as observed in the magnetotail boundary layer and northern plasma lobe
[IPS-81-11] N82-18797
The TIRGO secondary mirror modulation system
[IPS-81-6] N82-19034

ITALIAN AIR FORCE PRATICA DI MARE, ROME.
Parametric criteria and impact on design trends
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ITALIAN ARMY GENERAL STAFF, ROME.
Military requirements: Too little or too much
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JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
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JOHNS HOPKINS UNIV., BALTIMORE, MD.
Quantum chemical investigations of the mechanism of cationic polymerization and theoretical prediction of crystal densities and decomposition pathways of energetic molecules
[AD-A108520] N82-18396
A photon-counting photodiode array detector for far ultraviolet (FUV) astronomy
[NASA-CR-168551] N82-19118

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KENTRON INTERNATIONAL, INC., HAMPTON, VA.
Mobile work station concept for assembly of large space structures (zero gravity simulation tests)
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KENTUCKY UNIV., LEXINGTON.
Coal mine siting for the Ohio River Basin energy study [PB82-108119] N82-18690
A baseline assessment of coal industry structure in the Ohio River Basin Energy Study region [PB82-103615] N82-18737

KIEL UNIV. (WEST GERMANY).
Isotopic stack - measurement of heavy cosmic ray isotopes N82-18246
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KVB, INC., MINNEAPOLIS, MINN.
Emissions and efficiency performance of industrial coal stoker fired boilers [PB82-115312] N82-18730

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LABORATOIRE D'AEROTHERMIQUE DU C.N.R.S., MEUDON (FRANCE).
Very wide field camera N82-18250

LABORATORIUM ELEKTRONISCHE ONTWIKKELINGEN VOOR DE KRIJGSMACHT TNO, OEGSTGEEST (NETHERLANDS).
Analysis and design of hydraulic servosystems for the improvement of pulsed machinery for the Army [TDCK-75058] N82-18605

LABORATORY FOR ELECTRONIC DEVELOPMENT OF THE ARMED FORCES, OEGSTGEEST (NETHERLANDS).
Measurement of the dielectric constant of ceramic Al2O3 substrates [LEOK-TR-1980-04] N82-18392

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY, PALISADES, N. Y.
Interpretation of equatorial hydrographic, nutrient element and radioisotope data [DE82-001699] N82-18655

LEHIGH UNIV., BETHLEHEM, PA.
Angular scattering and channeling widths of positive and negative particles at multi-GeV energies [DE82-002933] N82-19024

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
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Distributed sensor networks [AD-A108275] N82-18888

LITTON SYSTEMS (CANADA) LTD., TORONTO (ONTARIO).
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Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 227. January 1982
[NASA-SP-7011(227)] N82-18856
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Directory of the NOAA Library and Information network
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NATIONAL STANDARD REFERENCE DATA SYSTEM.

Optical spectra of nonmetallic inorganic transient species in aqueous solution
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NATO COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY, BRUSSELS (BELGIUM).

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OFFICE OF NAVAL RESEARCH, LONDON (ENGLAND).

The 4th International Topical Conference on High-Power Electron and Ion-Beam Research and Technology
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OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, D. C.

Solar power satellites, summary
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Executive summary of the Cumberland River Basin regional plan: Water and related land resources report
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RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM (SWEDEN).

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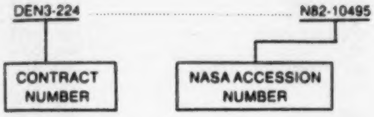

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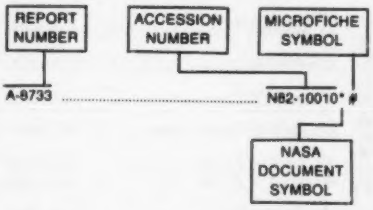

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AD-A108750 N82-19006 #
AD-A108751 N82-18458 #
AD-A108752 N82-18217 #
AD-A108753 N82-18628 #
AD-A108754 N82-18654 #
AD-A108755 N82-18999 #
AD-A108756 N82-18810 #
AD-A108819 N82-18892 #
AD-A108820 N82-18891 #
AD-A108822 N82-19013 #
AD-A108905 N82-18794 #
AD-A108929 N82-18890 #
AD-A108981 N82-18597 #
AD-A109024 N82-18548 #
AD-A109059 N82-18350 #
AD-A109076 N82-18940 #
AD-A109179 N82-18868 #
AD-A109190 N82-18398 #
AD-A109369 N82-18795 #

AD-E500447 N82-18462 #
AD-E500466 N82-18206 #
AD-E950182 N82-18196 #

AEBG-9/81-1568L N82-18135 #

AECL-6476 N82-13636 #
AECL-6853 N82-18637 #
AECL-6863 N82-18379 #
AECL-6961 N82-18630 #

AERE-R-9810 N82-19076 #
AERE-R-9829 N82-18527 #
AERE-R-10042 N82-18372 #

AERE-TP-877 N82-19073 #

AFAMRL-TR-80-140 N82-18192 #
AFAMRL-TR-81-27 N82-18193 #
AFAMRL-TR-81-31 N82-18743 #

AFGL-ERP-736 N82-18812 #
AFGL-ERP-746 N82-18815 #
AFGL-ERP-749 N82-19036 #
AFGL-ERP-750 N82-18813 #
AFGL-ERP-751 N82-19121 #

AFGL-IP-298 N82-18466 #
AFGL-IP-303 N82-18814 #

AFGL-TR-81-0019 N82-18468 #
AFGL-TR-81-0086 N82-18809 #
AFGL-TR-81-0102 N82-18812 #
AFGL-TR-81-0162 N82-18742 #
AFGL-TR-81-0191 N82-18815 #
AFGL-TR-81-0204 N82-18889 #
AFGL-TR-81-0217 N82-19036 #
AFGL-TR-81-0218 N82-18813 #
AFGL-TR-81-0219 N82-18814 #
AFGL-TR-81-0231 N82-19121 #
AFGL-TR-81-0233 N82-18560 #
AFGL-TR-81-0235 N82-18792 #
AFGL-TR-81-0262 N82-18589 #
AFGL-TR-81-0266 N82-18835 #

AFHRL-TP-81-38 N82-18227 #

AFMD-81-104 N82-19091 #

AFOSR-81-0739TR N82-19006 #
AFOSR-81-0746TR N82-18371 #
AFOSR-81-0755TR N82-18953 #
AFOSR-81-0762TR N82-19012 #
AFOSR-81-0764TR N82-18547 #
AFOSR-81-0765TR N82-18855 #
AFOSR-81-0767TR N82-18967 #
AFOSR-81-0768TR N82-18950 #
AFOSR-81-0769TR N82-18323 #
AFOSR-81-0770TR N82-18837 #
AFOSR-81-0773TR N82-18617 #
AFOSR-81-0775TR N82-18525 #
AFOSR-81-0782TR N82-18546 #
AFOSR-81-0785TR N82-18875* #
AFOSR-81-0789TR N82-18594 #
AFOSR-81-0790TR N82-18590 #
AFOSR-81-0791TR N82-18949 #
AFOSR-81-0792TR N82-18937 #
AFOSR-81-0793TR N82-18921 #
AFOSR-81-0795TR N82-18936 #
AFOSR-81-0796TR N82-18563 #
AFOSR-81-0797TR N82-18951 #
AFOSR-81-0800TR N82-18346 #
AFOSR-81-0802TR N82-18883 #
AFOSR-81-0804TR N82-18592 #
AFOSR-81-0806TR N82-18545 #
AFOSR-81-0814TR N82-18350 #
AFOSR-81-0850TR N82-18526 #
AFOSR-81-0852TR N82-18940 #
AFOSR-81-0862TR N82-18597 #

AFRPL-TR-81-70-VOL-1 N82-18319 #
AFRPL-TR-81-70-VOL-2 N82-18320 #
AFRPL-TR-81-70-VOL-3 N82-18321 #
AFRPL-TR-81-79 N82-18586 #

AFSC-TR-81-65 N82-19100 #
AFSC-TR-81-66 N82-19101 #
AFSC-TR-81-67 N82-19102 #

AFWAL-TR-80-1160 N82-18517 #
AFWAL-TR-80-4152 N82-18317 #
AFWAL-TR-81-1142 N82-18197 #
AFWAL-TR-81-1177 N82-18522 #
AFWAL-TR-81-1191 N82-19070 #
AFWAL-TR-81-2096 N82-18992 #
AFWAL-TR-81-3036 N82-18185 #
AFWAL-TR-81-3074 N82-18224 #
AFWAL-TR-81-4044 N82-18636 #
AFWAL-TR-81-4060 N82-18394 #
AFWAL-TR-81-4073 N82-18330 #
AFWAL-TR-81-4080 N82-18614 #
AFWAL-TR-81-4096 N82-18329 #
AFWAL-TR-81-4112 N82-18628 #

AFWL-TR-81-40 N82-18395 #
AFWL-TR-81-3061 N82-19119 #

AI-M-651 N82-18922 #
AI-M-653 N82-18938 #

AIAA-81-2637 N82-18178* #

AMMRC-TR-81-47 N82-18326 #

AMRC-N-167 N82-19006 #

AMSAA-TR-321-VOL-2 N82-18985 #

ANSER-SPDN-80-4 N82-19115 #

ANU-P-771 N82-19016 #
ANU-P-788 N82-19017 #

AP-42-ED-3-SUPPL-1-7/12 N82-18760 #

AR-1 N82-18546 #
AR-002-237 N82-18811 #

ARB-R-81/40 N82-18757 #

ARCSL-CR-81003 N82-19032 #

ARL/MECH/ENG/NOTE-386 N82-18418 #

ARL/PSU/TM-81-156 N82-18524 #
ARL/PSU/TM-81-166 N82-19000 #

ARL/STRUC-384 N82-18811 #

ARO-14740.4-MS N82-18398 #

ASD-TR-81-5030 N82-18210 #

B-80-157/80.7.0157 N82-18225 #

BBN-4444 N82-18743 #

BHT-699-099-111-VOL-2 N82-18231 #

BLG-536 N82-18351 #

BLM/YN/SR-81/02 N82-18800 #

BM-IC-8843 N82-18400 #

BM-OFR-135-81 N82-18685 #

BMFT-FB-T-81-145 N82-18710 #
BMFT-FB-T-81-172 N82-18532 #
BMFT-FB-T-81-175 N82-18552 #
BMFT-FB-T-81-176 N82-18711 #
BMFT-FB-T-81-177 N82-18712 #
BMFT-FB-T-81-178 N82-18713 #
BMFT-FB-T-81-179 N82-18714 #
BMFT-FB-T-81-183 N82-18715 #
BMFT-FB-T-81-184 N82-18716 #
BMFT-FB-T-81-186 N82-18717 #
BMFT-FB-T-81-193 N82-18718 #
BMFT-FB-T-81-194 N82-18514 #

BN-971 N82-18887 #

BONN-HE-80-15 N82-18988 #
BONN-HE-80-16 N82-18989 #

BR77700 N82-18503
BR78251 N82-18539
BR79375 N82-18857
BR79571 N82-18177
BR79940 N82-18505
BR80500 N82-18215
BR80525 N82-18555
BR80596 N82-18657
BR80786 N82-18504
BR81061 N82-18879
BR81100 N82-18447

CCVS74-VSR810 N82-18896 #
CCVS74-VSR825 N82-18899 #
CCVS74-VSR830 N82-18897 #
CCVS74-VSR845 N82-18898 #
CCVS74-VSR865 N82-18900 #

CEA-CONF-5209 N82-19014 #

CEA-N-2150 N82-19015 #
CEA-N-2169 N82-18958 #

CEA-R-5062 N82-19016 #

CETIM-1-4N-12-9 N82-18421 #
CETIM-1-6E-0-80 N82-18420 #
CETIM-11-H-285 N82-19002 #
CETIM-11-L-182 N82-18644 #

CETIM-12-DO-71 N82-18386 #
CETIM-12-G-199 N82-18387 #
CETIM-15-H-194 N82-19622 #

CISE-1695 N82-18357 #
CISE-1711 N82-18598 #
CISE-1713 N82-18529 #

CMS-01-81 N82-18651 #

CMT-16 N82-18476 #

CNES-81/CT/PRT/SST/SM/194 N82-18640 #

CNRS-CPT-80-P-1217 N82-18956 #
CNRS-CPT-80-P-1226 N82-18955 #
CNRS-CPT-80-P-1244 N82-18957 #

CONF-8105104-9 N82-19023 #

COO-1629 N82-18993 #

CRPE-NT-99 N82-18479 #

CRREL-SP-81-25 N82-18417 #

CRREL-SR-81-23 N82-18490 #
CRREL-SR-81-24 N82-18790 #
CRREL-SR-81-26 N82-18342 #
CRREL-SR-81-29 N82-19104 #

CRREL-81-17 N82-18849 #
CRREL-81-19 N82-18664* #

CSIR-ME-1705 N82-18722 #

CSIR-S-234 N82-18431 #

CTH-MATH-1981-14 N82-18962 #

CTH-R-31/1979 N82-18645 #

CTR-3-5-77-208-1 N82-18436 #

CUA/VSL-010781 N82-19013 #

CUED/A-THERMO/TR-15-1981 N82-18607 #

CUED/C-MAT/TR-76-181 N82-18333 #

CUED/C-MATS/TR-74-1981 N82-18331 #
CUED/C-MATS/TR-78-1981 N82-18332 #

CUED/D-SOILS/TR-102-1981 N82-18423 #
CUED/D-SOILS/TR-109-1981 N82-18966 #
CUED/D-SOILS/TR-110-1981 N82-18424 #

CUED/D-STRUCT/TR.88-1981 N82-18610 #

CUED/D-STRUCT/TR-91-1981 N82-18609 #
CUED/D-STRUCT/TR-92-1981 N82-18611 #

CUED/F-CAMS/TR-207-1981 N82-18964 #
CUED/F-CAMS/TR-211-1981 N82-18965 #
CUED/F-CAMS/TR-213-1981 N82-18963 #
CUED/F-CAMS/TR-215-1981 N82-18943 #

CUED/S-STRUCT/TR-89-1981 N82-18608 #

CUMER-81-3 N82-18548 #

C4100-50 N82-18698* #

DE81-029303 N82-18380 #
DE81-030321 N82-19023 #
DE81-030679 N82-18352 #
DE82-000689 N82-18705 #
DE82-000690 N82-18704 #
DE82-000727 N82-18993 #
DE82-001143 N82-18701 #
DE82-001175 N82-19020 #
DE82-001179 N82-19019 #
DE82-001181 N82-19022 #
DE82-001323 N82-18924 #
DE82-001573 N82-19025 #
DE82-001578 N82-18702 #
DE82-001603 N82-18378 #
DE82-001699 N82-18655 #
DE82-001724 N82-19021 #
DE82-001739 N82-18353 #
DE82-001740 N82-18650 #
DE82-001999 N82-18354 #
DE82-002095 N82-18706 #
DE82-002110 N82-18703 #
DE82-002166 N82-19026 #
DE82-002933 N82-19024 #

DFVLR-FB-79-41 N82-18961 #
DFVLR-FB-80-01 N82-18483 #
DFVLR-FB-80-10 N82-18199 #
DFVLR-FB-80-13 N82-18200 #
DFVLR-FB-80-25 N82-18551 #
DFVLR-FB-80-26 N82-18322 #
DFVLR-FB-80-29 N82-18191 #

DFVLR-MITT-79-17 N82-18198 #
DFVLR-MITT-80-07 N82-18190 #
DFVLR-MITT-80-14 N82-18861 #
DFVLR-MITT-80-15 N82-18214 #
DFVLR-MITT-80-16 N82-18484 #
DFVLR-MITT-81-03 N82-18399 #
DFVLR-MITT-81-08 N82-18485 #

DGLR-81-025 N82-18187 #
DGLR-81-026 N82-18188 #
DGLR-81-035 N82-18212 #
DGLR-81-103 N82-18482 #

DMI-CLIMATOL-PAPERS-8 N82-18638 #

DNA-5687F N82-18458 #
DNA-5701T-1 N82-18768 #

DOE/CS-20232/1 N82-18701 #
DOE/CS-30247/1 N82-18703 #

DOE/EIA-11075/T2 N82-18924 #

DOE/ER-1388/504 N82-19021 #
DOE/ER-01388/860 N82-19023 #
DOE/ER-01545/314 N82-19022 #
DOE/ER-01629/T1 N82-18993 #
DOE/ER-02894/1 N82-19024 #
DOE/ER-03342/9 N82-19025 #
DOE/ER-06027/13 N82-19020 #
DOE/ER-10578/1 N82-18354 #
DOE/ER-10583/2 N82-19026 #
DOE/ER-10617/1 N82-19019 #

DOE/ET-10571/4 N82-18378 #
DOE/ET-13148/T1 N82-18352 #
DOE/ET-15324/T2 N82-18380 #
DOE/ET-15416/2-VOL-1 N82-18704 #
DOE/ET-15416/2-VOL-2 N82-18705 #
DOE/ET-17089/T2 N82-18706 #

DOE/EV-10243/1 N82-18655 #
DOE/EV-70029/15 N82-18650 #

DOE/NASA/0100-1 N82-18693* #
DOE/NASA/0149-2 N82-18690* #
DOE/NASA/0180-4 N82-18696* #
DOE/NASA/0224-1-VOL-4 N82-18688* #
DOE/NASA/51040-36 N82-18691* #

DOE/SF-11438/T1-VOL-2 N82-18702 #

DOT-HS-805980-VOL-2 N82-18233 #

DP-1611 N82-18353 #

DRIC-T-6478 N82-18504

DRSMI/RD-81-18-TR N82-18307 #

DRSMI/RG-81-11-TR N82-18196 #

DT-7814-2 N82-18647 #

DTNSRDC-81/070 N82-18634 #

DVFLR-MITT-80-12 N82-18600 #

D6-41186-9 N82-18327* #
D180-25471-1 N82-18873 #
D180-26864-1 N82-18309* #

E-059 N82-18612* #
E-082 N82-18222* #
E-969-81-02 N82-18856* #
E-1047 N82-18694* #
E-1058 N82-18178* #
E-1112 N82-18311* #

ECRC/R-1440 N82-18425 #

EPA-450/4-81-032 N82-18762 #
EPA-460/3-81-026 N82-18864 #
EPA-460/3-81-027 N82-18865 #
EPA-600/1-81-068 N82-18863 #
EPA-600/2-81-106 N82-18362 #
EPA-600/2-81-144 N82-18575 #
EPA-600/2-81-162 N82-18566 #
EPA-600/2-81-167-VOL-1 N82-19110 #
EPA-600/2-81-180 N82-18410 #
EPA-600/2-81-188 N82-18408 #
EPA-600/2-81-189 N82-18756 #
EPA-600/2-81-206 N82-18568 #
EPA-600/2-81-217 N82-18678 #
EPA-600/2-81-221 N82-18411 #
EPA-600/2-81-223 N82-18677 #
EPA-600/2-81-234 N82-18574 #
EPA-600/2-81-242 N82-18422 #
EPA-600/3-81-041 N82-18761 #
EPA-600/4-81-040 N82-18765 #
EPA-600/7-81-003D N82-18753 #
EPA-600/7-81-012D N82-18766 #
EPA-600/7-81-042 N82-18740 #
EPA-600/7-81-043-VOL-2 N82-18442 #
EPA-600/7-81-047 N82-18736 #
EPA-600/7-81-048 N82-18739 #
EPA-600/7-81-050 N82-18738 #
EPA-600/7-81-053 N82-18735 #
EPA-600/7-81-057 N82-18441 #
EPA-600/7-81-058 N82-18737 #
EPA-600/7-81-062 N82-18440 #
EPA-600/7-81-066 N82-18734 #
EPA-600/7-81-068 N82-18679 #
EPA-600/7-81-106A-VOL-1 N82-18752 #
EPA-600/7-81-111A N82-18730 #
EPA-600/7-81-116 N82-18680 #
EPA-600/7-81-142 N82-18751 #
EPA-600/7-81-154 N82-18758 #
EPA-600/7-81-161 N82-18438 #
EPA-600/7-81-162 N82-18414 #
EPA-600/7-81-164 N82-18439 #
EPA-600/7-81-166 N82-18764 #
EPA-600/8-81-020 N82-18750 #
EPA-600/9-81-032 N82-18763 #
EPA-902/4-81-002 N82-18767 #
EPA-906/9-81-003 N82-19111 #

EPA/AA/CTAB/PA/81-16 N82-18412 #

EPL-81-4/ONR-81-4 N82-18567 #

EPRI-NP-81-19-LD N82-18984 #

EPRI-RP-1441-1 N82-18984 #

ER81-4053 N82-18609 #

ESA-CR(P)-1463 N82-18480 #
ESA-CR(P)-1464 N82-18530 #
ESA-CR(P)-1467 N82-18405 #
ESA-CR(P)-1468 N82-18564 #
ESA-CR(P)-1470-VOL-1 N82-18618 #
ESA-CR(P)-1470-VOL-2 N82-18619 #
ESA-CR(P)-1472 N82-19099 #
ESA-CR(P)-1473 N82-18531 #
ESA-CR(P)-1474 N82-18640 #
ESA-CR(P)-1475 N82-18481 #
ESA-CR(P)-1476 N82-18669 #

ESA-TT-667 N82-18198 #
ESA-TT-676 N82-18961 #
ESA-TT-677 N82-18483 #
ESA-TT-680 N82-18190 #
ESA-TT-683 N82-18199 #
ESA-TT-685 N82-18200 #
ESA-TT-689 N82-18600 #
ESA-TT-691 N82-18861 #
ESA-TT-697 N82-18271 #
ESA-TT-700 N82-18362 #
ESA-TT-702 N82-18551 #
ESA-TT-703 N82-18322 #
ESA-TT-705 N82-18214 #
ESA-TT-706 N82-18484 #
ESA-TT-708 N82-18191 #
ESA-TT-715 N82-18796 #

ESA-TT-716 ... N82-18399 #

ESA/FSLP-EX-001 ... N82-18234* #

ESD-TR-81-150 ... N82-18521 #
ESD-TR-81-210 ... N82-18886 #
ESD-TR-81-269 ... N82-18476 #

ESS/SS-1006 ... N82-18584 #

FAA-EM-82-6 ... N82-18219 #

FAA-G-2100/1B ... N82-18518 #
FAA-G-2100/2A ... N82-18518 #
FAA-G-2100/3A ... N82-18518 #
FAA-G-2100/4B ... N82-18518 #
FAA-G-2100/5A ... N82-18518 #
FAA-G-2100C ... N82-18518 #

FAA-RD-81-46 ... N82-18230 #

FAA/RD-81/4 ... N82-18218 #

FCTC/TR-81/22 ... N82-18895 #
FCTC/TR-81/23 ... N82-18902 #
FCTC/TR-81/24 ... N82-18904 #

FCVS78-VSR867 ... N82-18894 #
FCVS78-VSR871 ... N82-18903 #

FFA-TN-AU-1661-PT-1 ... N82-18306 #

FFA-TN-HU-2189-PT-5 ... N82-18720 #
FFA-TN-HU-2262-PT-1 ... N82-18798 #
FFA-TN-HU-2262-PT-3 ... N82-18840 #
FFA-TN-HU-2262-PT-4 ... N82-18721 #

FFA-134 ... N82-18719 #

FHWA-CT-81-4 ... N82-18433 #

FHWA/RD-80/065 ... N82-18435 #
FHWA/RD-80/172 ... N82-18427 #
FHWA/RD-81/136 ... N82-18428 #
FHWA/RD-81/164 ... N82-18434 #

FHWA/TX-81/13-208-1 ... N82-18436 #

FOA-A-30027-E2 ... N82-18490 #

FOA-B-20034-D8 ... N82-18985 #

FOA-C-20431-T1 ... N82-19094 #
FOA-C-30240-E1/E3 ... N82-18672 #
FOA-C-53005-H2 ... N82-18942 #
FOA-C-54035-H1 ... N82-18744 #
FOA-C-54036-H1 ... N82-18745 #
FOA-C-58010-H1 ... N82-18662 #

FOA-REPTS-VOL-15-NO-4 ... N82-18985 #

FR-80-39/EE ... N82-18764 #

FSGTR/INT-112 ... N82-18360 #

FSRN-INT-318 ... N82-18426 #

FSRN-PSW-347 ... N82-18567 #

FSU-MET-STU-81-3 ... N82-18842 #
FSU-MET-STU-81-4 ... N82-18843 #

FTD-ID(RS)T-1135-81 ... N82-18470 #
FTD-ID(RS)T-1293-81 ... N82-18791 #

GAO/MASAD-82-2 ... N82-18662 #

GAO/PLRD-82-4 ... N82-18207 #

GIT-ICS-81/14 ... N82-19098 #
GIT-ICS-81/15 ... N82-18892 #
GIT-ICS-81/16 ... N82-18891 #

GL-3298 ... N82-18593 #

GPO-55-278 ... N82-18205 #
GPO-85-553 ... N82-18450 #

GRI-79/0105.1 ... N82-18725 #
GRI-79/0105.2 ... N82-18726 #

GRI-80/0056 ... N82-18407 #
GRI-80/0059 ... N82-18731 #
GRI-80/0064 ... N82-18553 #
GRI-80/0066 ... N82-18409 #

GTR-3932 ... N82-18690* #

G22-V-2 ... N82-18233 #

H-81-06 ... N82-18312* #

HAC-W-43413 ... N82-18516 #

HDL-CR-80-384-2 ... N82-18562 #

HL81/515 ... N82-18372 #

HTS/81/10 ... N82-18549 #

HUD-0001996 ... N82-19107 #
HUD-0002055 ... N82-19108 #

IDA-P-A1621 ... N82-18206 #

IDA-P-1586 ... N82-18462 #

IDA/HQ-81-23521 ... N82-18462 #
IDA/HQ-81-23696 ... N82-18208 #

IEEE-81CH1658-4 ... N82-18534* #

IFKKI-81/2 ... N82-19112 #

INCO/UP-1-81-83155-U ... N82-18884 #

IND-FB-107 ... N82-18528 #

INPE-2092-RPE/322 ... N82-19061 #
INPE-2095-RPE/325 ... N82-18923 #
INPE-2097-RPE/327 ... N82-18216 #
INPE-2099-RPE/329 ... N82-18880 #
INPE-2103-RPE/330 ... N82-18558 #
INPE-2104-RPE/331 ... N82-18881 #
INPE-2105-RPE/332 ... N82-19064 #
INPE-2108-RPE/334 ... N82-19065 #
INPE-2111-RPE/336 ... N82-18765 #
INPE-2113-RPE/337 ... N82-18778 #
INPE-2114-RPE/338 ... N82-18783 #
INPE-2115-RPE/339 ... N82-19063 #
INPE-2116-RPE/340 ... N82-18456 #
INPE-2117-RPE/341 ... N82-18661 #
INPE-2118-RPE/342 ... N82-18662 #
INPE-2121-RPE/345 ... N82-18845 #
INPE-2123-RPE/347 ... N82-18512 #
INPE-2128-RPE/352 ... N82-18605 #
INPE-2129-RPE/353 ... N82-19062 #
INPE-2131-RPE/355 ... N82-18542 #
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Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

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For related information see also *34 Fluid Mechanics and Heat Transfer*

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For related information see also *14 Ground Support Systems and Facilities (Space)*.

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

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For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

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Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.
For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

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For related information see also *77 Thermodynamics and Statistical Physics.*

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ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.

For related information see also *Physics.*

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Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.

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Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

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Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

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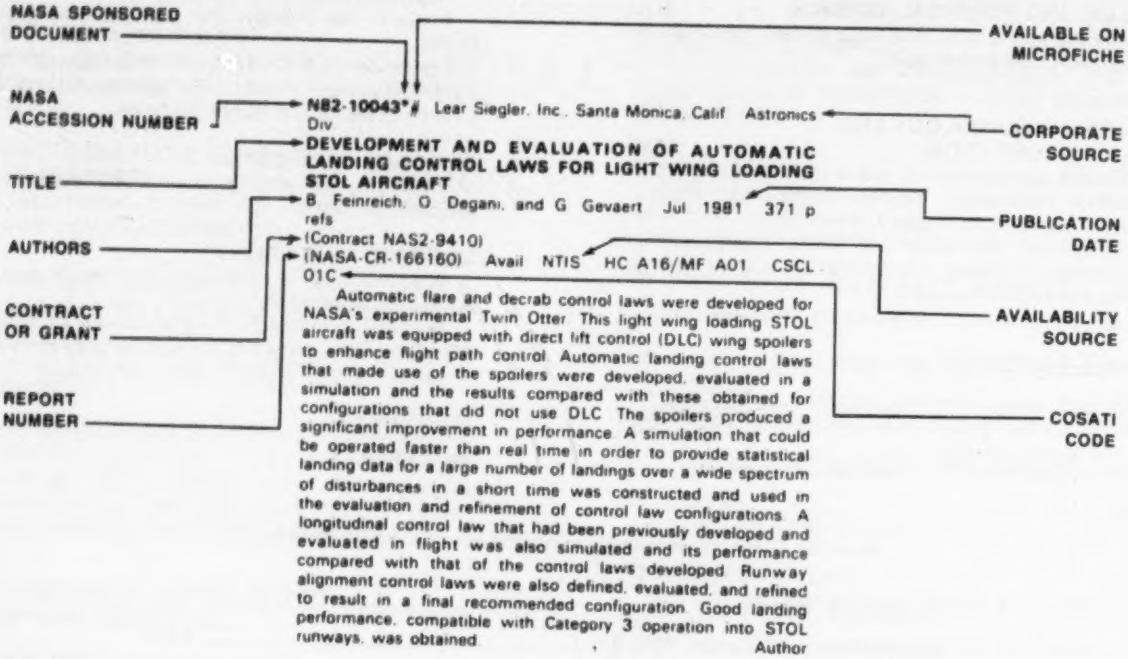
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DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT

B Feinreich, O Degani, and G Gevaert Jul 1981 371 p refs

(Contract NAS2-9410)

(NASA-CR-166160) Avail NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC The spoilers produced a significant improvement in performance A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration Good landing performance, compatible with Category 3 operation into STOL runways, was obtained Author

VOLUME 20 NUMBER 10/MAY 23, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-19131* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY (SUPPLEMENT 143)
Jan. 1982 85 p
(NASA-SP-7037(143)) Avail: NTIS HC $5.00 CSCL 01A

This bibliography lists 254 reports, articles, and other documents introduced into the NASA scientific and technical information system in December 1981. A.R.H.

N82-19132*# National Aeronautics and Space Administration, Washington, D. C.
BIBLIOGRAPHY OF NASA PUBLISHED REPORTS ON GENERAL AVIATION, 1975 TO 1981
Jun. 1981 277 p
(NASA-TM-83307) Avail: NTIS HC A13/MF A01 CSCL 01B

This bibliography lists 478 documents which relate to all heavier-than-air fixed wing aircraft exclusive of military types and those used for commercial air transport. An exception is the inclusion of commuter transport aircraft types within the general aviation category. NASA publications included in this bibliography are: conference publications (CP), reference publications (RP), technical memorandums (TM, TMX), technical notes (TN), technical papers (TP), and contractor reports (CR). In addition, papers and articles on NASA general aviation programs published by technical societies (AIAA, SAE, etc.) are included, as well as those listed in NASA's Scientific and Technical Aerospace Reports (STAR) Journal. Author and subject indexes are also provided to facilitate use of the bibliography. T.M.

N82-19133*# Oklahoma Univ., Norman. School of Aerospace Mechanical and Nuclear Engineering.
AN EXPERIMENTAL INVESTIGATION OF FLOW SURROUNDING AN AIRFOIL WITH A JET EXHAUSTING FROM THE LOWER SURFACE Final Report
A. Krothapalli and D. Leopold Jan. 1982 58 p refs
(Grant NsG-2111)
(NASA-CR-166131) Avail: NTIS HC A04/MF A01 CSCL 01A

The aerodynamics of an airfoil with a rectangular jet issuing from the lower surface at seventy percent of the chord, with and without a ground plane was studied. Measurements include surface pressure on the airfoil and the total pressure profiles in the near wake. These measurements were made at jet to free stream velocity ratios ranging from 0.5 to 5.0. The measurements indicated a significant positive and negative pressure regions on the lower surface of the airfoil ahead and after the nozzle exit respectively. The extent and intensity of these regions increase with increase in velocity ratio for the range covered here. The upper surface pressure distribution with velocity ratio show no significant variation. The presence of the ground plane, for height h, greater than one chord seem to have little influence on the overall pressure distribution of the airfoil. The airfoil wake centerline moves up with velocity ratio as compared to that of the free airfoil (without the jet). B.W.

N82-19134*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTRIC FLIGHT SYSTEMS
Nelson J. Groom, ed. and Ray V. Hood, ed. Feb. 1982 269 p
Proceedings of workshop held in Hampton, Va., 9-10 Jun. 1981
(NASA-CP-2209; L-14965) Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating presentations on the development of electric flight systems for the all-electric aircraft and for spacecraft are presented. For individual titles, see N82-19135 through N82-19150.

N82-19135*# Lockheed-California Co., Burbank.
ELECTRIC FLIGHT SYSTEMS, OVERVIEW c08
Michael J. Cronin *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 61-94 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on electric flight systems are presented. Fuel consumption, the power plant assembly, flight control technology, electromechanical actuator systems and components of possible power systems are surveyed. J.D.H.

N82-19136*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
A PROPULSION VIEW OF THE ALL-ELECTRIC AIRPLANE c07
Robert P. Wagner *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 95-102 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

Materials illustrating a presentation on electric propulsion systems are presented. The electric engine and engine/generator configurations are described and NASA's role outlined. J.D.H.

N82-19137*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
POTENTIAL PROPULSION CONSIDERATIONS AND STUDY AREAS FOR ALL-ELECTRIC AIRCRAFT c07
Thomas G. Lenox *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 103-112 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

Materials illustrating a presentation on all-electric aircraft propulsion systems are presented. Propulsion system impacts on aircraft design and areas requiring further study are outlined. J.D.H.

N82-19138*# Westinghouse Electric Corp., Lima, Ohio. Air All-Electronics Div.
A LOOK INTO THE FUTURE: THE POTENTIAL OF THE ALL-ELECTRIC SECONDARY POWER SYSTEM FOR THE ENERGY EFFICIENT TRANSPORT c07

Alan E. King *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 113-124 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on the all-electric aircraft power system are presented. The advantages of the system and the planning time table are outlined. J.D.H.

N82-19139*# Sundstrand Aviation-Rockford, Ill.
THE 400-HERTZ CONSTANT-SPEED ELECTRICAL GENERATION SYSTEMS **c33**
Richard McClung *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 125-146 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 09C

Materials illustrating a presentation on 400 Hz constant speed generation systems are presented. The system features are outlined, components and functioning described, and display graphics illustrated. J.D.H.

N82-19140*# AiResearch Mfg. Co., Torrance, Calif.
ELECTRIC ECS **c05**
Dale O. Moeller *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 147-154 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on electric environmental control systems for electric flight systems are presented. Requirements are outlined and schematics presented. J.D.H.

N82-19141*# Hamilton Standard, Windsor Locks, Conn.
ENVIRONMENTAL CONTROL SYSTEMS **c05**
Fred M. Rosenbush *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 155-188 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on environment control systems for electric flight systems are presented. Schematics and flow diagrams of fresh air source and air conditioning systems, and vapor cycle and air cycle parts lists are presented. J.D.H.

N82-19142*# Honeywell, Inc., Clearwater, Fla.
OVERVIEW OF HONEYWELL ELECTROMECHANICAL ACTUATION PROGRAMS **c05**
Charles Wyllie *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 163-187 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on electromechanical actuation programs (EMA) are presented. The development history is outlined. Space shuttle flight control systems and the advantages of EMAS, and EMA technology status and development requirements are outlined. J.D.H.

N82-19143*# Rockwell International Corp., Cedar Rapids, Iowa.
DIGITAL FLIGHT CONTROLS **c08**
John C. Hall *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 189-212 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on digital flight controls for electric flight systems are presented. System architecture and design criteria are outlined, and components described. J.D.H.

N82-19144*# Boeing Commercial Airplane Co., Seattle, Wash.
ELECTRIC FLIGHT SYSTEMS **c33**
C. William Clay *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 213-234 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 09C

Materials used to illustrate a presentation on the development of electric flight systems are presented. Systems concepts are outlined. J.D.H.

N82-19145*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENGINE TECHNOLOGY **c07**
Anthony C. Hoffman *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 235-240 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

Materials used in a presentation on development of engine technology for electric flight systems are presented. Component and system technology issues, NASA's role, and flight test requirements are outlined. J.D.H.

N82-19146*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POWER SYSTEMS **c05**
Robert Finke *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 241-246 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation of the development of power systems are presented. The technology issues and tradeoffs, the role of NASA, and testing requirements are outlined. J.D.H.

N82-19147*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENVIRONMENTAL CONTROL SYSTEMS **c54**
Frank Hrach *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 247-252 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 06K

Materials illustrating a presentation on environmental control systems for electric flight systems are presented. The major technology issues, major development and application steps, the role of NASA, and required flight testing are outlined. J.D.H.

N82-19148*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ELECTROMECHANICAL ACTUATORS **c08**
James Bigham *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 253-258 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on the development of electromechanical actuators (EMA) for electric flight systems are presented. Technology issues are identified, and major steps relative to EMA development, NASA's role, and a technology procurement plan are outlined. J.D.H.

N82-19149*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DIGITAL FLIGHT CONTROLS **c08**
Billy Dove *In its* Elec. Flight Systems Feb. 1982 p 259-261 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating the presentation on digital flight controls are presented. Technology issues, the role of NASA, and steps in the development of flight controls are outlined. J.D.H.

N82-19150*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTRIC FLIGHT SYSTEMS INTEGRATION **c08**
Ray V. Hood *In its* Elec. Flight Systems Feb. 1982 p 263-268 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on the integration of components and subsystems of electric flight systems are presented. The technology issues are outlined, and near and far term implications of issues affecting the systems integration are outlined. J.D.H.

N82-19151*# Kentron International, Inc., Hampton, Va.
A COMPUTER PROGRAM FOR WING SUBSONIC AERODYNAMIC PERFORMANCE ESTIMATES INCLUDING ATTAINABLE THRUST AND VORTEX LIFT EFFECTS Interim Report
Harry W. Carlson and Kenneth B. Walkley Washington NASA Mar. 1982 62 p refs
(Contract NAS1-16000)
(NASA-CR-3515) Avail: NTIS HC A04/MF A01 CSCL 01B

Numerical methods incorporated into a computer program to provide estimates of the subsonic aerodynamic performance of twisted and cambered wings of arbitrary planform with attainable thrust and vortex lift considerations are described. The computational system is based on a linearized theory lifting surface solution which provides a spanwise distribution of theoretical leading edge thrust in addition to the surface distribution of perturbation velocities. The approach used relies on a solution by iteration. The method also features a superposition of independent solutions for a cambered and twisted wing and a flat wing of the same planform to provide, at little additional expense, results for a large number of angles of attack or lift coefficients. A previously developed method is employed to assess the portion of the theoretical thrust actually attainable and the portion that is felt as a vortex normal force. B.W.

N82-19152# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

LA RECHERCHE AEROSPATIALE, BIMONTHLY BULLETIN NUMBER 1981-3, MAY - JUNE 1981

Claude Sevestre, ed. Paris ESA Oct. 1981 80 p refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 143-221 Sponsored by ESA
(ESA-TT-714) Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, PARIS FF 45

Advances in the aerospace industry are reviewed. Computation of vortex sheet rollup and transonic viscous flow are discussed. Topics also cover aircraft optimal control for gunnery, an algorithm for structural vibration mode calculation, aircraft antistatic protection testing, the modification of a transonic wind tunnel, and testing ventilated nozzle models. For individual titles, see N82-19153 through N82-19159.

N82-19153# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

ROLLING UP OF VORTEX SHEETS FROM THE EDGES OF LIFTING SURFACES c02

R. Legendre *In its* La Rech. Aerospatiale Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 3-7 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, May-Jun. 1981" p 143-147 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Calculations of vortex sheets in three-dimensional unsteady flows of incompressible liquids are considered. The correct adaptation of calculations to the interpretation of experimental facts, relating to the transient periods preceding the establishment of permanent flows, is discussed. Several methods already available for calculating incompressible fluid flow around a lifting surface, causing the release of vortices, are criticised. An extension to subsonic flows is shown possible when Prandtl-Glavert linearization is justified by data pertinent to the problem. Author (ESA)

N82-19154# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

MULTIVARIABLE AIRCRAFT CONTROL BY MANEUVER COMMANDS: AN APPLICATION TO AIR TO SURFACE GUNNERY c08

Binh DangVu *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 9-19 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 149-159 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Aircraft control where pilot commands are variables directly related to aircraft motion in opposition to deflection angles of control surfaces is described. Linear optimal control theory is applied so as to improve flight qualities and reduce the work load of the pilot. A control system for sideslip, rate of roll, and rate of pitch was tested in numerical simulation and its efficiency for aiming in air-to-surface gunnery was assessed. Results show that control of the rate of pitch is well adapted for cancelling longitudinal aiming devitions, but that control of yaw rate is preferable to roll for cancelling lateral deviations. Another system obtained by integrating the flight control and fire control systems is also suggested. Author (ESA)

N82-19155# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

STRONG MATCHING METHOD FOR COMPUTING TRANSONIC VISCOUS FLOWS INCLUDING WAKES AND SEPARATIONS: LIFTING AIRFOILS c02

J. C. LeBalleur *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 21-45 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 161-185 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

A general method is presented for computing lifting two-dimensional steady viscous flows with wakes and possibly separations inside viscous layers. The method uses a transonic potential calculation, strongly interacting with a defect integral method giving the viscous correction to apply inside boundary layers, laminar or turbulent, or inside dissymmetrical wakes. The mathematical model for matching, the viscous model for averaged mean velocities with reverse flow and for turbulent closure in nonequilibrium layers, and the different numerical solution techniques are described. The numerical coupling is reached through in iterative relaxation technique, either direct or semi-inverse according to the local shape parameters of the boundary layer or of the dissymmetrical wake. The wake geometry is calculated. The viscous mean flow is thoroughly determined and visualized. Examples of application to subsonic or supercritical airfoils, and to separated trailing-edges, are given. Author (ESA)

N82-19156# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

ELECTRICAL GROUND TESTING OF AIRCRAFT ANTISTATIC PROTECTION c03

A. Bruere *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 47-56 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 187-196 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Methods of ensuring aircraft protection against electrostatic spurious phenomena are reviewed and a device for ground testing of this protection is described. The equipment provides for checking the surface resistance of antistatic treatments as well as the quality of the electrical connections between the various components of the external structure and the aircraft potential reference point. Problems in electrostatic quality control for aircraft when testing in the presence of a finishing coat of paint are emphasized. The prototype device is depicted while operating and performance principles are explained. Author (ESA)

N82-19157# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

A SUBSPACE ITERATION ALGORITHM FOR SPINNING STRUCTURE VIBRATION MODE COMPUTATION c39

D. Osmont and L. Simon *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 57-62 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 197-202 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

A subspace inverse iteration algorithm is presented. Calculations for approximations of vibration modes for a discretized rotating structure, using finite elements, are explained. The equation is constructed with eigenvalues and eigenvectors from which it is easy to deduce the vibration modes. algorithm is discussed. The matrices of mass gyroscopic coupling and rigidity for mechanical systems discretized using finite elements are of large dimension and have a band structure. The algorithm, which simultaneously calculates several eigenvectors, is well adapted to large systems. It can also be adapted to damped structures for which a symmetrical, structural, damped matrix is superposed on the gyroscopic coupling matrix. Author (ESA)

N82-19158# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

INDUCTION DRIVEN TRANSONIC WIND TUNNEL T2: OPERATION AT ROOM TEMPERATURE AND CRYOGENIC ADAPTATION c09

A. Mignosi, D. Faulmann, and A. Seraudie *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 63-74 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 203-215 (For primary document see N82-19152 10-01)

Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

The transformation of the induction driven wind tunnel T2 (0.4 m X 0.4 m) into a cryogenic intermittent wind tunnel which uses high pressure air as driving gas and nitrogen as coolant is described. The operating mode and optimization of the wind tunnel for low temperature operation are discussed. Theoretical and experimental aspects of the transformed facilities, i.e., modification of the circuit, thermal insulation techniques, liquid nitrogen injection, startup process, cryoganic operating mode, and expected performance, are presented. Author (ESA)

N82-19159# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

TESTING VENTILATED NOZZLE MODELS WITH SUPERSONIC PRIMARY FLOW c02

J. Paulon and J. Perucchini *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 75-79 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 217-221 (For primary document see N82-19152 10-01)

Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Ventilated nozzles, i.e., aircraft engine ejectors with, at the periphery of the engine flux, a low rate flow from a circuit different from that passing through the compressor, the combustion chamber and the turbine, are considered. Theoretical schemes that take precise and correct account of the evolution of the two fluxes in order to deduce nozzle efficiency and jet engine thrust are examined. Simplifying hypotheses are discussed and tests carried out in an aerothermodynamic laboratory to confirm them are described. Results define the domain of influence of downstream disturbances which can modify nozzle performance. Author (ESA)

N82-19160# Network Analysis Corp., Vienna, Va.

NATIONAL AIRSPACE DATA INTERCHANGE NETWORK (NADIN) SUPPORT OF REMOTE MAINTENANCE MONITORING SYSTEM (RMMS) Final Report

Dec. 1981 111 p refs

(Contract DOT-FA79WA-4335)

(AD-A109125; NAC/FR-303J/01; FAA-RD-81-109) Avail: NTIS HC A06/MF A01 CSCL 05/2

National Airspace Data Interchange Network (NADIN) architectural enhancements necessary to support the Remote Maintenance Monitoring System (RMMS) and MMS programs are described. Several alternative approaches are formulated. These alternatives are compared and recommendations are made. It is found that: The NADIN backbone has sufficient capacity to handle initial RMMS traffic at adequate performance levels; An X.25 compatible interface for the NADIN and MPS connection is recommeeded; Additional frame routing capabilities at the NADIN concentrator and front end processors are required; and Future MPS communications will be best served by a fully distributed packet switched NADIN capable of supporting complete X.25 functions. Author (GRA)

N82-19161# Aeronautical Research Labs., Melbourne (Australia).

AERONAUTICAL RESEARCH LABORATORIES STRUCTURES DIVISION Annual Report, 1979 - 1980

F. H. Hooke, ed. Apr. 1981 46 p

(AD-A109049; ARL/STRUC-NOTE-473) Avail: NTIS HC A03/MF A01 CSCL 01/3

This report describes the functions, organization, staffing, unclassified research activities and ad-hoc investigations in progress in the Structures Division, Aeronautical Research Laboratories during the year 1979/80. Author (GRA)

N82-19162# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.

THE EUROPEAN AIRBUS: A CHALLENGE TO THE AMERICAN COMMERCIAL AIRCRAFT INDUSTRY [DER EUROPAEISCHE AIRBUS EINE HERAUSFORDERUNG AN DIE AMERIKANISCHE VERKEHRSFLUG ZEUG-INDUSTRIE]

Heribert Flosdorff 1981 56 p Partly in GERMAN and ENGLISH Presented at 7th A.W. Quick-B.H. Geothhert vorfesung, Aachen, 18 Feb. 1981

(MBB-UH-01-81-O) Avail: NTIS HC A04/MF A01

The challenge and competition of the European Airbus to the American aircraft industry is discussed. The history of the colaboration between western European countries in the development, planning, construction, and management of short and intermediate haul commercial jet airplanes is described. It is contended that sales to third world, oriental, and south east Asian countries, and the expansion to wide bodied airplanes established the airbus industry as an firm competitior on the world market. The wide bodied two engine aircraft shows considerable technical superiority and obvious aerodynamics improvements as compared to technologically equal wide bodied jets. The following comparisons with American similar aircrafts are made: performance reliability; flight operations data; aerodynamic standards; fuel consumption; noise absorption; weight/actual load operating span; production efficiency and strategy; A 310 advanced technology; cockpits; warning systems; and marketing potentials. Transl. by E.A.K.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-19163 California Univ., Berkeley.

NUMERICAL STUDY OF INCOMPRESSIBLE SLIGHTLY VISCOUS FLOW PAST BLUNT BODIES AND AIRFOILS Ph.D. Thesis

Angela Yit Lean Cheer 1981 94 p

Avail: Univ. Microfilms Order No. 8200050

A grid free numerical method is used to simulate incompressible flow at high Reynolds number. The numerical method simulates the flow inside the boundary layer by vortex sheets and the flow outside this layer by vortex blobs. The algorithm produces a smooth transition between the sheets and the blobs. The accuracy of this hybrid numerical method is tested in several numerical experiments. In the first experiment, the algorithm is used to simulate slightly viscous flow past a circular cylinder. In the second experiment, the algorithm is used to simulate flow past a Joukowski airfoil at various angles of attack. In the latter case, there is no evidence of 'blow-up' of the flow at the trailing edge of the airfoil. In both experiments, the calculated flow and its functionals (such as lift and drag coefficients) are in good agreement with both theoretical results and wind tunnel experiments. Dissert. Abstr.

N82-19164*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SPANWISE LOADING DISTRIBUTION AND WAKE VELOCITY SURVEYS OF A SEMI-SPAN WING

Fort F. Felker, III, Raymond A. Piziali (Army Aviation Research and Development Command, Moffett Field, Calif.), and Jay K. Gall (Informatics Inc., Moffett Field, Calif.) Feb. 1982 197 p refs Prepared in cooperation with Army Aviation Research and Development Command

(NASA-TM-84213; A-8819; USAAVRADCOM-TR-81-A-1) Avail: NTIS HC A09/MF A01 CSCL 01A

The spanwise distribution of bound circulation on a semi-span wing and the flow velocities in its wake were measured in a wind tunnel. Particular attention was given to documenting the flow velocities in and around the development tip vortex. A two-component laser velocimeter was used to make the velocity measurements. The spanwise distribution of bound circulation, three components of the time-averaged velocities throughout the near wake their standard deviations, and the integrated forces and moments on a metric tip as measured by an internal strain gage balance are presented without discussion. Author

N82-19165*# Old Dominion Univ., Norfolk, Va.
EXPERIMENTAL STUDY OF DELTA WING LEADING-EDGE DEVICES FOR DRAG REDUCTION AT HIGH LIFT
Thomas D. Johnson, Jr. and Dhanvada M. Rao Feb. 1982 139 p refs
(Contract NGR-47-003-052)
(NASA-CR-165846) Avail: NTIS HC A07/MF A01 CSCL 01A

The drag reduction devices selected for evaluation were the fence, slot, pylon-type vortex generator, and sharp leading-edge extension. These devices were tested on a 60 degree flatplate delta (with blunt leading edges) in the Langley Research Center 7- by 10-foot high-speed tunnel at low speed and to angles of attack of 28 degrees. Balance and static pressure measurements were taken. The results indicate that all the devices had significant drag reduction capability and improved longitudinal stability while a slight loss of lift and increased cruise drag occurred. R.J.F.

N82-19166*# Kansas Univ. Center for Research, Inc., Lawrence.
A VORTEX-FILAMENT AND CORE MODEL FOR WINGS WITH EDGE VORTEX SEPARATION
Jenn-Louh Pao and C. Edward Lan Feb. 1982 130 p refs
(Contract NCC1-18)
(NASA-CR-165847) Avail: NTIS HC A07/MF A01 CSCL 01A

A vortex filament-vortex core method for predicting aerodynamic characteristics of slender wings with edge vortex separation was developed. Semi-empirical but simple methods were used to determine the initial positions of the free sheet and vortex core. Comparison with available data indicates that: (1) the present method is generally accurate in predicting the lift and induced drag coefficients but the predicted pitching moment is too positive; (2) the spanwise lifting pressure distributions estimated by the one vortex core solution of the present method are significantly better than the results of Mehrotra's method relative to the pressure peak values for the flat delta; (3) the two vortex core system applied to the double delta and strake wings produce overall aerodynamic characteristics which have good agreement with data except for the pitching moment; and (4) the computer time for the present method is about two thirds of that of Mehrotra's method. Author

N82-19167*# Boeing Military Airplane Development, Seattle, Wash.
TRANSONIC PERTURBATION ANALYSIS OF WING-FUSELAGE-NACELLE-PYLON CONFIGURATIONS WITH POWERED JET EXHAUSTS
J. C. Wai, C. C. Sun, and H. Yoshihara Feb. 1982 67 p refs
(Contract NAS1-15887)
(NASA-CR-165852) Avail: NTIS HC A04/MF A01 CSCL 01A

A method using a transonic small disturbance code with successive line over-relaxation is described for treating wing/fuselage configurations with a nacelle/pylon/powered jet. Examples illustrating its use for the NASA transport research model are given. Reasonable test/theory comparisons were obtained. Author

N82-19168*# Texas A&M Univ., College Station. Dept. of Aerospace Engineering.
INVERSE TRANSONIC AIRFOIL DESIGN METHODS INCLUDING BOUNDARY LAYER AND VISCOUS INTERACTION EFFECTS Semiannual Progress Report, 1 Aug. 1981 - 31 Jan. 1982
Leland A. Carlson Feb. 1982 22 p refs
(Grant NsG-1174)
(NASA-CR-168579; TAMRF-3224-82-01) Avail: NTIS HC A02/MF A01 CSCL 01A

A body-fitted grid embedment technique applicable to inviscid transonic airfoil flow field analysis was developed and verified through a series of tests. Test cases used to verify the technique show that the accuracy of the solution was increased by grid embedding. This enhancement of the solution is especially true when small supercritical zones occur which cannot be adequately described using the main grid only. Results obtained with the SKANFP full potential program are considered with regard to the massive separated flow and high lift and the undesirable unrealistic 'bump' in the vicinity of the separation point due to a mismatch between the unseparated and separated pressure distributions. Techniques used to eliminate this feature are discussed. A.R.H.

N82-19169*# Pennsylvania State Univ., University Park. Dept. of Aerospace Engineering.
APPLICATION OF AN AIRFOIL STALL FLUTTER COMPUTER PREDICTION PROGRAM TO A THREE-DIMENSIONAL WING: PREDICTION VERSUS EXPERIMENT M.S. Thesis
Anthony J. Muffoletto Mar. 1982 136 p refs
(Grant NsG-3304)
(NASA-CR-168586) Avail: NTIS HC A07/MF A01 CSCL 01A

An aerodynamic computer code, capable of predicting unsteady and C sub m values for an airfoil undergoing dynamic stall, is used to predict the amplitudes and frequencies of a wing undergoing torsional stall flutter. The code, developed at United Technologies Research Corporation (UTRC), is an empirical prediction method designed to yield unsteady values of normal force and moment, given the airfoil's static coefficient characteristics and the unsteady aerodynamic values, alpha, A and B. In this experiment, conducted in the PSU 4' x 5' subsonic wind tunnel, the wing's elastic axis, torsional spring constant and initial angle of attack are varied, and the osciliation amplitudes and frequencies of the wing, while undergoing torsional stall flutter, are recorded. These experimental values show only fair comparisons with the predicted responses. Predictions tend to be good at low velocities and rather poor at higher velocities. Author

N82-19170*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 1: EXECUTIVE SUMMARY
5 Dec. 1980 115 p refs Workshop held at Palo Alto, Calif., 3-5 Dec. 1980
(NASA-TM-84149) Avail: NTIS HC A06/MF A01 CSCL 01A

This presentation provides an overview of the NASA Rotorcraft Program as an introduction to the technical sessions of the Advanced Rotorcraft Technology Workshop. It deals with the basis for NASA's increasing emphasis on rotorcraft technology, NASA's research capabilities, recent program planning efforts, highlights of its 10-year plan and future directions and opportunities. L.F.M.

N82-19171*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 2: OPERATORS' VIEWS
5 Dec. 1980 111 p refs Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
(NASA-TM-84148) Avail: NTIS HC A06/MF A01 CSCL 01A

A special panel of helicopter users give presentations in 12 basic areas of helicopter applications. Development of the helicopter and the needs for future growth are discussed. L.F.M.

N82-19172*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 3: AERODYNAMICS AND STRUCTURES SESSION
4 Dec. 1980 285 p refs Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
(NASA-TM-84147) Avail: NTIS HC A13/MF A01 CSCL 01A

Advanced rotorcraft technology and tilt rotor aircraft were discussed. Rotorcraft performance, acoustics, and vibrations were discussed, as was the use of composite materials in rotorcraft structures. Rotorcraft aerodynamics, specifically the aerodynamic phenomena of a rotating and the aerodynamics of fuselages, was discussed. R.J.F.

N82-19173*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 4: FLIGHT CONTROL AVIONICS SYSTEMS AND HUMAN FACTORS
5 Dec. 1980 149 p refs Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
(NASA-TM-84146) Avail: NTIS HC A07/MF A01 CSCL 01A

Helicopter user needs, technology requirements and status, and proposed research and development action are summarized. It is divided into three sections: flight dynamics and control; all weather operations; and human factors. L.F.M.

N82-19174*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
SOME OBSERVATIONS OF SURFACE PRESSURES AND THE NEAR WAKE OF A BLUNT TRAILING EDGE AIRFOIL
R. V. Digumarthi, S. P. Koutsoyannis, and K. Karamcheti Jun. 1981 189 p refs
(Grants NsG-2007; NsG-2233)
(NASA-CR-168563; SU-JIAA-TR-39) Avail: NTIS HC A09/MF A01 CSCL 01A

Experiments with a truncated and untruncated airfoils of profiles NACA 640A10, were carried out in subsonic wind tunnels in a velocity range of 19m/s to 54m/s corresponding to Reynolds numbers of 200,000 to 468,000 based on the chord. Airfoil spanned the test section to achieve two dimensionality of the model. Velocity measurements, pressure measurements, and vortex shedding in the wake were measured using a hotwire and pressure transducers. The measured chordwise static pressure distribution on the smooth trailing edge airfoil along the midspan plane, agreed with the theoretical results calculated on the basis of the potential flow for that airfoil. Boundary layer profiles measured in the midspan plane, behind the maximum thickness of the airfoil show no separation of the flow. Spanwise distribution of the measured static pressure on the upper surface of the airfoil shows uniformity for both configurations with and without the boundary layer trip. This uniformity of pressure distribution and separation indicates that the flow on the airfoil was uniform and two dimensional in character. T.M.

N82-19175*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RAXJET: A COMPUTER PROGRAM FOR PREDICTING TRANSONIC, AXISYMMETRIC FLOW OVER NOZZLE AFTERBODIES WITH SUPERSONIC JET EXHAUSTS
Richard G. Wilmoth Feb. 1982 76 p refs
(NASA-TM-83235; L-14789) Avail: NTIS HC A05/MF A01 CSCL 01A

A viscous-inviscid interaction method to calculate the subsonic and transonic flow over nozzle afterbodies with supersonic jet exhausts was developed. The method iteratively combines a relaxation solution of the full potential equation for the inviscid external flow, a shock capturing-shock fitting inviscid jet solution, an integral boundary layer solution, a control volume method for treating separated flows, and an overlaid mixing layer solution. A computer program called RAXJET which incorporates the method, illustrates the predictive capabilities of the method by comparison with experimental data is described, a user's guide to the computer program is provided. The method accurately predicts afterbody pressures, drag, and flow field properties for attached and separated flows for which no shock induced separation occurs. E.A.K.

N82-19176# Weapons Systems Research Lab., Salisbury (Australia). Defence Research Centre.
COMPUTATIONAL AERODYNAMICS AT WEAPONS SYSTEMS RESEARCH LABORATORY
L. M. Sheppard Oct. 1981 14 p refs
(WSRL-0236-TM; AR-002-640) Avail: NTIS HC A02/MF A01

Computer related aerodynamic research is reviewed. Three digital computers were used, namely, WREDAC, IBM 7090, and IBM 370. Potential applications include unguided bombs, bomblets, bullets, mortars, rockets and shells, as well as terminally corrected release of external stores from aircraft and carriage of external stores on aircraft. S.L.

N82-19177*# Boeing Commercial Airplane Co., Seattle, Wash.
TRANSONIC PRESSURE MEASUREMENTS AND COMPARISON OF THEORY TO EXPERIMENT FOR THREE ARROW-WING CONFIGURATIONS Final Summary Report
Marjorie E. Manro Washington NASA Feb. 1982 550 p refs
(Contract NAS1-14962)
(NASA-CR-3434; D6-51079-1) Avail: NTIS HC A23/MF A01 CSCL 01A

Wind tunnel tests of arrow-wing body configurations consisting of flat, twisted, and cambered twisted wings, as well as a variety of leading and trailing edge control surface deflections, were conducted at Mach numbers from 0.4 to 1.05 to provide an experimental pressure data base for comparison with theoretical methods. Theory to experiment comparisons of detailed pressure distributions were made using state of the art attached flow methods. Conditions under which these theories are valid for these wings are presented. S.L.

N82-19178*# Hamilton Standard, Windsor Locks, Conn.
EVALUATION OF WIND TUNNEL PERFORMANCE TESTINGS OF AN ADVANCED 45 DEG SWEPT 8-BLADED PROPELLER AT MACH NUMBERS FROM 0.45 TO 0.85 Final Report
C. Rohrbach, F. B. Metzger, D. M. Black, and R. M. Ladden Washington NASA Mar. 1982 129 p refs
(Contract NAS3-20769)
(NASA-CR-3505) Avail: NTIS HC A07/MF A01 CSCL 01A

The increased emphasis of fuel conservation in the world and the rapid increase in the cost of jet fuel has stimulated a series of studies of both conventional and unconventional propulsion systems for commercial aircraft. The results of these studies indicate that a fuel saving of 15 to 30 percent may be realized by the use of an advanced high-speed turboprop (Prop-Fan) compared to aircraft equipped with high bypass turbofan engines of equivalent technology. The Prop-Fan propulsion system is being investigated as part of the NASA Aircraft Energy Efficient Program. This effort includes the wind tunnel testing of a series of 8 and 10-blade Prop-Fan models incorporate swept blades. Test results indicate efficiency levels near the goal of 80 percent at Mach 0.8 cruise and an altitude of 10.67 km (35,000 ft). Each successive swept model has shown improved efficiency relative to the straight blade model. The fourth model, with 45 deg swept blades reported herein, shows a net efficiency of 78.2 at the design point with a power loading of 301 kW/sq meter and a tip speed of 243.8 m/sec (800 ft/sec.). Author

N82-19179*# Boeing Commercial Airplane Co., Seattle, Wash.
COMPUTATION OF TRANSONIC POTENTIAL FLOW ABOUT 3 DIMENSIONAL INLETS, DUCTS, AND BODIES
Theodore A. Reyhner Washington NASA Mar. 1982 94 p refs
(NASA-CR-3514; D6-49848) Avail: NTIS HC A05/MF A01 CSCL 01A

An analysis was developed and a computer code, P465 Version A, written for the prediction of transonic potential flow about three dimensional objects including inlet, duct, and body geometries. Finite differences and line relaxation are used to solve the complete potential flow equation. The coordinate system used for the calculations is independent of body geometry. Cylindrical coordinates are used for the computer code. The analysis is programmed in extended FORTRAN 4 for the CYBER 203 vector computer. The programming of the analysis is oriented toward taking advantage of the vector processing capabilities of this computer. Comparisons of computed results with experimental measurements are presented to verify the analysis. Descriptions of program input and output formats are also presented. B.W.

N82-19180*# McDonnell-Douglas Corp., St. Louis, Mo.
SUBSONIC PANEL METHOD FOR THE EFFICIENT ANALYSIS OF MULTIPLE GEOMETRY PERTURBATIONS
D. R. Bristow and J. D. Hawk Washington NASA Mar. 1982 101 p refs

(Contract NAS1-16156)
(NASA-CR-3528) Avail: NTIS HC A06/MF A01 CSCL 01A

An accurate and efficient method was developed for the aerodynamic analysis of a series of arbitrary small geometry perturbations to a given baseline configuration. The method is appropriate for wing-fuselage configurations in incompressible potential flow. Mathematical formulations are presented for three computer programs that are employed. The first program is a conventional surface panel method for calculating the baseline singularity distribution. The second program calculates a partial derivative matrix. Each element of the matrix is the rate of change of singularity strength at one point with respect to a surface coordinate of a different point. For each baseline configuration, the calculated quantities from the first two programs establish an input file for the third. The third program calculates the surface pressure distribution and forces and moments for a series of geometry perturbations. B.W.

N82-19181*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF INSTALLATION OF F101 DFE EXHAUST NOZZLES ON THE AFTERBODY-NOZZLE CHARACTERISTICS OF THE F-14 AIRPLANE
David E. Reubush and John R. Carlson Mar. 1982 133 p refs
(NASA-TM-83250; L-14895) Avail: NTIS HC A07/MF A01 CSCL 01A

A wind-tunnel investigation was conducted to determine the effects of F101 DFE (derivative fighter engine) nozzle axial positioning on the afterbody-nozzle longitudinal aerodynamic characteristics of the F-14 airplane. The model was tested in the Langley 16-Foot Transonic Tunnel at Mach numbers from 0.7 to 1.25 and angles of attack from about -2 to 6 degrees. Compressed air was used to simulate nozzle exhaust flow at jet total-pressure ratios from 1 (jet off) to about 8. The results of the investigation show that for subsonic Mach numbers the intermediate cruise nozzle position of the three positions tested resulted in the lowest drag. Author

N82-19182# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
THEORETICAL INVESTIGATION OF THE FLOW OF A SUPERSONIC FREE JET FROM A SLIT Thesis [THEORETISCHE UNTERSUCHUNG DER STROEMUNG EINES UEBERSCHALLFREISTRAHLS AUS EINER SCHLITZFOERMIGEN OEFFNUNG]
Horst Wegner Dec. 1980 79 p refs In GERMAN
(MPIS-25/1980; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,85

The flow a subsonic jet from a slot shaped port was investigated. The following problems were examined: equations by mathematical models; subsonic free jets from a port opening; formulation of a boundary value problem for a subsonic free jet with maximum mass flow; and solving of boundary values for supersonic free jets with maximum mass flow. Transl. by E.A.K.

N82-19183# Aeronautical Research Labs., Melbourne (Australia).
HIGH SPEED AERODYNAMIC CHARACTERISTICS OF THE GAFOPH AEROFOIL
B. D. Fairlie Sep. 1980 49 p refs
(AD-A108922; ARL/AERO-NOTE-398; AR-002-223) Avail: NTIS HC A03/MF A01 CSCL 20/4

Transonic wind tunnel tests are reported on a two dimensional model of the GAFOPH aerofoil. The tests covered Mach numbers in the range 0.5 to 0.85 and angles of incidence from -3 deg to above maximum life coefficient. Tests were conducted both with natural transition and with transition artificially fixed. Maximum lift coefficient was found to lie just below 0.8 for most of the Mach number range and was followed by a fairly gentle stall. Drag rise Mach number was found to lie between 0.75 and 0.76 for lift coefficients up to 0.4. A leading edge separation bubble was found on the upper surface of the aerofoil for angles of incidence greater than 2-1/2 deg. Author (GRA)

N82-19184# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
ADDITIONAL RESULTS OF A STUDY OF UNSTEADY AIRFOIL SURFACE PRESSURES AND TURBULENT BOUNDARY LAYERS Annual Report, 1 Sep. 1980 - 31 Aug. 1981
Eugene E. Covert and Peter F. Lorber Nov. 1981 39 p refs
(Grant AF-AFOSR-0282-80; AF Proj. 2307)
(AD-A108978; TR-212; AFOSR-81-0848TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

Unsteady pressure coefficients measured on an N.A.C.A. 0012 airfoil at geometric angles of attack of 0 and 10 degrees, Reynolds numbers of 700,000 and 1,000,000 and in the reduced frequency range of 0.5 to 6.4 (based upon the half chord) are presented. For simplicity the data are represented in terms of mean and unsteady pressure coefficients, which has both a magnitude and a phase. Primary conclusions are: (1) The difference pressures approach zero at the trailing edge. This corresponds to satisfying one statement of the Kutta condition. (2) Superposition of the unsteady processes in the steady flow seems accurate and valid up to reduced frequencies of 2. (3) For this airfoil with 16 deg trailing edge angle the effects of viscosity seem to be most prominent in the last 10 percent of the airfoil where the phase lags are much larger than those predicted by the linear theory. Author (GRA)

N82-19185# Montana State Univ., Bozeman. Supersonic Wind Tunnel Lab.
THE COMPRESSIBLE LAMINAR TWO-DIMENSIONAL WAKE WITH ARBITRARY INITIAL ASYMMETRY Annual Report, 1 Oct. 1980 - 30 Sep. 1981
Anthony Demetriades Jul. 1981 86 p refs
(Grant AF-AFOSR-0267-80; AF Proj. 2307)
(AD-A109084; SWT-81-3; AFOSR-81-0841TR) Avail: NTIS HC A05/MF A01 CSCL 20/4

Closed-form analytic solutions are presented for the two dimensional laminar wake, which are applicable from the trailing edge to infinite downstream distances, and for any 'initial asymmetry' ratio of the two merging boundary layer thicknesses. An initially exponential velocity profile is assumed, and Gold's treatment is utilized of the evolution of the profile based on the Oseen approximation. The solutions show the effect of edge Mach number, Reynolds number, wall-to-stagnation temperature ratio and asymmetry factor. Beyond a certain distance from the trailing edge the solutions reduce to the well-known asymptotic behavior regardless of the magnitude of these parameters. In the 'non-equilibrium' region from the trailing edge to the equilibration distance, the supersonic/hypersonic cooled wake behaves rather abnormally. The effect of initial asymmetry is to deflect the wake center off the plane of the trailing edge, and to displace the wake center of the velocity relative to the temperature-density center without much affecting the velocity, temperature or density defect magnitudes or the wake thickness. Comparison with earlier work shows very good agreement with the Tollmien-Goldstein implicit solutions near the trailing edge for symmetric incompressible flows. Good agreement is also found with available experimental data. Author (GRA)

N82-19186# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CHARACTERISTIC AERODYNAMIC COEFFICIENTS AT HIGH REYNOLDS NUMBERS
Jan Staszek 3 Dec. 1981 17 p refs Transl. into ENGLISH from Tech. Lotnicza Astronautyczna (Poland), no. 1, 1979 p 25-28
(AD-A109313; FTD-ID(RS)T-1263-81) Avail: NTIS HC A02/MF A01 CSCL 20/4

Changes in the characteristics of aerodynamic coefficients at high Reynolds numbers were investigated. Emphasis is placed on the transonic range. Results from wind tunnel and flight test are presented. Changes are compared with results from theoretical and experimental tests. E.A.K.

N82-19187# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CALCULATION OF SUPERSONIC THREE-DIMENSIONAL FLOW ABOUT BLUNT-NOSED BODIES
Youlan Zhu, Ruquan Wand, and Xichang Zhong 19 Nov. 1981 26 p refs Transl. into ENGLISH from Peking Li-hsueh (Mech.) (China), no. 4, 1977 p 270-282

(AD-A108808; FTD-ID(RS)T-0927-81) Avail: NTIS HC A03/MF A01 CSCL 20/4

Inviscid and non-heating-conducting steady-state gaseous flows are considered. The straight-line method was used to calculate flow in the supersonic region and flow with a sharp angle of attack. The calculated objects' shapes were ellipsoids with various axial ratios as well as objects which were nearly disc-shaped. T.M.

N82-19188# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

SINGULARITIES OF THE SOLUTION OF THE PROBLEM OF A WEAKLY PERTURBED SUPERSONIC FREE JET WITH ROTATIONAL SYMMETRY [DIE SINGULARITAETEN DER LOESUNG DES SCHWACH GESTOERTEN ROTATIONSSYMMETRISCHEN UEBERSCHALLFREISTRAHLES]

Georg Grabitz and Hans-Wilhelm Burmann (Goettingen Univ., West Germany) Oct. 1980 28 p refs In GERMAN

(MPIS-6/1980) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,20

Singularity in jet boundaries was mathematically interpreted. The solution of linearized basic equations for rotation symmetrical supersonic free jets is proposed. Sequences which occur in solution equations of geometric forms, like the flow dimension inside the free jet are treated. Transl. by E.A.K.

N82-19189# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

CHARACTERISTICS OF VON KARMAN-TREFFTZ PROFILES [ENIGE KARAKTERISTIEKE GROOTHEDEN VAN VON KARMAN-TREFFTZ PROFIELEN]

J. J. H. Blom Jun. 1981 40 p refs In DUTCH

(VTH-LR-323) Avail: NTIS HC A03/MF A01

For von Karman-Trefftz profiles, the characteristics which determine profile shape (profile nose dimensions, maximum thickness and position; tail slope and curvature) are stated as a function of transformation variables using the Timman method. The profile is obtained by iterative deformation of a von Karman profile with known transformation, corresponding as well as possible to the desired profile. The figures and relations which, enable a good choice of the required profile are given. Author (ESA)

N82-19190# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

A METHOD OF CHARACTERISTIC SURFACES: THE APPROXIMATE SOLUTION OF THREE-DIMENSIONAL SUPERSONIC FLOW FIELDS, FROM THE NEAR FIELD UP TO THE SONIC BOOM REGION

T. P. M. Hendriks Aug. 1981 171 p refs

(VTH-LR-331) Avail: NTIS HC A08/MF A01

A method of characteristic surfaces used to describe supersonic flow past a three dimensional lifting or nonlifting body, uniformly valid up to first order, is developed. Uniformity is achieved by a straining of the spatial coordinates of the nonuniform solution derived from classical linearized theory. Development is based on a geometric study of the characteristic surfaces which envelop spatial disturbances in otherwise planar supersonic flow. Linearized theory gives a correct first order description of a complete three dimensional flow field provided that the intersection curves of the acoustical characteristic surfaces with the acoustical main characteristic planes are replaced by those of the corresponding first order surfaces and planes. A simplified procedure for supersonic flow fields, ,which are dominated by only one three dimensional disturbance field, is demonstrated using conical flow at the leeward side, and wave formation at the windward side of a supersonic delta wing. Author (ESA)

N82-19191# Bristol Univ. (England). Dept. of Aeronautical Engineering.

AN INVESTIGATION INTO WING-CANARD INTERACTION FOR A MODEL WITH FORWARD SWEPT WINGS B.S. Thesis

S. B. Marshall and M. J. Knott Jun. 1981 88 p refs

(BU-261) Avail: NTIS HC A05/MF A01

A few of the fundamental wing/canard interference effects were investigated in a wind tunnel, and theoretically. In particular, the relative horizontal, vertical and pitch deflection of the two lifting surfaces on a fuselage were studied for their influence on interference and, as a consequence, on the principal lift, drag and moment coefficients. Results show not only how these coefficients are changed, but also, by the use of the theoretical model, the distribution of forces which are peculiar to this configuration. One variation on the standard shape was to add wing root fillets at the leading edge so as to influence stall characteristics; the virtues of such a scheme are quantified where possible. Author (ESA)

N82-19192# Bristol Univ. (England). Dept. of Aeronautical Engineering.

THE UNSTEADY AERODYNAMICS OF CERTAIN BLUFF SHAPES B.S. Thesis

K. P. Kalligas and N. Moyssidis Jun. 1981 71 p refs

(BU-264) Avail: NTIS HC A04/MF A01

A technique for obtaining reliable dynamic aerodynamic characteristics was devised. A 'decaying oscillations' rig was designed and built, then used to test a 1:3 scale Martin-Baker ejection seat and a 5:2:2 model container box. Limitations imposed either by wind tunnel turbulence or by nonlinear aerodynamics, meant restricting the range of the amplitude of oscillation to between 2 deg and 10 deg, each way. Results for the box and static stability characteristics of the ejection seat agree with previous work, giving an indication of the reliability of the technique. Regions of dynamic instability are almost invariably associated with attached flow on one surface and separated flow on another (usually opposite) surface, changing to separated flow on the first surface and attached flow on the second (via bubble flow) as the body changes attitude during oscillation. A theoretical approach to the nonlinear aerodynamics of such a system is outlined. Use of the technique in estimating add-mass, evaluating the net area under the curve: aerodynamic stiffness coefficient versus angle of incidence, is suggested. Author (ESA)

N82-19193# Bristol Univ. (England). Dept. of Aeronautical Engineering.

A STUDY OF THE EFFECTS OF LEADING-EDGE SLATS ON THE PERFORMANCE OF SLENDER WINGS B.S. Thesis

K. P. Graham and E. J. Motlhathudi Jun. 1981 85 p refs

(BU-266) Avail: NTIS HC A05/MF A01

The improvements in lift/drag (L/D) ratio predicted by conical delta with slats theory were confirmed. The L/D benefits on a slender delta of aspect ratio 1 with parallel leading edge slats were considered. The local normal force distributions for various values of incidence, slot width, and slat angle are measured on a conical delta with spanwise pressure tappings. Insight into the surface flow was gained by the oil flow pattern technique. It is concluded that considerable L/D improvements are found for certain geometric configurations when using parallel slats. Author (ESA)

N82-19194# Bristol Univ. (England). Dept. of Aeronautical Engineering.

THE EFFECT OF A WELL ON THE AERODYNAMICS OF A SPOILER B.S. Thesis

N. A. Cemm and J. J. Ovens Jun. 1981 82 p refs Original contains color illustrations

(BU-268) Avail: NTIS HC A05/MF A01

As an aid to spoiler design, the aerodynamics of a spoiler and its well were investigated. Particular attention was paid to gap and deployment angle. Three different shapes of spoiler and three types of well were tested. All tests were two dimensional, the spoiler being attached to a flat plate at zero incidence. A well was cut into the plate such that the spoiler was flush when not deployed. The Reynolds number was 62,000, based on fence chord. Flow visualization techniques and static pressure measurements were used both along the flat plate and around the spoiler to determine and understand the pressure distribution. Integration of the pressure results shows the normal force distribution. The application of the results to spoiler design is discussed through examples. Author (ESA)

N82-19153# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

ROLLING UP OF VORTEX SHEETS FROM THE EDGES OF

LIFTING SURFACES
R. Legendre *In its* La Rech. Aerospatiale Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 3-7 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, May-Jun. 1981" p 143-147
(For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

N82-19155# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
STRONG MATCHING METHOD FOR COMPUTING TRANSONIC VISCOUS FLOWS INCLUDING WAKES AND SEPARATIONS: LIFTING AIRFOILS
J. C. LeBalleur *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 21-45 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 161-185
(For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

N82-19159# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
TESTING VENTILATED NOZZLE MODELS WITH SUPERSONIC PRIMARY FLOW
J. Paulon and J. Perucchini *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 75-79 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 217-221
(For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

N82-20132# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
THEORETICAL AND EXPERIMENTAL DETERMINATION OF A COMPRESSOR TRANSFER FUNCTION
J. Fabri and J. Paulon *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 1-8 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 223-231
(For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

N82-19195 Department of Trade and Industry, London (England).
REPORT OF THE AIR TRAFFIC FORECASTING WORKING PARTY, 1981
Sep. 1981 30 p ref
Copyright. Avail: Issuing Activity

The U.K. forecasting model (improved by including relative tourist prices as a variable in leisure traffic equations and by refining business traffic specifications) is used to predict air traffic demand in the 1990's. London airports are treated separately. The effects of oil price rises, a channel tunnel, and hotel constraints in London are discussed. An increase of between 28 and 70 million passagers is predicted, i.e., a 2.5% to 5% annual growth rate. Growth rates for domestic traffic are lower then those projected for international traffic so that domestic traffic, which was 26% of the total in 1979, falls by 1995 to 23% on the low scenario and 20% on the high scenario. Author (ESA)

N82-19196*# Little (Arthur D.), Inc., Cambridge, Mass.
AN ASSESSMENT OF THE CRASH FIRE HAZARD OF LIQUID HYDROGEN FUELED AIRCRAFT Final Report
Feb. 1982 132 p refs
(Contract NAS3-22482)
(NASA-CR-165526; ADL-85161) Avail: NTIS HC A07/MF A01 CSCL 01C

The crash fire hazards of liquid hydrogen fueled aircraft relative to those of mission equivalent aircraft fueled either with conventional fuel or with liquefied methane were evaluated. The aircraft evaluated were based on Lockheed Corporation design for 400 passenger, Mach 0.85, 5500 n. mile aircraft. Four crash scenarios were considered ranging from a minor incident causing some loss of fuel system integrity to a catastrophic crash. Major tasks included a review of hazardous properties of the alternate fuels and of historic crash fire data; a comparative hazard evluation for each of the three fuels under four crash scenarios a comprehensive review and analysis and an identification of areas further development work. The conclusion was that the crash fire hazards are not significantly different when compared in general for the three fuels, although some fuels showed minor advantages in one respect or another. R.J.F.

N82-19197# Federal Aviation Administration, Atlantic City, N.J.
ANALYSIS OF A NONLINEAR ALTITUDE TRACKING METHOD Final Report, Sep. - Dec. 1980
Barry R. Billmann Nov. 1981 57 p refs
(FAA Proj. 052-242-320)
(AD-A108878; FAA-CT-81-15; FAA-RD-81-60) Avail: NTIS HC A04/MF A01 CSCL 01/2

This report analyzes the performance of the nonlinear altitude tracker developed for the Active Beacon Collision Avoidance System (BCAS) by Lincoln Laboratory. The tracker is intended for use in the collision avoidance logic of the BCAS system. The nonlinear tracker performance was characterized through comparisons with the previous altitude tracker. The original tracker, used by the collision avoidance logic, was a simplistic alpha-beta tracker. The nonlinear tracker performance evaluation was conducted in three phases: (1) The stand-alone error characteristics of the tracker were obtained. Simulated mode C report sequences were provided directly to the tracker. (2) The nonlinear tracker was integrated directly into the collision avoidance logic. With the use of the Fast-Time Encounter Generator (FTEG), a comparative study of performance with the nonlinear tracker versus the alpha-beta tracker was made. (3) Selected live flight test encounters were used to analyze the relative performance of the alpha-beta tracker versus the nonlinear tracker. The stand-alone analysis revealed that the nonlinear tracker consistently had smaller maximal errors in vertical rate estimation and a smaller transient rate response delay than did the alpha-beta tracker. Both the live flight test encounter simulations and the FTEG scenario simulation indicated that nonlinear tracking often caused an increase in separation for encounters with vertically accelerating threats and reduced occurrences of incorrect command sense choice. Author (GRA)

N82-19198# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
FAA STATISTICAL HANDBOOK OF AVIATION Annual Report, period ending 31 Dec. 1980
31 Dec. 1980 183 p
(AD-A109289) Avail: NTIS HC A09/MF A01 CSCL 01/2

This report presents statistical information pertaining to the Federal Aviation Administration, The National Airspace System, Airports, Airport Activity, U.S. Civil Air Carrier Fleet, U.S. Civil Air Carrier Operating Data, Airmen, General Aviation Aircraft, Aircraft Accidents, and a Glossary of the terms used in this publication. Author (GRA)

N82-19199# Aeronautical Research Labs., Melbourne (Australia).
DISENGAGEMENT OF SAFETY HARNESS BUCKLES - CT4 Report, Aug. - Dec. 1979
S. R. Sarrailhe and G. A. Thomas Mar. 1981 25 p
(AD-A109048; ARL/STRUC-NOTE-469) Avail: NTIS HC A02/MF A01 CSCL 13/12

During the crash of a CT4 Airtrainer in August, 1979 both safety harness buckles disengaged. The crash was very severe but the harnesses did not show signs of overloading. After a series of tests it was concluded that the buckles disengaged because of misalignment of the loads onto the buckle. This misalignment may not be represented in the standard test procedures and they may give a false sense of security. New tests are proposed, but further work would be desirable to establish design and test criteria. Author (GRA)

N82-19156# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
ELECTRICAL GROUND TESTING OF AIRCRAFT ANTISTATIC PROTECTION
A. Bruere *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 47-56 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestrial (Paris), No. 1981-3, May-Jun. 1981" p 187-196 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N82-19200 Virginia Univ., Charlottesville.
OPTIMAL AIRCRAFT LANDING PATTERNS FOR MINIMAL NOISE IMPACT Ph.D. Thesis
Robert Chi-Tuan Chang 1981 183 p
Avail: Univ. Microfilms Order No. 8129300

A total system to perform the task of optimizing aircraft landing trajectories with respect to aircraft noise annoyance in the area near airports was developed. The noise annoyance considered was solely due to aircraft. Multiple aircraft on multiple landing paths were studied by the total system developed. While many of the subsystems such as the aircraft noise signature model, annoyance model, optimization methods, etc. already existed, the task was to combine all these together into a single working system. The various subsystems included an annoyance model (aircraft noise signature model, population model, impact intensity weighting function), formulation of aircraft landing paths and constraints, performance measure, and optimization. A single numerical number, noise impact index, which represents the average severity of noise impact over the entire population of a community was adopted as the annoyance index. Dissert. Abstr.

N82-19201# Committee on Science and Technology (U. S. House).
AIRCRAFT COLLISION AVOIDANCE SYSTEMS
Washington GPO 1981 443 p refs Hearings before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci. and Technol., 97th Congr. 1st Sess., No. 5, 31 Mar. and 3 Apr. 1981
(GPO-79-431) Avail: Subcommittee on Transportation, Aviation and Materials

Midair collision avoidance systems, especially the beacon collision avoidance system is discussed. Magazine articles, letters, and statements of government and industry personnel are included. R.J.F.

N82-19202# Committee on Science and Technology (U. S. House).
AIR TRAFFIC CONTROL EN ROUTE COMPUTER SYSTEM
Washington GPO 1981 10 p Rept. to accompany H.R. 202 presented by the Comm. on Sci. and Technol., 97th Congr., 1st Sess., 14 Oct. 1981
(GPO-89-008; H-Rept-97-271) Avail: US Capitol, House Document Room

Amendments to the House Resolution requiring the Administrator of the FAA to submit full research and development program planning documentation to the Committee with respect to the modernization and replacement of the en route computer system are presented. Background material included covers the current ATC system as well as the justification, benefits, costs, and acquisition strategy for replacing the computer. It is recommended the FAA establish a mechanism whereby the judgements and experience of operating personnel and users of the air system be included in the en route computer development process. A.R.H.

N82-19203# Mitre Corp., McLean, Va.
ACTIVE BEACON COLLISION AVOIDANCE SYSTEM (BCAS) LOGIC PERFORMANCE DURING OPERATIONAL FLIGHT TESTS Report, 13 Jul. - 9 Sep. 1980
R. A. Tornese and A. L. McFarland Washington FAA Jan. 1981 123 p refs
(Contract DTFA01-81-C-10001)
(AD-A108893; MTR-80/W352; FAA-RD-80-138) Avail: NTIS HC A06/MF A01 CSCL 17/7

Between 13 July and 9 September 1980, operational flight tests of an Active BCAS Experimental Unit (BEU) were conducted. The flight tests included 129 approaches to 28 different airports during 60 hours of flight: 14 unplanned encounters which gave rise to BCAS alerts were recorded. In each of the encounters, the aircraft carrying the BEU came into a conflict with another aircraft entirely by chance. The other aircraft was not associated with the BCAS test program in any way. The primary purpose of the flight tests was to determine how many unplanned alerts would occur during normal flight operations and to assess whether each was a desirable or unwanted alert. In addition, alert correctness, timeliness, and utility were considered along with the potential impact of BCAS on the ATC system. The data was also used to determine approximately the region(s) where desensitization of BCAS threat logic should be applied to limit unwanted alerts. GRA

N82-19204# National Ocean Survey, Rockville, Md.
UNITED STATES COAST PILOT 2. ATLANTIC COAST: CAPE COD TO SANDY HOOK, 16TH EDITION
Jan. 1981 323 p refs
(PB82-109505; NOAA-81021106) Avail: NTIS HC A14/MF A01 CSCL 17G

Coast Pilots supplement the navigation information shown on the nautical charts and are based upon field inspection conducted by the National Ocean Survey. Most of this book information cannot be shown graphically on the standard nautical charts and is not readily available elsewhere. Coast Pilot subjects include navigation regulations, outstanding landmarks, channel and anchorage peculiarities, dangers, weather, ice, freshets, routes, pilotage, and port facilities. Information is included on: Cape Cod to Sandy Hook, Outer Cape Cod and Nantucket Sound, Vineyard Sound and Buzzards Bay, Narragansett Bay, Block Island Sound, Eastern Long Island Sound, Western Long Island Sound, South Coast of Long Island, New York Harbor, and Hudson River. GRA

N82-20126*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GLOBAL POSITIONING SYSTEM TIMING RECEIVERS IN THE DSN
P. A. Clements *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 90-99 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 17G

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-19205*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VEHICLE TEST REPORT: BATTRONIC PICKUP TRUCK
Theodore W. Price, Thomas W. Shain, Raymond J. Freeman, and Michael F. Pompa 1 Jan. 1982 47 p refs
(Contracts NAS7-100; DE-AI01-78CS-54209)
(NASA-CR-168637; JPL-Pub-82-8; DOE/CS-54209/6) Avail: NTIS HC A03/MF A01 CSCL 13F

An electric pickup truck was tested to characterize certain parameters and to provide baseline data that can be used for the comparison of improved batteries that may be incorporated into the vehicle at a later time. The vehicle tests were concentrated on the electrical drive subsystem; i.e., the batteries, controller, and motor. The tests included coastdowns to characterize the road load and range evaluations for both cyclic and constant speed conditions. A qualitative evaluation of the vehicle's performance was made by comparing its constant speed range performance with other vehicles. S.L.

N82-19206# Canyon Research Group, Inc., Westlake Village, Calif.

DESCENT-RATE CUING FOR CARRIER LANDINGS: EFFECTS OF DISPLAY GAIN, DISPLAY NOISE AND AIRCRAFT TYPE Interim Report, 1 May 1980 - 30 Nov. 1981

Gavan Lintern, Daniel J. Sheppard, and Charles E. Kaul Oct 1981 42 p refs
(Contract N61339-78-C-0060)
(AD-A108801; TR-81-015; NAVTRAEQUIPCEN-78-C-0060-8) Avail: NTIS HC A03/MF A01 CSCL 01/2

Two studies are reported concerning the utility of modifying a conventional Fresnel Lens Optical Landing System (FLOLS) to include variable-length vertical light arrays, or arrows, in order to provide descent-rate information to pilots making carrier landings. In the first study, the Descent-Rate Cuing (DRC) algorithm incorporated an angular gain to provide glideslope displacement information. The DRC system did not significantly improve glideslope tracking performance. Lineup performance was not adversely affected. The effects of aircraft type and noise on the DRC were also examined. In the second study, the DRC algorithm incorporated a modified linear gain to provide glideslope displacement information. The DRC system consistently reduced glideslope error throughout the approach. Comparison of the data and previous research suggests that a DRC system incorporating a linear gain can produce a strong and consistent improvement in glideslope control in carrier landings. Author (GRA)

N82-19207# Federal Aviation Administration, Atlantic City, N.J.

TRANSPORT AIRCRAFT COCKPIT STANDARDIZATION (FEDERAL AVIATION REGULATIONS PART 25) Final Report

Richard Sulzer Nov. 1981 42 p
(FAA Proj. 161-200-130)
(AD-A108924; FAA-CT-80-54; FAA-EM-81-11) Avail: NTIS HC A03/MF A01 CSCL 01/3

The present status of transport aircraft cockpit standardization was evaluated by examination of regulations and other design practice documents and by interviews with airline pilots and engineers. Flight critical areas most in need of increased standardization were identified as (1) primary flight guidance instrumentation and (2) pilot input keyboards. Additional areas proposed for further industry consultation, possibly leading to further standardization at a future date, include flap, slat, and leading-edge device control and display systems; indicated airspeed (IAS)-Mach indicators; powerplant instrumentation; and electric and hydraulic power diagrams, displays, and controls. The continued use of a mixed metric and English unit measurement plan in both United States and foreign manufactured aircraft is noted, and the incidence of pilot dual qualifications and the need for criteria for digital system software certification are also discussed. GRA

N82-19208# Army Aviation Engineering Flight Activity, Edwards AFB, Calif. Directorate of Development and Qualification.

HELICOPTER ICING SPRAY SYSTEM (HISS) NOZZLE IMPROVEMENT EVALUATION Final Report

Daumants Belte Sep. 1981 53 p refs
(AD-A109405; USAAEFA-79-02-2) Avail: NTIS HC A04/MF A01 CSCL 01/2

The U.S. Army Aviation Engineering Flight Activity (USAAEFA) operates a modified CH-47C helicopter as an airborne spray tanker to create a simulated icing test environment. This system was modified to improve its spray cloud characteristics with respect to uniformity of liquid water content (LWC) and reduction of drop size median volumetric diameter (MVD). The existing atomizers on the spray boom assembly were replaced by Sonic Development Corporation model 125-H 'Sonicore' nozzles. A UH-1H helicopter equipped with particle measuring spectrometers conducted in-flight sampling and calibration of a modified HISS spray cloud in conjunction with other helicopter icing tests. Average cross sectional dimensions of the present spray cloud was estimated as 36 ft wide and 8 ft deep. Usable values of cloud LWC in excess of 1 gram per cubic meter with a drop size MVD range of 20 to 35 microns can be generated at a 90 knot airspeed. GRA

N82-19209# Kaman Aerospace Corp., Bloomfield, Conn.

DEVELOPMENT OF MANUFACTURING TECHNOLOGY FOR FABRICATION OF A COMPOSITE HELICOPTER MAIN ROTOR SPAR BY TUBULAR BRAIDING Final Report, Sep. 1978 - Sep. 1980

Mark L. White St. Louis, Mo. Army Aviation Research and Development Command Apr. 1981 81 p refs
(Contract DAAG46-78-C-0070)
(AD-A109377; R-1618; AVRADCOM-TR-81-F-9) Avail: NTIS HC A05/MF A01 CSCL 11/4

Mechanical tubular braiding has been shown to be a viable blade spar manufacturing process in a program which included preliminary design of an improved main rotor blade for the OH-58 helicopter. The blade incorporates an advanced aerodynamic shape and has as its primary structural member a Kevlar 49/epoxy spar fabricated by braiding. Achievement of an analytically acceptable blade and spar design meeting critical structural and dynamic requirements was not hindered by braiding process constraints. Mechanical property tests of flat panels and spar sections exhibited excellent correlation with analytical predictions, substantiating the applicability of normal composite laminate analysis methods and the validity of the specific design. Ballistic testing of spar sections demonstrated superior containment of structural damage compared to composite spars produced by more conventional methods. Manufacturing cost estimates predict a price reduction of 1/3 for the braided spar relative to a similar S-glass/epoxy spar for an OH-58 blade of identical external shape fabricated by orthodox, low-cost technology. Author (GRA)

N82-19210# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.

EXPERIENCE DURING THE DEVELOPMENT OF THE GERMAN-JAPANESE HELICOPTER BK 117 [ERFAHRUNGEN WAEHREND DER ENTWICKLUNG DES DEUTSCH-JAPANISCHEN HUBSCHRAUBERS BK 117]

Klaus Szczeponik and Hans Fabian 1981 17 p In GERMAN Presented at DGLR Jahrestagung, Brunwick, 1980
(MBB-UD-318-81-O) Avail: NTIS HC A02/MF A01

The German-Japanese colaboration in building the BK 117 helicopter is described. The exchange of know-how, information dissemination, telecommunication, and technical expertese, are enumerated. It is shown that since international cooperation is possible, the German industries should be able to exchange and cooperate in the development of new products. Transl. by E.A.K.

N82-19211# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.

PERSPECTIVES FOR CONTROLLED WEAPONS TECHNOLOGY: REPORT OF THE 90TH HELICOPTER FORUM [PERSPEKTIVEN DER LENKWAFFENTECHNIK FUER DIE 90ER JAHRE VORTRAGE VOR DEM HUBSCHRAUBER FORUM BUECKEBURG]

D. Weis 2 May 1980 13 p In GERMAN Forum held in Bueckeburg, West Germany, 5-7 May, 1980
(MBB-UA-532-80-O) Avail: NTIS HC A02/MF A01

A general forecasting for the essential guided missile system technology in the 1990s is presented. The development of armored guided missiles since its conception in 1955, and an outline of goals and trends of armored defense for the near and far future are presented. Possibilities of acceleration in mission accomplishments of future armored defensive weapon systems are examined. Transl. by E.A.K.

N82-19212# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.

A METHOD FOR APPLYING LINEAR OPTIMAL CONTROL THEORY TO THE DESIGN OF A REGULATOR FOR A FLEXIBLE AIRCRAFT

L. J. J. Erkelens and J. L. Simons 31 Mar. 1980 83 p refs
Previously announced as NLR-TR-75118-C Sponsored by Directorate of Material Air RNLAF
(NLR-TR-80032-U; NLR-TR-75118-C) Avail: NTIS HC A05/MF A01

A hypothetical control system that provides improved rigid body and structural mode damping of a flexible aircraft in order to improve the riding quality and minimize the wing bending moment during flight in turbulence, is considered. The equations of motion are related to a high performance fighter aircraft with external stores. The feedback gains are determined, using linear optimal control theory. A quadratic optimization criterion, taking into account the normal acceleration at the pilot seat and the wing root bending moment, is used. A number of optimal and suboptimal regulators are calculated. The system performance is expressed in terms of pole location, frequency response, and power spectra for both pilot seat acceleration and wing root bending moment. Aircraft response to a deterministic gust disturbance is presented. Author (ESA)

N82-19213# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
ON THE DESIGN OF SOME AIRFOILS FOR SAILPLANE APPLICATION
L. M. M. Boermans and H. J. W. Selen Apr. 1981 47 p refs
Presented at 17th OSTIV Congr., Paderborn, West Germany, 1981
(VTH-LR-326) Avail: NTIS HC A03/MF A01

Airfoils were designed such that, by adding material to the surface, an existing wing could be modified and tested in flight. Wind tunnel experiments on inner and outer wing segments are described, giving information on the quality of actual airfoils achieved in serial production and of the LSL airfoil analysis and design computer program. The characteristics of several modern airfoils used in standard class sailplanes are analyzed and typical differences in the case of smooth surface and of rough leading edge are clarified. Wind tunnel measurements with real insect remains on a wing segment are compared with a well known simulated bug pattern and shown to have greatly different drag characteristics. The application of pneumatic turbulators to reduce the drag of an airfoil is discussed. The computer program was used to modify the wing of an ASW-193 sailplane. Flight tests are satisfactory. Author (ESA)

N82-19214# Bristol Univ. (England). Dept. of Aeronautical Engineering.
A FURTHER STUDY OF HELICOPTER ROTOR PITCH-FLAP-PHASE COUPLING B.S. Thesis
A. East and N. S. Sehmi Jun. 1981 81 p refs
(BU-259) Avail: NTIS HC A05/MF A01

Pitch-flap phase coupling between the blades of a helicopter rotor was studied in order to improve overall aircraft stability. A mathematical model was constructed for the Westland Lynx helicopter, which incorporates a semiarticulated rotor head. Full expressions are derived in a lengthy, but accurate fashion for the blade flapping motion as well as for rotor hub forces and moments. The rotor state defined is believed to be more accurate than that of any previous, known treatment. Pitch-flap phase coupling of the form: blade pitch angle at rotor center line - blade pitch control angle + pitch-flap coupling gain (blade flap angle + pitch-flap-phase coupling lead/lag), is introduced. The effect on the rotor derivatives is given with change in phase lead/lag angle and control gain. A full six degrees of freedom model is extensively used for the study of stability, with the results beset with problems which are discussed. Author (ESA)

N82-19215# Bristol Univ. (England). Dept. of Aeronautical Engineering.
A DESIGN STUDY OF THE MARSHAL B.S. Thesis
D. Suen and G. H. Tan Jun. 1981 55 p refs
(BU-262) Avail: NTIS HC A04/MF A01

The feasibility of a six seat variant of the Britten Sheriff twin-engined aircraft, the Marshal, was studied. Results show that the Marshal, powered by two 200 h.p. engines and at an all-up-weight (AUW) of 3550 lb, can compete in the open market, both in terms of performance and price. No major structural alterations, except on the fuselage to accommodate two additional passengers, are envisaged. This aircraft is expected to be suitable for a touring role. For business flying, a high cruise speed is favored and so a turbocharged version was also considered. The performance level attainable, with two 200 h.p. turbocharged engines, compares well with the competition. However, at an AUW of 3700 lb, certain modifications to the wing are necessary. The indication is that the Marshal is a commercially viable project. Author (ESA)

N82-19216# Bristol Univ. (England). Dept. of Aeronautical Engineering.
DESIGN STUDY INTO A HIGH ENDURANCE MINI-ROTORCRAFT B.S. Thesis
D. A. E. Beedell and J. C. Hendy Jun. 1981 71 p refs
Original contains color illustrations
(BU-265) Avail: NTIS HC A04/MF A01

Competing models in a minirotorcraft competition for maximum endurance with an all up weight no greater than 5 kg, must fly above a height of 5 m within an area 10 m square are discussed. A design in which aerodynamics, stability and control, and mechanical and structural aspects are considered to obtain the size and angular velocity of the rotor for minimum power, while sufficient stability and control for a long flight are still inherent in the overall system is presented. Weights of individual components are also examined. It is found that a rotor mounted engine configuration, with rotor radius about 1.6 m and rotational velocity 4 to 5 revs/sec, with engines half way along the rotors and with Hiller control rotors, is the most promising design. The possible endurance is some 12 hr and hence pilot error and mechanical failure become deciding factors. Author (ESA)

N82-19140*# AiResearch Mfg. Co., Torrance, Calif.
ELECTRIC ECS
Dale O. Moeller *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 147-154 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19141*# Hamilton Standard, Windsor Locks, Conn.
ENVIRONMENTAL CONTROL SYSTEMS
Fred M. Rosenbush *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 155-188 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19142*# Honeywell, Inc., Clearwater, Fla.
OVERVIEW OF HONEYWELL ELECTROMECHANICAL ACTUATION PROGRAMS
Charles Wyllie *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 163-187 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19146*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POWER SYSTEMS
Robert Finke *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 241-246 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N82-19217*# Mitre Corp., McLean, Va.
A CONCEPT FOR A FUEL EFFICIENT FLIGHT PLANNING AID FOR GENERAL AVIATION Final Report
B. P. Collins, A. L. Haines, and C. J. Wales Washington NASA Mar. 1982 96 p refs
(Contract NAS1-16430)
(NASA-CR-3533; MTR-81W233) Avail: NTIS HC A05/MF A01 CSCL 01D

A core equation for estimation of fuel burn from path profile data was developed. This equation was used as a necessary ingredient in a dynamic program to define a fuel efficient flight path. The resultant algorithm is oriented toward use by general aviation. The pilot provides a description of the desired ground track, standard aircraft parameters, and weather at selected waypoints. The algorithm then derives the fuel efficient altitudes and velocities at the waypoints. B.W.

N82-19218# Institute for Defense Analyses, Arlington, Va.
ASSESSMENT OF AVIONIC EQUIPMENT FIELD RELIABILITY AND MAINTAINABILITY AS FUNCTIONS OF UNIT COST
Mark I. Knapp and Joseph W. Stahl 7 Oct. 1981 24 p refs Presented at the 16th Ann. Dept. of Defense Cost Analysis Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109373) Avail: NTIS HC A02/MF A01 CSCL 01/3

Pound-for-pound, avionics is generally recognized as the most expensive, complex and sophisticated part of an aircraft. Reliability and maintainability are critical characteristics that influence spares provisioning, maintenance resource requirements, system operational availability and, ultimately, investment and operating costs. Consequently, much attention has been focused upon improving the reliability and maintainability of avionics which, in the past, have been disappointingly low. This paper addresses avionics reliability and maintainability. The analysis was performed last year in partial response to a request of IDA by OASD (C(3)I) to provide information for use by DSARC principals at the Full-Scale Development milestone. Since the 5000 series of DoD Directives and Instructions emphasize analytical comparisons of any new systems under consideration by the DSARC with current, comparable systems, we undertook analyses to determine if there may be one or more historical relationships between field reliability and maintainability and avionic equipment characteristics that would assist in forecasting those attributes. GRA

N82-19219# European Space Agency, Paris (France).
EQUIPMENT FOR TESTING AND MEASURING A 'HELMET MOUNTED SIGHT AND DISPLAY' SYSTEM WITH A COUPLED MOVABLE TV CAMERA IN THE FLIGHT SIMULATOR FOR RESEARCH OF THE DFVLR
Friedrich Erdmann, R. Dierke, E. Biertuempel, R. Ehlers, and H. Loehr Nov. 1981 70 p refs Transl. into ENGLISH of "Ein Versuchsaufbau zum Ausmessen eines 'Helmet Mounted Sight/Display' mit Nachgeschaltetem Kameraschwenkrahmen im Forschungsflugsimulator der DFVLR" Rept. DFVLR-Mitt-80-04 DFVLR, Brunswick, Jan. 1980 Original report in GERMAN previously announced as ESA-95301
(ESA-TT-675; DFVLR-Mitt-80-04) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 17,40

A test installation capable of static and dynamic measurements on a helmet mounted sight and display (HMS/D) during simulated helicopter motion, by means of a steerable camera rotation framework was built. The rotation frame is gyro controlled and moves about two axes (in pitch and yaw). The HMS/D generates the helmet line of sight referred to the simulator platform (the aircraft based system) in terms of azimuth and elevation. Through the helmet mounted display, using a semitransparent mirror, an electronically produced cross hair (the helmet mounted sight) is superimposed on the image in the right eye of the pilot. The TV picture is also reflected into his eye, enabling him to aim at a target on the sensor image. Test equipment accuracy is 40 min in azimuth, 20 min in elevation. Author (ESA)

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion.*

N82-19220*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DILUTION JET BEHAVIOR IN THE TURN SECTION OF A REVERSE FLOW COMBUSTER
Steven M. Riddlebaugh, Abraham Lipshitz (Ahuza, Haifa, Israel), and Isaac Greber (Case Western Reserve Univ., Cleveland, Ohio) Jan. 1982 15 p refs Presented at the 20th Aerospace Sci. Meeting, Orlando, Fla., 10-14 Jan. 1982; sponsored by AIAA
(NASA-TM-82776; E-1107; AIAA-82-0192) Avail: NTIS HC A02/MF A01 CSCL 21E

Measurements of the temperature field produced by a single jet and a row of dilution jets issued into a reverse flow combustor are presented. The temperature measurements are presented in the form of consecutive normalized temperature profiles, and jet trajectories. Single jet trajectories were swept toward the inner wall of the turn, whether injection was from the inner or outer wall. This behavior is explained by the radially inward velocity component necessary to support irrotational flow through the turn. Comparison between experimental results and model calculations showed poor agreement due to the model's not including the radial velocity component. A widely spaced row of jets produced trajectories similar to single jets at similar test conditions, but as spacing ratio was reduced, penetration was reduced to the point where the dilution jet flow attached to the wall. Author

N82-19221*# Garrett Turbine Engine Co., Phoenix, Ariz.
COOLED VARIABLE-AREA RADIAL TURBINE TECHNOLOGY PROGRAM Final Report
G. D. Large and L. J. Meyer Jan. 1982 303 p refs
(Contract NAS3-22004)
(NASA-CR-165408) Avail: NTIS HC A14/MF A01 CSCL 21E

The objective of this study was a conceptual evaluation and design analyses of a cooled variable-area radial turbine capable of maintaining nearly constant high efficiency when operated at a constant speed and pressure ratio over a range of flows corresponding to 50- to 100-percent maximum engine power. The results showed that a 1589K (2400 F) turbine was feasible that would satisfy a 4000-hour duty cycle life goal. The final design feasibility is based on 1988 material technology goals. A peak aerodynamic stage total efficiency of 0.88 was predicted at 100 percent power. Two candidate stators were identified: an articulated trailing-edge and a locally movable sidewall. Both concepts must be experimentally evaluated to determine the optimum configuration. A follow-on test program is proposed for this evaluation. Author

N82-19222*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PERFORMANCE OF SINGLE-STAGE AXIAL-FLOW TRANSONIC COMPRESSOR WITH ROTOR AND STATOR ASPECT RATIOS OF 1.63 AND 1.78, RESPECTIVELY, AND WITH DESIGN PRESSURE RATIO OF 1.82
Royce D. Moore and Lonnie Reid Feb. 1982 112 p refs
(NASA-TP-1974; E-259) Avail: NTIS HC A06/MF A01 CSCL 21E

The overall and blade-element performance of a transonic compressor stage is presented over the stable operating flow range for speeds from 50 to 100 percent of design. The stage was designed for a pressure ratio of 1.82 at a flow 20.2 kg/sec and a tip speed of 455 m/sec. At design speed the stage achieved a peak efficiency of 0.821 at a pressure ratio of 1.817. The stage stall margin at design speed based on conditions at stall and peak efficiency was about 11 percent. Author

N82-19136*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
A PROPULSION VIEW OF THE ALL-ELECTRIC AIRPLANE
Robert P. Wagner *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 95-102 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

N82-19137*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
POTENTIAL PROPULSION CONSIDERATIONS AND STUDY

AREAS FOR ALL-ELECTRIC AIRCRAFT
Thomas G. Lenox *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 103-112 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

N82-19138*# Westinghouse Electric Corp., Lima, Ohio. Air All-Electronics Div.
A LOOK INTO THE FUTURE: THE POTENTIAL OF THE ALL-ELECTRIC SECONDARY POWER SYSTEM FOR THE ENERGY EFFICIENT TRANSPORT
Alan E. King *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 113-124 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19145*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENGINE TECHNOLOGY
Anthony C. Hoffman *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 235-240 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-19223 Royal Aircraft Establishment, Farnborough (England).
A CRITERION FOR THE PREDICTION OF THE RECOVERY CHARACTERISTICS OF SPINNING AIRCRAFT
T. H. Kerr 1981 24 p refs
(RAE-TN-AERO-2251) Copyright. Avail: Issuing Activity

Full scale spinning tests were analyzed in order to produce a recovery estimation method for straight and swept wing aircraft. The rate of rotation about spin axis X wing span/true rate of descent in ft/sec, was estimated from the general layout and loading of the aircraft. Antispin rolling moment coefficient (wind axis) due to the body at a mean incidence of 45 deg and antispin moment due to the movement of the rudder from neutral to fully antispin were calculated. The unbalanced (antispin) rolling moment coefficient is derived. This is plotted against (I- (pitching moment of inertia/rolling moment of inertia)) and whether the aircraft is likely to have a satisfactory spin recovery characteristic is assessed by reference to the empirical boundary tables provided. Data for Spitfire and Hurricane aircraft are provided. Recovery standards improve as pitching moment of inertia/rolling moment of inertia increases. Author (ESA)

N82-19224*# Pennsylvania State Univ., University Park. Dept. of Aerospace Engineering.
AN EXPERIMENTAL STUDY OF THE EFFECT OF TAIL CONFIGURATION ON THE SPINNING CHARACTERISTICS OF GENERAL AVIATION AIRCRAFT M.S. Thesis
Mark G. Ballin Mar. 1982 182 p refs
(Grant NAG1-73)
(NASA-CR-168578) Avail: NTIS HC A09/MF A01 CSCL 01C

The feasibility of using static wind tunnel tests to obtain information about spin damping characteristics of an isolated general aviation aircraft tail was investigated. A representative tail section was oriented to the tunnel free streamline at angles simulating an equilibrium spin. A full range of normally encountered spin conditions was employed. Results of parametric studies performed to determine the effect of spin damping on several tail design parameters show satisfactory agreement with NASA rotary balance tests. Wing and body interference effects are present in the NASA studies at steep spin attitudes, but agreement improves with increasing pitch angle and spin rate, suggesting that rotational flow effects are minimal. Vertical position of the horizontal stabilizer is found to be a primary parameter affecting yaw damping, and horizontal tail chordwise position induces a substantial effect on pitching moment. A.R.H.

N82-19225*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SIMULATOR STUDY OF VORTEX ENCOUNTERS BY A TWIN-ENGINE, COMMERCIAL, JET TRANSPORT AIRPLANE
Earl C. Hastings, Jr. and Gerald L. Keyser, Jr. Feb. 1982 65 p refs
(NASA-TP-1966; L-14187) Avail: NTIS HC A04/MF A01 CSCL 01C

A simulator study of vortex encounters was conducted for a twin-engine, commercial, jet transport airplane encountering the vortex flow field of a heavy, four-engine, commercial, jet transport airplane in the final-approach configuration. The encounters were conducted with fixed controls and with a pilot using a state-of-the-art, manual-control system. Piloted encounters with the base-line vortex flow field out of ground effect (unattenuated) resulted in initial bank-angle excursions greater than 40 deg, coupled with initial sideslip-angle excursions greater than 10 deg. The severity of these initial upsets was significantly reduced when the vortex center was moved laterally or vertically away from the flight path of the encountering airplane. Smaller reductions occurred when the flow field was attenuated by the flight spoilers on the generating airplane. The largest reduction in the severity of the initial upsets, however, was from aging in ground effect. The severity of the initial upsets of the following airplane was relatively unaffected by the approach speed. Increasing the lift coefficient of the generating airplane resulted in an increase in the severity of the initial upsets. Author

N82-19226*# Boeing Aerospace Co., Kent, Wash.
A STUDY OF FLIGHT CONTROL REQUIREMENTS FOR ADVANCED, WINGED, EARTH-TO-ORBIT VEHICLES WITH FAR-AFT CENTER-OF-GRAVITY LOCATIONS Final Report
Andrew K. Hepler, Howard Zeck, William H. Walker, and Alexander Polack Washington NASA Feb. 1982 121 p
(Contract NAS1-16128)
(NASA-CR-3491) Avail: NTIS HC A06/MF A01 CSCL 01C

Control requirements of Controlled Configured Design Approach vehicles with far-aft center of gravity locations are studied. The baseline system investigated is a fully reusable vertical takeoff/horizontal landing single stage-to-orbit vehicle with mission requirements similar to that of the space shuttle vehicle. Evaluations were made to determine dynamic stability boundaries, time responses, trim control, operational center-of-gravity limits, and flight control subsystem design requirements. Study tasks included a baseline vehicle analysis, an aft center of gravity study, a payload size study, and a technology assessment. Author

N82-19227# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
FLUTTER AND TIME RESPONSE ANALYSES OF THREE DEGREE OF FREEDOM AIRFOILS IN TRANSONIC FLOW Final Report, Nov. 1979 - Dec. 1980
T. Y. Yang and C. H. Chen Wright-Patterson AFB, Ohio AFAWL Aug. 1981 50 p refs
(Grant AF-AFOSR-3523-78; AF Proj. 2307)
(AD-A108987; AFWAL-TR-81-3103) Avail: NTIS HC A04/MF A01 CSCL 20/4

Flutter and time response analyses are performed for a NACA 64A006 conventional and a MBB A-3 supercritical airfoil, both oscillating with plunge, pitch, and aileron pitch d.o.f.'s in small disturbance, transonic flow. The aerodynamic coefficients are calculated using the transonic code LTRAN2-NLR. The effects of various kinds of aeroelastic parameters on flutter speeds for the bending-torsion, bending-aileron, and torsion-aileron branches are studied. The flutter speeds associated with the bending-torsion branch are plotted against Mach number for different parameter values. The flutter speed, the amplitude ratio, and the phase difference at different Mach numbers are plotted against the mass ratio for both of two d.o.f. and a three d.o.f. case. Time-response results are obtained for the NACA 64A006 and the MBB A-3 airfoils at M = 0.85 and 0.765, respectively. Using the same sets of parameter values, the flight speeds used to obtain all the neutrally stable response are very close to the flutter speeds obtained in the flutter analysis. The principle of linear superposition of airloads is used in the flutter analysis but not in the response analysis. Author (GRA)

N82-19228# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.

ACTIVE GUST AND MANEUVER LOAD CONTROL CONCEPTS WITH THE EXAMPLE OF THE AIRBUS A300. PART 1: EXPLANATION OF A REGULAR IN THE TIME ZONE OF WIND GUST LOAD DECREASE AND EXAMINATION OF ITS EFFECTIVENESS IN STOCHASTIC GUSTS [AKTIVE BOEEN- UND MANOEVERLASTREGELUNGSKONZEPTE AM BEISPIEL DES AIRBUS A-300. TEILL: AUSLEGUNG EINES REGLERS IM ZEITBEREICH ZUR BOENLASTMINDERUNG UND NACHPRUEFUNG DER WIRKSAMKEIT FUER STOCHASTISCHE BOEEN]

J. Becker, O. Sensburg, and F. Weiss 28 Apr. 1981 60 p refs In GERMAN Presented at DGLR-Jahrestagung 1981, Aachen, 11-14 May, 1981
(MBB-FE-172/S/PUB/39-Pt-1) Avail: NTIS HC A04/MF A01

The development of active control technology and its application to flutter stabilization in aviation as well as maneuvering squall load control in the structural reduction and improvement of flying comfort was investigated. The design of the squall load control, and the plotting of the simulation model for the flexible airplane are examined. Transl. by E.A.K.

N82-19135*# Lockheed-California Co., Burbank.

ELECTRIC FLIGHT SYSTEMS, OVERVIEW

Michael J. Cronin *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 61-94 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19143*# Rockwell International Corp., Cedar Rapids, Iowa.

DIGITAL FLIGHT CONTROLS

John C. Hall *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 189-212 (For primary document see N82 19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19148*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

ELECTROMECHANICAL ACTUATORS

James Bigham *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 253-258 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19149*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DIGITAL FLIGHT CONTROLS

Billy Dove *In its* Elec. Flight Systems Feb. 1982 p 259-261 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19150*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ELECTRIC FLIGHT SYSTEMS INTEGRATION

Ray V. Hood *In its* Elec. Flight Systems Feb. 1982 p 263-268 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19154# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

MULTIVARIABLE AIRCRAFT CONTROL BY MANEUVER COMMANDS: AN APPLICATION TO AIR TO SURFACE GUNNERY

Binh DangVu *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 9-19 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 149-159 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-19229*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THE AEROSPACE TECHNOLOGY LABORATORY (A PERSPECTIVE, THEN AND NOW)

James F. Connors and Robert G. Hoffman Feb. 1982 21 p refs
(NASA-TM-82754; E-1070) Avail: NTIS HC A02/MF A01 CSCL 14B

The physical changes that have taken place in aerospace facilities since the Wright brothers' accomplishment 78 years ago are highlighted. For illustrative purposes some of the technical facilities and operations of the NASA Lewis Research Center are described. These simulation facilities were designed to support research and technology studies in aerospace propulsion. Author

N82-19230# Navy Experimental Diving Unit, Panama City, Fla. Ocean Simulation Facility.

COST ANALYSIS OF NEDU'S HELIUM RECLAIMER

Eric Randall Sep. 1981 31 p refs
(AD-A108409; NEDU-9-81) Avail: NTIS HC A03/MF A01 CSCL 14/2

The analysis compares the cost effectiveness of reclaiming helium from the Navy Experimental Diving Unit's (NEDU) Ocean Simulation Facility (OSF) Hyperbaric Chamber Complex using a Helium Reclamation System manufactured by DIVETEC Systems, Inc. to purchasing pure helium from the U.S. Department of the Interior Bureau of Mines. The cost of electrical power, maintenance and upgrade of the Helium Reclaim System is considered along with the effects of various inflation rates. A discounted cash flow analysis is provided. GRA

N82-19231# Bristol Univ. (England). Dept. of Aeronautical Engineering.

THE PRESSURE SIGNATURE METHOD FOR BLOCKAGE CORRECTIONS, AND ITS APPLICATIONS TO THE INDUSTRIAL WIND TUNNEL B.S. Thesis

A. S. Walker and N. P. Wiseman Jun. 1981 43 p refs
(BU-263) Avail: NTIS HC A03/MF A01

A recent method of correcting for errors due to blockage, applicable to complex shapes and high blockage ratios, was applied to the Aeronautical Engineering Department industrial wind tunnel. A tunnel centerline, source-sink distribution was derived from measured wall pressure signatures. The interference effect of the tunnel walls was calculated; blockage corrections were applied to in-tunnel measurements of forces and pressures. The drag coefficient of a normal flat plate of deliberately high blockage ratio (12%) was measured in the tunnel, then corrected to the value in unconfined flow. This is found to be close to the expected value and indicates that the pressure signature method can be reliably used to correct measurements obtained from models, up to this value of blockage. The effective body implied by the equivalent potential flow was also calculated. This compares well with the known effective body shapes of flat normal plates in confined flow. Author (ESA)

N82-19158# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

INDUCTION DRIVEN TRANSONIC WIND TUNNEL T2: OPERATION AT ROOM TEMPERATURE AND CRYOGENIC ADAPTATION

A. Mignosi, D. Faulmann, and A. Seraudie *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 63-74 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 203-215 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see 91 Lunar and Planetary Exploration.

N82-19232* National Aeronautics and Space Administration, Washington, D. C.
STUDENT'S EXPERIMENT TO FLY ON THIRD SHUTTLE MISSION
24 Feb. 1982 25 p refs
(NASA-News-Release-82-27; PB2-10027) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 22A

A spaceborne student experiment on insect motion during weightlessness scheduled to fly on the third flight of the space shuttle is described. The experiment will focus on the flight behavior in zero gravity of two species of flying insects with differing ratios of body mass to wing area, the velvetbean caterpillar moth and the honeybee drone. Ten insects of each species will be carried in separate canisters. The crew will remove the canisters from the storage locker and attach them to the mid-deck wall, where the insects will be observed and filmed by a data acquisition camera. R.J.F.

N82-19233*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT. MLR FLIGHT EQUIPMENT INSTALLED IN THE ORBITER CABIN
[1982] 13 p
(NASA-TM-84153; E-420-03-82-02) Avail: NTIS HC A02/MF A01 CSCL 22A

The monodisperse latex reactor (MLR), a materials processing payload, located in the middeck of the orbiter cabin, which will operate for 12 hours, is discussed. The capability of the MLR system to support experiments in the middeck area, and to study the kinetics of chemical reactions without the effects of buoyance and sedimentation will be demonstrated. Critical parameters required to understand the mechanism for large particle size monodisperse latex formation using seed latex are studied.
E.A.K.

N82-19234# Committee on Science and Technology (U. S. House).
FUTURE SPACE PROGRAMS, 1981
Washington GPO 1981 335 p refs Hearing before the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 50, 21-23 Sep. 1981
(GPO-86-913) Avail: Subcommittee on Space Science and Applications

Future space programs and the nature of the future in general are discussed. Predictions are made in the areas of science, technology, and demography. Space industrialization and space exploration are discussed. R.J.F.

N82-19235*# TRW Systems Group, Redondo Beach, Calif.
MATERIALS PROCESSING IN SPACE/SPACELAB. FES/VCGS PAYLOAD CRITICAL DESIGN REVIEW
25 Sep. 1980 173 p
Avail: NTIS HC A08/MF A01 CSCL 22A

A 25 mW He-Ne laser holographic recorder for recording the solution growth of triglycine sulfate crystals under low-zero gravity conditions is described. A systems engineering and design analysis, and mechanical and electrical design analyses of the equipmentation are presented. The equipment, fabricated for the SI-3 flight on the space shuttle, was designed to take 300 holograms (two orthogonal views) on 50-235 film of each growth experiment. Specifications and capabilities for support module mechanical assemblies are also presented. M.D.K.

N82-19236*# Lockheed Missiles and Space Co., Huntsville, Ala.
MANUFACTURING IN SPACE: FLUID DYNAMICS NUMERICAL ANALYSIS Annual Report, Aug. 1980 - Aug. 1981
S. J. Robertson, L. A. Nicholson, and L. W. Spradley Aug. 1981 51 p refs
(Contract NASw-3281)
(NASA-CR-168610; LMSC-HREC-TR-D784480) Avail: NTIS HC A04/MF A01 CSCL 22A

Natural convection in a spherical container with cooling at the center was numerically simulated using the Lockheed-developed General Interpolants Method (GIM) numerical fluid dynamic computer program. The numerical analysis was simplified by assuming axisymmetric flow in the spherical container, with the symmetry axis being a sphere diagonal parallel to the gravity vector. This axisymmetric spherical geometry was intended as an idealization of the proposed Lal/Kroes growing experiments to be performed on board Spacelab. Results were obtained for a range of Rayleigh numbers from 25 to 10,000. For a temperature difference of 10 C from the cooling sting at the center to the container surface, and a gravitional loading of 0.000001 g a computed maximum fluid velocity of about 2.4 x 0.00001 cm/sec was reached after about 250 sec. The computed velocities were found to be approximately proportional to the Rayleigh number over the range of Rayleigh numbers investigated. Author

N82-19237*# Princeton Univ., N. J.
OAO-C COPERNICUS OPERATIONS REPORT Final Report
Sep. 1981 53 p
(Contract NAS5-23576)
(NASA-CR-166774) Avail: NTIS HC A04/MF A01 CSCL 22A

An analysis of the operation of OAO 3, Copernicus, the orbiting astronomical observatory, is given with particular emphasis upon the Princeton Experiment Package. Malfunctions and their impact are discussed, as are orbital observations and operations. Software is described. R.J.F.

N82-19238# Technische Universitaet, Munich (West Germany). Lehrstuhl fuer Raumfahrttechnik.
ASTRONAUTICS: KEPLER AND HOHMANN [RAUMFAHRT: KEPLER UND HOHMANN]
H. O. Ruppe Mar. 1980 10 p In GERMAN
(TUM-RT-KB-80/1) Avail. NTIS HC A02/MF A01

The history of astronautics, its origins with Johannes Kepler, and Walter Hohmann's contribution are described. Hohmann based his theory of astronautics on Keplers laws of orbital mechanics. Kepler's law serves as the foundation for modern space mechanics and provides fast rough calculations for aeronautic measurements. The Hohmann trajectories serve as the obvious foundation of contemporary space technology, providing mathematical transparence and simplicity in the planning of space flights. E.A.K.

N82-19239# Northwick Park Hospital, Harrow (England). Clinical Research Centre.
SAFETY DEMONSTRATION STUDY ON PROPOSED BIORACK GLOVE BOX
H. S. Wolff, S. J. E. Humphrey, and J. Rashbass Paris ESA Mar. 1981 83 p Original contains color illustrations
(Contract ESA-4368/80/F-FC(SC))
(ESA-CR(P)-1482) Avail: NTIS HC A05/MF A01

A table top model of a glove box suitable for incorporation in the Spacelab biorack was tested. Containment tests following the internal dispersal of particles, microorganisms, and simulated spills of volatile materials were performed. The rate of removal of dispersed or volatilized substances from the working volume was investigated. The ergonomic aspects were considered. Results show that a simple design implemented with commercial components is capable of a very high degree of containment combined with a clean atmosphere in the working volume.
Author (ESA)

N82-19240# Eurosat S.A., Geneva (Switzerland).
TELEOPERATION AND AUTOMATION: A SURVEY OF EUROPEAN EXPERTISE APPLICABLE TO DOCKING AND ASSEMBLY IN SPACE Final Report
Michel Plantier, Rene Bodmer, Jean Bernard Lagarde, and Charles Miller Paris ESA May 1981 80 p refs
(Contract ESTEC-4402/80/NL-AK(SC))
(MP/PR/4905; ESA-CR(P)-1487) Avail: NTIS HC A05/MF A01

Academic and industrial R and D bodies were surveyed in order to assess European robotic and teleoperator technology capabilities. Sensors and control mechanisms are considered. The survey indicates that Europe could develop the facilities necessary for the automation of a large number of space stations. Computer hardware and software must be upgraded. More international cooperation is required to offset the advantages given to the U.S. and the USSR by their militarily subsidized research budgets. Author (ESA)

N82-19241# Fiat Research Center, Turin (Italy). Dept. of Technologies and Processes.
FOLLOW ON STUDY ON FLUID PHYSICS MODULE (PM). PART 1: INDEPENDENT OPERATING FLUID PHYSICS MODULE (FPM) Final Report
C. DAdda, G. Levizzari, R. Cerrato, and G. Rovera Paris ESA 1981 117 p
(Contract ESA-3631/78/F-FC(SC))
(Rept-79-RV-0; ESA-CR(P)-1509) Avail: NTIS HC A06/MF A01

An independently operating FPM, directly interfaced with the Spacelab subsystem, is proposed. An interface unit (IU) connects the FPM to the 28 V power supply bus and to the Spacelab command and data management subsystem. The power supply provides the voltages needed by the FPM and IU. The analog and digital signals acquisition starts every FPM cinecamera frame. The analog signals are converted to a digital format and stored in a buffer memory, together with digital signals and the time of the experiment. A microprocessor supervises the acquisition and updates the time elapsed, counting the 1024 KHz signal, distributed by the remote acquisition unit. The FPM signals are displayed for monitoring and initial setting of experiment parameters. A lamp display gives the status of the FPM during operation and acquisition phases, and provides alarm signals for anomalous conditions. Improvements which enlarge operational range and add monitoring capabilities are listed, e.g., fluid recovery, axial vibration and frame marking of film. Author (ESA)

N82-19242# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Product Assurance Dept. RQ11.
REPORT ON A STUDY OF THE MAINTENANCE IN READINESS OF ON-GROUND SPACECRAFT SYSTEMS FOR OPERATIONAL APPLICATION PROGRAMS
W. G. Cussen Paris ESA 24 Jun. 1981 46 p refs
(Contract ESA-4468/80/NL-AB)
(MBB-80-162/150; ESA-CR(P)-1513) Avail: NTIS HC A03/MF A01

Practical aspects of storage and maintenance of typical spacecraft equipment and program aspects relating to a decision to store such equipment were studied. Literature and experienced personnel were consulted. The long-term storage of operational equipment is expensive and should only be imposed on a project where there is a positively identified need. Where there is such a need it should be subject to a planned and coordinated approach recognized and directed at project management level from very early in the program. Onboard storage should be used as much as possible. Author (ESA)

N82-19243# European Space Agency, Paris (France). Directorate of Administration.
SPACE ACTIVITIES IN THE 80'S: THE PROGRAMS AND THE INDUSTRY. PARTS 1 AND 2: SURVEY OF SPACE PROGRAMS (1975 TO 1980); SURVEY OF THE CAPABILITIES AND EXPERIENCE OF THE EUROPEAN SPACE INDUSTRY
Giovanni Dondi Nov. 1981 290 p refs 3 Vol.
(ESA-SP-1012-Vol-1) Avail: NTIS HC A13/MF A01; ESA, Paris FF 80 (for volume 1) FF 300 (for complete set)

The programs and achievements of ESA since its creation, the evolution of ESA member national space programs, and international space programs involving European countries outside the ESA framework are reviewed. European industrial participation in space programs is summarized. Information on manufacturers involved in space industries is given for each member country, including their contributions to individual projects. Author (ESA)

N82-19244# European Space Agency, Paris (France). Directorate of Administration.
SPACE ACTIVITIES IN THE 80'S: THE PROGRAMS AND THE INDUSTRY. PART 3: DETAILED PRESENTATION OF THE EUROPEAN SPACE INDUSTRY (1982)
Giovanni Dondi Nov. 1981 535 p 3 Vol.
(ESA-SP-1012-Vol-2; ISSN-0379-6566) Avail: NTIS HC A23/MF A01; ESA, Paris FF 160 (for volume 2) FF 300 (for complete set)

The specializations, activities and potential of the space industry of ESA member countries are listed. The space firms of each country are indicated and their space activities are summarized. Contracts awarded by ESA to the firms of each country are detailed. Market guides for a number of key space/space related fields of activity, e.g., propulsion or remote sensing, are provided. Author (ESA)

N82-19245# European Space Agency, Paris (France). Directorate of Administration.
SPACE ACTIVITIES IN THE 80'S: THE PROGRAMS AND THE INDUSTRY. PART 4: OUTLOOK OF SPACE INDUSTRY OUTSIDE EUROPE (1981)
Giovanni Dondi Nov. 1981 260 p refs 3 Vol.
(ESA-SP-1012-Vol-3; ISSN-0379-6566) Avail: NTIS HC A12/MF A01; ESA, Paris FF 80 (for volume 3) FF 300 (for complete set)

The specializations, activities, and potential of each country are given for the American, Canadian, Japanese, and Indian space programs. Space firms in each country are indicated, and their space activities are summarized. Details of NASA contractors are provided for the U.S. Author (ESA)

N82-19246# European Space Agency, Paris (France). Science Advisory Committee.
RECOMMENDATIONS ON THE DEVELOPMENT OF SPACE SCIENCE IN THE 1980'S
Dec. 1981 74 p refs
(ESA-SP-1015; ESA-SPC(79)2; SAC(78)17) Avail: NTIS HC A04/MF A01

The role and effectiveness of ESA in science is reviewed and recommendations for development in the 1980's are made. These include: increasing the launch rate to one satellite per year; allocating Spacelab facilities to microgravity experiments as well as to atmospheric, plasma physics and astronomical investigations; and studying a fourth stage for Ariane or the use of alternative propulsion techniques. Author (ESA)

N82-20116*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A SUMMARY OF SPACE FLIGHT MISSIONS SUPPORTED BY THE DEEP SPACE NETWORK
E. S. Burke *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 13-17 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 22A

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N82-19247 Royal Aircraft Establishment, Farnborough (England).
GEOPOTENTIAL HARMONICS OF ORDER 29, 30 AND 31 FROM ANALYSIS OF RESONANT ORBITS
D. G. King-Hele and Doreen M. C. Walker Aug. 1981 27 p refs
(RAE-TR-81109; RAE-Space-603; BR81087) Copyright. Avail: Issuing Activity

The Earth gravitational potential was investigated in order to evaluate lumped harmonics of a particular order m by analyses of resonant satellite orbits (orbits with tracks over the Earth that repeat after m revolutions). Results on 30th order harmonics from analyses of 15th-order resonance, and results on 29th and 31st order harmonics from 29:2 and 31:2 resonances are reviewed. The values available for 30th order lumped harmonics of even degree are numerous enough to allow a solution for individual coefficients of degree up to 40. The best determined coefficients are those of degree 30 For the 29th and 31st order harmonics, and for the 30th order harmonics of odd degree, there are not enough values to determine individual coefficients, but the lumped values from particular satellites can be used for

resonance testing of gravity field models, particularly the Goddard Earth Model (GEM) 10B (up to degree 36) and 10C (for degree > 36). The results of applying these tests are discussed.
Author (ESA)

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N82-19248*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
FINANCIAL ASSESSMENT OF THE SPACE OPERATIONS CENTER AS A PRIVATE BUSINESS VENTURE Final Report
Michael Simon Jan. 1982 28 p refs Presented at Am. Astronautical Soc. Ann. Meeting, San Diego, Calif., 26-29 Oct. 1981 Submitted for publication
(Contract NASw-3204)
(NASA-CR-168636; Rept-39) Avail: NTIS HC A03/MF A01 CSCL 14B

The possibility of private financing and operation of the Space Operations Center (SOC) is considered as an alternative to SOC development by the government. A hypothetical revenue model for SOC services is constructed and is compared with NASA estimates of SOC development and operating costs. A present value analysis based on a 1985 to 2000 investment horizon shows a potential for substantial profit in a private SOC venture, although the possibility of large losses is not discounted. Present value estimates range from $8.6 billion down to a low minus $3.3 billion.
Author

N82-19249*# Ford Aerospace and Communications Corp., Houston, Tex. Space Information Systems Operation.
MISSION SUPPORT PLAN STS-2
F. Ibanez 19 Aug. 1981 352 p
(Contract NAS9-15014)
(NASA-CR-167435; DRL-50) Avail: NTIS HC A16/MF A01 CSCL 22D

The plan defines the anticipated GSTDN/DOD station support and configuration requirements for a nominal flight with an orbital inclination of 38.4 degrees and a circular orbit of 120 nautical miles for the first 5 orbits and 137 nautical miles thereafter. A complete set of preliminary site configuration messages (SCM) define nominal station AOS/LOS times and configurations for S-Band and UHF support. This document is intended for use as a planning tool, providing the necessary guidelines and data base for SCM generation in support of STS-2.
Author

N82-19250# Range Commanders Council, White Sands Missile Range, N. Mex. Documentation Group.
A GLOSSARY OF RANGE TERMINOLOGY Final Report
1981 241 p
(AD-A108894; DG-502-81) Avail: NTIS HC A11/MF A01 CSCL 16/1

This glossary contains definitions, acronyms, occasional abbreviations and other information used in daily operations at the major test ranges and facilities. Some of the terminology is peculiar to certain activities, while other terms are common in usage and application. The basic issue of this glossary was a compilation of information from the other groups of the Range Commanders Council (RCC). This revision incorporates additional contributions, suggestions and recommendations submitted by these sources since publication of the basic issue. Major terms and subdivisions are listed alphabetically. Cross-references are used for clarification when necessary.
GRA

N82-19251# Range Commanders Council, White Sands Missile Range, N. Mex. Documentation Group.
UNIVERSAL DOCUMENTATION SYSTEM HANDBOOK. SUPPLEMENT 2: PROCEDURES FOR THE ELECTRONIC TRANSMISSION AND PROCESSING OF LEVEL 1, 2, AND 3 TEST REQUIREMENTS AND SUPPORT INFORMATION Final Report
Oct. 1981 55 p
(AD-A108901; DG-501-79-Suppl-2) Avail: NTIS HC A04/MF A01 CSCL 17/2

This supplement describes the procedures for converting the Universal Documentation System (UDS) forms to a format more conducive to electronic transmission. The purpose of these procedures is to provide a standard format for electronic processing and transmission of the UDS forms which will be compatible with typewriters, optical character recognition readers, word processors, and high-speed computer printers.
GRA

N82-19252# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MILLSTONE HILL RADAR SATELLITE TRACKING SYSTEM
Eli M. Hauser 4 Nov. 1981 65 p
(Contract F19628-80-C-0002; AF Proj. 2296; AF Proj. 2750)
(AD-A109279; STK-114; ESD-TR-81-298) Avail: NTIS HC A04/MF A01 CSCL 22/4

This document describes the hardware utilized at the Lincoln Laboratory Millstone radar facility. A system overview is presented which explains the function each subsystem fulfills and its interaction with the system. A detailed analysis of each subsystem follows. Diagrams for each level of consideration are included. This document is current as of 1 September 1981.
Author (GRA)

N82-20117*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
HELIOS MISSION SUPPORT
A. L. Berman, C. T. Stelzried, B. L. Seidel, J. C. Nash, and R. E. Nevarez *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 18-23 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 22D

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-19253 Alabama Univ. in Huntsville.
TARGET/CLUTTER DISCRIMINATION TECHNIQUES FOR LASER SEMI-ACTIVE MISSILE SYSTEMS Ph.D. Thesis
Huey Frederick Anderson 1981 193 p
Avail: Univ. Microfilms Order No. 8128319

Laser semi-active missile systems, a class of precision guided weapons, are utilized in terminal homing applications. However, clutter signals due to atmospheric and battlefield aerosol backscatter degrade detection performance. Differences between target and clutter signals are determined through field measurements and computer simulations. On this basis two new discrimination and detection techniques are developed and evaluated. The first technique combines FFT processing, inverse filtering and adaptive detection. In the second technique, digital filtering is performed in the time domain and results are evaluated in the frequency domain. The techniques have been applied to realistic target and clutter signals resulting in improvement up to 10db in signal-to-clutter ratios. Adaptive detection when combined with inverse filtering provides correct decisions for all target and clutter signals processed.
Dissert. Abstr.

N82-19254 Royal Aircraft Establishment, Farnborough (England).
TABLE OF SPACE VEHICLES, 1958 - 1980
H. Hiller and J. A. Pilkington Jul. 1981 52 p refs
(RAE-TR-81095; RAE-Space-602; BR81084) Copyright. Avail: Issuing Activity

Details of all space vehicles that escaped from the Earth's influence as a result of the 109 launchings from 1958 to 1980 are given. Name, international designation, launch date, mass, basic shape and size, details of orbit or trajectory, and the time and place of impact or landing on the Moon or a planet are indicated. The table includes orbits around the Sun, in the

Earth-Moon system, and around the Moon, around Mars, and around Venus. Author (ESA)

N82-19255*# Wiggins (J. H.) Co., Redondo Beach, Calif.
DEVELOPMENT OF STS/CENTAUR FAILURE PROBABILITIES LIFTOFF TO CENTAUR SEPARATION Final Report
James M. Hudson Feb. 1982 82 p
(Contract NAS9-16259)
(NASA-CR-167549; TR-82-1404) Avail: NTIS HC A05/MF A01 CSCL 22B

The results of an analysis to determine STS/Centaur catastrophic vehicle response probabilities for the phases of vehicle flight from STS liftoff to Centaur separation from the Orbiter are presented. The analysis considers only category one component failure modes as contributors to the vehicle response mode probabilities. The relevant component failure modes are grouped into one of fourteen categories of potential vehicle behavior. By assigning failure rates to each component, for each of its failure modes, the STS/Centaur vehicle response probabilities in each phase of flight can be calculated. The results of this study will be used in a DOE analysis to ascertain the hazard from carrying a nuclear payload on the STS. Author

N82-19256# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
GENERAL CONFIGURATION AND INTERNAL DISPOSITION OF EQUIPMENT IN A SATELLITE FOR COLLECTING ENVIRONMENTAL DATA
Carlos deOliveira Lino and Aydano Barreto Carleial Oct. 1981 32 p refs In PORTUGUESE; ENGLISH summary Presented at 33d Ann. Meeting of SBPC, Salvador, 81-5 Jul. 1981
(INPE-2240-PRE/026) Avail: NTIS HC A03/MF A01

The general configuration of an experimental satellite for reception and retransmission to the Earth of environmental data is described. The data originates from small automatic Earth stations equipped with sensors and capable of operating in remote locations. The interrelationships among the equipment blocks constituting the satellite and between these and the outside medium, which were used in the search for an adequate disposition for the equipment blocks are presented. The proposed internal and external disposition for the blocks is presented in drawings. Some mechanical quantities (position of the center of mass, moments of inertia) resulting from the mass distribution inherent to the chosen configuration, are calculated. S.L.

N82-19257*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARGE SPACE SYSTEMS TECHNOLOGY, PART 2, 1981
William J. Boyer, comp. Mar. 1982 479 p refs Conf. held in Hampton, Va., 16-19 Nov. 1981
(NASA-CP-2215-Pt-2; L-15096-Pt-2) Avail: NTIS HC A21/MF A01 CSCL 22B

Four major areas of interest are covered: technology pertinant to large antenna systems; technology related to the control of large space systems; basic technology concerning structures, materials, and analyses; and flight technology experiments. Large antenna systems and flight technology experiments are described. Design studies, structural testing results, and theoretical applications are presented with accompanying validation data. These research studies represent state-of-the art technology that is necessary for the development of large space systems. A total systems approach including structures, analyses, controls, and antennas is presented as a cohesive, programmatic plan for large space systems. For individual titles, see N82-19258 through N82-19285.

N82-19258*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
JPL ANTENNA TECHNOLOGY DEVELOPMENT
R. E. Freeland *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 429-438 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

Systems-level technology for evolving cost-effective, STS compatible antennas that will be automatically deployed in orbit to perform a variety of missions in the 1985 to 2000 time period is discussed. For large space-based antenna systems, the LSST program has selected deployable antennas for development. The maturity of this class of antenna, demonstrated by the success of smaller size apertures, provides a potential capability for satisfying a significant number of near-term, space-based applications. The offset wrap-rib concept development is the basis of the JPL LSST antenna technology development program. Supporting technology to the antenna concept development include analytical performance prediction, the capability for measuring and evaluating mechanical antenna performance in the intended service environment, and the development of candidate system-level configurations for potential applications utilizing the offset wrap-rib antenna concept. Author

N82-19259*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
OFFSET WRAP RIB ANTENNA CONCEPT DEVELOPMENT
A. A. Woods, Jr. and N. F. Garcia *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 439-470 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The demonstration of 50 to 150 m, STS compatible, offset antenna technology readiness is reported. Fabrication of a ground and flight testable partial 55 m reflector section and feed support structure is discussed. Reduction to practice through ground test verification is presently contained in the program. Key objectives for the program include the design of a compatible feed support structure and the fabrication and testing of critical components. T.M.

N82-19260*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ANALYTICAL PERFORMANCE PREDICTION FOR LARGE ANTENNAS
M. El-Raheb *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 471-478 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The coupled free-free modes of the 55M LMSS antenna configuration are shown. They were determined using modal synthesis. Reflector modes clamped at the hub were calculated adopting the efficient cyclic symmetry technique. Similarly, clamped hub modes of the offset boom structure were calculated. The modes of the two substructures were then combined through the process of modal synthesis on the assumption that the interface at the hub structure is rigid thus satisfying statically determinate matching conditions. For attitude control purposes, only modes associated with symmetric components zero and one involve net motions of the center of gravity of the reflector. This condition restricts the set of admissible eigenfunctions for modal synthesis. Modes with symmetric components higher than one are excited only by forces acting on the ribs. These modes are totally uncoupled from the boom dynamics. T.M.

N82-19261*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SURFACE MEASUREMENT SYSTEM DEVELOPMENT
Martin Berdahl *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 479-490 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The development of an optical system designed to satisfy the requirements of early deployable concepts such as the LMSC offset wrap rib antenna is reported. The system is relatively lightweight, will measure distance to several targets, and provide data in engineering units in real time. Accuracy of measurements is such that use of the system will permit evaluation of surface quality of large parabolic antenna dishes. Operation of the system was conceptually proven. T.M.

N82-19262*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SUMMARY OF ANTENNA TECHNOLOGY DEVELOPMENT AT THE LANGLEY RESEARCH CENTER
Thomas G. Campbell *In its* Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 491-502 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

Compatible antenna systems for the STS are discussed. Potential applications of the systems include communications, radiometry, and radio astronomy. The technologies discussed are those needed to evaluate, fabricate, package, design, transport, and cost effectively deploy the antenna systems. T.M.

N82-19263*# Harris Corp., Melbourne, Fla.

MAYPOLE (HOOP/COLUMN) CONCEPT DEVELOPMENT PROGRAM

M. R. Sullivan *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 503-550 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The program is divided into six tasks: preliminary design and performance; materials development; advanced concepts; economic assessment; demonstration/verification models; and a 15 meter engineering model. All support the main objective of the program which is the technology development necessary to evaluate, design, manufacture, package, transport and deploy the Hoop/Column reflector by means of a ground-based test program. Progress for each task is reported. T.M.

N82-19264*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

RADIO FREQUENCY VERIFICATION TASKS RELATED TO A MULTIPLE APERTURE REFLECTOR SYSTEM

Thomas G. Campbell *In its* Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 551-556 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The establishment of analytical methods for predicting the electromagnetic performance of multiple offset fed apertures for multiple beam large space antenna systems is highlighted. The development of experimental modeling techniques for verifying the analytical methods used in predicting the effects of surface roughness (pillows), scattering, and aperture coupling on RF performance is discussed. T.M.

N82-19265*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

PRELIMINARY EXPERIMENTAL TEST RESULTS USING 35 GHz OFFSET FED REFLECTOR SIMULATING SURFACE PILLOWS AND APERTURE CABLES

Thomas G. Campbell and W. Robert Young *In its* Large Space Systms Technol., Pt. 2, 1981 Mar. 1982 p 557-582 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The effects caused by reflector surface pillows and aperture cables on RF performance were determined. The test uses models that were designed to be replicas of a quad aperture at the proper F/D = 1.50 as provided in the LSST point design. Separate pillow models were machined from solid aluminum sections that simulated the surface contour pillows but on an exaggerated basis. The worse case pillow heights lamda/20 and lamda/5 were machined onto the precision reflector. In addition to the pillow effects, the scattering effects of aperture (Hoop/Column cables) cables were determined. Therefore, simulated quartz and graphite cables were tested with the smooth, lamda/20, and lamda/5 reflector models. T.M.

N82-19266*# Martin Marietta Corp., Denver, Colo.

PRELIMINARY ANALYTICAL RESULTS USING SURFACE CURRENT INTEGRATION FOR PREDICTING EFFECTS OF SURFACE PILLOWS ON RF PERFORMANCE

C. E. Farrell and D. A. Strange *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 583-590 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

An overview of the fast integral RF evaluation (FIRE) program is presented. This program uses surface current integration to evaluate RF performance of antenna systems. It requires modeling of surfaces in X, Y, Z coordinates along equally spaced X and Y grids with Z in the focal directon. The far field contribution of each surface point includes the effects of the Z-component of surface current which is not included in the aperture integration technique. Because of this, surface current integration is the most effective and inclusive technique for predicting RF performance on non-ideal reflectors. Results obtained from use of the FIRE program and an aperture integration program to predictt RF performance of a LSS antenna concept are presented. T.M.

N82-19267*# Harris Corp., Melbourne, Fla.

RF VERIFICATION TASKS UNDERWAY AT THE HARRIS CORPORATION FOR MULTIPLE APERTURE REFLECTOR SYSTEM

T. A. Gutwein *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 591-604 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

Mesh effects on gain and patterns and adjacent aperture coupling effects for 'pie' and circular apertures are discussed. Wire effects for Harris model with Langley scale model results included for assessing D/lamda effects, and wire effects with adjacent aperture coupling were determined. Reflector surface distortion effects (pillows and manufacturing roughness) were studied. T.M.

N82-19268*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DISTORTED REFLECTOR ANTENNA PERFORMANCE PREDICTION TECHNIQUE

M. C. Bailey *In its* Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 605-610 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The application of a 3-D curve-fit technique to the electromagnetic analysis of reflector antennas is presented. the reflector antennas are described by the coordinates of an irregular distribution of measured points on the reflector surface. The reflector antenna analysis method used to calculate radiation patterns is geometric-optics with aperture-integration since an efficient and accurate computer code was readily available for modification. T.M.

N82-19269*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

MEASUREMENT OF LOSSES OF MESH MEMBRANE MATERIAL FOR REFLECTOR APPLICATIONS WITH AN S-BAND RADIOMETER

Hans-Juergen C. Blume *In its* Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 611-620 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The spatial resolution, the frequency of revisits, and the accuracy requirements for the detection of Earth surface parameters from space force the satellite designers to consider large space structures for microwaves. Some Earth surface parameters are only detectable with radiometers. Because the large reflectors should be much lighter than solid and deployable reflectors, mesh membrane material is considered to be used as the reflector. It is essential to determine the emissivity of the reflecting material even when close to zero to estimate the accuracy of the radiometer measurement. An existing S-band radiometer was used to determine the loss of a 1 sq m pretensioned mesh first in a field experiment and later in a well shielded laboratory set-up. The models for retrieving the emissivity of the mesh are described in detail and the equivalent losses for different mesh positions were calculated. T.M.

N82-19270*# Harris Corp., Melbourne, Fla.

THE SUITABILITY OF MESH MEMBRANE MATERIAL FOR RADIOMETER REFLECTOR APPLICATIONS

W. F. Croswell *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 621-630 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The standard measurement system used for evaluating the transmission properties of mesh used in deployable antennas is shown schematically. The system allows the rapid measurement of the transmissivity of mesh samples at a given incidence angle. The analysis has the advantage in that the effects of conductivity loss, junction impedance, and cross polarization can be treated. T.M.

N82-19271*# TRW Defense and Space Systems Group, Redondo Beach, Calif.

CONCEPTED DESIGN OF A SURFACE MEASUREMENT SYSTEM FOR LARGE DEPLOYABLE SPACE ANTENNAS

R. S. Neiswander *In* NASA. Langley Research Center Large

Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 631-640 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The sensor system is in essence a point design, specifically interfacing with the Harris, Inc., 1000 meter deployable mesh communication antenna. The design can, without large modification, be adapted to other large deployable antennas such as the Lockheed Wrap-rib, the General Dynamics Precision Erectable Truss and the TRW Advanced Sunflower antennas. Measurements are optical displacements. The elements of the system are a central cluster of receivers near the apex of the antenna and active bright targets at the antenna. The cluster defines a single coordinate frame from which all surface positions are referenced. The receivers continuously observe an extended array of sample points located throughout the reflecting surface and its supporting structure. For the Harris antenna, the surface samples are at the mesh gore lines and at the supporting hoop. Output data is in real-time, compatible with on-board processing and active control of antenna figure. Lifetime of the system is at least 10 years continuous operation in space. T.M.

N82-19272*# Barnes Engineering Co., Stamford, Conn.
ELECTRO-OPTICAL SYSTEM FOR REMOTE POSITION MEASUREMENTS IN REAL TIME
P. W. Collyer, S. C. Spielberger, and K. A. Ward *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 641-656 refs (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The development of an electro-optic position sensing system usable for Large Space Systems applications is described. A form of autocollimation was selected as the best overall technology, and a brassboard model was fabricated and tested. L.F.M.

N82-19273*# Martin Marietta Aerospace, Denver, Colo.
NEAR FIELD TESTING OF LARC MULTIPLE BEAM ANTENNA
G. J. Lang *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 657-680 refs (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

Near field antenna measurements as an alternative to far field measurements are discussed. Most of the serious shortcomings of far field measurements can be alleviated using near field techniques. The near field data can be used as a direct diagnostic of antenna performance before the integration by the aperture which can make it difficult to isolate the cause of far field pattern anomalies. L.F.M.

N82-19274*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTROSTATIC MEMBRANE ANTENNA CONCEPT TESTING Progress Report
J. W. Goslee *In its* Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 681-688 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The electrostatic concept is evaluated to determine its feasibility for future antenna applications. The concept tested illustrates how the individual power supplies are connected to concentric electrodes located in back of the plastic membrane which is the reflective surface. L.F.M.

N82-19275*# Martin Marietta Aerospace, Denver, Colo.
CONCEPTUAL DESIGN OF ELECTROSTATIC ANTENNA
J. V. Coyner *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 689-707 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The concept of using electrostatic forces to tension a thin, conducting membrane and maintain it in a precision antenna shape is discussed. This electrostatically controlled membrane mirror is an adpative structure which maintains surface quality despite errors in construction, irregularities of materials, solar heating, and on board disturbances. L.F.M.

N82-19276*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ANTENNA SUBSYSTEM REQUIREMENTS
R. E. Freeland *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 707-710 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

An in depth review of the hoop/column and offset wrap rib antenna technology development program was conducted. Additional work that needs to be undertaken to bring concept developments to a system level technology readiness state was identified. L.F.M.

N82-19277*# Boeing Aerospace Co., Seattle, Wash.
CONFIGURATION DEVELOPMENT OF THE LAND MOBILE SATELLITE SYSTEM (LMSS) SPACECRAFT
C. T. Golden, J. A. Lackey, and E. E. Spear *In* NASA. Langley Research Center Large Space System Technol., Pt. 2, 1981 Mar. 1982 p 711-760 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

Configurations for a Land Mobile Satellite System Spacecraft are discussed. It is a preliminary concept of a quad aperture reflector spacecraft capable of relaying radio messages to land mobile units throughout the United States. L.F.M.

N82-19278*# Boeing Aerospace Co., Seattle, Wash.
CONFIGURATION DEVELOPMENT OF THE LAND MOBILE SATELLITE SYSTEM (LMSS) SPACECRAFT: CONCLUSIONS
C. T. Golden, J. A. Lackey, and E. E. Spear *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 761-766 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

It is concluded that both the wrap/rib and hoop/column antenna designs are feasible for the Land Mobile Satellite System. Additional configuration design iterations are necessary. L.F.M.

N82-19279*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LAND MOBILE SATELLITE SYSTEMS (LMSS): SINGLE APERTURE SYSTEM DESIGN
W. J. Weber, III *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 797-780 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The large size of the UHF antenna on the satellite provides two advantages with respect to the Land Mobile Satellite System design. It provides tremendous gain for both transmitting and receiving at the satellite and enables very simple, low power equipment in the mobile vehicle. The UHF antenna for this study was selected to have an aperture of 55 meters. This implies a beamwidth of roughly 0.45 degree and requires 87 beams to cover the continental United States. L.F.M.

N82-19280*# General Electric Co., Philadelphia, Pa. Space System Div.
QUAD APERTURE RF DEFINITION
P. Foldes *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 781-820 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22A

A single STS package 118 m diameter hoop/column antenna is capable of providing service for appr. 250,000 mobile users. The selected quad aperture configuration is able to provide at least 25 db C/I without cable blockage, column scatter, coupling between quad apertures, and tolerance effects. A feed can be designed which uses single polarized radiating elements while the overall system employs dual polarization. The quad aperture concept can eliminate the use of diplexers and their associated losses. The critical technology issues in the RF area include the design of the radiating elements, BFN, monolithic power amplifiers and receiver front end, tolerance control and packaging of the feed. L.F.M.

N82-19281*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ATTITUDE CONTROL SUBSYSTEM STUDY FOR THE LAND MOBILE SATELLITE SYSTEM SPACECRAFT
A. F. Tolivar *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 821-839 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

This Attitude Control Subsystem study applies the generic antenna control technology to the specific requirements of the Land Mobile Satellite System mission and defines suitable attitude control subsystem designs for both the wrap/rib and hoop/column antenna configurations. The technology developments required to establish technology readiness by 1987 are also identified.
L.F.M.

N82-19282*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
STRUCTURAL ASSEMBLY DEMONSTRATION EXPERIMENT
Jack W. Stokes *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 841-858 refs (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The experiment is of an operational variety, designed to assess crew capability in Large Space System (LSS) assembly. The six Structural Assembly Demonstration Experiment objectives include: (1) the establishment of a quantitative correlation between LSS neutral buoyancy simulation and on-orbit assembly operations in order to enhance the validity of those assembly simulations; (2) the quantitative study of the capabilities and mechanics of human assembly in an Extravehicular Activity environment; (3) the further corroboration of the LSS Assembly Analysis cost algorithm through the obtainment of hard data base information; (4) the verification of LSS assembly techniques and timeless, as well as the identification of crew imposed loads and assembly aid requirements and concepts; (5) verification of a Launch/Assembly Platform structure concept for other LSS missions; and (6) lastly, to advance thermal control concepts through a flexible heat pipe.
L.F.M.

N82-19283*# Massachusetts Inst. of Tech., Cambridge.
STRUCTURAL ASSEMBLY DEMONSTRATION EXPERIMENT (SADE) EXPERIMENT DESIGN
D. L. Akin and M. L. Bowden *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 859-880 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The Structural Assembly Demonstration Experiment concept is to erect a hybrid deployed/assembled structure as an early space experiment in large space structures technology. The basic objectives can be broken down into three generic areas: (1) by performing assembly tasks both in space and in neutral buoyancy simulation, a mathematical basis will be found for the validity conditions of neutral buoyancy, thus enhancing the utility of water as a medium for simulation of weightlessness; (2) a data base will be established describing the capabilities and limitations of EVA crewmembers including effects of such things as hardware size and crew restraints; and (3) experience of the M.I.T. Space Systems Lab in neutral buoyancy simulation of large space structures assembly indicates that the assembly procedure may create the largest loads that a structure will experience during its lifetime. Data obtained from the experiment will help establish an accurate loading model to aid designers of future space structures.
L.F.M.

N82-19284*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SOLAR ARRAY FLIGHT EXPERIMENT (SAFE)
R. W. Schock *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 881-891 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The solar arrays flight experiment consists of four experiments on two different flights. The first experiment, termed the baseline, has a basic purpose to demonstrate the flight readiness of lightweight solar array technology for solar electric propulsion and other payload power applications. The early availability of this experiment and its basic large space structure characteristics make it a logical candidate to demonstrate other disciplines critical to large space structures. These demonstrations form the basis for three other solar array experiments, two in remote sensing and one in control. All of these experiments are briefly reviewed in this paper.
L.F.M.

N82-19285*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
LARGE SPACE SHUTTLE FLIGHT EXPERIMENT
Lyle M. Jenkins *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 893-909 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

It appears practical to challenge the Orbiter DAP with a large, attached structure. The definition of this capability is a fundamental step in the development of nearly all large space systems currently under consideration. Experiment features may be incorporated that apply to control systems for large space systems such as model damping devices. In a relatively simple deployable structure, the correlation of flight test results with ground test and analysis should provide a basis for extrapolation to more complex structures. Initial experiment concepts will provide a starting point for the examination of antenna feed mast requirements with the objective changing the design to produce a representative test article. Correlation of construction operations with ground simulations will provide for better task and time-line definition. EVA needs to be a direct benefit to the conduct of the experiment. Early consideration of safety issues is a precaution against defining an unacceptable experiment concept. Integration of many objectives seems feasible and is generally perceived as the only way to justify a relatively expensive experiment.
L.F.M.

N82-19286# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THERMOELASTIC DEFORMATION IN CYLINDRICAL SHELLS OF GREAT LENGTH [DEFORMACAO TERMOELASTICA EM CASCAS CILINDRICAS DE GRANDE ALONGAMENTO]
Wolodymir Boruszewski Nov. 1981 14 p refs In PORTUGUESE; ENGLISH summary Presented at the INPE-LCC Seminar, Rio de Janeiro, 25-27 Nov. 1981
(INPE-2268-PRE/049) Avail: NTIS HC A02/MF A01

The utilization of long and slender cylindrical shells, as flexible appendages of satellites, is presented intending to introduce the problem of bending and torsion of thermoelastic origin. A finite element method approach to this problem is proposed.
S.L.

N82-19287# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RETROSPECTIVE ANALYSIS OF SATELLITE THERMAL SYSTEMS M.S. Thesis [ANALISE RETROSPECTIVA DE SISTEMS TERMICOS PARA SATELITE]
Kiyoshi Yoneda Dec. 1981 75 p refs In PORTUGUESE; ENGLISH summary
(INPE-2295-TDL/069) Avail: NTIS HC A04/MF A01

The backward analysis of heat transfer in a satellite is studied. Given heat quantities generated by the Sun and the equipment, and given the component temperatures, the heat transfer coefficients for conduction and radiation are investigated. The mathematical formulation results in an ill conditioned noisy system of linear equations. Two methods for solving the system are discussed: the variable selection and the singular value decomposition methods. The use of the nonnegativity conditions for the heat transfer coefficients are discussed and more general solutions are presented.
S.L.

N82-19288*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OAO-3 END OF MISSION TESTS REPORT
Ford Kalil, F. Jerry Kuli, R. McIntosh, S. Ollendorf, Donald L. Margolies, Jim Gemmell, C. Michael Tasevoli, R. S. Polidan, H. Kochevar, Cooper Chapman et al Sep. 1981 170 p refs Prepared in cooperation with Princeton University Observatory and Westinghouse Electric Corp., Pittsburgh
(NASA-TM-83824) Avail: NTIS HC A08/MF A01 CSCL 22A

Twelve engineering type tests were performed on several subsystems and experiment(s) of the OAO 3 spacecraft near its end of mission. The systems tested include: Princeton experiment package (PEP), fine error system guidance, inertial reference unit, star trackers, heat pipes, thermal control coatings, command and data handling, solar array; batteries, and onboard processor/power boost regulator. Generally, the systems performed well for the 8 1/2 years life of OAO 3, although some degradation was noted in the sensitivity of PEP and in the absorptivity of the skin coatings. Battery life was prolonged during the life of the mission in large part by carefully monitoring the charge-discharge cycle with careful attention not to overcharge. S.L.

N82-19289# Naval Research Lab., Washington, D. C.
RANGING AND SYCHRONIZATION BETWEEN NOMINALLY CO-ORBITAL SATELLITES Interim Report
J. W. Schwartz 24 Dec. 1981 16 p refs
(AD-A109272; NRL-8532) Avail: NTIS HC A02/MF A01 CSCL 22/3

A link between two satellites can provide direct measurements of clock synchronism and intersatellite range that are more accurate than estimates obtainable from ground measurements. Moreover these direct measurements can be made continuously with near-zero delays. Two approaches to ranging and synchronization between satellite pairs are 'balanced' systems in which each satellite makes a time-difference measurement, and 'full loop' systems in which a time-difference measurement is made on only one satellite. This report discusses factors which determine the ultimate limitations and capabilities of both approaches, and compares the schemes for applications in which two digital clocks are actually brought into synchronism with accuracies of several nanoseconds. Author (GRA)

N82-19290# Naval Surface Weapons Center, Dahlgren, Va. Strategic Systems Dept.
AERODYNAMIC DESIGN MANUAL FOR TACTICAL WEAPONS Final Report
Lawrence A. Mason, Leroy Devan, Frank G. Moore, and Donald McMillan Jul. 1981 178 p refs
(DA Proj. 1L1-62303-A-214)
(AD-A109180; NSWC/TR-81-156) Avail: NTIS HC A09/MF A01 CSCL 20/4

The Naval Surface Weapons Center Aeroprediction Code has been extensively applied to the prediction of static and dynamic aerodynamics of missile configurations. Major extensions have recently been made to the Code, extending its capability to 0 less than or equal to M (infinity) less than or equal to 8 and 0 degrees less than or equal to alpha less than or equal to 180 degrees and improving the transonic and dynamic derivative predictions. The theoretical basis for the Code is reviewed. The Code is evaluated through comparisons of computational examples with experiment for body alone, body-tail, and body-tail-canard configurations. The speed and accuracy of the Code is ideal for use in preliminary design. Representative design charts (generated by the use of the Code) for both the static and dynamic aerodynamic coefficients of a wide variety of configuration components are included. The charts will aid the designer in making preliminary design estimates or for data comparisons. GRA

N82-19291# ARO, Inc., Arnold Air Force Station, Tenn.
HYPERVELOCITY TRACK TESTS OF THE NASA GALILEO PROBE HEATSHIELD Final Report, 14 Oct. - 24 Nov. 1980
A. M. Adams AEDC Dec. 1980 19 p refs
(AD-A109042; AEDC-TSR-80-V60) Avail: NTIS HC A02/MF A01 CSCL 22/2

Tests were conducted in a hypervelocity track facility to establish the ablative characteristics of the heatshield material for the NASA/Ames Galileo Probe. Data were obtained from eight shots at launch velocities ranging from 15,850 fps to 17,950 fps. Six of the shots were conducted through an argon environment. The test required the nosetip to be recovered intact. Measurements were made of the model velocity and in-flight surface temperature. A description of the test unit, test article, and test technique is presented herein. Author (GRA)

N82-19292# Engins Matra, Velizy (France).
EXUV. PHASE A STUDY. VOLUME 1: EXECUTIVE SUMMARY Final Report
Paris ESA Nov. 1979 73 p Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol.
(Contract ESTEC-3846/79/NL-MS)
(Rept-44/69/JS/CB-Vol-1; ESA-CR(P)-1481-Vol-1) Avail: NTIS HC A05/MF A01

The study objectives, mission analysis, EXUV system and subsystem guidelines, and development program are summarized. The mission requires an extreme UV telescope whose nominal waveband is from 100 to 912 A, and a soft X-ray telescope in the 5 to 250 A waveband. The EXUV source examination needs spatial resolution and source position accuracy of arcmin order. The observation program is divided into a 6 month slow scan survey of the entire celestial sphere, 6 months complementary survey work, and a 12 month study of specific EXUV sources. A longitudinal satellite configuration with three axis stabilized attitude control is adopted. Thermal control, electrical power subsystems, data handling, and communications subsystems are described. Author (ESA)

N82-19293# Engins Matra, Velizy (France).
EXUV. PHASE A STUDY. VOLUME 2A: SATELLITE SYSTEM CONCEPTUAL DESIGN Final Report
Paris ESA Nov. 1979 282 p Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol.
(Contract ESTEC-3846/79/NL-MS)
(Rept-44/69/JS/CB-Vol-2A; ESA-CR(P)-1481-Vol-2A) Avail: NTIS HC A13/MF A01

A longitudinal configuration comprising a service module and two telescope assemblies (X-ray, UV) was adopted for the EXUV satellite. The telescopes are parallel to launcher (Ariane) longitudinal axis. The advantages of longitudinal configuration over transverse are: less demanding dynamic balance requirements; payload growth potential; no solar scattering hazard from service module; and less sensitivity of payload contamination from thrusters. The satellite is three axis spin stabilized. The service module is a parallelipipedic box with two equipment floors supported by a central cylinder. The payload is on top of the service module. Each telescope is cantilevered at the focal plane assembly interface, using a statically determinate mounting system consisting of three sliding trunnions with spherical bearings. Author (ESA)

N82-19294# Engins Matra, Velizy (France).
EXUV. PHASE A STUDY. VOLUME 2B: SATELLITE SYSTEM CONCEPTUAL DESIGN Final Report
Paris ESA Nov. 1979 369 p refs Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol.
(Contract ESTEC-3846/79/NL-MS)
(Rept-44/69/JS/CB-Vol-2B; ESA-CR(P)-1481-Vol-2B) Avail: NTIS HC A16/MF A01

The EXUV satellite power storage/conditioning system, communication subsystem, data handling subsystem and attitude determination/control subsystem are described. During the launch and acquisition phases batteries supply all power required until the solar array is oriented towards the Sun. During the second year of operation the payload must be switched off for battery recharging. The telemetry system transmits 14 Kbits/sec scientific data to ground stations and 2 Kbit/sec housekeeping data. A 750 bit/sec telecommand rate ensures a 33 s sky map reloading. About 0.25 sec is required for two on/off commands. The onboard data processing system which is under ground control handles satellite orientation, payload activites, satellite housekeeping and scientific data transmission. Three axis stabilization is achieved by continuous x axis pointing towards the Sun with a simultaneous roll motion at nearly constant rate. Author (ESA)

N82-19295# Engins Matra, Velizy (France).
EXUV. PHASE A REPORT. VOLUME 3: PRELIMINARY PAYLOAD INTERFACE SPECIFICATION Final Report
Paris ESA Nov. 1979 66 p Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol.
(Contract ESTEC-3846/79/NL-MS)
(Rept-44/69/JS/CB-Vol-3; ESA-CR(P)-1481-Vol-3) Avail:

NTIS HC A04/MF A01

The optical, mechanical, thermal, command/data interfaces of the EXUV X-ray and UV telescopes are defined, along with mass properties, ground handling, cleanliness, power requirements and budget. The telescopes are mounted on a support which also accommodates two star trackers forming part of the satellite attitude control system. Tracker/telescope interface is treated since maintenance of alignment between them is crucial to mission success. Advantages resulting from commonality between the telescopes include ease and cost of manufacture, development and testing. Accommodation and integration of the payload are facilitated. Author (ESA)

N82-19296# Engins Matra, Velizy (France).
EXUV. PHASE A STUDY. VOLUME 4: SATELLITE DEVELOPMENT PROGRAM Final Report
Paris ESA Nov. 1979 51 p Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol.
(Contract ESTEC-3846/79/NL-MS)
(Rept-44/69/JS/CB-Vol-4; ESA-CR(P)-1481-Vol-4) Avail: NTIS HC A04/MF A01

Model utilization in the EXUV satellite development program is discussed and a master time schedule is outlined. Assembly, integration, test and launch plan are described. Ground support equipment specifications are given. A combination prototype/flight model offers large cost savings, as does a structural/thermal model. The master schedule comprises a 12 month project definition phase and a 36 month development/protoflight phase. Integration and test sequences include launch operations, structure/thermal model tests, engineering model tests, and prototype/flight model tests. Ground support equipment consists, where possible, of concepts, designs and test equipment from previous ESA programs. Author (ESA)

N82-19297# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abteilung Forschungsanlagen.
ON THE DESIGN OF MISSILE MODELS FOR STATIC FORCE MEASUREMENTS IN WIND TUNNELS
Helmut Esch Aug. 1981 86 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-81-21) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 15,65

A computer program was developed to aid in the design of missile models, stings and balances for wind tunnel tests at high angle of attack. The high normal forces encountered in such tests, especially for slender missile configurations, can lead to overload of the balance or to contact between model and sting. Design optimization will help to increase the angle of attack range. Model dimensioning, force fields, and stress analysis in balance and sting are described and an optimization of geometrical parameter with respect to stress and balance exploitation is performed. The results show that improvements can be obtained by optimization of the sting length, usage of sting materials with high elasticity modulus, conical shaping of the balance sting, and by optimization of the ratio of sting diameter to model bore. Author (ESA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N82-19298* National Aeronautics and Space Administration, Washington, D. C.
COLUMBIA CARRIES ASTRONOMY EXPERIMENTS ON THIRD TEST FLIGHT
Mar. 1982 99 p
(NASA-News-Release-82-29; P82-10029) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 22A

The Space Transportation System 3 flight is discussed. The objectives of the test flight are given as well as an account of launch preparations, in liftoff, reentry; and landing. Numerous astronomy and space science experiments carried in the cargo bay are described. R.J.F.

N82-19299*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PROPULSION SYSTEM IGNITION OVERPRESSURE FOR THE SPACE SHUTTLE
R. S. Ryan, J. H. Jones, S. H. Guest, H. G. Struck, M. H. Rheinfurth, and V. S. Verferaime Dec. 1981 70 p refs
(NASA-TM-82458) Avail: NTIS HC A04/MF A01 CSCL 20H

Liquid and solid rocket motor propulsion systems create an overpressure wave during ignition, caused by the accelerating gas particles pushing against or displacing the air contained in the launch pad or launch facility and by the afterburning of the fuel-rich gases. This wave behaves as a blast or shock wave characterized by a positive triangular-shaped first pulse and a negative half-sine wave second pulse. The pulse travels up the space vehicle and has the potential of either overloading individual elements or exciting overall vehicle dynamics. The latter effect results from the phasing difference of the wave from one side of the vehicle to the other. This overpressure phasing, or delta P environment, because of its frequency content as well as amplitude, becomes a design driver for certain panels (e.g., thermal shields) and payloads for the Space Shuttle. The history of overpressure effects on the Space Shuttle, the basic overpressure phenomenon, Space Shuttle overpressure environment, scale model overpressure testing, and techniques for suppressing the overpressure environments are considered. T.M.

N82-19300# Committee on Commerce, Science, and Transportation (U. S. Senate).
SPACE SHUTTLE OPERATIONS
Washington GPO 1982 59 p Hearing before the Subcomm. on Sci., Technol., and Space of the Comm. on Commerce, Sci., and Transportation, 97th Congr., 1st Sess., 9 Dec. 1981
(GPO-89-661) Avail: Subcommittee on Science, Technology, and Space

The space shuttle flights are discussed and the competition with the Ariane is analyzed. The size of the Orbiter fleet, the demand for communications satellites, and the modification of the Centaur for space shuttle support are also discussed. R.J.F.

N82-19301*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT. SPACE SHUTTLE PROGRAM STS-3 LAUNCH
[1982] 26 p
(NASA-TM-84154; M-989-81-03) Avail: NTIS HC A03/MF A01 CSCL 22A

This STS-3 prelaunch report states the mission objectives and provides a detailed description of the STS-3 mission. A description of the STS-3 payload, OSS-1, and its mission objectives are included. S.L.

N82-19302*# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
STRUCTURAL DYNAMIC ANALYSIS OF THE SPACE SHUTTLE MAIN ENGINE Final Report
Leland P. Scott, G. T. Jamison, W. A. McCutcheon, and J. M. Price Dec. 1981 166 p refs
(NAS8-33808)
(NASA-CR-161945; LMSC-HREC-TR-D784490) Avail: NTIS HC A08/MF A01 CSCL 21H

This structural dynamic analysis supports development of the SSME by evaluating components subjected to critical dynamic loads, identifying significant parameters, and evaluating solution methods. Engine operating parameters at both rated and full power levels are considered. Detailed structural dynamic analyses of operationally critical and life limited components support the assessment of engine design modifications and environmental changes. Engine system test results are utilized to verify analytic model simulations. The SSME main chamber injector assembly is an assembly of 600 injector elements which are called LOX posts. The overall LOX post analysis procedure is shown. S.L.

N82-19303*# National Aeronautics and Space Administration, Washington, D. C.
UPPER STAGE ALTERNATIVES FOR THE SHUTTLE ERA NASA/DOD Report to Congress
Oct. 1981 89 p refs Sponsored in part by DOD
(NASA-TM-84137) Avail: NTIS HC A05/MF A01 CSCL 22B

The status and general characteristics of Space Shuttle upper stages now in use or in development, as well as new vehicle possibilities are examined. Upper stage requirements for both civil and Department of Defense missions, categorized generally into near-term (early and mid-1980's), mid-term (late 1980's to mid-1990's), and far-term (late 1990's and beyond) are discussed. Finally, the technical, schedule and cost impact of alternative ways in which these requirements could be met are examined, and a number of conclusions and recommendations are reached. R.J.F.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N82-19304# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DATA COLLECTION PLATFORMS: APPLICATIONS TO HYDROLOGY [PLATFORMAS DE COLETA DE DADOS: APLICACAO A HIDROLOGIA]
Jose Roberto deOliveira Oct. 1981 14 p refs In PORTUGUESE; ENGLISH summary Presented at 4th Brazilian Symp. on Hydrol. and Hydrol. Resources, 15-19 Nov. 1981
(INPE-2246-PRE/030) Avail: NTIS HC A02/MF A01

Data collection platforms which use artificial satellites as data relayers of meteorological data to receiving centers are discussed. The main systems available for data collection, and their advantages and limitations relative to hydrologic applications are discussed. R.J.F.

N82-19305# Mitre Corp., Bedford, Mass.
ANALYSIS OF MULTIPATH INTERFERENCE FOR APATS
G. A. Robertshaw Hanscom AFB, Mass. Electronic Systems Div. Dec. 1981 68 p refs
(Contract F19628-81-C-0001; AF Proj. 4290)
(AD-A108797; MTR-8366; ESD-TR-81-255) Avail: NTIS HC A04/MF A01 CSCL 09/6

Multipath propagation and the resulting interference are theoretically analyzed for a ballistic missile re-entry vehicle (RV) to aircraft telemetry link in order to predict performance parameters for the ARIA Phased Array Telemetry System (APATS). A basic two-path model incorporating direct and specularly reflected transmission is presented. Model calculations, which take into account RV and APATS antenna gain, polarization, sea state and Doppler shift, yield the depth and frequency of fade anticipated for several mission scenarios. RF fades associated with RV antenna pattern nulls and modulation distortion resulting from a combination of Doppler shift and relative path delay are tentatively identified as the principal sources of link degradation which will limit APATS support altitudes. Areas of continuing interest and work are described. Author (GRA)

N82-19306# Mitre Corp., Bedford, Mass.
ANALYSIS OF THE MULTIPATH ENVIRONMENT FOR APATS TESTING
G. A. Robertshaw Hanscom AFB, Mass. ESD Nov. 1981 51 p refs
(Contract F196 28-81-C-0001; AF Proj. 4290)
(AD-A109345; MTR-8391; ESD-TR-81-254) Avail: NTIS HC A04/MF A01 CSCL 09/6

Phase 2 of the ARIA Phased Array Telemetry System (APATS) test program will include tower-air-ground (TAG) testing of system sensitivity, tracking capability, and other functions. As presently envisioned, these test configurations involve propagation paths for which transmitter and receiver (APATS) heights are small relative to baseline separations and interference caused by multipath propagation must be considered in the context of the test objectives. A two-path propagation model which incorporates specular reflection from the Earth is developed and calculations are performed for typical test configurations. The anticipated effects and ramifications of multipath interference are discussed and specific test configurations are recommended. GRA

N82-19307# Centre National d'Etudes Spatiales, Toulouse (France). Groupe de Recherches de Geodesie Spatiale.
STUDY OF A COMSS HIGH ACCURACY POSITIONING SYSTEM: HIGH ACCURACY POSITIONING SYSTEM (HASP) Final Report [ETUDE D'UN SYSTEME DE POSITIONNEMENT PRECIS DE SATELLITE/RADAR ALTIMETRIQUE COMSS HASP (HIGH ACCURACY SYSTEM POSITIONING)]
F. Nouel and M. Berge Paris ESA 1981 116 p In FRENCH
(Contract ESA-4407/80/F-DD)
(CNES-85.55.00; ESA-CR(P)-1491) Avail: NTIS HC A06/MF A01

The development of a positioning system with 5 to 10 cm trajectory accuracy and 1 to 2 m orbital accuracy is discussed. Experience gained from existing satellites is adapted in order to develop calculation methods and to deduce the best approach. The proposed system has onboard processing of ranging and tracking data so as to have a single time and frequency reference for the entire tracking operation. It can operate under any weather conditions. Calculations are based on short arcs (half a revolution) with satellite and ground station positions established in relation to one another. The trajectory arc is calculated from a spherical harmonics based global potential model. Simulations for 650 and 850 km altitude show that a higher number of ground stations is needed for 650 km, but otherwise system accuracy is similar. Author (ESA)

N82-20122*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ON THE GROUP DELAY EFFECT OF DSN MICROWAVE COMPONENTS ON MULTIMEGABIT TELEMETRY
P. J. Lee *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 59-65 ref (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09F

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-19308# European Space Agency, Paris (France).
RECENT ADVANCES IN SPACE STRUCTURE DESIGN-VERIFICATION TECHNIQUES
W. R. Burke, comp. Oct. 1981 78 p refs Proceedings held at Noordwijk, Netherlands, 27-28 Apr. 1981
(ESA-SP-1036; ISSN-0379-6566) Avail: NTIS HC A05/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The simulation of flight loads in order to verify the dynamic characteristics of space structures is treated. Remaining problems, improvement in techniques, and the engineering of alternative test methods are discussed. Procedures for compiling load diagrams, used in satellite design, which take into account payload/launch vehicle interaction are summarized. The dynamic characteristics of a 160 kN vibration table are determined as an example of test equipment modeling. For individual titles, see N82-19309 through N82-19312.

N82-19309# European Space Research and Technology Center, Noordwijk (Netherlands).
INTRODUCTION TO PROBLEMS OF STRUCTURAL DYNAMICS VERIFICATION
E. Nellessen *In* ESA Recent Advances in Space Struct. Design-Verification Tech. Oct. 1981 p 1-8 refs (For primary document see N82-19308 10-18)
Avail: NTIS HC A05/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The definition and simulation of mechanically induced flight loads which form the low frequency portion of the flight environment are addressed. This includes: the development of a method for design load definition; the development of reduction techniques for vibration test data and time histories obtained from launcher/spacecraft coupled analyses; and the identification of vibrator system characteristics for analyzing uncontrolled interaction between vibrator and test item. Techniques for flight environment simulation, including transient test methods and multi-axis testing, using servohydraulic facilities, are also considered as well as the improvement of modal coupling techniques, including statically indeterminate coupling and nonlinear joints, and the development of procedures for systematic updating of mathematical models on the basis of experimental data. Author (ESA)

N82-19310# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
DYNAMIC ANALYSIS AND MODELING OF ELECTRODYNAMIC VIBRATION TEST FACILITIES APPLIED TO THE AIBG 160 kN SYSTEM
T. Oeguet and K. Muehlbauer *In* ESA Recent Advances in Space Struct. Design-Verification Tech. Oct. 1981 p 9-25 refs (For primary document see N82-19308 10-18)
Avail: NTIS HC A05/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Mathematical dynamic models of a typical electrodynamic vibration exciter and of a slip table, including its hydrostatic bearings, are presented which can be coupled with test structure models in order to investigate problems of real vibration testing. Several of the model parameters were determined by direct measurement or calculation. Most of them, however, were obtained by fitting the calculated responses to the corresponding results of various dynamic tests performed with the test facility. The basic modelling procedure, the tests and analyses performed, and the models finally established are surveyed. Author (ESA)

N82-19311# Centre National d'Etudes Spatiales, Toulouse (France).
METHODOLOGY OF UNIAXIAL TRANSIENT VIBRATION TESTS FOR SATELLITES
B. Boissin, A. Girard, and J. F. Imbert *In* ESA Recent Advances in Space Struct. Design-Verification Tech. Oct. 1981 p 35-53 refs Submitted for publication (For primary document see N82-19308 10-18)
(Contract ESA-4160/79/NL-AK)
Avail: NTIS HC A05/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The problem of dependence of test specification on possible variations in launch vehicle and satellite dynamic characteristics is addressed. For most of the low frequency dynamic flight environment of a satellite, transient testing minimizes the risk of under or overtesting inherent to conventional sine testing. The feasibility of such tests on uniaxial electrodynamic shakers is cited. Realistic data for thrust transient, launch vehicle, and satellite characteristics are defined and dynamic response analysis is performed after a survey of current methods. Possible variations of parameters are identified and a sensitivity analysis is carried out. It is found that the frequency variations have the largest influence and must be considered simultaneously. A numerical procedure is developed that computes a worst shock spectrum envelope. Author (ESA)

N82-19312# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
ACHIEVEMENTS IN MULTI-AXES TESTING USING SERVOHYDRAULIC VIBRATION SYSTEM
W. Raasch *In* ESA Recent Advances in Space Struct. Design-Verification Tech. Oct. 1981 p 55-71 refs (For primary document see N82-19308 10-18)
Avail: NTIS HC A05/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

A multi-axes vibration table is described which was used in tests conducted to prove the limitations of reproducing specified acceleration time histories in three dimensions. Besides the good reproduction accuracy of transient acceleration signals, results show essential elastomechanic properties of the test specimens can be determined, using multi-axes transients as excitations. This means a drastic reduction in test duration. It is also found that multi-axes excitation may cause an amplification of vibration level in one axis if the excitation level in the orthogonal axis is magnified. Nevertheless, transient excitations result in lower vibrational response than sine sweep excitation. Author (ESA)

N82-19313# British Aerospace Dynamics Group, Bristol (England). Space Systems Div.
GIOTTO COMET HALLEY MISSION, PHASE A STUDY. VOLUME 1: SPACECRAFT DESIGN Final Report
Paris ESA May 1980 125 p refs Prepared in cooperation with Dornier-Werke G.m.b.H., Friedrichshafen, West Germany
(Contract ESA-4254/80/NL-MS)
(ESS/SS/1000; ESA-CR(P)-1489) Avail: NTIS HC A06/MF A01

A spacecraft for a post perihelion encounter with Comet Halley was designed. The GEOS design and hardware are used, subject to detail changes to subsystems. An X band telemetry system provides a bit rate of 40 Kbit/sec (under favorable weather conditions) using a despun, high gain, offset fed antenna. A dust shield protects the spacecraft from damage due to particle impact during encounter, the spin axis being aligned with the relative velocity vector. The spacecraft is suitable for Ariane launch, even if another payload is carried. Author (ESA)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-19314# National Aerospace Lab., Tokyo (Japan).
A STUDY OF LIQUID HYDROGEN COOLED LO-2/LH-2 ROCKET COMBUSTOR WITH SLOTTED WALL LINER
Nobuyuki Yatsuyanagi, Masayuki Niino, Akinaga Kumakawa, Hiromi Gomi, Akio Suzuki, Hiroshi Sakamoto, Masaki Sasaki, and Eiji Sogame Aug. 1981 99 p refs In JAPANESE; ENGLISH summary
(NAL-TR-679; ISSN-0389-4010) Avail: NTIS HC A05/MF A01

An experimental investigation of the combustion and the heat transfer characteristics of a liquid oxygen-liquid hydrogen rocket combustor was conducted. The liquid hydrogen cooled chamber with a slotted wall liner made of OFHC copper for coolant passage was designed for use at a thrust level of 300 kgf with a nominal combustion chamber pressure of 35 atm. The following results were noted. The regenerative cooling combustion tests at the design thrust and the combustion pressure were sucessfully performed. The slotted wall chamber was revealed to have a sufficiently high heat transfer rate and enough cooling margin even in this small thrust level combustor. In the independent cooling experiments, a new thermal design equation was obtained, which should be recommended as the design equation for regeneratively cooled rocket engines. As a result, many design equations previously obtained from Joule heated tube experiments proved to be not suitable for the design of slotted wall combustors. Author

N82-19315# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
THE DAEDUT/PMLTNO HYBRID ROCKET MOTOR FACILITIES
H. F. R. Schoeyer and P. A. O. G. Korting May 1981 39 p refs Prepared in cooperation with Prins Maurits Lab. TNO
(VTH-LR-321; PML-1981-103) Avail: NTIS HC A03/MF A01

Hybrid rocket motors are introduced, and research/test facilities are described, including major system components and operational procedures. Aspects of the hybrid combustion process, which is characterized by the fuel and oxidizer being in different states of aggregation, are covered, including turbulence of oxidizer flow and fuel regression rate. A model of the combustion process is compared with experimental results for PMMA/oxygen; polyethylene/peroxide; rubber/nitric oxide; and polyethylene/oxygen. For PMMA/O2, the model agrees reasonably well with experiments, although at low pressures discrepancies between model and experiment are observed. Polyethylene and H2O2 also follow the predicted behavior. Doubts arise whether the model is applicable to metal enriched fuels. Only lithium enriched fuels show reasonable agreement between theory and experiment. Author (ESA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-19316# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE SCIENCE AND ENGINEERING OF MATERIALS [DOCUMENTO SOBRE CIENCIA E ENGENHARIA DOS MATERIALS]
Jun. 1981 103 p refs In PORTUGUESE; ENGLISH summary
(INPE-2138-RPE/361) Avail: NTIS HC A06/MF A01

Priorities in projects being developed in materials science and engineering are defined for the following sub-areas: semiconductors, ceramics, glasses, conjugate materials, catalysts, rubber, plastics, firewoods, materials for civil construction, and materials processed in space. The group tried to include in the discussions some aspects of social and economic relevance. When possible, the participation in the discussions of scientific and technological community representatives was not only permitted, but also supported. R.J.F.

N82-19317# State Univ. of New York at Buffalo. Dept. of Chemistry.
THE ATTEMPTED SYNTHESES OF LOW OXIDATION STATE, ORGANOMETALLIC DERIVATIVES OF ALUMINUM, GALLIUM AND INDIUM. A NEW SYNTHESIS Al(CH2SiMe3)3
O. T. Beachley, Jr., C. Tessier-Youngs, R. G. Simmons, and R. B. Hallock 19 Mar. 1981 20 p refs Submitted for publication
(Contract N00014-78-C-0562; NR Proj. 053-686)
(AD-A109333; TR-8) Avail: NTIS HC A02/MF A01 CSCL 07/3

The synthesis of KAl(CH2SiMe3)2 by a reductive elimination reaction between Al(CH2SiMe3)3 and KH has been attempted but a pure product could not be isolated. The reactants combine at 70 C to form KAl(CH2SiMe3)3H, a white pyrophoric solid, which has been fully characterized. A molecular weight study indicates the presence of a mixture of monomeric and dimeric species in benzene solution. The pyrolysis of KAl(CH2SiMe3)3H at 205 C produces Si(CH3)4 but also CH4. The formation of Si(CH3)4 suggests that KAl(CH2SiMe3)2 might have been formed but the presence of CH4 indicates that a decomposition reaction occurs either prior to or after the formation of KAl(CH2SiMe3)2. The reactions of mixtures of KH-Al(CH3)3, KH-Ga(CH3)3, NaH-Ga(CH3)3, KH-In(CH3)3 and NaH-In(CH3)3 have also been investigated in order to determine the role of the organic substituent in the attempted reductive elimination reactions. In all cases the formation of CH4 during pyrolysis of KAl(CH3)H, KGa(CH3)3H and the other reaction mixtures is consistent with the occurrence of reduction but no pure compounds could be isolated. A new synthetic route to Al(CH2SiMe3)3 from AlBr3 and LiCH2SiMe3 in refluxing hexane is also described.
Author (GRA)

N82-19318# Cornell Univ., Ithaca, N. Y. Dept. of Environmental Engineering.
SOLUTE-GAS EQUILIBRIA IN MULTI-ORGANIC AQUEOUS SYSTEMS Final Report
James M. Gossett and Andrew H. Lincoff 30 Nov. 1981 37 p refs
(Grant AF-AFOSR-0074-81; AF Proj. 2303)
(AD-A109082; AFOSR-81-0858TR) Avail: NTIS HC A03/MF A01 CSCL 07/3

The objective of this research was to study the effects of temperature, ionic strength, and presence of additional organics on the aqueous solution/gas equilibria of a variety of chlorinated organic compounds: 1,1,1-trichloroethane, tetrachloroethylene, trichloroethylene, chloroform, methylene chloride, and o-dichlorobenzene. Henry's Constant for each alone was determined in pure water over the temperature range, 10 deg - 30 deg C, using an equilibrium, batch stripping reactor. Data were fit to a regression equation. Henry's constants for selected organic solvents were determined at ionic strengths up to 1.0 M (KCl). Results suggest that ionic strength effects on activity can be ignored in systems processing ionic strengths less than 0.07 M. Henry's constants for organic solvents dissolved in multicomponent aqueous mixtures of other organic solvents were measured. It was found that relatively small concentrations of the organic solvents in water mutually affected one another's volatility.
Author (GRA)

N82-19319# Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover (West Germany).
DEUTERIUM HYDROGEN ISOTOPE RATIOS IN ORGANIC MATTER, MINERAL OILS, AND NATURAL GASES Final Report, Mar. 1981
Martin Schoell Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 79 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-204; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16,80

The dependence of the D/H isotope ratio in mineral oils and natural gases on the type of oil source rock and its usefulness for oil exploration were investigated. A technique was developed capable of determining D/H ratios in organic matter with an accuracy of + or - 2 pro mille. Results show that the isotope ratio in oils are indeed transferred by the mother rocks. Exchange experiments demonstrate that this ratio is not affected by exchange with water, even on geological time scales. The deuterium concentration in the methane of thermally formed natural gases is shown to be dependent on the maturity of the source organic matter, not on the type of mather rock. Cross correlation between the C14/C13 and the D/H ratios of natural gas methanes leads to a genetic diagram characterizing the origin of these gases. A criterium was also developed for the identification of bacterial natural gases. Author (ESA)

24 COMPOSITE MATERIALS

Includes laminates.

N82-19320*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
BOLT CLAMPUP RELAXATION IN A GRAPHITE/EPOXY LAMINATE

K. N. Shivakumar and John H. Crews, Jr. Jan. 1982 32 p refs Presented at ASTM Symp. on the Long-Term Behavior of Composites, Williamsburg, Va., 9-10 Mar. 1982
(NASA-TM-83268) Avail: NTIS HC A03/MF A01 CSCL 11D

A simple bolted joint was analyzed to calculate bolt clampup relaxation for a graphite/epoxy (T300/5208) laminate. A viscoelastic finite element analysis of a double-lap joint with a steel bolt was conducted. Clampup forces were calculated for various steady-state temperature-moisture conditions using a 20-year exposure duration. The finite element analysis predicted that clampup forces relax even for the room-temperature-dry condition. The relaxations were 8, 13, 20, and 30 percent for exposure durations of 1 day, 1 month, 1 year, and 20 years, respectively. As expected, higher temperatures and moisture levels each increased the relaxation rate. The combined viscoelastic effects of steady-state temperature and moisture appeared to be additive. From the finite-element analysis, a simple equation was developed for clampup force relaxation. This generalized equation was used to calculate clampup forces for the same temperature-moisture -conditions as used in the finite-element analysis. The two sets of calculated results agreed well. B.W.

N82-19321# Naval Ship Research and Development Center, Annapolis, Md. Ship Materials Engineering Dept.

RELATIVE EFFECTS OF A GRAPHITE FIBER REINFORCED EPOXY COMPOSITE AND NICKEL-ALUMINUM BRONZE ON A CATHODIC PROTECTION SYSTEM IN SEAWATER Interim Report

Harvey P. Hack and Aleksander B. Macander Nov. 1981 28 p
(AD-A109078; DTNSRDC/SME-81/73) Avail: NTIS HC A03/MF A01 CSCL 11/4

This study was designed to quantify the cathodic efficiency of a graphite fiber reinforced epoxy laminated composite material by comparing the amount of zinc consumption from a sacrificial-anode cathodic protection system on the composite with the consumption due to a nickel-aluminum bronze in seawater. Specimens of the composite or of bronze were electrically coupled to anode zinc in seawater at flow velocities of 0 and 10 meters per second for up to 270 days. The composite did not cause a significantly different current demand than bronze on the zinc sacrificial cathodic protection system. It was noted that this represents a worst-case condition for the composite, since the specimens were deliberately prepared with the graphite-fiber ends exposed on the test surface. Author (GRA)

N82-19322# Vought Corp., Dallas, Tex.

THE DEVELOPMENT OF A LOW VELOCITY IMPACT METHODOLOGY FOR HYBRID MATERIAL SYSTEMS Final Report, Apr. 1980 - Apr. 1981

S. V. Hayes and E. F. Rybicki Jul. 1981 102 p refs
(Contract N00019-80-C-0265)
(AD-A109282; ATC-R-92000/1CR-63) Avail: NTIS HC A06/MF A01 CSCL 11/4

A design methodology for hybrid structures which describes the extent of damage and associated failure modes due to low velocity impact was undertaken. Hybrids can provide a synergistic improvement in damage resistance caused by foreign body low velocity impact over graphite/epoxy material and when properly designed, enhance the visual and NDI damage detection threshold of the baseline material. Improvements in the visible and NDI damage detectability threshold of graphite/epoxy material, subject to low velocity impact, via proper placement and use of Kevlar plies and metallic coatings within this baseline material were exhibited. Correlation between the math model and the damage tests was used to validate the model. Residual strength tests of damaged panels were run to quantify the static strength reduction experience. The math model was based upon physical parameters identified through experimental testing. These included transverse impact of hybrid and graphite-epoxy panels and tensile tests of the target materials at elevated strain rates. High speed photography of the impact events was used to provide dynamic modes of failure.
GRA

N82-19323# Wyoming Univ., Laramie. Composite Materials Research Group.

MOISTURE AND THERMAL EXPANSION OF COMPOSITE MATERIALS M.S. Thesis. Interim Report

Douglas S. Cairns, Donald F. Adams, and David E. Walrath Nov. 1981 210 p refs
(Contract DAAG29-79-C-0189)
(AD-A109131; UWME-DR-101-104-1; ARO-16370.5-MS) Avail: NTIS HC A10/MF A01 CSCL 11/4

An experimental technique is presented for determining the moisture and thermal expansion coefficients of polymers, and polymer-matrix composite materials. Materials tested included Hercules 3501-6 neat epoxy resin, Hercules AS/3501-6 graphite/epoxy composite and Owens-Corning S2 glass fibers in the same Hercules 3501-6 epoxy matrix. Correlations of the experimentally determined moisture and thermal expansion properties with a nonlinear finite element micromechanics analysis are presented. Thermal expansion results for all three materials, both dry and moisture-conditioned, were obtained. Diffusivity constants were also experimentally determined. It is demonstrated that the moisture and thermal expansion of composite materials can be determined experimentally, and predicted numerically with generally good results.
Author (GRA)

N82-19324# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).

IMPROVEMENT OF THE X-RAY PROCEDURE FOR THE DETECTION OF DEFECTIVE ADHESIONS IN FIBER COMPOSITES BY ADDING CONTRAST SUBSTANCES TO THE ADHESIVES [VERBESSERUNG DES ROENTGENVERFAHRENS FUER DIE ERKENNBARKEIT VON FEHLKLEBUNGEN BEI FASERVERBUNDETEILEN DURCH BEIMENGUNG VON KONTRASTMITTELN IM KLEBSTOFF]

Bernd Lembke Bonn Bundesministerium der Verteidigung 1981 61 p refs In GERMAN; ENGLISH summary
(BMVg-FBWT-81-11) Avail: NTIS HC A04/MF A01; DOKZENTBw, Bonn DM 30

The detectability of defective adhesions in carbon fiber composites (CFC) by X-ray procedure is shown to be improved by increasing the absorption capacity of the adhesive, adding the contrast substances barium sulfate or aluminum. The adhesives BSL 313 A and AF 126-2 were tested with and without additives on metal-metal adhesion samples for strength and aging behavior and its defect detectability. The CFC laminate adhesions with defined defects were X-ray tested under various aging conditions with respect to tensile shearing strength, pealing resistance, shear deformation, and dynamic strength. The most favorable results were achieved with 12% of BaSO4 added to BSL 313 A, or with 9% added to AF 126-2. Specifications for the production of the adhesive sheet are provided for these adhesive systems.
Author (ESA)

N82-19325# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

DESIGN AND FUNCTION OF AN EXPERIMENTAL WING BOX USING CARBON FIBER REINFORCED EPOXY VATLIT-C'85 [ONTWERP EN FABRICAGE VAN EEN EXPERIMENTELE VLEUGELDOOS UITGEVOERD IN KOOLSTOFVEZEL VERSTERKTE EPOXY VATLIT-C'85]

W. H. M. vanDreumel and A. H. J. Verlaan Apr. 1981 13 p refs In DUTCH
(VTH-LR-318) Avail: NTIS HC A02/MF A01

Design and construction of an experimental wing torsion box for the VATLIT project are described. Carbon fiber reinforced epoxy was used, starting with a supporting skin. The filters are oriented under + or - 45 deg. The prismatic box is made of two identical parts, bolted together. The sandwich construction provides bending stiffness. The sandwich core material is Nomex. Unidirectional netto prepreg material added between the fibers drastically increases the glueing surface and improves uniform load transfer without extreme stress concentrations. The dimensioning of the 1100 x 600 x 160 mm box was based on a 85 kNm bending moment, a 46 kN cross-force and a 25.5 kNm torsion moment.
Author (ESA)

N82-19326# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

A NEW FATIGUE RESISTANT MATERIAL: ARAMIDE REINFORCED ALUMINUM LAMINATE (ARALL)

L. B. Vogelesang, R. Marissen, and J. Schijve May 1981 40 p refs

(VTH-LR-322) Avail: NTIS HC A03/MF A01

A material for aircraft structures, obtained by adhesive bonding of a number of thin aluminum sheets and aramide weaves, is shown to have very favorable fatigue crack growth properties and a high tensile yield strength, especially if favorable residual stresses are introduced in a laminate with optimal metal sheet laminate thickness. Results of corrosion fatigue tests, and comparative tensile and fatigue tests, carried out on centrally cracked specimens, lug type specimens, and on bolted joint specimens all of monolithic, laminated, and ARALL material, are given. Author (ESA)

N82-19327# Bristol Univ. (England). Dept. of Aeronautical Engineering.

SHEAR DIFFUSION IN SANDWICH SPECIMENS HAVING GLASS REINFORCED PLASTIC FACE PLATES WITH PAPER HONEYCOMB CORES B.S. Thesis

A. M. Ahmad Mustapha and C. K. Liew Jun. 1981 48 p refs

(BU-270) Avail: NTIS HC A03/MF A01

The behavior of a glass reinforced plastic (GRP) strap used to join the face plates of two separate GRP skinned, paper honeycomb sandwich specimens, subjected to tensile loads up to 1.5 kN was investigated. The paper honeycomb core was 8.8 mm thick with 1/8 in. cell size. The average thickness of each face plate was 0.5 mm. Results indicate that strap length and thickness taper of the strap influence the load diffusion process. Specimen length is found to have very little effect. The theoretical model developed gives good, but conservative, correlation with experimental results. Moduli of the specimen found from three point bending tests are Young's modulus of the face plates symptotic to 15,000 N/sq mm and shear modulus of the core asymptotic to 10 N/sq mm. Author (ESA)

N82-19328# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Materials Dept.

THE SIGNIFICANCE OF DEFECTS ON THE FAILURE OF FIBRE COMPOSITES

Sarah M. Bishop Dec. 1981 23 p refs Presented at the 53rd Meeting of the AGARD Struct. and Mater. Panel, Noordwijkerhout, Netherlands, 27 Sep. - 2 Oct. 1981

(AGARD-R-690; ISBN-92-835-1410-9) Avail: NTIS HC A02/MF A01

Defects produced during manufacture, cracking produced during loading, and in-service damage such as impact were studied together with their effects on mechanical properties and their implications for structural design. There is also work modelling the behavior of notched composites and on the design of composites to give improved toughness and increased tolerance to damage. R.J.F.

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-19329 Pennsylvania State Univ., University Park.

ANGULAR MOMENTUM ALIGNMENT IN NOZZLE EXPANSIONS OF GAS MIXTURES Ph.D. Thesis

William Raymond Sanders 1981 84 p

Avail: Univ. Microfilms Order No. 8129209

Nozzle expansions of gas mixtures containing I2 were examined to determine the degree of alignment of the axes of rotation of the I2 molecules. Conditions were chosen to produce a velocity difference between the components of the mixtures. Thus a test of the suggestion that nonisotropic velocity distributions in the flow enhance the degree of alignment occurring in molecular beams of nonspherical particles is provided. Classical trajectory calculations were carried out for 350 I2 molecules experiencing ten successive collisions with Ar atoms simulating a nozzle expansion exhibiting a significant degree of velocity slip. After each collision, the degree of alignment of the I2 molecules was determined. An argon ion laser was used to induce I2 fluorescence in expansions of I2 and CO2 from a slit nozzle. From measurements of the fluorescence intensities plane polarized parallel and perpendicular to the flow direction, the degree of polarization of the laser induced fluorescence was calculated. An equation is derived which relates I2 to the degree of polarization molecules used in the trajectory calculations. It is concluded that nonisotropic velocity distributions in the flow are necessary for the production of large degrees of alignment in light of the very small alignments found in earlier studies of pure I2 molecular beams. Dissert. Abstr.

N82-19330 California Univ., Berkeley.

EFFECT OF NUCLEAR SPIN ON CHEMICAL REACTIONS AND INTERNAL MOLECULAR ROTATION Ph.D. Thesis

Larry Lee Sterna 1981 352 p

Avail: Univ. Microfilms Order No. 8200285

The magnetic isotope effect is studied and results are presented for the separation of C13 and C12 isotopes. Two models are included in the theoretical treatment of the effect, and geminate recombination is calculated. Both models contain terms which account for loss of radicals due to competitive chemical reactions. The two reactions studied are photolysis of benzophenone and toluene and the photolytic decomposition of dibenzylketone(1,3-diphenyl-2-propanone). The theory and results for the use of Zeeman spin-lattice relaxation as a probe of methyl group rotation in the solid state are presented. Experimental results are presented for the time and angular dependences of rotational polarization, the methyl group magnetic moment, and methyl-methyl steric interactions. Dissert. Abstr.

N82-19331 Minnesota Univ., Minneapolis.

PERCOLATION AND CONDUCTION PHENOMENA IN DISORDERED COMPOSITE MEDIA Ph.D. Thesis

Philip Henry Winterfeld 1981 320 p

Avail: Univ. Microfilms Order No. 8126041

A model of a chaotic composite is presented. Space is subdivided into granular regions and a fraction of grains, chosen at random, are labeled conducting, the rest not. A chaotic composite is modeled as a continuum. A Voronoi tessellation is constructed. Algorithms are outlined to construct the tessellation in two and three dimensions and the tessellation's geometrical statistics are obtained. A two dimensional chaotic composite is modeled by selecting at random a given number of polygons in a tessellation and labelling them conducting, the rest nonconducting. Percolation properties obtained are the cluster distribution, the percolation threshold and the percolation probability. Conduction properties are obtained by a network reduction and by finite element analysis. Two finite element analyses arise, one from imposing a potential drop across the system and another from imposing a current flow through it, that yield upper and lower bounds to the conductivity, respectively. By refinement of the finite element technique, convergence of the bounds results. Percolation and conduction properties of composites generated from the Voronoi tessellation are compared to those from regular tessellations, i.e., the square, triangular and hexagonal. Dissert. Abstr.

N82-19332 IEA Coal Research, London (England).

CHEMICAL DESULPHURISATION OF COAL

Geoffrey F. Morrison Jun. 1981 72 p refs

(ICTIS-TR-15; ISBN-92-9029-066-8) Copyright. Avail: Issuing Activity

The forms of organic and pyritic sulfur in coal and the chemical reactions these may undergo are assessed. Processes for the chemical cleaning of coal are described and evaluated, including wet oxidation, chlorinolysis, hydrothermal, microwave, and chemical comminution processes. The additional sulfur removed by chemical as compared to physical cleaning processes is insufficient to justify the additional complexity and cost of preparation. More research is required into the modes of occurrence and chemistry of sulfur in coal, particularly of organic sulfur, before the efficiency of the chemical cleaning of coal can be improved. Author (ESA)

N82-19333*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NASA REDOX CELL STACK SHUNT CURRENT, PUMPING POWER, AND CELL PERFORMANCE TRADEOFFS Final Report
Norman Hagedorn, Mark A. Hoberecht, and Lawrence H. Thaller Feb. 1982 33 p refs
(Contract DE-AI01-80AL-12726)
(NASA-TM-82686; DOE/NASA/12726-11; E-967) Avail: NTIS HC A03/MF A01 CSCL 10C

The NASA Redox energy storage system is under active technology development. The hardware undergoing laboratory testing is either 310 sq. cm. or 929 sq. cm. (0.33 sq. ft. or 1.0 sq. ft. per cell active area with up to 40 individual cells connected to make up a modular cell stack. This size of hardware allows rather accurate projections to be made of the shunt power/pump power tradeoffs. The modeling studies that were completed on the system concept are reviewed along with the approach of mapping the performance of Redox cells over a wide range of flow rates and depths of discharge of the Redox solutions. Methods are outlined for estimating the pumping and shunt current losses for any type of cell and stack combination. These methods are applicable to a variety of pumping options that are present with Redox systems. The results show that a fully developed Redox system has acceptable parasitic losses when using a fixed flow rate adequate to meet the worst conditions of current density and depth of discharge. These losses are reduced by about 65 percent if variable flow schedules are used. The exact value of the overall parasitics will depend on the specific system requirements of current density, voltage limits, charge, discharge time, etc.

S.L.

N82-19334# Technische Hogeschool, Delft (Netherlands).
QUANTITATIVE THERMAL DESORPTION SPECTROMETRY OF NOBLE GASES IN SOLIDS Ph.D. Thesis
Aart vanGorkum 1981 157 p refs
Avail: NTIS HC A08/MF A01

Quantitative thermal desorption spectrometry carried out with the doses below limits to avoid the creation of surface disorder, the interaction of gas atoms during the desorption cycle, the retrapping of helium during the desorption cycle, and the multiple occupation of traps by helium is described. These limits are quantified, and it is shown that in general small amounts of gas have to be detected. The accuracy with which the energy E and frequency factor nu can be extracted from a measured 1st order desorption peak is ultimately limited by shot noise in the mass spectrometer. This noise is quantified for both the static and dynamic modes of operation. Examples are given showing that accuracies of approximately 1% can be obtained for peaks with 100 million practicles for practically achievable values of L and S.

J.D.H.

N82-19335# Technische Hogeschool, Delft (Netherlands).
THERMAL INVESTIGATION OF UNSTABLE SUBSTANCES, INCLUDING A COMPARISON OF DIFFERENT THERMAL ANALYTICAL TECHNIQUES Ph.D. Thesis
Robert Bernard Berendregt 11 Feb. 1981 143 p refs
Avail: NTIS HC A07/MF A01

A procedure for the determination of the heat conductivity of a monatomic gas from measurements of the structure of the unsteady thermal boundary layer at the end wall of a shock tube is proposed. In the non-ionized case the structure of the boundary layer determined by means of laser schlieren measurements appears to be self similar. Improved analysis of the schlieren data and accurate pressure measurements yield heat conductivity data with an accuracy of 4% for temperatures up to 7000 K (argon, pressure 30,000 Pa to 100,000 Pa). There are still systematic errors of a few percent, due to the influence of side wall boundary layers and to the simplifications in the procedure for the determination of the state of the gas outside the boundary layer. In the ionized case a model for the development of the thermal boundary layer is proposed.

S.L.

N82-19336*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A HIGH RESOLUTION SPECTROSCOPIC STUDY OF THE v SUB 2 BAND OF HYDROGEN SULFIDE AND THE 1-0 BAND OF HYDROGEN IODIDE Ph.D. Thesis - Maryland Univ.
Lawrence Larrabee Strow Dec. 1981 159 p refs
(NASA-TM-83852) Avail: NTIS HC A08/MF A01 CSCL 07D

A tunable diode laser spectrometer was constructed and used to study: (1) the effects of centrifugal distortion on the transition frequencies and strengths of the nu sub 2 band of H2S, and (2) nuclear quadrupole hyperfine structure in the 1-0 band of HI. A total of 126 line frequencies and 94 line strengths in the nu sub 2 band of H2S were measured. The average accuracy of the line frequency measurements was + or - 0.0016 cm. The line strengths were measured to an average accuracy of about 3 percent. The effect of the finite spectral width of the diode laser on the measurement of line strengths is discussed. The observed H2S line frequencies were fit to Watson's AS and NS reduced Hamiltonian in both the Ir and IIIr coordinate representations in order to determine the best set of rotation distortion constants for the upper state of the nu sub 2 band. Comparisons of the observed line strengths in this band to rigid rotor line strengths are also presented. Nuclear quadrupole hyperfine structure in the low J lines of the 1-0 band of HI was observed. The upper vibrational state nuclear quadrupole coupling constant, determined from the observed splittings, was -1850 MHz + or - 12 MHz or 1.2 percent + or - 0.7 percent larger than the ground state coupling constant.

S.L.

N82-19337# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATION OF A CaCl MOLECULAR JET BY MEANS OF LASER INDUCED FLUORESCENCE Thesis [UNTERSUCHUNG EINES CaCl-DUESENSTRAHLS DURCH LASERINDUZIERTE FLUORESZENZ]
Dietmar Otten Dec. 1980 61 p refs In GERMAN
(MPIS-29/1980; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,85

Internal conditions in CaCl jet nozzles were investigated. The division of oscillation conditions is considered. The CaCl was chosen for its on the one hand completely different bonding characteristics, and on the other hand its well known absorption spectra in visible light, which makes it possible to penetrate it with continuous dye lasers. The structure of the CaCl molecule, the molecular beam activation, and fluorescent measurements are described. First measurements on CaCl jet nozzles for relaxation equations between oscillation and rotation during expansion with different carrier gases are also reported. Transl. by E.A.K.

N82-19338# Massachusetts Inst. of Tech., Cambridge. Center for Materials Science and Engineering.
STUDY OF THE MAGNETIC PHASE DEPENDENCE OF THE Ni-CO REACTION RATE Final Research Report, 1 Oct. 1976 - 30 Sep. 1981
M. S. Dresselhaus 13 Nov. 1981 7 p refs
(Grant AF-AFOSR-3130-77; AF Proj. 2301)
(AD-A108422; AFOSR-81-0776TR) Avail: NTIS HC A02/MF A01 CSCL 07/2

Our studies of the magnetic phase dependence of chemical reactions includes both an experimental and a theoretical program. We describe below progress made during the funding period of the grant in both the experimental and theoretical programs. The experimental program focused firstly on repeating previously reported observations of a strong, oscillatory magnetic field dependence of a chemical reaction, the carbonylation of Ni to form nickel carbonyl. Using a more sensitive experimental system than that of the previous workers, we were not able to repeat their reported results. The second experimental program focused on the observation of a change in reaction rate and activation energy of the chemical reaction due to a magnetic phase transition of the reacting substrate. This phenomenon was conveniently studied using nickel copper alloys to vary the Curie temperature. Cluster calculations for the energy levels showed that the addition of a single carbon monoxide group fills the d shell and leads to a diamagnetic complex. The third experimental program addressed the observation of the Hedvall effect in a reaction where the magnetic species was purely catalytic, namely the hydrogenation of ethylene on nickel copper surfaces. The theoretical modeling was carried out with a spin polarized calculation of the energy levels of an ethylene molecule bound to a nickel cluster.

GRA

N82-19339# Ohio State Univ., Columbus. Dept. of Aeronautical and Astronautical Engineering.
IGNITION, COMBUSTION, DETONATION AND HEAT ADDITION TO ESTABLISHED FLOWS Interim Annual Report, 1 Apr. 1980 - 1 May 1981
R. Edse and T. D. Costello Aug. 1981 215 p refs
(Grant AF-AFOSR-3604-78; AF Proj. 2308)
(AD-A108580; AFOSR-81-0788TR) Avail: NTIS HC A10/MF A01 CSCL 21/2

Detonation Induction distances have been measured at room-temperature at various initial pressures in hydrogen-oxygen third gas mixtures. Various detonation parameters of these mixtures have been calculated at various initial temperatures down to 100K. A conical burner tube with a wide approach section has been set up to measure the normal flame speeds of various hydrogen-oxygen third gas mixtures at temperatures down to 200K. A new combustion tube is being assembled for the study of heat addition to an existing flow of air. Rigorous calculations have been made to evaluate the performance of ramjets using hydrogen or propane as fuel and flying at speeds ranging from M (infinity) = 1 to M (infinity) = 10.
Author (GRA)

N82-19340# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
DETERMINATION OF THE COMBUSTION MECHANISMS OF ALUMINIZED PROPELLANTS Annual Report, 1 Oct. 1980 - 30 Sep. 1981
J. P. Renie, H. M. Pressley, J. S. Lilley, and J. R. Osborn Bolling AFB, Washington, D.C. AFOSR 26 Oct. 1981 11 p refs
(Grant AF-AFOSR-3381-77; AF Proj. 2308)
(AD-A109058; AFOSR-81-0839TR) Avail: NTIS HC A02/MF A01 CSCL 21/2

This research project is concerned with determining the mechanisms governing the formation and combustion of metal/agglomerate/metal oxide particles throughout the solid rocket motor, that is, surface/near surface, cavity, and nozzle regions. Also of concern is the influence these particles have on propellant combustion characteristics and motor performance. The efforts of this past year were directed toward developing the experimental equipment needed for determining particle size distributions at and near the propellant surface. A solid propellant strand window bomb with a servo controlled positioning device was constructed and operated. Also, the interface of this equipment with data recording and reduction equipment was accomplished. The laser imaging device to be used to measure particle size distributions is undergoing calibration tests.
Author (GRA)

N82-19341# National Bureau of Standards, Washington, D.C. Surfaces Science Div.
CONFIGURATIONAL EFFECTS IN THE ADSORPTION OF HD ON ZnO
G. L. Griffin and J. T. Yates, Jr. Dec. 1981 12 p refs Submitted for publication
(Contract N00014-81-F-0008)
(AD-A109368; TR-24) Avail: NTIS HC A02/MF A01 CSCL 07/4

Hydrogen deuterate, (HD) adsorption on ZnO surfaces has been studied by infrared spectroscopy as a function of ZnO temperature. It is shown that at 300K, the configuration Zn(H)-O(D) is preferred, as expected on thermodynamic grounds. As the temperature is lowered, the configuration Zn(D)-O(H) becomes preferred on kinetic grounds. We demonstrate that configuration reversal on heating must proceed via HD desorption and subsequent re-adsorption. This behavior is consistent with a model in which the transition state for HD adsorption is characterized by nearly complete dissociation of the H-D bond.
GRA

N82-19342# Naval Research Lab., Washington, D. C.
WEAK AND STRONG IGNITION. 2: SENSITIVITY OF THE HYDROGEN-OXYGEN SYSTEM Interim Report
E. S. Oran and J. P. Boris 7 Dec. 1981 38 p refs
(RR0130144; ZF43451001)
(AD-A108843; NRL-MR-4671) Avail: NTIS HC A03/MF A01 CSCL 21/2

This paper identifies the physical and chemical mechanisms which cause certain mixtures of hydrogen, oxygen and argon to be very sensitive to sound wave or entropy (temperature) perturbctions. Detailed simulations of the effects of sound waves in typical mixtures are used to show explicity the effects of such fluctuations on the chemical induction time. A quantity delta TAU max, is defined which represents the maximum variation produced in the chemical induction time of a system given the amplitude and frequency of a perturbation. It is observed that these perturbations may cause ignition to occur unevenly in such mixtures and this leads to ignition which appears spotty. Using detailed numerical simulations and a generalized induction parameter model derived from it, delta TAU max is evaluated and a criterion is developed for spotty and smooth ignition behind reflected shock waves. These effects are related to weak and strong ignition observed in shock tube experiments.
Author (GRA)

N82-19343# Federal Aviation Administration, Atlantic City, N.J.
WORKSHOP ON MATHEMATICAL FIRE MODELING
Aug. 1981 227 p Workshop held 24-27 Mar. 1981
(AD-A108876; FAA-CT-81-209) Avail: NTIS HC A11/MF A01 CSCL 01/2

Computerized simulation of aircraft fires is discussed. Cabin fires are emphasized with particuliar attention given to the study of the flammability of construction materials. Three types of aircraft fires are analyzed: ramp fires, in-flight fires, and post crash fires. Flame spread, heat fluxes, and fire dynamics are discussed.
R.J.F.

N82-19344# Texas Univ. at Arlington. Dept. of Chemistry.
PHOTOASSISTED REACTIONS ON DOPED METAL OXIDE PARTICLES Technical Report, 1 Jan. - 31 Dec. 1981
J. M. White 31 Dec. 1981 28 p refs Submitted for publication
(Contract N00014-75-C-0922; NR Proj. 056-578)
(AD-A109383; TR-21) Avail: NTIS HC A03/MF A01 CSCL 07/5

Photoassisted reactions involving doped metal oxide semiconductor powders are reviewed. The mechanisms, insofar as they are now understood, are discussed for several reactions involving gas phase water near its equilibrium vapor pressure in contact with the oxide. Experimental results are presented along with some discussion of how these processes may be involved with heterogeneous processes in the atmosphere. Author (GRA)

N82-19345# Wisconsin Univ. - Madison.
STUDY OF PHOTOPHYSICAL PROCESSES AND MOLECULAR TRANSFORMATIONS OF EXCITED STATES Final Report, 25 Sep. 1978 - 24 Sep. 1981
Howard E. Zimmerman 14 Dec. 1981 17 p
(Grant DAAG29-78-G-0204)
(AD-A109137; ARO-15917.3-C) Avail: NTIS HC A02/MF A01 CSCL 05/2

A brief description, including bibliography and personnel, is given for 28 years of ARO support. The areas of photophysical processes and molecular transformations of excited states are reported. Author (GRA)

N82-19346# Georgetown Univ., Washington, D.C. School of Engineering and Applied Science.
MULTIANGULAR SCANNING ABSORPTION-EMISSION TECHNIQUES FOR THREE-DIMENSIONAL COMBUSTION DIAGNOSTICS Annual Report, 1 Sep. 1980 - 30 Aug. 1981
Robert Goulard 1 Dec. 1981 14 p refs
(Contract AF-AFOSR-3439-77; AF Proj. 2308)
(AD-A109060; AFOSR-81-0857TR) Avail: NTIS HC A02/MF A01 CSCL 21/2

This program explores the potential of absorption techniques for low ppm, real time 3-dimensional combustion diagnostics. In the current phase of activity, a laser beam has been transformed into a sheet of light and made to converge on a 128-element array, with electronics suitable for repeatable 1.5 KHz scanning and data processing. Available memory modules (4K) allow for 34 successive slicings of a passing target within 20 milliseconds. In this manner, a detailed projection of three-dimensional flow field concentrations is available. An axisymmetrical flow (tobacco smoke rings) has been measured and a tomographic procedure was applied to these data. Better ranges of absorption are being considered and multiangular experiments (non-symmetrical cases) will follow. The construction of a portable tomographic unit is also in progress. It was upgraded to nonsteady flow capabilities by coupling a CAMAC digitizer with a MINC minicomputer. The source and sensor part of the experiment have been completed. Data processing and flow controls will follow. A theoretical review of flow instabilities is underway. Existing qualitative work suggests three-dimensional patterns for which this tomographic approach is ideally suited. Author (GRA)

N82-19347# Illinois Univ. at Urbana. Dept. of Aeronautical and Astronautical Engineering.

INITIATION, COMBUSTION AND TRANSITION TO DETONATION IN HOMOGENEOUS AND HETEROGENEOUS REACTIVE MIXTURES: A SUMMARY Final Report, 1 Jun. 1980 - 31 May 1981

Roger A. Strehlow, Harold O. Barthel, and Herman Krier Sep. 1981 76 p refs
(Grant AF-AFOSR-3336-77; AF Proj. 2308)
(AD-A109057; AFOSR-81-0840TR) Avail: NTIS HC A05/MF A01 CSCL 21/2

Certain aspects of ignition source effects in reactive fuel-air mixtures are discussed. These aspects include effects of chemical sensitizers, flame acceleration, flame area, and ignition point location. The other area involves the hydrodynamic modeling of ignition and flamespreading in granular energetic solids to predict the potential for deflagration-to-detonation transition (DDT). Key results in the first area are that chemically sensitized clouds can lead to detonation, that flame acceleration or a large increase in the time rate of increase of the flame area are needed for transition from deflagration to detonation and that it is very difficult to generate damaging overpressure from edge-ignited combustion even for very high subsonic burning velocities. The research dealing with analysis of DDT in porous high energy solid propellant has shown (for the first time) actual steady-state detonation solutions, following the unsteady flow, for materials with sufficient porosity and critical burning rate properties. Limits of the run-up length to detonation are predicted as a function of propellant chemical energy, burning rate, bed porosity, and granulation (size). The detonation states conform to realistic measured conditions for porous HMX and RDX propellants. GRA

N82-19348# Michigan State Univ., East Lansing. Dept. of Chemistry.

ELECTRON EXCHANGE BETWEEN BIS (ETA MESON-6-ARENE) CHROMIUM (I) AND BIS (ETA MESON-6-ARENE) CHROMIUM (O). COMPARISONS BETWEEN EXPERIMENTAL AND CALCULATED KINETICS PARAMETERS

Tomi T-T. Li, Michael J. Weaver, and Carl H. Brubaker, Jr. 15 Dec. 1981 26 p refs Submitted for publication
(Contract N00014-79-C-0670)
(AD-A109051; TR-7) Avail: NTIS HC A03/MF A01 CSCL 07/3

Comparisons have been made between kinetics parameters for the self exchange of (eta(6)-arene)2Cr(I)/(eta(6)-arene)2Cr(O) (where arene = benzene, toluene, methoxylbenzene, biphenyl, ethylbenzoate and chlorobezene) measured by ESR line broadening in dimethylsulfoxide, with the predictions from contemporary electron-transfer theory. The biphenyl system was additionally studied in a number of other solvents. These reactions provide especially tractable systems with which to test theories of outer-sphere electron transfer since the work terms should be essentially zero, and the inner-shell contributions. Delta G to the free energy barrier are small and can be estimated from infra-red spectroscopy combined with crystallographic data. These were found to be somewhat (ca. 5-20 fold) larger than the corresponding frequency factors derived from the experimental activation enthalpies combined with the dielectric continuum estimates of the activation entropies. These 'experimental' frequency factors are compared with the estimates obtained from the 'reactive collision' and the 'ion-pair pre-equilibrium' models. The majority of the experimental frequency factors were found to be numerically closer to the predictions of the former model. GRA

N82-19349# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

MEASUREMENT OF THE DIFFERENTIAL SCATTERING CROSS SECTIONS OF ELECTRON EXCITED SODIUM BY ARGON Thesis [MESSUNGEN DIFFERENTIELLER STREUQUERSCHNITTE VON ELEKTRONISCH ANGEREGTEM NATRIUM AN ARGON]

Reiner Liedtke Dec. 1980 70 p refs In GERMAN
(MPIS-31/1980; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13.50

Differential scattering profiles with thermal energy caused by electron excited sodium by argon was measured. A grouping of crossed molecular beams was applied. A combination of Langmuir-Taylor detectors with a particle multiplier allowed measurement improvement of dissolving capacity which is needed to measure fast oscillation. The dominating elastic process allows concentration on classic scattering theory. Transl. by E.A.K.

N82-19350# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

INTEGRAL TOTAL COLLISION AND IONIZATION CROSS SECTIONS FOR THE INTERACTION OF EXCITED He IN THE (2/SUPER 1/S, 2/SUPER 3/S) STATE WITH Ar IN THE THERMAL ENERGY RANGE Ph.D. Thesis - Georg-August Univ. [INTEGRALE TOTALE STOSS- UND IONISATIONSQUERSCHNITTE FUER H3 (2/SUPER 1/S 2/SUPER 3/S)-Ar IM-THERMICHEN ENERGIEBEREICH]

Siegfried Burdenski Dec. 1980 84 p refs In GERMAN
(MPIS-32/1980; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,75

Integral profiles of total and Penning ionization profiles of the He - Ar were measured by singlet and triplet system. Collision with good velocity resolution of ionization profiles were determined. It is found that it is possible, despite the simplicity of the two body impact, to apply a theoretical curve on measurements of complicated anelastic processes. One channel measurements rated two very interdependent dimensions providing the real component and the imaginary component of the potentials. Transl. by E.A.K.

N82-19351# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

KINETIC INVESTIGATIONS OF THE REACTIONS OF UFG IN THE GASEOUS PHASE Ph.D. Thesis - Georg-August Univ. [KINETISCHE UNTERSUCHUNGEN VON REAKTTONEN DES UF6 IN DER GASPHASE]

Karin Rienaecker Feb. 1981 158 p refs In GERMAN
(MPIS-1/1981; ISSN-0436-1199) Avail: NTIS HC A08/MF A01; Fachinformationszentrum Karlsruhe, West Germany DM 26,70

Gas phase reactions of elementary fluorides which have taken place since the development of HF lasers, and the F2 reaction which are matching to the conversion of other halogens were investigated. The kinetic reaction of UF6 with HBr is examined. The occurrence of the establishment of an interference free test of gaseous phase reactions is shown. The hydrogen halide reaction and conversion with clear hydrogen, especially the reaction with H-atoms, is also discussed. Transl. by E.A.K.

N82-19352# Sheffield Univ. (England). Dept. of Control Engineering.

ON THE CONTROL OF COCURRENT TUBULAR CHEMICAL REACTORS

S. P. Banks and A. A. N. Al-shawi Oct. 1981 16 p refs
(RR-160) Avail: NTIS HC A02/MF A01

A dynamic model of a nonadiabatic tubular reactor in the form of a set of partial differential equations by using mass and energy balance to study optimal control was obtained. Distributed parameter theory is used to derive optimal control criteria from an infinite dimensional Riccati equation, without consideration of Laplace transforms in t and z. The mean squared error of the actual and equilibrium states is used as the cost functional, since the dynamic equations are obtained as a linearization of the true nonlinear dynamics about the equilibrium states. On-line calculations required are for the Fourier coefficients of system state and for the summations involved in feed flow rates and absolute temperatures. Author (ESA)

N82-19353# National Training and Operational Technology Center, Cincinnati, Ohio.
INORGANIC ANALYSES IN WATER QUALITY CONTROL PROGRAMS: INSTRUCTOR'S GUIDE
Audrey Kroner Jul. 1981 253 p refs
(PB82-111378; EPA-430/1-81-016) Avail: NTIS HC A12/MF A01 CSCL 07D

This manual is designed for use by instructors who will have to teach others how to perform analyses for selected inorganic pollutants. Topics related to the presentation of training courses in which the analyses would be taught include: the course description, personnal needed to conduct the training, the course agenda, a milestones list for planning and preparing the course, instructional resources available to support the instruction and a list of equipment and supply requirements. Also included are instructional package worksheets (lesson plans) giving details relative to presenting instruction regarding each of the analyses covered in the associated student training manual. GRA

N82-19354# Princeton Univ., N. J.
ON THE DISRUPTIVE VAPORIZATION AND BURNING OF EMULSIFIED AND MULTICOMPONENT FUEL DROPLETS Ph.D. Thesis
Juan Carlos LasherasToralba 1981 246 p
Avail: Univ. Microfilms Order No. 8129595

Systematic experimental studies of the combustion and vaporization properties of isolated free droplets of emulsified and multicomponent fuel droplets were conducted. For the case of emulsified fuel droplets the liquid-phase disruption is caused by the internal boiling of the dispersed-phase when the droplet temperature reaches the superheat-limit temperature of the dispersed-phase in the emulsion. For the case of water-in-fuel emulsions it is shown that the liquid-phase disruption is primarily governed by a very fast growth of the water vapor bubbles which is controlled by the large pressure difference between the vapor and the surrounding liquid. The experimental results substantiate the theory that the disruptive phenomena results from the homogeneous bubble nucleation of the superheated droplet core when the droplet temperature reaches the superheat-limit temperature of the solution. The concept of liquid-phase disruption is extended to practical solution and emulsions formed by the addition of methanol, ethanol or water to a conventional distillate fuel oil. Dissert. Abstr.

N82-20133# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
EXPERIMENTAL DETERMINATION OF TEMPERATURE/VELOCITY PROBABILITY DENSITY FUNCTIONS IN A TURBULENT FLAME
P. Moreau *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 9-20 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 233-244 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-19355 British Library Lending Div., Boston Spa (England).
MIXED CONVECTION IN MOLTEN METALS [LA CONVECTION MIXTE DANS LES METAUX EN FUSION]
J. Huetz (CNRS) 25 Feb. 1981 22 p refs Transl. into ENGLISH from La Houille Blance (France), no. 2/3, 1979 p 175-182
(BLL-RISLEY-TR-4385-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

Mixed convection gives rise to thermal exchanges due to natural convection as well as those resulting from forced convection. The relative importance of these two exchange processes is determined by the value of the Froude number, namely the quotient of the Reynolds number and the square root of the Grashof number. The industrial sectors concerned with flows of liquid metal are defined. The heat transfers to which the latter are subjected are: nonisothermal conditions created by the imperatives of working a metal product, and molten metals used as heat transfer fluids. Iron, steelmaking, and energy production are emphasized. S.L.

N82-19356 Defence Research Information Centre, Orpington (England).
MAGNETIC PROPERTIES OF COPPER ALLOYS
D. Arnaud Nov. 1981 11 p refs Transl. into ENGLISH of Fonderie (France), no. 293, Aug.-Sep. 1970 p 293-297
(DRIC-T-6498; BR81313) Copyright. Avail: Issuing Activity

The magnetic properties of copper, bronzes, brasses, aluminum bronzes and German silver are summarized. Pure copper is scarcely affected by magnetic fields, but even very low iron contents have a perceptible influence. If bronze is to be nonmagnetic, iron content must be < 0.05%. For brasses, a soaking treatment (1 hr at 800 to 850 C) followed by rapid cooling lowers susceptibility to magnetic field action. Manganese and iron can increase susceptibility. Binary alloys (Fe in traces) have a susceptibility of 0.0000002. Magnetism is present from 0.15% iron concentration. This limit is raised to 0.5% after quenching at 900 C. German silver alloys are safest, since the critical iron content is lower (0.5%) than for the other copper alloys. Author (ESA)

N82-19357*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ENVIRONMENTAL DURABILITY OF ELECTROPLATED BLACK CHROMIUM
James R. Lowery Dec. 1981 13 p refs
(NASA-TM-82454) Avail: NTIS HC A02/MF A01 CSCL 11F

A study was undertaken to determine the durability of nickel-black chromium plated aluminum in an outdoor rural industrial, and seacoast environment. Test panels were exposed to these environments for 60, 36, and 13 months, respectively. The results of this study showed that no significant optical degradation occurred from exposure to either of these environments, although a considerable amount of corrosion occurred on the panels exposed to the seacoast environment. The rural and industrial atmosphere produced only a slight amount of corrosion on test panels. Author

N82-19358*# Rockwell International Corp., El Segundo, Calif. Aircraft Operations.
EVALUATION OF SUPERPLASTIC FORMING AND CO-DIFFUSION BONDING OF Ti-6Al-4V TITANIUM ALLOY EXPANDED SANDWICH STRUCTURES Technical Report, May 1979 - Dec. 1980
G. H. Arvin, L. Israeli, J. H. Stolpestad, and G. W. Stacher Sep. 1981 134 p refs
(Contract NAS1-15788)
(NASA-CR-165827; NA-81-185-1) Avail: NTIS HC A07/MF A01 CSCL 11F

The application of the superplastic forming/diffusion bonding (SPF/DB) process to supersonic cruise research is investigated. The capability of an SPF/DB titanium structure to meet the structural requirements of the inner wing area of the NASA arrow-wing advanced supersonic transport design is evaluated. Selection of structural concepts and their optimization for minimum weight, SPF/DB process optimization, fabrication of representative specimens, and specimen testing and evaluation are described. The structural area used includes both upper and lower wing panels, where the upper wing panel is used for static compression strength evaluation and the lower panel, in tension, is used for fracture mechanics evaluations. The individual test specimens, cut from six large panels, consist of 39 static specimens, 10 fracture mechanics specimens, and one each full size panel for compression stability and fracture mechanics testing. Tests are performed at temperatures of -54 C (-65 F), room temperature, and 260 C (500 F). B.W.

N82-19359# Helsinki Univ. of Technology, Espoo (Finland). Inst. of Process Metallurgy.
ACTA POLYTECHNICA SCANDINAVICA. OXYGEN-METAL (Ag, Au, Bi, Cu, In, Ni, Sb, Sn, Te) INTERACTIONS IN DILUTE MOLTEN LEAD ALLOYS Ph.D. Thesis

Anja Taskinen 1981 45 p refs
(ISBN-951-666-137-3; ISSN-0001-6853) Avail: NTIS HC A03/MF A01

Measurement of the first order interaction coefficients of nine metals on oxygen in liquid lead using a solid electrolyte cell is described. The lead oxygen system was studied first in order to check the reliability of the experimental apparatus. The Gibbs energy of dissolution of oxygen in liquid lead, the self interaction coefficient of oxygen in liquid lead, and first order action coefficients of the metals are reported and compared with previous findings in the literature. Application of the model of McLellan to Pb-Metal-O solutions and of the quasichemical model of Jacob and Alcock is considered. The entropy interaction coefficient was observed to be a linear function of the enthalpy interaction coefficient.
J.D.M.

N82-19360*# Pratt and Whitney Aircraft, East Hartford, Conn.
TAILORED PLASMA SPRAYED MCrAlY COATINGS FOR AIRCRAFT GAS TURBINE APPLICATIONS
F. J. Pennisi and D. K. Gupta Jan. 1981 132 p refs
(NAS3-21730)
(NASA-CR-165234; PWA-5642-21) Avail: NTIS HC A07/MF A01 CSCL 11F

Eighteen plasma sprayed coating systems, nine based on the NiCoCrAly chemistry and nine based on the CoCrAly composition, were evaluated to identify coating systems which provide equivalent or superior life to that shown by the electron beam physical vapor deposited NiCoCrAly and CoCrAly coatings respectively. NiCoCrAly type coatings were examined on a single crystal alloy and the CoCrAly based coatings were optimized on the B1900+ Hf alloy. Cyclic burner rig oxidation and hot corrosion and tensile ductility tests used to evaluate the various coating candidates. For the single crystal alloy, a low pressure chamber plasma sprayed NiCoCrAly + Si coating exhibited a 2x oxidation life improvement at 1394 K (2050 F) over the vapor deposited NiCoCrAly material while showing equivalent tensile ductility. A silicon modified low pressure chamber plasma sprayed CoCrAly coating was found to be more durable than the baseline vapor deposited CoCrAly coating on the B1900+ Hf alloy.
S.L.

N82-19361 Aeronautical Research Labs., Melbourne (Australia).
ACCESSION OF TITANIUM AS AN AIRCRAFT MATERIAL: A CURRENT VIEW
H. R. Chin Quan Mar. 1981 24 p refs
(ARL/Mat-Note-129; AR-002-280) Copyright. Avail: Issuing Activity

The metallurgy, alloy development, fabrication, and property characteristics of titanium alloys for aircraft structural applications are presented. Alloy compositions and a general bibliography of titanium references are included.
S.L.

N82-19362# Connecticut Univ., Storrs. Inst. of Materials Science.
INTERACTION OF MICROSEGREGATION AND COARSENING DURING DENDRITIC NICKEL-BASE ALLOY MONOCRYSTAL GROWTH Final Report, 1 Apr. 1977 - 31 Aug. 1981
T. Z. Kattamis 31 Oct. 1981 57 p refs
(Grant AF-AFOSR-3344-77)
(AD-A108980; UC-MET-KAT-4-1981; AFOSR-81-0660TR) Avail: NTIS HC A04/MF A01 CSCL 11/6

Dendritic monocrystals of various Ni-Al-Ta and Ni-Cr alloys, some of which were microalloyed with C,B,Zr or Hf were processed at various growth rates up to 200 cm/h, or cooling rates up to 4.44 K/s under a thermal gradient in the mushy zone of 80 K/cm and in some cases 180 K/cm. The solidification microstructure was substantially refined with increasing growth rate and dendrite arm spacings as fine as 1 to 2 micrometer were observed in laser or electron beam surface glazed monocrystals. Microsegregation of Al, Ta and Cr was found to depend on growth conditions. With increasing cooling rate the volume fraction of nonequilibrium interdendritic upsilo minus upsilo prime eutectic or secondary upsilo prime increases. At the high growth rates achieved in surface glazing this volume fraction is greatly reduced. Very high growth rates are required for complete elimination of interdendritic upsilo prime through solute trapping, and formation of a completely homogeneous surface layer. With the present chilling techniques available growth of homogeneous monocrystals at such high rates is not possible.
GRA

N82-19363# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va.
THE EFFECT OF SURFACE COATINGS ON THE FATIGUE STRENGTH OF ALUMINUM ALLOYS
Dario A. Emeric, Sidney Levine, and Kathryn L. Washburn Sep. 1981 23 p refs
(DA Proj. 1L1-61101-89-18)
(AD-A108869; MERADCOM-2339) Avail: NTIS HC A02/MF A01 CSCL 11/3

Aluminum is a widely used metal in military applications such as vehicles, bridges, air-cushion vehicles, etc., but its use is limited to areas where the aluminum alloys would not be under load with variable or constant stresses and to areas where there would be almost no severe abrasion or corrosion. Anodic coatings tend to increase the abrasion and corrosion resistance of aluminum and its alloys, but the coatings have a detrimental effect on the fatigue endurance (in some instances by as much as 65 percent). The objective of this work was to provide a surface treatment and/or coatings that will allow the use of aluminum wrought alloys in any type of environment and that will be able to withstand the effects of abrasion and stress corrosion and temperature changes up to 344 deg F with an increased fatigue endurance.
Author (GRA)

N82-19364# Massachusetts Inst. of Tech., Cambridge.
GRAIN-COARSENING RESISTANCE AND THE STABILITY OF SECOND-PHASE DISPERSIONS IN RAPIDLY SOLIDIFIED STEELS Technical Report, Oct. 1980 - Sep. 1981
G. B. Olson, H. C. Ling (Western Electric Engineering Research Labs., Princeton, N.J.), J. S. Montgomery, J. B. VanderSande, and M. Cohen 1 Dec. 1981 9 p refs Presented at the Mater. Res. Soc. Symp. on Rapid Solidification Crystalline and Amorphous Mater., Boston, 17-19 Nov. 1981
(Contract N00014-81-K-0013)
(AD-A109152; TR-1) Avail: NTIS HC A02/MF A01 CSCL 11/6

Control of alloy composition and processing to achieve grain coarsening resistance in rapidly solidified alloys is examined via the theory of grain boundary pinning and particle coarsening. The principles are illustrated for the case of manganese sulfides in steels. A thermodynamic survey of potential stable dispersed phases identifies TiN and rare-earth sulfides as particularly promising for alloy development via rapid solidification.
Author (GRA)

N82-19365# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
A STUDY OF DISLOCATION DENSITY AND PHASE ELONGATION AS A FUNCTION OF DEFORMATION IN SINTERED TUNGSTEN COMPOSITES [EN STUDIE AV DISLOKATIONSTAETHETEN OCH FASTOEJNINGEN SOM FUNKTION AV DEFORMATION I SINTRADE VOLFRAMKOMPOSITER]
Ulf Lindegren Oct. 1981 37 p refs In SWEDISH
(FOA-C-20428-D4) Avail: NTIS HC A03/MF A01

Dislocation density and phase elongation are calculated from the observed dislocation density in the tungsten grains. The studied composite is a DXT alloy. It contains 90% W, 6% Ni, and 4% Fe. In the sintered form, it consists of tungsten grains embedded in a weaker matrix. Such composites are used for armor piercing projectiles. Electron microscopes were used to determine the dislocation density. Results show the difference in the dislocation density values of the matrix and the tungsten grains measured for a total deformation up to 5%. For higher deformations, calculated values are indicated, based on theoretical models. A method is described for producing thin films by electropolishing and ion implantation.
Author (ESA)

N82-19366# Thyssen Edelstahlwerke A.G., Krefeld (West Germany). Forschungsinst.
INFLUENCE OF FABRICATION CONDITIONS AND STABILITY OF AUSTENITE ON THE FORMING BEHAVIOR OF AUSTENITIC STAINLESS STEELS Final Report
Werner Kueppers Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 89 p refs In GERMAN; ENGLISH

summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-192; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18.90

The effect of cold rolling conditions on austenitic steel stretching and deep drawing properties is discussed. During the fabrication of three coils of various stability of austenite, the degree of cold forming between the annealing processes was varied by cold rolling from the thickness of hot rolled coil to final thickness without, or with one or two, intermediate annealings. It is shown that the best stretch forming is made with unstable austenitic steels, and becomes better with increasing sheet thickness. The most favorable deep drawing behavior is gained with highest degrees of cold rolling before final annealing and is independent of the stability of austenite. Cold rolling to the highest degree before intermediate annealing and deformation before final annealing are important. It is found that conditions can be given for cold rolling to obtain best forming behavior.
Author (ESA)

N82-19367# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
FATIGUE CRACK GROWTH IN ALUMINUM ALLOYS
L. B. Vogelesang Jun. 1981 19 p refs Presented at 5th Intern. Conf. on Fracture, Cannes, France, 29 Mar. - 3 Apr. 1981
(VTH-LR-324) Avail: NTIS HC A02/MF A01

Fatigue crack propagation tests with different wave shapes were carried out in vacuum, air, and salt water, on 7075-T6 and 7024-T3 center-cracked sheet specimens. Scanning electron microscope studies of plastic castings of the fatigue cracks are discussed. Crack growth is shown to be sensitive to the loading rate during uploading and relatively insensitive to holding periods. The observations support a model for crack growth based on the synergistic effects of crack tip plasticity and the environmental contribution to tensile decohesion. Author (ESA)

N82-19368# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
CORROSION OF CARBON STEEL AT HIGH TEMPERATURE IN REDUCING CHEMICAL CONDITIONS
P. A. Borroni, E. Diacci, R. Rizzi, and C. Ronchetti 1981 20 p refs Presented at 8th Intern. Congr. on Metal. Corrosion, Mainz, West Germany, 6-11 Sep. 1981 Sponsored by Comitato Nazionale per l'Energia Nucleare (CNEN)
(CISE-1699) Avail: NTIS HC A02/MF A01

Corrosion tests of carbon steel were carried out in a dynamic loop at high temperature and pressure under reducing chemical conditions. These experiments were performed in ammoniated water, with and without oxygen, at temperatures up to 250 C. Corrosion rate was determined by measuring the linear polarization resistance drop in the water. Redox potential of the water and corrosion potential of the steel were also measured. The influence of additions of hydrazine on the same potentials and corrosion rate was determined. Results show that (1) the measurement method is capable of following the change in corrosion rate due to increasing surface passivation and that (2) the most important parameter relevant to corrosion rate at equilibrium is water quality, even in the presence of a reducing agent. Author (ESA)

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-19369 Florida Univ., Gainesville.
THE POLARIZED INFRARED REFLECTION SPECTROSCOPIC CHARACTERIZATION AND AQUEOUS DURABILITY OF LITHIA-DISILICATE GLASS CERAMICS Ph.D. Thesis
Walter John McCracken 1981 132 p
Avail: Univ. Microfilms Order No. 8127450

The structure property environment relationship of glass ceramic materials was investigated in order to study their changes during aqueous corrosion. Polarized infrared reflection spectroscopy (PIRRS) is used to assign atomic vibrational modes to the peaks in reflection spectra of single crystals of quartz, lithia disilicate, and lithia metasilicate. The effect on the PIRRS data of increasing the number of nonbridging oxygens per silica tetrahedra in the silicate structure is demonstrated. By combining the PIRRS data of single crystal lithia disilicate and the PIRRS data of polycrystalline lithia disilicate glass ceramics the glass ceramic surface can be characterized so that changes in the surface structure during aqueous corrosion can be monitored. Aqueous durability of lithia disilicate glass ceramics was studied using four volume fractions of crystallinity and three different pH environments. The crystallization significantly affects the corrosion behavior of the lithia disilicate glass. In general, the least surface damage is observed on all the materials when exposed to acidic solution and the most extensive surface alterations occur on all the materials exposed to the basic solutions. On glass, network dissolution occurs uniformly over the entire exposed surface. On glass ceramics, network dissolution proceeds at different rates over the surface, with the highest rate occurring on the glassy phase. In addition to ion exchange and network dissolution, phase boundary attack between the glass and crystalline phases and intracrystalline attack are important in glass ceramic systems exposed to basic solutions, or to static neutral solutions for long times. Dissert. Abstr.

N82-19370 Florida Univ., Gainesville.
FRACTURE MECHANICS AND FAILURE PREDICTIONS FOR GLASS, GLASS-CERAMIC, CERAMIC SYSTEMS Ph.D. Thesis
Ronald Alan Palmer 1981 170 p
Avail: Univ. Microfilms Order No. 8127457

The fatigue parameters for the lithium disilicate glass/glass-ceramic system were determined, in examining the effects of crystallization on fatigue behavior. Two methods (dynamic fatigue and slow crack growth) were employed and were found to produce different values for the fatigue parameters. It was found that aqueous corrosion has a severe effect on the fatigue parameters, as measured in dynamic fatigue, especially after aging up for up to one week in distilled water. The lithium disilicate glass, which is known to readily form a gel layer in water, exhibits the most rapid change in parameters. The most crystalline composition (92% crystalline) shows the greatest strength loss due to aging. At low volume fraction of crystals (7%) a residual stress in the glassy matrix effects a strength increase and a decrease in the environmental sensitivity which disappears with aging in water. No effect of aging in water was found in the slow crack growth studies. In all cases, the environmental sensitivity was found to be much higher in these experiments than in dynamic fatigue. The limitations of the present fracture mechanics theory are discussed in the light of the inconsistencies found between these methods. A matrix of tests, including static and dynamic fatigue and proof tests, is proposed as an improved method of characterizing the fatigue behavior of a material.
Dissert. Abstr.

N82-19371 North Carolina State Univ. at Raleigh.
THE SYNTHESIS OF BIODEGRADABLE BLOCK COPOLYMERS CONTAINING AMYLOSE AND POLYESTER OLIGOMERIC BLOCKS Ph.D. Thesis
Kiu-Seung Lee 1981 127 p
Avail: Univ. Microfilms Order No. 8121763

Block co- and terpolymers containing amylose and polyester oligomeric blocks were synthesized using a six step reaction scheme. Block co- and terpolymers were readily degraded by alpha amylase, an enzyme present in the human body. Intrinsic viscosity versus time of enzymatic exposure were used to follow the biodegradation of the polymers. The block co- and terpolymers were characterized by a variety of techniques. The chemical properties and physical properties of the polymers were measured. All of the data collected support the formation of biodegradable block copolymers. Dissert. Abstr.

N82-19372 North Carolina State Univ. at Raleigh.
FREE VOLUME THEORY OF DIFFUSION INTO POLYMERS. PART 1: METHOD OF PREDICTING ACTIVATION ENERGIES OF DIFFUSION FOR GASES INTO ELASTO-

MERS. PART 2: DIFFUSION OF NON-IONIC DYES INTO SEMI-CRYSTALLINE POLY (ETHYLENE TEREPHTHALATE) FILMS. PART 3: RELATIONSHIP BETWEEN GLASS-TRANSITION AND DYEING-TRANSITION TEMPERATURES Ph.D. Thesis
Rochana Kosiyanon 1981 192 p
Avail: Univ. Microfilms Order No. 8121737

The validity of Fujita's free volume theory, applied to the diffusion of various penetrants into polymers, was tested. The diffusion of five gasses into nine amorphous polymers is examined. An equation is derived to predict the activation energies of diffusion, the temperature of diffusion, the glass transition temperature of the polymer, and a constant depending on the penetrant. This equation and the theoretical approach on which it is based are shown to be satisfactory for a set of five simple gases, diffusing into a set of nine elastomers. A modified theory is applied to the disperse dyeing of semi-crystalline Poly(ethylene terephthalate) fibers and film. Several systems such as vapor phase dyeing, aqueous and solvent dyeing are examined. The analysis of the data confirms the validity of certain aspects of the proposed, modified free volume theory. The modified theory is extended to describe the transition temperature of dyeing. A mathematical expression is deduced which makes it possible to predict the transition temperature of dyeing in any system which conforms to the basic assumptions inherent in the modified theory. The predictions agree with the experimental data for a two-component, vapor phase dyeing system. Dissert. Abstr.

N82-19373*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TRIBOLOGICAL PROPERTIES AT 25 C OF SEVEN POLYIMIDE FILMS BONDED TO 440 C HIGH-TEMPERATURE STAINLESS STEEL
Robert L. Fusaro Feb. 1982 23 p refs
(NASA-TP-1944; E-758) Avail: NTIS HC A02/MF A01 CSCL 07C

The tribological properties of seven polyimide films applied to 440 C high temperature stainless steel substrates were studied at 25 C with a pin-on-disk type of friction and were apparatus. The polyimides fell into two groups according to friction and wear properties. Group I polyimides had slightly lower friction but much higher wear than group II polyimides. The wear mechanism was predominately adhesion, but the wear particles were larger for group I polyimides. For most of the polyimides the transfer films consisted of clumps of compacted wear particles. One polyimide composition produced a very thin transfer film that sheared plastically in the contact area. Author

N82-19374*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SURFACE CHEMISTRY AND WEAR BEHAVIOR OF SINGLE-CRYSTAL SILICON CARBIDE SLIDING AGAINST IRON AT TEMPERATURES TO 1500 C IN VACUUM
Kazuhisa Miyoshi and Donald H. Buckley Feb. 1982 14 p refs
(NASA-TP-1947; E-654) Avail: NTIS HC A02/MF A01 CSCL 07C

X-ray photoelectron and Auger electron spectroscopy analyses and morphological studies of wear and metal transfer were conducted with a single-crystal silicon carbide 0001 surface in contact with iron at various temperatures to 1500 C in a vacuum of 10 to the minus 8th power pascal. The results indicate that below 800 C, carbide-carbon and silicon are primarily seen on the silicon carbide surface. Above 800 C the graphite increases rapidly with increase in temperature. The outermost surficial layer, which consists mostly of graphite and little silicon at temperatures above 1200 C is about 2 nm thick. A thicker layer, which consists of a mixture of graphite, carbide, and silicon is approximately 100 nm thick. The closer the surface sliding temperature is to 800 C, the more the metal transfer produced. Above 800 C, there was a transfer of rough, discontinuous, and thin iron debris instead of smooth, continuous and thin iron film which was observed to transfer below 800 C. Two kinds of fracture pits were observed on the silicon carbide surface: (1) a pit with a spherical asperity; and (2) multiangular shaped pits. Author

N82-19375# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.
LABORATORY EVALUATION OF MULTIVISCOSITY-GRADE ENGINE OILS IN US ARMY DIESEL ENGINES Interim Report, Nov. 1978 - Jun. 1980
Richard B. Moon and Alan F. Montemayor May 1981 567 p refs
(Contracts DAAK70-78-C-0001; DAAK70-80-C-0001; DA Proj. 1L7-62733-AH-20)
(AD-A108890; AFLRL-112) Avail: NTIS HC A24/MF A01 CSCL 11/8

Seven multigrade engine oils were tested against 10 grade and 30 grade reference oil in the DD 6V-53T engine using a 240-hour tracked-vehicle cyclic endurance test and in the Teledyne Continental LD/LDT-465 engines using a 210-hour wheeled-vehicle cyclic endurance test. The results of these tests are tabulated and compared with results from reference oil tests. Two SAE 15W-40 oils proved equal or better than the reference oil and were recommended for adoption as MIL-L-2104 oils. GRA

N82-19376# Ministry of Defence, London (England). Joint Committee on the Behavior of Plastics Materials under Tropical Conditions.
THE WEATHERING OF PLASTICS MATERIALS IN THE TROPICS. 6: THE FURTHER EVALUATION OF A SOLAR RADIATION CONCENTRATING DEVICE (EMMA) AS A MEANS OF ACCELERATING THE WEATHERING OF PLASTICS
1981 42 p refs Prepared jointly with British Plastics Federation
(AD-A109385; DRIC-BR-80352) Avail: NTIS HC A03/MF A01 CSCL 11/9

This report is an account of a second trial conducted at Desert Sunshine Exposure Test Inc. using the facility of the EMMA and EMMAQUA machines which are reported to accelerate natural weathering. Low density polyethylene and polyacetal specimens were tested and no real acceleration factors could be found for the EMMA machines over natural 45 deg exposure. Author (GRA)

N82-19377# General Electric Co., Schenectady, N. Y. Corporate Research and Development Office.
IMPACT RESPONSE CHARACTERISTICS OF POLYMERIC MATERIALS Final Report, 27 Apr. 1979 - 30 Apr. 1981
William B. Hillig Nov. 1981 98 p refs
(Contract N00019-79-C-0347)
(AD-A109281; SRD-81-081) Avail: NTIS HC A05/MF A01 CSCL 11/9

Studies concerned with determining, understanding, and trying to predict the behavior of polymethylmethacrylate (PMMA) and polycarbonate (PC) under impact are discussed. In the present work the impact velocity was extended to 2.1, 125, and 220 m/s using a 4.5 mm steel ball as the projectile. Because of dispersion effects the pulse detected using an instrumented Hopkinson impact bar was markedly distorted. A new semi-empirical procedure for correcting the pulse was developed. Analysis of the data showed that the deduced Young's modulus of PMMA slowly increases with increasing impact velocity. However, the derived modulus of PC decreases by a fctor of five when the impact velocity was increased from 2.1 to 220 m/s. A theoretically based model was formulated to 'predict' the impact response of the two materials from their elastic modulus, densification properties, and stress relaxation laws. This modified spring/dashpot model allows the response of the polymers to be continuously varied between seties-like and parallel-like. The PMMA was found to require a predominantly series-like mode description, whereas the PC response was more parallel-like. GRA

N82-19378# Stanford Univ., Calif. Dept. of Chemical Engineering.
MORPHOLOGY OF THE POLYSTYRENE/POLY(VINYL METHYL ETHER) BLEND AS STUDIED BY EXCIMER FLUORESCENCE Final Report, 16 Oct. 1978 - 15 Oct. 1981
Curtis W. Frank 14 Dec. 1981 7 p refs
(Contract DAAG29-78-C-0047)
(AD-A109143; ARO-15770.2-C) Avail: NTIS HC A02/MF A01 CSCL 07/3

Excimer fluorescence was used to study conformational statistics and aggregation in miscible and immiscible blends of polystyrene with poly(vinyl methyl ether). At low polystyrene concentration in miscible blends, excimer fluorescence of isolated polystyrene chains is analyzed in terms of a one dimensional random walk of the migrating singlet exciton. At high concentration in miscible blends the energy migration is three-dimensional. Knowledge of the fluorescence behavior for miscible blends was used to determine the phase composition for phase separated blends. GRA

N82-19379# National Centre of Tribology, Risley (England). European Space Tribology Lab.
MOLYBDENUM DISULPHIDE LUBRICATION. A CONTINUATION SURVEY: 1977/78
A. R. Lansdown and W. R. Burke, ed. Jun. 1981 37 p refs
Previously announced as ESA-CR(P)-1330
(ESA-TRIB-4; ESA-CR(P)-1330; ISSN-0250-4448) Avail: NTIS HC A03/MF A01

Aspects of molybdenum disulfide lubrication considered include chemical and physical properties, the lubrication mechanism, its incorporation in bulk solids, its use in oils and greases, and whether it has anticorrosive properties. Although a reduction in molybdenite supply means higher prices for molybdenum-containing materials, the literature indicates that molybdenum disulphide based lubricants are becoming more widely used as multipurpose products for general use following the energy crisis. They reduce fuel and oil consumption in car engines, are wear effective up to 700 F, and are solvent resistant. Author (ESA)

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-19380# Northwestern Univ., Evanston, Ill. Dept. of Physics and Astronomy.
ELECTRONICALLY INDUCED PHASE TRANSFORMATIONS Interim Scientific Report, 1 Oct. 1980 - 30 Sep. 1981
Arthur J. Freeman 30 Nov. 1981 11 p refs
(Grant AF-AFOSR-0024-81; AF Proj. 2301)
(AD-A108982; AFOSR-81-0866TR) Avail: NTIS HC A02/MF A01 CSCL 19/1

The electronic interactions responsible for the observed electronically induced phase transformations in several important classes of materials were investigated theoretically in close collaboration with experimental programs at other institutions. These include the high field superconductivity of Chevrel phase compounds and the first theoretical demonstration that the Jaccarino-Peter mechanism is responsible for the large increase in the upper critical field when large concentrations of Eu magnetic impurities are added to SnMo6S8, an extensive study of the unusual magnetic and superconducting properties of some C15 compounds, self-consistent energy band calculations including all electrons and all atoms in the 16 atoms per unit cell of the linear chain transition metal trichalcogenide, TaSe3, and the first demonstration of the onset of a metamagnetic transition in Pd Metal. Author (GRA)

N82-19381# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
PARAMETRIC STUDY OF PROPELLANT CRACK COMBUSTION Final Report, 1979
Kibong Kim 21 Oct. 1981 37 p refs
(AD-A108769; NSWC/TR-79-485) Avail: NTIS HC A03/MF A01 CSCL 21/9

Selective calculations have been made for burning in cracks as it pertains to solid rocket motor propellants. The possibility of obtaining pressures high enough to cause a shock-to-detonation transition (sdt) in propellant grains is examined. Variables affecting the crack combustion process which were selected for study are: crack shape; location; surface roughness; propellant deformation; ignition criterion; and burning rate. The variables are evaluated and ordered in groups of relative importance. Results suggest that SDT should not occur in propellants unless the granulation of the grain is severe enough to provide large burning surface area. Author (GRA)

N82-19382# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
HIGH ENERGY PROPELLANTS CONTAINING MAGNESIUM [BRAENSLERIKA KRUT INNEHAALLANDE MAGNESIUM]
Torsten Liljegren Nov. 1981 31 p refs In SWEDISH
(FOA-C-20432-D1) Avail: NTIS HC A03/MF A01

The possibilities for using these propellants in external combustion projectiles or in ramjet engines are studied. Magnesium has a moderate heat of combustion lower than, e.g., boron or aluminum. It has a low ignition temperature and burns in gas phase with a high burning rate. Energy and performance data are given and from these the choice of propellant composition is discussed. Manufacture of hydroxy terminated polybutadiene or HTPB propellants is reported. Results from test firings are given. Author (ESA)

N82-19383# Mathtech, Inc., Princeton, N. J.
IMPEDIMENTS TO ENERGY AND MATERIALS RECOVERY FACILITIES FOR MUNICIPAL SOLID WASTE Final Report
Ernest H. Manuel, Jr. and Fritz W. Efaw Sep. 1981 229 p refs Prepared in cooperation with Franklin Associates, Prairie Village, Kans.
(Contract EPA-68-03-2761)
(PB82-102302; EPA-600/2-81-181) Avail: NTIS HC A11/MF A01 CSCL 21D

The impediments to recycling municipal solid waste were studied. The eight facilities selected for indepth analysis represented a cross section of technologies, ownership types, geographical locations, and recovered products. None of the facilities were economical in the context of providing the least cost mode of disposal, and all eight facilities experienced net operating losses. A major impediment encountered by most of the facilities was competition from lower-cost landfills. GRA

N82-19384# Systems Technology Corp., Xenia, Ohio.
COAL: dRDF (DENSIFIED REFUSE DERIVED FUEL) DEMONSTRATION TEST IN AN INDUSTRIAL SPREADER STOKER BOILER. USE OF COAL: dRDF BLENDS IN STOKER-FIRED BOILERS, VOLUME 1 Final Report
Ned J. Kleinhenz Cincinnati, Ohio EPA Sep. 1981 146 p 2 Vol.
(Contract EPA-68-03-2426)
(PB82-100868; EPA-600/2-81-183-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 21D

Boiler performance and environmental feasibility when combusting densified forms of refuse derived fuels (dRDF) blended with coal and fired in a modern industrial spreader stoker-fired boiler are evaluated. The second phase of a two phase evaluation program is discussed. Phase 2 demonstration testing was conducted in a larger industrial spreader stoker boiler. In a period of 402 hours, 1702 tons of dRDF were co-fired with coal. An additional 231 hours of coal baseline testing was completed to provide a basis of comparison for the test results. GRA

N82-19385# Systems Technology Corp., Xenia, Ohio.
COAL: dRDF (DENSIFIED REFUSE DERIVED FUEL) DEMONSTRATION TEST IN AN INDUSTRIAL SPREADER STOKER BOILER. USE OF COAL: dRDF BLENDS IN STOKER-FIRED BOILERS, APPENDICES A, B, C AND D, VOLUME 2 Final Report
Ned J. Kleinhenz Cincinnati, Ohio EPA Sep. 1981 250 p refs 2 Vol.
(Contract EPA-68-03-2426)
(PB82-100876; EPA-600/2-81-184-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 21D

Boiler performance and environmental feasibility when combusting densified forms of refuse derived fuels (dRDF) blended with coal and fired in a modern industrial spreader stoker-fired boiler are evaluated. Phase 2 demonstration testing was conducted in a large industrial spreader stoker boiler. Site selection criteria, test data tables, formulae, and fuel evaluations are presented. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-19386 Michigan Univ., Ann Arbor.
TIME EFFECTS OF LOW-AMPLITUDE SHEAR MODULUS OF COHESIVE SOILS Ph.D. Thesis
George Andreas Athanasopoulos 1981 300 p
Avail: Univ. Microfilms Order No. 8125061

The results of an experimental investigation of time effects on the low-amplitude shear modulus, G sub 0, of artificial and natural cohesive soils are described. The main objectives of the investigation were: (1) evaluation of the effects of drained creep on G sub 0; (2) evaluation of the effects of a temporary total stress release on G sub 0; and (3) correlation of G sub 0 with the undrained shearing strength of cohesive soils. In addition, preliminary studies were performed regarding age-induced overconsolidation and temporary drop of stiffness following the application of the stress increments in a resonant column test.
Dissert. Abstr.

N82-19387*# SRI International Corp., Menlo Park, Calif. Systems Management Div.
MARKET ANALYSIS OF SEISMIC SECURITY SYSTEMS
Steven Taglio Jul. 1981 39 p
(Contract NAS2-10143)
(NASA-CR-166612) Avail: NTIS HC A03/MF A01 CSCL 14B

This report provides information on the commercialization potential of the NASA Activity Monitor. Data on current commercially available products, market size, and growth are combined with information on the NASA technology and the projected impact of this technology on the market. L.F.M.

N82-19388*# Rockwell International Science Center, Thousand Oaks, Calif.
STUDY OF NEAR-THRESHOLD FATIGUE CRACK PROPAGATION IN PIPELINE STEELS IN HIGH PRESSURE ENVIRONMENTS Final Report
M. Mitchell Nov. 1981 133 p refs
(Contract NAS2-10312)
(NASA-CR-166295; SC5230.17FR) Avail: NTIS HC A07/MF A01 CSCL 11F

Near threshold fatigue crack propagation in pipeline steels in high pressure environments was studied. The objective was to determine the level of threshold stress intensity for fatigue crack growth rate behavior in a high strength low alloy X60 pipeline-type steel. Complete results have been generated for gaseous hydrogen at ambient pressure, laboratory air at ambient pressure and approximately 60% relative humidity as well as vacuum of 0.000067 Pa (< 0.0000005 torr) at R-ratios = K(min)/K(max) of 0.1, 0.5, and 0.8. Fatigue crack growth rate behavior in gaseous hydrogen, methane, and methane plus 10 percent hydrogen at 6.89 MPa (100 psi) was determined.
R.J.F.

N82-19389# Technische Hogeschool, Delft (Netherlands).
SYSTEM IDENTIFICATION FOR MULTIVARIABLE CONTROL
Gerrit Adrianus vanZee 6 May 1981 119 p refs
Avail: NTIS HC A06/MF A01

System identification methods and modern control theory are applied to industrial processes. These processes must often be controlled in order to meet certain requirements with respect to the product quality, safety, energy consumption, and environmental load. Modern control system design methods which take the occurring interaction phenomena and stochastic disturbances into account are used. An accurate dynamic mathematical model of the process, by theoretical modelling and/or by system identification is obtained. The computational aspects of two important types of identifications methods, i.e., stochastic realization and prediction error based parameter estimation are studied. The studied computational aspects are the robustness, the accuracy, and the computational costs of the methods. Theoretical analyses and applications to a multivariable pilot scale process, operating under closed loop conditions are investigated.
S.L.

N82-19390*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECT OF VACUUM PROCESSING ON OUTGASSING WITHIN AN ORBITING MOLECULAR SHIELD
R. A. Outlaw Mar. 1982 14 p refs
(NASA-TP-1980; L-14987) Avail: NTIS HC A02/MF A01 CSCL 20H

The limiting hydrogen number density in an orbiting molecular shield is highly dependent on the outgassing rates from the materials of construction for the shield, experimental apparatus, and other hardware contained within the shield. Ordinary degassing temperatures used for ultrahigh vacuum studies (less than 450 C) are not sufficient to process metals so that the contribution to the number density within the shield due to outgassing is less than the theoretically attainable level (approximately 200 per cu. cm). Pure aluminum and type 347 stainless steel were studied as candidate shield materials. Measurements of their hydrogen concentration and diffusion coefficients were made, and the effects of high temperature vacuum processing (greater than 600 C) on their resulting outgassing rates was determined. The densities in a molecular shield due to the outgassing from either metal were substantially less (< 0.003) than the density due to the ambient atomic hydrogen flux at an orbital altitude of 500 km.
S.L.

N82-19391# Naval Ship Research and Development Center, Annapolis, Md. Propulsion and Auxiliary Systems Dept.
FOUNDATIONS FOR COMPUTER SIMULATION OF A LOW PRESSURE OIL FLOODED SINGLE SCREW AIR COMPRESSOR M.S. Thesis - Purdue Univ.
Thomas W. Bein Dec. 1981 122 p refs
(AD-A108230; DTNSRDC/PAS-81/24) Avail: NTIS HC A06/MF A01 CSCL 13/7

The necessary logic to construct a computer model to predict the performance of an oil flooded, single screw air compressor is developed. The geometric variables and relationships used to describe the general single screw mechanism are developed. The governing equations to describe the processes are developed from their primary relationships. The assumptions used in the development are also defined and justified. The computer model predicts the internal pressure, temperature, and flowrates through the leakage paths throughout the compression cycle of the single screw compressor. The model uses empirical external values as the basis for the internal predictions. The computer values are compared to the empirical values, and conclusions are drawn based on the results. Recommendations are made for future efforts to improve the computer model and to verify some of the conclusions that are drawn. Author (GRA)

N82-19392# New Mexico Univ., Albuquerque. Engineering Research Inst.
ASPHALT RECYCLING TECHNOLOGY: LITERATURE REVIEW AND RESEARCH PLAN Final Report, 30 Sep. 1980 - 15 Apr. 1981
David E. Newcomb and Jon A. Epps Tyndall AFB, Fla. Air Force Engineering and Services Center Jun. 1981 172 p refs
(Contract F29601-76-C-0015; AF Proj. 2104)
(AD-A108199; NMERI-5.16-AP-40; AFESC/ESL-TR-81-42) Avail: NTIS HC A08/MF A01 CSCL 11/7

A review of current technology for the rehabilitation and maintenance of pavement surfaces by recycling was conducted. While the primary concern was asphalt concrete recycling, a brief review of portland cement concrete recycling is included. Reports of cases involving recycling technology and lessons learned are reviewed. Recommendations are presented outlining research required to advance the state-of-the-art in a manner that will permit the U.S. Air Force to fully attain the benefits of recycling technology.
Author (GRA)

N82-19393# San Diego State Univ., Calif. Dept. of Civil Engineering.
LABORATORY VERIFICATION OF BLAST-INDUCED LIQUEFACTION MECHANISM Final Report, Jan. - Jul. 1981

Richard J. Fragaszy and Michael E. Voss Oct. 1981 59 p refs
(Grant AF-AFOSR-0085-81; AF Proj. 2307)
(AD-A109000; AFOSR-81-0843TR; SDSU-CES-81145) Avail: NTIS HC A04/MF A01 CSCL 08/13

A mechanism for blast-induced liquefaction was tested in a series of high pressure undrained, isotropic compression tests on saturated samples of Eniwetok beach sand and Ottawa sand. Theory, based on inelastic volume compressibility of sand, was shown to be valid for the case of quasi-static, isotropic loading. Specimens of Eniwetok sand subjected to an initial effective stress of 1 MPa were liquefied by a single cycle of loading of 34 MPa. Specimens of Ottawa sand, tested in the same manner, generated excess pore pressure but not enough to completely liquefy the soil. The errors introduced by flexibility of the testing systems were analyzed and found to be insignificant. Suggestions for future research were made. Author (GRA)

N82-19394# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.
ABRASION-EROSION RESISTANCE OF FIBER REINFORCED CONCRETE Final Report
Tony C. Liu and James E. McDonald Nov. 1981 31 p refs Presented at the Am. Soc. for Testing and Mater. Symp. on Durability of Concrete, Orlando, Fla., Dec. 1980
(AD-A108988; WES/MP/SL-81-32) Avail: NTIS HC A03/MF A01 CSCL 11/2

The concrete was used for repair of abrasion erosion damaged areas such as stilling basins, conduits, sluiceways, and discharge laterals in hydraulic structures. Thirteen concrete mixtures of three water cement ratios ranging from 0.40 to 0.72, each containing one of four different types of steel fibers, were tested. As is true of concrete without steel fibers, the abrasion erosion resistance of FRC increased with decrease in water cement ratio and consequent increase in compressive strength. The lengths of the fibers had very little effect on the abrasion erosion resistance, and the FRC containing collated and hooked fibers had better abrasion erosion resistance than the comparable concrete containing straight fibers. A comparison of the performance of FRC and concrete not containing fibers clearly showed that FRC was less resistant to abrasion erosion than concrete of the same aggregate type and water cement ratio without fibers. GRA

N82-19395# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
PRECAST CONCRETE PAVEMENTS Final Report, Nov. 1978 - Sep. 1980
Raymond S. Rollings and Yu. T. Chou Nov. 1981 66 p refs
(DA Proj. 4A1-61102-AT-22)
(AD-A108802; WES/MP/GL-81-10) Avail: NTIS HC A04/MF A01 CSCL 13/13

This report reviewed published literature on precast concrete pavements and found that precast concrete pavements have had some limited application in airfields, roads, and storage areas. This review of past experience and an analytical study of precast slabs concluded that existing design and construction techniques can be adapted for use with precast concrete pavements, but more work is needed to develop effective and easily constructed load transfer designs for slab joints. Precast concrete does not offer any advantage for conventional pavements due to its high cost and surface roughness, but it may find applications for special problems such as construction in adverse weather, subgrade settlement, temporary pavements that need to be relocated, and military operations. Author (GRA)

N82-19396# Engineering Dynamics International, St. Louis, Mo.
AIRPORT RELATED RESIDENTIAL ACOUSTICAL INSULATION DEMONSTRATION PROJECT: REPORT 1720 Final Report
J. T. Weissenburger, J. C. McBryan, and L. F. Heitkamo Jun. 1981 107 p refs Sponsored by St. Louis Airport Authority, Mo.
(PB82-100777) Avail: NTIS HC A06/MF A01 CSCL 13B

A demonstration project to evaluate the feasibility of retrofit acoustical insulation in single family residences as a possible remedial measure for homes impacted by airport and aircraft noise is described. Six private residences generally located in an area to the east and southeast of Lambert St. Louis International Airport were used. The program involved making before and after noise measurements, selecting contractors, and overseeing the installation of selected acoustical controls, and evaluating the effectiveness of the program. A description of each individual house and measured data pertaining to the house is presented. GRA

N82-19397# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.
THE OPTIMAL PLANNING OF COMPUTERIZED MANUFACTURING SYSTEMS
Kathryn E. Stecke, J. J. Solberg, and Moshe M. Barash Feb. 1981 323 p refs
(Grant NSF APR-74-15256)
(PB82-110644; NSF/MEA-81010; Rept-20) Avail: NTIS HC A14/MF A01 CSCL 13H

Grouping and loading problems associated with flexible manufacturing systems (FMS) are addressed. The solution to the grouping problem is to organize the machines so that each machine in a particular group is able to perform the same operations. The loading problem is to allocate the operations and associated tools of a set of selected part types among the machine groups, subject to the technological and capacity constraints of FMS. A closed network of queues (CNC) model is used. The expected production rate is defined as a function of the number of parts in the system, the number and sizes of machine groups, and the workload assigned to each group. Alternative loading objectives are defined in addition to the balancing and unbalancing objective examined. Nonlinear mixed integer for mutations of the loading problem are developed GRA

N82-19398# Bureau of Reclamation, Boulder City, Nev.
WATER ASSESSMENT FOR THE LOWER COLORADO RIVER REGION-EMERGING ENERGY TECHNOLOGY DEVELOPMENT
Aug. 1981 170 p Sponsored in part by Water Resources Council
(PB82-110107) Avail: NTIS HC A08/MF A01 CSCL 13B

Water supply availability for two hypothetical levels of emerging energy technology development are assessed. The water and related land resources implications of such hypothetical developments are evaluated. Water requirement, the effects on water quality, costs of water supplies, costs of disposal of wastewaters, and the environmental, economic and social impacts are determined, providing information for the development of non-nuclear energy research. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-19399 British Broadcasting Corp., Kingswood (England). Engineering Div.
IMPROVEMENTS TO SPEECH QUALITY FROM A DIVING HELMET
D. J. Meares Dec. 1981 9 p refs
(BBC-RD-1981/9) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

The normal quality of speech received from a microphone in a diving helmet is far from acceptable for broadcasting. It is both severely distorted in terms of spectral content and, where air is supplied to the diver via a 'demand valve', the noise level from the demand valve is extremely high. These problems are examined and ways in which they can be overcome without losing the verisimilitude of the event are suggested. Author

N82-19400 British Broadcasting Corp., Kingswood (England). Engineering Div.
DIGITAL AUDIO. RECURSIVE DIGITAL FILTERING FOR HIGH QUALITY AUDIO SIGNALS
G. W. McNally and C. Eng Dec. 1981 32 p refs
(BBC-RD-1981/10) Avail: BBC, Kingswood Warren, Tadworth,

Surrey, England

A high speed, low cost digital signal processor was designed and built suitable for real-time operations on high quality sound signals. The purpose of the work described here is to examine its application to audio filters of a kind currently found in equipment such as mixing desks. The methods by which digital audio filters may be designed are reviewed and a detailed study is presented of the many ways in which the design may be realized and implemented. The Report describes two structures in detail which were identified as providing high performance with ease of implementation. The effects of coefficient quantization and round-off noise are quantified by computer simulation of the hardware structure; and by these means, a specification for the required world-length is determined. An example is given of a four filter cascade for audio equalization with a suitable implementation in programmable hardware. The filters are controlled by flexible commands issued on an internationally standarized communications bus. Author

N82-19401 Aeronautical Research Labs., Melbourne (Australia).

GROUND STATION DIGITAL INTERFACE

K. F. Fraser and U. R. Krieser Sep. 1980 66 p refs
(ARL/MECH-ENG-Rept-158) Copyright. Avail: Issuing Activity

Digital computer interface equipment was developed to enable the recovery of digital data encoded in special format and recorded, both in flight and in laboratory experiments, using an analog magnetic tape transport. The recorded data were first reproduced, in a continuous manner, at a ground station processing center, using an analogue magnetic tape reproducing machine and was then taken to the input of the interface equipment. Serial to parallel conversion of the data into 16-bit words suitable for direct entry into a computer, under interrupt control, was performed by the interface equipment. Time-of-day information which is normaly multiplexed with other digital data and recorded on the magnetic tape, effectively constitutes an identifier which may be used for specifying the location of any areas of interest on the tape. To enable the analog reproducing machine to be stopped at any predetermined location, a present stop signal generator was incorporated in the interface equipment. Complete details, together with a functional description, of each circuit within the digital interface equipment are included. Author

N82-19402 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).

COMPARATIVE STUDIES OF CORRELATION TECHNIQUES IN THE SIDELOBE CANCELLER IN THE PRESENCE OF PULSE-TYPE JAMMING SIGNALS

E. Egner and D. Baumgarten Apr. 1981 35 p refs In GERMAN; ENGLISH summary
(Contracts BMVg-RuS-1/80; BMVg-T/RF-31/71435/71340)
(Rept-3/81; Lfd-187) Copyright. Avail: Issuing Activity

A digitally implemented sidelobe canceller is proposed in replacement of the sidelobe blanker usually used for suppressing pulse type jamming signals which may otherwise reduce the sidelobe cancellation performance of radar array processing against interference significantly. The signal processing methods in the control loop correlator are reviewed and a concept for a digitally implemented canceller is derived. Its filter weight vector is computed by a linear inhomogeneous differential equation with periodic coefficients, the solution of which is found by reduction to a linear difference equation with constant coefficients. The theory is supported by results of an analog computer simulation and by a bench test of a digital adaptive spatial filter. The latter results indicate that integration correlation is superior to low pass correlation in suppressing jamming signals. Author (ESA)

N82-19403 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).

MEASUREMENTS OF AZIMUTH AND DISTANCE USING ARBITRARY CONFIGURATIONS OF SENSORS WITH UNKNOWN COORDINATES IN TWO DIMENSIONS

W. Brandenburg Jul. 1981 33 p refs In GERMAN; ENGLISH summary
(Contracts BMVg-SuK-2.4/80; BMVg-GF-5/81)
(Rept-7/81; Lfd-191) Copyright. Avail: Issuing Activity

In two dimensional space, a unique solution can be found for the determination of the azimuth and distance of unknown sources by means of the measurement of time delays from an arbitrary configuration of sensors whose exact coordinates are unknown. A typical example is the deployment of sonobuoys. Significant simplification is obtained when the sensor-source distance is infinite. For the case of finite distance, an iterative procedure is required, using as initial conditions the distances of the different sensors with respect to a reference sensor, but not their relative directions or relative distances. The accuracy is better the closer the sources are with respect to the reference sensor. Iterative methods are also presented for identifying the deformation of an antenna, using narrowband processes. Author (ESA)

N82-19404 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).

DETERMINATION OF THE VELOCITY AND THE DISTANCE OF A MOVING CW SOURCE BY EXPLOITING THE DOPPLER EFFECT ON THE REVERBERATION SIGNAL

J. Ziegenbein Jun. 1981 30 p refs In GERMAN; ENGLISH summary
(Contracts BMVg-GF-80; BMVg-SuK-2)
(Rept-6/81; Lfd-190) Copyright. Avail: Issuing Activity

A ship intercept analysis method is proposed. The Doppler frequency spread of the reverberation signals received in a bistatic sonar configuration are analyzed in order to determine the ship velocity vector and distance. The principle of the method is explained and the accuracy is estimated. A priori knowledge of the source frequency is not required. A stationary and a moving receiver are considered. In the latter case, the velocity vector of the receiver should be known accurately. Sea experiments are not available. Author (ESA)

N82-19405 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).

COMPARISON OF SUBJECTIVE AND AUTOMATIC PROCEDURES FOR ESTIMATING APPARENT TARGET LENGTH FROM ECHO DURATION

F. Dommermuth Sep. 1981 12 p refs In GERMAN; ENGLISH summary Supplement to FHP-6-79
(Contract BMVg-T/RF-37/71501/71300)
(Rept-8/81; Lfd-192; FHP-6-79) Copyright. Avail: Issuing Activity

The capabilities of human operators and of automatic procedures in estimating the length of targets detected by such localization systems as sonar or radar are compared. The measurement of the apparent, i.e., radially projected, length is achieved by using signals with sufficient bandwidth to resolve the reflecting target into several resolution cells. One hundred echo examples were presented to nine test operators and likewise processed automatically by means of a maximum likelihood procedure. Statistical testing shows that the performance of the individual human operators is worse than that of the automatic procedure. The average performance of the operators on the contrary compares well with more objective procedure. Author (ESA)

N82-19406*# Rice Univ., Houston, Tex.

PHASE PERTURBATION MEASUREMENTS THROUGH A HEATED IONOSPHERE Final Report

A. Frey and W. E. Gordon Feb. 1982 38 p refs
(Contract NAS9-16428)
(NASA-CR-167550) Avail: NTIS HC A03/MF A01 CSCL 20N

High frequency radiowaves incident on an overdense (i.e., HF-frequency < penetration frequency) ionosphere produce electron density irregularities. The effect of such ionospheric irregularities on the phase of UHF-radiowaves was determined. For that purpose the phase of radiowaves originating from celestial radio sources was observed with two antennas. The radiosources were chosen such that the line of sight to at least one of the antennas (usually both) passed through the modified volume of the ionosphere. Observations at 430 MHz and at 2380 MHz indicate that natural irregularities have a much stronger effect on the UHF phase fluctuations than the HF-induced irregularities for presently achieved HF-power densities of 20-80 uW/sq m. It is not clear whether some of the effects observed are the result of HF-modification of the ionosphere. Upper limits on the phase perturbations produced by HF-modification are 10 deg at 2380 MHz and 80 deg at 430 MHz. A.R.H.

N82-19407*# Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.
SAR CALIBRATION TECHNOLOGY REVIEW Final Report
J. L. Walker and R. W. Larson Aug. 1981 161 p refs
(Contract NAS9-16135)
(NASA-CR-167534; Rept-150400-7-F) Avail: NTIS HC A08/MF A01 CSCL 17I

Synthetic Aperture Radar (SAR) calibration technology including a general description of the primary calibration techniques and some of the factors which affect the performance of calibrated SAR systems are reviewed. The use of reference reflectors for measurement of the total system transfer function along with an on-board calibration signal generator for monitoring the temporal variations of the receiver to processor output is a practical approach for SAR calibration. However, preliminary error analysis and previous experimental measurements indicate that reflectivity measurement accuracies of better than 3 dB will be difficult to achieve. This is not adequate for many applications and, therefore, improved end-to-end SAR calibration techniques are required. R.J.F.

N82-19408*# Texas Univ. at Arlington. Applied Research Labs.
MATHEMATICAL MODELING AND SAR SIMULATION MULTIFUNCTION SAR TECHNOLOGY EFFORTS Final Report, 1 Aug. 1980 - 31 Jul. 1981
Carroll R. Griffin and James M. Estes 10 Sep. 1981 60 p refs
(Contract NAS9-16171)
(NASA-CR-167535; ARL-TR-81-41) Avail: NTIS HC A04/MF A01 CSCL 17I

The orbital SAR (synthetic aperture radar) simulation data was used in several simulation efforts directed toward advanced SAR development. Efforts toward simulating an operational radar, simulation of antenna polarization effects, and simulation of SAR images at serveral different wavelengths are discussed. Avenues for improvements in the orbital SAR simulation and its application to the development of advanced digital radar data processing schemes are indicated. B.W.

N82-19409*# Texas A&M Univ., College Station. Remote Sensing Center.
DEVELOPMENT OF A SYNTHETIC APERTURE RADAR DESIGN APPROACH FOR WIDE-SWATH IMPLEMENTATION Final Report
B. R. Jean Sep. 1981 35 p refs
(Contract NAS9-16102)
(NASA-CR-167536; RSC-4272) Avail: NTIS HC A03/MF A01 CSCL 17I

The first phase of a study program to develop an advanced synthetic aperture radar design concept is presented. Attributes of particular importance for the system design include wide swath coverage, reduced power requirements, and versatility in the selection of frequency, polarization and incident angle. The multiple beam configuration provides imaging at a nearly constant angle of incidence and offers the potential of realizing a wide range of the attributes desired for an orbital imaging radar for Earth resources applications. L.F.M.

N82-19410*# SRI International Corp., Menlo Park, Calif.
COMPRESSED TELEVISION TRANSMISSION: A MARKET SURVEY
Ruth M. Lizak and Laird Q. Cagan Oct. 1981 58 p refs
(Contract NAS2-10143)
(NASA-CR-168614) Avail: NTIS HC A04/MF A01 CSCL 17B

NASA's compressed television transmission technology is described, and its potential market is considered; a market that encompasses teleconferencing, remote medical diagnosis, patient monitoring, transit station surveillance, as well as traffic management and control. In addition, current and potential television transmission systems and their costs and potential manufacturers are considered. L.F.M.

N82-19411# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF THE AVAILABILITY OF SATELLITE TELECOMMUNICATION LINKS SUBJECT TO ATTENUATION BY RAIN
Janio Kono and Aydano Barreto Carleial Oct. 1981 45 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Ann. Meeting of SBPC, Salvador, 8-15 Jul. 1981
(INPE-2239-PRE/025) Avail: NTIS HC A03/MF A01

A model for satellite telecommunication links subject to attenuation by rain is presented. Parameterized equations describe the joint probability density of the attenuations in the Earth-to-space and space-to-Earth paths. The correlation coefficient between the two marginal densities is a free parameter. Link availability is calculated by numerical integration of the joint density over the region of the plane that corresponds to satisfactory communications. The method is applied to the case of a network of low-capacity Earth stations that communicate through a satellite using frequency-division multiple access with a single channel per carrier (SCPC); and to a link where the entire bandwidth of the satellite transponder is occupied by a single carrier. The results show that the value of the correlation coefficient may be important in link design. M.D.K.

N82-19412# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
QPSK DEMODULATOR
Jose Antonio Rodrigues and Aydano Barreto Carleial Jul. 1981 28 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Ann. Meeting of SBPC, Salvador, 8-15 Jul. 1981
(INPE-2164-RPE/382) Avail: NTIS HC A03/MF A01

A description of the quaternary phase shift keying modulated signal and of its spectral characteristics is presented. A closed loop demodulator structure is presented, obtained from some practical approximations from the ideal structure. The problem of phase ambiguities is discussed and a technique to solve it is described. R.J.F.

N82-19413# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNA (SELECTED ARTICLES)
2 Nov. 1981 30 p refs Transl. into ENGLISH from Antenny (USSR), no. 8, 1970 p 28-46
(AD-A108204; FTD-ID(RS)T-0993-81) Avail: NTIS HC A03/MF A01 CSCL 20/14

Direct and reverse interconnection in an infinte emitter array are considered. For individual titles, see N82-19414 through N82-19415.

N82-19414# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COMPENSATION FOR DIRECT AND REVERSE INTERCONNECTION IN AN INFINITE EMITTER ARRAY
L. V. Ryzhkova *In its* Antenna (Selected Articles), No. 8, 1970 (FTD-ID(RS)T-0993-81) 2 Nov. 1981 p 1-15 refs Transl. into ENGLISH from Antenny (USSR), no. 8, 1970 (For primary document see N82-19413 10-32)
Avail: NTIS HC A03/MF A01 CSCL 20/14

An infinite emitter array is presented in the form of a multiterminal network whose input connectors coincide with the inputs of actual emitters and whose output connectors coincide with the outputs of individual emitters. This permits expressing all elements of the emitter array scatter matrix by the coupling coefficient between the input connectors. The possibility of compensation for the leakage of energy from one of the channels to the inputs of other channels and the reradiation, by the apertures, of the energy which has landed on them from other apertures is studied. Author

N82-19415# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SIMULTANEOUS COMPENSATION OF DIRECT AND REVERSE INTERCONNECTION IN AN INFINITE EMITTER ARRAY
L. V. Ryzhkova *In its* Antenna (Selected Articles), no. 18, 1970 (FTD-ID(RS)T-0993-81 2 Nov. 1981 p 16-25 refs Transl. into ENGLISH from Antenny (USSR), no. 8, 1970 (For primary document see N82-19413 10-32)

Avail: NTIS HC A03/MF A01 CSCL 20/14

A method is proposed for the calculation of a scheme to compensate for the interconnection of emitters of a plane array in the form of a system of openings which connect the feeding waveguide of all emitters of the array with each other. The simultaneous compensation for the leakage of energy from one of the channels to the inputs of other channels (reverse interconnection) and the reradiation by apertures of the energy which landed on them from other apertures (direct interconnection), it is shown, is possible in a two dimensional array. Author

N82-19416# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNA (SELECTED ARTICLES)
6 Nov. 1981 32 p refs Transl. into ENGLISH from Antenny (USSR), no. 10, 1971 p 3-26
(AD-A108175; FTD-ID(RS)T-1134-81) Avail: NTIS HC A03/MF A01 CSCL 20/14

Coordination of linear phased array of waveguide radiators with wide-angle scanning in the E plane is discussed. The radiation characteristics of highly directional arc antennas are calculated. For individual titles, see N82-19417 through N82-19418.

N82-19417# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COORDINATION OF A LINEAR PHASE ARRAY OF WAVEGUIDE RADIATORS WITH WIDE-ANGLE SCANNING IN THE E PLANE
O. G. Vendik and L. V. Rizhkova *In its* Antenna (Selected Articles), no. 10, 1971 (FTD-ID(RS)T-1134-81) 6 Nov. 1981 p 1-10 refs Transl. into ENGLISH from Antenny (USSR), no. 10, 1971 (For primary document see N82-19416 10-32)
Avail: NTIS HC A03/MF A01 CSCL 20/14

A linear antenna array of waveguide radiators which permits the compensation of the variation in the reflection coefficient at the input of the system in the scanning sector is examined. The parameters of the system were determined. The calculation carried out for the dependence of the reflection coefficient at the input on the scanning angle shows that the compensation improves the coordination significantly in a wide scan sector. Author

N82-19418# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CALCULATION OF THE RADIATION CHARACTERISTICS OF HIGHLY DIRECTIONAL ARC ANTENNAS
A. A. Kuzmin *In its* Antenna (Selected Articles), no. 10, 1971 (FTD-ID(RS)T-1134-81) 6 Nov. 1981 p 11-27 refs Transl. into ENGLISH from Antenny (USSR), no. 10, 1971 (For primary document see N82-19416 10-32)
Avail: NTIS HC A03/MF A01 CSCL 20/14

The radiation patterns of a high-directional arc-antenna array are examined. Simple relations were obtained for calculating the width of the main beam, position, and size of the aperture side lobes with isotropic radiators, which are excited uniformly. Author

N82-19419# Radio Technical Commission for Aeronautics, Washington, D. C.
FM BROADCAST INTERFERENCE RELATED TO AIRBORNE ILS, VOR AND VHF COMMUNICATIONS
18 Nov. 1981 96 p refs
(RTCA/DO-176; RTCA/SC-141) Avail: NTIS HC A05/MF A01

Recommendations for controlling the problem of FM broadcast interference with airborne communications are given. For individual titles, see N82-19420 through N82-19423.

N82-19420# Radio Technical Commission for Aeronautics, Washington, D. C.
INVESTIGATION OF TECHNICAL REQUIREMENTS
In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 7-8 (For primary document see N82-19419 10-32)
Avail: NTIS HC A05/MF A01

Tolerances and standards applicable to FM broadcast stations are given, and minimum performance standards for airborne receiving equipment are identified. Performance standards for ILS localizer receiving equipment, for VOR receiving equipment operating at 108-118 MHz, and for radio communication receiving equipment operating at 117.975-136.000 MHz are considered. J.D.H.

N82-19421# Radio Technical Commission for Aeronautics, Washington, D. C.
INVESTIGATION OF AIRBORNE VHF COMMUNICATION AND NAVIGATION EQUIPMENT
In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 9-22 ref (For primary document see N82-19419 10-32)
Avail: NTIS HC A05/MF A01

The Federal Aviation Administration test program investigating the problem of FM broadcast interference is described. The communication signal level to be protected, receiver minimum performance standards, antenna characteristics, and receiver interference tests are described for airborne VHF communications and for ILS and VOR navigation equipment. J.D.H.

N82-19422# Radio Technical Commission for Aeronautics, Washington, D. C.
INVESTIGATION OF THE EFFECTS OF AIRBORNE INSTALLATION FACTORS ON RECEIVER INTERFERENCE
In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 23-52 (For primary document see N82-19419 10-32)
Avail: NTIS HC A05/MF A01

Significant variables which may have an impact on protection criteria are discussed. A rationale for developing voltage limits at a VHF receiver input is presented. A system model consisting of an antenna, transmission line and receiver is developed to define system equations. Distance criteria using model and 100 kW ERP FM broadcast propagation data is developed for various transmission line lengths. J.D.H.

N82-19423# Radio Technical Commission for Aeronautics, Washington, D. C.
FAA/FCC COORDINATION PROCEDURES FOR FM BROADCAST STATIONS
In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 53-60 (For primary document see N82-19419 10-32)
Avail: NTIS HC A05/MF A01

Procedures for coordination between the Federal Aviation Administration and the Federal Communications Commission are given and their effectiveness evaluated. Recommendations for strengthening the present informal coordination procedures are presented. J.D.H.

N82-19424# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DESIGN FOR THE INSTALLATION OF A SYSTEM OF ANTENNAS FOR STRATOSPHERIC BALLOON MOBILE TRACKING STATIONS [PROJECTO DE INSTALACAO DE UM SISTEMA DE ANTENAS PARA ESTACAO MOVEL DE RASTREAMENTO DE BALAO ESTRATOSFERICO]
Satoshi Koshima Jan. 1982 59 p refs In PORTUGUESE; ENGLISH summary
(INPE-2308-PRE/073) Avail: NTIS HC A04/MF A01

The design and development of a VHF-UHF antenna system for telemetry and telecommand for INPE mobile tracking stations is discussed. A bihelical antenna working simultaneously as a 460 MHz transmitting antenna and a 240 MHz receiving antenna and a 126.8 MHz optimized four element Yagi antenna are described. Operating characteristics of a protoype 240 MHz helical filter are described. Author

N82-19425# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF THE AVAILABILITY OF SATELLITE TELECOMMUNICATION NETWORKS SUBJECT TO RAIN ATTENUATION M.S. Thesis [ESTUDO DA DISPONIBILIDADE DE ENLACES DE TELECOMUNICACOE POR SATELITES SUJEITOS A ATENUACAO POR CHUVAS]
Janio Kono Jan. 1982 73 p refs In PORTUGUESE; ENGLISH summary
(INPE-2300-TDL/071) Avail: NTIS HC A04/MF A01

A model for satellite telecommunication links subject to attenuation by rain is presented. The model has parameterized equations describing the joint probability density of the attenuations in the Earth-to-space and space-to-Earth paths. The correlation coefficient between the two marginal densities is a free parameter. Link availability is calculated by numerical integration of the joint density over the region of the plane that corresponds to satisfactory communications. The method is applied to the case of a network of low capacity Earth stations that communicate through a satellite using frequency division multiple access with a single channel per carrier (SCPC), and to the case of a link where the entire bandwidth of the satellite transponder is occupied by a single carrier. The results show that the value of the correlation coefficient may be important in link design. For an SCPC system of 14/12 GHz a difference of approximately 2 dB was found between minimum values of available carrier-to-noise ratios for 99.8% of the time when the correlation coefficient was varied between 0 and 1. J.D.H.

N82-19426# Communications Research Centre, Ottawa (Ontario). Space Technology and Applications Branch.
ANIK-B PROGRAM DELIVERY PILOT PROJECT. A 12 MONTH PERFORMANCE ASSESSMENT
I. Bischof, J. W. B. Day, R. W. Huck, W. T. Kerr, and N. G. Davies Dec. 1981 124 p refs
(CRC-1349) Avail: NTIS HC A06/MF A01

An assessment of the Program Delivery Pilot Project (PDPP), one of the most significant projects of the ANIK-B Communications Program of the Department of Communications (DOC) is provided. This project is a field trial involving the reception of television signals at 12 GHz from the 20 watt RF channels of the ANIK-B using low cost TV receive-only earth terminals with antenna diameters of 1.2 and 1.8m. The PDPP has been in operation since late September 1979 with approximately 80 receive-only terminals located in the two geographically distinct regions of northwestern Ontario and British Columbia, the Yukon and Northwest Territories. The objectives of the project are to demonstrate, evaluate and gain field experience with direct-to-home and small community satellite broadcasting, to provide a testing ground and small initial market for terminals, to contribute to policy development and plans for future operational use of broadcasting satellites and to provide information to the various interested agencies. Author

N82-19427# Communications Research Centre, Ottawa (Ontario). Information Technology and Systems Branch.
A METHOD OF MEASURING AND RECORDING. THE IMPULSE RESPONSE OF THE IONOSPHERIC CHANNEL
S. M. Chow Jan. 1982 13 p refs
(CRC-1352) Avail: NTIS HC A02/MF A01

A simple method by which the propagation modes of an ionospheric communication channels can be measured and recorded is described. Experimental results are included as illustration of the technique. Author

N82-19428*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FRESNEL-REGION FIELDS AND ANTENNA NOISE-TEMPERATURE CALCULATIONS FOR ADVANCED MICROWAVE SOUNDING UNITS
R. F. Schmidt Jan. 1982 42 p refs
(NASA-TM-83813) Avail: NTIS HC A03/MF A01 CSCL 20N

A transition from the antenna noise temperature formulation for extended noise sources in the far-field or Fraunhofer-region of an antenna to one of the intermediate near field or Fresnel-region is discussed. The effort is directed toward microwave antenna simulations and high-speed digital computer analysis of radiometric sounding units used to obtain water vapor and temperature profiles of the atmosphere. Fresnel-region fields are compared at various distances from the aperture. The antenna noise temperature contribution of an annular noise source is computed in the Fresnel-region (D squared/16 lambda) for a 13.2 cm diameter offset-paraboloid aperture at 60 GHz. The time-average Poynting vector is used to effect the computation. B.W.

N82-19429# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MULTI-DIMENSIONAL SIGNAL-PROCESSING RESEARCH PROGRAM **Semiannual Technical Summary, 1 Oct. 1980 - 31 Mar. 1981**
Dan E. Dudgeon 31 Mar. 1981 53 p refs
(Contract F19628-80-C-0002; AF Proj. 4594)
(AD-A108641; ESD-TR-81-94) Avail: NTIS HC A04/MF A01 CSCL 09/2

In the area of image segmentation and classification, a hierarchical segmentation scheme was developed for processing images with several region classes. Adaptive contrast enhancement was used as a preprocessor for image segmentation based on texture rather than gray level. These techniques were also applied to aerial images degraded by light cloud cover and haze. The primary effects of this type of degradation are a reduction in contrast and an increase in the local average intensity of the image. Two aspects of the iterative implementation of multi-dimensional digital filters are also discussed. This first concerns spatial truncation effects which occur during the iteration because the image frame buffer has a finite storage capability. The errors caused by this truncation are closely related to the solution of a boundary value problem with boundary conditions specified on the frame edges. These errors can be eliminated by including the boundary conditions in the spatially truncated iteration. Potential multiprocessor architectures are discussed. GRA

N82-19430# Ohio State Univ., Columbus. Electroscience Lab.
SOPHISTICATED JAMMERS AND ADAPTIVE ARRAYS **Quarterly Report**
R. T. Compton, Jr. Sep. 1981 8 p ref
(Contract N00019-81-C-0093)
(AD-A109300; ESL-713603-3) Avail: NTIS HC A02/MF A01 CSCL 17/4

This report describes progress under Naval Air Systems Command Contract N00019-81-C-0093 for the second quarterly period. This contract involves studies on the effectiveness of two types of jamming against adaptive arrays: envelope modulated jammers and cross-polarized jammers. Our progress during the second quarter in these areas is described. GRA

N82-19431# Syracuse Univ., N. Y. Dept. of Electrical and Computer Engineering.
THE RESPONSE OF A TWO-WIRE TRANSMISSION LINE TO INCIDENT FIELD AND VOLTAGE EXCITATION, INCLUDING THE EFFECTS OF HIGHER ORDER MODES **Phase Report, 1 Oct. 1979 - 30 Sep. 1980**
Yehuda Leviatan and Arlon T. Adams Griffiss AFB, N.Y. RADC Aug. 1981 88 p refs
(Contract F30602-79-C-0011; AF Proj. 2338)
(AD-A108780; RADC-TR-81-214) Avail: NTIS HC A05/MF A01 CSCL 09/5

The main objective of this report has been to derive the induced current on a two-wire transmission line due to incident field excitation. Special attention has been paid to the case of voltage source excitation, where the current may be given, at least approximately, using the so-called leaky-wave concept. The influence of the electrical dimensions of the structure on the currents and the relative importance of the higher modes is examined by numerical examples. Author (GRA)

N82-19432# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
SATNET DEVELOPMENT AND OPERATION. PLURIBUS SATELLITE IMP DEVELOPMENT. REMOTE SITE MAINTENANCE. INTERNET OPERATIONS AND MAINTENANCE. MOBILE ACCESS TERMINAL NETWORK. TCP FOR THE HP3000. TCP-TAC. TCP FOR VAX-UNIX. COMBINED QUARTERLY TECHNICAL REPORT **Report, 1 Aug. - 31 Oct. 1981**
R. D. Bressler Nov. 1981 83 p
(Contracts MDA903-80-C-0353; MDA903-80-C-0214; N00039-78-C-0405; N00039-80-C-0664; N00039-81-C-0408; DAHC15-69-C-01759; F08606-73-C-0027; F08606-75-C-0032; MDA903-76-C-0214; MDA903-76-C-0252; et al)
(AD-A108783; BBN-4825; QTR-23) Avail: NTIS HC A05/MF A01 CSCL 17/2

This quarterly technical report describes work on the development of and experimentation with packet broadcast by satellite; on development of Pluribus Satellite IMPs; on a study of the technology of Remote Site Maintenance; on Internetwork monitoring; on shipboard satellite communications; and on the development of Transmission Control Protocols for the HP3000, TAC, and VAX-UNIX. Author (GRA)

N82-19433# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Chemical Systems Lab.

AN ASCII FORTRAN SUBROUTINE FOR COMPUTING THE ELECTROMAGNETIC RADIATION SCATTERED BY A SPHERE Technical Report, period ending May 1980

Merrill E. Milham Nov. 1981 43 p refs
(DA Proj. 1L1-62662-A-554)
(AD-A108772; ARCSL-TR-81088) Avail: NTIS HC A03/MF A01 CSCL 20/6

This report describes the ASCMIE subroutine for performing Mie scattering calculations by means of the downward recursion algorithm developed by J. V. Dave. ASCMIE is written in UNIVAC 1100 series ASCII FORTRAN language. The ASCII FORTRAN compiler is a modern, state-of-the-art compiler which implements the ANSI FORTRAN 77 standard; this compiler is intended as a future replacement for the UNIVAC 1100 series FORTRAN V compiler. Rather than carry out a straightforward conversion of the FORTRAN V Mie scattering routine to ASCII FORTRAN, the code was completely rewritten in order to incorporate new ASCII FORTRAN language elements. The result is a more structured, modular, Mie scattering code which executes faster than the FORTRAN V code. Author (GRA)

N82-19434# Naval Research Lab., Washington, D.C. Information Technology Div.

VLFACM PROGRAM DESCRIPTION AND OPERATIONAL MANUAL Final Report

J. P. Hauser, F. J. Rhoads, and Francis J. Kelly 24 Nov. 1981 59 p refs
(AD-A109003; NRL-8530) Avail: NTIS HC A04/MF A01 CSCL 17/2

VLFACM is a FORTRAN computer program which can compute signal or noise-field strengths and signal-to-noise, signal-to-jam, or signal-to-jam-plus-noise ratios in the 14- to 3-kHz frequency range. Additional postprocessing programs exist which can plot VLFACM results in the form of rectangular or polar contour maps, field strength versus distance plots, or diurnal plots. Author (GRA)

N82-19435# Washington Univ., Seattle. Polar Science Center.

SEA ICE MOVEMENTS FROM SYNTHETIC APERTURE RADAR Final Report, 1 Apr. 1979 - 30 Jun. 1981

David A. Rothrock and Alan S. Thorndike 1 Dec. 1981 84 p refs
(Contract N00014-79-C-0418; NR Proj. 307-428)
(AD-A109002) Avail: NTIS HC A05/MF A01 CSCL 08/12

The spatial structure of the sea ice velocity field determines ridging, open water production and ice stress. The velocity has been measured roughly every 2 km along an 865 km track from SEASAT synthetic aperture radar. The movement shows individual pieces as large as 100 km. The spatial autocorrelation function of velocity has been estimated from these data and FGGE and AIDJEX buoy data, and has a length scale of roughly 1000 km. A model of the movement of a set of pieces shows the large uncertainty in opening and ridging estimated from velocities measured at only three points. Author (GRA)

N82-19436# Worcester Polytechnic Inst., Mass. Dept. of Electrical Engineering.

COMPUTER MODELS FOR CONDUCTING SURFACES Final Technical Report, Sep. 1979 - Sep. 1980

Jitendra Singh Griffiss AFB, N.Y. RADC Aug. 1981 170 p refs
(Contract F30602-79-C-0091; AF Proj. 2338)
(AD-A108763; RADC-TR-81-222) Avail: NTIS HC A08/MF A01 CSCL 09/5

Under this effort work has been done to derive and use closed form expressions for generalized impedance parameters involving rectangular, conducting patches in free space. A Galerkin model for the interaction between two wires, a wire and a patch and two patches has been developed. Basis functions sinusoidal in the direction of the current and triangular in the transverse direction have been used. Farrar's Integration technique has been used so as to give most of the results of the model in closed form. Author (GRA)

N82-19437# Harvard Univ., Cambridge, Mass. Computation Lab.

UNBOUNDED SPEED VARIABILITY IN DISTRIBUTED COMMUNICATIONS SYSTEMS

John H. Reif and Paul G. Spirakis 1981 19 p refs
(Contract N00014-80-C-0647; Grant NSF MCS-79-21024)
(AD-A108824; TR-14-81) Avail: NTIS HC A02/MF A01 CSCL 09/2

The problem of synchronizing communication between distributed processes whose speeds (steps per real time unit) vary dynamically is discussed. The implementation of a distributed local scheduler to find matching pairs is reported. The only means of synchronization are boolean 'flag' variables, each of which can be written by only one process and read by at most one other process. No global bounds in the speeds of processes are assumed. Processes with speed zero are considered dead. However, when their speed is nonzero then they execute their programs correctly. Dead processes do not harm the algorithms' performance with respect to pairs of other running processes. When the rate of change of the ratio of speeds of neighbour processes is bounded, then any two of these processes will establish communication within a constant number of steps of the slowest process with high likelihood. The implementation presented has the property of achieving relative real time response. The techniques can be used to solve other problems such as resource allocation and implementation of parallel languages such as CSP and Ada. Note that we do not have any probability assumptions about the system behavior, although our algorithms use the technique of probabilistic choice. GRA

N82-19438# Research Inst. of National Defence, Linkoeping (Sweden). Radiolab.

VARIATIONS IN PROPAGATION ATTENUATION AT THE FREQUENCIES 11, 18 AND 36 GHz [VARIATIONER I UTBREDNINGSDAEMPNING VID FREKVENSERNA 11, 18 OCH 36 GHz]

Bernt Danielsson and Lennart Nilsson May 1981 20 p refs In SWEDISH
(FOA-A-30028-E2; RI-1015/81) Avail: NTIS HC A02/MF A01

In order to assess the effect of variations in propagation attenuation on the performance of transmitters operating at frequencies > 10 GHz, field strengths were measured over a 15 km path with free visibility. At 18 and 36 GHz, the depolarization effects of the atmosphere were recorded. Data was processed with a PDP 11/10 computer at a sampling frequency of 5 Hz. Results show that atmospheric anomalies cause multipath propagation, resulting in strong variation of the attenuation with quick and deep fading, whereas signal variations due to precipitation develop more slowly. The influence grows when the frequency increases. Depolarization occurs in relation to important propagation disturbances. Author (ESA)

N82-19439# Eurospace, Paris (France).

TELEVISION SERVICES IN EUROPE IN THE AGE OF DIRECT SATELLITE TELEVISION [LES SERVICES NOUVEAUX DE TELEVISION ENVISAGEABLES EN EUROPE A L'AGE DU SATELLITE DE TELEVISION DIRECTE]

Bernard Gonner Paris ESA Jan. 1981 224 p refs In FRENCH
(Contract ESA-4139/79/F-FC(SC))
(ESA-CR(P)-1503) Avail: NTIS HC A10/MF A01

Consumer and industrial reaction to direct satellite television is discussed. Legal aspects raised at the Geneva conferences are summarized. Existing techniques are reviewed and the expansion of services is outlined. A country by country breakdown of the economic, social, cultural, and legal impact of satellite television is provided. The television and peritelevision market in Western Europe to the year 2000 is forecast, and the effect on this satellite television is evaluated. The outlook is good, with increased program variety, cheap teletext and increased quality leading to more receivers being bought and more satellites sold to countries outside Europe. Frequencies used for ground based television transmission can be used for other purposes, e.g. citizens' band radio. Author (ESA)

N82-19440# Ferranti Ltd., Bracknell (England).

ANALOGUE SAR SIGNAL PROCESSING: DEVICE EVALUATION AND RADIATION TESTS

K. M. Harvey, M. A. B. Hugues, C. Lambert, D. W. Sergeant, and D. W. Cruse Paris ESA Nov. 1980 147 p refs
(Contract ESA-3400/77/NL-HP(SC))
(Rept-3972-Issue-1; ESA-CR(P)-1512) Avail: NTIS HC A06/MF A01

For onboard satellite SAR signal processing, charge coupled video integrators for prefiltering/subaperture filtering, and a bucket brigade binary-analog correlator, were tested. Breadboard performance at room temperature and after X-irradiation is reported. Dark current is excessive in the video integrators and the transfer inefficiency is large. One device is insensitive to radiation up to 4.5 KRads, the other is sensitive to doses < 500 Rads, although both came from the same wafer. The correlator meets data processing and power supply immunity requirements, but does not meet low power and temperature stability requirements. No significant radiation damage is observed below 2 KRads. Author (ESA)

N82-19441# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

RECOGNITION OF, AND DAMAGES CAUSED TO A RADAR ANTENNA BY A CARBON DIOXIDE LASER [UPPTAECKT AV OCH SKADOR PAA RADARANTENN MED CO2-LASER]

Kai Gullberg and Dietmar Letalick Nov. 1981 23 p refs In SWEDISH
(FOA-C-30244-E1) Avail: NTIS HC A02/MF A01

The detection of radar antennas by reflection of laser radiation is discussed. The differences between antenna and other flat surface reflection is considered. The amount of radiation needed to inflict light or severe damage on an antenna is estimated for a 5.5 GHz spiral antenna. Findings are inconclusive. Author (ESA)

N82-19442# Bosch (Robert) G.m.b.H., Berlin (West Germany). Geschaeftsbereich Elektronik.

SPECTRUM SAVING SPEECH TRANSMISSION FOR LAND MOBILE RADIO. A STUDY ON SINGLE SIDEBAND TRANSMISSION IN 5 kHz CHANNELS FOR 2 AND 4 m BANDWIDTHS Final Report

Heribert Gorzel and Manfred Poetter Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 85 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-173; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,65

The spectrum efficiency of single sideband in the two and four m band was studied. Requirements on transmitter and receiver were investigated. Receiver and oscillator are synchronized by a short burst before any transmission, instead of by a continuous pilot carrier during the entire transmission. It is shown that the performance of current FM units is met at one fifth of the power. The problem of fast automatic gain control for compensating for the influence of multipath fading, especially at higher vehicular speeds, is not yet satisfactorily solved. Author (ESA)

N82-19443# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

SIGNAL ANALYSIS USING THE MAXIMUM ENTROPY METHOD [SIGNAALANALYSE MET DE MAXIMALE ENTROPIEMETHODE]

W. Kuik Mar. 1981 43 p refs In DUTCH
(VTH-LR-316) Avail: NTIS HC A03/MF A01

The analysis of discrete series is explained using the maximum entropy method in order to solve data processing problems in the aeroelastic study of wind turbines. Discrete Fourier spectrum and maximum entropy spectrum are compared. This method searches for an autoregressive model for a series containing a maximum of information about entropy. The autoregressive model is outlined and the notions 'information' and 'entropy' in signal analysis are defined. Energy and phase spectrum construction, starting from an autoregressive model, is described, with examples. The maximum entropy method is valuable where Fourier transformation techniques hardly work or fail. Author (ESA)

N82-19444# European Space Agency, Paris (France).

MODELING OF THE INFLUENCE OF STATIC ACCELERATION ON SURFACE WAVE (QUARTZ) OSCILLATOR Ph.D. Thesis

Patrick Levesque Jan. 1982 149 p refs Transl. into ENGLISH from "Modelisation de l'Influence des Accelerations Statiques sur les Dispositifs a Ondes Elastiques de Surface", Rept. ONERA-NT-1981-3 ONERA, Paris, 1981 Original report in FRENCH previously announced as N82-14470
(ESA-TT-726; ONERA-NT-1981-3) Avail: NTIS HC A07/MF A01

The application of a static acceleration on a quartz oscillator, working in elastic surface wave mode, is modeled. Modification of the wave propagation speed through the substrate and its frequency are studied. Experiment proves that this frequency shift depends on the nature of the substrate through which the wave is propagating, but also on its dimensions and its mode of attachment. Theory confirms and explains these results, and also shows the relationship between the stresses arising in the substrate during the acceleration and the sensitivity to this acceleration of surface wave devices. Author (ESA)

N82-19445# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Physik der Atmosphaere.

PLANNING OF A C-BAND PULSE DOPPLER RADAR WITH POLARIZATION DIVERSITY FOR ATMOSPHERIC RESEARCH IN THE MESOSCALE RANGE

Herbert Schuster Sep. 1981 48 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-750)
(DFVLR-Mitt-81-28; ESA-TT-750) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 11,80

A radar system was defined, suitable for research in cloud physics requiring measured values of meteorological parameters relevant to a complete model of the behavior of the observed object in space and time. This problem can be solved using remote sensing methods, especially radar measuring methods. A semimobile system, comprising computer controlled pulse Doppler radar with polarization diversity and digitized radar signal processing is recommended. The fundamental attributes of the radar system are summarized. Author (ESA)

N82-19446# National Telecommunications and Information Administration, Washington, D.C. Office of Policy Analysis and Development.

DIRECT BROADCAST SATELLITES: POLICIES, PROSPECTS, AND POTENTIAL COMPETITION

Kim E. Degnan, Kenneth R. Dunmore, and Vincent Sardella Mar. 1981 144 p refs
(PB82-110164; NTIA-SP-81-11) Avail: NTIS HC A07/MF A01 CSCL 17B

Potential service options and concentration for a direct broadcast satellite (DBS) television service are examined relative to regulatory issues. The conclusion is drawn that pay television is the most likely service, absent regulation, to be provided due to the large potential cashflow that offsets the high risk of the enterprise. The extent of competition with terrestrial distribution modes is examined with respect to substitutability and geography. Technical, cost, and demand characteristics are discussed in order to evaluate the potential for competing DBS systems. T.M.

N82-19447# National Telecommunications and Information Administration, Washington, D.C.

PROPOSED TECHNIQUES FOR ADDING FM BROADCAST STATIONS IN A MAJOR MARKET, PART 2

E. J. Haakinson Jul. 1981 27 p refs
(PB82-114240; NTIA/REPT-81-77-Pt-2) Avail: NTIS HC A03/MF A01 CSCL 17B

To demonstrate the approach of adding assignments to a saturated major market, it is shown how the number of FM broadcast stations in the Washington, DC, market could be increased from the present 13 commercial and non-commercial stations to 21 assignments. Recommendations are made which, if adopted, could increase significantly the number of FM broadcast stations in almost all markets. GRA

N82-19448# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNA (SELECTED ARTICLES)
4 Nov. 1981 64 p refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 p 31-79
(AD-A108174; FTD-ID(RS)T-0940-81) Avail: NTIS HC A04/MF A01 CSCL 20/14

A statistical analysis of field focused systems and the properties of connected vibrator structures was made. The efficiency and input impedance of analyzing and reducing the directive gain and direction dispersion of the main maximum of the beam pattern of a sectional traveling wave antenna were derived and are discussed. An assessment of aircraft capacitive circuit medium wave antennas' efficiency is also presented. For individual titles, see N82-19449 through N82-19453.

N82-19449# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DECREASING DG AND DIRECTION DISPERSION OF MAIN MAXIMUM OF BEAM PATTERN OF SECTIONAL TRAVELING WAVE ANTENNA
V. I. Zamyatin and L. G. Komiyenko *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0940-81) 4 Nov. 1981 p 1-17 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 (For primary document see N82-19448 10-32)
Avail: NTIS HC A04/MF A01 CSCL 20/14

Formulas to analyze and reduce the directive gain and direction dispersion of the main maximum of the beam pattern of a sectional traveling wave antenna when there are errors of the wave number in the system and phase errors at the sites of contact between the sections are presented. A condition of optimality of sectioning and a condition in which the limiting directive gain was missing were obtained. The effectiveness of the sampling of phase errors was studied. Results of a statistical analysis of the field of traveling wave sectional antennas are discussed. M.D.K.

N82-19450# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
STATISTICS OF THE FIELD OF FOCUSED SYSTEMS
A. S. Yevseyev *In its* Antenna (Selected Articled) (FTD-ID(RS)T-0940-81) 4 Nov. 1981 p 18-29 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 (For primary document see N82-19448 10-32)
Avail: NTIS HC A04/MF A01 CSCL 20/14

The average characteristics of a focal spot were examined in the focusing area when there were random phase errors. Calculated correlations and graphs which make it possible to estimate the decrease in field intensity in the focus and the expansion of the focal spot, depending on the numerical characteristics of the phase errors are presented. Author

N82-19451# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
EFFICIENCY AND INPUT IMPEDANCE OF PLANAR EMITTER PLACED NEAR THE INTERFACE
V. P. Kultsap *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0940-81) 4 Nov. 1981 p 30-44 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 (For primary document see N82-19448 10-32)
Avail: NTIS HC A04/MF A01 CSCL 20/14

Strict general formulas were derived for complex input impedance of a random plane-parallel interface of an emitter with assigned current distribution. A calculation was made of the dependence of the input impedance and efficiency of the inphase planar disk emitter on its radius and the distance from the interface for emitters of any size. Results are presented and discussed. Author

N82-19452# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANALYSIS OF THE PROPERTIES OF CONNECTED VIBRATOR STRUCTURES
N. A. Bay and N. M. Yakusheva *In its* Antenna (Selected Articles) (FTD-ID(RS)-0940-81) 4 Nov. 1981 p 45-52 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 (For primary document see N82-19448 10-32)
Avail: NTIS HC A04/MF A01 CSCL 20/14

The phase veloc ties of the main waves propagating in connected infinite vibrator structures was solved by the method of integrated equations. The obtained correlations make it possible to link the phase velocities of the main waves with the geometric parameters of the system. A numerical analysis of the properties of connected vibrator structures arranged in th H-plane with equal geometric parameters is also discussed. M.D.K.

N82-19453# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ASSESSMENT OF AIRCRAFT CAPACITIVE CIRCUIT MEDIUM WAVE ANTENNAS ACCORDING TO THEIR EFFICIENCY
E. O. Brudnyy and L. Ya. Ilnitskiy *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0940-81) 4 Nov. 1981 p 53-59 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 (For primary document see N82-19448 10-32)
Avail: NTIS HC A04/MF A01 CSCL 20/14

A method for assessing aircraft capacitive circuit medium wave antennas according to their efficiency is presented. The measure of efficiency is the product of the antenna capacitance times the active altitude. An expression was obtained which links the antenna efficiency to its geometric dimensions. The suggested method discussed produces the optimal dimensions for aircraft capacitive circuit antennas direction during their designing. Author

N82-19454# Illinois Univ. at Urbana-Champaign.
WAVE PROPAGATION PROBLEMS IN CERTAIN ELASTIC ANISOTROPIC HALF SPACES Ph.D. Thesis
Constantine George Caracostis 1981 204 p
Avail: Univ. Microfilms Order No. 8129570

The Smirnov-Sobolev method of self-similar potentials is used to solve certain propagation problems in anisotropic media. The solutions are expressed in terms of analytic functions determined from the boundary conditions in a straightforward manner. The first problem concerns the two dimensional case of an orthotropic material under plain-strain conditions subjected to a suddenly applied line force on the surface or in the interior of a half space. The second type treats the three dimensional problem of a point force suddenly applied on the surface of a transversely isotropic half space. This solution is formed by a rotational superposition of the solutions for a plane strain and for an antiplane problem with appropriately defined boundary conditions. The mapping of the wave fields in the complex domain composed of a four-sheeted Riemann surface is examined in detail. Techniques used in the numerical treatment of certain singularities are discussed. Time histories for the displacements and stresses in the two dimensional case and as time histories of only the displacements in the three dimensional case are given. Dissert. Abstr.

N82-19455# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNA (SELECTED ARTICLES)
3 Dec. 1981 110 p refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 p 17-49, 106-162
(AD-A108174; FTD-ID(RS)T-0939-81) Avail: NTIS HC A06/MF A01 CSCL 09/5

Scattering of a spherical wave on truncated revolution bodies is considered. Broad-directional lens antennas made of an inhomogeneous dielectric are discussed. Modeling beam patterns of linear antennas is examined. Compensation for systematic weight deformations of parabolic radio telescope mirror systems is studied. Input impedance of a system made of intersecting low set vibrators is determined. For individual titles, see N82-19456 through N82-19460.

N82-19456# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SCATTERING OF A SPHERICAL WAVE ON TRUNCATED REVOLUTION BODIES
Yu. A. Yerukhimovich *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0939-81) 3 Dec. 1981 p 1-35 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 36 p (For primary document see N82-19455 10-32)

Avail: NTIS HC A06/MF A01 CSCL 09/5

A scattering field is analyzed on trucated revolution bodies formed by curves of the second order when they are irradiated from one focus by a source of a spherical wave. The analysis uses the method of curvilinear coordinates. The solution is obtained in the distant zone, in approximation of physical optics. The system of formulas describes the diagram of the scattering field in all space, including the transitional zones between the regions of the angles of the observation point. N.W.

N82-19457# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

BROAD-DIRECTIONAL LENS ANTENNAS MADE OF AN INHOMOGENEOUS DIELECTRIC

Ye. G. Zelkin and R. A. Petrova *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0939-81) 3 Dec. 1981 p 36-53 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 19 p (For primary document see N82-19455 10-32)

Avail: NTIS HC A06/MF A01 CSCL 09/5

Broad directional lens antennas are examined. Their refractive index is completed with the help of the conformal transform method. Calculation of the refractive and beam trajectory indices is made. N.W.

N82-19458# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

MODELING BEAM PATTERNS OF LINEAR ANTENNAS

K. S. Shcheglov *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0939-81) 3 Dec 1981 p 54-68 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 16 p (For primary document see N82-19455 10-32)

Avail: NTIS HC A06/MF A01 CSCL 09/5

A method is examined for mathematical modeling on a computer of the beam patterns of antennas based on the use of Kotel'nikov's theorem. The values of the patterns for a number of reference directions are used for complete analysis of the properties of the pattern, including directional gain and scattering coefficient. The examined algorithm is applied to computing antennas by the Monte Carlo method which consists of modeling random patterns. N.W.

N82-19459# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

COMPENSATION FOR SYSTEMATIC WEIGHT DEFORMATIONS OF MIRROR SYSTEM OF PARABOLIC RADIO TELESCOPES

B. A. Poperechenko and N. M. Feyzulla *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0939-81) 3 Dec. 1981 p 69-84 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 17 p (For primary document see N82-19455 10-32)

Avail: NTIS HC A06/MF A01 CSCL 09/5

An examination is made of the nature of the phase errors in field distribution in the aperture of a radio telescope which develop under the influence of weight deformations of the main mirror and the support structures of the irradiating system. Based on an analysis of the normed functions of individual components in the errors, a technique for their mutual compensation is suggested. N.W.

N82-19460# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

INPUT IMPEDANCE OF SYSTEM MADE OF INTERSECTING LOW-SET VIBRATORS

V. P. Kultsep *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0939-81) 3 Dec. 1981 p 85-100 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 17 p (For primary document see N82-19455 10-32)

Avail: NTIS HC A06/MF A01 CSCL 09/5

The input impedance of a system, made of symmetrical vibrators with sinusoidal current distribution which intersect at the power point, is determined. The vibrators are suspended at a low altitude above the Earth. A single low set vibrator is examined as a particular case. Results are presented from measurements of the input impedance of the system of intersecting vibrators in the short-wave and medium-wave ranges. N.W.

N82-20115*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE DSN RADIO SCIENCE SYSTEM MARK 3, 1980

B. J. Buckles *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 6-11 (For primary document see N82-20113 10-99)

Avail: NTIS HC A07/MF A01 CSCL 17B

N82-20120*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SIDEBAND-AIDED RECEIVER ARRAYING

S. A. Butman, L. J. Deutsch, R. G. Lipes, and R. L. Miller *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 39-54 refs (For primary document see N82-20113 10-99)

Avail: NTIS HC A07/MF A01 CSCL 17B

N82-20127*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

NOISE TEMPERATURE AND NOISE FIGURE CONCEPTS: DC TO LIGHT

C. T. Stelzried *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 100-111 refs (For primary document see N82-20113 10-99)

Avail: NTIS HC A07/MF A01 CSCL 20N

N82-20129*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SPECIAL ACTIVITY UTILIZATION OF GDSCC ANTENNAS DURING 1981

E. B. Jackson *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 121-126 (For primary document see N82-20113 10-99)

Avail: NTIS HC A07/MF A01 CSCL 20N

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N82-19461 Virginia Polytechnic Inst. and State Univ., Blacksburg.

FINITE-ELEMENT ANALYSIS FOR DESIGN OF CLASSICAL AND ELECTRONICALLY OPERATED MACHINES Ph.D. Thesis

Fakhry Ahmed Fouad 1981 251 p

Avail: Univ. Microfilms Order No. 8126257

A method for analysis of magnetic fields in electrical machines is developed. A modular approach is developed to analyze the effects of machine geometry on machine performance and to solve for the magnetic field for any set of winding excitation currents as well as for any relative stator to rotor angular position. This generalized finite element approach is applied to the calculation of various machine parameters and performance characteristics. These parameters include a rigorous calculation of the saturated values of machine inductances, core losses, flux density waveforms throughout the magnetic circuit, induced EMF's and flux distributions under various load conditions. These parameters are key elements in the dynamic simulation of such machine systems. The advantage of this generalized machine modeling is the ability to predict accurately machine performance characteristics during design stages using the digital computer. Dissert. Abstr.

N82-19462 Virginia Univ., Charlottesville.

DEVELOPMENT AND CHARACTERIZATION OF THE FLIP-CHIP DIODE Ph.D. Thesis

Claude Samuel Setzer 1981 436 p

Avail: Univ. Microfilms Order No. 8117918

The standard structure of the Schottky diode chip incorporated an ohmic contact on the back surface of the chip and an array of anodes on the front surface, one of which must be contacted by a sharply pointed whisker. This contact whisker is troublesome because it inherently has less than the desired mechanical stability and adds considerable uncertainty to choke structure design due to inability to predict its exact shape. The development of a new millimeter-wave Schottky diode structure which eliminates the whisker completely and allows direct bonding of the anode to the RF choke structure. Detailed theoretical analysis of this new structure, the Flip-Chip, is presented and shows that it will be capable of not only adding the mechanical stability and predictability of a directly bonded structure, but will also allow improvement of diode sensitivity through reduction of parasitic elements. Also, complete details of technology necessary for fabrication of the device are presented, along with preliminary experimental performance data which indicate great promise for future uses of the Flip-Chip diode. Dissert. Abstr.

N82-19463 Alabama Univ. in Huntsville.
ANALYSIS AND SYNTHESIS OF BINARY SEQUENCES Ph.D. Thesis
Henry Eugene Stern 1981 176 p
Avail: Univ. Microfilms Order No. 8128325

A method which combines the concept of run length with the technique of piecewise polynomial convolution for rectangular waveforms, is proposed for the analysis of binary sequences of arbitrary length. The synthesis of short binary sequences with desired correlation properties is facilitated. Long binary sequences, or time series, are treated as the outcomes of a generalized Markov chain. Given a transition matrix, correlation of coefficients are calculated and simulation models to generate sample sequences tested. Conversely, given a set of correlation coefficients, a transition matrix, optimum in a least squares sense, is defined. For moderately long sequences, an iterative procedure is developed which combines the deterministic selection of run lengths with their statistical placement in the sequence. Examples of synthesis are given for the three techniques. Dissert. Abstr.

N82-19464 Utah Univ., Salt Lake City.
MATHEMATICAL AND GRAPHICAL TOOLS FOR THE CREATION OF COMPUTATIONAL ARRAYS Ph.D. Thesis
Uri Chanan Weiser 1981 148 p
Avail: Univ. Microfilms Order No. 8129930

A formalism for describing the behavior of computational networks at the algorithmic level is introduced. Formal mathematical models for delay and combinatorial elements establish a direct correspondence between mathematical expressions defining a function, and graphs representing the computational networks which compute that function. Different and often more efficient networks can be developed using transformations on either the graphs or the mathematical expressions describing those networks. These transformations are expressed by formal rules which exist in both the mathematical and the dual graphical form. The concept of a wavefront is presented to simplify the mathematical notation and to enhance understanding of the progression of sets of data elements through a computational network. Dissert. Abstr.

N82-19465 Royal Signals and Radar Establishment, Malvern (England).
A REVIEW OF MILLIMETRE WAVE DEVICES
A. J. Grant Jun. 1981 18 p refs
(RSRE-Memo-3372; BR81131) Copyright. Avail: Issuing Activity

Power sources in the 30 to 300 GHz band, corresponding to free space wavelengths from 1 cm to 1 mm are reviewed. The magnetron, the TWT, the carcinotron or backward wave oscillator, the gyrotron or cyclotron resonance maser, and the orbitron (which was demonstrated using an empty aluminium beer-can) are discussed. Solid state sources continue to make progress upwards in frequency and power. Transferred electron devices using InP produce 126 mW at 90 GHz, a level suitable for local oscillator applications. Si impatts demonstrate peak power of 13W ar 94 GHz with 8% efficiency. The tunnett diode, a variation of the impatt in which tunneling replaces avalanching, is useful above 300 GHz. Author (ESA)

N82-19466*# General Electric Co., Philadelphia, Pa. Space Systems Div.
ULTRA HIGH SPEED IMAGE PROCESSING TECHNIQUES Final Report
T. Anthony, D. F. Hoeschele, R. Connery, J. Ehland, and J. Billings Apr. 1981 75 p refs
(Contract NAS5-25654)
(NASA-CR-166771) Avail: NTIS HC A04/MF A01 CSCL 09C

Packaging techniques for ultra high speed image processing were developed. These techniques involve the development of a signal feedthrough technique through LSI/VLSI sapphire substrates. This allows the stacking of LSI/VLSI circuit substrates in a 3 dimensional package with greatly reduced length of interconnecting lines between the LSI/VLSI circuits. The reduced parasitic capacitances results in higher LSI/VLSI computational speeds at significantly reduced power consumption levels. S.L.

N82-19467# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A 12 GHz MIXER WITH PLANAR CIRCUITS IN A WAVEGUIDE
Eduardo Antonio Parada Tude Jul. 1981 25 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Ann. Meeting of SBPC, Salvador, Bahia, 8-15 Jul. 1981
(INPE-2149-RPE/370) Avail: NTIS HC A02/MF A01

A 12 GHz mixer, used in satellite communications, which produces an intermediate frequency of 1 to 3 GHz is presented. The conversion is achieved by a Schottky diode mounted in a planar circuit in the waveguide. This technique consists of inserting a metal plate in the middle of the waveguide, parallel to the E plane. The image frequency was short circuited so as to obtain a lower conversion loss. A computer program was developed for this purpose, which calculates the line increment due to the short effect, in the ridge waveguide formed by the planar circuit. The prototype has presented low conversion loss (6 dB) and good reproducibility, which may be credited to ease of construction. S.L.

N82-19468# Technische Univ., Berlin (West Germany).
DESIGN OF A VERSATILE LSI MODULE FOR THE SIMPLE CONFIGURATION OF HIGH-THROUGHPUT REAL-TIME POLYPROCESSOR SYSTEMS Ph.D. Thesis
Richard W. Macmillan 1980 225 p refs
Avail: NTIS HC A10/MF A01

The design of a single LSI module which is capable of implementing a wide variety of real time multiple processor systems in a simple and inexpensive manner is described. Efficient communication between modules and the attainment of very high system throughput is emphasized. The 'Universal Module' ('UM'), contains two identical ports, thereby providing ease of interconnection and permitting the configuration of systems containing a virtually unlimited number of communication busses. Under the conditions of the UM protocol up to 16 UM's may be connected to each bus. In requesting a communication a UM must declare the resources, i.e., other UM's, it requires for its successful completion. S.L.

N82-19469# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
TWO DIMENSIONAL FILTERS FOR DIGITAL PROCESSING OF IMAGES: DESIGN AND IMPLEMENTATION TECHNIQUES [FILTROS BIDIMENSIONAIS PARA PROCESSAMENTO DIGITAL DE IMAGENS: TECNICAS DE PROJETO E IMPLEMENTACAO]
Gilberto Camara Neto and Edson Alves Ribeiro Nov. 1981 12 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Natl. Congr. on Appl. and Computational Math., Rio de Janeiro, 8-11 Sep. 1981 Submitted for publication
(INPE-2273-PRE/053) Avail: NTIS HC A02/MF A01

Two design methods of two dimensional digital filters are presented. Finite impulse response filters which make possible linear phase frequency responses are emphasized. The design methods considered are windowing and transformations. In the windowing methods, a time limited function is sought, the Fourier transform of which would be a best approximation to a given frequency limited function. An approximate solution for the one dimensional case is the Kaiser window: a two dimensional Kaiser window is proposed. In the transformation method, a change of variables transforms a one dimensional frequency response into a two dimensional one. Finally, implementation of filters and their application is discussed for the case of LANDSAT images. S.L.

N82-19470# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

THE 10 MHz CRYSTAL FILTER FOR SCPC EARTH STATIONS

Helcio Aranha and Plinio Tissi Dec. 1981 28 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBFC, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2286-PRE/062) Avail: NTIS HC A03/MF A01

The design of a crystal filter at 10 MHz for application as a narrow channel filter in Earth stations is described. Its realization and practical characteristics are also considered. A.R.H.

N82-19471# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

ANALYSIS OF PHASE NOISE IN A J BAND TRANSMITTER [ANALISE DO RUIDO DE UM TRANSMISSOR NA FAIXA J]

Wilton Jose Fleming Dec. 1981 41 p refs In PORTUGUESE; ENGLISH summary
(INPE-2294-NTE/178) Avail: NTIS HC A03/MF A01

The phase noise analysis of a frequency generation system using synthesizers and multipliers is described. Rules are shown which can be used in the definition of the system block diagram. An example is presented for a transmitter in band J. Author

N82-19472# Communications Research Centre, Ottawa (Ontario). Space Technology and Applications Branch.

A MICROWAVE FET OSCILLATOR DESIGN APPROACH AND ITS APPLICATION IN AN INJECTION LOCKED OSCILLATOR

P. Morrison and R. Douville Jan. 1982 47 p refs
(CRC-1347) Avail: NTIS HC A03/MF A01

A low power 14 GHz MIC GaAs FET oscillator was designed. The analytical model of the oscillator and design approach used are discussed in detail. A shunt feedback oscillator configuration was employed. Approximations were made to account for FET large signal effects in the design for maximum oscillator output power. An expression relating oscillator output power to feedback loop loss is presented. The requirement for filtering in the feedback loop is discussed. Experimental results were compared with theory and found to be in good agreement. Output power was 10 dBm at 14.0 GHz. The injection locked characteristics of the oscillator were experimentally investigated. It was found that for a 15 dB injection gain, the locking bandwidth was 69 MHz. The FM noise properties and transient performance of the injection locked oscillator are presented. Author

N82-19473# Laboratory for Electronic Development of the Armed Forces, Oegstgeest (Netherlands).

MICAD: AN INTERACTIVE COMPUTER FOR THE DESIGN OF MICROWAVE CIRCUITS [MICAD EEN INTERACTIEF COMPUTER-PROGRAMMA VOOR HET ONTWERPEN VAN MICROGOLFCIRCUITS]

H. R. Vanes Jun. 1980 93 p refs In DUTCH
(LEOK-TR-1980-06; TDCK-75000) Avail: NTIS HC A05/MF A01

The construction of an interactive computer program in the design of microwave circuits was examined. The microwave interactive computer aided design (MICAD) which can perform this task is presented. The system provides all the necessary data, organizes program execution, and computates 18 possible options, while data can be recalled by just one simple letter. Ten different elements and five indicators are included to describe the network. Transl. by E.A.K.

N82-19474# Naval Research Lab., Washington, D. C. Surface Chemistry Branch.

ELECTRON TRANSMISSION THROUGH AND REFLECTION BY AN ARBITRARY SET OF SQUARE POTENTIAL STEPS Interim Report

F. L. Carter 7 Dec. 1981 13 p refs
(AD-A108630; NRL-MR-4680) Avail: NTIS HC A02/MF A01 CSCL 20/10

An exact analytic solution was derived for the transmission of electrons through a series of up to six square potential steps. From these an algorithm was derived which readily gives the solution for any arbitrary number of square potential steps. Author (GRA)

N82-19475# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

Y-CIRCULATOR WITH DIELECTRIC FILLER

A. K. Stolyarov, I. P. Tyukov, V. N. Shakhgedanov, and A. A. Shilova 10 Dec. 1981 8 p Transl. into ENGLISH from Russian Patent no. 216065 (11 Apr. 1968) p 45-46
(AD-A109175; FTD-ID(RS)T-1275-81) Avail: NTIS HC A02/MF A01 CSCL 09/5

A Y-circulator with a dielectric filler and ferrite insert located in the center of the waveguide branching, is investigated. The overall dimensions are reduced because the dielectric constant of ferrite and dielectric material from which the waveguide is made, are identical. Author

N82-19476# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

EVALUATION OF PARAMETERS OF THE OSCILLATORY MOTION OF DIGITAL SERVO SYSTEM IN A STEADY-STATE MODE

V. P. Strakhov and Ye. G. Kuznetsova 4 Dec. 1981 8 p refs Transl. into ENGLISH from Izv. Vyssh. Uch. Zaved., Priborostr. (USSR), v. 14, no. 6, 1971 p 44-47
(AD-A109314; FTD-ID(RS)T-1267-81) Avail: NTIS HC A02/MF A01 CSCL 09/3

A digital servo system characterized by the quantization of a signal respect to level and time is examined. The steady-state mode of the system is characterized by the emergence of an oscillating motion. The dependence of the parameters of the oscillating motion on the parameters of the system is given. R.J.F.

N82-19477# Carnegie-Mellon Univ., Pittsburgh, Pa. College of Engineering.

INTEGRATED DEVICES OF SEMICONDUCTOR METAL-OXIDES IN CONJUNCTION WITH SILICON FOR SOLID-STATE GAS SENSORS Progress Report, 1 Jan. 1980 - 30 May 1981

A. G. Jordan, G. N. Advani (Sierra Monitor Corp.), and D. Berg Jul. 1981 63 p refs
(Contracts DE-AS02-77EV-04346; EE-77-S-02-4346)
(DE82-000397; DOE/EV-04346/T1; COO-4346-3) Avail: NTIS HC A04/MF A01

Further progress in the use of SnO2 thin films as solid state gas sensors is reported. Films of SnO2, prepared by the radio frequency sputtering technique, were doped with antimony and tested in H2 and CO in order to elucidate the mechanisms of gas sensitivity. Improvements in the response and recovery times were then obtained by the incorporation of gold in the oxide material. Zeolite films were deposited on the SnO2 films in order to enhance the selectivity process of gas sensors. Finally, a working device was prepared using state-of-the-art fabrication techniques. GRA

N82-19478# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.

GALVANIC CHARGING IN AIR AND SPACE FLIGHT [GALVANOFORMUNG IN LUFT- UND RAUMFAHRT]

R. Suchentrunk and O. Tuscher 10 Jun. 1981 10 p refs Reprint from Galvanotech., (Cologne), v. 12, n. 70, 1979 In GERMAN Presented at DGLR-Jahrestagung 1979, Cologne
(MBB-BB-485-O) Avail: NTIS HC A02/MF A01

Utilization of galvanic shaping for solving heavy finishing problems in the aerospace industry is discussed. Special galvanic electrolytes like nickel sulfate solutions and acid copper electrolytes are used to produce independent self supporting structural parts. The multiple application possibilities of this galvanic finishing process is described. Examples are given of production problems and how they are solved. It is indicated that galvanic process engineering is used increasingly in the production of complicated structures and for solving problems in industrial development and finishing. Transl. by E.A.K.

N82-19479# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

MICROWAVE TUBES. LITERATURE STUDY NUMBER 2 RELATING TO THE YEAR 1980 [MIKROVAAGSROER. LITTERATUROEVERSIKT NR 2. OMFATTANDE AAR 1980]

Herbert Steyskal Nov. 1981 135 p refs In SWEDISH

(FOA-C-30247-E) Avail: NTIS HC A07/MF A01

Literature on microwave tube utilization is reviewed. Traveling wave tubes account for most of the activity in conventional applications. Cyclotron resonance devices are commercially available for high efficiency generators. Ultra high frequency usages are expected to increase, due to the introduction of relativistic electron radiation devices which enable high performance to be achieved, e.g., 3 GW pulses in the superhigh frequencies with a relativistic reflex triode. Author (ESA)

N82-19480# Siemens A.G., Erlangen (West Germany). Forschungslab.

SUPERCONDUCTING NIOBIUM-TIN RESONATORS Final Report

Bernhard Hillebrand, Norbert Krause, Hans Pfister, Kurt Schnitzke, Yilmaz Uzel, and Karl Wohlleben Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 72 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-168; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,20

A preparation method was developed for covering a Nb substrate with Nb 35 n layers by exposing the substrate to saturated tin vapor for 3 to 4 hr at 1050 C. The method preanodizes the Nb substrate and heats it up. Alternatively, small amounts of SnF2 are added. With TE011 X-band resonators, critical flux densities up to 100 mT and quality factors up to 9.10 exp 10 (at 1.5 K) are reached. Average values amount to 60 mT and 2.10 exp 9 (at 1.5 K) and 1.10 exp 9 (at 4.2 K). Comparable results are obtained with TM010 resonators. Author (ESA)

N82-19481# Stuttgart Univ. (West Germany). Inst. fuer Technische Optik.

CONTACTLESS OPTOELECTRONIC POSITION SENSING Final Report

Guenter Hege and Reinhold Litschel Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 53 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-191; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,35

A photoelectric lateral perflectometer sensing system and an axial probe depth sensor were developed, since increasing automation in production processes gives rise to an equivalent demand in optoelectronic sensor systems for automatic measurement and control. Concentric circular grids are used for two dimensional sensing with the perflectometer as well as for automatic adjustment of the instrument. The resulting Moire patterns are detected by a matrix solid state image sensor. The use of light emitting diodes gives a small and rugged z axis probe. As with the autofocus, the measuring principle employs the concept of disappearing parallax. Accuracy in the submicrometer range makes it possible to use the perflectometer for dimensional measuring as well as for exact positioning of work pieces having moderate surface roughness and dimensions. The z axis probe has a capture range of + or - 1 mm and an accuracy of better than 1 micron even on rough surfaces. Author (ESA)

N82-19482# Siemens A.G., Munich (West Germany). Forschungslab.

Ga (As, P): N - LED'S FOR MONOCHROMATIC ILLUMINATION Final Report, Dec. 1980

Ludwig Hoffmann Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 68 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-198; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,30

The feasibility of decreasing Ga hole concentration to improve the internal quantum efficency of Ga As/sub 1-x/P/sub x/light emitting diodes doped with nitrogen was studied. It is assumed that the concentration determines the lifetime of the minority carriers. Continuous liquid phase epitaxial layers with thicknesses up to 15 microns were grown on exactly oriented 100 - surfaces of VPE layers with sufficient p-type doping. Two diagnostic techniques are developed: (1) nitrogen concentration measurement by photocurrent spectroscopy at 300 K; and (2) deep level energy determination by photocapacity measurement at 300 K. Author (ESA)

N82-19483# National Centre of Tribology, Risley (England). European Space Tribology Lab.

BRITISH AERODYNAMICS GROUP (BAE) SOLAR-ARRAY DRIVE MECHANISM: LIFE TEST, STRIPDOWN AND OPTICAL ENCODER EXAMINATION

A. J. Walton, J. Gillies, and J. A. Duvall Dec. 1980 31 p

(ESA-TRIB-2; ISSN-0250-4448) Avail: NTIS HC A03/MF A01

A drive mechanism which rotates a satellite solar array at 1 rev/day was tested. The real time life test simulated actual satellite operating conditions of vacuum and temperature (including eclipses) and lasted four years. Termination was caused by a failure in the optical sensing elements of the position sensing digital encoder. The mechanism behaves according to specification as regards drive motor power, error angle compared with a 24 hr clock and performance of power slip rings. Examination at the end of the test shows the mechanism to be in excellent mechanical condition, there being no features (apart from the encoder) that might limit the life to less than the projected seven years. Results for the main parameters are summarized. Details of the post test examination, which includes the measurements made on the optical encoder elements, are given. Author (ESA)

N82-19484# National Centre of Tribology, Risley (England). European Space Tribology Lab.

THERMAL VACUUM REAL-LIFE TEST OF AN MARCONI SPACE AND DEFENCE SYSTEMS (MSDS) SOLAR-ARRAY DRIVE MECHANISM (MSDS 002). FIRST FOUR YEARS OF OPERATION

K. Parker, A. Douglas, and W. R. Burke, ed. Jan. 1981 40 p

(ESA-TRIB-3; ISSN-0250-4449) Avail: NTIS HC A03/MF A01

The first part of a 7 yr life test on a mechanism which turns a satellite solar array at 1rev/day is reported. A thermal transfer shroud, surrounding the mechanism in a vacuum chamber, is held at a constant temperature of 22.5 C while the shaft temperature, measured near the top of the shaft at the large bearing, is changed at 6-monthly intervals so that it operates alternately at 60 and 10 C. At the beginning of each 6-monthly cycle, 30 eclipse simulations are performed, i.e., the shaft temperature is reduced from 60 C to 0 C in 72 min and is returned to 60 C in as short a time as possible. Apart from a very small increase in motor power during eclipse simulation, no changes in the mechanism parameters occur with temperature. The mechanism operates within motor power and angular rotation accuracy specifications. The electrical noise on all slip rings increased during the first two years, but then slowly decreased. Certain slip ring pairs show a noise level in excess of the arbitrary limits set at the start of the test, and two slip ring pairs give large periodic noise transients which may be due to mechanical damage to the slip rings or brushes. Author (ESA)

N82-19485# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.

HIGH STABILITY COPLANAR OSCILLATORS

E. M. Bastida and P. Bergamini 1981 9 p refs Presented at 11th European Microwave Conf., Amsterdam, 7-11 Sep. 1981

(CISE-1720) Avail: NTIS HC A02/MF A01

The feasibility of various kinds of coplanar oscillators, stabilized by a high Q dielectric cavity, was demonstrated. Their performance is comparable with devices obtained with microstrip circuits. An X-band coplanar oscillator with a frequency versus temperature stability better than + or - 0.2 ppm/C, over the temperature range -50 to 50C, is described. It has a loaded quality factor Q sub L asymptotic to 3500, a drain pushing figure of 8 ppm/V, and particularly appealing FM noise characteristics. The coplanar approach allows overall reduction in oscillator size; it can be placed directly over the cavity on a monolithic chip (including the active portion of the linear oscillator), avoiding unwanted linear oscillator coupling anywhere in the circuit. Author (ESA)

N82-19486# Fondazione Ugo Bordoni, Rome (Italy).
THE GENERATION OF PSEUDORANDOM BINARY SEQUENCES IN PARALLEL [GENERAZIONE DI SEQUENZE BINARIE PSEUDOALEATORIE IN PARALLELO]
Odoardo Brugia, Maurizio Pioli (Face Standard), and William Wolfowicz Jul. 1981 13 p refs In ITALIAN
(FUB-9-1981) Avail: NTIS HC A02/MF A01

An equivalent circuit of a multiple feedback pseudorandom binary sequence generator is presented, characterized by operating at a submultiple of the frequency used in current devices. The reduction in working frequency may simplify the design of devices such as self synchronizing scramblers, reset scramblers, and line encoders. The implementation of the circuit is discussed. Two applications are described, using two and four frequency reduction factors. Author (ESA)

N82-19139*# Sundstrand Aviation-Rockford, Ill.
THE 400-HERTZ CONSTANT-SPEED ELECTRICAL GENERATION SYSTEMS
Richard McClung *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 125-146 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 09C

N82-19144*# Boeing Commercial Airplane Co., Seattle, Wash.
ELECTRIC FLIGHT SYSTEMS
C. William Clay *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 213-234 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 09C

N82-20114*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SETI DOWNCONVERTER
B. Crow *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 1-5 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09C

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N82-19487 Iowa Univ., Oakdale.
RADIATIVE HEAT TRANSFER IN TURBULENT MHD CHANNEL FLOW Ph.D. Thesis
Fariborz Alipour-Haghighi 1981 148 p
Avail: Univ. Microfilms Order No. 8128371

Radiative heat transfer in a MHD channel has been studied for fully developed turbulent flow of an electrically conducting fluid. A uniform magnetic field is imposed transverse to the flow direction between the electrically insulated parallel plates. Thermal entry region is analyzed for constant wall temperature including viscous dissipation and Joulean heating. A van Dreist mixing length model with Mei and Squire correction factor is used for eddy diffusivity of momentum and a modified Cebeci model is used for eddy conductivity. An exponential wide band model is employed in evaluation of radiative heat flux for a real gas. The tegro-differential equation for thermal energy transport is solved by a finite difference iterative method. It is shown that radiative heat transer is a major mechanism of heat transfer in the channel and accelerates the thermal development and results in reduced gas temperature profiles. Dissert. Abstr.

N82-19488 Pennsylvania Univ., Philadelphia.
STATIC AND HYDRODYNAMIC STUDIES OF THE CONFORMATION OF ADSORBED MACROMOLECULES AT THE SOLID/LIQUID INTERFACE Ph.D. Thesis
David Paul Yavorsky 1981 272 p
Avail: Univ. Microfilms Order No. 8127094

The structure of an adsorbed macromolecular layer at the solid/liquid interface under both stationary and flow conditions is examined. The conformation of adsorbed bovine serum albumin (BSA) is deduced from the thickness of surface layers formed on the pore walls of track etched (mica) membranes. Changes in membrane permeability due to protein adsorption are related directly to a net reduction in pore size or an equivalent adsorbed layer thickness. Complementary permeability measurements using electrolyte conduction, tracer diffusion, and pressure driven flow have verified the unique structural qualities of the track etched membrane and collectively demonstrate an ability to determine bare pore size with an accuracy of + or - 2A. The average static thickness of an adsorbed BSA layer, as derived from electrolyte conduction and tracer diffusion, was 43 + or - 3A. independent of pore size. In comparison with the known BSA solution dimensions, this measured thickness is consistent with a monolayer of structurally unperturbed protein molecules each oriented in a 'side-on' position. Pronounced conformational changes in adsorbed BSA layers were observed under conditions of shear flow. Electrostatic interactions were also shown to significantly affect adsorbed protein conformation through changes in solution ionic strength and surface charge. Dissert. Abstr.

N82-19489 Ecole Polytechnique Federale de Lausanne (Switzerland). Lab. d'Hydraulique.
[ACTIVITIES REPORT OF THE HYDRAULICS LABORATORY] Annual Report, 1980 [RAPPORT ANNUEL 1980: LABORATOIRE D'HYDRAULIQUE]
1980 59 p refs Partly in FRENCH and ENGLISH
Avail: Issuing Activity

Drag force, turbulence, flooding, air water interaction, and the hydraulics of steep channels with moveable bed were researched. Mathematical and scale models were used in order to investigate aspects of dam construction, including overflow, erosion, and silting. The hydraulic aspects of a hydroelectric power scheme were evaluated. Author (ESA)

N82-19490 Defence Research Information Centre, Orpington (England).
MAINTENANCE OF HYDROSTATIC TRANSMISSIONS
A. Esposito Oct. 1981 10 p Transl. into ENGLISH from Oleodinamica Pneumatica, (Italy) no. 9, 1980 p 156-159
(DRIC-T-6497; BR81311) Copyright. Avail: Issuing Activity

Problems in hydrostatic transmission maintenance are identified and ways of overcoming them are suggested. It is found that problems arise from lack of lubrication, impurities in the oil, and cavitation at the pump and at the motor. It is under suggested that under nonsevere operating conditions, oil and filter should be changed every year, or every 1500 to 2000 hr running time. Under severe operating conditions or in dusty environments, the interval should be every 6 months or 1000 hr. Author (ESA)

N82-19491 Admiralty Marine Technology Establishment, Teddington (England).
FREE-WAVE PROPAGATION IN FLUID-LOADED THICK-WALLED CIRCULAR PIPES
S. A. Lester Nov. 1981 20 p refs
(AMTE-N-TM-81903; BR81307) Copyright. Avail: Issuing Activity

Wave propagation and sound radiation by layered pipes is treated by analyzing the dispersion relation of an infinite thick-walled pipe which contains, and is surrounded by, and inviscid fluid. Pipe wall displacements satisfy the exact linear equations of elasticity. The interior and exterior fluids satisfy the scalar Helmholtz wave equation. The differential equations are solved by Fourier transforms, giving the dispersion relation which connects frequency with axial and circumferential wavenumbers. The dispersion relation is solved numerically, producing examples of axial wavenumber versus frequency plots for selected circumferential harmonics. Author (ESA)

N82-19492*# Southwest Research Inst., San Antonio, Tex. Engineering Sciences Div.
STUDY OF LIQUID SLOSH IN THE TRACKING AND DATA RELAY SATELLITE HYDRAZINE TANKS Final Report
Daniel D. Kana and Franklin T. Dodge Nov. 1981 124 p refs

(Contract NAS5-26482; SwRI Proj. 02-6539)
(NASA-CR-168745) Avail: NTIS HC A06/MF A01 CSCL 20D

An experimental study was conducted to provide data for evaluation of the parameters for an analytical mechanical model representation of liquid/interface dynamics in the TDRSS propellant tanks. Models were developed for two liquid-under ullage (forward tank) configurations and for one liquid-over-ullage (aft tank) configuration. However, additional test runs were conducted with liquids of different densities in both cases to allow separation of bladder stiffness and gravity effects under various simulated steady acceleration conditions. Both static and dynamic parameters are evaluated to provide a good prediction of observed results. Author

N82-19493*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF LOCATION IN AN ARRAY ON HEAT TRANSFER TO A CYLINDER IN CROSSFLOW

Robert J. Simoneau and G. James VanFossen, Jr. 1982 15 p refs Proposed for presentation at the 3rd Joint Thermophy. Fluids, Plasma and Heat Transfer Conf., St. Louis, 7-11 Jun. 1982
(NASA-TM-82797; E-1131) Avail: NTIS HC A02/MF A01 CSCL 20D

An experiment was conducted to measure the heat transfer from a heated cylinder in crossflow in an array of circular cylinders. All cylinders had a length-to-diameter ratio of 3.0. Both in-line and staggered array patterns were studied. The cylinders were spaced 2.67 diameters apart center-to-center in both the axial and transverse directions to the flow. The row containing the heated cylinder remained in a fixed position in the channel and the relative location of this row within the array was changed by adding up to five upstream rows. The working fluid was nitrogen gas at pressures from 100 to 600 kPa. The Reynolds number ranged based on cylinder diameter and average unobstructed channel velocity was from 5,000 to 125,000. Turbulence intensity: prufiles were measured for each case at a point one half space upstream of the row containing the heated cylinder. The basis of comparison for all the heat transfer data was the single row with the heated cylinder. For the in-line cases the addition of a single row of cylinders upstream of the row containing the heated cylinder increased the heat transfer by an average of 50 percent above the base case. Adding up to five more rows caused no increase or decrease in heat transfer. Adding rows in the staggered array cases resulted in average increases in heat transfer of 21, 64, 58, 46, and 46 percent for one to five upstream rows, respectively. Author

N82-19494*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

HYDRODYNAMIC AND AERODYNAMIC BREAKUP OF LIQUID SHEETS

R. Ingebo 1982 5 p refs Proposed for presentation at the 2nd Intern. Conf. on Liquid Atomization and Spray Systems, Madison, Wisc., 20-24 Jun. 1982
(NASA-TM-82800; E1139) Avail: NTIS HC A02/MF A01 CSCL 20D

The effect of hydrodynamic, aerodynamic and liquid surface forces on the mean drop diameter of water sprays that are produced by the breakup of nonswirling and swirling water sheets in quiescent air and in airflows similar to those encountered in gas turbine combustors is investigated. The mean drop diameter is used to characterize fuel sprays and it is a very important factor in determining the performance and exhaust emissions of gas turbine combustors. S.L.

N82-19495*# Oklahoma State Univ., Stillwater. School of Mechanical and Aerospace Engineering.

INVESTIGATIONS OF FLOWFIELDS FOUND IN TYPICAL COMBUSTOR GEOMETRIES Semiannual Status Report, 1 Aug. 1981 - 31 Jan. 1982

D. G. Lilley 31 Jan. 1982 138 p refs
(Grant NAG3-74)
(NASA-CR-168585; SASR-3) Avail: NTIS HC A07/MF A01 CSCL 20D

Measurements and computations are being applied to an axisymmetric swirling flow, emerging from swirl vanes at angle phi, entering a large chamber test section via a sudden expansion of various side-wall angles alpha. New features are: the turbulence measurements are being performed on swirling as well as nonswirling flow; and all measurements and computations are also being performed on a confined jet flowfield with realistic downstream blockage. Recent activity falls into three categories: (1) Time-mean flowfield characterization by five-hole pitot probe measurements and by flow visualization; (2) Turbulence measurements by a variety of single- and multi-wire hot-wire probe techniques; and (3) Flowfield computations using the computer code developed during the previous year's research program. Author

N82-19496*# United Technologies Research Center, East Hartford, Conn.

MASS AND MOMENTUM TURBULENT TRANSPORT EXPERIMENTS WITH CONFINED COAXIAL JETS Interim Report, 16 Feb. - 16 Oct. 1981

B. V. Johnson and J. C. Bennett Nov. 1981 157 p refs
(Contract NAS3-22771)
(NASA-CR-165574; R81-915540-9) Avail: NTIS HC A08/MF A01 CSCL 20D

Downstream mixing of coaxial jets discharging in an expanded duct was studied to obtain data for the evaluation and improvement of turbulent transport models currently used in a variety of computational procedures throughout the propulsion community for combustor flow modeling. Flow visualization studies showed four major shear regions occurring; a wake region immediately downstream of the innet jet inlet duct; a shear region further downstream between the inner and annular jets; a recirculation zone; and a reattachment zone. A combination of turbulent momentum transport rate and two velocity component data were obtained from simultaneous measurements with a two color laser velocimeter (LV) system. Axial, radial and azimuthal velocities and turbulent momentum transport rate measurements in the r-z and r-theta planes were used to determine the mean value, second central moment (or rms fluctuation from mean), skewness and kurtosis for each data set probability density function (p.d.f.). A combination of turbulent mass transport rate, concentration and velocity data were obtained system. Velocity and mass transport in all three directions as well as concentration distributions were used to obtain the mean, second central moments, skewness and kurtosis for each p.d.f. These LV/LIF measurements also exposed the existence of a large region of countergradient turbulent axial mass transport in the region where the annular jet fluid was accelerating the inner jet fluid. . S.L.

N82-19497# Technische Hogeschool, Eindhoven (Netherlands).

SHOCK TUBE DETERMINATION OF THE HEAT CONDUCTIVITY OF NON-IONIZED AND PARTIALLY IONIZED ARGON Ph.D. Thesis

Avraham Hirschberg 27 Feb. 1981 249 p refs
Avail: NTIS HC A11/MF A01

A procedure to determine the heat conductivity of a monatomic gas, from measurements of the structure of the unsteady thermal boundary layer at the end-wall of a shock tube, is proposed. In the non-ionized case the structure of the boundary layer determined by means of laser schlieren measurements appears to be self-similar. Improved analysis of the schlieren data and accurate pressure measurements yielded conductivity data with an accuracy of 4% for temperatures up to 7000 K. In the ionized case a model for the development of the thermal boundary layer was proposed to consider the processes of ionization and thermal relaxation. Data on electron and atom density profiles from laser schlieren measurements agree within 10% with theory for a moderate degree of ionization (3%). Quantitative information on radiative cooling was obtained from absorption and pressure measurements outside the boundary layer. Experimental information on the influence of ionization relaxation on the structure of the boundary layer and data on the ionization rate of hydrogen by collisions with argon atoms is also presented. M.D.K.

N82-19498*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

HISTORICAL PERSPECTIVES ON THERMOSTRUCTURAL RESEARCH AT THE NACA LANGLEY AERONAUTICAL LABORATORY FROM 1948 TO 1958

Richard R. Heldenfels Feb. 1982 35 p refs Presented at

NASA Symp. on Computational Aspects of Heat Transfer in Struct.
Hampton, Va., 3-5 Nov. 1981
(NASA-TM-83266; L-15104) Avail: NTIS HC A03/MF A01
CSCL 20D

Research on structural problems associated with aerodynamic heating, conducted by the National Advisory Committee for Aeronautics (NACA) during its last decade are described. The text of a special presentation given at the NASA Symposium on Computational Aspects of Heat Transfer in Structure is presented. Some early thermostructural research activities using charts is also discussed. The prinicipal message of the paper is that although vehicle oriented research programs speed development of new technology for specific missions, too much effort may be expended on developing technology which is never used because a vehicle is never built. A healthy research program must provide freedom to explore new ideas that have no obvious applications at the time to generate the technology that makes important, unanticipated flight or vehicle opportunities possible.
M.D.K.

N82-19499*# Nielsen Engineering and Research, Inc., Mountain View, Calif.
LAMINAR FLOW TRANSITION: A LARGE-EDDY SIMULATION APPROACH Final Report, 14 Jul. 1980 - 30 Sep. 1981
Sedat Biringen Washington NASA Feb. 1982 34 p refs
(Contract NAS1-16289)
(NASA-CR-3518; NEAR-TR-251) Avail: NTIS
HC A03/MF A01 CSCL 20D

A vectorized, semi-implicit code was developed for the solution of the time-dependent, three dimensional equations of motion in plane Poiseuille flow by the large-eddy simulation technique. The code is tested by comparing results with those obtained from the solutions of the Orr-Sommerfeld equation. Comparisons indicate that finite-differences employed along the cross-stream direction act as an implicit filter. This removes the necessity of explicit filtering along this direction (where a nonhomogeneous mesh is used) for the simulation of laminar flow transition into turbulence in which small scale turbulence will be accounted for by a subgrid scale turbulence model. Author

N82-19500# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
TEMPERATURE DISTRIBUTION IN THE WALLS OF A CYLINDRICAL THERMAL CHAMBER: FORMULATION AND PROPOSED SOLUTION [DISTRIBUICAO DE TEMPERATURA NAS PAREDES DE UMA CAMARA TERMICA CILINDRICA FORMULACAO E PROPOSTA DE SOLUCAO]
Humberto Pontes Cardoso Nov. 1981 12 p refs In PORTUGUESE; ENGLISH summary Presented at the INPE-LCC Seminar, Rio de Janeiro, 25-27 November 1981
(INPE-2267-PRE/048) Avail: NTIS HC A02/MF A01

A formulation and a proposed solution scheme by finite element method for determining the wall temperature distribution of a cylindrical thermal vacuum chamber cooled by refrigeration and heated by a cylindrical source is presented. Author

N82-19501# Houston Univ., Tex. Dept. of Mechanical Engineering.
SEARCH FOR LARGE-SCALE COHERENT STRUCTURES IN THE NEARLY SELF-PRESERVING REGION OF A TURBULENT AXISYMMETRIC JET Final Report, 1 Sep. 1979 - 31 Aug. 1980
A. K. M. F. Hussain Mar. 1981 32 p refs
(Contract F49620-79-C-0227; AF Proj. 2307)
(AD-A108334; AFOSR-81-0760TR) Avail: NTIS
HC A03/MF A01 CSCL 20/4

In an attempt to explore the existence of large-scale coherent structures in the self-preserving region of an axisymmetric free air jet, a 2.54 cm air jet at a Reynolds number of 46,000 has been investigated for distances in excess of 40 diameters using both long and short time-averaged space-time correlation measurements. Conventional space-time correlation data with probe separations in the streamwise direction by as much as 25 diameters suggest the existence of large-scale coherent structures centered off the jet axis. The radial extent of these structures is about one local jet diameter, and the azimuthal extent is about a quadrant of the cross-section. Time series of short time-averaged correlations between longitudinal velocity fluctuations obtained with two arrays of hot-wires separated in the streamwise direction strongly support the existence of these structures. Nearly periodic peaks and valleys were intermittently observed. A qualitative picture of the spatial characteristics of these structures was inferred from the short time-averaged cross correlation of these time series with a sinusoidal model function. Traces of instantaneous transverse velocity and Reynolds stress as well as the instantaneous velocity vector patterns obtained from a radial array of X-wires also depict existence of large-scale organized motions. Author (GRA)

N82-19502# New York Univ., Westbury. Dept of Applied Science.
THE INVESTIGATION OF THE PROPAGATION MECHANISM OF PRESSURE FLUCTUATION IN TURBULENT FLOW Final Report
Victor Zakkay and Vincent Barra Feb. 1981 39 p refs
(Grant AF-AFOSR-0128-79; AF Proj. 2307)
(AD-A108498; NYU/DAS-81-23; AFOSR-81-0759TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

A one foot induction wind tunnel was built for the purpose of studying the coherent structure of turbulence. Simultaneous measurements of velocity, wall pressure and wall-shear fluctuations were made on the wall of a one foot pipe in a range of velocities from 30 to 700 ft/sec. The results presented here were obtained for flow conditions which differ significantly from those in previous studies. For the majority of the tests, the free stream velocity is in the high subsonic regime, and the Reynolds number is an order of magnitude higher than that for which the coherent structure has previously been investigated. The measurements were made on the wall of an axially symmetric one foot test section in order to insure true two dimensionality of the flow. GRA

N82-19503# Paris VI Univ. (France). Lab. de Luminescence.
RESEARCH ON THE EFFECTS OF HYDROSTATIC PRESSURE ON THE ELECTRONIC STATES OF IMPURITIES Final Report
J. Mattler Sep. 1981 15 p refs
(Grant DA-ERO-78-G-063; DA Proj. 1T1-61102-BH-57)
(AD-A108403) Avail: NTIS HC A02/MF A01 CSCL 20/4

The theoretically predicted shift of vibronic components and change of their distribution under high pressure were confirmed by the low temperature emission spectra of the natural crystal scapolite. The insensibility of the self-activated luminescence in the ZnS : B crystals to the high pressure action indicated that it comes from a tightly associated now luminescence center. The differences between the high pressure action on the cubic and hexagonal ZnS : Mn crystals are interpreted by the resonance energy transfer. The pressure shifts of the excitonic excitation bands in the ZnS and ZnSe crystals agree with the gap shifts calculated for these crystals but are smaller than the experimentally found pressure shifts of the donor-acceptor luminescence bands.
Author (GRA)

N82-19504# Naval Research Lab., Washington, D. C.
INFLUENCE OF VELOCITY SHEAR ON THE RAYLEIGH-TAYLOR INSTABILITY Interim Report
P. N. Guzdar, P. Satyanarayana, J. D. Huba, and S. L. Ossakow
16 Dec. 1981 27 p refs
(DNA Proj. S99-QAXH; RR0330244)
(AD-A108800; NRL-MR-4701) Avail: NTIS
HC A03/MF A01 CSCL 14/1

The influence of a transverse velocity shear on the Rayleigh-Taylor instability is investigated. It is found that a sheared velocity flow can substantially reduce the growth rate of the Rayleigh-Taylor instability in the short wavelength regime (i.e., $kL > 1$ where L is the scale length of the density inhomogeneity), and causes the growth rate to maximize at $kL < 1.0$. Applications of this result to ionospheric phenomena (equatorial spread F (ESF) and ionospheric plasma clouds) are discussed. In particular, the effect of shear could account for, at times, the 100's of km modulation observed on the bottomside of the ESF ionosphere and the km scale size wavelengths observed in barium cloud prompt striation phenomena. Author (GRA)

N82-19505# Science Applications, Inc., El Segundo, Calif. Applied Mechanics Operation.

PERFORMANCE TECHNOLOGY PROGRAM (PTP-S 2). VOLUME 9: EVALUATION OF REENTRY VEHICLE NOSETIP TRANSITION AND HEAT TRANSFER IN THE AEDC HYPERBALLISTICS TRACK G Final Report, Dec. 1977 - Sep. 1979
A. T. Wassel, W. C. L. Shih, and R. J. Curtis Jan. 1981 106 p refs
(Contract F04702-77-C-0126)
(AD-A108848; SAI-063-81R-051-Vol-9; BMO-TR-81-61-Vol-9)
Avail: NTIS HC A06/MF A01 CSCL 16/3

Boundary layer transition and surface heating distributions on graphite fine weave carbon-carbon, and metallic nosetip materials were derived from surface temperature responses measured in nitrogen environments during both free-flight and track-guided testing in the AEDC Hyperballistics Range/Track G. Innovative test procedures were developed, and heat transfer results were validated against established theory through experiments using a super-smooth tungsten model. Quantitative definitions of mean transition front locations were established by deriving heat flux distributions from measured temperatures, and comparisons made with existing nosetip transition correlations. Qualitative transition locations were inferred directly from temperature distributions to investigate preferred orientations on fine weave nosetips. Levels of roughness augmented heat transfer were generally shown to be below values predicted by state of the art methods. Author (GRA)

N82-19506# Tel-Aviv Univ. (Israel). Dept. of Applied Mathematics.
FINITE ELEMENTS FOR FLUID DYNAMICS. SUPERCRITICAL DESIGN Final Report
Nima Geffen and Sara Yaniv Oct. 1981 135 p refs
(Grant AF-AFOSR-0017-81; AF Proj. 2307)
(AD-A108983; AFOSR-81-0867TR) Avail: NTIS HC A07/MF A01 CSCL 20/4

The mathematical modeling of a physical continuum by a set of first-order partial differential equations is commonly redundant, i.e., it includes more equations than unknowns. A simple analysis gives the reduced set, which fully determines the field quantities satisfying appropriately prescribed initial and boundary conditions. An algebraic look at the system provides the appropriate choice for descretization, which is a necessary condition for solvability and stability. The same is tried for a number of variational representations of the field in terms of primitive variables. A few of the latter formulations are new. Author (GRA)

N82-19507# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
SURFACE LAYER ORIENTATION COORDINATION FOR BOUNDARY LAYER CALCULATIONS ON GENERAL CONFIGURATIONS [OBERFLAECHENORIENTIERTE KOORDINATEN FUER GRENZSCHICHTBERECHNUNGEN AN ALLGEMEINEN KONFIGURATIONEN]
E. H. Hirschel 23 Apr. 1981 28 p refs In GERMAN
(MBB-FE-122/S/PUB/41; DGLR-81-014) Avail: NTIS HC A03/MF A01

Three dimensional boundary layered bodies were calculated by coordinate system. General wing and fuselage surface configurations made for curvilinear, nonorthogonal, local monoclinic coordinates, and the boundary layer coordinates for calculations of the first degree show an exception for these coordinates. Metric tensors and curved tensors on surfaces are illustrated, transformation laws Cartesian coordinates of friction free foreign flow in the boundary layer coordinates are reported. The tensorial concepts are applied in the formulation of boundary layer equations and the calculation of the flow pattern of friction free foreign flow and boundary wall flows are detailed. Transl. by E.A.K.

N82-19508# Societe Anonyme Belge de Constructions Aeronautiques, Brussels (Belgium). Heat Pipe Caloduc.
HIGH PERFORMANCE VARIABLE CONDUCTANCE HEAT PIPE (VCHP) FOLLOW-ON DEVELOPMENT: PHASE 2 Final Report
Paris ESA 27 Apr. 1981 82 p refs 2 Vol.
(Contract ESA-3737/78)
(SABCA-JPM/LN/HO5/NO144-Vol-1; ESA-CR(P)-1497-Vol-1)
Avail: NTIS HC A05/MF A01

Design characterization tests, and wick optimization of a VCHP used for spacecraft temperature control are summarized. The 1 cm diameter VCHP was subjected to adverse environment, aging, and thermal tests. An ammonia heat carrier, and cold gas reservoir conductance control are used. Heat conductance is 100 Wm, even in zero gravity. Performance is maintained when control gas is added to the working fluid. The gas reservoir achieves a 5 C control range when input power varies from 2 to 120 W, with an effective length of 0.75 m (90 Wm). The stainless steel pipe is bendable and performs well up to 30 mm adverse tilt, and can start up at 120 W from -40 C. Theoretical expressions for a saturated wick were used to optimize the wick with respect to its porosity and fiber diameter. Results show that for a specified capillary pressure limit, a porosity of 0.79 gives the highest permeability. The corresponding fiber diameter is then set such that the expressions for the capillary pressure limit give the required value. Author (ESA)

N82-19509# Societe Anonyme Belge de Constructions Aeronautiques, Brussels (Belgium). Heat Pipe Caloduc.
FOLLOW-ON DEVELOPMENT OF SMALL CRYOGENIC HEAT PIPES: PHASE 2 REPORT
Paris ESA Feb. 1981 102 p refs 2 Vol.
(Contract ESA-3737/78)
(SABCA-JPM/LN/HO5/N11-Vol-2; ESA-CR(P)-1497-Vol-2)
Avail: NTIS HC A06/MF A01

Cryogenic heat pipe literature is reviewed and a 6 mm pipe is described. Most cryopipes derive from grooved profiles developed for use at ambient temperatures, and have diameters > 10 mm. Below 10 mm, only artery geometries provide appreciable power transport capabilities, but these geometries present pressure containment problems due to the high liquid inventories involved. The 6 mm pipe is based on classical heat pipes featuring ammonia in a stainless steel tube and a single layer wall capillary structure. The ammonia is replaced by methane, nitrogen, or ethane. The pipe performs well in the 70 to 150 K range. It is suitable for spaceborne low power sensors, detectors, and low noise amplifiers. Author (ESA)

N82-19510# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Experimentelle Stroemungsmechanik.
AN INVESTIGATION OF WALL PRESSURE FLUCTUATIONS BEHIND A SUDDEN ENLARGEMENT OF THE CROSS SECTIONAL AREA OF A ROUND PIPE
Bernhard Stahl Aug. 1981 74 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-81-35) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 13,35

Wall pressure fluctuations behind an abrupt enlargement of a round pipe cross section, where flowing air forms a turbulent mixing zone generating aerodynamic noise, were investigated theoretically and experimentally. Microphone measurements along the pipe wall indicate that the greatest part of the energy lies in the low frequency wall pressure fluctuations, and that these fluctuations encompass the entire mixing zone. The propagating acoustic modes in the flow field within the pipe were computed using the wave equation, and compared with the experimentally determined pipe resonances. Narrow band measurements made with different boundary conditions (open pipe end, anechoically closed pipe) show that the resonances occurring in the pipe can strongly influence the pressure fluctuations. For the low frequency pressure fluctuations, mode decomposition shows that most of the energy lies in the axisymmetric mode $m = 0$. Author (ESA)

N82-19511# Delft Hydraulics Lab. (Netherlands). Mathematics Branch.
ON THE NEUMANN PROBLEM FOR THE PRESSURE IN A NAVIER-STOKES MODEL
B. J. Alfrink Aug. 1981 13 p refs Presented at 2nd Intern. Conf. on Numerical Methods in Laminar and Turbulent Flow, Venice, 13-16 Jul. 1981
(Publ-257) Avail: NTIS HC A02/MF A01

The numerical solution of two dimensional viscous incompressible fluid flow is treated. As the transient pressure solution is required, the differential system is formulated in terms of primitive variables. The equation of motion is split into divergence free and curl free parts. The pressure is solved, using the marker and cell algorithm. The Neumann problem for the pressure must satisfy a Gauss theorem. Care has to be taken to fulfill this compatibility condition in discrete form. Results show that by using a regular grid this is not realized in general. Particular attention is paid to the treatment of boundary conditions on a space-staggered grid. Author (ESA)

N82-19512# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.

TRANSID: A COMPUTER PROGRAM FOR THE ANALYSIS OF HYDRAULIC TRANSIENTS IN CONDENSER COOLING CIRCUITS

A. Capozza 1981 43 p refs Presented at 5th Intern. Symp. on Water Column Separation, Obernach, West Germany, 28-30 Sep. 1981 Sponsored by Ente Nazionale per l'Energia Eletricca (CISE-1722) Avail: NTIS HC A03/MF A01

A computer program to predict the hazards of a given pump regime to the integrity of a cooling circuit was developed. The computer program is based on models of overpressures resulting from water column separation phenomena induced by strong and swift variations of cooling water flow rate in the circuit. The TRANSID version, termed TR/2, is described. The TRANSID code is written in FORTRAN IV language. It runs on an IBM 4341 as well as on a CDC CYBER 76. The total storage occupation, including the necessary system routines, is equivalent to 360 Kbytes on an IBM 4341 and 35 Kwords on a CYBER 76. The CPU time, for time step and for space mesh, is equivalent to 10 msec and 1 msec. Pump trip-off transients predicted by the TR/2 code are compared with in situ condenser cooling circuit measurements. Author (ESA)

N82-19513# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ACTA MECHANICA SINICA (SELECTED ARTICLES)

12 Nov. 1981 74 p refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1980 p 18-28, 38-47, 84-99 (AD-A108208; FTD-ID(RS)T-0708-81) Avail: NTIS HC A04/MF A01 CSCL 20/4

Aerodynamic analyses of bodies in hypersonic source flow fields were made. Measurements of the static and dynamic stability derivatives of conical models in shock tunnels were obtained. Laminar heat transfer with mass injection and chemical reaction was investigated. Numerical calculation of the steady two dimensional axi-symmetrical turbulent boundary layer of a compressible fluid was also made. Results are presented and discussed. For individual titles, see N82-19514 through N82-19518.

N82-19514# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

NUMERICAL CALCULATION OF STEADY TWO-DIMENSIONAL AXI-SYMMETRICAL TURBULENT BOUNDARY LAYER OF A COMPRESSIBLE FLUID

Wang Ying-shih *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 12 Nov. 1981 p 1-23 refs Transl. into ENGLISH from Acta. Mech. Sinica (China), no. 1, 1980 23 p (For primary document see N82-19513 10-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

A momentum equation expressed by the stress tensor was employed to derive the momentum equation of a non-rotational steady axi-symmetrical turbulent boundary layer of a compressible fluid in the axi-symmetrical coordinate system. It was found that if the flow in the duct was to be treated as viscous fluid everywhere then the curvature of the duct and the rate of variation of the curvature along the direction of the flow cannot be too large. This was not proven in existing literature. Based on the set of equations proposed in this paper, a computer program is compiled and a numerical example is computed. M.D.K.

N82-19515# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

LAMINAR HEAT TRANSFER WITH MASS INJECTION AND CHEMICAL REACTION

Zu Tie-lin *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 12 Nov. 1981 p 24-43 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1980 20 p (For primary document see N82-19513 10-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

A general stoichiometric formula was derived to simplify a boundary layer problem with mass injection and chemical reaction. An analysis was performed using chemical equilibrium as an example. The calculated results were found to be consistent with the experimental ones. When the amount of injection is zero, the relevant data were in good agreement with the results. Finally, it was pointed out that with the increasing available energy of the exo-thermic reaction the effect of Lewis number on heat transfer decreases as the capability of heat generating reactions increases. M.D.K.

N82-19516# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE MEASUREMENTS OF THE STATIC AND DYNAMIC STABILITY DERIVATIVES OF CONICAL MODELS IN THE SHOCK TUNNEL

Jia-huan Ma, Zhong-heng Tang, Xiao-ping Zhang, and Yan-ping Guo *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 12 Nov. 1981 p 44-52 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1980 9 p (For primary document see N82-19513 10-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

An experiment was conducted in a JF-8 reflection type shock tunnel. To extend the range of application of the shock tunnel on the one hand, and to initiate the experimental study of hypersonic dynamic stability some effort was spent on modeling and angular measurement. Measurements of 1.5-2.0 cycles of pitching angle motion 0c = 10 deg and 11 deg cones in a hypersonic flow of M infinity = 9.0 with the model free flight method were obtained. Through data processing technique, not only the static stability derivatives were obtained, but also the preliminary results of the dynamic stability. M.D.K.

N82-19517# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

LEAST SQUARES FINITE ELEMENT ANALYSIS OF STEADY HIGH SUBSONIC PLANE POTENTIAL FLOWS

Bo-nan Jiang and Jia-zhen Chai *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 12 Nov. 1981 p 53-59 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1980 7 p (For primary document see N82-19513 10-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

A least squares finite element method was used to analyze steady, subsonic plane potential flows. Several advantages of the method for solving problems of compressible potential flows are discussed. An iteration method was employed to find the numerical solutions. Both the variable stiffness and constant stiffness models were tried. It was found that the variable stiffness method is especially suitable for high subsonic flows. M.D.K.

N82-19518# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE AERODYNAMICAL ANALYSIS OF BODY IN HYPERSONIC SOURCE FLOW FIELD

Guo-can Ling *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 12 Nov. 1981 p 60-70 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1980 11 p (For primary document see N82-19513 10-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

The hypersonic source flow field, a typical non-uniform free stream flow field, around a body was investigated. Various aerodynamic coefficients were obtained by means of Newton's theory. Analysis of the effects of the non-uniformity of the free stream was emphasized. It was found that under the condition of small angle of attack the analytical results are satisfactory. M.D.K.

N82-19519# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Fluid Dynamics Panel.

A COMPILATION OF UNSTEADY TURBULENT BOUNDARY LAYER EXPERIMENTAL DATA

L. W. Carr (Army Aeromechanics Lab., Ames Research Center, Calif.) London Nov. 1981 56 p refs (AGARD-AG-265; ISBN-92-835-1406-8) Avail: NTIS HC A04/MF A01

A comprehensive literature search was conducted and those experiments related to unsteady turbulent boundary layer behavior were cataloged. In addition, an international survey of industrial, university, and governmental research laboratories was made, in which experimental programs associated with unsteady turbulent boundary layer research were identified. Pertinent references were reviewed and classified based on the technical emphasis of the various experiments. Experiments that include instantaneous or ensemble averaged profiles of boundary layer variables are stressed. Detailed reviews that include descriptions of the experimental apparatus, flow conditions, summaries of acquired data, and significant conclusions are made. The measurements of these experiments that exist in digital form have been stored on magnetic tape, and instructions are presented for accessing these data sets for further analysis. S.L.

N82-19564# Shock and Vibration Information Center (Defense), Washington, D. C.

VORTEX SHEDDING FROM CYLINDERS AND THE RESULTING UNSTEADY FORCES AND FLOW PHENOMENA, PART 2

S. T. Fleischmann and D. W. Sallet (Maryland Univ., College Park) *In its* The Shock and Vibration Digest, Vol. 13, No. 12 Dec. 1981 p 15-24 refs (For primary document see N82-19562 10-39)

Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375: $15.00/set CSCL 20/11

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-19520# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

AUTOMATIC ANALYSIS OF MULTISPECTRAL IMAGES

Luciano Vieira Dutra, Ricardo Cartaxo Modesto deSouza, Fernando Augusto Mitsuo, II, and Jose Carlos Moreira Aug. 1981 33 p refs In PORTUGUESE; ENGLISH summary

(INPE-2212-MD/009) Avail: NTIS HC A03/MF A01

Some ideas of automatic multispectral image analysis are introduced. Automatic multispectral image analysis plays a central role in numerically oriented remote sensing systems. It presupposes the utilization of electronic equipments, mainly computers and their peripherals, to help people to interpret the information contained in multispectral digital imagery. This necessity derives from the great amount of multispectral data gathered by remote sensors within satellites and airplanes. When the number of channels or spectral bands is increased, the interpretation becomes more complex and subjective. In some cases, for example, in harvest estimation in national or regional level, it is imperative to use computer systems to complete the work within the time required. Automatic analysis also aimes to eliminate subjective factors that appear in the human interpretation, so increasing the global precision. R.J.F.

N82-19521*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

HIGH-SPEED LASER ANEMOMETER SYSTEM FOR INTRAROTOR FLOW MAPPING IN TURBOMACHINERY

J. Anthony Powell, Anthony J. Strazisar, and Richard G. Seasholtz Feb. 1982 22 p refs

(NASA-TP-1663; E-276) Avail: NTIS HC A02/MF A01 CSCL 14B

A fringe-type laser anemometer with innovative features is described. The innovative features include: (1) rapid, efficient data acquisition processes, (2) detailed graphic display of data being accumulated, and (3) input laser-beam positioning that allows greater optical access to the intrarotor region. Results are presented that demonstrate the anemometer's capability in flow mapping within a transonic axial-flow compressor rotor. M.D.K.

N82-19522# Army Electronics Research and Development Command, Fort Monmouth, N. J. Combat Surveillance and Target Acquisition Lab.

RADIATION AND TEMPERATURE TESTS OF CADMIUM TELLURIDE DETECTORS Research and Development Technical Report, Oct. 1980 - Oct. 1981

Ockle E. Johnson Nov. 1981 36 p

(DA Proj. 1L1-62703-DH-93)

(AD-A106774; DELCS-TR-81-3) Avail: NTIS HC A03/MF A01 CSCL 18/4

The testing of CdTe sensors together with front end electronics developed by Radiation Monitoring Devices, Inc. for Radiac Division CS&TA Laboratory, Fort Monmouth, N.J. is described. These new solid state sensors show promise, in terms of miniature size and sensitivity, toward the development goal of wrist-watch-sized military radiac. The unit was to operate from .01 mR/h to 1,000,000 mR/h using the least of number of sensors. GRA

N82-19523# Range Commanders Council, White Sands Missile Range, N. Mex. Telecommunications Group.

INSTRUMENTATION TIMING SYSTEMS Final Report

Nov. 1981 187 p Supersedes TCG-123-72

(AD-A109006; TCG-123-81; TCG-123-72) Avail: NTIS HC A09/MF A01 CSCL 16/1

An update of Document 123-72, published April 1972 is presented. It describes the timing systems and facilities available at the various Range Commanders Council member and associate member ranges. GRA

N82-19524# Texas Technological Univ., Lubbock. Dept. of Electrical Engineering.

SPACE-VARIANT OPTICAL SYSTEMS Annual Report, 30 Sep. 1980 - 30 Sep. 1981

John F. Walkup and Thomas F. Krile Nov. 1981 15 p refs (Grant AF-AFOSR-0076-79; AF Proj. 2305)

(AD-A109083; AFOSR-81-0834TR) Avail: NTIS HC A02/MF A01 CSCL 14/5

Analytical and experimental investigations of 2-D space-variant optical processing techniques were conducted. Coherent processing investigations have included (1) an experimental study of the characteristics of photoresist phase masks for multiplex holography, (2) the development of facility for generating high quality computer-generated holograms by use of a laser plotter, and (3) analytical investigation of an idea for using 1-D techniques to perform 2-D space variant operations. In the incoherent processing area experiments have proceeded to test the tristimulus-based technique for performing complex operations using hue, saturation, and intensity parameters to represent complex numbers. Author (GRA)

N82-19525# Utah State Univ., Bedford, Mass. Electro-Dynamics Lab.

CRYOGENICALLY COOLED INFRARED INTERFEROMETRIC SPECTROMETERS

Ronald J. Huppi and Allan J. Steed 30 Jun. 1981 52 p

(Contract F19628-78-C-0018; AF Proj. 7670; DNA Proj. S99-QAXH)

(AD-A108868; EDL-SRL-81-1; AFGL-TR-81-0201; SR-2) Avail: NTIS HC A04/MF A01 CSCL 17/5

Very sensitive Fourier transform spectrometers (FTS's) have been developed for infrared measurements utilizing advanced technology to achieve stable operation at very low temperatures. All of the structural, optical, and detector components used to construct these spectrometers are cryogenically cooled to improve the sensitivity of their detectors and to eliminate unwanted background emission signals from the components. Various designs of cooled FTS systems which have been successfully used and tested by USU and AFGL are presented in the paper. The performance specifications, the advantages, and the limitations of each technique are discussed. Also, general evaluations of the advantages and the limitations of cooling an FTS are given. Author (GRA)

N82-19526# Societe pour le Perfectionnement des Materiels et Equipements Aerospatiaux, Toulouse (France). Lab. d'Essais d'Environnement.

DEFINITION STUDY ON MULTISHAKERS FOR VIBRATION TESTING
J. Merlet and J. C. Pasquet Paris ESA 5 Aug. 1981 179 p
Partly in FRENCH and ENGLISH
(Contract ESTEC-4515/80/NL-PP(SC))
(SOPEMEA-ET-17004; ESA-CR(P)-1499) Avail: NTIS
HC A09/MF A01

The mechanical coupling of two 140 KN electrodynamic shakers for random vibration testing of Ariane payloads is described. The shakers placed side by side, operate in a range from 5 to 2000 Hz. Tests at 11 g between 20 and 2000 Hz can be performed. Time required for changing the axis of vibration is cut since no manual handling is required. Vertical and horizontal excitation tables are provided. For horizontal tests, a control system based on hydrostatic bearings is used. The table is highly rigid, with satisfactory transverse motion. Author (ESA)

N82-19527# Technische Universitaet, Brunswick (West Germany). Inst. fuer Thermodynamik.
CONCEPTION OF AN APPARATUS FOR PRESSURE, DENSITY, AND TEMPERATURE MEASUREMENTS IN THE CRITICAL REGION OF PURE FLUIDS IN SPACELAB Final Report, Feb. 1979
Wolfgang Wagner, Hans-Georg Kratz, and Willi Pentermann Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 40 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-026; ISSN-0170-1339) Avail: NTIS
HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Gemany DM 8,40

A multicell arrangement, allowing isochoric pressure, density and temperature measurements, in the critical region of pure fluids in order to establish their thermodynamic properties in the absence of gravity, is described. The knowledge of these properties is a prerequisite for obtaining correct equations of state and strongly affects the dimensioning of chemical engineering processing plants. Fundamental aspects of measuring thermodynamic data in the critical region are discussed and applied to the Spacelab environment. The layout of the apparatus, its temperature control, and the instrumentation for density and pressure measurements are described. Author (ESA)

N82-19528# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
DETAILED INVESTIGATION OF A TIME OF FLIGHT NEUTRON SPECTROMETER Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Physics (EUR-NE)
T. Elevant, J. Lorenzen (Studsvik Energiteknik AB), and B. Trostell (Studsvik Science Research Lab., Sweden) Feb. 1981 53 p refs Sponsored by Euratom and JET
(TRITA-PFU-81-01; ISSN-0348-7644) Avail: NTIS
HC A04/MF A01

A neutron spectrometer and telescope based on double elastic interaction in two scintillators was tested on two neutron sources: a solid deuterium titanium target for D(d, n)He3 reaction, and a tritium gas cell for T(p, n)He3. The spectrometer provides a relative resolution of the ion temperature from 20% to 70% at ion temperatures around 1 keV and a flight path length of 2 m. For ion temperatures around 5 keV, the figures are 10% to 20% and for 10 keV, 7% to 10%. The telescope provides spatial resolutions from 0.25 to 0.50 m with flight path lengths from 0.6 to 1.3 m. The width of the energy peak of a neutron source used for calibrating must be known to within a few keV to obtain adequate resolutions. Author (ESA)

N82-19529# Stuttgart Univ. (West Germany). Inst. for Clock Engineering and Precision Mechanics.
DIGITAL TIME CONTROL FOR CAMERA SHUTTERS
Manfred Ackermann Jul. 1980 37 p refs Transl. into English of mono. "Digitale Zeitsteuerung fuer Kameraverschluesse" West Germany Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn
(PB82-116328; BMFT-FB-T-80-028) Avail: NTIS
HC A03/MF A01 CSCL 14E

The employment of a digital circuitry instead of mechanical escapements for the shutter control of automatically controlled exposure meters in still cameras is discussed. A way to determine the proper exposure time is described. Automatic exposure has the advantage that it summarizes digitally the light quantities which enter when the shutter is open. It is found that exposure control has the possibility for accuracy, especially when lighting conditions are changing, and also at long exposure times. GRA

N82-20124*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MASTER TIMING SYSTEM MEASUREMENTS
E. F. Endsley *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 70-74 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14B

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-19530# Sigma Tau Standards Corp., Tuscaloosa, Ala.
LIGHTWEIGHT HYDROGEN MASER Interim Report, 1 Oct. 1980 - 30 Jun. 1981
Harry E. Peters Griffiss AFB, N.Y. RADC Oct. 1981 14 p refs
(Contract F19628-79-C-0104; AF Proj. 4600)
(AD-A108628; Rept-102-3; RADC-TR-81-270) Avail: NTIS
HC A02/MF A01 CSCL 20/5

Based upon a new approach to cavity resonator design, an atomic hydrogen maser frequency standard was developed which is smaller and lighter by a factor of eight from previous hydrogen maser designs, but exhibits improved performance over other types of atomic standard. An operational prototype device is presently in the final assembly stage. Author (GRA)

N82-19531# Rochester Univ., N. Y. Dept. of Chemistry.
ON THE SYNERGISTIC EFFECTS OF LASER/PHONON-STIMULATED PROCESSES: A MASTER EQUATION APPROACH Interim Technical Report
Jui-teng Lin and Thomas F. George Dec. 1981 17 p refs
Submitted for publication
(Contract N00014-80-C-0472; NR Proj. 056-749)
(AD-A109025; TR-16) Avail: NTIS HC A02/MF A01 CSCL 20/5

The synergistic effects of an adspecies/surface system influenced by a coherent laser field and an incoherent thermal phonon field are theoretically investigated. A generalized master equation is derived in the Schrodinger-Markoff picture and the total stimulated transition rates are decomposed into three parts: thermal phonon, laser and the interference terms. The energy transfer dynamics is pictured via the evolution equation of the average excitation of the active mode. A random phase of the off-diagonal matrix elements induced by the laser-stimulated surface processes is introduced. Finally, possible applications of the laser/phonon-stimulated master equation are discussed. Author (GRA)

N82-19532# Saint Louis Univ., Mo. Dept. of Physics.
CATOPTRIC X-RAY OPTICAL SYSTEM FOR USE IN LASER-FUSION DIAGNOSTICS Annual Technical Report, 1 Oct. 1980 - 30 Sep. 1981
James F. McGee 30 Nov. 1981 20 p refs
(Grant AF-AFOSR-3480-78; AF Proj. 2301)
(AD-A109037; AFOSR-81-0865TR) Avail: NTIS
HC A02/MF A01 CSCL 14/2

A compound X-ray imaging device was developed as an aid in the diagnostics of a laser-fusion process which involves a pellet about 100 microns in diameter. While previous reports have dealt with the use of certain aspheric surfaces in the X-ray imaging process, this report is confined to a thorough investigation of the use of Abbe's sine condition at grazing angles of incidence in the case of a single reflector. Author (GRA)

N82-19533# Philips Labs., Briarcliff Manor, New York.
DEVELOPMENT OF A NOVEL LASER MATERIAL FOR MINIATURIZED LASER SYSTEMS Quarterly Technical Report, 1 Jul. - 30 Sep. 1981

Walter K. Zwicker, Sel Colak, and Jacob Khurgin Nov. 1981 28 p refs
(Contract MDA903-81-C-0034; DARPA Order 4040)
(AD-A109129; QTR-4) Avail: NTIS HC A03/MF A01 CSCL 20/5

Our work during this quarter dealt with the growth and evaluation of NPP crystals for a 1.06 micrometer miniature laser and Er(3+) stoichiometric crystals for an eyesafe miniature laser emitting at 1.54 micrometer. Crystals of NPP up to 2x2x20 mm for fabrication of miniature laser rods were grown by a previously described high-temperature, solution-growth technique. Flashlamp-pumped lasing experiments were conducted using various sizes of NPP crystals, in both the free-oscillation and Q-switched modes at different pulse repetition rates. Output pulse energies and properties of the laser output beam were measured. The efficiencies for the free-oscillation mode were close to the maximum published values; for the Q-switched mode, the efficiencies were low compared to published values. Crystals of ErP5O14 were grown by the same technique used for NPP; crystals of ErLiP4O12 and ErAl3(BO3)4 were grown by related fluxed-melt techniques. These crystals were several millimeters in size. Both Yb and Gd were added in various ratios as sensitizing and/or diluent ions. the absorption and emission properties of the Er3+ luminescence in some samples of ErP5O14, LiErP4O12, and ErAl3(BO3)4 have been studied both in the visible and infrared regions of the spectrum. Preliminary evaluations of these materials for laser applications have been made. GRA

N82-19534# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Kreiselgeraete und Traegheitsortung.
ELECTRONICS FOR DATA ACQUISITION OF LASER GYROSCOPE MEASUREMENTS
Friedrich Posnien Apr. 1981 54 p refs In GERMAN; ENGLISH summary
(Contract BWB-E/F-51-E/90001/85484)
(DFVLR-Mitt-81-16) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 15

The electronics for a signal readout system for laser gyroscopes are described. In the analog part of the readout electronics, a single beam readout method was used, enhancing the signal to noise ratio as compared to the interference stripe pattern. Two digital methods for identifying the lock-in-gap and for steering the output counter were investigated. The first is based on identification by monostable multivibrators, the second on identification by a digital comparator. Author (ESA)

N82-19535# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
LASER JOURNAL (SELECTED ARTICLES)
6 Nov. 1981 31 p refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 2, 1981 p 5-9, 17-20, 47-49, 56-57
(AD-A108173; FTD-ID(RS)T-0861-81) Avail: NTIS HC A03/MF A01 CSCL 20/5

Properties of steady discharge in Ar-Kr-F2 gas mixtures are discussed. Experimental investigations of uv-preionized ArF and KrF eximer lasers are reported. Nd: yag pulsed laser output at various infrared singlet spectral lines are examined. A feedback controlled stabilized power supply for gas lasers is reported. For individual titles, see N82-19536 through N82-19539.

N82-19536# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PROPERTIES OF STEADY DISCHARGE IN Ar-Kr-F2 GAS MIXTURE
Zheng Chengen *In its* Laser J. (Selected Articles) (FTD-ID(RS)T-0861-81) 6 Nov. 1981 p 1-11 refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 2, 1981 p 5-9 (For primary document see N82-19535 10-36)
Avail: NTIS HC A03/MF A01 CSCL 20/5

Some properties of Ar-Kr-F2 laser gas mixture plasma under steady discharge conditions are computed and discussed. Both the excitation rate of the discharging electrons and the distribution of the discharge energy are discussed. The effects of fluoride gas content and impurity gas content on the discharge property are studied. B.W.

N82-19537# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
UV-PREIONIZED ArF AND KrF EXCIMER LASERS
Shangguan Cheng, Yuan Cailai, and Ye Chao Dou Alrong *In its* Laser J. (Selected Articles) (FTD-ID(RS)T-0861-81) 6 Nov. 1981 p 12-19 refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 2, 1981 p 17-20 (For primary document see N82-19535 10-36)
Avail: NTIS HC A03/MF A01 CSCL 20/5

Experimental investigations of UV-preionized ArF and KrF excimer lasers are reported. The output laser energies of 105 mJ for ArF and 185 mJ for KrF are obtained. Effects of various parameters on the laser characteristics are discussed. Author

N82-19538# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
Nd:YAG PULSED LASER OUTPUT AT 1.064, 1.073, 1.061 AND 1.052 MICROMETERS SINGLET SPECTRAL LINES
In its Laser J. (Selected Articles) (FTD-ID(RS)T-0861-81) 6 Nov. 1981 p 20-24 refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 2, 1981 p 47-49 (For primary document see N82-19535 10-36)
Avail: NTIS HC A03/MF A01 CSCL 20/5

Single spectral lines at 1.064, 1.073, 1.061, and 1.052 micron were obtained respectively by inserting into the cavity the uncoated (or coated) solid etalons of 0.1 mm or both 0.1 mm and 0.14 mm thickness and appropriately controlling the gain of Nd:YAG laser and tilted angles of the etalons. An output cavity mirror which has different reflectivities for different wavelengths was also developed. B.W.

N82-19539# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A NEW FEEDBACK CONTROLLED CURRENT STABILIZED POWER SUPPLY FOR GAS LASER
In its Laser (Selected Articles) (FTD-ID(RS)T-0861-81) 6 Nov. 1981 p 25-27 refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 2, 1981 p 56-57 (For primary document see N82-19535 10-36)
Avail: NTIS HC A03/MF A01 CSCL 20/5

A feedback controlled current stabilized power supply for CO2 wave guide lasers is reported. This current negative feedback control method involved connecting the control transistor to the DC output and of an AC bridge rectifier. Current is stabilized in the range of 2 to approximately 4 mW, the unstability of the current is less than 1% with respect to 20% fluctuation of network voltage. The principal circuit and the voltage-current wave forms of the power supply are shown. B.W.

N82-20041*# Maryland Univ., College Park. Dept. of Physics and Astronomy.
PLASMA LASERS (A STRONG SOURCE OF COHERENT RADIATION IN ASTROPHYSICS)
K. Papadopoulos *In* ESA Plasma Astrophys. Nov. 1981 p 89-95 refs (For primary document see N82-20030 10-88)
(Contracts NAGw-81; N00014-79-C-0665)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 20E

N82-20118*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DEVELOPMENT OF A MAGNETICALLY ENHANCED HYDROGEN GAS DISSOCIATION
L. Maleki and T. K. Tucker *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 24-28 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20E

N82-20119*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MAGNETIC REFRIGERATION FOR MASER AMPLIFIER COOLING
D. L. Johnson *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 29-38 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20E

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-19540* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPOSITE SEAL FOR TURBOMACHINERY Patent
Robert C. Bill and Lawrence P. Ludwig, inventors (to NASA) Issued 20 Oct. 1981 5 p Filed 20 Nov. 1979 Division of US Patent Appl. SN-931090, filed 8 Aug. 1978, US Patent-4,207,024 which is a division of US Patent Appl. SN-810290, filed 27 Mar. 1977, US Patent-4,135,851
(NASA-Case-LEW-12131-3; US-Patent-4,295,786; US-Patent-4,207,024; US-Patent-4,135,851; US-Patent-Appl-SN-096255; US-Patent-Appl-SN-931090; US-Patent-Appl-SN-801290; US-Patent-Class-415-174; US-Patent-Class-415-196) Avail: US Patent and Trademark Office CSCL 11A

A gas path seal suitable for use with a turbine engine or compressor is provided. A shroud wearable or abradable by the abrasion of the rotor blades of the turbine or compressor shrouds the rotor blades. A compliant backing surrounds the shroud. The backing is a yieldingly deformable porous material covered with a thin ductile layer. A mounting fixture surrounds the backing.
Official Gazette of the U.S. Patent and Trademark Office

N82-19541 British Aerospace Dynamics Group, Bristol (England).
LIFE-SIZE QUANTITATIVE TESTS ON A SIMPLE COUNTERSPUN FLYWHEEL NUTATION DAMPER
S. W. Tonkin and W. J. Shackcloth 1980 60 p refs
(BAe-NUTDAM-11) Avail: Issuing Activity

A nonactive nutation damper for use on single-spin spacecraft is considered. A test rig and damper calibration table were constructed. Suitable instrumentation and measurement techniques were developed. The damper was integrated into the test rig and a series of tests were completed. The damper is shown to be effective. However, further modifications are required on both damper and test techniques before a commercial damper can be marketed; these are discussed. Author (ESA)

N82-19542*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONVENTIONAL ENGINE TECHNOLOGY. VOLUME 1: STATUS OF OTTO CYCLE ENGINE TECHNOLOGY
M. W. Dowdy 15 Dec. 1981 216 p refs
(Contracts NAS7-100; DE-AI01-80CS-50194)
(NASA-CR-168643; JPL-Pub-81-65-Vol-1; DOE/CS-50194/1)
Avail: NTIS HC A10/MF A01 CSCL 21A

Federally-mandated emissions standards have led to major changes in automotive technology during the last decade. Efforts to satisfy the new standards were directed more toward the use of add-on devices, such as catalytic converters, turbochargers, and improved fuel metering, than toward complete engine redesign. The resulting changes are described and the improvement brought about by them in fuel economy and emissions levels are fully documented. Four specific categories of gasoline-powered internal combustion engines are covered, including subsystem and total engine development. Also included are the results of fuel economy and exhaust emissions tests performed on representative vehicles from each category. Author

N82-19543*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONVENTIONAL ENGINE TECHNOLOGY. VOLUME 2: STATUS OF DIESEL ENGINE TECHNOLOGY
H. W. Schneider 15 Dec. 1981 191 p refs
(Contracts NAS7-100; DE-AI01-80CS-50194)
(NASA-CR-168644; JPL-Pub-81-65-Vol-2; DOE/CS-50194/1)
Avail: NTIS HC A09/MF A01 CSCL 21A

The engines of diesel cars marketed in the United States were examined. Prominent design features, performance characteristics, fuel economy and emissions data were compared. Specific problems, in particular those of NO and smoke emissions, the effects of increasing dieselization on diesel fuel price and availability, current R&D work and advanced diesel concepts are discussed. Diesel cars currently have a fuel economy advantage over gasoline engine powered cars. Diesel drawbacks (noise and odor) were reduced to a less objectionable level. An equivalent gasoline engine driveability was obtained with turbocharging. Diesel manufacturers see a growth in the diesel market for the next ten years. Uncertainties regarding future emission regulation may inhibit future diesel production investments. With spark ignition engine technology advancing in the direction of high compression ratios, the fuel economy advantages of the diesel car is expected to diminish. To return its fuel economy lead, the diesel's potential for future improvement must be used.
Author

N82-19544*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONVENTIONAL ENGINE TECHNOLOGY. VOLUME 3: COMPARISONS AND FUTURE POTENTIAL
M. W. Dowdy 15 Dec. 1981 32 p ref
(Contracts NAS7-100; DE-AI01-80CS-50194)
(NASA-CR-168645; JPL-Pub-81-Vol-3; DOE/CS-50194/1)
Avail: NTIS HC A03/MF A01 CSCL 21A

The status of five conventional automobile engine technologies was assessed and the future potential for increasing fuel economy and reducing exhaust emission was discussed, using the 1980 EPA California emisions standards as a comparative basis. By 1986, the fuel economy of a uniform charge Otto engine with a three-way catalyst is expected to increase 10%, while vehicles with lean burn (fast burn) engines should show a 20% fuel economy increase. Although vehicles with stratified-charge engines and rotary engines are expected to improve, their fuel economy will remain inferior to the other engine types. When adequate NO emissions control methods are implemented to meet the EPA requirements, vehicles with prechamber diesel engines are expected to yield a fuel economy advantage of about 15%. While successful introduction of direct injection diesel engine technology will provide a fuel savings of 30 to 35%, the planned regulation of exhaust particulates could seriously hinder this technology, because it is expected that only the smallest diesel engine vehicles could meet the proposed particulate requirements. A.R.H.

N82-19545# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va.
PERFORMANCE OF INDUSTRIAL-TYPE ENGINES IN MILITARY EQUIPMENT USING SYNTHETIC CRANKCASE OILS Final Report
Gene H. Austin, Thomas Bowen, Lewis Cheek, and Basil Zanedis Jun. 1981 187 p ref
(AD-A109023; MERADCOM-2326) Avail: NTIS HC A09/MF A01 CSCL 11/8

The investigation was to determine the possibility of eliminating crankcase oil changes in engines used in Military equipment. Based on the results, it appears that an extended oil change interval can be used which would result in significant savings. Author (GRA)

N82-19546# Stuttgart Univ. (West Germany). Inst. fuer Kernenergetik und Energiesysteme.
TUBE TO TUBESHEET WELDING BY ELECTRON BEAM FOR HEAT EXCHANGER APPLICATION
F. Noller and H. G. Mayer Jun. 1981 116 p refs In GERMAN; ENGLISH summary
(IKE-1-11; ISSN-0173-6892) Avail: NTIS HC A06/MF A01

The importance of tube to tubesheet welding and the choice of materials, by electron beam (EB) application, in the construction of steam generators was examined. The EB process was used to weld tubes into tubesheets even with materials sensitive to hot cracking. The range of qualified welding parameters is evaluated. A microcomputer controlled welding cycle using beam deflection, automatic seam tracking, beam current and focus control, is recommended. Results are adapted to specific conditions of mobile welding equipment with localized vacuums.
Transl. by E.A.K.

N82-19547# National Centre of Tribology, Risley (England).
SELECTED EUROPEAN SPACE TRIBOLOGY LABORATORY (ESTL) PAPERS ON BALL BEARINGS FOR SATELLITES
M. J. Todd, K. T. Stevens, and E. J. Robbins Paris ESA Sep.

1980 98 p refs Sponsored by ESA
(ESA-TRIB-1; ISSN-0250-4448) Avail: NTIS HC A05/MF A01

Thin lead film lubricants, radial thermal conductance, torque, and cage instabilities are discussed. A lead plating method with improved adhesion torque, and wear characteristics is presented. The effect of bearing size, load, speed, and lubricant on thermal conductance in vacuum is examined. A model which predicts frictional torque is assessed. The torque of ball bearings moving over very small angles, of relevance to attitude control and pointing, is treated. For individual titles, see N82-19548 through N82-19548.

N82-19548# National Centre of Tribology, Risley (England).
ION-PLATED LEAD AS A FILM LUBRICANT FOR BEARINGS IN VACUUM
M. J. Todd and E. J. Robbins *In its* Selected ESTL Papers on Ball Bearings for Satellites Sep. 1980 p 1-13 refs Sponsored by ESA (For primary document see N82-19547 10-37)
Avail: NTIS HC A05/MF A01

A space qualified technique which produces adherent, good quality lead films on the raceways of ball bearings is described. After argon ion sputter cleaning, the lead is evaporated into a glow discharge maintained in an inert gas, usually argon. The atoms of vapor, some of which become ionized, then bombard a target cathode holding the specimens to be plated. The deposition rate during plating must exceed sputtering rate. Six pairs of ion plated bearings were torque tested at 2 million revolutions per pair, at low speed. The average torque is 0.002 Nm, well within the 0.028 Nm preset trip level. Steel wear is restricted to very mild pitting. Debris worn from the lead-bronze cage still represents the major source of torque noise, despite the large reduction in debris compared with vacuum-evaporated films. A lead-containing cage with a very much lower wear rate of the supporting matrix is needed for medium and high speed use. Author (ESA)

N82-19549# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).
THE SUSPENSION SYSTEM OF THE CRYOGENIC GRAVITATIONAL ANTENNA OF THE ISTITUTO PLASMA SPAZIO [SISTEMA DI SOSPENSIONE DELL'ANTENNA GRAVITAZIONALE CRIOGENICA DEL'I.P.S.]
E. Coccia (Rome Univ.) and V. Iafolla Oct. 1981 35 p refs In ITALIAN
(IPS-81-14) Avail: NTIS HC A03/MF A01

The design of a two stage suspension system for a gravitational antenna is described. The antenna weighs 5 t and works in liquid helium, pumped at 4.2 K. The signals to be detected, mainly from supernova sources, are energy fluxes on the order of 0.0001 erg/cm sq. The amplitudes, induced in the fundamental vibration mode at 1796 Hz, are about 10 to the -18th power cm. The mechanical attenuation system was designed with a 3 Hz resonant frequency and 100 dB attenuation for the first stage and a 30 Hz frequency and 70 dB attenuation for the second stage. The measured value of attenuation is 120 dB, which is deemed satisfactory although lower than the 150 dB design value. The possible causes of this attenuation loss are discussed. Author (ESA)

N82-19556# Newcastle-upon-Tyne Univ. (England). Dept. of Mechanical Engineering.
CHAIN AND BELT DRIVES, A REVIEW
J. N. Fawcett *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 5 May 1981 p 5-12 refs (For primary document see N82-19555 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

N82-19559# Indian Inst. of Science, Bangalore. Dept. of Mechanical Engineering.
EVALUATION AND CONTROL OF THE EXHAUST NOISE OF RECIPROCATING I.C. ENGINES
M. L. Munjal *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 1 Jan. 1981 p 5-14 refs (For primary document see N82-19558 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-19550*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIENCE WITH MODIFIED AEROSPACE RELIABILITY AND QUALITY ASSURANCE METHOD FOR WIND TURBINES
William E. Klein 1982 11 p refs Proposed for Presentation at 9th Ann. Engr. Conf. on Reliability, Hershey, Penn., 16-18 Jun. 1982 Revised
(Contract DE-AI01-76ET-20320)
(NASA-TM-82803; DOE/NASA/20320-38; E-1142) Avail: NTIS HC A02/MF A01 CSCL 14D

The SR&QA approach assures that the machine is not hazardous to the public or operating personnel, can operate unattended on a utility grid, demonstrates reliability operation, and helps establish the quality assurance and maintainability requirements for future wind turbine projects. The approach consisted of modified failure modes and effects analysis (FMEA) during the design phase, minimal hardware inspection during parts fabrication, and three simple documents to control activities during machine construction and operation. Five years experience shows that this low cost approach works well enough that it should be considered by others for similar projects. T.M.

N82-19551# Mitre Corp., Bedford, Mass.
RIW WORKSHOP REPORT
Walter P. Crossley and Sidney A. Greenberg Hanscom AFB, Mass. Electronic Systems Div. Nov. 1981 56 p
(Contract F19628-82-C-0001; AF Proj. 5170)
(AD-A108798; MTR-8255; ESD-TR-81-257) Avail: NTIS HC A04/MF A01 CSCL 14/4

A reliability improvement warranty (RIW) workshop was convened on 9 to 10 December 1980 at the MITRE Corporation, Bedford, Mass., to explore the feasibility of RIW for current and future production JTIDS (Joint Tactical Information Distribution System) contracts. In particular, RIW suitability for the Class 1 JTIDS production buy was discussed. The concensus of the group was that RIW is not appropriate for the Class 1 production buy, but that it can be useful on other programs including Class 2 JTIDS if certain conditions are met and the RIW contract is tailored to the program. Author (GRA)

N82-19552# Grumman Aerospace Corp., Bethpage, N.Y.
TAPED RANDOM SPECTRA FOR RELIABILITY DEMONSTRATION TESTING Final Report, Oct. 1979 - Apr. 1981
Joseph J. Popolo, John G. Devitt, Richard OPokallus, and Noe Arcas Apr. 1981 211 p
(Contract N00019-77-C-0032)
(AD-A108803; RMS-81-R-1) Avail: NTIS HC A10/MF A01 CSCL 14/4

A study to develop an economical test technique for Reliability Demonstration tests in accordance with MIL-STD-781C was undertaken. This has been accomplished by developing two different methods: Multiplex System - incorporates a reel-to-reel tape recorder that generates the desired synthesized random spectrum on one channel while the other channel incorporates a control programmer; and Microprocessor System - incorporates a desk top computer that is programmed to initiate, monitor and control a Reliability Demonstration test. Included with this system is a 'sound-on-sound' tape cassette recorder to generate the synthesized random spectrum and a printer to record the control signals and monitor data during the test. Author (GRA)

N82-20125*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
OPTIMUM EQUIPMENT MAINTENANCE/REPLACEMENT POLICY. PART 2: MARKOV DECISION APPROACH
T. Charng *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 75-89 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

N82-20128*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TIGER RELIABILITY ANALYSIS IN THE DSN
J. M. Gunn *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 112-120 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

N82-20130*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MAINTENANCE AND OPERATIONS TASKS ACCOMPLISHED AT DSS 12 DURING THE ANTENNA PANEL REPLACEMENT DOWNTIME
L. Butcher, T. Jonas, and W. Wood *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 127-128 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N82-19553 Alabama Univ. in Huntsville.
DYNAMICS OF A CHAIN OF FLEXIBLE BODIES Ph.D. Thesis
Ramendra P. Singh 1981 134 p
Avail: Univ. Microfilms Order No. 8128324

A mathematical modeling technique is developed for a space structure idealized as a collection of flexible bodies in a chain configuration. The methodology employed in the derivation does not require the presence of a rigid body in the chain. The contiguous bodies are permitted to undergo large relative rotations. The Lagrange's form of D'Alembert's principle is adopted to derive the equations of motion. The mathematical foundations of the quasicoordinates are explored an it is shown that they emerge naturally from a variational principle. A floating reference frame called the Tisserand frame or the mean axis frame is selected for the dynamic analysis. It is shown that the Tisserand frame follows the deformable body in an optimal manner. This frame has a well defined motion in an inertial reference frame and is suitable for use in conjunction with linear structural theory. Dissert. Abstr.

N82-19554 Illinois Univ. at Urbana-Champaign.
NUMERICAL SIMULATION OF REINFORCED CONCRETE SUBJECTED TO MULTIAXIAL STRESS CONDITIONS Ph.D. Thesis
Eugene Yu-Tze Chen 1981 197 p
Avail: Univ. Microfilms Order No. 8127563

Reinforced concrete is by far one of the most commonly used construction materials. This composite material demonstrates a highly nonlinear behavior caused by cracking, crushing, aggregate interlock, bond slip, dowel action, shrinkage and creep. Because the reinforced concrete involves so many nonlinear phenomena interacting with one another, the formulation of a 'complete' analytical model is very difficult. The focus of this study is cast on: (1) three dimensional nonlinear constitutive relations and failure criterion for concrete subjected to short term monotonic loading; (2) crack modeling in concrete; (3) interface and stiffness transfer across the crack; and (4) finite element implementation of the findings into an integrated program. Comparison of numerical results with actual test results are presented to verify this proposed algorithm. Dissert. Abstr.

N82-19555# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 5 Monthly Report
Judith Nagle-Eshleman, ed. May 1981 129 p refs
(AD-A099477) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375: $15.00/set CSCL 20/11

The specific problems of chain drives and of belt drives are discussed. Methods for solving nonlinear stochastic problems in dynamics are presented including equivalent linearization, perturbation, functional series representation and simulation. Book reviews, seminars, and newsbriefs on related subjects are presented. A bibliography with abstracts is included. For individual titles, see N82-19556 through N82-19557.

N82-19556# Newcastle-upon-Tyne Univ. (England). Dept. of Mechanical Engineering.
CHAIN AND BELT DRIVES, A REVIEW c37
J. N. Fawcett *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 5 May 1981 p 5-12 refs (For primary document see N82-19555 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

The specific problems of chain drives and of belt drives are discussed. The general problem of axially moving materials which is appropriate to the spans of both chain and belt drives is also discussed. Vibration, noise and pulley-belt interaction are examined. B.W.

N82-19557# Sussex Univ., Brighton (England). School of Engineering and Applied Sciences.
RESPONSE OF NONLINEAR MECHANICAL SYSTEMS TO RANDOM EXCITATION. PART 2: EQUIVALENT LINEARIZATION AND OTHER METHODS
J. B. Roberts *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 5 May 1981 p 15-29 refs (For primary document see N82-19555 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Methods for solving nonlinear stochastic problems in dynamics are discussed. Equivalent linearization, perturbation, functional series representation, and simulation are examined. B.W.

N82-19558# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 1 Monthly Report
Judith Nagle-Eshleman, ed. Jan. 1981 102 p refs
(AD-A095594) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375: $15.00/set CSCL 20/11

Recent advances in the study of shock and vibration in mechanical systems are reviewed. Engine exhaust noise, vibration control with viscoelastic materials, and the vibrations and stability of mechanical systems are discussed. Book reviews on failure prevention and reliablity assurance, Lagrangian mechanics of nonconservative nonholonomic systems, and vibration measurement are included. A bibliography with abstracts is given. For individual titles, see N82-19559 through N82-19561.

N82-19559# Indian Inst. of Science, Bangalore. Dept. of Mechanical Engineering.
EVALUATION AND CONTROL OF THE EXHAUST NOISE OF RECIPROCATING I.C. ENGINES c37
M. L. Munjal *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 1 Jan. 1981 p 5-14 refs (For primary document see N82-19558 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375: $15.00/set CSCL 20/11

Recent advances in the analysis, design, and testing of exhaust mufflers for reciprocating internal combustion engines are reviewed. An outline of specific areas needing further attention is given. R.J.F.

N82-19560# Indian Inst. of Tech., New Delhi. Dept. of Mechanical Engineering.
VIBRATION CONTROL WITH VISCOELASTIC MATERIALS, 2
B. C. Nakra *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 1 Jan. 1981 p 17-20 refs (For primary document see N82-19558 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington D.C. 20375: $15.00/set CSCL 20/11

Investigations dealing with vibration control using viscoelastic materials are reviewed. Specific topics include analysis of configurations, properties of the materials used, and applications. R.J.F.

N82-19561# Waterloo Univ. (Ontario). Dept. of Systems Design.
VIBRATIONS AND STABILITY OF MECHANICAL SYSTEMS: 2
K. Huseyin *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 1 Jan. 1981 p 21-29 refs (For primary document see N82-19558 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Developments in linear and nonlinear theories for studying the vibrational and stability behavior of autonomous systems under the influence of several independent parameters are described. Four classes of systems are identified for linear theories: conservative, pseudo-conservative, gyroscopic, and circulatory. Nonlinear theories involve both gradient and nongradient systems. R.J.F.

N82-19562 Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 12 Monthly Report
Judith Nagle-Eshleman, ed. Dec. 1981 178 p refs
(AD-A109583) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

A literature review of finite element modeling of fiber reinforced composite plates and shells and a discussion of unsteady forces and flow phenomena resulting from vortex shedding from circular and noncircular cylinders are presented. For individual titles, see N82-19563 through N82-19564.

N82-19563*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
FINITE-ELEMENT MODELING OF LAYERED, ANISOTROPIC COMPOSITE PLATES AND SHELLS: A REVIEW OF RECENT RESEARCH
J. N. Reddy *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 12 Dec. 1981 p 3-12 refs (For primary document see N82-19562 10-39)
(Grants NAG3-208; AF-AFOSR-0142-81)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Finite element papers published in the open literature on the static bending and free vibration of layered, anisotropic, and composite plates and shells are reviewed. A literature review of large-deflection bending and large-amplitude free oscillations of layered composite plates and shells is also presented. Non-finite element literature is cited for continuity of the discussion. J.D.H.

N82-19564# Shock and Vibration Information Center (Defense), Washington, D. C.
VORTEX SHEDDING FROM CYLINDERS AND THE RESULTING UNSTEADY FORCES AND FLOW PHENOMENA, PART 2 c34
S. T. Fleischmann and D. W. Sallet (Maryland Univ., College Park) *In its* The Shock and Vibration Digest, Vol. 13, No. 12 Dec. 1981 p 15-24 refs (For primary document see N82-19562 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

An extensive review of the unsteady flow phenomena that occur on and near cylinders in cross flow and that are related to vortex shedding is presented. Vortex shedding from non-circular cylinders and the topic of cylinders undergoing flow-induced vibration are introduced. Experimental values of the unsteady lift and drag coefficients and experimental values of the Strouhal number for circular cylinders over a wide range of Reynolds numbers obtained from numerous investigators are presented. J.D.H.

N82-19565 Defence Research Information Centre, Orpington (England).
PELLINI'S THEORY OF BRITTLE FRACTURE AND THE LIMITS OF ITS APPLICABILITY
K. Fromm and H. D. Schulze Oct. 1981 18 p refs Transl. into ENGLISH of Schneiden, (West Germany) v. 32, no. 10, 1980 p 416-420
(DRIC-T-6468; BR81312) Copyright. Avail: Issuing Activity

The development of Pellini's theory of brittle fracture is described. The correlation of the results of many cases of damage, and of extensive tests on components and large plates, with this theory led to the development of the fracture analysis diagram. The ability to apply the NDT temperature to the behavior of components explains the significance of the drop weight test in comparison with other strength testing methods. Problems in determining the NDT temperature are pointed out, e.g. the effect of notch shape on brittleness. Using the example of the failure behavior of cylindrical shots and pipes, the limits of the theory are shown: it does not account for system energy content, or impact strength. The failure behavior of these components does not however contradict theory. Author (ESA)

N82-19566*# Iowa Univ., Iowa City. Div. of Materials Engineering.
INVESTIGATION OF CREEP BY USE OF CLOSED LOOP SERVO-HYDRAULIC TEST SYSTEM
Han C. Wu and J. C. Yao 20 Nov. 1981 44 p refs
(Contract NsG-1499)
(NASA-CR-168613; G302-81-001) Avail: NTIS HC A03/MF A01 CSCL 20K

Creep tests were conducted by means of a closed loop servo-controlled materials test system. These tests are different from the conventional creep tests in that the strain history prior to creep may be carefully monitored. Tests were performed for aluminum alloy 6061-0 at 150 C and monitored by a PDP 11/04 minicomputer at a preset constant plastic-strain rate prehistory. The results show that the plastic-strain rate prior to creep plays a significant role in creep behavior. The endochronic theory of viscoplasticity was applied to describe the observed creep curves. The concepts of intrinsic time and strain rate sensitivity function are employed and modified according to the present observation. Author

N82-19567# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Aeronautics.
LARGE SCALE DYNAMICS OF LONG FLEXIBLE CABLES TOWED THROUGH AIR
Lasse K. Karlsen 1981 32 p refs
(KTH-Aero-TN-61) Avail: NTIS HC A03/MF A01

The full nonlinear equations of motion of a flexible cable in air are formulated together with the appropriate initial and boundary conditions at the cable ends. The properties of transverse waves are studied using a linearized amplitude equation. Numerical computations are carried out on the complete equations for the large scale motion. The longitudinal elastic equation is replaced by an inextensibility condition and a modified equation for the cable tensile force. Some typical cases of targets towed by an aircraft are considered. The response is computed for aircraft maneuvers such as acceleration - deceleration, climb - descent, and 180 deg. turns with short and long cables. S.L.

N82-19568# Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
FATIGUE OF 2024-T351 AND 7075-T7351 Al-ALLOY LUGS WITH AND WITHOUT INTERFERENCE FIT UNDER MANEUVER SPECTRUM LOADING
A. Buch and A. Bercovits Apr. 1981 39 p refs
(TAE-440) Avail: NTIS HC A03/MF A01

Aircraft pin-lug joints with and without interference fit were tested under maneuver loading programs with random loading sequence. The effect of design load, lug material and interference fit on the spectrum fatigue life was investigated. The interference fit of 0.3% had a strong beneficial effect on the fatigue life for all loading programs, even when local tensile stress peaks exceeded the material yield stress. The spectrum fatigue life of 2024-T351 lug specimens was longer than that of 7075-T7351 specimens, with the exception of interference fit lugs at the highest design load. Test results are presented and compared with predictions based on Miner's Rule, the Relative Miner Rule, and a notch analysis method. A.R.H.

N82-19569# Illinois Univ., Urbana. Dept. of Mathematics.
AN IMPROVED SCHEME TO DEVELOP MULTIDIMENSIONAL GENERALIZED YIELD AND FAILURE SURFACES FOR STRUCTURAL ELEMENTS
Margaret Cheney and Thomas A. Duffey (New Mexico Univ., Albuquerque) Apr. 1981 32 p refs

(Contract W-7405-eng-36)
(LA-8728-MS) Avail: NTIS HC A03/MF A01

Two dimensional convex generalized yield and failure curves for structural elements are combined to form lower bound, higher dimensional interaction surfaces. These higher dimensional surfaces are useful for predicting yielding or failure of structural elements when subjected to several simultaneously interacting generalized stresses at a given cross section. The geometrical version of the Hahn-Banach theorem, and Lagrange multipliers are used. Each method is illustrated by three and six dimensional examples, and the degree of conservatism of each is evaluated by comparison to exact multidimensional interaction surfaces. S.L.

N82-19570# National Aerospace Lab., Tokyo (Japan).
ACOUSTIC FATIGUE ENDURANCE TEST OF USB FLAP STRUCTURE MODELS AT ELEVATED TEMPERATURE
Masaaki Sano, Yoshinori Fukimori, Soushiro Iida, Keiji Komatsu, and Koichi Egawa Oct. 1981 59 p refs In JAPANESE; ENGLISH summary
(NAL-TR-683) Avail: NTIS HC A04/MF A01

Five substructural models of upper surface blown flaps were tested to verify the safety of the flap structure during a planned flight evaluation of the NAL-STOL experimental aircraft. All models consisted of the face panel with stringers and ribs rivetted on the backside in shape. Four panels were flat; one had the same curvature as the actual flap structure. Three face panels and stiffeners were of Ti-6Al-4V' the others were of 2024C-T3 alloy. Results of thermal buckling tests, resonant frequencies of all panels, the dynamic and the measurement of dynamic strain response are discussed. All structural models proved strong enough to resist both acoustic and thermal loading. No detectable damage was found on the panel face nor around the rivet holes. Estimated lives based on simulated and experimental strain histories suggest confirmation of the fatigue test results. A.R.H.

N82-19571# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.
PRACTICAL APPLICATIONS OF FRACTURE MECHANICS
Harold Liebowitz, ed. (George Washington Univ.) May 1980 425 p refs
(AGARD-AG-257; ISBN-92-835-1359-2) Avail: NTIS HC A16/MF A01

Practical applications of fracture mechanics for all aspects of aircraft design, manufacture and testing are presented. Although theoretical discussions are included to provide an appreciation of the complexity of the problems involved, the emphasis is on practical examples. Applications to engine components; built-up structures; joints, lugs and fasteners; integral structures and forgings are covered. The effects of stress corrosion and problems of scatter affecting determination of stress concentration factors, fatigue crack propagation and residual strength are discussed. S.L.

N82-19572# Puerto Rico Univ., Mayaguez. Dept. of Civil Engineering.
IMPLEMENTATION OF A POSTCRACKING MODEL FOR FINITE ELEMENT ANALYSIS OF REINFORCED CONCRETE Final Report, 1 Feb. - 31 Jul. 1981
Rafael Jimenez-Perez Sep. 1981 66 p refs
(Grant AF-AFOSR-0092-81; AF Proj. 2307)
(AD-A108984; AFOSR-81-0868TR) Avail: NTIS HC A04/MF A01 CSCL 11/2

A computer code was developed to model the nonlinear response of reinforced concrete elements subjected to plane strain, plane stress or axisymmetric loading conditions. The material subroutine includes the following sources of nonlinear behavior: (a) Nonlinear stress strain curve for concrete as represented by the endochronic model; (b) stress-strain curve for the reinforcement including the elastic, plastic and strain hardening stages; (c) concrete anisotropy caused by complex stress states and cracking; and (d) the postcracking shear transfer mechanisms. The computer code was checked with a very limited amount of experimental data for plain concrete and for an initially cracked reinforced concrete panel subjected to biaxial stress states. In general, the code predicts results that agree satisfactorily with the experimental data but needs to be further checked against additional test cases. GRA

N82-19573# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
THE ROLE OF ENVIRONMENT ON TIME DEPENDENT CRACK GROWTH
R. E. Ricker and D. J. Duquette Dec. 1981 22 p refs
(Contracts N00014-67-A-0117-0012; N00014-75-C-0466; NR Proj. 036-093)
(AD-A109388) Avail: NTIS HC A02/MF A01 CSCL 11/6

Gaseous as well as aqueous environments are known to accelerate time dependent crack growth under either static loading (SCC or HE) or dynamic loading conditions. In some cases, the rate controlling processes of these phenomena have been related to surface controlled reactions, while in other cases bulk reactions such as diffusion appear to be rate limiting. It is not entirely clear that the mechanisms of time dependent crack growth are identical for different environment/alloy couples, or for different ranges of loading conditions. This paper will attempt to examine the chemical aspects of environment/alloy interactions and to correlate those aspects with observed crack propagation rates under a variety of loading conditions at or near room temperature. Additionally, a brief discussion of the role of environment on elevated temperature fatigue crack growth will be presented. Author (GRA)

N82-19574# Stanford Univ., Calif. Div. of Applied Mechanics.
THE VALUE OF DYNAMIC FRACTURE TOUGHNESS AND ITS DEPENDENCE ON MATERIAL PROPERTIES AND LOADING CONDITIONS Final Report
George Herrmann Dec. 1981 6 p
(Grant DAAG29-78-G-0086)
(AD-A109151; ARO-14932.8-E) Avail: NTIS HC A02/MF A01 CSCL 13/13

Investigation of dynamic fracture of long brittle beams under different loading conditions was effected under ARO Grant DAAG29-78-G-0086. The work has proceeded in two distinct areas - the numerical solution of crack propagation problems using a finite difference code and the analytical solution of some beam fracture problems using several one dimensional theory formulations. Author (GRA)

N82-19575# Battelle Columbus Labs., Ohio.
THE DEVELOPMENT OF A DYNAMIC ELASTOPLASTIC FINITE ELEMENT ANALYSIS FOR FAST FRACTURE UNDER IMPACT LOADING Interim Report
Jalees Ahmad, J. Jung, C. R. Barnes, and M. F. Kanninen Jun. 1981 29 p refs Presented at ASME/PVP Conf., Denver, 22-25 Jun. 1981
(Contract N00014-77-C0576)
(AD-A109323) Avail: NTIS HC A03/MF A01 CSCL 20/11

Recent evidence has pointed to the possible inadequacy of elastodynamic treatments of rapid crack propagation and crack arrest. This paper describes the development of a dynamic elastic-plastic finite element capability designed to address this concern by taking direct account of crack tip plasticity. Comparisons with known dynamic fracture mechanics solutions and with experimental data are made to demonstrate the fidelity of the approach. A comparison with an elastodynamic solution in an impact loaded 4340 steel bend specimen is also made. This result reveals that a significant effect of crack tip plasticity may exist even for high strength materials. Author (GRA)

N82-19576# Battelle Columbus Labs., Ohio.
FINITE ELEMENT ANALYSIS OF DYNAMIC CRACK PROPAGATION Interim Report
J. Jung, Jalees Ahmad, M. F. Kanninen, and C. H. Popelar (Ohio State Univ., Columbus) Mar. 1981 24 p refs Presented at the Failure Prevention and Reliability Conf., Hartford, Conn., 20-23 Sep. 1981
(Contract N00014-77-C-0576)
(AD-A109322) Avail: NTIS HC A02/MF A01 CSCL 20/11

A finite element analysis of stationary and propagating cracks in the presence of inertia forces is presented. An extension of the J-integral approach is employed. To model a propagating crack, a conceptually simple yet effective technique has been

developed. The new crack propagation scheme eliminates the difficulties associated with the use of moving singular elements.
Author (GRA)

N82-19577# Battelle Columbus Labs., Ohio.
THE NUMERICAL SIMULATION OF CRACK GROWTH IN WELD-INDUCED RESIDUAL STRESS FIELDS Interim Report
M. F. Kanninen, F. W. Brust, Jalees Ahmad, and I. S. Abou-Sayed Jul. 1981 25 p refs Presented at 28th Army Sagamore Res. Conf., Lake Placid, N.Y., 13-17 Jul. 1981
(Contract N00014-77-C-0516)
(AD-A109321) Avail: NTIS HC A02/MF A01 CSCL 20/11

A merriage of elastic plastic fracture mechanics techniques with thermoplastic finite element analyses is developed to examine crack growth in the presence of weld-induced residual stresses. A hypothetical crack growth relation based on the crack tip opening displacement is used. Three problem areas are studied: stress corrosion cracking in a girth-welded pipe, fatigue crack growth under cyclic loading in a butt-welded plate, and dynamic crack propagation under impact loading in a butt-welded plate. Comparisons with computations carried out under conventional linear elastic assumptions are made. It is found that, in all three cases, neglect of the plastic deformation caused by the welding process appears to be anti-conservative. It is concluded that more realistic computations for crack growth in and around welds than are commonly used may be needed for realistic structural integrity assessments.
Author (GRA)

N82-19578# Boeing Aerospace Co., Seattle, Wash.
PROGRAM FOR NONLINEAR STRUCTURAL ANALYSIS Final Report, Jan. 1979 - Jun. 1981
Robert E. Jones Sep. 1981 77 p refs
(Contract F49620-79-C-0057; AF Proj. 2307)
(AD-A108975; AFOSR-81-0842TR) Avail: NTIS HC A05/MF A01 CSCL 13/13

The development and evaluation of new theoretical and numerical approaches for strongly nonlinear finite element analysis are reported. The element technology uses interior nodes to create higher order in-plane displacement forms needed for nonlinear strain calculation. Several solution procedure types are discussed, based on an updated total Lagrangian formulation. Progress with this approach and current capability levels are discussed.
Author (GRA)

N82-19579# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
THERMO-ELASTIC-PLASTIC STRESSES IN MULTILAYERED CYLINDERS
John D. Vasilakis Nov. 1981 32 p refs Presented at 27th Conf. of Army Math., West Point, N.Y., 10-12 Jun. 1981
(DA Proj. 1T1-61101-A-91A)
(AD-A109320; ARLCB-TR-81044) Avail: NTIS HC A03/MF A01 CSCL 19/6

One of the many efforts undertaken to increase the life of gun tubes and/or increase their resistance to erosion involves the use of linears fabricated from different materials. A finite difference computer code for investigating the thermo-elastic-plastic response of gun tubes has been expanded to include multi-layered cylinder response to time dependent boundary conditions. Considered are both cyclic heat input and cyclic stress input. Response curves from inputs representative of repeated firing cycles are presented. The emphasis in this report is on the transient temperature response and on the thermo-elastic stresses and mechanical stresses in the layers. Author (GRA)

N82-19580# Army Materials and Mechanics Research Center, Watertown, Mass. Mechanics of Materials Div.
STRESS INTENSITY AND FATIGUE CRACK GROWTH IN MULTIPLY-CRACKED, PRESSURIZED, PARTIALLY AUTO-FRETTAGED THICK CYLINDERS Final Report
Anthony P. Parker (Royal Military College of Science) Aug. 1981 20 p refs
(DA Proj. 1L1-620105-AH-84)
(AD-A109081; AMMRC-TR-81-37) Avail: NTIS HC A02/MF A01 CSCL 19/6

Stress intensity factors are determined for internally and externally cracked, pressurized thick cylinders with partial autofrettage (less than 100% overstrain). The solutions are based on a superposition of existing solutions which does not involve any loss of accuracy. Implications of the stress intensity factor results for the safe-life design of gun tubes are discussed. Various suggestions for future work are presented. Author (GRA)

N82-19581# R and D Associates, Marina Del Rey, Calif.
STRESS PULSED REFLECTION AND TENSILE CRACKING IN A ONE-DIMENSIONAL BILINEAR MATERIAL Report, 1 Nov. 1979 - 31 Dec. 1980
D. A. Simons 31 Dec. 1980 42 p
(Contract DNA001-80-C-0069; DNA Proj. P99-QAXD)
(AD-A108833; RDA-TR-113206-005; DNA-5738T) Avail: NTIS HC A03/MF A01 CSCL 12/1

As a check case for numerical studies of tensile cracking in nonlinear media, closed form solutions have been derived for the following problems. A finite slab of bilinear material is loaded on one face by a sharp-fronted triangular pressure pulse. Cracks are assumed to form in the first case when the stress exceeds a tensile limit for a finite time, i.e., the tensile impulse is finite. In both cases the stress reaches the tensile limit and a first crack forms shortly after the incident wavefront reflects from the free face of the slab. In the first case a continuously cracked zone develops under the action of a tensile spike caused by the first crack. In the second case, the tensile spike has no effect on cracking, and a sequence of discrete cracks form. Stress histories and stress profiles are plotted for both cases.
Author (GRA)

N82-19582# Systems Research Labs., Inc., Dayton, Ohio.
SURFACE-STRENGTHENING MECHANISMS IN REACTION-BONDED SiSUB3NSUB4 AND SUBCRITICAL-CRACK GROWTH BEHAVIOR IN CERAMICS Final Scientific Report, 1 Aug. 1977 - 30 Sep. 1981
M. G. Mendiratta Nov. 1981 79 p refs
(Contract F49620-77-C-0124; AF Proj. 2306)
(AD-A109087; SRL-6956; AFOSR-81-0863TR) Avail: NTIS HC A05/MF A01 CSCL 11/2

Investigations on: 1) strength and fracture toughness of oxidized, reaction-bonded (RB) Si3N4; 2) evaluation of chemical vapor deposition (CVD) coated reaction bonded Si3N4 and characterization of controlled nucleation thermochemical deposited (CNTD) silicon carbide 3) subcritical crack growth (SCG) behavior of hot pressed (HP) Si3N4 under mixed mode loading conditions and; SCG behavior of oxidized HP Si3N4; and 4) SCG behavior of Lithium-Aluminum Silicate (LAS) glass ceramics. The strength of HP Si3N4 under mixed mode loading conditions indicated that the effect of the shear component of applied stress is minimal and that the SCG mainly occurs in Mode 1. The preoxidation of HP Si3N4 decreased the SCG kinetics measurably SCG behavior of LAS glass ceramic also indicates that Mode 1 is the predominant mode of SCG. E.A.K.

N82-19583# Kaman Aerospace Corp., Bloomfield, Conn.
STRUCTURAL SYSTEM IDENTIFICATION TECHNOLOGY VERIFICATION Final Report
N. Giansante, A. Berman, W. G. Flannelly, and E. J. Nagy Ft. Eustis, Va. Army Research and Technology Labs. Nov. 1981 218 p refs
(Contract DAAK51-78-C-0017; DA Proj. 1L1-62209-AH-76)
(AD-A109181; R-1631; USAAVRADCOM-TR-81-D-28) Avail: NTIS HC A10/MF A01 CSCL 13/13

Structural system identification is the method of obtaining structural and dynamic mathematical models and improving existing mathematical models using ground vibration test data. The purpose of the subject program was to perform experimental, development, and research work to verify the concepts of structural system identification technology. To accomplish this, system identification techniques were applied to a U. S. Army AH-1G helicopter fuselage to create a mathematical model from ground vibration test data, to improve a reduced model of an existing NASTRAN model of the AH-1G using shake test data, and to test the effectiveness of these new mathematical models in predicting the effects of stiffness and mass changes to the airframe. The results of the program indicate that system identification is a viable and cost-effective technique for developing new models and for improving existing finite-element models of an airframe using ground vibration test data. Author (GRA)

N82-19584# Lockheed Missiles and Space Co., Palo Alto, Calif.
UNDERWATER SHOCK ANALYSIS OF NONLINEAR STRUCTURES, A REFERENCE MANUAL FOR THE USA-STAGS CODE, VERSION 3 Final Report, 1 Mar. 1978 - 9 Dec. 1980
J. A. DeRuntz and F. A. Brogan 9 Dec. 1980 212 p refs
(Contract DNA001-78-C-0029; Q68QAXS)
(AD-A108911; LMSC-D779760; DNA-5545F) Avail: NTIS HC A10/MF A01 CSCL 20/11

This report is a reference manual for the third version of the USA-STAGS Code that calculates the nonlinear transient response of a totally or partially submerged structure to a spherical shock wave of arbitrary pressure profile and source location. USA-STAGS is the result of interfacing USA (Underwater Shock Analysis) and STAGS (Stress Analysis of General Shells). The fluid is assumed to be an infinite acoustic medium whose response to motions of the structure is described by either of the Doubly Asymptotic Approximations, DDA1 or DDA2. Author (GRA)

N82-19585# Technion - Israel Inst. of Tech., Haifa. Material Mechanics Lab.
TIME DEPENDENT INELASTIC BEHAVIOR OF MATERIALS Final Scientific Report, 1 Jul. 1980 - 30 Jun. 1981
Sol R. Bodner Jul. 1981 14 p Sponsored in part by the European Office of Aerospace Research and Development
(Grant AF-AFOSR-0214-80; AF Proj. 2307)
(AD-A109089; AFOSR-81-0855TR) Avail: NTIS HC A02/MF A01 CSCL 11/4

A period of a research program was devoted to solving problems of the inelastic response of composite elements under dynamic loading, examining wave propagation in rate dependent inelastic media, and studying the creep response of metals. The reference material representation was taken to be the constitutive equations of Bodner-Partom for elastic-viscoplastic work-hardening materials. In particular, a theory for the dynamic behavior of laminated slabs of elastic-viscoplastic materials was developed. In addition, the constitutive equations were shown to provide realistic characterization of the time dependent inelastic behavior of metals ranging from creep to wave propagation conditions. Author (GRA)

N82-19586# Washington Univ., Seattle. Dept. of Mechanical Engineering.
FURTHER STUDIES ON DYNAMIC CRACK CURVING
Y. J. Sun, M. Ramulu, A. S. Kobayashi, and B. S.-J. Kang Nov. 1981 21 p refs
(Contract N00014-76-C-0060; NR Proj. 64-478)
(AD-A109299; TR-42) Avail: NTIS HC A02/MF A01 CSCL 20/11

The elastodynamic stress field surrounding rapidly propagating cracks in thin polycarbonate, double edged crack tension specimens were analyzed by dynamic photoelasticity using a 16 spark gap Cranz-Schardin camera system. Crack curving was observed in two slanted double edged crack specimens and in two offset parallel double edged crack specimens. In another test, the crack ran straight between two symmetrically located twin cracks. Results of these five tests were used to verify the dynamic crack curving criterion by Ramulu, et al., in which a reference distance from the crack tip is incorporated into the maximum circumferential stress of minimum strain energy density criteria. The critical material property for crack curving in this thin polycarbonate sheet was found to be about ro = 0.5 mm. GRA

N82-19587# Georgetown Univ., Washington, D.C. Dept. of Civil Mechanical and Environmental Engineering.
FRACTURE AND FATIGUE CHARACTERIZATION OF AIRCRAFT STRUCTURAL MATERIALS UNDER BIAXIAL LOADING Final Scientific Report, 1 Oct. 1976 - 30 May 1980
D. L. Jones and J. Eftis Dec. 1981 204 p refs
(Grant AF-AFOSR-3096-76; AF Proj. 2307)
(AD-A109054; AFOSR-81-0856TR) Avail: NTIS HC A10/MF A01 CSCL 01/3

A general fracture mechanics analysis was performed to examine the influence of biaxial applied loads on the mechanical state of the body. The geometries examined were the single crack and two coplanar cracks with an arbitrary orientation and the cracked shear panel. It was found that the biaxial loads influenced all aspects of the mechanical state of the body, with the exception of the stress intensity factor for a crack oriented parallel to the biaxial load. The extent and nature of the biaxial effect on the crack-tip stress field, stress intensity factor, angle of initial crack extension, crack-tip displacements, elastic strain energy, fracture load and fatigue crack growth rates are all discussed. A biaxial test facility was developed and a considerable number of photoelastic, fracture toughness, and fatigue crack growth rate experiments were performed. Confirmation of the analytical predictions was obtained for the biaxial effects on the crack-tip stress field, the angle of initial crack extension, the fracture load, and the fatigue crack growth rates. The biaxial loads were seen to influence all of these parameters in varying degrees. GRA

N82-19588# Lehigh Univ., Bethlehem, Pa. Inst. of Fracture and Solid Mechanics.
SURFACE REACTIONS AND FATIGUE CRACK GROWTH
R. P. Wei and G. W. Simmons Aug. 1981 20 p refs
(Contract N00014-75-C-0543; NR Proj. 036-097)
(AD-A109296; IFSM-81-107; TR-11) Avail: NTIS HC A02/MF A01 CSCL 20/11

Recent fracture mechanics and surface chemistry studies of environment assisted crack growth in gaseous environments have shown that crack growth may be controlled in some systems by the rate of surface reactions and in others by the rate of transport of the aggressive environment to the crack tip. Based on considerations of surface reactions and gas transport, a model for surface reaction and transport controlled fatigue crack growth in single component gaseous environments was proposed and experimentally verified. In practice, however, there is usually more than one gas in a given environment. The various component gases can compete for surface reaction sites and therefore alter the fatigue crack growth response. In this paper, the development of the model for surface reaction and transport controlled fatigue crack growth in single component gaseous environments is briefly reviewed. Modeling of fatigue crack growth in a binary gas mixture, in which one of the components acts as an inhibitor, is described, and the model is applied to the consideration of the influence of oxygen on fatigue crack growth in humid air. Author (GRA)

N82-19589# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
SURFACE MODIFICATION IN CONTROL SiO2 FIBER FRACTURE Final Technical Report, 22 Feb. 1979 - 22 Feb. 1981
Roy Kaplow Griffiss AFB, N.Y. RADC Oct. 1981 145 p refs
(Contract F19628-79-C-0055; AF Proj. 4600)
(AD-A108796; RADC-TR-81-292) Avail: NTIS HC A07/MF A01 CSCL 11/2

It is known that corrosion resistance can be imparted to various materials by carefully controlling the chemical environment to which newly formed and atomically clean surfaces are initially exposed. We take the view that the embrittlement of silica (SiO2) is also a corrosion process, originating from the activated hydrolysis of siloxane (Si-O-Si) bonds by molecular water. Our approach considers that surface states of SiO2 can be altered by the presence of absorbed or chemisorbed gases so as to increase the activation energy required for the absorption of water vapor or alternatively to impede the dissociation of molecular water on silica surfaces. Either of these mechanisms should raise the activation energy involved in hydrolyzing siloxane bonds and thus lower the susceptibility for crack propagation. Gases containing straight or branched chain hydrocarbons are expected to reduce the absorption potential for H2O for the silica surface. Absorbed gases containing strong polar residues such as halogens are expected to establish a surface dipole layer which may repel the absorbing end of H2O and prevent its dissociation on the silica surface. GRA

N82-19590# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
BASIS-CRACK: AN EVALUATION OF PERFORMANCE

Final Report
B. Palmberg 1981 36 p refs
(Contract FMV-F-FL-82223-78-003-21-001)
(FFA-TN-HU-2171) Avail: NTIS HC A03/MF A01

The BASIS-CRACK option, which can handle singularities in finite element shape functions thereby enabling the elements to be used for modeling cracks in a structure, is evaluated. The demands on the node grid and element size were investigated and the effects of varying the virtual crack extension or altering the crack growth direction were studied. Operation with different types of elements and mixture of different elements verifies the reliability and accuracy of the program. A combination of BASIS-CRACK and the SUPER-BASIS was tested successfuly. A crack tip element size of half the crack length is sufficient for an acceptable accuracy in the computed energy release rate.
Author (ESA)

N82-19591# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
DIFFERENCES BETWEEN THE GROWTH OF SMALL AND LARGE FATIGUE CRACKS. THE RELATION TO THRESHOLD K-VALUES
J. Schijve Jul. 1981 34 p refs Presented at Intern. Symp. on Fatigue Thresholds, Stockholm, 1-3 Jun. 1981
(VTH-LR-327) Avail: NTIS HC A03/MF A01

Differences in the behavior of small and large cracks, including microscopic and fractographic aspects, are analyzed. They are shown to be related to restraint on cyclic slip, the number of active slip systems, crack growth mechanics, and the irregularity of the crack front geometry at both micro and macro levels. A difference associated with residual plastic deformation in the wake of the crack is that large cracks are subject to more effective crack closure than small cracks. Illustrative crack growth data are presented. Nominal stress intensity factors are shown to be lower than actual in the case of small cracks, due to an underestimate of the stress severity at the crack tip. Threshold values of the stress intensity factor are not necessarily valid for small cracks. However, stress intensity factors can be used for small cracks for some (particularly high yield strength) materials.
Author (ESA)

N82-19592# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
THE STRESS INTENSITY FACTOR OF SMALL CRACKS AT NOTCHES
J. Schijve Jul. 1981 31 p refs
(VTH-LR-330) Avail: NTIS HC A03/MF A01

The effect of geometrical notches in a structure on fatigue crack propagation is investigated theoretically. Given that the stress distribution in the proximity of the notch is approximately the same for a variety of notches and stress concentration factors (Kt), if the peak stress at the notch (sigma peak) and root radius (rho) are the same, then small cracks occurring in similar stress fields have the same stress intensity factor (K): i.e., for small cracks K depends on sigma peak and rho only. Analysis of literature data confirms the similar concept that the geometry factor (C) in K = C sigma peak root pi 1, where 1 = crack length, depends on 1/rho.
Author (ESA)

N82-19593# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
SOME REAL VARIABLE EXPRESSIONS FOR STRESS DISTRIBUTIONS IN ORTHOTROPIC PLATES
G. J. Spies Sep. 1981 40 p refs
(VTH-LR-334) Avail: NTIS HC A03/MF A01

A number of solutions of Lekhnitskii's method for determining stress distributions in orthotropic plates are presented in a form containing only real variables. The expressions are exact solutions, giving stresses at the circular boundary as well as on the principal axes. The solutions are presented as an aid to the general designer of anisotropic structures requiring expressions which can be worked out on a pocket calculator. The general method yields simple expressions for stresses in several cases where a circular hole or a circular insert causes stress concentrations, but the formulas contain complex variables complicating their evaluation unless use can be made of a FORTRAN 4 programmed computer.
Author (ESA)

N82-19594# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Strength of Materials and Solid Mechanics.
A NONLINEAR FINITE ELEMENT ANALYSIS OF RAPID CRACK GROWTH AT LARGE SCALE YIELDING
Lars Dahlberg Apr. 1980 33 p refs
(TRITA-HFL-0027; KTH-Publ-207; ISSN-0349-1234) Avail: NTIS HC A03/MF A01

Crack propagation experiments were performed on a highly loaded, single edge-notched rectangular sheet of cold rolled and hardened carbon steel. Crack lengths and signals from three strain gages were tape recorded. Results were analyzed with a finite element program, allowing for dynamic elastic-plastic calculations, using an elastic, linear, strain hardened plastic material model. Analysis, assuming purely linear elastic material behavior, was carried out for comparison. Values obtained in the elastic-plastic analysis were approximately half the corresponding values for purely elastic analysis, showing estimates of energy flow to the crack tip region to be influenced considerably by the introduction of plasticity into the analysis. Suitable models for the crack tip region are considered.
Author (ESA)

N82-19595# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Strength of Materials and Solid Mechanics.
SENSITIVITY OF THE FRACTURE PROBABILITY IN A REACTOR VESSEL TO VARIATIONS IN DATA
Fred Nilsson and Stefan Palm May 1980 44 p refs
(TRITA-HFL-0028; KTH-Publ-208; SKI-B37/79) Avail: NTIS HC A03/MF A01

A theoretical probability model for fracture risk in nuclear reactor pressure vessels was developed. Input data based on theoretical estimates was selected, and variations about this basic set were performed. The resulting changes in total fracture probability were calculated in order to indicate the sensitivity of the total failure probability to changes in different parameters of the assumed input data. The method of linear elastic fracture mechanics was used to analyze failure risk. Fracture was assumed to occur when the stress intensity factor is greater than the fracture toughness of the material. Periodic inspection data from the fourth year onwards has little effect on predictions. Fracture probability is insensitive to length of working life, so calculating failure risk per vessel year can be highly misleading.
Author (ESA)

N82-19596# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Strength of Materials and Solid Mechanics.
ON THE INFLUENCE OF MEAN LOAD ON CRACK OPENING AND FATIGUE CRACK GROWTH IN A SHIP HULL PLATE STEEL
Stig Waestberg Oct. 1980 19 p refs
(TRITA-HFL-0029; KTH-Publ-209) Avail: NTIS HC A02/MF A01

The influence of mean load on crack closure in a steel for which the crack growth rate is largely insensitive to mean load was studied. Fatigue crack growth rates were measured in LR-DH quality steel for different stress ratios R-values under sinusoidal loading. No significant influence of the R-values was found in the loading range investigated. Crack surface displacements were recorded in order to detect possible crack closure during the lower part of the loading cycle. Crack lengths were measured by traveling microscope. No crack closure was observed. The results are discussed in terms of toughness (ability to withstand local static fracture during the upper part of the loading cycle) and the amount of stable crack growth during the loading cycle. No significant influence of the R-values (R = 0.04 to 0.8) is found in the load range from 10 to 40 Mpa root m.
Author (ESA)

N82-19597# Bristol Univ. (England). Dept. of Aeronautical Engineering.
THE STRUCTURAL BEHAVIOUR OF INFLATED CYLINDRICAL CANTILEVER BEAMS B.S. Thesis
R. J. Oldfield and D. M. Pearson Jun. 1981 83 p refs
(BU-260) Avail: NTIS HC A05/MF A01

A wing structure, consisting of spanwise inflatable cylinders, was considered for remotely piloted vehicle applications. The behavior of isolated pressurized cylinders mounted as cantilevers and subjected to bending, torsion, and combined loadings was investigated experimentally and theoretically. It was found that, except in the case of pure torsion, the cylinders are able to withstand substantial loading even when in a partly wrinkled state. Theories derived for the behavior of the wrinkled cantilevers generally give reasonable predictions of the experimental results. An appraisal of a three cylinder combined structure leads to recommendations concerning the construction of such a wing structure. Author (ESA)

N82-19598# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
A COMPUTER PROGRAM FOR CYCLE-BY-CYCLE CRACK GROWTH COMPUTATION Final Report
Bjoern Palmberg 1981 112 p refs
(Contract FMV-F-K-82223-78-003-21-001)
(FFA-TN-HU-2048) Avail: NTIS HC A06/MF A01

A computer program which handles Paris crack propagation formulas, the Forman crack propagation formula, and the inverse tangent hyperbolic crack growth rate relation is presented. The crack growth increment for a load cycle is taken as the crack growth rate obtained by the selected formula, evaluated for the actual stress intensity range. Interaction effects in the loading history is considered by applying either Wheeler's or Willenborg's model for crack growth rate retardation. The program is written in BASIC and is run on a PDP 11/34 minicomputer. Author (ESA)

N82-19599# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
FATIGUE PERFORMANCE AND FASTENER FLEXIBILITY FOR SINGLE SHEAR ALUMINUM JOINT WITH DIFFERENT SPLICE PLATES Final Report
Bjoern Palmberg 1981 80 p refs Revised
(Contract FMV-F-FL-82223-78-00)
(FFA-TN-HU-2165) Avail: NTIS HC A05/MF A01

The influence of bending stiffness on secondary bending single shear double row joints was investigated. Countersunk steel bolts were installed in 6D10 holes. A load spectrum representing a fighter aircraft wing panel was used. It is shown that in fatigue life increases with increasing bending stiffness, and that secondary bending is decreased by a splice plate arrangement which has very low bending stiffness. The bolt flexibility is determined from measured values of splice plate elongation and the gap variation between the two base plates. It is found that different splice plates yield almost the same bolt flexibility and additional lubrication when torquing the simloc nuts increases fatigue life significantly. Author (ESA)

N82-19600# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
DURABILITY OF ADHESIVE BONDED STRUCTURES SUBJECTED TO ACOUSTIC LOADS
H. F. Wolfe (AFWAL, Wright-Patterson AFB, Ohio) and I. Holehouse (Rohr Industries, Chula Vista, Calif.) London Dec. 1981 16 p refs Presented at the 53rd Meeting of the AGARD Struct. and Mater. Panel, Noordwijkerhout, Netherlands, 27 Sep. - 2 Oct. 1981
(AGARD-R-701; ISBN-92-835-1409-2) Avail: NTIS HC A02/MF A01

Acoustic fatigue prediction techniques for weldbonded aluminum, adhesive bonded aluminum, an adhesive bonded graphite epoxy structures are summarized. Adequate performance under static loading did not guarantee adequate performance under dynamic loading. Some prediction methods were developed for certain failure modes in adhesive bonded aluminum and graphite epoxy bonded skin stiffened structures. Further investigations are needed to adequately predict the acoustic fatigue life of adhesive bonded aircraft structures. N.W.

N82-19157# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
A SUBSPACE ITERATION ALGORITHM FOR SPINNING STRUCTURE VIBRATION MODE COMPUTATION
D. Osmont and L. Simon *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 57-62 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 197-202
(For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

N82-20136# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
REYNOLDS STRESS EQUATIONS MODELING IN A ROTATING REFERENCE SYSTEM
J. Cousteix and B. Aupoix *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 51-60 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 275-285
(For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N82-19601* Michigan Energy and Resource Research Association, Detroit.
RESOURCEFUL DECISIONS: LANDSAT IN MICHIGAN
Todd Anuskiewicz, Principal Investigator and Roy Meador [1982] 29 p Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS
(E82-10037; NASA-CR-164771) Avail: SOD HC CSCL 05B

The capabilities of LANDSAT and the continuous advantages the satellite offers in remote sensing are reviewed. The processing and application of data from the satellite to the study of resource and environmental needs in Michigan highlighted include: land use; classification of trophic states in lakes and the monitoring of water quality; prospecting for oil, gas, minerals, and water; identifying wetlands, wildlife habitats, and recreation areas; forest management; routing power lines; transportation planning; and surveying the Great Lakes Basin. The work of the Environmental Research Institute of Michigan in solving modern sensor technological problems and in gathering ground truth is reported as well as activities available through the University of Michigan remote sensing program. A.R.H.

N82-19602 Utah State Univ., Logan.
MODEL CHOICE: AN OPERATIONAL COMPARISON OF STOCHASTIC STREAMFLOW MODELS FOR DROUGHTS Ph.D. Thesis
William Robert James 1981 312 p
Avail: Univ. Microfilms Order No. 81213830

Five annual stochastic streamflow generation models are compared on their ability to preserve drought-related time series properties and annual statistics. Using Monte Carlo generation procedures and comparing the average generated statistics and drought or water supply properties, a basis is established to evaluate model performance on four different Utah study streams. A seasonal disaggregation model is applied to each of the generated annual model. The ARMA-Markov and ARMA models are judged to be the best overall models in terms of preserving the short and long term persistence statistics for the four historic time series studied. The broken line model is judged to be the best model in terms of minimizing the economic regret as determined by an agricultural crop production function. Dissert. Abstr.

N82-19603 Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).
HELMUT WOLF: ON THE OCCASION OF HIS 70TH BIRTHDAY [HELMUT WOLF ZUM 70. GEBURTSTAG]
Verlag der Bayerischen Akademie der Wissenschaften 1980 45 p refs In GERMAN Presented at Bonn, 2 May 1980
(Ser-E-18; ISSN-0065-5341; ISBN-3-7696-9663-8) Copyright. Avail: Issuing Activity

The life and accomplishments of Helmut Wolf, and his contribution to theoretical geodesy are described. A collection of publications and lectures in the geodetic sciences is presented. Wolf's contribution to the development of geodestic surveys and to the mathematical and stochastic model of photogrammetry are outlined. Transl. by E.A.K.

N82-19604 Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).
DEVELOPMENTS IN GEODESY WITHIN THE SCOPE OF HELMUT WOLF'S WORK [DIE ENTWICKLUNG DER ERDMESSUNG IN SPIEGEL DES WERKES HELMUT WOLFS]
Helmut Moritz *In its* Helmut Wolf: On the Occasion of his 70th Birthday 1980 p 5-12 In GERMAN (For primary document see N82-19603 10-43)
Avail: Issuing Activity

Twenty years of progress in geodetic surveys, the use of artificial satellites and their practical applications are described. Gravimetric methods, astrogeodetic methods, statistical procedures in the physical geodesy, and geodetic problems in geodynamics are discussed. It is found that in the geometric reference system of deep geodynamic observations the axis of rotation of the Earth is a fundamental direction of reference which changes, whether it is in the universe or on terrestrial bodies. E.A.K.

N82-19605 Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).
MATHEMATICAL AND STOCHASTIC MODELS IN PHOTOGRAMMETRY RELATING TO HELMUT WOLF'S WORK [DAS MATHEMATISCHE UND STOCHASTISCHE MODELL DER PHOTOGRAMMETRIE MIT BEZUG AUF DAS WERK HELMUT WOLFS]
Hellmut Schmid *In its* Helmut Wolf: On the Occasion of his 70th Birthday 1980 p 13-27 In GERMAN (For primary document see N82-19603 10-43)
Avail: Issuing Activity

The development of a mathematical model which is applied to interpret the measured variables and random variables with their characteristic random noise is discussed. It is posited that for typical geometric problems, as well as for geodetic and photogrammetric tasks it is possible to analyze specific geometrically established solvent algorithms quantitatively and qualitatively. Such a computing method is often advantageous, especially because it can be applied to practical engineering. E.A.K.

N82-19606 IEA Coal Research, London (England).
HYDROLOGICAL PROBLEMS OF SURFACE MINING
Peter A. Wood Sep. 1981 102 p refs
(ICTIS-TR-17; ISBN-92-9209-079-X) Copyright. Avail: Issuing Activity

The physical aspects of the relation between hydrology and the surface mining of coal are reviewed. Surface and ground water are considered at the planning, extraction and restoration phases of mining. Aspects covered include the collection and handling of hydrologica data; the construction of river diversions; the control of runoff, erosion and sediment; problems of ground water and dewatering; and spoil bank hydrology. Mining hydrology interrelationships must be considered in order to ensure the efficient running of a surface mining operation while adequately protecting the environment. Author (ESA)

N82-19607*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
WHEAT STRESS INDICATOR MODEL, CROP CONDITION ASSESSMENT DIVISION (CCAD) DATA BASE INTERFACE DRIVER, USER'S MANUAL
R. F. Hansen, Principal Investigator Feb. 1981 15 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10031; NASA-CR-161032; EW-L1-00711; LEMSCO-16034; JSC-17114) Avail: NTIS HC A02/MF A01 CSCL 02C

The use of the wheat stress indicator model CCAD data base interface driver is described. The purpose of this system is to interface the wheat stress indicator model with the CCAD operational data base. The interface driver routine decides what meteorological stations should be processed and calls the proper subroutines to process the stations. Author

N82-19608*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
AGRISTARS: INTERIM CATALOG GROUND DATA SUMMARY, DATA ACQUISITION YEAR 1979
H. M. Doyle and V. L. Cook, Principal Investigators Feb. 1981 32 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. Agristars)
(E82-10032; NASA-CR-161033; MU-L1-04055; LEMSCO-16207; JSC-17119) Avail: NTIS HC A03/MF A01 CSCL 02C

To honor numerous requests for information about data holdings, and to facilitate the requirements specifications process, a series of interim catalogs are being developed. The 1979 data acquisition year is covered in this volume with subsequent years to follow under different covers. This catalog lists by state those sample segment numbers for which aircraft data has been acquired and/or field inventory products produced. A.R.H.

N82-19609*# Mississippi State Univ., Mississippi State.
APPLICATION OF REMOTE SENSING TO STATE AND REGIONAL PROBLEMS Semiannual Progress Report, 1 Nov. 1980 - 30 Apr. 1981
W. Frank Miller, John S. Powers, Jon R. Clark, Jimmy L. Solomon, and Sidney G. Williams, Principal Investigators 30 Apr. 1981 106 p refs ERTS
(Grant NGL-25-001-054)
(E82-10033; NASA-CR-164746; SAPR-15) Avail: NTIS HC A06/MF A01 CSCL 05B

The methods and procedures used, accomplishments, current status, and future plans are discussed for each of the following applications of LANDSAT in Mississippi: (1) land use planning in Lowndes County; (2) strip mine inventory and reclamation; (3) white-tailed deer habitat evaluation; (4) remote sensing data analysis support systems; (5) discrimination of unique forest habitats in potential lignite areas; (6) changes in gravel operations; and (7) determining freshwater wetlands for inventory and monitoring. The documentation of all existing software and the integration of the image analysis and data base software into a single package are now considered very high priority items. A.R.H.

N82-19610*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
RECOMMENDED DATA SETS, CORN SEGMENTS AND SPRING WHEAT SEGMENTS, FOR USE IN PROGRAM DEVELOPMENT
Willa W. Austin, Principal Investigator Apr. 1981 27 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10034; NASA-CR-161034; SR-L1-0409; LEMSCO-15708; JSC-17137) Avail: NTIS HC A03/MF A01 CSCL 02C

The sets of Large Area Crop Inventory Experiment sites, crop year 1978, which are recommended for use in the development and evaluation of classification techniques based on LANDSAT spectral data are presented. For each site, the following exists: (1) accuracy assessment digitized ground truth; (2) a minimum of 5 percent of the scene ground truth identified as corn or spring wheat; and (3) at least four acquisitions of acceptable data quality during the growing season of the crop of interest. The recommended data sets consist of 41 corn/soybean sites and 17 spring wheat sites. Author

N82-19611*# National Aeronautics and Space Administration, Washington, D. C.

SATELLITE EARTH RESOURCES DATA, MODULE U-3

Jan. 1980 13 p Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS
(E82-10035; NASA-TM-84130) Avail: NTIS HC A02/MF A01 CSCL 05B

Satellite data image products potentially useful in solving Earth resource and environmental problems are described. Sources for satellite data and user information are given. Recommendations for suitability of use of data from each satellite are presented. Satellite sources of Earth resources data are summarized for satellites launched since 1965 and those projected for launch through the late 1980s. The sensors of interest on each satellite, the wavelength or frequency of operation, and the resolution are given. Color ranges are illustrated and compared. The form and utility of aircraft and LANDSAT images are compared. Data from the Gemini-Apollo photography, Skylab, meteorological satellites, the Heat Capacity Mapping Mission, the Coastal Zone Color Scanner, Seasat, LANDSAT, and projected future satellites are briefly described. J.D.H.

N82-19612*# Consiglio Nazionale delle Ricerche, Venice (Italy). Lab. per lo Studio della Dinamica delle Grandi Masse.

LANDSAT IMAGERY OF THE VENETIAN LAGOON: A MULTITEMPORAL ANALYSIS

L. Alberotanza and A. Zandonella, Principal Investigators (Telespazio S.p.A., Rome) 1980 9 p refs Sponsored by NASA ERTS
(E82-10036; NASA-CR-164772) Avail: NTIS HC A02/MF A01 CSCL 08H

The use of LANDSAT multispectral scanner images from 1975 to 1979 to determine pollution dispersion in the central basin of the lagoon under varying tidal conditions is described. Images taken during the late spring and representing both short and long range tidal dynamics were processed for partial haze removal and removal of residual striping. Selected spectral bands were correlated to different types of turbid water. The multitemporal data was calibrated, classified considering sea truth data, and evaluated. The classification differentiated tide diffusion, algae belts, and industrial, agricultural, and urban turbidity distributions. Pollution concentration is derived during the short time interval between inflow and outflow and from the distance between the two lagoon inlets and the industrial zones. Increasing pollution of the lagoon is indicated. J.D.H.

N82-19613*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A COMPARISON OF UNSUPERVISED CLASSIFICATION PROCEDURES ON LANDSAT MSS DATA FOR AN AREA OF COMPLEX SURFACE CONDITIONS IN BASILICATA, SOUTHERN ITALY

Chris Justice and John Townshend, Principal Investigators Mar. 1981 40 p refs Submitted for publication Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux, Falls, S.D. 57198. ERTS
(E82-10038; NASA-TM-82098) Avail: NTIS HC A03/MF A01 CSCL 05B

Two unsupervised classification procedures were applied to ratioed and unratioed LANDSAT multispectral scanner data of an area of spatially complex vegetation and terrain. An objective accuracy assessment was undertaken on each classification and comparison was made of the classification accuracies. The two unsupervised procedures use the same clustering algorithm. By on procedure the entire area is clustered and by the other a representative sample of the area is clustered and the resulting statistics are extrapolated to the remaining area using a maximum likelihood classifier. Explanation is given of the major steps in the classification procedures including image preprocessing; classification; interpretation of cluster classes; and accuracy assessment. Of the four classifications undertaken, the monocluster block approach on the unratioed data gave the highest accuracy of 80% for five coarse cover classes. This accuracy was increased to 84% by applying a 3 x 3 contextual filter to the classified image. A detailed description and partial explanation is provided for the major misclassification. The classification of the unratioed data produced higher pecentage accuracies than for the ratioed data and the monocluster block approach gave higher accuracies than clustering the entire area. The moncluster block approach was additionally the most economical in terms of computing time. Author

N82-19614*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

AGRISTARS: FOREIGN COMMODITY PRODUCTION FORECASTING. MINUTES OF THE ANNUAL FORMAL PROJECT MANAGER'S REVIEW, INCLUDING PRELIMINARY TECHNICAL REVIEW REPORTS OF FY80 EXPERIMENTS

24 Sep. 1980 191 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development
(Proj. AgRISTARS)
(E82-10039; NASA-TM-84050; FC-J0-00502; JSC-16823) Avail: NTIS HC A09/MF A01 CSCL 02C

The U.S./Canada wheat/barley exploratory experiment is discussed with emphasis on labeling, machine processing using P1A, and the crop calendar. Classification and the simulated aggregation test used in the U.S. com/soybean exploratory experiment are also considered. Topics covered regarding the foreign commodity production forecasting project include: (1) the acquisition, handling, and processing of both U.S. and foreign agricultural data, as well as meteorological data. The accuracy assessment methodology, multicrop sampling and aggregation technology development, frame development, the yield project interface, and classification for area estimation are also examined. A.R.H.

N82-19615*# Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.

USE OF THERMAL INERTIA DETERMINED BY HCMM TO PREDICT NOCTURNAL COLD PRONE AREAS IN FLORIDA Quarterly Report, 16 Mar. - 15 Jun. 1981

L. H. Allen, Jr., Principal Investigator, Ellen Chen, J. D. Martsolf, and P. H. Jones 15 Jun. 1981 36 p refs Original contains color imagery. Original imagery may be purchased from NASA Goddard Space Flight Center, (Code 601), Greenbelt, Md. 20771. Domestic users send orders to 'Attn: National Space Science Data Center', non-domestic users send orders to 'Attn: World Data Center A for Rockets and Satellites'. HCMM
(Contract NAS5-26453)
(E82-10040; NASA-CR-164917; QR-1) Avail: NTIS HC A03/MF A01 CSCL 04B

The HCMM transparency scenes for the available winter of 1978-1979 were evaluated; scenes were identified on processed magnetic tapes; other remote sensing information was identified; and a soil heat flux model with variable-depth thermal profile was developed. The Image 100 system was used to compare HCMM and GOES transparent images of surface thermal patterns. Excellent correspondence of patterns was found, with HCMM giving the greater resolution. One image shows details of thermal patterns in Florida that are attributable to difference in near surface water contents. The wide range of surface temperatures attributable to surface thermal inertia that exist in the relatively flat Florida topography is demonstrated. A.R.H.

N82-19616*# Business and Technological Systems, Inc., Seabrook, Md.

EQUIVALENT SOURCE MODELING OF THE MAIN FIELD USING MAGSAT DATA Quarterly Report, 1 Apr. - 30 Jun. 1981

11 Aug. 1981 4 p ERTS
(Contract NAS5-26047)
(E82-10041; NASA-CR-164918; QR-6) Avail: NTIS HC A02/MF A01 CSCL 08G

Magsat dipole solution models were obtained with both 32 deg and 21 deg resolution based on a data set extending over 4 months. Time dependence was modeled using first time derivatives for the dipole magnetization vector components. This doubles the n total number of parameters in the solution. The solutions displayed a very slow convergence in time derivatives although at each iteration the conversion of the dipole parameters to spherical harmonic coefficients showed close agreement with the MGST (12/80) spherical harmonic model to degree 13 in the constant terms and 8 in the secular variation terms. The program error in the option to simultaneously estimate observatory anomaly biases was found and corrected. A 32 deg resolution dipole model was generated using the selected magnetic observatory data from 1960-1977 used in the GSFC (9/80) spherical harmonic model. A.R.H.

N82-19617*# Pennsylvania State Univ., University Park. Office for Remote Sensing of Earth Resources.
DELINEATION OF SOIL TEMPERATURE REGIMES FROM HCMM DATA Quarterly Report
Rick L. Day and Gary W. Petersen, Principal Investigators 30 Sep. 1981 3 p Sponsored by NASA HCMM
(E82-10042; NASA-CR-164919) Avail: NTIS
HC A02/MF A01 CSCL 08M

Supplementary data including photographs as well as topographic, geologic, and soil maps were obtained and evaluated for ground truth purposes and control point selection. A study area (approximately 450 by 450 pixels) was subset from LANDSAT scene No. 2477-17142. Geometric corrections and scaling were performed. Initial enhancement techniques were initiated to aid control point selection and soils interpretation. The SUBSET program was modified to read HCMM tapes and HCMM data were reformated so that they are compatible with the ORSER system. Initial NMAP products of geometrically corrected and scaled raw data tapes (unregistered) of the study were produced. A.R.H.

N82-19618*# Brown Univ., Providence, R. I. Dept. of Geological Sciences.
ELECTROMAGNETIC DEEP-PROBING (100-1000 KMS) OF THE EARTH'S INTERIOR FROM ARTIFICIAL SATELLITES: CONSTRAINTS ON THE REGIONAL EMPLACEMENT OF CRUSTAL RESOURCES Quarterly Progress Report, 30 Jun. - 30 Sep. 1981
John F. Hermance, Principal Investigator 30 Sep. 1981 9 p refs ERTS
(Contract NAS5-26138)
(E82-10043; NASA-CR-164920; QPR-5) Avail: NTIS
HC A02/MF A01 CSCL 08G

An algorithm was developed to address the problem of electromagnetic coupling of ionospheric current systems to both a homogeneous Earth having finite conductivity, and to an Earth having gross lateral variations in its conductivity structure, e.g., the ocean-land interface. Typical results from the model simulation for ionospheric currents flowing parallel to a representative geologic discontinuity are shown. Although the total magnetic field component at the satellite altitude is an order of magnitude smaller than at the Earth's surface (because of cancellation effects from the source current), the anomalous behavior of the satellite observations as the vehicle passes over the geologic contact is relatively more important pronounced. The results discriminate among gross lithospheric structures because of difference in electrical conductivity. A.R.H.

N82-19619*# Brown Univ., Providence, R. I.
ELECTROMAGNETIC DEEP-PROBING (100-1000 KMS) OF THE EARTH'S INTERIOR FROM ARTIFICIAL SATELLITES: CONSTRAINTS ON THE REGIONAL EMPLACEMENT OF CRUSTAL RESOURCES Quarterly Progress Report, 31 Mar. 1980 - 30 Jun. 1981
John F. Hermance, Principal Investigator 30 Sep. 1981 5 p ERTS
(Contract NAS5-26138)
(E82-10044; NASA-CR-164921; QPR-4) Avail: NTIS
HC A02/MF A01 CSCL 08G

Efforts continue in the development of a computer program for looking at the coupling of finite-dimensional source fields with a laterally heterogeneous Earth. An algorithm is also being developed for calculating a time-varying reference field using ground-based magnetic observatory data. It was discovered that ground-based standard magnetic observation is not as so available for the time of the MAGSAT mission as might be expected. Attempts are being made to determine the exact times and observatories from which data are avaliable. A.R.H.

N82-19620*# Business and Technological Systems, Inc., Seabrook, Md.
MAGSAT SCIENCE INVESTIGATIONS Quarterly Report, 1 Jun. - 30 Aug. 1981
30 Aug. 1981 4 p ERTS
(Contract NAS5-26328)
(E82-10045; NASA-CR-164922; QR-4) Avail: NTIS
HC A02/MF A01 CSCL 08G

The optimal source spacing for the computer delta-B data set was determined from the intermediate attitude tapes. A U.S. magnetization map based on this result is in preparation. Computed delta-B from the fine-attitude tapes is unexpectedly noisy; the reason for this is being sought. A.R.H.

N82-19621*# Agricultural Research Service, Weslaco, Tex.
METHODS OF EDITING CLOUD AND ATMOSPHERIC LAYER AFFECTED PIXELS FROM SATELLITE DATA Quarterly Progress Report, 5 Jun. - 5 Sep. 1981
Paul R. Nixon, Principal Investigator, Craig L. Wiegand, Arthur J. Richardson, Michael P. Johnson, and Benjamin G. Goodier Sep. 1981 10 p ERTS
(NASA Order S-75406-B)
(E82-10046; NASA-CR-164923; QPR-3) Avail: NTIS
HC A02/MF A01 CSCL 05B

The location and migration of cloud, land and water features were examined in spectral space (reflective VIS vs. emissive IR). Daytime HCMM data showed two distinct types of cloud affected pixels in the south Texas test area. High altitude cirrus and/or cirrostratus and 'subvisible cirrus' (SCi) reflected the same or only slightly more than land features. In the emissive band, the digital counts ranged from 1 to over 75 and overlapped land features. Pixels consisting of cumulus clouds, or of mixed cumulus and landscape, clustered in a different area of spectral space than the high altitude cloud pixels. Cumulus affected pixels were more reflective than land and water pixels. In August the high altitude clouds and SCi were more emissive than similar clouds were in July. Four-channel TIROS-N data were examined with the objective of developing a multispectral screening technique for removing SCi contaminated data. Author

N82-19622*# Miami Univ., Fla. School of Marine and Atmospheric Science.
INVESTIGATIONS OF MEDIUM WAVELENGTH MAGNETIC ANOMALIES IN THE EASTERN PACIFIC USING MAGSAT DATA Interim Report, Apr. - Jun. 1981
Christopher G. A. Harrison, Principal Investigator Jun. 1981 3 p Sponsored by NASA ERTS
(E82-10047; NASA-CR-164924) Avail: NTIS
HC A02/MF A01 CSCL 08G

Processing continued on the data set covering the first three months of the mission. Orbits were selected over a specified range of longitude and latitude and those orbits falling within the geographical boundaries were stored on a disk and a listing made. To verify the quality of the data, plots were made showing altitude vs latitude, anomalous field vs latitude, and corrected anomalous field vs latitude. Results of the plotting showed that: (1) data from the first day of the mission are not usable because they are too noisy; (2) some orbits contain spikes, no doubt a processing error on the tape; (3) some orbits contain a 20 deg region in latitude, offset roughly 30 nT from the rest of the anomalous field profiles; and (4) the correlation between the adjacent orbits is poor. Even the new ring current coefficients provided with a later, corrected set of data tapes did not not yield the desired correlations. A.R.H.

N82-19623*# Pennsylvania State Univ., University Park. Dept. of Meteorology.
INTERACTIVE INITIALIZATION OF HEAT FLUX PARAMETERS FOR NUMERICAL MODELS USING SATELLITE TEMPERATURE MEASUREMENTS Quarterly Report, 1 Jun. - 31 Aug. 1981
Toby N. Carlson, Principal Investigator 31 Aug. 1981 5 p Sponsored by NASA HCMM
(E82-10048; NASA-CR-164925; QR-2) Avail: NTIS
HC A02/MF A01 CSCL 08M

Day/night Heat Capacity Mapping Mission image pairs over Kansas and Indiana were used to examine the spatial variation of moisture availability on the mesoscale. Of particular concern was whether patterns of moisture availability and thermal inertia, as well as surface heat fluxes, respond to significant spatial variations in the rainfall pattern. A temperature analysis for the Indiana case is presented. M.G.

N82-19624*# Iowa Univ., Iowa City. Dept. of Geology.
USE OF MAGSAT ANOMALY DATA FOR CRUSTAL STRUCTURE AND MINERAL RESOURCES IN THE US MIDCONTINENT Quarterly Report, period ending 30 Sep. 1981
Robert S. Carmichael, Principal Investigator 28 Sep. 1981 10 p Original contains color illustrations ERTS
(Contract NAS5-26425)
(E82-10049; NASA-CR-164926; QR-3) Avail: NTIS HC A02/MF A01 CSCL 08G

Magnetic profiles on individual satellites tracks were examined to identify bad (nonterrestrially-based) data points r profiles. Anomaly profiles for the same satellite track, but at different passes were compared for parallel tracks and for tracks that cross. The selected and processed data were plotted and contoured to develop a preliminary magnetic anomaly map. The map is similar in general morphology to NASA's Magsat global scalar anomaly map, but has more detail which is related to crustal properties. Efforts have begun to interpret the satellite magnetic anomalies in terms of crustal character. The correlation of magnetics with crustal petrology may have a much larger tectonic implication. Th possibility of there being an ultramafic lower crust along one zone as a consequence of a continental collision/subduction which helped form the midcontinent craton in Precambrian times is being investigated. A.R.H.

N82-19625*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STUDIES RELATED TO MAGSAT Progress Report, period ending Sep. 1981
David P. Stern, Principal Investigator 30 Sep. 1981 21 p ERTS
(E82-10050; NASA-TM-84129) Avail: NTIS HC A02/MF A01 CSCL 08G

The westward drift of the geomagnetic field was analyzed using models from Magsat which include secular variation. Two approaches were utilized. A straightforward covariance method gave large drift rates (0.25 degr./yr and up) and suggested that the drift was larger in the Southern Hemisphere than in the Northern, and was small near the poles. The drawback was a rather large noise level superimposed on a small signal. The other approach followed the method of A.D. Richmond and obtained drifts of the order of 0.1 deg/yr. The use of Magsat to study the Backus effect is explored. Particular attention is drawn to the comparison with resuls of general inverse analysis. A.R.H.

N82-19626*# Phoenix Corp., McLean, Va.
IMPROVED DEFINITION OF CRUSTAL ANOMALIES FOR MAGSAT DATA Quarterly Report
25 Mar. 1981 11 p ERTS
(Contract NAS5-25882)
(E82-10051; NASA-CR-164928; QR-6) Avail: NTIS HC A02/MF A01 CSCL 08G

A scheme was developed for separating the portions of the magnetic field measured by the Magsat 1 satellite that arise from internal and external sources. To test this method, a set of sample coefficients were used to compute the field values along a simulated satellite orbit. This data was then used to try to recover the original coefficients. Matrix inversion and recursive least squares methods were used to solve for the input coefficients. The accuracy of the two methods are compared. M.G.

N82-19627*# Public Technology, Inc., Washington, D. C.
REMOTE SENSING PROCUREMENT PACKAGE: A MANAGEMENT REPORT FOR STATE AND LOCAL GOVERNMENTS
Jun. 1981 21 p ERTS
(Contract NAS13-129)
(E82-10052; NASA-CR-168633) Avail: NTIS HC A02/MF A01 CSCL 05B

An overview of the remote sensing procurement process is presented for chief executives, senior administrators, and other local and state officials responsible for purchasing remote sensing products, services, or equipment. Guidelines are provided for planning, organizing, staffing, and implementing such a procurement project. Other sections of the four-volume package are described and their benefits examined. A.R.H.

N82-19628*# Department of Agriculture, Houston, Tex.
AGRISTARS: SOIL MOISTURE/EARLY WARNING AND CROP CONDITION ASSESSMENT. INTERFACE CONTROL DOCUMENT
Nov. 1980 13 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E82-10053; NASA-CR-161028; MU-JO-0101; JSC-16842) Avail: NTIS HC A02/MF A01 CSCL 02C

The interactions and support functions required between the early warning/crop condition assessment (EW/CCA) project and soil moisture (SM) project are defined. The EW Project aims to develop, test and evaluate techniques and procedures for adapting remote sensing technology to provide early warning of events and the timely assessment of those factors which affect the quality and quantity of production of economically important crops. Those techniques to augment and reinforce the current assessment activities are to be developed to improve the definition of the relationship between the plant(s) and its environment. This assessment and evaluation will certainly include the need for soil moisture measurement and estimation. The SM Project aims to develop, test, and evaluate techniques and procedures to measure or predict soil moisture in the root zone using both contact and remote sensors. A.R.H.

N82-19629*# Department of Agriculture, Houston, Tex.
AGRISTARS: YIELD MODEL DEVELOPMENT/SOIL MOISTURE. INTERFACE CONTROL DOCUMENT
Nov. 1980 12 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E82-10054; NASA-CR-161029; MU-JO-0100; JSC-16841) Avail: NTIS HC A02/MF A01 CSCL 02C

The interactions and support functions required between the crop Yield Model Development (YMD) Project and Soil Moisture (SM) Project are defined. The requirements for YMD support of SM and vice-versa are outlined. Specific tasks in support of these interfaces are defined for development of support functions. J.D.H.

N82-19630*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
AGRISTARS: EARLY WARNING AND CROP CONDITION ASSESSMENT. PATCH IMAGE PROCESSOR USER'S MANUAL
M. J. Nieves, Principal Investigator Sep. 1980 12 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10055; NASA-CR-161038; EW-LO-00707; LEMSCO-15692; JSC-16833) Avail: NTIS HC A02/MF A01 CSCL 02C

The Patch Image Processor extracts patches in various size (32x32, 64x64, 128x128, and 256x256 pixels) from full-frame Landsat imagery data. With the patches that are extracted, a patch image mosaic is created in the image processing system, IMDACS, format. Author

N82-19631*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
AGRISTARS: FOREIGN COMMODITY PRODUCTION FORECASTING. CORN/SOYBEAN DECISION LOGIC DEVELOPMENT AND TESTING
C. L. Dailey and K. M. Abotteen, Principal Investigators Oct. 1980 81 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10056; NASA-CR-161024; FC-LO-00480; LEMSCO-14811; JSC-16380) Avail: NTIS HC A05/MF A01 CSCL 02C

The development and testing of an analysis procedure which was developed to improve the consistency and objectively of crop identification using LANDSAT data is described. The procedure was developed to identify corn and soybean crops in the U.S. corn belt region. The procedure consists of a series of decision points arranged in a tree-like structure, the branches of which lead an analyst to crop labels. The specific decision logic is designed to maximize the objectively of the identification process and to promote the possibility of future automation. Significant results are summarized. J.D.H.

N82-19632*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

AGRICULTURAL SOIL MOISTURE EXPERIMENT, COLBY, KANSAS 1978: MEASURED AND PREDICTED HYDROLOGICAL PROPERTIES OF THE SOIL

L. M. Arya, Principal Investigator Oct. 1980 46 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10057; NASA-CR-161025; SM-LO-00463; LEMSCO-14307; JSC-16366) Avail: NTIS HC A03/MF A01 CSCL 02C

Predictive procedures for developing soil hydrologic properties (i.e., relationships of soil water pressure and hydraulic conductivity to soil water content) are presented. Three models of the soil water pressure-water content relationship and one model of the hydraulic conductivity-water content relationship are discussed. Input requirements for the models are indicated, and computational procedures are outlined. Computed hydrologic properties for Keith silt loam, a soil typer near Colby, Kansas, on which the 1978 Agricultural Soil Moisture Experiment was conducted, are presented. A comparison of computed results with experimental data in the dry range shows that analytical models utilizing a few basic hydrophysical parameters can produce satisfactory data for large-scale applications. Author

N82-19633*# Department of Agriculture, Houston, Tex. Soil Conservation Service.

TAXONOMIC CLASSIFICATION OF WORLD MAP UNITS IN CROP PRODUCING AREAS OF ARGENTINA AND BRAZIL WITH REPRESENTATIVE US SOIL SERIES AND MAJOR LAND RESOURCE AREAS IN WHICH THEY OCCUR

Horace F. Huckle, Principal Investigator Oct. 1980 42 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E82-10058; NASA-CR-161021; SR-UO-00497; JSC-16824) Avail: NTIS HC A03/MF A01 CSCL 02C

The most probable current U.S. taxonomic classification of the soils estimated to dominate world soil map units (WSM)) in selected crop producing states of Argentina and Brazil are presented. Representative U.S. soil series the units are given. The map units occurring in each state are listed with areal extent and major U.S. land resource areas in which similar soils most probably occur. Soil series sampled in LARS Technical Report 111579 and major land resource areas in which they occur with corresponding similar WSM units at the taxonomic subgroup levels are given. Author

N82-19634*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

PRELIMINARY EVALUATION OF SPECTRAL, NORMAL AND METEOROLOGICAL CROP STAGE ESTIMATION APPROACHES

R. B. Cate, J. A. Artley, P. C. Doraiswamy, T. Hodges, M. C. Kinsler, D. E. Phinney, and M. L. Sestak, Principal Investigators Oct. 1980 74 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10059; NASA-CR-161023; SR-LO-04002; LEMSCO-14640; JSC-16830) Avail: NTIS HC A04/MF A01 CSCL 02C

Several of the projects in the AgRISTARS program require crop phenology information, including classification, acreage and yield estimation, and detection of episodal events. This study evaluates several crop calendar estimation techniques for their potential use in the program. The techniques, although generic in approach, were developed and tested on spring wheat data collected in 1978. There are three basic approaches to crop stage estimation: historical averages for an area (normal crop calendars), agrometeorological modeling of known crop-weather relationships agrometeorological (agromet) crop calendars, and interpretation of spectral signatures (spectral crop calendars). In all, 10 combinations of planting and biostage estimation models were evaluated. Dates of stage occurrence are estimated with biases between -4 and +4 days while root mean square errors range from 10 to 15 days. Results are inconclusive as to the superiority of any of the models and further evaluation of the models with the 1979 data set is recommended. Author

N82-19635*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.

NOTES FOR BRAZIL SAMPLING FRAME EVALUATION TRIP Technical Report, 1 - 19 Feb. 1981

Robert Horvath, Principal Investigator and David R. Hicks, comp. Aug. 1981 32 p ref Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior and Agency for International Development ERTS
(Contract NAS9-15476; Proj. AgRISTARS)
(E82-10060; NASA-CR-167420; SR-E1-04138; ERIM-152400-7-T) Avail: NTIS HC A03/MF A01 CSCL 02C

Field notes describing a trip conducted in Brazil are presented. This trip was conducted for the purpose of evaluating a sample frame developed using LANDSAT full frame images by the USDA Economic and Statistics Service for the eventual purpose of cropland production estimation with LANDSAT by the Foreign Commodity Production Forecasting Project of the AgRISTARS program. Six areas were analyzed on the basis of land use, crop land in corn and soybean, field size and soil type. The analysis indicated generally successful use of LANDSAT images for purposes of remote large area land use stratification. Author

N82-19636*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

SEGMENT-LEVEL EVALUATION OF THE SIMULATED AGGREGATION TEST: US CORN AND SOYBEAN EXPLORATORY EXPERIMENT

S. A. Davidson, Principal Investigator Oct. 1980 26 p refs Sponsored by NASA, USDA, Dept. of Commerce, of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10061; NASA-CR-161022; FC-LO-00493; LEMSCO-15116; JSC-16820) Avail: NTIS HC A03/MF A01 CSCL 02C

An evaluation of the corn and soybean proportion-estimation accuracy and dot labeling accuracy of the Simulated Aggregation Test, U.S. Corn and Soybean Exploratory Experiment, is presented. These results are in turn compared with the corn and soybean proportion-estimation accuracy and dot labeling accuracy of the Classification Procedures Verification Test. Author

N82-19637*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

LONGWALL GUIDANCE AND CONTROL DEVELOPMENT Final Report, 1974 - 1982

31 Jan. 1982 118 p refs
(Contract ET-75-I-01-9012)
(NASA-TM-82455) Avail: NTIS HC A06/MF A01 CSCL 08I

The longwall guidance and control (G&C) system was evaluated to determine which systems and subsystems lent themselves to automatic control in the mining of coal. The upper coal/shale interface was identified as the reference for a vertical G&C system, with two sensors (the natural backgound and the sensitized pick) being used to locate and track this boundary. In order to insure a relatively smooth recession surface (roof and floor of the excavated seam), a last and present cut measuring instrument (acoustic sensor) was used. Potentiometers were used to measure elevations of the shearer arms. The intergration of these components comprised the vertical control system (pitch control). Yaw and roll control were incorporated into a face alignment system which was designed to keep the coal face normal to its external boundaries. Numerous tests, in the laboratory and in the field, have confirmed the feasibility of automatic horizon control, as well as determining the face alignment. S.L.

N82-19638*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.

DIELECTRIC PROPERTIES OF SNOW Interim Technical Report

W. H. Stiles and F. T. Ulaby Greenbelt, Md. NASA. Goddard Space Flight Center Dec. 1981 43 p refs
(Grant NAG5-163)
(NASA-CR-166764; RSL-TR-527-1) Avail: NTIS HC A03/MF A01 CSCL 08L

The dielectric properties of snow in the radio frequency range from 100 KHz to 35 GHz are reviewed. Applicable dielectric mixing formulas are discussed and compared to available experimental data. S.L.

N82-19639# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

UTILIZATION OF AEROCHROME 2443 FILM FOR IDENTIFICATION AND ESTIMATING WHEAT GROWING AREAS

Francisco Jose Mendonca, Angela Maria DeLima, Antonio Teraldi Tardin, Armando P. Dossantos, Dall Arthur Cottrell, David C. L. Lee, Fernando C. S. Maia, Liane A. M. Lucht, Mauricio A. Moreira, and Rene Antonio Novaes Aug. 1981 10 p refs In PORTUGUESE; ENGLISH summary Submitted for publication
(INPE-2197-PRE/006) Avail: NTIS HC A02/MF A01

To identify and estimate wheat area using remote sensing techniques, aerial photographs were taken using KODAK Aerochrome 2443, at Soledade, Cruz Alta, and Santa Angelo in the state of Rio Grande do Sul, the photographs were interpreted manually and maps indicating areas for wheat, barley, idle land, flowed land, pasture land, nature vegetation, reforestation and others were prepared for each segment. A.R.H.

N82-19640# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

METHOD OF INTERPRETATION OF REMOTE SENSING DATA AND APPLICATIONS TO VEGETATION

Joao Roberto dosSantos, Pedro Hernandez Filho, and Yosio Edemir Shimabukuro Aug. 1981 54 p refs In PORTUGUESE; ENGLISH summary
(INPE-2215-MD/010) Avail: NTIS HC A03/MF A01

The material provided for remote sensing training course on vegetation is presented. Studies using remote sensing products for characterization and mapping, inventory or management problems in forestry were reviewed in the literature. The methodology of visual or automatic interpretation of those most commonly used LANDSAT data products in forestry studies is described. Case studies in natural or reforested vegetation, which were carried out in INPE, are included with the basic information. A.R.H.

N82-19641# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

METHODOLOGY OF THE INTERPRETATION OF REMOTE SENSING DATA AND APPLICATIONS IN PEDOLOGY

Mario Valario Filho, Jose Carlos Neves Epiphanio, and Antonio Roberto Formaggio Aug. 1981 55 p refs In PORTUGUESE; ENGLISH summary
(INPE-2211-MD/008) Avail: NTIS HC A03/MF A01

A global view of photointerpretation techniques in soil survey is presented. Photopedologic methods are described which served as a base for the systematic approach to orbital data interpretation for soil survey. Several pedology research projects in Brazil are described. A.R.H.

N82-19642# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

METHODOLOGY OF THE INTERPRETATION OF REMOTE SENSING DATA AND APPLICATIONS IN GEOMORPHOLOGY

Tania Maria Sausen and Evlyn Marcia Leao deM. Novo Aug. 1981 42 p refs In PORTUGUESE; ENGLISH summary
(INPE-2209-MD/007) Avail: NTIS HC A03/MF A01

Remote sensing techniques not only permit the acquisition, in a short time, of a large volume of information about phenomena occurring at the Earth's surface, but also provide a constant flux of data showing variations in spatial distribution patterns, which is of value in predicting and controlling geomorphological events. The use of aerial panchromatic, color, and multispectral photography is discussed as well as the interpretation of radar and thermal infrared imagery. Methods for interpreting multispectral imagery from LANDSAT are examined. A.R.H.

N82-19643# Los Alamos Scientific Lab., N. Mex.

CONTINENTAL SCIENTIFIC DRILLING PROGRAM CURATORIAL NEEDS

Grant Heiken and Sue Goff Feb. 1981 300 p refs
(Contract W-7405-eng-36)
(LA-8726-MS) Avail: NTIS HC A13/MF A01

To circulate and protect cores, cuttings, and other samples produced during the continental scientific drilling program (CSDP), a uniform policy of curation must be established that addresses who receives the samples, curator's responsibilities, and standard procedures of description and handling of samples. Investigation of state laws dealing with the preservation of rock materials concludes that 46 of the 50 states do not have any regulations that would hinder a CSDP program from removing core and placing it in a national repository. Two of the remaining states require that only one-quarter of the core length remain with the state, while the other two may request the core but usually only ask for a representative sample. It is recommended that regional repositories be established at existing facilities and that the budget for curation be about five per cent of the budget for the total program. A.R.H.

N82-19644*# Business and Technological Systems, Inc., Seabrook, Md.

AN INFORMATION ADAPTIVE SYSTEM STUDY REPORT AND DEVELOPMENT PLAN

William S. Ataras, Kenneth Eng, John J. Morone, Paul R. Beaudet, and Roland Chin 9 May 1980 225 p
(Contract NAS5-25668)
(NASA-CR-166768; BTS-FR-80-117) Avail: NTIS HC A10/MF A01 CSCL 05B

The purpose of the information adaptive system (IAS) study was to determine how some selected Earth resource applications may be processed onboard a spacecraft and to provide a detailed preliminary IAS design for these applications. Detailed investigations of a number of applications were conducted with regard to IAS and three were selected for further analysis. Areas of future research and development include algorithmic specifications, system design specifications, and IAS recommended time lines. N.W.

N82-19645*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE EFFECT OF FINITE FIELD SIZE ON CLASSIFICATION AND ATMOSPHERIC CORRECTION

Yoram J. Kaufman and Robert S. Fraser Sep. 1981 53 p refs
(NASA-TM-83818) Avail: NTIS HC A04/MF A01 CSCL 20F

The atmospheric effect on the upward radiance of sunlight scattered from the Earth-atmosphere system is strongly influenced by the contrasts between fields and their sizes. For a given atmospheric turbidity, the atmospheric effect on classification of surface features is much stronger for nonuniform surfaces than for uniform surfaces. Therefore, the classification accuracy of agricultural fields and urban areas is dependent not only on the optical characteristics of the atmosphere, but also on the size of the surface do not account for the nonuniformity of the surface have only a slight effect on the classification accuracy in other cases the classification accuracy descreases. The radiances above finite fields were computed to simulate radiances measured by a satellite. A simulation case including 11 agricultural fields and four natural fields (water, soil, savanah, and forest) was used to test the effect of the size of the background reflectance and the optical thickness of the atmosphere on classification accuracy. It is concluded that new atmospheric correction methods, which take into account the finite size of the fields, have to be developed to improve significantly the classification accuracy. Author

N82-19646*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.

ACTIVE MICROWAVE INVESTIGATION OF SNOWPACKS: EXPERIMENTAL DOCUMENTATION, COLORADO 1979-1980

W. H. Stiles, Fawwaz T. Ulaby, A. Aslam, and M. Abdelrazik Jul. 1981 188 p refs
(Grant NsG-5335)
(NASA-CR-166727; RSL-TR-410-3) Avail: NTIS HC A09/MF A01 CSCL 08L

During the winter of 1979-1980, the University of Kansas Microwave Active Spectrometer systems measured the backscattering properties of snowpacks under varying conditions at four test sites in Colorado. In addition to the radar data over 1-35 GHz, ground-truth measurements of the atmospheric, snow, and soil characteristics were obtained for each radar data set. The test sites, data acquisition procedures, and data that were acquired in this experiment are presented and described. Author

N82-19647*# Systematics General Corp., Sterling, Va.

GUIDELINES FOR SPACEBORNE MICROWAVE REMOTE SENSORS

Viqui Litman (Applied Media, Inc., Greenbelt, Md.) and John Nicholas Mar. 1982 87 p refs
(Contract NASw-3398)
(NASA-RP-1086) Avail: NTIS HC A05/MF A01 CSCL 14B

A handbook was developed to provide information and support to the spaceborne remote sensing and frequency management communities: to guide sensor developers in the choice of frequencies; to advise regulators on sensor technology needs and sharing potential; to present sharing analysis models and, through example, methods for determining sensor sharing feasibility; to introduce developers to the regulatory process; to create awareness of proper assignment procedures; to present sensor allocations; and to provide guidelines on the use and limitations of allocated bands. Controlling physical factors and user requirements and the regulatory environment are discussed. Sensor frequency allocation achievable performance and usefulness are reviewed. Procedures for national and international registration, the use of non-allocated bands and steps for obtaining new frequency allocations, and procedures for reporting interference are also discussed. M.D.K.

N82-19648# Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).

THE DIAGNOSIS SETTLEMENT 1980 OF THE GERMAN MAIN TRIANGULATION NETWORK. PART 2: TRAJECTORIES [DIE DIAGNOSEAUSGLEICHUNG 1980 DES DEUTSCHEN HAUPTDREICKSNETZES. 2: STRECKEN]

Rudolf Schmidt Frankfurt am Main Verlag des Instituts fuer Angewandte Geodaesie 1981 501 p refs In GERMAN
(SER-B-253-Mitt-159-Pt-2; ISSN-0071-9196) Avail: NTIS HC A22/MF A01

Diagnostic balancing in triangulation networks was investigated. The purpose of defining the network for diagnostic balancing is to reduce the balance of the edge effect. The computer program is based on observations of the geographic coordinates system. The following tasks were performed: compilation of results from end to end measurements; execution of end to end measurements in the triangulation network; reduction of field length; and, calculation of end to end measurements. E.A.K.

N82-19649# British Aerospace Dynamics Group, Stevenage (England). Space and Communications Div.

STUDY OF EARTH RESOURCES SATELLITE (ERS) DATA REDUCTION UNIT

C. J. Collins, comp., F. A. C. Burke, comp., J. W. Pengelly, comp., P. Redstone, comp. (Logica Ltd.), C. Burrows, comp. (Logica Ltd.), and N. McEvoy, comp. (Logica Ltd.) Paris ESA Aug. 1981 188 p refs
(Contract ESA-4415/80/NL-PP(SC))
(BAe-TP-7905; ESA-CR(P)-1478) Avail: NTIS HC A09/MF A01

Techniques for reducing onboard, by a factor of 4, the data rate from imaging instruments on Earth resources satellites, especially from the ocean color monitor on ERS 1, were examined. Theoretical analysis and simulation with real images allow algorithms to be defined for implementation assessment. A tradeoff based on performance and engineering criteria shows that spatial resolution degrading unit (SRDU) and a fixed weight spectral transform followed by a Rice Machine (FWST + RM2) meet reduction criteria within the mass and power constraints. Costs (two model program) are comparable, the greater complexity of FWST + RM2 being largely offset by more advanced technology in SRDU. Before either option is adopted, further simulation and breadboarding are recommended. Author (ESA)

N82-19650# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).

SATELLITE SCATTEROMETER FEASIBILITY STUDY. VOLUME 1: TECHNICAL RESULTS Final Report

R. Anders, G. Bommas, W. Gieraths, W. Gilg, P. Hans, M. Haimerl, H. Hoelzl, A. Kuehnle, H. Schuessler, P. Stuerzenhofaecker et al Paris ESA Apr. 1981 194 p refs 2 Vol.
(Contract ESA-4367/80/F-DD(SC))
(ESA-CR(P)-1492-Vol-1) Avail: NTIS HC A09/MF A01

A scatterometer for ERS 1 is described. A wind sensor determines vector fields within a 400 km sweep parallel to satellite motion. Individual vectors are extractable from 50 X 50 km cells. Wind speeds between 4 and 24 m/sec are measured with an angular accuracy of + or - 20 deg. A wave sensor handles spectra between 100 and 1000 m wavelength. Measurements are taken with a spacing of 100 km or less along the satellite track. Data are extractable from 5 x 5 km resolution cells. Wind speed and wind direction measurements are derived from Seasat data and of two-dimensional ocean wave spectra measurement are derived from the synthetic aperture radar mode. Author (ESA)

N82-19651# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).

SATELLITE SCATTEROMETER FEASIBILITY STUDY. VOLUME 2: DATA EXTRACTION ALGORITHM AND ERROR SIMULATION FOR WIND SENSOR Final Report

P. Hans Paris ESA Apr. 1981 100 p ref 2 Vol.
(Contract ESA-4367/80/F-DD(SC))
(ESA-CR(P)-1492-Vol-2) Avail: NTIS HC A05/MF A01

The ERS 1 scatterometer operation was computer simulated to: (1) test the Moore's relationship between the backscattering coefficient sigma deg and wind speed/direction; (2) investigate the influence of statistical errors in the sigma deg measurement on the resultant wind parameters; and (3) investigate antenna configurations with respect to functional performance and hardwear realization. Erroneous a sub zero parameter values in the radar sea return model cause errors mainly in wind speed, while erroneous a sub 2 causes errors in wind direction, and a sub 1 has little effect. The dual beam/dual polarization concept is recommended. Author (ESA)

N82-19652# Spar Aerospace Products Ltd., Toronto (Ontario).

STUDY OF A RADAR ALTIMETER FOR THE EUROPEAN REMOTE SENSING PROGRAM. VOLUME 1: EXECUTIVE SUMMARY

A. Thompson and S. J. Alexander Jun. 1981 90 p Prepared jointly with Dornier-Werke GmbH Friedrichshafen, West Germany
(Contract ESA-4427/80/F-DD(SC))
(Spar-R.1090-Issue-A; ESA-CR(P)-1502) Avail: NTIS HC A05/MF A01

Sea scattering, radar parameter selection, performance characteristics such as acquisition and tracking, and operation in rain and over land were studied in order to design a radar altimeter. Tradeoffs covering the antenna, microwave subsystem, signal processor, and altimeter controller were performed. A configuration consisting of a full deramp radar pulse compression system operating at 13.7 GHz, with a maximum likelihood estimator tracker/processor is chosen. The design meets the specification in all respects, has better performance and less weight than the Seasat altimeter, yet is fully redundant. A costed development plan completely compatible with the ERS 1 schedule is outlined. Author (ESA)

N82-19653# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost.

DEVELOPMENT OF A BREADBOARD COOLER FOR INFRARED REMOTE SENSING PAYLOADS, PHASE 1 Final Report

E. G. Overbosch and N. P. Enderberg Paris ESA 14 Mar.

1981 153 p
(Contract ESTEC-4484/80/NL-PP(SC))
(FOK-RV-R-81-064; ESA-CR(P)-1506) Avail: NTIS HC A08/MF A01

A multistage passive cryogenic cooler was designed for the ocean color monitor (OCM) for ERS 1. Mathematical models of thermal and mechanical behavior support the concept of a radiator located in a parabolic reflector. Technologically critical areas of the design are compared with corresponding components in the optical imaging instrument, i.e. the glass reinforced thermal insulation/suspension straps, the suspension system integrated in the cooler, the parabolic reflector, and the cold stage radiator. A set of critical components suitable for both coolers is feasible. A three stage breadboard cooler is described. The multilayer insulation (MLI) radiator cools the MLI support, the first stage cools the paraboloid. The second stage is the cold stage radiating its heat loads by the open faced honeycomb radiator to space. The suspension of the first stage consists of dummies representing the thermal behavior of the corresponding OCM straps. The outside mounting ring is sufficiently stiff to support the cooler, and is used for mounting the cooler in the test chamber. Author (ESA)

N82-19654# Engins Matra, Velizy (France). Lab. de Traitement des Images.

DATA RATE REDUCTION. IMPACT OF IMAGE DATA COMPRESSION ON END TO END DATA MANAGEMENT OF A MULTISPECTRAL PAYLOAD

G. E. Lowitz, J. M. Vivier, J. P. Camus, and B. H. Roy Paris ESA Jul. 1980 51 p refs
(Contract ESTEC-3749/78)
(Rept-44/130; ESA-CR(P)-1507) Avail: NTIS HC A04/MF A01

Satellite onboard data compression by clustering in the raw channels with a variable number of classes is discussed. The effect on the overall image chain is illustrated by land applications satellite system (LASS) data and LANDSAT ground stations processing and dissemination systems. Image quality, processing costs, software and hardware are considered. Onboard mechanization is efficient and the compression principles benefit user interpretation routines such as classification. Compressed data can be processed efficiently, yielding cost savings on the order of 100 to 1. A 512 X 512 pixel frame, including preprocessing, is treated in 5 min. The compressed imagery can be recognized, zones can be located and cloud cover can be assessed, making high quality quick looks possible. Author (ESA)

N82-19655# World Meteorological Organization, Geneva (Switzerland).

CASE STUDIES OF NATIONAL HYDROLOGICAL DATA BANKS (PLANNING, DEVELOPMENT AND ORGANIZATION)

1981 147 p refs
(WMO-576; OHR-17; ISBN-92-63-10576-6) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 10

Contributions from 14 countries on the planning, development, and organization of national hydrological data banks are included, with information on developing data archives for specific elements and on the broader concept of coordinated data banks. For each country the type of data bank (centralized, coordinated, or limited) and the status of hydrological data collection systems are indicated. Contributions to the operation of the data bank and the role and requirements of users are listed. The structure and organization of the data bank, the nature and composition of the hydrological information received, and data processing and quality control procedures are described. Case studies are presented for Australia, Brazil, Canada, Columbia, Finland, France, the Federal Republic of Germany, Morocco, New Zealand, Norway, Portland, Switzerland, the United Kingdom, and the United States of America. Author (ESA)

N82-19656# Saab-Scania, Linkoping (Sweden).

ON THE ACCURACY OF THERMAL INERTIA MAPPING BY INFRARED IMAGERY

Sune R. J. Axelsson 1981 20 p refs
(SAAB-REPR-AE-10) Avail: NTIS HC A02/MF A01

The influence of different interfering parameters on the estimation of the thermal inertia of the ground from the diurnal variations of the surface temperature, using thermal infrared and albedo measuring imagery, was investigated. The strong influence of these parameters degrades the accuracy of the analysis and makes the interpretation complex. This influence was studied, starting from an improved analytic model of the surface temperature of a periodically heated ground surface. The errors in albedo and atmospheric heat exchange, and the limited accuracy of sensors and the model used in data processing, dominate the thermal inertia error. Further reductions of the accuracy are due to the translation of the thermal inertia map into user data like soil type, porosity and soil moisture. Upper bounds on the potential thermal inertia mapping accuracy are found by calculating the estimation error when the interfering parameters are known with specified accuracy. Author (ESA)

N82-19657# National Oceanic and Atmospheric Administration, Ann Arbor, Mich. Environmental Research Lab.

IMPROVED ST. CLAIR RIVER DYNAMICS FLOW MODELS AND COMPARISON ANALYSIS

J. A. Derecki and R. N. Kelly May 1981 49 p refs
(PB82-119272; NOAA-81072407; NOAA-TM-ERL-GLERL-34; GLERL-CONTRIB-260) Avail: NTIS HC A03/MF A01 CSCL 08H

The St. Clair River dynamic flow models, modified to provide better channel definition, to include additional discharge measurements for model calibration, and to incorporate wind stress effects on river flows, are described and compared for daily flow differences resulting from channel definition improvements, wind effects, time scale effects, and a combination of these factors. All the St. Clair River models are derived for the upper river channel, spanning approximately one-third of the river. The three available models can be operated on hourly or daily time scales, with and without surface wind stress effects. During the winter, ice may affect the accuracy of flow computations and model differences may exceed 15% of daily flow. GRA

N82-19658# Geological Survey, Boston, Mass. Water Resources Div.

WATER RESOURCES DATA FOR NEW HAMPSHIRE AND VERMONT, WATER YEAR 1980 Annual Report, 1 Oct. 1979 - 30 Sep. 1980

Jun. 1981 186 p
(PB82-110156; USGS/WRD/HD-81/073; USGS-WDR-NH-VT-80-1) Avail: NTIS HC A09/MF A01 CSCL 08H

Water resources data for the 1980 water year for New Hampshire and Vermont are reported. Records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of wells are presented. Discharge records for 77 gaging stations, stage records for 3 lakes, monthend contents for 25 lakes and reservoirs, water quality data for 4 gaging stations, and water levels for 40 observation wells are included. Also included are data for 4 crest-stage partial-record stations. Additional water data were collected at various sites, not part of the systematic data-collection program, and are published as miscellaneous measurements. A few pertinent stations (not included above) in bordering States and Province of Quebec are also included. GRA

N82-19659# Geological Survey, Richmond Va. Water Resources Div.

WATER RESOURCES DATA FOR VIRGINIA, WATER YEAR 1980 Annual Water Data Report

Jun. 1981 609 p refs
(PB82-113416; USGS/WRD/HD-81-040; USGS/WDR/VA-80-1) Avail: NTIS HC A99/MF A01 CSCL 08H

Records are presented for water discharge at 210 gaging stations, stage only at 1 gaging station, stage and contents at 10 lakes and reservoirs; water quality at 53 gaging stations and 120 wells; and water levels at 60 observation wells. Data are included for 63 crest stage partial record stations. Additional water data were collected at various sites not involved in the systematic data collection program. Discharge measurements were made at 142 coal monitoring partial record stations and at 67 low-flow partial record stations. Miscellaneous data were collected at 311 measuring sites and 186 water quality sampling sites. GRA

N82-19660# Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.
SOCIAL AND ENVIRONMENTAL CONSEQUENCES OF NATURAL RESOURCES POLICIES WITH SPECIAL EMPHASIS ON BIOSPHERE RESERVES Final General Technical Report
Peter F. Ffolliott (Arizona Univ., Tucson) and Gonzalo Halffter (Inst. of Ecology, Mexico) 22 Sep. 1981 63 p refs Seminar held at Durango, Mexico, 8-13 Apr. 1980
(PB82-113937; FSGTR/RM-88) Avail: NTIS HC A04/MF A01 CSCL 02F

A seminar to promote international cooperation among natural resources policy makers, scientists, and educators, within the framework of the international Man and the Biosphere Program is discussed. Papers on a variety of topics relating to natural resources policies formed a basis for formal and information discussions among the participants proceedings are discussed.
GRA

N82-19661# Scientific Service, Inc., Redwood City, Calif.
A MOBILE STREAM DIVERSION SYSTEM FOR HAZARDOUS MATERIALS SPILLS ISOLATION Final Report
James V. Zaccor Cincinnati EPA Sep. 1981 48 p
(Contract EPA-68-03-2458)
(PB82-109679; EPA-600/2-81-219) Avail: NTIS HC A03/MF A01 CSCL 08H

A prototype mobile system was designed and developed for quick diversion of a stream flow around a contaminated area. Spill scenarios were analyzed to stablish design criteria for a self contained, independent system that would maintain flow continuity around a region undergoing decontamination. Stock items available nationwide were used to provide easy maintenance and replaceability. The system was assembled as two independent units, mounted on trailers so that spills would be readily accessible via state or interstate highways. A quick unloading feature provides capability for air shipment to more distant locations. Once onsite, the system can be assembled and placed in operation by a crew of five in a matter of hours. Unit operation and ability to deliver a flow rate of 0.35 cu m/s a distance of 0.3 km over unprepared ground were evaluated in a shakedown test.
GRA

N82-19662# Geological Survey, Harrisburg, Pa. Water Resources Div.
WATER RESOURCES DATA FOR PENNSYLVANIA, WATER YEAR 1980: VOLUME 2: SUSQUEHANNA AND POTOMAC RIVER BASINS Annual Water-data Report, 1 Oct. 1979 - 30 Sep. 1980
Apr. 1981 363 p refs Prepared in cooperation with Pennsylvania Dept. of Environmental Resources
(PB82-115908; USGS/WRD/40-80/062; USGS/WDR/PA-80-2) Avail: NTIS HC A16/MF A01 CSCL 08H

Water resources data for the 1980 water year for Pennsylvania consist of records of discharge and water quality of streams; contents of lakes and reservoirs; and water levels of ground-water wells. Records for water discharge at 100 stations, contents at 13 lakes and reservoirs, water quality at 35 gaging stations, and water levels at 25 observation wells are included. Also included are data for 21 crest stage, 15 low-flow, and 129 water-quality partial-record stations.
GRA

N82-19663# Bureau of Mines, Twin Cities, Minn. Research Center.
IN SITU MINING RESEARCH. PROCEEDINGS OF BUREAU OF MINES TECHNOLOGY SEMINAR Information Circular, 1981
Jul. 1981 114 p refs Seminar held in Denver, 5 Aug. 1981
(PB82-104753; BM-IC-8852; LC-81-607050) Avail: NTIS HC A06/MF A01 CSCL 08I

An overview of the in situ mining research currently being carried out by the Bureau of Mines is presented with emphasis on the environment and productivity. Topics covered include the restoration of ground water, the selection of lixiviants, in situ mining of commodities other than uranium, in situ mining costs, the application of resistance measurements to in situ mining, an acid leach mining case history, and the use of branched boreholes for in situ mining. A bibliography on in situ mining is appended.
GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-19664 Department of Energy, London (England). Transport Working Group.
REVIEW OF THE UK TRANSPORT ENERGY OUTLOOK: AND POLICY RECOMMENDATIONS
1981 43 p refs
(EP-47; ACEC-Paper-11) Copyright. Avail: Issuing Activity; HMSO £4 + postage, PHI

Liquid fuel consumption for transport (excluding international bunkers for ships) in 1979 is analyzed and used to forecast the position at the end of the century. Car population is expected to increase by 6 million to over 20 million, but fuel saving designs mean that fuel consumption increases only slightly. Truck fuel consumption stays the same. Fuel consumption by UK airlines is expected to double. The proportion of a barrel of crude oil which is refined as transport fuel must be increased.
Author (ESA)

N82-19665 Department of Energy, London (England). Buildings Working Group.
ENERGY CONSERVATION IN THE PRODUCTION OF DOMESTIC HOT WATER
1981 23 p refs
(EP-48; ACEC-Paper-12) Copyright. Avail: Issuing Activity; HMSO £2.80 + postage, PHI

Improvements in energy efficiency in existing buildings and the construction of energy efficient buildings are discussed with emphasis on water heating. Cost effective measures proposed include fitting an 80-mm insulating jacket to the hot water storage cylinder, using time switches, fitting thermostatic control systems to boiler based central heating, and storing domestic hot water at a lower temperature. Research into the recovery of heat from waste water, the use of cold water detergents, and the use of heat pumps is urged.
Author (ESA)

N82-19666 Department of Energy, London (England). Severn Barrage Committee.
TIDAL POWER FROM THE SEVERN ESTUARY, VOLUME 1
1981 125 p refs Original contains color illustrations 2 Vol.
(EP-46-Vol-1; ISBN-0-11-410916-8) Copyright. Avail: Issuing Activity; HMSO £9.80 + postage, PHI

Environmental, energy, and economic factors associated with building a tidal power barrage in the Bristol channel were studied. An ebb generation scheme is recommended since it minimizes the unit cost of electricity generation and has less effect on ports than flood or two way generation. The economic justification for a barrage depends on factors which are not known when the decision on whether to build is taken, e.g., the extent of nuclear generation, or the price of coal in the first third of the next century. Further study of the environmental consequences of the barrage is required. An inner barrage is recommended since the larger output of an outer barrage does not outweigh engineering, environmental and economic disadvantages.
Author (ESA)

N82-19667 Department of Energy, London (England). Severn Barrage Committee.
TIDAL POWER FROM THE SEVERN ESTUARY. VOLUME 2: ANALYSIS, STUDIES, REPORTS AND EVALUATIONS

1981 470 p refs 2 Vol.
(EP-46-Vol-2; ISBN-0-11-410919-2) Copyright. Avail: Issuing Activity; HMSO £ 19.50 + postage, PHI

Environmental, energy, and economic factors associated with building a barrage in the Bristol channel were studied. Data collection and analysis are described. Sites, configurations, and costs are considered. Turbine caissons, sluice caissons, and hydroelectric plant are treated. Embankments, navigation and locks are discussed. Environmental, social, industrial, and economic impact are evaluated. An inner barrage, ebb generation scheme is recommended. Author (ESA)

N82-19668*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CHARACTERIZATION OF ASEC BSR 2 OHM-cm SILICON SOLAR CELLS WITH DIELECTRIC WRAPAROUND CONTACTS AS A FUNCTION OF TEMPERATURE AND INTENSITY
A. F. Whitaker and S. A. Little Dec. 1981 18 p refs
(NASA-TM-82456) Avail: NTIS HC A02/MF A01 CSCL 10A

Twenty high performance BSR 2 ohm-cm silicon solar cells manufactured by ASEC were evaluated at 1 AU conditions and at low temperature and low intensities representative of deep space. These cells showed evidence of series resistance of 1 AU conditions and approximately 50% had reduced power outputs under deep space conditions. Average efficiency of these cells was 12.4% of 1 AU conditions of 1 SC/+25 C. Author

N82-19669*# Arizona State Univ., Tempe.
SOCIOECONOMIC IMPACT OF PHOTOVOLTAIC POWER AT SCHUCHULI, ARIZONA Final Report
Donald Bahr, Billy G. Garrett, and Carolyn Chrisman Oct. 1980 161 p refs
(Contracts DEN3-50; DE-AI01-79ET-20485)
(NASA-CR-165551; DOE/NASA/0050-1) Avail: NTIS HC A08/MF A01 CSCL 10A

The social and economic impact of photovoltaic power on a small, remote native American village is studied. Village history, group life, energy use in general, and the use of photovoltaic-powered appliances are discussed. No significant impacts due to the photovoltaic power system were observed. R.J.F.

N82-19670*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PHOSPHORIC ACID FUEL CELL TECHNOLOGY STATUS
Stephen N. Simons, Robert B. King, and Paul R. Prokopius 1981 20 p refs Presented at Fuel Cells: Technol. Status and Appl., Chicago 16-18 Nov. 1981; sponsored by Institute of Gas Technology
(Contract DE-AI01-80ET-17088)
(NASA-TM-82791; DOE/NASA/17088-3) Avail: NTIS HC A02/MF A01 CSCL 10A

A review of the current phosphoric acid fuel cell system technology development efforts is presented both for multimegawatt systems for electric utility applications and for multikilowatt systems for on-site integrated energy system applications. Improving fuel cell performance, reducing cost, and increasing durability are the technology drivers at this time. Electrodes, matrices, intercell cooling, bipolar/separator plates, electrolyte management, and fuel selection are discussed. B.W.

N82-19671*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MECHANISM AND MODELS FOR ZINC METAL MORPHOLOGY IN ALKALINE MEDIA
Charles E. May and Harold E. Kautz Dec. 1981 36 p refs
(NASA-TM-82768; E-1090) Avail: NTIS HC A03/MF A01 CSCL 10A

Based on experimental observations, a mechanism is presented to explain existence of the different morphologies of electrodeposited zinc in alkaline solution. The high current density dendrites appear to be due to more rapid growth on the nonbasal crystallographic planes than on the basal plane. The low current density moss apparently results from dissolution from the nonbasal planes at low cathodic voltages. Electrochemical models were sought which would produce such a phenomenon. The fundamental plating mechanism alone accounts only for different rates on different planes, not for zinc dissolution from a plane in the cathodic region. Fourteen models were explored: two models were in accord with the proposed mechanism. One involves rapid disproportionation of the zinc +1 species on the nonbasal planes. The other involves a redox reaction (corrosion) between the zinc-zincate and hydrogen-water systems. S.L.

N82-19672*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PERFORMANCE AND OPERATIONAL ECONOMICS ESTIMATES FOR A COAL GASIFICATION COMBINED-CYCLE COGENERATION POWERPLANT
Joseph J. Nainiger, Raymond K. Burns, and Annie J. Easley Mar. 1982 32 p refs
(NASA-TM-82729; E-1032) Avail: NTIS HC A03/MF A01 CSCL 10B

A performance and operational economics analysis is presented for an integrated-gasifier, combined-cycle (IGCC) system to meet the steam and baseload electrical requirements. The effect of time variations in steam and electrial requirements is included. The amount and timing of electricity purchases from sales to the electric utility are determined. The resulting expenses for purchased electricity and revenues from electricity sales are estimated by using an assumed utility rate structure model. Cogeneration results for a range of potential IGCC cogeneration system sizes are compared with the fuel consumption and costs of natural gas and electricity to meet requirements without cogeneration. The results indicate that an IGCC cogeneration system could save about 10 percent of the total fuel energy presently required to supply steam and electrical requirements without cogeneration. Also for the assumed future fuel and electricity prices, an annual operating cost savings of 21 percent to 26 percent could be achieved with such a cogeneration system. An analysis of the effects of electricity price, fuel price, and system availability indicates that the IGCC cogeneration system has a good potential for economical operation over a wide range in these assumptions. R.J.F.

N82-19673*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
OPERATIONAL PERFORMANCE OF THE PHOTOVOLTAIC-POWERED GRAIN MILL AND WATER PUMP AT TANGAYE, UPPER VOLTA Summary Report, Mar. 1979 - Apr. 1981
James E. Martz, Anthony F. Ratajczak, and Richard DeLombard Feb. 1982 59 p refs Sponsored in part by Bureau for Development Support
(NASA-TM-82767; E-1089) Avail: NTIS HC A04/MF A01 CSCL 10B

The first two years of operation of a stand alone photovoltaic (PV) power system for the village of Tangaye, Upper Volta in West Africa are described. The purpose of the experiment was to demonstrate that PV systems could provide reliable electrical power for multiple use applications in remote areas where local technical expertise is limited. The 1.8 kW (peak) power system supplies 120-V (d.c.) electrical power to operate a grain mill, a water pump, and mill building lights for the village. The system was initially sized to pump a part of the village water requirements from an existing improved well, and to meet a portion of the village grain grinding requirements. The data, observations, experiences, and conclusions developed during the first two years of operation are discussed. Reports of tests of the mills used in the project are included. B.W.

N82-19674*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE GEOTHERMAL PROBABILISTIC COST MODEL WITH AN APPLICATION TO A GEOTHERMAL RESERVOIR AT HEBER, CALIFORNIA
Lowell H. Orren, G. Michael Ziman, and Sue Campbell Jones 15 Dec. 1981 70 p refs
(Contracts NAS7-100; DE-AI03-79ET-37116)
(NASA-CR-168641; DOE/ET-37116/1; JPL-Pub-81-117) Avail: NTIS HC A04/MF A01 CSCL 10A

A financial accounting model that incorporates physical and institutional uncertainties was developed for geothermal projects. Among the uncertainties it can handle are well depth, flow rate, fluid temperature, and permit and construction times. The outputs of the model are cumulative probability distributions of financial measures such as capital cost, levelized cost, and profit. These outputs are well suited for use in an investment decision incorporating risk. The model has the powerful feature that conditional probability distribution can be used to account for correlations among any of the input variables. The model has been applied to a geothermal reservoir at Heber, California, for a 45-MW binary electric plant. Under the assumptions made, the reservoir appears to be economically viable. Author

N82-19675*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A REVIEW OF THE SALT-GRADIENT SOLAR POND TECHNOLOGY
E. I. H. Lin 30 Jan. 1982 60 p refs
(Contracts NAS7-100; DE-AI03-81SF-11552)
(NASA-CR-168635; JPL-Pub-81-116; JPL-5107-3; DOE/SF-11552/1) Avail: NTIS HC A04/MF A01 CSCL 10A

The state of the salt-gradient solar pond technology is reviewed. Highlights of findings and experiences from existing ponds to data are presented, and the behavior, energy yield, operational features, and economics of solar ponds are examined. It is concluded that salt-gradient solar ponds represent a technically feasible, environmentally benign, and economically attractive energy producing alternative. In order to bring this emerging technology to maturity, howevar, much research and development effort remains to be undertaken. Specific R&D areas requiring the attention and action of technical workers and decision-makers are discussed, both from the perspectives of smaller, thermally-oriented ponds and larger, electricity generating ponds. Author

N82-19676*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VACUUM LAMINATION OF PHOTOVOLTAIC MODULES
D. R. Burger 15 Jan. 1982 22 p refs
(Contracts NAS7-100; DE-A101-76ET-20356)
(NASA-CR-168634; DOE/JPL-1012-32; JPL-Pub-81-118; JPL-5101-188) Avail: NTIS HC A02/MF A01 CSCL 10A

Vacuum lamination of terrestrial photovoltaic modules is a new high volume process requiring new equipment and newly develop materials. Equipment development, materials research, and some research in related fields and testing methods are discussed. Author

N82-19677*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A LOW-POWER PHOTOVOLTAIC SYSTEM WITH ENERGY STORAGE FOR RADIO COMMUNICATIONS: DESCRIPTION AND DESIGN METHODOLOGY
C. P. Chapman, Paul D. Chapman (Everest and Jennings, Los Angeles), and Alvin H. Lewison (Simpson Electric Co., Elgin, Ill.) 15 Jan. 1982 73 p refs
(Contracts NAS7-100; DE-A101-76ET-20356)
(NASA-CR-168640; JPL-Pub-82-2) Avail: NTIS HC A04/MF A01 CSCL 10B

A low power photovoltaic system was constructed with approximately 500 amp hours of battery energy storage to provide power to an emergency amateur radio communications center. The system can power the communications center for about 72 hours of continuous nonsun operation. Complete construction details and a design methodology algorithm are given with abundant engineering data and adequate theory to allow similar systems to be constructed, scaled up or down, with minimum design effort. Author

N82-19678*# Naval Weapons Support Center, Crane, Ind. Weapons Quality Engineering Center.
RESULTS OF CONTINUOUS SYNCHRONOUS ORBIT TESTING OF SEALED NICKEL-CADMIUM CELLS
J. D. Harkness 1 Jun. 1981 472 p refs
(NASA Order S-53742-AG)
(NASA-CR-168564; WQEC/C-81-120A) Avail: NTIS HC A20/MF A01 CSCL 10C

Test results from continuous synchronous orbit testing of sealed nickel cadmium cells are presented. The synchronous orbit regime simulates a space satellite maintaining a position over a fixed point on earth as the earth rotates on its axis and revolves about the sun. Characteristics of each lot of cells, test conditions, and charge control methods are described. E.A.K.

N82-19679# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
NEW BIOREACTORS FOR AEROBIC PROCESSES
K. Schuegerl 1982 44 p refs Transl. into ENGLISH from Chem. Ing. Tech., (West Germany), v. 52, no. 12, 1980 p 951-905 Presented at Dechema Ann. Meeting, Frankfurt am Main, 18 Jun. 1980
(ISSN-0077-5606; NRC/CNR-TT-2005) Avail: NTIS HC A03/MF A01

The best known bioreactors are classified into three types and described according to the method of introducing energy. All these reactors consist of few constructional units, of which only the dispersion systems will be considered. In all the dispersion units, gas dispersion in the range of interest in practice is by a turbulent mechanism. Thus the dispersion units can be compared directly with one another. It is shown that the efficiency of the dispersion units depends upon the properties of the turbulence generated thereby. B.W.

N82-19680*# McDonnell-Douglas Corp., St. Louis, Mo.
THE NASA STANDARD 20 AMPERE HOUR NICKEL-CADMIUM BATTERY MANUAL
D. A. Webb 29 Jun. 1979 70 p refs
(Contract NAS5-23844)
(NASA-CR-166700; MMS-408-2101-0003) Avail: NTIS HC A04/MF A01 CSCL 10C

The NASA standard 20 ampere hour spacecraft nickel-cadmium battery in described. Mechanical electrical and thermal data are supplied. Both qualification and acceptance tests are described. Information on handling and storage is given. R.J.F.

N82-19681# Advanced Engineering Lab., Salisbury (Australia). Defence Research Centre.
FEASIBILITY STUDY ON A LOW POWER VERTICAL AXIS WIND-POWERED GENERATOR
W. R. Crook, T. Puust, M. L. Robinson, and L. J. Vencel Sep. 1980 102 p refs
(AEL-0039-TR; AR-001-672) Avail: NTIS HC A06/MF A01

Investigations carried out to establish a design concept for a 1 kW wind-powered generator suitable for use as an alternative power source in isolated locations is described. Design criteria include high power to weight ratio, simplicity of assembly, and potential for fixed, mobile or portable applications. A suitable configuration using a Darrieus straight blade rotor with a microprocessor based control system is proposed. Information on the power output to be expected in different wind environments is provided. Author

N82-19682*# Talandic Research Corp., Pasadena, Calif.
[EVALUATION OF CRYSTAL OSCILLATORS AND FREQUENCY DIVIDERS FOR HIGH TEMPERATURE OPERATION] Final Report
1 Jun. 1981 16 p refs Prepared for JPL
(NASA Order IC-727659)
(NASA-CR-168561; JPL-9950-554) Avail: NTIS HC A02/MF A01 CSCL 10A

Active and passive components of crystal oscillators and frequency dividers were tested to determine their performance at temperatures from 300 C to 350 C. The properties of GaAs JFETs were determined and their performance compared with that of silicon devices. Techniques for constructing breadboard circuits were assessed for operation in this temperature range. A Pierce oscillator and a multivibrator (Colorado crystal) oscillator were constructed and tested. Device failures are discussed. A.R.H.

N82-19683# New Mexico State Univ., Las Cruces.
DESIGN CALCULATION PROCEDURE FOR PASSIVE SOLAR HOUSES AT NAVY INSTALLATIONS IN REGIONS WITH COLD CLIMATE, VOLUME 1 Preliminary Report, Apr. 1980 - Sep. 1981
Monika Lumsdaine Port Hueneme, Calif. NCEL Oct. 1981 123 p refs 5 Vol.
(Contract N62583-79-MR-585)
(AD-A108382; CEL-CR-82.002-Vol-1) Avail: NTIS

HC A06/MF A01 CSCL 13/1

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in regions with cold climate. GRA

N82-19684# New Mexico State Univ., Las Cruces.
DESIGN CALCULATION PROCEDURE FOR PASSIVE SOLAR HOUSES AT NAVY INSTALLATIONS IN EAST COAST REGIONS WITH TEMPERATE CLIMATE, VOLUME 2 Preliminary Report, 1980 - Sep. 1981
Monika Lumsdaine Port Hueneme, Calif. NCEL Oct. 1981 117 p refs 5 Vol.
(Contract N62583-79-MR-585)
(AD-A108383; CEL-CR-82.003-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 13/1

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in East Coast regions with temperate climate. GRA

N82-19685# New Mexico State Univ., Las Cruces.
DESIGN CALCULATION PROCEDURE FOR PASSIVE SOLAR HOUSES AT NAVY INSTALLATIONS IN REGIONS WITH WARM, HUMID CLIMATE, VOLUME 3 Preliminary Report, Apr. 1980 - Sep. 1981
Monika Lumsdaine Port Hueneme, Calif. NCEL Oct. 1981 132 p refs 5 Vol.
(Contract N62583-79-MR-585)
(AD-A108384; CEL-CR-82.004-Vol-3) Avail: NTIS HC A07/MF A01 CSCL 13/1

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in regions with warm, humid climate. GRA

N82-19686# New Mexico State Univ., Las Cruces.
DESIGN CALCULATION PROCEDURE FOR PASSIVE SOLAR HOUSES AT NAVY INSTALLATIONS IN THE PACIFIC NORTHWEST, VOLUME 4 Preliminary Report, Apr. 1980 - Sep. 1981
Monika Lumsdaine Port Hueneme, Calif. NCEL Oct. 1981 120 p refs 5 Vol.
(Contract N62583-79-MR-585)
(AD-A108385; CEL-CR-82.005-Vol-4) Avail: NTIS HC A06/MF A01 CSCL 13/1

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in the Pacific Northwest. GRA

N82-19687# New Mexico State Univ., Las Cruces.
DESIGN CALCULATION PROCEDURE FOR PASSIVE SOLAR HOUSES AT NAVY INSTALLATIONS IN WARM CALIFORNIA CLIMATES, VOLUME 5 Preliminary Report, Apr. 1980 - Sep. 1981
Monika Lumsdaine and Edward Lumsdaine Port Hueneme, Calif. NCEL Oct. 1981 121 p refs 5 Vol.
(Contract N62583-79-MR-385)
(AD-A108386; CEL-CR-82.006) Avail: NTIS HC A06/MF A01 CSCL 13/1

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in warm California climates. GRA

N82-19688# Solarex Corp., Rockville, Md.
DESIGN OF MOBILE PHOTOVOLTAIC POWER SYSTEMS: 0.5-3kW Final Report
Roy D. Gibson 1 Oct. 1981 133 p
(Contract DAAK70-80-C-0147)
(AD-A108889) Avail: NTIS HC A07/MF A01 CSCL 10/2

This contract effort can be summarized by four technical tasks: Task 1 - Analysis of Engine-Generator Inventory and Use for a less than 5 kW system; Task 2 Parametric analysis of the Transportability of Photovoltaic System, i.e., the range of size and weight of transportable trailers and the associated PV generator size; Task 3 - Preliminary Cost Estimates for Photovoltaic Systems, and Task 4 - Preliminary Photovoltaic System Design. This report presents the results of Task 1 for the engine generator set planned inventory and characteristics. Task 1 also contained candidate photovoltaic system configurations which would be compared with the engine-generator characteristics identified in Task 1. A parametric study was made of sizing trade-offs between photovoltaic arrays and battery storage capacities which were capable of at least meeting the identified engine-generator characteristics and on structural designs for the photovoltaic array and storage battery for the two trailer configurations. The preliminary cost estimate support in Task 3 involved life cycle cost analysis for the system sizes studied in Task 1. The Task 4 preliminary system design support consisted of examining the results of Tasks 1, 2 and 3 and determining characteristics of transportable photovoltaic systems. GRA

N82-19689# General Electric Co., Philadelphia, Pa. Energy Systems Programs Dept.
DESIGN AND FABRICATION OF CONTAINMENT RINGS FOR USE IN TESTS OF SIX PROTOTYPE FLYWHEEL ROTORS
Anthony P. Coppa Feb. 1981 106 p refs
(DE81-030357; UCRL-15370) Avail: NTIS HC A06/MF A01

The design of containment rings for use in the prototype flywheel rotor test was examined. Rotor dynamics and failure characteristics were measured. Six designs for prototypes for containment rings are identified. The all metallic and kevlar overwrapped metallic linear containment designs are compared. E.A.K.

N82-19690# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Abteilung Energietechnik.
DEVELOPMENT OF SIMPLE SOLAR COLLECTORS Final Report
Wilmar Fuhse, Karl Jaeger, and Hans-Peter Kleinemeier Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 314 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-174; ISSN-0340-7608) Avail: NTIS HC A14/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 47,90

The feasibility of simplifying solar energy systems, and the production techniques of their components, for usage in developing countries was investigated. The emphasis in those countries should not be so much on efficiency. Simplicity of construction and minimal reliance on imported components should be emphasized rather than efficiency because of favorable radiation conditions and high ambient temperatures. Several systems were tested consisting only of collectors, heat storage and a simple flow control. The construction of the collectors was reviewed for materials, heat vector, efficiency, construction and assembly techniques, and the material resources and climate of individual countries. As a result, a prototype collector was built and tested, satisfying the requirements. Author (ESA)

N82-19691# Friedrichsfeld G.m.b.H., Mannheim (West Germany). Steinzeug- und Kunststoffwerke.

PRODUCTION TECHNOLOGY OF AN OXYGEN ION CONDUCTIVE CERAMIC FOR HIGH TEMPERATURE FUEL CELLS AND HIGH TEMPERATURE WATER ELECTROLYSIS Final Report

Guenther Heimke, Helmut Mayer, and Arno Reckziegel Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 104 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-180; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21,85

The cheap mass production of stabilized zirconia ceramic bodies with thin walls, suitable for high temperature fuel cell or water electrolysis applications is discussed. Chemical and thermal corrosion effects were laboratory tested. Such bodies sintered from YZO3-YbZO3 and YZO3 doped zirconia with high density, good electrical conductivity, small grain size, and 5 mm wall thickness can be produced by conventional methods at temperatures > 1700 C. Extremely fine grained structure ceramics of almost theoretical density can be produced at 1600 C using coprecipitated powders. These powders are, however, too expensive for mass production. Author (ESA)

N82-19692# Dortmund Univ. (West Germany). Inst. fuer Umweltschutz.

A SOLAR HIGH TEMPERATURE KILN Final Report

Norbert Huettenhoelscher and Konrad Bergmann Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 93 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-181; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,75

The feasibility of using solar energy in developing countries for baking ceramic construction materials was investigated. The solar high temperature kiln is described. It uses two parabolic concentrators which direct available radiation into the baking chamber. The Sun tracker has only one axis. Preliminary test results with the prototype kiln were satisfactory. Author (ESA)

N82-19693# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.

JOINT INDIAN-GERMAN PROGRAM ON SOLAR ENERGY: PHASE 2 Final Report

Knut Berndorfer Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 99 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-182; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21

Based on the analysis of the total energy needs of a typical Indian village and of the local sources: sun, wind and biomass, several energy supply concepts were analyzed. A project proposal for short and long-term development and testintg of components and systems was elaborated. Test results and experience with the 10 kW solar power plant of Madras are presented, including recommendations for further work regarding low temperature systems. The work carried out on a parabolic dish test stand at Hyderabad is reported. Author (ESA)

N82-19694# Fraunhofer-Inst. fuer Systemtechnik und Innovationsforschung, Karlsruhe (West Germany).

EXAMINATION OF HEAT STORAGE IN SOIL Final Report, Dec. 1980

Fredy Jaeger, Juergen Reichert, and Hermann Herz Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 154 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-200; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 31,90

The performance of a heat storage system, based on soil storage by spherical temperature stratification, was assessed and compared to conventional hot water systems for usage in single family houses heated by solar energy. A heat conduction code was used in combination with a simulation model for solar room heating systems in order to evaluate the dependence of storage performance on soil materials, heat transfer parameters, and storage size. Results show that the initially suggested storage scheme should be supplemented with insulation in order to perform somewhat better than hot water storage. A more definite assessment requires further studies on transmission losses, heat capacity enlargement, and mechanical stability and aging properties of insulation materials. Author (ESA)

N82-19695# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.

A PITCH CONTROL SYSTEM FOR LARGE SCALE WIND TURBINES

Brad S. Liebst 12 Jan. 1981 146 p refs Sponsored in cooperation with Aeronautical Research Foundation Prepared in cooperation with MIT
(Contract NE-5061-014)
(FFA-TN-HU-2262-Pt-6) Avail: NTIS HC A07/MF A01

A pitching blade segment control system, to alleviate problems associated with wind shear, tower shadow, and gravity, like shortened lifetime and noise generation was designed. The classical linear quadratic Gaussian optimal regulator approach is used in the control formulation. An aerodynamic analysis, incorporating wind shear and tower shadow, is performed. An equivalent hinge model describes the turbine structural dynamics. Pitch, flap and lag blade degrees of freedom and shaft torsion and generator dynamics are included. It is shown that the system reduces vibration and noise, provides a cleaner power signal, improves gust response, and increases annual energy output. Author (ESA)

N82-19696# Technical Research Centre of Finland, Espoo. Lab. of Building Economics.

ENERGY PROPERTIES IN URBAN BUILDING STOCK

Veikko Kanerva and Markku Lappalainen 1981 35 p refs Sponsored by Ministry of Trade and Industry and National Housing Board
(VTT-RR-1/81; ISBN-951-38-1236-7; ISSN-0358-5069) Avail: NTIS HC A03/MF A01

Buildings in urban areas were examined for energy consumption and energy conservation potential. Oil is 7.5% of heating fuel. Over 30% of the overall building volume heated is served by district or regional heating. The annual consumption of heating energy in buildings fluctuates between 30 and 140 kW hr/cu m. Function, size, and maintenance patterns affect energy consumption. Interior temperature levels and ventilation account for much of the dispersion in consumption values. Older buildings consume less energy per unit volume than those erected after 1960. Buildings constructed since 1975 consume over 10% less energy than the average. It is concluded that it is possible to reduce energy consumption within cost-effective limits in urban building stock by one third during the 1980's. Author (ESA)

N82-19697# Commerce Dept., Washington, D.C. Economic Policy Staff.

US ENERGY FOR THE REST OF THE CENTURY Annual Report

Joseph F. Gustaferro 2 Jul. 1981 36 p
(PB82-115866) Avail: NTIS HC A03/MF A01 CSCL 10A

The basic quantitative results of U.S. Commerce Department forecasting efforts in the energy area are summarized. The data cover the entire spectrum of U.S. energy requirements and focus on the end-use of energy for operational purposes, e.g. highway transportation, space heating, lighting, and road construction. The tables provide data on fuel consumption by types and BTU content for 1980 and as projected for the year 2000. GRA

N82-19698# Science Research Council, Chilton (England).

THE TECHNIQUES, MAGNITUDES AND OPPORTUNITIES FOR DEVELOPMENT OF ENERGY STORAGE (UK)

F. M. Russell 1981 13 p
(PB82-120858; RL-80-087) Copyright. Avail: NTIS HC A02/MF A01 CSCL 10C

The development of energy storage techniques is discussed.

Opportunities for development of existing and new forms of energy storage are examined. The increase in energy transformation with increasing industrialization the need for efficient energy storage and recovery also grows. The large scale transformation of chemical energy stored in fossil fuels emphasizes the need for energy conversion. Techniques of energy storage, applications, and possible research and development areas are also discussed. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-19699 Delaware Univ., Newark.
DETRITAL EXCHANGE PROCESSES OF A DELAWARE SALT MARSH Ph.D. Thesis
Charles True Roman 1981 156 p
Avail: Univ. Microfilms Order No. 8128345

Quantitative and qualitative aspects of detrital exchange between the 190-hectare Canary Creek salt marsh and lower Delaware Bay were studied on a seasonal basis. An accurate assessment of water volume flux was obtained from detailed hydrographic measurements of cross-sectional velocity patterns. Hourly field collections over three consecutive tidal cycles revealed ebbtide concentrations of particulate organic carbon and nitrogen to be higher than flood during all seasons, except during winter icing conditions. Mean ebbtide dissolved organic carbon concentrations were greater than floodtide during all seasons. An equivalent of 16% of the aboveground primary production of this Spartina-dominated system was exported as particulate organic carbon, with 31% flushed to coastal waters as dissolved organic carbon. Meteorological events are undoubtedly dominant forces controlling marsh/estuarine material exchange processes. Dissert. Abstr.

N82-19700 Emory Univ., Atlanta, Ga.
THE EFFECTS OF SULFUR DIOXIDE AND ACID PRECIPITATION ON DECOMPOSITION AND NUTRIENT CYCLING PROCESSES Ph.D. Thesis
Marlin Ralph Gottschalk 1981 112 p refs
Avail: Univ. Microfilms Order No. 8129855

Terrestrial microcosms (intact soil cores) from an oak-hickory forest on the Piedmont Plateau in Georgia were used to ascertain the impact of sulfur dioxide and acid precipitation on decomposition and nutrient cycling processes. Changes in carbon dioxide efflux and soil leachate nutrient concentrations were measured to detect systems level functional responses to the experimental stresses. Nutrient export increased significantly over a 40 week calibration period because of increased decomposition and nitrification and subsequent soil acidification. Soil leachate concentrations of Ca, Mg, K and NO3-N increased asymptotically from 1.4, 2.0, 3.9 and 0.3 mu g/ml (ppm), respectively, to 53.1, 33.5, 26.0 and 110.7 ppm after about 32 weeks. Ammonium N concentrations peaked at 5.0 ppm at week 18 and then declined significantly. Phosphate P concentrations remained relatively constant at 0.020 to 0.040 ppm. Leachate pH decreased from 5.0 to 4.0. Dissert. Abstr.

N82-19701 International Institute for Applied Systems Analysis, Laxenburg (Austria).
LIFE ON A WARMER EARTH: POSSIBLE CLIMATIC CONSEQUENCES OF MAN MADE GLOBAL WARMING
H. Flohn 1981 80 p refs
(ER-3) Copyright. Avail: Issuing Activity

The interaction between energy and climate is explored, including the impact on global climate of three main energy sources: solar, nuclear and fossil fuels. The global warming problem is introduced. Comprehensive analogies with warmer times are made. From the best models available, the future global average surface temperature is found and modified, describing the global warming effects caused by greenhouse effect caused by gases other than carbon dioxide, released into the atmosphere by man, i.e. nitrous oxide, methane, ammonia, and the chlorofluoromethanes. Paleoclimatic scenarios are reviewed, showing possible effects of global warming. An 800 to 1100 ppm CO2 concentration causes irreversible Arctic melting, leading to displacement of present climatic zones by 400 to 800 km. Author (ESA)

N82-19702 International Institute for Applied Systems Analysis, Laxenburg (Austria).
OPERATIONAL WATER QUALITY MANAGEMENT: BEYOND PLANNING AND DESIGN
M. B. Beck 1981 84 p refs
(ER-7) Copyright. Avail: Issuing Activity

Effective means of water quality management is discussed. The theory, practice, and the changing character of problems related to water pollution are considered. Current practice in each of the subsystems of a water quality management system is reviewed. The desirable attributes of water quality management and recommendations for realizing the full potential of operational management are noted. Author (ESA)

N82-19703# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THREE DIMENSIONAL NUMERICAL MODEL FOR ESTIMATION OF POLLUTANT CONCENTRATION M.S. Thesis - 12 Dec. 1980 [MODELO NUMERICO TRIDIMENSIONAL PARA ESTIMATIVA DE CONCENTRACAO DE POLUENTES]
Nelson Arai Aug. 1981 76 p refs In PORTUGUESE; ENGLISH summary
(INPE-2193-TDL/060) Avail: NTIS HC A05/MF A01

The pollution concentration in a region with wind velocities less than 1 m/s was studied by a three dimensional numerical dispersion model. The model calculates the three dimensional concentration distribution which results from emission of pollutant from a continuous source. The Gaussian Plume formulation is used to calculate wind velocities greater than 1 m/s. It is suggested that these models may be used as a first approximation to estimate pollutant concentration. E.A.K.

N82-19704# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PRELIMINARY RESULTS OF A STUDY OF MAPPING THERMAL DISCHARGE IN THE OCEAN, USING REMOTE SENSING DATA
Merritt Raymond Stevenson, Carlos Alberto Steffen, and Hector Manual Inostroza Villagra Sep. 1981 23 p refs In PORTUGUESE; ENGLISH summary Presented at 33d Ann. Meeting of SBPC, Salvador, 8-15 Jul. 1981
(INPE-2229-PRE/021) Avail: NTIS HC A02/MF A01

The spatial and temporal variations of the sea surface temperature, utilizing data obtained from sea surface, aircraft and satellite platforms were studied. The objective of the study is the evaluation and mapping of small scale variations in the sea surface temperature, caused by the thermal discharge from a nuclear power plant at Angra dos Reis, Brazil. Evaluation of data from ANGRA 01, the first experiment made on December 19, 1980, showed the surface temperature to be quite isothermal. Temperature from the aircraft and satellite radiometers were about 0.6 C and 5.0 C cooler, respectively, than the temperatures measured from the boat. These thermal offsets are readily accounted for by differences in emissivities of the sea surface and the intervening water vapor in the lower atmosphere. Author

N82-19705# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
BINARY MOSAICS AND POINT QUADRAT SAMPLING IN ECOLOGY M.S. Thesis
Cajo J. F. terBraak Sep. 1980 108 p refs
(A-80-ST-96-37) Avail: NTIS HC A06/MF A01

Point quadrat sampling, a method for estimating the proportional cover of a plant species over a planar region whereby the presence or absence of the species is recorded at each of N samples points is discussed. If n is the number of points at which the species is present, p = n/N is unbiased for p. Expressions for the variance of circumflex p are given for a random sample of sample points independently and uniformly distributed over a region, a systematic sample of points in a rectangular lattice covering the region, and a frame sample of small randomly located frames, each with m points regularly spaced along a line or in a square lattice. The efficiency of systematic sampling and frame sampling with respect to random sampling is evaluated for two classes of underlying mosaic processes. A map showing the incidence of heather and the locations of pines on a 10m x 20m area in Central Sweden is analyzed to test for association between pine and heather. N.W.

N82-19706# Committee on Foreign Affairs (U. S. House).
UNITED STATES-CANADIAN RELATIONS AND ACID RAIN
Washington GPO 1981 123 p refs Hearing before the Subcomm. on Human Rights and Intern. Organ. and the Subcomm. on Inter-Am. Affairs of the Comm. on Foreign Affairs, 20 May 1981
(GPO-80-995) Avail: Subcommittee on Human Rights and International Organizations

United States and Canadian relations are discussed in the context of the problem of acid rain and its effects on the environment. Legislation to control exhaust emissions is discussed. R.J.F.

N82-19707*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF REPETITION RATE AND IMPULSIVENESS OF SIMULATED HELICOPTER ROTOR NOISE ON ANNOYANCE
Clemans A. Powell and David A. McCurdy Feb. 1982 59 p refs
(NASA-TP-1969; L-14936) Avail: NTIS HC A04/MF A01 CSCL 20A

Annoyance judgements were obtained for computer generated stimuli simulative of helicopter impulsive rotor noise to investigate effects of repetition rate and impulsiveness. Each of the 82 different stimuli was judged at 3 sound pressure levels by 48 subjects. Impulse repetition rates covered a range from 10 Hz to 115 Hz; crest factors covered a range from 3.2 dB to 19.3 dB. Increases in annoyance with increases in repetition rate were found which were not predicted by common loudness or annoyance metrics and which were independent of noise level. The ability to predict effects of impulsiveness varied between the noise metrics and was found to be dependent on noise level. The ability to predict the effects of impulsiveness was not generally improved by any of several proposed impulsiveness corrections. Instead, the effects of impulsiveness were found to be systematically related to the frequency content of the stimuli. A modified frequency weighting was developed which offers improved annoyance prediction. Author

N82-19708# Mississippi State Univ., Mississippi State. Agriculture and Experiment Station.
VEGETATIVE EROSION CONTROL STUDIES TENNESSEE-TOMBIGBEE WATERWAY Final Report, 3 Aug. 1976 - 30 Oct. 1980
Jeffrey V. Krans, Clifford Trammel, Richard Harrod, and Veronica Henning Jan. 1981 139 p
(Contract DACW62-76-C-0216)
(AD-A108318) Avail: NTIS HC A07/MF A01 CSCL 08/13

Vegetative erosion control studies of establishment, overseeding, and refertilization were conducted at two sites in Tishomingo CO., MS (Yellow Creek Port Site and Tennessee-Tombigbee Waterway Site) that were most representative of the Tenn-Tom Waterway slopes and spoil areas from August, 1976 thru October 1980. Primary objectives were focused on species selection, seeding rates, mulch evaluations, post-establishment fertilization and overseeding. Species shown to be well adaptive to site and soil conditions are given. Comparison of seeding rates, mixtures, and seed distribution methods were made. Overseeding was also performed. Cultivation practices of burning, discing, and clod-busting were evaluated with clod-busting being the most effective method. Regrowth of the established stand following overseeding and plant response to nitrogen fertilization were also evaluated. GRA

N82-19709# Stadtwerke Bocholt G.m.b.H., (West Germany).
PRELIMINARY STUDY ON THE SUPPLY OF INDUSTRIAL WATER BY ADVANCED TREATMENT OF WASTE WATER DISCHARGED FROM A SEWAGE TREATMENT PLANT Final Report
Dietmar Wallisch Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 81 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-205; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,95

The reuse of waste water in closed circuit as industrial water after centralized treatment, but without passage through the soil, was studied for application in a newly developed industrial area which includes a sewage treatment plant. The quality of the water discharged from the sewage plant and the factors influencing it the requirements for industrial water and the economics of the processing were studied. Results show that, although the waste waters allow further cleaning, it is impossible to fix standards for industrial waters. In order to prove economic feasibility, a test on a semi-industrial scale is planned. Author (ESA)

N82-19710# Donohue and Associates, Inc., Sheboygan, Wis.
SMALL SCALE RECLAMATION/DISPOSAL OF TOXIC PORCELAIN ENAMELING WASTE SLUDGES Final Report
Karl G. Voelkel Feb. 1981 69 p refs
(Grant NSF ISP-80-09922)
(PB82-101593; NSF/ISP-81013) Avail: NTIS HC A04/MF A01 CSCL 13B

The technical, economic, and legal feasibility of various onsite methods for reclaiming or disposing of wastes containing hazardous metals generated in the manufacture of porcelain enameled (PE) aluminum ware is determined. Results indicate that (1) PE waste stream pretreatment with polyelectrolyte polymers is advantageous in generating both sludges and clear supernatants that conform to current regulatory standards for normal disposal and subsequent treatment as nonhazardous wastes; and (2) commercial encapsulation methods are not economical for many PE ball room mill waste streams. Acid extraction of metals from sludges with subsequent metal salt recovery by ion exchange/distillation appears economically feasible for dry overspray sludges from the spray booth. Author (GRA)

N82-19711# Franklin Research Center, Philadelphia, Pa.
LITERATURE STUDY OF THE BIODEGRADABILITY OF CHEMICALS IN WATER. VOLUME 1: BIODEGRADABILITY PREDICTION, ADVANCES IN CHEMICAL INTERFERENCES WITH WASTEWATER TREATMENT Final Report, Jul. 1979 - Apr. 1981
John Geating Cincinnati EPA Sep. 1981 248 p refs 2 Vol.
(Grant EPA-R-806699)
(PB82-100843; EPA-600/2-81-175-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 13B

Biodegradability productions and advances in chemical interferences with wastewater treatment were studied. It is indicated that 93% accuracy for biodegradables, but only 70% for nonbiodegradables. Technological advances in wastewater treatment are reported. In the same selection, in tabular format, are references to commercial literature and some journal articles, supplied with this reports to EPA, obtained by canvassing Japanese and West German manufacturers in this field. A condensation of abstracts from the 1913-1974 literature dealing only with adverse effects of chemicals on wastewater treatment, in tabular format, is included. It is intended to complement references to this topic in the permutated index. GRA

N82-19712# Franklin Research Center, Philadelphia, Pa.
LITERATURE STUDY OF THE BIODEGRADABILITY OF CHEMICALS IN WATER. VOLUME 2: PERMUTATED INDEX OF CHEMICALS, MICROBIAL POPULATIONS, AND WASTEWATER TREATMENT SYSTEMS WITH BIBLIOGRAPHY Final Report, Jul. 1979 - Apr. 1981
Cincinnati EPA Sep. 1981 157 p refs 2 Vol.
(Grant EPA-R-806699)
(PB82-100850; EPA-600/2-81-176-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 13B

Post 1974 literature on wastewater treatment was retrieved by online searching of eight databases. Six hundred articles were used to generate a three tiered permutated index keyed to, and presented with the 600 article bibliography; the three levels of the index are name of chemical, name of microbe affecting or affected by said chemical, and treatment process involved. These articles were used to generate separate biodegradable and nonbiodegradable lists of chemicals, on which a feasibility study was carried out to create an algorithm to predict biodegradability using only substructural fragments and molecular weight. GRA

N82-19713# Dufresne-Henry, Inc., North Springfield, Vt.
AN INEXPENSIVE BIOLOGIC METHOD OF UPGRADING LAGOON EFFLUENT, PHASE 1: SMALL BUSINESS INNOVATIVE RESEARCH PROGRAM
Gordon Richardson Pyper Feb. 1981 81 p refs
(Grant NSF ISP-80-09414)
(PB82-101072; NSF/ISP-81003) Avail: NTIS HC A05/MF A01 CSCL 13B

The use of fresh water mussels to treat and upgrade wastewater lagoon effluent by filtering suspended solids and lowering the biological oxygen demand (BOD) is evaluated. The mussels were introduced to domestic waste effluent to (1) test their tolerance to environmental loading factors such as suspended solids, BOD, and heavy metals; (2) define their ability to remove the solids and BOD; (3) develop prototype data; and (4) formulate a cost and efficiency model for a tertiary lagoon. Lampsilis radiata were cultured in secondary lagoon wastewater effluent using continuous flow fields. Suspended solids and BOD changes were evaluated for several organic and hydraulic loadings. Heavy metals, dissolved oxygen, pH, BOD, chemical oxygen demand, stress, and space needs were determined. GRA

N82-19714# Minnesota Dept. of Transportation, St. Paul. Office of Research and Development.
WATER POLLUTION FROM HIGHWAYS AND URBAN AREAS: AN ANNOTATED BIBLIOGRAPHY (SUPPLEMENT) Final Report, 1979 - 1980
Duane M. Zwiers Feb. 1981 21 p
(PB82-113317; FHWA/MN-81/3) Avail: NTIS HC A02/MF A01 CSCL 08H

An annotated bibliography was carried out in 1978 to determine what publications are available that deal with water pollution from highways and urban areas. Approximately 112 citations are presented. GRA

N82-19715# Tennessee Valley Authority, Norris. Office of Natural Resources.
REMOTE SENSING OF SULFUR DIOXIDE EFFECTS ON VEGETATION. VOLUME 1: SUMMARY Final Report, 1976 - 1980
C. Daniel Sapp Washington EPA Jul. 1981 33 p 2 Vol.
(PB82-115122; TVA/ONR/ARP-81/5-Vol-1;
EPA-600/7-81-113) Avail: NTIS HC A03/MF A01 CSCL 06F

Three techniques for detecting and mapping sulfur dioxide (SO2) effects on the foliage of sensitive crops and trees near large, coal fired power plants were tested. These techniques used are spectroradiometry, photometric analysis of aerial photographs, and computer analysis of airborne multispectral scanner data. Airborne multispectral scanner data covering affected soybean fields were analyzed using three computer assisted procedures. GRA

N82-19716# Tennessee Valley Authority, Norris. Office of Natural Resources.
REMOTE SENSING OF SULFUR DIOXIDE EFFECTS ON VEGETATION. VOLUME 2: DATA Final Report, 1976 - 1980
C. Daniel Sapp Washington EPA Jul. 1981 284 p refs 2 Vol.
(PB82-115130; TVA/ONR/ARP-81/6-Vol-2;
EPA-600/7-81-114) Avail: NTIS HC A13/MF A01 CSCL 06F

Techniques for detecting and mapping sulfur dioxide (SO2) effects on foliage of sensitive crops and trees near large coal fired power plants were calculated. The techniques are: laboratory spectroradiometry field spectroradiometry; interpretation and analysis of aerial photographs; analysis of multispectral scanner data. GRA

N82-19717# Najarian, Thatcher and Associates, Closter, N.J.
UPPER CHESAPEAKE BAY SALINITY STUDY
Tavit O. Najarian, Dong-Ping Wang, and M. Llewellyn Thatcher Jul. 1981 70 p refs Sponsored by Maryland Dept. of Natural Resources
(PB82-116641; PPSP/PPRP-51) Avail: NTIS HC A04/MF A01 CSCL 13B

The influences of different forcing mechanism on the circulation and salt distribution in the Chesapeake Bay and in its tributary estuaries are described. Specifically, the study analyzes the variation of salinity distribution in the upper Bay during low freshwater discharges from the Susquehanna River, and when Chesapeake and Delaware Canal flows are predominately in the westward direction. The investigations are centered around the exercise of two different models: one and two dimensional (in the vertical plant). GRA

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation*.

N82-19718 Houston Univ., Tex.
THREE-DIMENSIONAL MIGRATION VELOCITY ANALYSIS IN THE SPACE-FREQUENCY DOMAIN Ph.D. Thesis
Thomas Richard Morgan 1981 133 p
Avail: Univ. Microfilms Order No. 8129730

Through the use of general techniques of image formation, two algorithms that yield both optimum velocity for migration, and strike and dip parameters is presented. The formation and evaluation of acoustic images is of prime importance to the methods employed. The particular images of interest are the source image for field gathers and the common reflection 'point' for common midpoint gathers. Through the use of two forms of the Rayleigh Sommerfield diffraction formula, acoustic images for these types of recordings are formed for a range of parameters (velocity, dip, and strike), the image of highest intensity corresponding to the 'best fit' set of trial parameters. Both algorithms operate in the temporal frequency domain and present new methods for frequency domain velocity and dip analysis and direct extraction or strike information. Dissert. Abstr.

N82-19719 California Univ., Berkeley.
ONE AND TWO DIMENSIONAL PHOTOCHEMICAL MODELING OF THE TWO CHEMICAL INTERACTIONS IN THE MIDDLE ATMOSPHERE (0-120 km) Ph.D. Thesis
Susan Solomon 1981 276 p
Avail: Univ. Microfilms Order No. 8200281

Photochemical modeling studies of the middle atmosphere are described, with particular emphasis on the photochemistry of the nitrogen oxides, their production in the lower thermosphere, and possible transport to the stratosphere. A one-dimensional photochemical model which treated the troposphere and stratosphere was extended to include the mesosphere and lower thermosphere. This model was used to study the ion and neutral chemistry of charged particle precipitation events. The production of NO and OH by such events and their effects on atmospheric ozone in the stratosphere and mesosphere are described. A two-dimensional model was also extended to treat the lower thermosphere and mesosphere, as well as the stratosphere and troposphere. The effect of this large additional source of stratospheric NO from upper atmospheric phenomena on both stratospheric ozone and NO was found to be substantial using presently accepted photochemistry. Dissert. Abstr.

N82-19720 British Library Lending Div., Boston Spa (England).
STRATOSPHERIC OZONE CONCENTRATION MEASUREMENTS AT SUNRISE AND AT SUNSET
P. Aimedieu 18 Mar. 1981 8 p refs Transl. into ENGLISH from Acad. of Sci., C.R., (Paris) no. 288, Ser. B p 89-92
(BLL-Trans-1499-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

In situ ozone measurements were taken at dawn and at dusk with a stratospheric ozonometer using gas phase chemiluminescence. Ozone is constant at the 19 and 5 mb (26 and 36 km) levels. At 2.5 mb (42 km) there is a rapid drop of about 5% at sunrise. In situ investigation of turbulent stratospheric transport

with the aid of the ozonometer employs Kolmogorov's theory, supposing, in particular, that the ozone concentration is locally stationary on the time-scale of the measurement. Evidence is provided that supports passive tracer for the low stratosphere on the time-scale of one day. It shows, however, that in the production regions rapid fluctuations are observed at sunrise.
B.W.

N82-19721 British Library Lending Div., Boston Spa (England).
GEOPHYSICAL EFFECTS ON THE LENGTH OF THE SIDERAL DAY
W. Rudloff 18 Dec. 1980 17 p refs Transl. into ENGLISH from Deut. Hydrogr. Z. (West Germany), v. 16, 1963 p 76-85
(BLL-Trans-1489-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The monthly variation of the length of the day dl/dt = L was computed using the deviation of the length of the day L. The shearing forces, the atmospheric forces acting on the globe, solar radiation, the tropical atmospheric circulation, the sub-polar westerlies in the Southern Hemisphere, and the turning force of the roaring fortiers are considered.
N.W.

N82-19722 Institut d'Aeronomie Spatiale de Belgique, Brussels.
SOME ASPECTS OF THE SOLAR RADIATION INCIDENT AT THE TOP OF THE ATMOSPHERES OF MERCURY AND VENUS
E. vanHemelrijck and J. Vercheval 1981 35 p refs Submitted for publication
(Aeronomica-Acta-A-236-1981) Avail: Issuing Activity

A formalism was developed for the calculation of the insolation on the planets Mercury and Venus neglecting any atmospheric absorption. For Mercury, the instantaneous insolation curves are repeated in a two-tropical year cycle, the distribution of the solar radiation being perfectly symmetric between both hemispheres. In addition to latitudinal variations, a longitudinal effect expessed by different instantaneous insolation distributions during the course of time is observed; on the equator, the relative diurnal insolation variability may attain a factor of 3. The small obliquity of Venus results in a nearly symmetric solar radiation distribution with respect to the equator except at the poles where an important seasonal effect is found. No longitudinal dependence exists. The insolation curves are repeated in a nearly half year cycle.
Author (ESA)

N82-19723* Institut d'Aeronomie Spatiale de Belgique, Brussels.
THEORY OF THE AURORAL MAGNETOSPHERE
Michael Schulz, U. T. Chiu, and J. M. Cornwall 1981 18 p refs Presented at Auroral Workshop, Oulu, Finland, 17-20 Aug. 1980 Submitted for publication Co-sponsored by NSF and Belgian National Foundation for Scientific Research
(Contract NASW-3434)
(Aeronomica-Acta-A-237-1981) Avail: Issuing Activity

The boundary layer just inside the magnetospheric surface, which consists of magnetopause and neutral sheet, forms the auroral oval which is a region of reversal for the meridional component of the magnetospheric convection electric field. The parallel electric field produces upgoing ion beams and precipitating electron beams in the afternoon-evening sector of local time, and accounts for the polarity of Region 1 currents as a function of local time. Region 2 currents result from the need to conserve current despite the diminution of ionospheric electric field with decreasing latitude. The strength of the parallel electric field, and consequently of all related auroral phenomena, depends on the reconnection efficiency with which the interplanetary (solar wind) electric field penetrates into the magnetosphere.
Author (ESA)

N82-19724 Institut d'Aeronomie Spatiale de Belgique, Brussels.
SOLAR IRRADIANCE BETWEEN 120 AND 400 mm AND ITS VARIATIONS
Paul C. Simon 1981 41 p refs Presented at 14th ESLAB Symp., Scheveningen, Netherlands, 16-19 Sep. 1980 Submitted for publication
(Aeronomica-Acta-A-238-1981) Avail: Issuing Activity

The solar ultraviolet irradiance measurements in the wavelength range from 120 to 140 mm were compared. It is shown that important discrepancies exist between the irradiance values deduced from the most recent observations. The possible variations of the solar ultraviolet irradiance with the 27 day rotation period of the Sun and with the 11 year activity cycle are presented and discussed on the basis of the available irradiation fluxes obtained during the rising phase of solar cycle 21. It is found that the spectral features of both kinds of variation are related to the solar atmospheric layer from which the corresponding radiation is emitted.
Author (ESA)

N82-19725# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
IONOSPHERIC IRREGULARITIES IN LOW LATITUDES OF THE AMERICAN SECTOR Ph.D. Thesis
Yukitaka Nakamura Oct. 1981 124 p refs In PORTUGUESE; ENGLISH summary
(INPE-2243-TDL/065) Avail: NTIS HC A06/MF A01

The atomic oxygen airglow emission at the wavelength of 6300 A observed at Cachoeira Paulista with frequently occurring perturbations intensity which propagate from north to south and from west to east was analyzed. Irregularities originated in the ionospheric F region and occur essentially during the premidnight period. Perturbations occur frequently during spring and summer and are rare during winter and fall. The disturbances are correlated with range type spread F detected over Cachoeira Paulista, and have characteristics similar to equatorial ionospheric plasma bubbles. The evolution of the bubble as a function of the electron density profile and as a function of the amplitude of the initial density perturbation was studied. The bubble is assumed to be aligned with the earth magnetic field and extending from higher altitudes at the equatorial region down to the arbitrary height of 150 km. Airglow calculation show that as the bubble goes up, the disturbances in the airglow intensity propagate from north to south.
E.A.K.

N82-19726# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ASSOCIATION BETWEEN IRREGULARITIES CAUSED IONOSPHERIC BUBBLES AND AIRGLOW PERTURBATIONS IN LOW LATITUDES IN BRAZIL [ASSOCIACAO ENTRE IRREGULARIDADES CAUSADAS POR BOLHAS IONOSFERICAS E PERTURBACOES DE LUMINESCENCIA EM BAIXAS LATITUDES NO BRAZIL]
Jose Humberto A. Sobral, M. A. Abdu, C. J. Zamlutti, and I. S. Batista Jun. 1981 10 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Ann. Meeting of SBPC, Salvador-Bahia, Brazil, 8-15 Jul. 1981
(INPE-2122-RPE/346) Avail: NTIS HC A02/MF A01

Meridional profiles of OI 6300 A nightglow emission measured using a scanning photometer over Cachoeira Paulista, a low latitude station, often show propagating patches of airglow disturbances with north to south and west to east velocity components, occurring mostly in the premidnight period. Measurements carried out during a period of 26 months since January 1978, show significant seasonal dependence in the occurrence of these disturbances, with most of the events occurring in the spring-summer months and with very rare occurrence during the winter solstice. The north to south propagation velocities lie in the range of 150 to 350 m/s. A case by case comparison of the occurrences of these airglow disturbances with simultaneous ionograms over Cachoeira Paulista show that almost the totality of these disturbances are accompanied by strong range type echoes in the ionograms and vice versa. These results therefore support our earlier contention that these types of airglow disturbances might be manifestations of the equatorial plasma bubbles.
Author

N82-19727*# Alaska Univ., Fairbanks. Geophysical Inst.
KINETIC RESPONSE OF IONOSPHERIC IONS TO ONSET OF AURORAL ELECTRIC FIELDS
Y. T. Chiu (Aerospace Corp., El Segundo) and J. R. Kan El Segundo, Calif. Aerospace Corp. 27 Jul. 1981 38 p refs
(Contract NASw-3434)
(NASA-CR-164799; ATR-81(7951)-3) Avail: NTIS HC A03/MF A01 CSCL 04A

By examining the exact analytic solution of a kinetic model of collisional interaction of ionospheric ions with atmospheric neutrals in the Bhatnagar-Gross-Krook approximation, we show that the onset of intense auroral electric fields in the topside ionosphere can produce the following kinetic effects: (1) heat the bulk ionospheric ions to approximately 2 eV, thus driving them up to higher altitudes where they can be subjected to collisionless plasma processes; (2) produce a non-Maxwellian superthermal tail in the distribution function; and (3) cause the ion distribution function to be anisotropic with respect to the magnetic field with the perpendicular average thermal energy exceeding the parallel thermal energy. Author

N82-19728# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

CORRECTION FOR ATMOSPHERIC EFFECTS IN SATELLITE IMAGES [CORRECAO DE EFEITOS ATMOSFERICOS EM IMAGENS DE SATELITE]

Luiz Alberto Vieira Dias, Antonio Eduardo Costa Pereira, Gilberto Camara Neto, and Juan Jose Verdesio Bentancourt Nov. 1981 11 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Natl. Congr. on Appl. and Computational Math., Rio de Janeiro, 8-11 Sep. 1981 Submitted for publication
(INPE-2281-PRE/059) Avail: NTIS HC A02/MF A01

An algorithm to minimize the atmospheric effect on satellite images is presented. The equation L = L sub i x T + L sub p is used, where L, L sub i and L sub p are, respectively, the radiances: as measured by the satellite, intrinsic of the target, and that of the path; and T is the atmospheric transmittance. In the proposed method, the image is transformed to one for standard conditions, and T and L sub p are calculated a priori on tables. This makes the algorithm very fast and user friendly. M.G.

N82-19729*# New York State Univ., Albany.

INTEGRATED AND SPECTRAL ENERGETICS OF THE GLAS GENERAL CIRCULATION MODEL

J. Tenenbaum [1982] 51 p refs Submitted for publication
(Grant NsG-5077)
(NASA-CR-168766) Avail: NTIS HC A04/MF A01 CSCL 04A

Integrated and spectral error energetics of the GLAS General circulation model are compared with observations for periods in January 1975, 1976, and 1977. For two cases the model shows significant skill in predicting integrated energetics quantities out to two weeks, and for all three cases, the integrated monthly mean energetics show qualitative improvements over previous versions of the model in eddy kinetic energy and barotropic conversions. Fundamental difficulties remain with leakage of energy to the stratospheric level, particularly above strong initial jet streams associated in part with regions of steep terrain. The spectral error growth study represents the first comparison of general circulation model spectral energetics predictions with the corresponding observational spectra on a day by day basis. The major conclusion is that eddy kinetics energy can be correct while significant errors occur in the kinetic energy of wavenumber 3. Both the model and observations show evidence of single wavenumber dominance in eddy kinetic energy and the correlation of spectral kinetics and potential energy. Author

N82-19730*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ASSESSMENT OF THE FIRST RADIANCES RECEIVED FROM THE VSSR ATMOSPHERIC SOUNDER (VAS) INSTRUMENT

Dennis Chesters, Louis W. Uccellini, Harry Montgomery, Anthony Mostek (Computer Sciences Corp., Silver Spring, Md.), and Wayne Robinson (Computer Sciences Corp., Silver Spring, Md.) 10 Aug. 1981 134 p refs
(NASA-TM-83827) Avail: NTIS HC A07/MF A01 CSCL 04A

The first orderly, calibrated radiances from the VAS-D instrument on the GOES-4 satellite are examined for: image quality, radiometric precision, radiation transfer verification at clear air radiosonde sites, regression retrieval accuracy, and mesoscale analysis features. Postlaunch problems involving calibration and data processing irregularities of scientific or operational significance are included. The radiances provide good visual and relative radiometric data for empiricially conditioned retrievals of mesoscale temperature and moisture fields in clear air. S.L.

N82-19731*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

INFORMATION THEORY LATERAL DENSITY DISTRIBUTION FOR EARTH INFERRED FROM GLOBAL GRAVITY FIELD

David Parry Rubincam Oct. 1981 64 p refs Submitted for publication
(NASA-TM-83825) Avail: NTIS HC A04/MF A01 CSCL 08N

Information Theory Inference, better known as the Maximum Entropy Method, was used to infer the lateral density distribution inside the Earth. The approach assumed that the Earth consists of indistinguishable Maxwell-Boltzmann particles populating infinitesimal volume elements, and followed the standard methods of statistical mechanics (maximizing the entropy function). The GEM 10B spherical harmonic gravity field coefficients, complete to degree and order 36, were used as constraints on the lateral density distribution. The spherically symmetric part of the density distribution was assumed to be known. The lateral density variation was assumed to be small compared to the spherically symmetric part. The resulting information theory density distribution for the cases of no crust removed, 30 km of compensated crust removed, and 30 km of uncompensated crust removed all gave broad density anomalies extending deep into the mantle, but with the density contrasts being the greatest towards the surface (typically + or 0.004 g cm 3 in the first two cases and + or - 0.04 g cm 3 in the third). None of the density distributions resemble classical organized convection cells. The information theory approach may have use in choosing Standard Earth Models, but, the inclusion of seismic data into the approach appears difficult. Author

N82-19732*# Woods Hole Oceanographic Institution, Mass.

GRAVITY AND GEOID ANOMALIES OF THE PHILIPPINE SEA: EVIDENCE ON THE DEPTH OF COMPENSATION FOR THE NEGATIVE RESIDUAL WATER DEPTH ANOMALY

Carl Bowin [1982] 27 p refs
(Grant NAG5-18)
(NASA-CR-168639; WHOI-4931) Avail: NTIS HC A03/MF A01 CSCL 08G

A negative free-air gravity anomaly which occurs in the central part of the Philippine Sea was examined to determine the distribution and nature of possible regional mass excesses or deficiencies. Geoid anomalies from GEOS-3 observation were positive. A negative residual geoid anomaly consistent with the area of negative free-air gravity anomalies were found. Theoretical gravity-topography and geoid-topography admittance functions indicated that high density mantle at about 60 km dept could account for the magnitudes of the gravity and residual geoid anomaly and the 1 km residual water depth anomaly in the Philippine Sea. The negative residual depth anomaly may be compensated for by excess density in the uppermost mantle, but the residual geoid and regional free-air gravity anomalies and a slow surface wave velocity structure might result from low-density warm upper mantle material lying beneath the zone of high-density uppermost mantle. From a horizontal disk approximation, the depth of the low-density warm mantle was estimated to be on the order of 200 km. M.D.K.

N82-19733*# Woods Hole Oceanographic Institution, Mass.

UPPER MANTLE HETEROGENEITY: COMPARISONS OF REGIONS SOUTH OF AUSTRALIA WITH PHILIPPINE BASIN

Final Technical Report

[1982] 16 p refs
(Grant NAG5-18; NAG5-8)
(NASA-CR-168646) Avail: NTIS HC A02/MF A01 CSCL 08G

The nature of mass anomalies that occur beneath the regions of negative residual depth anomalies were identified. Residual geoid anomalies with negative residual depth anomalies are identified in the Philippine Basin (negative) and in the region south of Australia (positive and negative). In the latter region the geoid anomalies are eastward and the depth anomaly is northeast. It is suggested that the negative depth anomaly and the compensating mass excess in the uppermost mantle developed in the Eocene as the lithosphere of the west Philippine basin formed. Heating of the deeper upper mantle which causes slow surface wave velocities and negative gravity and geoid anomal-

ies may be a younger phenomenon which is still in progress.
E.A.K.

N82-19734*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL, VOLUME 2. APRIL 1979 TO OCTOBER 1979
M. Patrick McCormick, Helen M. Steele (Systems and Applied Sciences Corp., Hampton, Va.), and Patrick Hamill (Systems and Applied Sciences Corp., Hampton, Va.) Mar. 1982 78 p refs
(NASA-RP-1088-Vol-2; L-15120) Avail: NTIS HC A05/MF A01 CSCL 04A

The Stratospheric Aerosol Measurement (SAM) II sensor is abroad the Earth orbiting Nimbus 7 spacecraft proving extinction measurements of the Antarctic and Arctic stratospheric aerosol with a vertical resolution of 1 km. Representative examples and weekly averages of aerosol data and corresponding temperature profiles for the time and place of each SAM II measurement (April 29, 1979, to October 27, 1979) is presented. Contours of aerosol extinction as a function of altitude and longitude or time were plotted and weekly aerosol optical depths were calculated. Seasonal variations and variations in space (altitude and longitude) for both polar regions are easily seen. Typical values of aerosol extinction at the SAM II wavelength of 1.0 micron for the time period were 1 to 3 × 10 to the -4th power km -1 in the main stratospheric aerosol layer. Optical depths for the stratosphere were about 0.002. Polar stratospheric clouds at altitudes between the tropopause and 20 km were observed during the Antarctic winter at various times and locations. A ready-to-use format containing a representative sample of the second 6 months of data to be used in atmospheric and climatic studies is presented. M.D.K.

N82-19735# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
A SIMULATION STUDY TO TEST THE PREDICTION OF 1 DEG TIMES 1 DEG MEAN GRAVITY ANOMALIES USING LEAST SQUARES COLLOCATION FROM THE GRAVSAT MISSION
Dhaneshwar P. Hajela Hanscom AFB, Mass. AFGL Sep. 1981 62 p refs
(Contract F19628-79-C-0027; AF Proj. 2309)
(AD-A108867; Rept-316; SCIENTIFIC-9; AFGL-TR-81-0302)
Avail: NTIS HC A04/MF A01 CSCL 08/5

The purpose of this simulation study was to test the accuracy of prediction of mean gravity anomalies from the GRAVSAT mission, to establish the resolution achievable in terms of anomaly block size, and to draw conclusions for the data requirement for economical processing in terms of computer time. It was found that though the estimates of the formal standard deviation of the predicted 1 deg anomalies were reduced with the increase in size of the data cap, and with the increase in the density of data inside the cap, there was little improvement in the predicted value of 1 deg anomalies by least squares collocation technique. Besides, there was a large increase in the computer time required for the processing of the increased data. GRA

N82-19736# Atmospheric Radiation Consultants, Acton, Mass.
INVERSION OF SPIRE NO DATA
A. S. Zachor, R. D. Sharma, R. M. Nadile, and A. T. Stair, Jr. 20 Aug. 1981 36 p refs
(Contract F19628-79-C-0139; AF Proj. 7670)
(AD-A108866; SR-2; AFGL-TR-81-0325) Avail: NTIS HC A03/MF A01 CSCL 04/1

An algorithm was developed to invert spectrally resolved Earth limb radiance profiles. It is applicable in the nonequilibrium altitude regime for species/tangent heights that correspond to the optically thin condition. It was used to infer vertical distributions of temperature and excited NO density from data measured by SPIRE (the Spectral Infrared Rocket Experiment) in the NO fundamental band near 5.3 microns. The solution for excited NO density was used to compute atmospheric radiative cooling rates for the 5.3 microns band and the de-excitation rate constant kO for the reaction NO + O yields NO + O. The results are in good agreement with previously published values.
Author (GRA)

N82-19737# Colorado Univ. at Boulder.
A MEASUREMENT OF LONG TERM TILT IN COLORADO AND WYOMING Final Report, 6 Dec. 1977 - 31 May 1981
J. Christopher Harrison and Judah Levine 1 Sep. 1981 49 p refs
(Contract F19628-78-C-0065; AF Proj. 2309)
(AD-A108865; AFGL-TR-81-0304) Avail: NTIS HC A03/MF A01 CSCL 14/2

We have developed a borehole tiltmeter capable of operating for long periods of time at tidal sensitivity, and we have developed six of these tiltmeters at two sites near Boulder, Colorado. The data from the tiltmeters are recorded using a data acquisition and control system capable of recording the data from a large number of widely spaced instruments linked to a central site by means of telephone lines or radio links. We have also written analysis software to examine the power spectra of the tilt records, to extract the tidal admittance from time series and to evaluate the coherence between different instruments as a function of frequency. We have used our tilt array to measure the amplitude and phases of the major components of the earth tides, and we have examined the time dependence of the tidal admittance. We also have some preliminary estimates of the coherence between independent instruments at periods longer than one day. Author (GRA)

N82-19738# Army Missile Command, Redstone Arsenal, Ala. Research Directorate.
A SURVEY OF ATMOSPHERIC TURBULENCE CHARACTERISTICS
Dorothy A. Stewart 19 Aug. 1981 35 p refs
(AD-A109306; DRSMI-RR-81-6) Avail: NTIS HC A03/MF A01 CSCL 04/1

Literature on atmospheric turbulence in the planetary boundary layer, with the main emphasis on the lowest tens of meters. A table summarizes 26 references which discuss variations in intensity of turbulence. This intensity tends to be greater over rough surfaces than over smooth surfaces. Intensity of turbulence normally decreases when either altitude or atmospheric stability increases. High wind speeds are more likely to be associated with nearly neutral stability than with very stable or very unstable conditions. This report also includes a discussion of the autocorrelation function for the three components of the wind vector.
Author (GRA)

N82-19739# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SEISMIC DISCRIMINATION Semiannual Technical Summary Report, 1 Oct. 1980 - 31 Mar. 1981
Michael A. Chinnery 31 Mar. 1981 105 p refs
(Contract F19628-80-C-0002; ARPA Order 512; AF Proj. 1A10)
(AD-A109184; ESD-TR-81-84) Avail: NTIS HC A06/MF A01 CSCL 08/11

This Semiannual Technical Summary describes the Lincoln Laboratory Vela Uniform program. Section 1 describes progress in the development of a prototype Seismic Data Center. This development is on schedule, and a first version of the prototype will be operational during the next six months. Section 2 describes a series of activities in the development and implementation of the seismic processing techniques that will be utilized in the prototype system. Section 3 describes a series of investigations in General Seismological Research. GRA

N82-19740# Cologne Univ. (West Germany). Inst. fuer Geophysik und Meteorologie.
ATLAS OF THE GLOBAL DISTRIBUTION OF THE TOTAL OZONE CONCENTRATION ACCORDING TO SATELLITE MEASUREMENTS [ATLAS DER GLOBALVERTEILUNG DES GESAMTOZONBETRAGES NACH SATELLITENMESSUNGEN (APRIL 1970-MAY 1972)]
Anver Ghazi 1980 47 p refs In GERMAN
(Mitt-28; ISSN-0069-5882) Avail: NTIS HC A03/MF A01

An atlas of interdisciplinair research on the many different aspects of ozone research is presented. Maps were drawn from backscatter ultraviolet satellite observations. Data are compiled on global distribution of the total ozone layer. E.A.K.

N82-19741# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Electron and Plasma Physics.

EVENT STUDY ON PRE-SUBSTORM PHASES AND THEIR RELATION TO THE ENERGY COUPLING BETWEEN SOLAR WIND AND MAGNETOSPHERE

R. J. Pellinen (Finnish Meteorological Inst.), W. Baumjohann (Muenster Univ., West Germany), W. J. Heikkila, V. A. Sergeev (Leningrad Univ.), A. G. Yahnin, G. Marklund, and A. O. Melnikov (Academy of Sciences, USSR) Nov. 1981 50 p refs Submitted for publication Co-sponsored by Deutsche Forschungsgeimschaft, and Finnish-Soviet Committee on Co-operation in Science and Technology
(Grant NSF ATM-78-3603)
(TRITA-EPP-81-04; ISSN-0348-7539) Avail: NTIS HC A03/MF A01

A sudden southward turning of the interplanetary magnetic field, immediately followed by a worldwide intensification of convection, is documented. Observations within the auroral zone and polar cap show enhanced activity ending in a localized substorm. Large fluctuations in ionospheric parameters starting before the substorm onset, and subsequent high energy particle precipitation (recorded by balloon X-ray detectors), with changes in maximum ionospheric current density and in electrojet halfwidth and total electrojet current, are resolved together with the increase in auroral brightness prior to final breakup. Observations during this trigger phase are discussed. The energy coupling function correlates with the Joule heating rate at first, but subsequently increases as the heating rate decreases. This suggests that the start of the trigger phase is internally controlled while the length of the phase and onset of the final substorm are influenced by changes in the energy coupling function. Author (ESA)

N82-19742# Danish Meteorological Inst., Copenhagen. Div. of Geophysics.

DIFFUSE AND DISCRETE OPTICAL EMISSIONS AT THE POLEWARD BORDER OF THE MORNING AURORAL OVAL

K. Lassen, C. Danielsen, and V. Singh 1981 10 p refs Presented at 4th IAGA Scientific Assembly, Edinburgh Submitted for publication
(DMI-Geophis-Papers-R-66; ISBN-87-7478-201-0) Avail: NTIS HC A02/MF A01

A meridian scanning photometer was used to supplement all sky camera observations of high latitude morning auroras. A 5 to 10 deg wide area of diffuse light is recorded at the poleward edge of the morning to noon auroral oval. Discrete auroras known as high latitude morning auroras are embedded in the veil. Discrete as well as diffuse emissions are observed on practically every clear morning, both limited by a well defined border oriented along the geomagnetic meridian between 03 and 07 corrected geomagnetic time. The ratio I 6300A/I 5577A is greater in the diffuse background than in the discrete forms. The intensity of the diffuse emission has its maximum near 75 deg, coinciding with the oval. The intensity at this latitude generally increases 1 to 2 hr before the occurrence of the high latitude veil. Author (ESA)

N82-19743# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).

IONOSPHERIC IONS IN THE NEAR EARTH GEOMAGNETIC TAIL PLASMA LOBES

Stefano Orsini, Maurizio Candidi, Hans Balsiger (Bern Univ.), and Arturo Ghielmetti (Bern Univ.) May 1981 21 p refs Submitted for publication
(Grant SNSF-2.467.79)
(IPS-81-7) Avail: NTIS HC A02/MF A01

By comparing data from the plasma experiment on ISEE-2 and from the ion mass spectrometer on ISEE-1, composition and plasma properties of tailward flowing ions in the magnetotail lobes is assessed. The ions beams consist mainly of protons and singly charged oxygen, flowing roughly along magnetic field lines. It is concluded that these ions are of mainly ionospheric origin. They are observed with the same velocity due to the E x B filter action of the magnetotail. Estimates of the E sub Z electric field components in the lobes are given. Author (ESA)

N82-19744# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).

KELVIN-HELMHOLTZ INSTABILITY OF THE MAGNETOPAUSE BOUNDARY: COMPARISON WITH OBSERVED FLUCTUATIONS

E. Trussoni (CNR, Turin), M. Dobrowolny, and G. Mastrantonio Sep. 1981 30 p refs
(IPS-81-12) Avail: NTIS HC A03/MF A01

Results for the wavelength of the most unstable perturbations and corresponding phase velocities are derived, using realistic profiles for the magnetopause transition, and using the parameter values deduced from the analysis of the Voyager 1 multiple magnetopause crossings. A numerical stability analysis was employed. The calculations are in reasonable agreement with the observations made by Lepping and Burlaga. This agreement considerably strengthens the idea that the fluctuations of the discontinuity surface shown by the observations are a result of a Kelvin-Helmholtz instability driven by velocity shear. Author (ESA)

N82-19745# Stanford Univ., Calif. Dept. of Civil Engineering.

BAYESIAN GEOPHYSICAL MODEL FOR SEISMIC HAZARD

H. C. Shah and Martin W. McCann, Jr. May 1981 193 p refs
(Grant NSF ENV-77-17834)
(PB82-122391; NSF/CEE-81-36) Avail: NTIS HC A09/MF A01 CSCL 08K

The development of a methodology for modeling strong ground motion for application in seismic hazard analysis is presented. It is based on an event defined according to its size and seismotectonic properties. A Bayesian model is described that incorporates the information from empirical studies as well as theoretical seismological models into the estimate of future strong ground motion. The methodology defines what information is available and compares it to that currently being used. A theoretical seimological method is selected to provide additional input on strong ground motion into the Bayesian model. It is applied to the determination of the Fourier transform of acceleration and deterministic modeling of the Imperial Valley in southern California. A sensitivity study is presented which identifies the effects of various source parameters on the predicted strong motion. GRA

N82-19746# Iowa Univ., Oakdale.

STRATIGRAPHY, PETROGRAPHY AND DEPOSITIONAL HISTORY OF THE HERTHA FORMATION (UPPER PENNSYLVANIAN), MIDCONTINENT NORTH AMERICA Ph.D. Thesis

Robert Lee Ravn 1981 293 p
Avail: Univ. Microfilms Order No. 8128452

The Hertha Formation (Missourian Stage, Upper Pennsylvanian Series) of the Western Interior Basin is less regular lithologically and stratigraphically than are most overlying Pennsylvanian marine cyclothems. Three members were delineated, in ascending order: Critzer Limestone, Mound City Shale, Sniabar Limestone. Through application of a eustatic sea level fluctuation model for Hertha deposition, the Critzer Limestone was regarded as a transgressive unit, the Mount City Shale as deposited during maximum marine inundation, and the Sniabar Limestone as regressive. Extension of the transgressive-regressive depositional model to other portions of the Hertha outcrop revealed a significant miscorrelation between the Hertha and strata assigned to the underlying Pleasanton Group in extreme southern Kansas. Beds historically considered Hertha in this area consist only of the regressive Sniabar Member. Dissert. Abstr.

N82-19747# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Fluid Dynamics Panel.

MODELING THE LOWEST 1 Km OF THE ATMOSPHERE

W. S. Lewellen (Aeronautical Research Associates of Princeton, Inc.) Nov. 1981 89 p refs
(AGARD-AG-267; ISBN-92-835-1407-6) Avail: NTIS HC A05/MF A01

The interdependence between the turbulent transport of mass, momentum, and energy through the lower levels of the atmosphere, and the distribution of wind, temperature, and species within this layer were reviewed. Particular emphasis is placed on models, either analytical or numerical, which have a basic theoretical foundation in turbulent transport modeling. The results of example model solutions are used to discuss such micrometeorological problems as: wind shear and turbulence around airports; the prediction of low-level clouds and fog; the dispersion of industrial pollutants; the interaction of electromagnetic radiation with turbulent fluctuations in humidity and temperature; and the evolution of organized features within the boundary layer. T.M.

N82-20072# Tel-Aviv Univ. (Israel). Dept. of Physics and Astronomy.
COLLECTIVE GRAVITATIONAL EFFECTS
Gerald E. Tauber *In* ESA Plasma Astrophys. Nov. 1981 p 365-368 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20083# Academia Sinica, Peking (China). Inst. of Space Physics.
IDENTIFICATION OF THE DISCONTINUITIES AT THE MAGNETOPAUSE
Zhou Guo-cheng *In* ESA Plasma Astrophys. Nov. 1981 p 413-414 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-19748 Texas A&M Univ., College Station.
A COMPUTATIONAL STUDY OF THE MODIFICATION OF RAINDROP SIZE DISTRIBUTIONS IN SUBCLOUD DOWNDRAFTS Ph.D. Thesis
Robert George Borchers 1981 156 p
Avail: Univ. Microfilms Order No. 8128876

A computational study is made of the variation of steady-state raindrop-size distributions (0.004 cm < or = radius < or = 0.40 cm) in adiabatic subcloud downdrafts of constant magnitude. The cloud base drop-size distribution is assumed to be Marshall-Palmer. The microphysical processes progressively introduced are evaporation, collision-coalescence, aerodynamic and collisional breakup of drops. Collision-coalescence and breakup are treated through a stochastic model. Thermodynamic and hydrometeoric variables of temperature, relative humidity, total liquid water, rainfall rate and radar reflectivity are computed as functions of height below cloud base along with the dropsize distributions. It is found that evaporation tends to deplete, as expected, the smaller members of the droplet population. Computed raindrop-size distributions agree quite well with measured maritime raindrop spectra. Dissert. Abstr.

N82-19749 British Library Lending Div., Boston Spa (England). Meteorological Office.
MAXIMUM WIND SPEEDS IN THE NORTH PACIFIC (WITH SPECIAL REFERENCE TO OWS P, N AND V)
L. V. Gorbach 3 Jun. 1981 27 p refs Transl. into ENGLISH from Vses. Nauch.-Issled. Inst. Gidromet. Inf.-Mirov. Tsent. Danny. T. Vyp. (Moscow), v. 64, 1980 p 38-53
(BLL-Trans-1495-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The different methods of computing maximum wind speeds (Vg) in the North Pacific are investigated. Comparison of computed and actual values of Vg indicates that in temperature latitudes all of the methods may be used. In tropical regions Vg must be computed from annual maximum wind speeds. An analysis is presented of maximum wind speeds at the locations of weather stations. B.W.

N82-19750 British Library Lending Div., Boston Spa (England). Meteorological Office.
AREA PRECIPITATION MEASUREMENT BY WEATHER RADAR: PROBLEMS AND PRACTICAL EXPERIENCES
R. Aniol and J. Riedl 29 Oct. 1981 26 p refs Transl. into ENGLISH from Met. Rundsch. (Berlin), v. 32, 1979 p 116-127
(BLL-Trans-1458-(9022.552)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

The data collection process and factors determining the accuracy of a radar system are described. Experience with different problems in the calculation of areal precipitation intensity is discussed with the aid of examples, namely correction using surface rain gauge readings, the effect of the Z/R ratio, the height of the freezing level, attenuation losses, sampling rate and screening in hilly terrain. Examples of problems still to be solved are the elimination of ground clutter, the detection of hail, the intersection of the melting layer and instances of snowfall or mixed precipitation. Author

N82-19751 British Library Lending Div., Boston Spa (England).
THE COMPUTATION OF THE GROUND SURFACE TEMPERATURE FOR SIMULATION OF THE GENERAL ATMOSPHERIC CIRCULATION
I. Jacobsen, H. Reiser, and E. Heise 29 Oct. 1981 37 p Transl. into ENGLISH from Abt. Forsch., Interner Ber., West Germany, 1980 30 p
(BLL-Trans-1521-(9022.552)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

Simple equations for forecasting surface temperature in circulation models are compared with simple wave solutions of the one-dimensional thermal conductivity equation, given a pre-set external drive function (residue of the energy fluxes through a surface element). N.W.

N82-19752 British Library Lending Div., Boston Spa (England).
REGIONAL CLASSIFICATION OF THE SPECTRAL VARIANCE OF LONG EUROPEAN TEMPERATURE SERIES AND ITS APPLICATION IN A STATISTICAL FILTER MODEL FOR FORECASTING IN THE REGION NORTH OF THE ALPS
C. D. Schoenwiese 24 Jun. 1981 22 p refs Transl. into ENGLISH from Met. Rundsch. (Berlin), vol. 33, 1980 p p 167-174
(BLL-Trans-1514-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

A total of 35 long European temperature series were analysed with reference to spectral variance T > 1a (where T = period and a = year) and classified in the range 1a < T < 10a. It is demonstrated that variance components of particular periods dominate and that individual geographical regions of Europe have typical variance spectra. Using 6 series for the region north of the Alps whose annual means are closely correlated, a statistical model is developed based on a Gaussian lowpass filter, 66 cosine band-pass filters, and the results of spectral variance analysis. This model approximates the regional annual temperature means with a Pearson correlation coefficient of r = +0.95. The corresponding extrapolation for the next few years indicates moderately increasing temperatures up to about 1981, followed by moderately decreasing temperatures. Author

N82-19753 British Library Lending Div., Boston Spa (England).
INSTRUMENTS AND METHODS FOR STUDYING ATMOSPHERIC ELECTRICITY
I. M. Imyanitov 19 Nov. 1980 39 p refs Transl. into ENGLISH from Gos. Izd. Tekh. Teor. Lit. (Moscow), 1957 p 7-48
(BLL-Trans-1487-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

A review of mechanical electrometers was made. The estimable properties such as simplicity of design, good insulation, and relative cheapness as well as the shortcomings which impair their use were considered. The reliability and stability of the following instruments, designed to measure atmospheric electricity, are discussed: mechanical electrometers, Wulf two-string electrometer, Sg-2M and 1M electrometers, leaf and torsion quartz electrometers, Braun electrometer, electrometers with and without an auxiliary field, Perucca and vibration electrometers, and other related instrumentation. M.D.K.

N82-19754 British Library Lending Div., Boston Spa (England).
STATISTICAL STUDY OF FREEZING CLOUDS IN THE GINA 2-PAP, MARCH - APRIL 1979
J. F. Gayet 24 Jun. 1981 46 p refs Transl. into ENGLISH of Rept. Sci. 27 Clermont-Ferrand Univ., France, 1980 15 p
(BLL-Trans-1511-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The progress of the GINA II-PAP measurement program carried out in Spain and an account of employed methods is reported. The microphysical characteristics of cumuliform and stratiform clouds at negative temperatures, and the meteorological conditions are described. The process of formation of precipitation process in which the ice phase played an important role is examined. It is hypotesized that particles with a mean size greater than 200 micro m are composed of ice. It is concluded that the large concentrations of this type of particle is due to ice multiplication processes. E.A.K.

N82-19755 British Library Lending Div., Boston Spc (England).
THE APPLICABILITY OF PRESSURE MEASUREMENTS BY RADIOSONDES TO CALCULATING THE HEIGHT
G. Adrian and N. Witte 30 Apr. 1981 24 p refs Transl. into ENGLISH from Met. Rundsch., (Berlin), no. 33, 1980 p 107-116
(BLL-Trans-1505-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

Application of pressure measurements by radiosondes to calculate the height of the measured profiles of temperature and humidity in the lower troposphere is considered. Measurements made by radar or theodolite are compared. Considerable deviations are shown between the heights calculated barometrically and those resulting from radar or theodolite data, especially for sondes of the older type, as well as in decoding the pressure records. Deviations found by comparisons in a qualitative as well as a quantitative manner are interpreted. It is concluded that in the analysis of pressure records of the newer radiosonde the height can be computed barometrically with an accuracy of better than 2%. E.A.K.

N82-19756 British Library Lending Div., Boston Spa (England).
CLASSIFICATION OF THE FIELDS OF ANOMALY IN MONTHLY WATER TEMPERATURE OF THE NORTH ATLANTIC DURING THE COLD HALF-YEAR
R. M. Vilfand 27 Jul. 1981 6 p refs Transl. into ENGLISH from Gidromet. Nauch.-Issled. Tsentr. SSSR (USSR), v. 231, 1980 p 123-126
(BLL-Trans-1509-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The use of the thermal characteristics of ocean surface in making long-term forecasts is examined. Fields of anomaly in the mean monthly water temperature of the North Atlantic were classified and analyzed. R.J.F.

N82-19757 British Library Lending Div., Boston Spa (England).
METHODOLOGY FOR THE USE OF (FOREIGN) SYNOPTIC MESSAGES IN THE GENERALIZATION OF CLIMATOLOGICAL INFORMATION (DERIVATION OF CLIMATIC PARAMETERS)
Z. M. Makhover, L. A. Nudelman, and A. P. Penkov 3 Jun. 1981 18 p refs Transl. into ENGLISH from Vses. Nauch-Issled. Inst. Gidromet. Inf. Mirov. Tsent. Danny. (USSR), v. 65, 1979 p 31-45
(BLL-Trans-1506-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The fundamentals of the methodology applied to processing synoptic data on cloud cover, visibility, and other weather phenomena are considered. Emphasis is placed on the processing of cloud cover from observations made at Soviet meteorological stations. The frequency of total and low cloud cover, the frequency of cloud forms the height of the lower cloud boundary are determined along with the frequency of fog, mist, haze, dust or sand storms, snow-storms, thunderstorms, hail, and glazed frost. Data observations for each of four synoptic hours, for each month, and for the entire year are included. Data are presented in tabular form. J.M.S.

N82-19758 British Library Lending Div., Boston Spa (England).
A NEW METEOROLOGICAL CODE FOR 1 JANUARY 1982
M. Merlet 30 Apr. 1981 9 p Transl. into ENGLISH from Met-Mar (France), no. 109, 1980 p 43-46
(BLL-Trans-1510-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The implemention of the SYNOP/SHIP meteorological code is discussed. The coding system is adapted for land (SYNOP) and marine (SHIP) stations. The adaptation of the code to automatic encoding and to simple computerized programming is outlined. Requirements for the new code are: (1) simplicity; (2) adaptable structure; (3) have a key group indicating content of message; (4) contain indicators; (5) avoid coding dodges; (6) present measured first, followed by visually observed data; (7) account for data requirements which are related to exchange in the global network, and at regional and local levels. E.A.K.

N82-19759 British Library Lending Div., Boston Spa (England).
THE CONTROL OF THE QUALITY OF SURFACE METEOROLOGICAL INFORMATION
M. Z. Shaymardanov et al 18 Mar. 1981 33 p refs Transl. into ENGLISH from Vses. Nauch.-Issled. Inst. Gidromet. Inf. Mirov. Tsent. Danny. (USSR), v. 67, 1980 p 30-45
(BLL-Trans-1503-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

Results of algorithms to control surface meteorological information applied in the system for processing meteorological data were analyzed. The various criteria did not operate effectively. The shortcomings which appeared and the failure to control a range of elements made it necessary to refine and supplement the algorithms and to devise new ones. It was necessary above all to exclude the control criteria based on the Lagrange interpolation formulas, because a polynomial of one and the same degree was used in all instances. N.W.

N82-19760 British Library Lending Div., Boston Spa (England).
COST ESTIMATES IN CONNECTION WITH THE SELECTION OF A SYSTEM FOR LONG-TERM STORAGE OF HYDROMETEOROLOGICAL DATA
L. F. Penkova and N. N. Bydanov 12 Mar. 1981 24 p refs Transl. into ENGLISH from Vses. Nauch.-Issled. Inst. Gidromet. Inf. Mirov. Danny. (USSR), v. 67, 1980 p 101-110
(BLL-Trans-1502-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

Estimates of the specific costs of methods of archiving, handling, and long-term storage of hydrometeorological data are discussed. A comparison of systems in terms of cost characteristics with a storage system based on magnetic tape was made. Conclusions concerning the efficiency of the application of particular systems are presented and discussed. It is concluded, in the general case, that economically expedient systems for long-term storage of data sets must be constructed using both magnetic tape and photographic film as archive carriers. M.D.K.

N82-19761 British Library Lending Div., Boston Spa (England).
SOME CHARACTERISTICS OF THE VARIATION OF AIR TEMPERATURE IN THE NORTHERN HEMISPHERE DURING INDIVIDUAL MONTHS OF THE PERIOD 1881-1975
L. P. Spirina 3 Jun. 1981 15 p refs Transl. into ENGLISH from Glav. Geof. Obs. (USSR), v. 438, 1980 p 117-125
(BLL-Trans-1497-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The variation of air temperature in the Northern Hemisphere during individual months of the years 1881 to 1975 is examined. It is found that there was a warming trend in recent years. However, the absence of sub-annual synchronicity in the temperature variation, and the large variability over the last 10 to 15 years, do not provide a basis for asserting that the observed mean annual tendency towards warming will be maintained in the future. R.J.F.

N82-19762 British Library Lending Div., Boston Spa (England). Meteorological Office.
TURBULENCE WITHIN CUMULUS CLOUDS AND OUTSIDE THEM
V. I. Silayeva and S. M. Shmeter 30 Apr. 1981 12 p refs Transl. into ENGLISH from Tsent. Aerol. Obs. T. Vyp. (Moscow), v. 128, 1977 p 63-72
(BLL-Trans-1481-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

Within a cumulus cloud and in its environment the standard deviations of the speed of horizontal and vertical gusts are several times greater than the values of the gusts in the undisturbed portion of the atmosphere. The mean curve of the distribution of the horizontal and vertical gusts is described by a normal distribution. In individual cases the distributions of the horizontal and vertical gusts differ substantially from the normal. Within the Cu the values of vertical gusts increase with the thickness of the cloud. The degree of gustiness (vertical gusts and the mean vertical speed) by contrast, is on average inversely proportional to the cloud. Powerful convective currents are often pseudolaminar, while small currents are also very turbulent. S.L.

N82-19763 British Library Lending Div., Boston Spa (England).
THE USE OF WEATHER RADAR IN THE CIVIL AVIATION WEATHER SERVICE
K. J. Tenter 11 Feb. 1981 12 p ref Transl. into ENGLISH from Oesterreich. Gesellsch. Met., Wetter u. Leben (Vienna), vol. 30, 1978 p 224-229
(BLL-Trans-1456-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

Thunderstorms associated with hail and turbulence continue to constitute a hazard to aviation. The use of weather radar is intended to enhance the provision to pilots of information and warnings about areas of bad weather. The experience gained in employing a hail reconnaissance pilot has formed the basis for a weather radar service. S.L.

N82-19764 British Library Lending Div., Boston Spa (England). Meteorological Office.
INVERSION LAYERS AND THEIR INTERACTION WITH CUMULUS CLOUDS BELOW
S. M. Roznanets, A. I. Furman, and S. M. Shmeter 30 Apr. 1981 10 p refs Transl. into ENGLISH from Tsent. Aerol. Obs., T. Vyp. (Moscow), v. 128, 1977 p 73-79
(BLL-Trans-1482-(9022.549)) Avail: British Library Lending Div., Boston Spa, Engl.

Inversion and isothermal layers, which influence the development of cumulus clouds are discussed. Capping layers form frequently in the free atmosphere, and inversions are observed in all seasons and weather. The development of cumulus clouds is affected by: the height of the lower boundary of the retaining layer, thickness, temperature gradient, and humidity within above and below the layer. Data are presented for frequency, height of lower boundary and thickness for inversions in the troposphere during the summer. It is suggested that during Cu development stratification above the clouds undergoes marked variations. E.A.K.

N82-19765 British Library Lending Div., Boston Spa (England). Meteorological Office.
AUTOMATIC MEASUREMENT OF AREAL PRECIPITATION USING C-BAND RADAR
W. Attmannspacher [1982] 7 p refs Transl. into ENGLISH from Offenbach a. M., D. Wetterd., Ann. Met. (Neue Folge), no. 13, 1977 p 167-169
(BLL-Trans-1378-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The radar equipment, the digitalizing system of the video signal and the calculation of the measured data by aid of a connected electronic computer is described. Examples of the measurements are compared to a special rain guage network. These comparisons and some statistical treatments represent the quality of the radar measurements. Area precipitation means over a two month period are measured in a realistic way only by aid of the radar. S.L.

N82-19766 British Library Lending Div., Boston Spa (England). Meteorological Office.
THE PROBLEM OF PRECIPITATION MEASUREMENT BY ATTENUATION OF RADIO WAVES
M. D. Belaga 30 Apr. 1981 14 p refs Transl. into ENGLISH from Tsent. Aerol. Obs. T. Vyp. (Moscow), v. 135, 1979 p 64-69
(BLL-Trans-1475-(9022.549)) Avail: British Library Lending Div., Boston Spa, Engl.

A radar system which measures precipitation over small areas or paths and performs pluviometric measurements is presented. The radar unit is used to measure precipitation in mountain valleys, and to calibrate radar systems used in measuring precipitation over large areas. Phase modulating reflectors may be used to measure the intensity and amount of precipitation for attenuation in the centimetre band. The marked reduction in the variability of the coefficients in the equation and the increase in accuracy links the intensity of precipitation to produced attenuation. The obtained information may be applied to measuring small areas and in calibrating existing radar systems for the measurement of precipitative intensity of reflectivity over wide areas. E.A.K.

N82-19767 Institut d'Aeronomie Spatiale de Belgique, Brussels.
A FREE BOUNDARY VALUE PROBLEM ARISING IN CLIMATE DYNAMICS
C. Nicolis 1981 36 p refs Submitted for publication Sponsored in part by Inst. Internationaux de Physique et de Chimie
(Aeronomica-Acta-A-240-1981) Avail: Issuing Activity

A heat and mass transfer problem which involves coexisting phases was studied. The atmosphere hydrosphere cryosphere is the dynamical system wherein the spatial degrees of freedom along the vertical and longitudinal directions are lumped. The reduced one dimensional system is modelled by a yearly averaged, energy balance model, considering the coupling between the two phases present: the ice sheets and the ocean. A Stefan type of boundary condition is introduced at the interface. The balance equation is linearized and solved by mode truncation and Galerkin's method. The stability of the present day climatic regime with respect to small excursions of the ice boundary is analyzed. The thermodynamic aspects and the characteristic time scales of evolution are emphasized. Author (ESA)

N82-19768*# Wisconsin Univ. - Madison. Dept. of Meteorology.
OPTIMUM EMPLOYMENT OF SATELLITE INDIRECT SOUNDINGS AS NUMERICAL MODEL INPUT Final Report
Lyle H. Horn, John C. Derber, Thomas L. Koehler, and Brian D. Schmidt Dec. 1981 112 p refs
(Grant NsG-5252)
(NASA-CR-168509) Avail: NTIS HC A06/MF A01 CSCL 04B

The characteristics of satellite-derived temperature soundings that would significantly affect their use as input for numerical weather prediction models were examined. Independent evaluations of satellite soundings were emphasized to better define error characteristics. Results of a Nimbus-6 sounding study reveal an underestimation of the strength of synoptic scale troughs and ridges, and associated gradients in isobaric height and temperature fields. The most significant errors occurred near the Earth's surface and the tropopause. Soundings from the TIROS-N and NOAA-6 satellites were also evaluated. Results again showed an underestimation of upper level trough amplitudes leading to weaker thermal gradient depictions in satellite-only fields. These errors show a definite correlation to the synoptic flow patterns. In a satellite-only analysis used to initialize a numerical model forecast, it was found that these synoptically correlated errors were retained in the forecast sequence. For individual titles, see N82-19769 through N82-19771.

N82-19769*# Wisconsin Univ. - Madison. Dept. of Meteorology.
A CASE STUDY OF HEIGHT AND TEMPERATURE ANALYSES DERIVED FROM NIMBUS-6 SATELLITE SOUNDINGS
Thomas L. Koehler *In its* Optimum Employment of Satellite Indirect Soundings as Numerical Model Input Dec. 1981 p 1-50 refs (For primary document see N82-19768 10-47)
Avail: NTIS HC A06/MF A01 CSCL 04B

Height and temperature analyses were constructed on a subset of the LFM grid using only Nimbus-6 satellite temperature profiles from approximately 1800 GMT 22 Feb. 1976. Several experiments were performed to evaluate various features of these satellite derived analyses. Fields derived from the bracketing LFM analyses provide the verification data. The results indicate that Nimbus-6 soundings were able to correctly position the major troughs and ridges, but underestimate gradients in the analyses due primarily to the soundings being too warm in the troughs. No advantage could be found in using a set of satellite soundings with a greater horizontal resolution than the DST soundings. M.D.K.

N82-19770*# Wisconsin Univ. - Madison. Dept. of Meteorology.
EVALUATION OF TIROS-N AND NOAA-6 SATELLITE DATA: COMPARISONS OF COLOCATED SOUNDINGS AND ANALYSES FOR A JANUARY CASE

Brian D. Schmidt, Thomas L. Koehler, and Lyle H. Horn *In its* Optimum Employment of Satellite Indirect Soundings as Numerical Model Input Dec. 1981 p 51-81 refs (For primary document see N82-19768 10-47)
Avail: NTIS HC A06/MF A01 CSCL 04B

An early January 1980 synoptic situation was used in evaluating the performance of TIROS-N and NOAA-6 operational temperature soundings. Visual and statistical comparisons of temperature and thickness fields were employed to determine the effects of manual screening of the satellite soundings and measure the accuracy of both the satellite soundings and analyses derived from them. Comparisons between the performance of TIROS-N and NOAA-6 were emphasized. Both satellites were able to correctly position the major troughs and ridges. Gradients were underestimated though, with troughs markedly too warm and ridges slightly too cold. The poorest data occurred near the surface and tropopause as reflected by larger standard deviations in those layers. The performance of TIROS-N was slightly superior to that of NOAA-6. M.D.K.

N82-19771*# Wisconsin Univ. - Madison. Dept. of Meteorology.
A NUMERICAL EVALUATION OF TIROS-N AND NOAA-6 ANALYSES IN A HIGH RESOLUTION LIMITED AREA MODEL
John C. Derber, Thomas L. Koehler, and Lyle H. Horn *In its* Optimum Employment of Satellite Indirect Soundings as Numerical Model Input Dec. 1981 p 82-108 refs (For primary document see N82-19768 10-47)
Avail: NTIS HC A06/MF A01 CSCL 04B

Vertical temperature profiles derived from TIROS-N and NOAA-6 radiance measurements were used to create separate analyses for the period 0000 GMT 6 January to 0000 GMT 7 January 1980. The 0000 GMT 6 January satellite analyses and a conventional analysis were used to initialize and run the University of Wisconsin's version of the Australian Region Primitive Equations model. Forecasts based on conventional analyses were used to evaluate the forecasts based only on satellite upper air data. The forecasts based only on TIROS-N or NOAA-6 data did reasonably well in locating the main trough and ridge positions. The satellite initial analyses and forecasts revealed errors correlated to the synoptic situation. The trough in both TIROS-N and NOAA-6 forecasts which was initially too warm remained too warm as it propagated eastward during the forecast period. Thus, it is unlikely that the operational satellite data will improve forecasts in a data dense region. However, in regions of poor data coverage, the satellite data should have a beneficial effect on numerical forecasts. M.D.K.

N82-19772# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FORECASTS OF PRECIPITATION IN THE NORTHEAST OF BRAZIL: DYNAMIC ASPECTS [PREVISAO DE PRECIPITACAO NO NORDESTE DO BRASIL: O ASPECTO DINAMICO]
Vernon Edgar Kousky and Antonio Divino Moura Oct. 1981 17 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Brazilian Symp. on Hydrol. and Hydrol. Resources, 15-19 Nov. 1981
(INPE-2244-PRE/029) Avail: NTIS HC A02/MF A01

Large scale atmospheric oceanic circulation changes in the North and South Atlantic are dynamically related to rainfall variability in Northeast Brazil. Above normal cyclonic activity near Newfoundland is associated with stronger than normal westerlies in the North Atlantic, a stronger than normal North Atlantic subtropical high and stronger than normal northeast trade winds at low latitudes. These features accompany a more southward than normal displacement of the intertropical convergence zone and wetter than normal conditions in Northeast Brazil. Drier than normal conditions occur when the opposite situation exists. The severest droughts occur in association with the simultaneous weakening of the North Atlantic high and strengthening of the South Atlantic high. These events are also found to occur in association with the simultaneous occurence of positive sea surface temperature anomalies in the north, and negative SST anomalies in the south Tropical Atlantic. Author

N82-19773# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A STUDY ON THE DEVELOPMENT OF INTERMEDIATE SCALE DISTURBANCES WITH A MODEL OF PRIMITIVE EQUATIONS OF HIGH VERTICAL RESOLUTION Ph.D. Thesis
Prakki Satyamurty Sep. 1981 88 p refs In PORTUGUESE; ENGLISH summary
(INPE-2232-TDL/063) Avail: NTIS HC A05/MF A01

Linear stability of basic states in the vicinity of idealized weak thermal fronts was examined. Vertical profiles of the basic zonal wind and potential temperature are hyperbolic tangent. Even if the curvature in the lower levels is positive, intermediate scale unstable modes appear in smaller static stability and shear or vertical distribution of diabatic heating due to the liberation of latent heat in the lower troposphere. If the diabatic heating is not allowed for and the curvature is unfavorable inclusion of surface drag produces an additional growth rate peak in the intermediate scales. The amplitude of the most unstable intermediate scale wave is confined to the lower troposphere and its growth rate increases with the inclusion of diabatic heating. E.A.K.

N82-19774*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VISSR ATMOSPHERIC SOUNDER (VAS) SIMULATION EXPERIMENT FOR A SEVERE STORM ENVIRONMENT
Dennis Chesters, Louis W. Uccellini, and Anthony Mostek Sep. 1981 50 p refs Submitted for publication
(NASA-TM-83822) Avail: NTIS HC A03/MF A01 CSCL 04B

Radiance fields were simulated for prethunderstorm environments in Oklahoma to demonstrate three points: (1) significant moisture gradients can be seen directly in images of the VISSIR Atmospheric Sounder (VAS) channels; (2) temperature and moisture profiles can be retrieved from VAS radiances with sufficient accuracy to be useful for mesoscale analysis of a severe storm environment; and (3) the quality of VAS mesoscale soundings improves with conditioning by local weather statistics. The results represent the optimum retrievability of mesoscale information from VAS radiance without the use of ancillary data. The simulations suggest that VAS data will yield the best soundings when a human being classifies the scene, picks relatively clear areas for retrieval, and applies a 'local' statistical data base to resolve the ambiguities of satellite observations in favor of the most probable atmospheric structure. A.R.H.

N82-19775*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PREDICTABILITY OF THE TROPICAL ATMOSPHERE
J. Shukla Oct. 1981 57 p refs
(NASA-TM-83829) Avail: NTIS HC A04/MF A01 CSCL 04B

An examination of the deterministic predictability for tropics and middle-latitudes separately indicates that the theoretical upper limit of deterministic predictability for low latitudes is shorter than that for middle latitudes. Variability of time averages in low latitudes is mainly determined by the location and intensity of the large-scale Hadley and Walker circulations. Since these are largely influenced by the slowly varying boundary conditions of sea surface temperature and soil moisture, and since synoptic instabilities are not strong enough to change drastically the large scale flow, there is larger potential for predictability of monthly and seasonal means in low latitudes. It is conjectured that for short and medium range deterministic prediction, a prescribed diabatic heating field due to moist convection may be more useful than their explicit calculation from the evolving flow. R.J.F.

N82-19776# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A NUMERICAL MODEL FOR SIMULATION OF LOCAL CIRCULATION, APPLIED TO THE COASTAL REGION OF NORTHEASTERN BRAZIL [UN MODELO NUMERICO PARA SIMULACAO DAS CIRCULA COES LACAIS, APLICADO A REGIAO COSTEIRA DO NORDESTE DO BRASIL]
Sergio Henrique Franchito and Vernon Edgar Kousky Nov. 1981 69 p refs In PORTUGUESE; ENGLISH summary Submitted

for publication
(INPE-2270/PRE/051) Avail: NTIS HC A04/MF A01

A predictive, two-dimensional, nonlinear, primitive equation model was employed to study the land-sea breeze circulation in North-Northeast Brazil. The model considers dry air and involves boundary layer formulation. The surface temperature is determined by a forcing function applied to the Earth's surface. The time integration scheme utilized is that of Shuman-Brown-Campana. In order to study the seasonal variations of the circulation, under conditions of zero mean flow and flat terrain, the model is applied to several months, using different values of land and sea surface temperatures, corresponding to the time at the year. With the inclusion of elevated terrain, the circulation becomes more intense during both day and night. Under the influence of mean onshore flow (5 m/s) and considering flat terrain, the sea breeze becomes slightly weaker. In order to verify the influence of the atmospheric stability on the circulation, the model is initialized using different vertical temperature profiles. R.J.F.

N82-19777# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

STUDIES OF THE ENERGY AND THE FLUX OF WATER VAPOR IN THE ATMOSPHERE OVER NORTHEASTERN BRAZIL Ph.D. Thesis - 30 Jun. 1981 [ESTUDOS DA ENERGETICA E DO FLUXO DE VAPOR D'AGUA NA ATMOSFERA SOBRE O NORDESTE BRASILEIRO]

Valdo daSilva Marques Dec. 1981 174 p refs In PORTUGUESE; ENGLISH summary
(INPE-2288-TDL/068) Avail: NTIS HC A08/MF A01

The energetics and water vapor balance over Northeast Brazil are studied with the purpose of identifying interannual and seasonal variations. All the quantities are calculated for a cylinder, containing most of Northeast Brazil. Monthly mean data for a period of 8 years are used. Calculations are made separately for the dry season (September-October-November), wet season (March-April-May), wet season of 1976 (relatively dry) and 1974 (relatively wet). Evaluation of the mass budget revealed the following patterns: during the wet year/season, there is convergence in the lower troposphere and divergence in the upper troposphere causing rising motion in the lower atmosphere, thus favoring precipitation. On the other hand, during the dry year/season convergence is found in the middle troposphere with divergence above and below, inducing sinking motion in the lower levels. Such a situation provokes drought. Interannual and seasonal variations of water vapor flux are found to occur mainly in the North/Northwest and South/Southeast borders of the cylinder. S.L.

N82-19778# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

CONVERGENCE ZONES IN THE SOUTH ATLANTIC AND THEIR INFLUENCE ON THE PRECIPITATION REGIME IN NORTHEASTERN BRAZIL M.S. Thesis [ZONAS DE CONVERGENCIA NO ATLANTICO SUL E SUAS INFLUENCIAS NO REGIME DE PRECIPITACAO NO NORDESTE DO BRASIL]

Lucimar Luciano deOliveira Jan. 1982 125 p refs In PORTUGUESE; ENGLISH summary
(INPE-2307-TDL/074) Avail: NTIS HC A06/MF A01

The relationship between the convergence zones in the South Atlantic and the rainfall variability on Northeast Brazil was studied. Radiosonde data from the Posto Oceanografico da Ilha da Trindade, wind charts from the National Meteorological Center, USA, precipitation data of selected coastal stations and satellite imagery were utilized. Monthly and half-yearly brightness charts were constructed from such satellite imagery between the parallels of 10 degrees N and 55 degrees S and the meridians of 010 degrees E and 080 degrees W, for a dry and a rainy year. The results reveal that dry years correspond to the permanence of the Spring pattern of interaction between the intertropical convergence zone and the South Atlantic convergence zones, the Bolivian high (in 200 mb) being more developed; in such dry years a stronger and more regular Walker circulation seems to be present. R.J.F.

N82-19779*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MICROWAVE RADIOMETRIC OBSERVATIONS NEAR 19.35, 92 AND 183 GHz OF PRECIPITATION IN TROPICAL STORM CORA

T. T. Wilheit, A. T. Chang, J. L. King, E. B. Rodgers, R. A. Nieman, B. M. Krupp, A. S. Milman, J. S. Stratigos, and H. Siddalingaih [1982] 28 p refs Prepared in cooperation with Computer Sciences Corp., Silver Spring, Md. and Systems and Applied Sciences Corp., Riverdale, Md. and GIT and OAO Corp., Beltsville, Md. Submitted for publication
(NASA-TM-82164) Avail: NTIS HC A03/MF A01 CSCL 04B

Observations of rain cells in the remains of a decaying tropical storm were made by Airborne Microwave Radiometers at 19.35,92 and three frequencies near 183 GHz. Extremely low brightness temperatures, as low as 140 K were noted in the 92 and 183 GHz observations. These can be accounted for by the ice often associated with raindrop formation. Further, 183 GHz observations can be interpreted in terms of the height of the ice. The brightness temperatures observed suggest the presence of precipitation sized ice as high as 9 km or more. M.D.K.

N82-19780*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MONITORING TROPICAL CYCLONE INTENSITY USING WIND FIELDS DERIVED FROM SHORT-INTERVAL SATELLITE IMAGES

Edward B. Rodgers and R. Cecil Gentry Jul. 1981 51 p refs
(NASA-TM-82162) Avail: NTIS HC A04/MF A01 CSCL 04B

Rapid scan visible images from the Visible Infrared Spin Scan Radiometer sensor on board SMS-2 and GOES-1 were used to derive high resolution upper and lower tropospheric environmental wind fields around three western Atlantic tropical cyclones (1975-78). These wind fields were used to derive upper and lower tropospheric areal mean relative vorticity and their differences, the net relative angular momentum balance and upper tropospheric mass outflow. These kinematic parameters were shown by studies using composite rawinsonde data to be strongly related to tropical cyclone formation and intensity changes. Also, the role of forced synoptic scale subsidence in tropical cyclone formation was examined. The studies showed that satellite-derived lower and upper tropospheric wind fields can be used to monitor and possibly predict tropical cyclone formation and intensity changes. These kinematic analyses showed that future changes in tropical cyclone intensity are mainly related to the 'spin-up' of the storms by the net horizontal transport of relative angular momentum caused by convergence of cyclonic vorticity in the lower troposphere and to a lesser extent the divergence of anticyclone vorticity in the upper troposphere. Author

N82-19781*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ESTIMATING OCEAN-AIR HEAT FLUXES DURING COLD AIR OUTBREAKS BY SATELLITE

Shu-Hsien Chou and David Atlas Nov. 1981 52 p refs Submitted for publication Original contains color illustrations
(NASA-TM-83854) Avail: NTIS HC A04/MF A01 CSCL 04B

Nomograms of mean column heating due to surface sensible and latent heat fluxes were developed. Mean sensible heating of the cloud free region is related to the cloud free path (CFP, the distance from the shore to the first cloud formation) and the difference between land air and sea surface temperatures, theta sub 1 and theta sub 0, respectively. Mean latent heating is related to the CFP and the difference between land air and sea surface humidities q sub 1 and q sub 0 respectively. Results are also applicable to any path within the cloud free region. Corresponding heat fluxes may be obtained by multiplying the mean heating by the mean wind speed in the boundary layer. The sensible heating estimated by the present method is found to be in good agreement with that computed from the bulk transfer formula. The sensitivity of the solutions to the variations in the initial coastal soundings and large scale subsidence is also investigated. The results are not sensitive to divergence but are affected by the initial lapse rate of potential temperature; the greater the stability, the smaller the heating, other things being equal. Unless one knows the lapse rate at the shore, this requires another independent measurement. For this purpose the downwind slope of the square of the boundary layer height is used, the mean value of which is also directly proportional to the mean sensible heating. The height of the boundary layer should be measurable by future spaceborn lidar systems. B.W.

N82-19782# Cornell Univ., Ithaca, N. Y. School of Electrical Engineering.
REPORT ON THE ANALYSIS OF DATA FROM THE NOAA/ALASKAN MST RADAR SYSTEM Interim Report
M. F. Larsen, M. C. Kelly, and D. T. Farley Nov. 1981 42 p refs
(Grant AF-AFOSR-0020-80; AF Proj. 2310)
(AD-A109056; AFOSR-81-0859TR) Avail: NTIS HC A03/MF A01 CSCL 04/2

During this period the investigation of mesoscale eddy spectra was completed as well as a study of objective analysis schemes using geostrophic wind adjustments. Both depend upon the continuous data of the NOAA MST radar at Poker Flat, Alaska. The atmospheric power spectral studies revealed a k to the minus 5/3 inertial subrange at time scales of hours. The implication in this essentially two dimensional eddy regime is a source of energy existing at spatial scales of less than 100 km, propagating energy up the spectrum toward lower wavenumbers. At smaller scales, in the fully 3-d turbulent spectrum, the classic Kolmogorov inertial spectrum is found with energy cascading towards smaller scales. Again, a source of energy is suggested on the scale of 10-100 km. The candidate is convection. In the study of objective analysis techniques, Cressman, and Gandin and other approaches are analyzed using the continuous radar data record. No significant differences were found between the Cressman and Gandin schemes. Knowing the character of the radar data with respect to these well-known analyses now permits comparison to more sophisticated and less trivial techniques and may lead to suggestions for entirely new concepts. Author (GRA)

N82-19783# Battelle Columbus Labs., Ohio.
NUMERICAL DECONVOLUTION TO OBTAIN CLOUD SIGNATURES FROM SCATTERED LIGHT PULSES
James M. Supplee and Dennis W. McGuire Adelphi, Md. Harry Diamond Labs. Jul. 1981 44 p refs
(Contract DAAG29-76-D-0100)
(AD-A108806; HDL-CR-81-100-1) Avail: NTIS HC A03/MF A01 CSCL 20/6

The optical return pulse resulting from light reflected from a cloud is given by a convolution of the transmitted pulse with the system range response and the cloud signature. To calculate the cloud signature when everything else is known requires a deconvolution. Since this deconvolution enhances noise, it is very difficult to get better resolution in the cloud signature than the 1 to 2 m that is immediately available by dividing the return pulse by the range response. (This relatively good resolution is available in this way because the transmitted pulse is fairly short, being about 6 ns FWHM.) It is shown that modestly improved resolution is possible if the signal to noise ratio in the return pulse is greater than about 100 to 1. Author (GRA)

N82-19784# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Geophysical Sciences Branch.
SYNOPTIC METEOROLOGY DURING THE SNOW-ONE FIELD EXPERIMENT
Michael A. Bilello Nov. 1981 60 p refs
(DA Proj. 4A7-62730-AT-42)
(AD-A109080; CRREL-SR-81-27) Avail: NTIS HC A04/MF A01 CSCL 04/2

The daily atmospheric pressure systems and weather fronts that traversed the northeastern United States during the SNOW-ONE Field Experiment from 11 January through 20 February 1981 are summarized. This experiment is the first in a planned series of measurements to study the influence of atmospheric obscurants on electro-optical system performance. The analysis of the large-scale synoptic patterns that developed during the field test period constitutes a critical component of the research program. The weather during the measurement period included nine new daily high temperature records. January was one of the driest and February was one of the wettest ever observed. These conditions were caused in part by two high pressure cells and two major low pressure systems that crossed the region. One of these lows brought warm air and heavy rain to New England, and the other produced significant snowfall in northern Vermont. GRA

N82-19785# Aeronautical Research Labs., Melbourne (Australia).
AIRCRAFT MEASUREMENTS OF THE FREQUENCY OF TURBULENCE ENCOUNTERS IN AUSTRALIA. A REVIEW AND ASSESSMENT
Douglas J. Sherman Mar. 1981 35 p refs
(AD-A108923; ARL/Struc-Note-471) Copyright Avail: Issuing Activity CSCL 01/1

All available aircraft V-g-h measurements of turbulence encounters during routine flying in Australia have been summarised on a common basis. The data are insufficient to determine the Australian gust environment although they are not incompatible with the Royal Aeronautical Society data item ESDU 69023. There are, however, indications that at high altitudes (30,000 ft and above) gusts are encountered more frequently than the data item predicts. This is particularly so for the stronger gusts. Author (GRA)

N82-19786# Air Force Geophysics Lab., Hanscom AFB, Mass.
SPECIFICATION OF CLOUD AMOUNT OVER LOCAL AREAS FROM GOES VISUAL IMAGERY Environmental Research Papers
Thomas J. Keegan 28 May 1981 60 p refs
(AD-A109325; AFGL-TR-81-0153; AFGL-ERP-743) Avail: NTIS HC A04/MF A01 CSCL 04/2

Albedos derived from GOES visual imagery data are compared with the cloud cover reported at seven sites in the northeastern United States in the spring through autumn of 1977 and 1978. The data sample was closely edited to remove all cases containing unexplainable inconsistencies between the satellite and surface data. Statistics were generated for the aggregate of stations for spring/summer and autumn periods separately, as well as the two years separately. The seasonal data were further divided into those cases that contained predominantly ice crystal clouds or water clouds. The characteristics of the satellite data were computed for a 9 by 9 one-mile pixel box and were the average, maximum and minimum albedos, the range of albedo, and the texture. Detailed attention was given to the relationship between average albedo and cloud amounts. Equations were generated for each station for each year for the water droplet clouds during the spring/summer season. There were not sufficient cases to do the same for the autumn of the ice crystal cloud cases. There is a logical, consistent variation in the equations from station to station despite noisy data and a serious shortage of data throughout most of the scattered and broken cloud cover ranges. A multivariate analysis including infrared characteristics is indicated. Author (GRA)

N82-19787# Scripps Institution of Oceanography, La Jolla, Calif. Visibility Lab.
SPRING AND FALL MEASUREMENTS OF EUROPEAN VERY LOW ALTITUDE VOLUME SCATTERING COEFFICIENTS Interim Report
Richard W. Johnson Aug. 1981 22 p refs
(Contract F19628-78-C-0200; AF Proj. 7670)
(AD-A108879; SIO-REF-81-33; SRI-17; AFGL-TR-81-0237) Avail: NTIS HC A02/MF A01 CSCL 04/2

This report presents measurements of atmospheric volume scattering coefficients collected during 25 low altitude flights made mostly during the spring and fall seasons of 1976 and 1977 at four different European locations. The measurements were conducted during an instrumented aircraft's final approach and landing at its staging airbase. The measurements were made using a pseudophotopic spectral response and thus are suitable for comparison with data associated with standard visual determinations of airfield visibility. The data illustrate that in 22 of 25 cases, there was little or no significant variation in the value of scattering coefficient as the aircraft approached the surface from an altitude of several hundred meters. Author (GRA)

N82-19788# Wisconsin Univ. - Madison. Space Science and Engineering Center.
THE DEVELOPMENT AND TESTING OF METHODS TO

INFER MIDLATITUDE PRECIPITATION INTENSITY FROM GEOSYNCHRONOUS SATELLITE INFRARED DATA
John V. Zapotocny, Donald R. Johnson, and Thomas M. Whittaker Hanscom AFB, Mass. AFGL 31 Jul. 1981 90 p refs
(Contract F19628-78-C-0137; AF Proj. 6670)
(AD-A108881; SCIENTIFIC-3; AFGL-TR-81-0252) Avail: NTIS HC A05/MF A01 CSCL 04/2

In an attempt to aid development of simple techniques applicable in middle latitudes, this study addresses the inference of precipitation intensity and its temporal change associated with imbedded convective activity at a location in areas of continuous stratiform precipitation from Geosynchronous Operational Environmental Satellite (GOES) IR digital data. Imbedded convective activity is easily identified in high resolution visible GOES imagery if high cloud layers are not present to obscure the convection. At low Sun angles with the shadowing effect of the convective towers, details of these convective areas are especially enhanced. However, with the need for these methods to be applicable during both daytime and nighttime hours, only the IR 11 micron channel data were used in this study which was based on several synoptic cases. In each of the cases examined, visible and IR imagery and loops were used to help pinpoint optimum areas for study.
GRA

N82-19789# Kiruna Geophysical Inst. (Sweden).
STUDIES OF THE STRATOSPHERIC AND MESOSPHERIC WIND SYSTEM AND TEMPERATURE DISTRIBUTION FROM OBSERVATIONS OF INFRASONIC WAVES GENERATED DURING REGULAR CONCORDE FLIGHTS
Ludwik Liszka Sep. 1981 16 p refs Presented at Intern. Symp. on Acoustic Remote Sensing of Atmosphere and Oceans, Calgary, Canada, 22-25 Jun. 1981
(KGI-176; ISSN-0347-6405) Avail: NTIS HC A02/MF A01

The applications of infrasonic recording to atmospheric studies are discussed and results from Concorde flight observations at four recording stations are presented. The Concorde aircraft is considered as an infrasonic source located at a known distance, strong enough to be recorded at distances of up to 5000 km. It is assumed that the direction of propagation of the infrasound produced by the aircraft is determined by the Mach cone, i.e. basic principles of geometrical acoustics are applied. At each station, azimuth and horizontal phase velocity of the arriving signal were recorded as a function of time. As the propagation of infrasound in the atmosphere is strongly influenced by wind and temperature profiles, Concorde recordings in the infrasonic range provide information about the atmosphere-horizontal wind and temperature variations. Variations in propagation time, angle of arrival and phase velocity of recorded infrasonic signals are interpreted in terms of temporal and spatial variations of the wind system.
Author (ESA)

N82-19790# Food and Agriculture Organization of the United Nations, Rome (Italy). Remote Sensing Centre.
PRECIPITATION ASSESSMENT FROM ENVIRONMENTAL SATELLITE DATA FOR NORTHWEST LIBYA INCLUDING THE GEFARA PLAN
A. vanDijk 1981 50 p refs
(RSC-4) Avail: NTIS HC A04/MF A01

The FAO precipitation assessment technique (satellite imagery combined with rain gage data) was applied to NW Libya to improve precipitation monitoring in this data sparse region. A 21 day period containing a few dry days, a heavy rainstorm, then a few more dry days was chosen. Rain gages reported 3 days of heavy rainfall, but failed to detect 2 further days with rain indicated by satellite data. The FAO rainfall maps appear more reliable than rain gage ones. The application of the technique to the whole of Libya, using Meteosat 2, and 10 reliable, well distributed rain gages, in combination with selected rain gages in South Italy, Tunisia and West Egypt is suggested.
Author (ESA)

N82-19791# Bureau of Reclamation, Denver, Colo. Office of Atmospheric Resources Research.
THERMODYNAMIC FEATURES AFFECTING CONVECTIVE CLOUD GROWTH AND DYNAMIC SEEDING: A COMPARATIVE SUMMARY OF HIPLEX SOUNDINGS, 1975 TO 1977 Thermodynamic Cloud Model Analyses
David A. Matthews Jul. 1981 207 p refs
(PB82-123423) Avail: NTIS HC A10/MF A01 CSCL 04B

The summary is based primarily on rawinsonde data observed at Miles City, MT., Goodland, KS., and Big Spring, TX., during the summer months of 1975-77, as part of HIPLEX (High Plains Cooperative Program). Data were stratified according to the occurrence or nonoccurence of convective clouds and, when clouds occurred, according to cloud type as seen in geosynchronous satellite imagery. Geographic comparisons show significant variations from north to south over the high plains--the most intense convection occurring in the central and southern plains, the least intense in the north. Large annual variations were noted in mean values of the thermodynamic features at each site among the three summers.
GRA

N82-19792# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
TURBULENCE STATISTICS FOR DESIGN OF WIND TURBINE GENERATORS
J. C. Kaimal, J. E. Gaynor, and D. E. Wolfe Dec. 1980 109 p refs Sponsored in part by DOE
(PB82-112939; NOAA-81082702; Rept-3) Avail: NTIS HC A06/MF A01 CSCL 04B

Characteristics of moments and probability distributions for two high-wind episodes are examined in depth. The two episodes represent entirely different stability conditions. Statistics for the GUST 0 and GUST 1 models for different heights and bandpass filters are the main focus.
Author (GRA)

N82-19793# National Meteorological Center, Washington, D.C.
CLIMATE ANALYSIS CENTER USERS CONFERENCE Final Report
Jul. 1981 43 p Conf. held in Gettysburg, Pa., 12-14 May 1981
(PB82-113325; NOAA-81082102) Avail: NTIS HC A03/MF A01 CSCL 04B

The primary intent of this conference was to examine more fully the needs and problems of the principal users of the products and services of the Climate Analysis Center (CAC). With this information at hand CAC plans to focus its activities to satisfy as broad a spectrum of requirements (from private industry, university, and state and federal agencies) as possible. Specific objectives were: inform users about CAC products, services, and plans; define principal user needs for existing and planned CAC products and services; suggest new products and services, particularly those tailored for specialized user applications. GRA

N82-19794# National Oceanic and Atmospheric Administration, Miami, Fla. Atlantic Oceanographic and Meteorological Labs.
AUSTRALIAN TROPICAL CYCLONES KERRY AND ROSA, FEBRUARY - MARCH 1979
Robert C. Sheets and Greg Holland (Bureau of Meteorology, Melbourne, Australia) May 1981 145 p refs
(PB82-114182; NOAA-TM-ERL-AOML-46; NOAA-81082502) Avail: NTIS HC A07/MF A01 CSCL 04B

Flights by highly instrumented research aircraft into Southern Hemisphere tropical cyclones were made into Australian Tropical Cyclones Kerry and Rosa of 1979. Three flights were made into Kerry and one into Rosa with one of NOAA's P-3 research aircraft. Data collected during these flights are presented along with a brief discussion of the major features of the structures of these storms as revealed by these data sets.
GRA

N82-19795# Florida State Univ., Tallahassee. Dept. of Meteorology.
THE TWENTY YEAR AVERAGE ATMOSPHERIC STRUCTURE AT LIMA, PERU M.S. Thesis
Jay Anthony Albrecht Jun. 1981 92 p refs
(Grant NSF ATM-78-10814)
(PB82-114216; NSF/IDOE-81-43; FSU-MET-STU-81/1) Avail: NTIS HC A05/MF A01 CSCL 04B

Rawinsonde observations taken at Lima, Peru are used to calculate twenty year average soundings and deviations from them. The average soundings are used to document the seasonal variations in the atmospheric structure at Lima. Five millibar average soundings are compared to fifty millibar average soundings to show that higher vertical resolutions are necessary when studying the mean atmospheric structure at locations where day to day variations are small and strong, persistent subsidence inversions are present much of the time. Temperature anomalies in the lower marine layer are found to be approximately equal to the sea surface temperature anomalies. Author

N82-19796# Florida State Univ., Tallahassee. Dept. of Meteorology.
COASTAL UPWELLING ECOSYSTEMS ANALYSIS. ATLAS OF THE JOINT I AIRCRAFT WINDS FOR THE 500 FOOT LEVEL Final Report
D. W. Stuart, A. I. Watson, and W. P. Duval Jun. 1981 73 p refs
(Grant NSF OCE-77-27735)
(PB82-114703; NSF/IDOE-81-44; FSU-MET-STU-81/2; NSF/IDOE/CUEA/TR-39) Avail: NTIS HC A04/MF A01 CSCL 04B

Maps of winds at 500 ft are presented for 17 individual flights and for 3 mean wind regimes using aircraft data gathered during daytime flights made in February-March 1974 as part of JOINT I. The total wind field is shown by maps of the streamlines and isotachs while the north-south component is shown by maps of isotachs and averaged offshore and alongshore profiles. GRA

N82-19797# Electronic Techniques, Inc., Fort Collins, Colo.
SCPP FORECASTING SUPPORT Interim Progress Report, 1 Jul. 1980 - 30 Jun. 1981
J. Owen Rhea, John L. LeCompte, Arlen W. Huggins, Gilbert L. Hemmer, and Arunas P. Kuciauskas Sep. 1981 340 p refs
(Contract DI-9-07-85-Vol-021)
(PB82-123167) Avail: NTIS HC A15/MF A01 CSCL 04B

The objectives of the Sierra Cooperative Pilot Project (SCPP) are to develop a better understanding of the physical processes of precipitation formation and to identify those conditions that provide the best potential for enhancement of winter precipitation. The project is designed to test the feasibility of using weather modification for improving water resources in the Sierra Nevada. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-19798 Institute of Oceanographic Sciences, Birkenhead (England). Bidston Observatory.
PUBLICATIONS AND REPORTS OF THE INSTITUTE OF OCEANOGRAPHIC SCIENCES 1973-1978
K. D. Jones, ed. 1981 157 p refs
(IOS-R-122) Avail: Issuing Activity

Over 800 oceanographic papers, data special and cruise reports are listed. Topics covered include research methods, effects on climate, wave studies, currents, continental shelves, and tides. Author (ESA)

N82-19799*# City Coll. of the City Univ. of New York. Inst. of Marine and Atmospheric Sciences.
MONTE CARLO STUDIES OF OCEAN WIND VECTOR MEASUREMENTS BY SCATT: OBJECTIVE CRITERIA AND MAXIMUM LIKELIHOOD ESTIMATES FOR REMOVAL OF ALIASES, AND EFFECTS OF CELL SIZE ON ACCURACY OF VECTOR WINDS Final Report
Willard J. Pierson Feb. 1982 344 p refs
(Contract NAS1-15669)
(NASA-CR-165837-1) Avail: NTIS HC A15/MF A01 CSCL 08C

The scatterometer on the National Oceanic Satellite System (NOSS) is studied by means of Monte Carlo techniques so as to determine the effect of two additional antennas for alias (or ambiguity) removal by means of an objective criteria technique and a normalized maximum likelihood estimator. Cells nominally 10 km by 10 km, 10 km by 50 km, and 50 km by 50 km are simulated for winds of 4, 8, 12 and 24 m/s and incidence angles of 29, 39, 47, and 53.5 deg for 15 deg changes in direction. The normalized maximum likelihood estimate (MLE) is correct a large part of the time, but the objective criterion technique is recommended as a reserve, and more quickly computed. procedure. Both methods for alias removal depend on the differences in the present model function at upwind and downwind. For 10 km by 10 km cells, it is found that the MLE method introduces a correlation between wind speed errors and aspect angle (wind direction) errors that can be as high as 0.8 or 0.9 and that the wind direction errors are unacceptably large, compared to those obtained for the SASS for similar assumptions. Author

N82-19800*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WAVE SPECTRA OF A SHOALING WAVE FIELD: A COMPARISON OF EXPERIMENTAL AND SIMULATED RESULTS
W. D. Morris, C. E. Grosch (Old Dominion Univ.), and L. R. Poole Jan. 1982 33 p refs
(NASA-TM-83211) Avail: NTIS HC A03/MF A01 CSCL 08C

Wave profile measurements made from an aircraft crossing the North Carolina continental shelf after passage of Tropical Storm Amy in 1975 are used to compute a series of wave energy spectra for comparison with simulated spectra. Results indicate that the observed wave field experiences refraction and shoaling effects causing statistically significant changes in the spectral density levels. A modeling technique is used to simulate the spectral density levels. Total energy levels of the simulated spectra are within 20 percent of those of the observed wave field. The results represent a successful attempt to theoretically simulate, at oceanic scales, the decay of a wave field which contains significant wave energies from deepwater through shoaling conditions. M.D.K.

N82-19801*# National Aeronautics and Space Administration, Washington, D. C.
NASA OCEANIC PROCESSES PROGRAM, FISCAL YEAR 1981 Annual Report
Mar. 1982 132 p refs
(NASA-TM-84467) Avail: NTIS HC A07/MF A01 CSCL 08C

Summaries are included for Nimbus 7, Seasat, TIROS-N, Altimetry, Color Radiometry, in situ data collection systems, Synthetic Aperture Radar (SAR)/Open Ocean, SAR/Sea Ice, Scatterometry, National Oceanic Satellite System, Free Flying Imaging Radar Experiment, TIROS-N/Scatterometer and/or ocean color scanner, and Ocean Topography Experiment. Summaries of individual research projects sponsored by the Ocean Processes Program are given. Twelve investigations for which contracting services are provided by NOAA are included. N.W.

N82-19802# Electronics Research Lab., Adelaide (Australia).
AN AERIAL SURVEY OF WATER TURBIDITY AND LASER DEPTH SOUNDING PERFORMANCE ALONG THE QUEENSLAND COAST
D. M. Phillips and R. H. Abbot Apr. 1981 29 p refs
(AD-A109050; ERL-0192-TR) Avail: NTIS HC A03/MF A01 CSCL 08/10

The performance of the WRELADS laser airborne depth sounder has been assessed in North Queensland coastal waters from Townsville to Torres Strait. This was achieved by recording water turbidity and maximum sounding depth in the aircraft along the flight path. The parameter used in the aerial survey as a measure of water turbidity was related to beam attenuation coefficient measured from a boat in a joint aircraft and boat trial. Data relating the statistical distribution of turbidity to water depth were obtained and compared with the observed performance characteristic in order to indicate the proportion of Queensland coastal waters suitable for sounding with an airborne laser sounder. Author (GRA)

N82-19803# SACLANT ASW Research Center, La Spezia (Italy). Underwater Research Div.
THE SACLANTCEN OCEANOGRAPHIC DATA BASE. VOLUME 2: ACCESS, INTERROGATION AND DISPLAY
Richard F. J. Winterburn 15 Jun. 1981 58 p refs
(AD-A109417; SACLANTCEN-SM-151) Avail: NTIS HC A04/MF A01 CSCL 05/2

An oceanographic data base established at SACLANTCEN on an 'in-house' UNIVAC 1106 computer system is described.

Volume I discusses the design criteria used in setting up the data base, lists its structure and content, and explains how acquired data, either from outside institutions or from SACLANTCEN experiments are re-formatted and entered. Volume II describes how data are accessed, interrogated, and displayed, including the plotting of charts with coastlines and of contoured data.
Author (GRA)

N82-19804# Louisiana State Univ., Baton Rouge. Dept. of Civil Engineering.
PREDICTION OF SURF ZONE CHARACTERISTICS Final Report, 1979-1981
Joseph N. Suhayda and Gerald F. McHugh 4 Jul. 1981 70 p refs
(Contract N00014-79-C-0342; NR Proj. 388-152)
(AD-A108759) Avail: NTIS HC A04/MF A01 CSCL 20/4

This report presents the results of the development and testing of predictive models for computing surf zone characteristics from wave measurements made outside the surf zone. The surf zone characteristics predicted are average breaker height, maximum breaker height, average breaker position, maximum breaker position, breaker type, average longshore current and maximum longshore current. Preliminary field tests indicate breaker height prediction was within + or - 10% for wave heights of about 1 meter.
Author (GRA)

N82-19805# Ecole Nationale Superieure des Mines, Valbonne (France). Centre de Teledetection et d'Analyse des Milieux Naturels.
THE TOCIND EXPERIMENT Final Report [EXPERIENCE TOCIND]
L. Wald Paris ESA Jul. 1981 21 p refs In FRENCH
Sponsored in cooperation with CNES
(Contract ESA-4423/80/F-FC(SC))
(CTAMN/81/R/10; ESA-CR(P)-1479) Avail: NTIS HC A02/MF A01

The relation between surface isotherms and current is discussed. Predicting surface current from satellite thermographs is investigated. Ship measurements of Indian Ocean currents are compared with Meteosat images. Extensive cloud cover makes it impossible to compare results. Results from a horizontal heat advection model agree closely with measurements. Author (ESA)

N82-19806# Maryland Univ., Solomons. Biological Lab.
ESTUARINE COMMUNITY DYNAMICS BENTHIC PROGRAM, PATUXENT RIVER ESTUARY, PRELIMINARY DATA REPORT
W. R. Boynton, W. M. Kemp, C. G. Osborne, E. Spalding, and C. W. Keefe Annapolis, Md. Maryland Power Plant Siting Program Jun. 1981 63 p refs
(PB82-108689; ; UMCEES-81-52-CBL; PPSP-CP-81-2) Avail: NTIS HC A04/MF A01 CSCL 08A

Sedimentation, resuspension, benthic respiration, nutrient flux, and plankton metabolism rates were measured at four locations along the Patuxent Estuary during 1979-80. Measurement techniques are described and data are reported. GRA

N82-19807# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Environmental Lab.
ANALYSIS OF METHODOLOGIES USED FOR THE ASSESSMENT OF WETLANDS VALUES: APPENDICES C-E
Robert I. Lonard, Ellis J. Clairain, Jr., Robert T. Huffman, J. W. Hardy, Linda D. Brown, Paul E. Ballard, and Janet W. Watts Sep. 1981 450 p refs Sponsored in part by Water Resources Council
(PB82-110362) Avail: NTIS HC A19/MF A01 CSCL 08J

An appendice C-E to analysis methodology used for the assessment of wetlands values is presented. It consists of wetlands evaluation procedures satisfying evaluation criteria, sample criteria form, sample descriptive characteristics form, and criteria and descriptive characteristics forms for each procedure. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-19808 Texas A&M Univ., College Station.
BIOCHEMICAL, PHYSIOLOGICAL AND ECOLOGICAL ASPECTS OF AMMONIUM REGENERATION BY MARINE CRUSTACEANS Ph.D. Thesis
Robert Richard Bidigare 1981 122 p
Avail: Univ. Microfilms Order No. 8128874

Laboratory investigations were carried out with the marine mysid, Praunus flexuosus, to assess the degree of coupling between glutamate dehydrogenase (GDH) activity and the rate of whole animal ammonium excretion. A strong correlation between GDH activity and rate of ammonium excretion by this mysid confirmed that ammonium excretion rates could be accurately predicted by employing the enzyme assay presented here. GDH activity surveyed in different taxa of marine crustaceans was higher in muscle tissue extracts than in gill tissue extracts or in a whole animal homogenate. Zooplankton excretion experiments conducted during austral spring and summer in the Scotia Sea, Antarctica, showed that weight-specific ammonium excretion increased both with increasing ambient temperature and with decreasing body size. The GDH assay appears useful as an alternative method to the traditional time-course, animal-in-a-jar experiments for quantifying zooplankton excretion impacts in the world oceans. Used in conjunction with the ETS assay, the GDH assay is a sensitive tool for surveying depths of maximal grazing and/or predation. Dissert. Abstr.

N82-19809*# General Electric Co., Fairfield, Conn. Space Div.
LIFE SCIENCES PASSIVE GN2 FREEZER THERMAL PERFORMANCE TEST Summary Report
G. W. Belshaw 13 Nov. 1981 79 p
(Contract NAS9-15629)
(NASA-CR-167546) Avail: NTIS HC A05/MF A01 CSCL 06C

Thermal performance tests that were conducted on the life sciences passive GN2 freezer project are summarized as well as the improvements to the freezers to improve the thermal performance of the containers. Procedures were developed, based upon these tests, to initially charge the freezers with LN2 and verify that the freezer performance is adequate for the mission duration. Improvements were made to the corvac sample tube to limit the amount of breakage due to thermal expansion of the liquid during freezing. A method of verifying the freezer vacuum insulative integrity was defined as well as a procedure for refurbishment of the internal vacuum level. Freezer modifications were made to ease the reevacuation of the containers. The orientation of the freezer in a 1-G environment, after being charged, had to remain in a vertical position. The LN2 boiloff rate increased significantly in a horizontal position. This resulted in a stowage definition in the spacecraft prior to launch. Functional testing, using the SL-1 mission timeline showed that the freezer will maintain samples in the frozen state for the duration of the mission. S.L.

N82-19810# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
STUDY OF THE KINETICS OF OXYGEN SATURATION OF FLUOROCARBON EMULSIONS
Yu. D. Aprosin, V. K. Alekseeva, and N. I. Afonin 1982 20 p refs Transl. into ENGLISH from Vop. Med. Khim. (Russia), v. 26, no. 6, 1980 p 793-799
(ISSN-0077-5606; NRC/CNR-TT-2007) Avail: NTIS HC A02/MF A01

The use of fluorocarbon emulsions as blood substitutes is addressed. Specifically, the mechanism of oxygen absorption by perfluorotributyl amine (PFTBA) emulsions is examined. The functional dependence of the absorption constant on various parameters (viscosity, temperature, and concentration of PFTBA in the emulsion) was established, and a comparative analysis of the efficiency of gas transport by the emulsion and by blood was carried out.
M.G.

N82-19811# Ball State Univ., Muncie, Ind. Dept. of Biology.
DETERMINATION OF THE EFFECTS OF MATERIAL FROM ALTERNATE ENERGY SOURCES ON THE UPPER RESPIRATORY TRACT CLEARANCE MECHANISM. PART 1: IN VITRO EXPOSURE TO PARTICULATE POLLUTANTS.

PART 2: IN VIVO EXPOSURE TO OZONE Final Report
Dorothy Adalis Sep. 1981 75 p refs
(Contract EPA-68-02-2295)
(PB82-117037; EPA-600/1-81-067) Avail: NTIS HC A04/MF A01 CSCL 06T

Studies were conducted to measure the toxic effects of a variety of substances from the environment on the clearance mechanism of the upper respiratory tract using an in vitro hamster model system. Studies using hamsters for in vivo exposures to ozone were also conducted to determine the effects of ozone on the cilia beat frequency and cytopathology of the tracheal epithelium. Organ cultures of hamster tracheal tissue were exposed to graded concentrations of pollutants to determine effects on the respiratory cilia. Parameters studied were beat frequency, ciliostasis, cytopathology, and ATP concentration. GRA

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-19812 Utah Univ., Salt Lake City.
NUMERICAL AND EXPERIMENTAL STUDIES OF ELECTROMAGNETIC NEAR-FIELD ENERGY ABSORPTION IN MODELS OF MAN Ph.D. Thesis
Indira Chatterjee 1981 156 p
Avail: Univ. Microfilms Order No. 8125898

The Plane Wave Spectrum approach was used to numerically evaluate the electromagnetic fields and energy absorption in models of man subjected to near-zone leakage fields. Three models were considered: a homogeneous semi-infinite slab model, a layered slab model, and an inhomogeneous 180 cell block model. The numerical results show the strong dependence of energy absorption on the characteristics of the prescribed leakage fields. Results are presented, both for plane waves at various angles of incidence and for near-zone leakage fields. The importance of phase and amplitude variations in the prescribed leakage field is evaluated. A highlight of this work is the considerably reduced energy absorption for near-field partial-body exposures as compared to that obtained for far-field exposure conditions. Experimental results supporting the validity of the empirical relationships are presented. Dissert. Abstr.

N82-19813 Texas A&M Univ., College Station.
CATECHOLAMINE LEVELS IN FIT AND NONFIT MALES WHEN EXPOSED TO AN EMOTIONAL STRESS Ph.D. Thesis
Camille Jeanette Bunting 1981 123 p
Avail: Univ. Microfilms Order No. 8128877

The difference in catecholamine (CA) excretion levels and perceived anxiety levels between physically fit and nonfit human subjects when exposed to an emotional stress was studied. The differences in heart rate responses between physically fit and nonfit subjects, as well as the difference in CA excretion levels and perceived anxiety levels between individuals classified as introverts and extraverts were also studied. Rock climbing was selected as the experimental stress factor. The results of the analysis for the fit and nonfit classifications indicated significant differences in epinephrine (E) excretion levels and responses on the Spielberger State Anxiety Inventory (SSAI) between treatments, as well as significant groups x treatments interaction for norepinephrine (NE) excretion levels. Significant groups x treatments x times and treatments x times x activities interactions were found for heart rate. Analysis for the introvert and extravert classifications revealed significant differences in NE excretion levels and SSAI responses between treatments, as well as a significant groups x treatments interaction for E excretion levels. Dissert. Abstr.

N82-19814*# General Electric Co., Houston, Tex. Systems Dept.
ANALYSIS OF EVAPORATIVE WATER LOSS IN THE SKYLAB ASTRONAUTS
J. I. Leonard 19 Dec. 1977 77 p refs
(Contract NAS9-14523)
(NASA-CR-167462) Avail: NTIS HC A05/MF A01 CSCL 06P

Daily evaporative water losses (EWL) during the three Skylab missions were measured using the indirect mass and water balance techniques. A mean inflight EWL of 860 ml/day-m 2 was obtained for nine men who averaged one hour of daily exercise. Although it was expected the EWL would increase in the hypobaric environment of Skylab (1/3 atmosphere), an average decrease from preflight sea level conditions of 11 percent was measured. The results suggest that weightlessness may have been a factor in modifying EWL primarily by decreasing sweat losses during exercise and possibly by reducing insensible skin losses as well. The weightless environment apparently promotes the formation of a sweat film on the skin surface both directly, by reducing heat and mass convective flow and sweat drippage, and perhaps indirectly by inducing measurable biochemical changes resulting in high initial sweating rates. It is proposed that these high levels of skin wettedness favor sweat suppression by a previously described mechanism. Author

N82-19815*# Baylor Univ., Houston, Tex. Dept. of Dermatology.
EVALUATION OF MATERIALS PROPOSED FOR USE IN SPACE FLIGHT Final Report
W. Christopher Duncan Aug. 1981 4 p
(Contract NAS9-16358)
(NASA-CR-167537) Avail: NTIS HC A02/MF A01 CSCL 06Q

The cutaneous primary irritancy and allergenicity potential of cotton shirts/fabrics treated with flame retardants were evaluated in order to establish their suitability for spacecraft crew use. Twenty-five volunteer human subjects were patch tested on the back utilizing standard methodology, with both treated and untreated cotton fabric. The fabric was treated with tetrakis (hydroxymethyl) phosphonium hydroxide and subsequently cured with gaseous ammonia. The final treatment comprised adding on dicyandiamine phosphoric acid. None of the individuals experienced primary irritant or allergic reactions attributable to the fabric during induction or challenge patch testing. Likewise, there were no reactions to treated or untreated fabric patches placed on ten subjects of the usage panel at the conclusion of the study. R.J.F.

N82-19816# Communications Research Centre, Ottawa (Ontario). Informatics Applications Management Branch.
REVIEW OF HEALTH AND SAFETY ASPECTS OF VIDEO DISPLAY TERMINALS
W. C. Treurniet Feb. 1982 39 p refs
(CRC-TN-712-E) Avail: NTIS HC A03/MF A01

The factors that contribute to worker complaints when video display terminals (VDT) are introduced into the workplace are investigated. Survey data from field experiments indicate that a number of ergonomic factors and job characteristics can contribute to reports of discomfort from VDT users. Specifically, reports of visual discomfort are related to improper ambient lighting (which can cause bothersome reflections and contrast glare), poor display quality, and ophthalmological deficiencies. Reports of muscle pain and fatigue are related to poor workstation design such as improper heights of chair, keyboard, and display screen, and absence of source document holder, and no support for the forearms and wrists. It is noted that the frequency of such complaints is influenced by the worker's attitude regarding the job. A negative attitude arising from performing a meaningless, routine task, or from having no opportunities for career advancement, will result in more complaints due to ergonomic shortcomings. The issue of electromagnetic emissions from television displays is also considered. B.W.

N82-19817# European Space Agency, Paris (France).
HUMAN CARDIOVASCULAR ADAPTATION TO ZERO GRAVITY
F. Bonde-Petersen, ed., B. Battrick, comp., and J. Mort, comp. Jan. 1981 64 p refs Proceedings of Symp., Copenhagen, 20-21 Apr. 1981. Sponsored in cooperation with Copenhagen Univ.
(ESA-SP-1033; ISSN-0379-6566) Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Methods for investigating the effects of weightlessness on the human body are presented, and the physiological problems caused by zero gravity are discussed. Cardiovascular and hormonal responses, incuding hemodynamic effects and posture influence, are considered. Vestibular, brain and masticatory functions are investigated. Rebreathing techniques are assessed. For individual titles, see N82-19818 through N82-19832.

N82-19818# Technische Univ., Berlin (West Germany).
CURRENT VIEWS AND FUTURE PROGRAMS IN CARDIOVASCULAR PHYSIOLOGY IN SPACE
K. Kirsch *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 3-5 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

A microplethysmographic method which charts fluid shifts such as those caused by sudden exposure to zero gravity is described. An ultrasonic probe, calibrated in human tissue layer thickness, measures areas where the underlying bone provides good echos. Tissue volume is calculated from the depth of the tissue cylinder between the skin surface and the bone. Measurements on subjects undergoing tilting confirm that edema occurs preferentially in the lower third of the tibia close to the ankle. Tilting the subject from a slight head down position into the upright position is followed by a decrease of tissue layer thickness above heart level, whereas below heart level the opposite occurs. The effects are reversible. Author (ESA)

N82-19819# Texas Univ. Health Science Center, Dallas.
ADAPTATION TO ZERO GRAVITY AS SIMULATED BY HEAD-DOWN TILT
C. G. Blomqvist, J. V. Nixon, R. L. Johnson, and J. H. Mitchell *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 6-7 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The accuracy of the head down tilt model of adaptation to zero gravity is assessed by comparing test results of subjects undergoing a 24 hr 5 deg tilt with measurements of heart rate, plasma volume, urine production, etc., obtained during and after space flight. The magnitude of the changes in body fluid distribution and the degree of post-tilt cardiovascular dysfunction closely resemble space results. Results indicate that the cardiovascular system adapts rapidly and efficiently to the central fluid shift that occurs early during exposure to zero gravity. Hemodynamic changes are transient with a nearly complete return to the control state within 6 hrs. The adaptation is achieved primarily by a diuresis and a decrease in blood volume, mediated by ADH, renin, and aldosterone inhibition. Author (ESA)

N82-19820# Kobenhavns Amts Sygehus i Glostrup (Denmark).
CLINICAL PHYSIOLOGY OF THE RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM
J. Giese *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 8-9 (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Methods for studying the renin-angiotensin-aldosterone system are reviewed. Plasma renin concentration measurements, referred to the international standard, are advocated as a way of standardizing measures obtained by different methods. Plasma concentration of angiotensin 2 is the most suitable measurement. Saralasin and converting enzyme inhibitors are good angiotensin 2 blockers. Tetrahydroaldosterone excretion measurement is a satisfactory method for studying aldosterone secretion. Author (ESA)

N82-19821# Kommune Hospital, Copenhagen (Denmark).
CARDIOVASCULAR REFLEXES DURING UPRIGHT POSITION
O. Henriksen *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 10-12 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Control systems involved in compensatory changes in vascular conductance in response to postural changes are described. Studies of blood flow regulation in subcutaneous limb tissue during changes of vascular transmural pressure are cited. Evidence suggests that constriction of the vessels in the skin contributes to the decrease in total vascular conductance in upright position. Both remote sympathetic reflex mechanisms elicited by a decrease in baroreceptor activity, and local sympathetic (axon) reflex mechanisms elicited by venous distension participate in pressure regulation during upright position. Author (ESA)

N82-19822# Technische Univ., Berlin (West Germany).
VOLUME REGULATING HORMONES AND THEIR ROLE IN THE CARDIOVASCULAR ADAPTATION TO ZERO GRAVITY
L. Roecker *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 18-20 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Neurohormonal control of plasma volume is postulated. A change in blood volume is sensed by cardiovascular receptors which transmit this information up to the central nervous system. From there two main routes are involved, the antidiuretic hormone (ADH) mechanism for the water, and the sympathetic renin-angiotensin-aldosterone-system for sodium control. Diuresis measurements during water immersion, negative pressure breathing, and prolonged bed rest support this concept. Evidence suggests that ADH is the key to volume control of the circulation system, but the low physiological concentrations of ADH, especially under weightless conditions, make detection difficult. Thermal dehydration tests indicate that factors other than osmolality control ADH secretion under long term negative water balance. Author (ESA)

N82-19823# Nara Women's Univ. (Japan).
CARDIOVASCULAR RESPONSES TO ISOMETRIC EXERCISE IN SITTING AND LYING POSITION
T. Sadamoto, F. Bonde-Petersen, and Y. Suzuki *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 21-24 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Cardiovascular responses to static exercises in the sitting and lying positions, which simulated 1 g and 0 g, were studied. Subjects were investigated during and after 2 min of sustained isometric exercise performed as knee extension, plantar flexion or handgrip at a tension of 40% of maximum voluntary contraction. Heart rate, arterial pressure, and blood flow were recorded. In the two positions, where the force of gravity was varied but where the conditions in the exercising muscles were identical, there was a significant difference in mean arterial pressure (MAP). The effect of isometric exercise on MAP is reduced in the lying position due to the decreased sympathetic nervous activity (SNA). Increments in forearm blood flow and forearm vascular resistance indicate that the baroreceptors are active in both cases. Lower heart rate, MAP and forearm vascular resistance as well as increased forearm blood flow during rest in the lying as compared to the sitting position are attributed to differences in SNA. Author (ESA)

N82-19824# Texas Univ. Health Science Center, Dallas.
HEMODYNAMIC EFFECTS OF LOWER BODY POSITIVE PRESSURE
F. A. Gaffney, E. R. Thal, W. F. Taylor, B. C. Bastian, J. A. Weigelt, J. M. Atkins, and C. G. Blomqvist *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 25-26 ref (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The way in which medical antishock trousers increase arterial pressure is examined. Supine and 60 deg head up tilt blood pressure, heart rate, forearm muscle flow, cardiac output and stroke volume measurements on healthy adults in garments with 10 and 100 mm Hg pressures are presented. Results show that the garment acts as a local, effective, nonpharmacologic, vasoconstrictor. In supine normovolemic subjects it raises pressure by increased afterload. During head up tilt, venous pooling in

the legs decreases stroke volume and cardiac output.
Author (ESA)

N82-19825# Copenhagen Univ. (Denmark).

CARDIOVASCULAR REACTIONS TO TILT AND LOWER BODY POSITIVE PRESSURE (LBPP)

F. Bonde-Petersen, Y. Suzuki, T. Sadamoto, and T. Staehr-Johansen *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 27-29 refs (For primary document see N82-19817 10-52)

Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The difference in the reaction of the heart towards increasing total peripheral resistance passively, as during lower body positive pressure (LBPP), and actively, as during head up tilt, is examined. Standard measures were taken of subjects tilted at 25 deg (head up, head down) and in anti-g suits inflated to 60 or 120 mm Hg. For passive increase, a substantial increase in afterload does not affect cardiac output (CO). For active increase, CO is decreased without any significant increase in afterload, due to the decreased venous return. For LBPP applied in the sitting position (where venous return also is reduced) there is no increase in venous return and CO, although mean arterial pressure rises, probably due to the mechanical compression of the vascular beds in the legs.
Author (ESA)

N82-19826# University Hospital, Copenhagen (Denmark).

MEASUREMENTS OF VESTIBULAR FUNCTION

S. Vesterhauge and K. Zilstorff *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 33-34 (For primary document see N82-19817 10-52)

Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Vestibular reflexes used for measuring vestibular function are discussed, including vestibular sensations, vestibular vegetative vestibulo-spinal, and vestibulo-ocular reflexes. Most human displacements consist of linear accelerations/decelerations, which stimulate otolith organs, but angular accelerations provoked by rotatory movements which stimulate the semicircular canals, give rise to more compensations, so it is on these that clinical interest centers. Understanding of the interactions between the semicircular canal otolith functions and the rest of the system is hampered by the difficulty of isolating the effect of the peripheral sense organs, since the system adapts well to defects in sensory input. Zero gravity experiments are a step towards developing more sensitive measurement techniques for vestibular functions.
Author (ESA)

N82-19827# Kobenhavns Amts Sygehus i Gentofte, Hellerup (Denmark).

CEREBRAL HEMODYNAMICS AT ZERO GRAVITY

J. Olesen *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 35-36 refs (For primary document see N82-19817 10-52)

Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Investigations on the effects of weightlessness and increased gravity on cerebral pressure autoregulation in man and animals are reviewed. Mean arterial blood pressure (MABP) was altered by vasoactive drugs, by a pneumatic cuff, and by posture changes. Test pilots' medical histories and the reactions of patients subjected to extirpation of external and internal jugular veins during bilateral radical dissection for neck carcinoma are considered. Artificial spinal fluid was infused into animals in order to increase intracranial pressure. Results show that cerebral blood flow is unchanged between perfusion pressures of 60 to 150 mm Hg MABP, and that substantial increases in cerebral venous pressure do not impair intellectual capacity. Therefore high g forces during ascent and weightlessness do not overload the autoregulation mechanism.
Author (ESA)

N82-19828# Royal Dental Coll., Copenhagen (Denmark).

THE ETIOLOGY OF FACIAL PAIN AS RELATED TO MASTICATORY MUSCLES

E. Moeller *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 37-41 refs (For primary document see N82-19817 10-52)

Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The link between chewing and facial pain in subjects with functional disorders of the masticatory system was tested. Blood flow in mandibular elevators was assessed by local isotope clearance using Xenon 133. Intercuspal biting at 25% or more of full effort for 90 sec causes obstruction or impairment of blood flow in the muscles. Deliberate unilateral mastication for 90 sec in a normal subject produces post exercise hyperemia in the most vigorously acting muscles. Since the degree of activity exerted by the elevators during mastication typically exceeds 50% of full effort, only pauses between the bursts of activity in the opening movement are available for blood flow. During part of these periods stretching of the elevators limits the capacity for circulation. This suggests that impaired blood flow due to contraction is the source of the pain.
Author (ESA)

N82-19829# Copenhagen Univ. (Denmark).

MEASUREMENTS OF INTRA AND EXTRACELLULAR WATER SPACES AND ELECTROLYTE CONCENTRATIONS IN HUMAN SKELETAL MUSCLE

G. Sjoegaard *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 43-44 refs (For primary document see N82-19817 10-52)

Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

A method for measuring the extracellular space in small muscle biopsies was developed. For each 70 kg body weight, 2 mCi of sup 3H inulin is injected. Extracellar water content (H2Oe) is calculated from: H2Oe ml/100 g d.w. muscle tissue = (sup 3H activity/100 g d.w. muscle tissue)/(sup 3H activity/ml plasma H20). The magnitude of H20e in the soleus (high % slow twitch fibers) triceps brachii (high % fast twitch) and vastus lateralis (equal number slow and fast twitch) was calculated. The total water content was 318 (298-342) ml/100 g d.w. for the three muscles. This indicates that factors other than fiber composition, e.g., the hydrostatic effect, are responsible for H20e magnitude differences. The method can measure reductions in muscle water spacing in the lower body caused by adaptation to zero gravity, and whether this is accompanied by electrolyte concentration changes.
Author (ESA)

N82-19830# Texas Univ. Health Science Center, Dallas.

USE OF ACETYLENE REBREATHING METHOD FOR MEASURING CARDIAC OUTPUT DURING PHYSIOLOGICAL AND CLINICAL STUDIES

C. G. Blomqvist *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 45-46 refs (For primary document see N82-19817 10-52)

Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

A modification of the acetylene rebreathing method, suitable for complex or prolonged experiments which require multiple sessions, is presented. A mixture containing 0.5% C2H2, 10% He, 30% O2 with a balance of N2 for a total bag volume of 1.5 to 2.5 l is used. Six ml of C18O is added for pulmonary diffusion capacity determination. Instantaneous C2H2 concentrations are normalized with respect to He, which is not absorbed. Comparison with the standard indocyanine green indicator dilution technique reveals no systematic error. Experimentally induced stroke volume and cardiac output differences of + or - 10% to 15% can be established by standard statistical methods in groups of 5 to 10 subjects.
Author (ESA)

N82-19831# Copenhagen Univ. (Denmark).

A COMPARISON BETWEEN ACETYLENE AND FREON REBREATHING FOR MEASURING CARDIAC OUTPUT DURING EXERCISE

P. Norsk, F. Bonde-Petersen, and Y. Suzuki *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 47-49 refs (For primary document see N82-19817 10-52)

Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The suitability of freon rebreathing as a noninvasive measurement method in spaceborne microgravity cardiac output tests was examined. Cardiac output, oxygen uptake, blood pressure, and heart rate were measured for subjects with spontaneous, and subjects with forced respiratory rates during rebreathing. Comparison of their results shows that freon can replace acetylene if a spontaneous breathing rate is used, and if the end tidal gas fractions are corrected for changes in rebreathing volume. Inadequate mixing can be avoided by using an inert, insoluble gas. Author (ESA)

N82-19832# Odense Univ. (Denmark).
ON-LINE, REAL-TIME DETERMINATIONS OF BREATH-TO-BREATH GAS EXCHANGE
J. S. Lundegaard and J. Groenlund *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 50-53 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

A real-time on-line system which measures respiratory gas uptake and release in noninvasive investigations of cardiac output is described. For respiration, a hot-wire anemometer connected to the computer measures true mass gas flow. The nonlinear relation between flow rate and flow signal, which differs between gases, is accounted for by a calibration table in the computer program. Another flowmeter, which measures inspiration, is connected to the first by an alternating switch. A mass spectrometer samples 20 cu cm/min flow in order to measure partial pressures. Author (ESA)

N82-19833# Ohio State Univ., Columbus. College of Pharmacy.
CHEMICAL AND MOLECULAR BIOLOGICAL ASPECTS ALKYLHYDRAZINE-INDUCED CARCINOGENESIS IN HUMAN CELLS IN VITRO Interim Report, 1 Sep. 1980 - 31 Aug. 1981
Donald T. Witiak Sep. 1981 20 p refs
(Contract F49620-80-C-0086; AF Proj. 2312)
(AD-A109088; AFOSR-81-0864TR) Avail: NTIS HC A02/MF A01 CSCL 06/20

Carbon-14 labeled 1,1-DMH and 1,2-DMH of high specific activity were prepared and utilized, along with 14C-labeled MMH, to study alkylation of DNA and proteins in low passage human neonatal foreskin derived fibroblasts. When human fibroblasts were treated under conditions which would be expected to lead to a negligible number of transformation events, i.e. cells labeled were in a non-growing environment and the dose of methylhydrazine (1.6 microgram/ml) was well below the ED50 value (62-100 microgram/ml), significant differences in DNA and protein methylation were observed. For both protein and DNA, 1,2-DMH produced a higher degree of methylation than 1,1-DMH, with MMH demonstrating the lowest level. The data suggests that in these cells there are significant differences in the metabolic and/or chemical transformation of the methylhydrazines in the proposed active metabolite, methyl diazonium ion. GRA

N82-19834# Naval Health Research Center, San Diego, Calif.
NONAUDITORY EFFECTS OF HIGH INTENSITY NOISE ON GROUND CREWS AT A NAVAL AIR STATION Interim Report
David J. Hord and M. A. Coultas 1981 19 p refs
(MF58524002)
(AD-A108996; NAVHLTHRSCHC-81-27) Avail: NTIS HC A02/MF A01 CSCL 06/19

Physiological, behavioral and subjective data were obtained from 14 ground crew considered possibly to be at risk for nonauditory effects of intense noise while working around jet aircraft. Fourteen matched control subjects working in normal noise environments were given the same test protocol. Brain stem evoked potentials, eye tracking behavior, balance, and nystagmus were compared between the groups and found to be nondiscriminating. In addition, subjective mood and perceived illness were compared and found to be the same in the two groups. It was concluded that ground crew wearing the required ear protection devices do not show nonauditory effects of intense noise encountered on their jobs, and that within the confines of the variables studied, no evidence exists that current safety measures and standards are inadequate. Author (GRA)

N82-19835# Tracor Jitco, Inc., Rockville, Md.
ENVIRONMENTAL AND HEALTH ASPECTS OF ACRYLAMIDE: A COMPREHENSIVE BIBLIOGRAPHY OF PUBLISHED LITERATURE Final Report, 1950 - 1981
Washington EPA Jun. 1981 83 p
(Contract EPA-68-01-5836)
(PB82-110123; EPA-560/7-81-006) Avail: NTIS HC A05/MF A01 CSCL 06I

The citations were selected from a thorough literature search, and broadly classified as having primarily environmental or biological emphasis. The sources used in the search are identified, and for the portion performed on line, the search strategies are also included. GRA

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-19836# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
THE EFFECT OF VISUAL INFORMATION ON THE MANUAL APPROACH AND LANDING
P. H. Wewerinke 16 May 1980 72 p refs
(Contract NIVR-1857)
(NLR-TR-80055-U) Avail: NTIS HC A04/MF A01

The effect of visual information combined with a basic display information on manual approach performance on the manual approach and landing task was studied. A pre-experimental, theoretical analysis in terms of the optimal control model for pilot/aircraft was performed, yielding approach performance predictions which could be compared with the experimental results of a moving base simulator program. The model provides a description of the visual perception process involved in the complex manual approach task, with predictive capability. The complex interaction of a variety of task variables is examined. Author (ESA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-19837*# CAE Electronics Ltd., Montreal (Quebec).
SIX DEGREE OF FREEDOM MANUAL CONTROLS STUDY REPORT Final Report
G. M. McKinnon, A. Lippay, and M. L. King [1982] 65 p
(Contract NAS9-15939)
(NASA-CR-167532) Avail: NTIS HC A04/MF A01 CSCL 05H

The feasibility of using degree of freedom manual controls in space in an on orbit environment was determined. Several six degree of freedom controls were tested in a laboratory environment, and replica controls were used to control robot arms. The selection of six degrees of freedom as a design goal was based on the fact that six degrees are sufficient to define the location and orientation of a rigid body in space. S.L.

N82-19838*# SRI International Corp., Menlo Park, Calif.
THE FEASIBILITY OF MINIATURIZING THE VERSATILE PORTABLE SPEECH PROSTHESIS: A MARKET SURVEY OF COMMERCIAL PRODUCTS
Tracy Walklet Nov. 1981 207 p
(Contract NAS2-10143; SRI Proj. 8134)
(NASA-CR-166611) Avail: NTIS HC A10/MF A01 CSCL 05H

The feasibility of a miniature versatile portable speech prosthesis (VPSP) was analyzed and information on its potential users and on other similar devices was collected. The VPSP is a device that incorporates speech synthesis technology. The objective is to provide sufficient information to decide whether there is valuable technology to contribute to the miniaturization of the VPSP. The needs of potential users are identified, the development status of technologies similar or related to those used in the VPSP are evaluated. The VPSP, a computer based speech synthesis system fits on a wheelchair. The purpose was to produce a device that provides communication assistance in educational, vocational, and social situations to speech impaired individuals. It is expected that the VPSP can be a valuable aid for persons who are also motor impaired, which explains the placement of the system on a wheelchair. E.A.K.

N82-19839# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 5.
HUMAN FACTORS IN SYSTEM DEVELOPMENT: EXPERIENCES AND TRENDS
Bengt Bergstroem, ed., Hans Furustig, ed., and Jeanette Palm, ed. Jun. 1981 156 p refs Proceedings of Symp., Karlstad, Sweden, 24-25 Sep. 1980
(FOA-A-56003-H9) Avail: NTIS HC A08/MF A01

The role of human factors engineering and research in present and future systems development is evaluated. Limitations on the man machine systems design process are pointed out. Status and effectiveness of human factors engineering are assessed. Ergonomic considerations in product design and evaluation are highlighted. Human factors and safety in nuclear power plant operation are discussed. For individual titles, see N82-19840 through N82-19845.

N82-19840# Research Inst. of National Defence, Karlstad (Sweden).
HUMAN FACTORS AND THE REAL WORLD
Bengt Bergstroem *In its* Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 7-13 refs (For primary document see N82-19839 10-54)
Avail: NTIS HC A08/MF A01

The integration of human factors in systems design and development is considered. The role of the ergonomist as an integral member of the design team is depicted. Real world limitations which sometimes prevent optimal systems from being realized are pointed out. These can be technical and economical, or political and legal constraints on design engineers. Limitations may also arise from the planning process or from scientific uncertainty as to the solvability of a problem. Common systems language and systems design criteria improve communication between specialists on the human side and on the hardware side. The identification of systems related tasks and functions has a direct influence on human performance in systems operation and determines their efficiency. Author (ESA)

N82-19841# Navy Personnel Research and Development Center, San Diego, Calif.
HUMAN FACTORS IN SYSTEM DEVELOPMENT: STATUS AND EVALUATION
David Meister *In* Research Inst. of National Defence Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 15-76 refs (For primary document see N82-19839 10-54)
Avail: NTIS HC A08/MF A01

Human factors in system development as it is presently performed in the U.S. is described. What is achieved and remaining problems are discussed, indicating research requirements and how human factors research does or does not satisfy these requirements. The way in which the developmental human factors engineer performs and the kinds of information needed are determined by circumstances under which the work is done. These circumstances make demands for supporting human factors research which to a large extent are not now being satisfied. As a consequence, the developmental human factors engineer's ability to perform system development tasks is severely impaired. Author (ESA)

N82-19842# Aktiebolaget Ergonomilaboratoriet, Stockholm (Sweden).
ERGONOMIC CONSIDERATIONS IN PRODUCT DESIGN AND EVALUATION
Toni Ivergaard *In* Research Inst. of National Defence Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 77-95 (For primary document see N82-19839 10-54)
Avail: NTIS HC A08/MF A01

The influence of free market competition, particularly advertising and marketing constraints, on product development is assessed. The need for an ecological approach is stressed while an ergonomic design procedure is outlined. The marketing of products which are offered to consumers, including industrial users, is in some respects good and fulfills useful functions for the consumers. Still, there are many products which are potentially dangerous, unhealthy, uncomfortable, wearing or difficult to use. Ergonomics in product evaluation can help identify these problems. In many countries, the authorities feel obliged to control development in different ways. The extent and direction of these controls depends on the companies themselves investing in ergonomics as part of product development. Author (ESA)

N82-19843# Ergonomaad A.B., Karlstad (Sweden).
HUMAN FACTORS AND SAFETY IN NUCLEAR POWER PLANT OPERATION
Jan Wirstad *In* Research Inst. of National Defence Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 97-122 refs (For primary document see N82-19839 10-54)
Avail: NTIS HC A08/MF A01

Taking the Three Mile Island accident as an example, the extent to which human factors engineering is accepted and implemented in nuclear power plant design and operation is discussed. Characteristics of process plant operator jobs are pointed out. The safety philosophy of a nuclear power plant is called into question. Human factors R and D in the U.S. and Europe are reviewed. The need to integrate human factors with plant planning, procurement and evaluation is evident. Author (ESA)

N82-19844# Research Inst. of National Defence, Karlstad (Sweden).
WORK PARADIGMS IN HUMAN FACTORS RESEARCH
Hans Furustig *In its* Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 123-135 refs (For primary document see N82-19839 10-54)
Avail: NTIS HC A08/MF A01

Reasons for studying the systems development process from a behavioral standpoint are put forward. The complexity of factors influencing systems development is examined. Indications of irrational systems development are listed. The work paradigm is defined in terms of hardware factors, personnel factors, and procedures. Means of studying systems development are outlined, i.e., participation in systems development, historical documentation, and simulation. The results of such studies can be of significant assistance in optimizing the efficiency of the development process. Author (ESA)

N82-19845# Navy Personnel Research and Development Center, San Diego, Calif.
HUMAN FACTORS FOR THE FUTURE: TRENDS AND SPECULATIONS
David Meister *In* Research Inst. of National Defence Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 137-155 refs (For primary document see N82-19839 10-54)
Avail: NTIS HC A08/MF A01

Two possible scenarios for human factors (HF) utilization in the next 20 years are projected. The worst case scenario is one of status quo; it suggests that no fundamental changes in HF research and practice will occur because of the continuing inability of the HF practitioner (the developmental human factors engineer) to apply research to systems development. The best case scenario assumes that the current gap between HF research and practice will be bridged and that consequently the developmental engineer's ability to analyze, evaluate and predict will be significantly increased. Author (ESA)

N82-19846# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Computer Science.
SAM: A CONFIGURABLE EXPERIMENTAL TEXT EDITOR FOR INVESTIGATING HUMAN FACTORS ISSUES IN TEXT PROCESSING AND UNDERSTANDING
Roger W. Ehrich Sep. 1981 38 p
(Contract N00014-81-K-0143)
(AD-A109331; CSIE-81-3) Avail: NTIS HC A03/MF A01 CSCL 09/2

There are numerous behavioral issues involving human-machine communications that are exemplified by text editing applications. Examples include scanning mechanisms and information location techniques, command language design, effect of language syntax on productivity and accuracy, and the relationship of syntax to the user task model. In general, there

exist little data to support design goals, and in order to formulate studies of these issues, a flexible text editing system is required. This report describes SAM, a reasonably sophisticated text editor that has table driven command language and syntax that allows reasonably easy reconfiguration for special experiments. In particular, it is straightforward to insert the metering procedures required to measure specific aspects of human performance.
Author (GRA)

N82-19847# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
TRANSMISSION OF SINUSOIDALLY CHANGING VERTICAL SPECIFIC FORCE TO THE HEADS OF SEATED MEN MEASURED IN A FLIGHT SIMULATOR
R. A. A. Reutlinger and J. C. vanderVaart May 1981 34 p refs
(VTH-LR-319) Avail: NTIS HC A03/MF A01

Modulus and phase lag of the transmission of vertical specific force between a flight simulator moving base and the heads of 10 male seated subjects were measured over a frequency range of 0.1 to 9 Hz. Subjects were seated unrestrained in a normal relaxed position in a pilot seat with or without seat cushions. Although there is scatter among subjects, prominent peaks at around 1.5, 6, and 10 Hz are found for the case without seat cushions. The presence of seat cushions tends to cause a single larger peak in the modulus at around 4 to 5 Hz, and a larger phase lag at higher frequencies. A modulus close to unity and no phase lag are found both with and without seat cushions at frequencies below 1 Hz. It is difficult to read cockpit instruments in the frequency range 4 to 8 Hz.
Author (ESA)

N82-19848# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Instrumentierung und Anthropotechnik.
INTERACTIONS BETWEEN HELMET MOUNTED SIGHT DISPLAY AND SENSOR PLATFORM UNDER THE INFLUENCE OF A HUMAN PILOT
Erhard Danneberg, Ernst Kohnen, Helmut Stein, and Ulrich Stolzke Jun. 1981 182 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-746)
(DFVLR-FB-81-30) Avail: NTIS HC A09/MF A01; DFVLR, Cologne DM 37,90

For low altitude flight of helicopters at night and with poor visibility, the interaction of a helmet mounted sight display (HMS/D), a moving sensor platform and a human pilot as system user was investigated by means of laboratory, moving simulator, and flight tests. The technical potential of the HMS/D in the laboratory, the tracking accuracy achieved by the pilot on the moving simulator, and the practical application under real flight conditions are considered. Considerable improvements are possible compared to head down displays if the layout of the instrument readings and their combination with an environmental picture are favorable.
Author (ESA)

N82-19147*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENVIRONMENTAL CONTROL SYSTEMS
Frank Hrach *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 247-252 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 06K

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N82-19849# Los Alamos Scientific Lab., N. Mex.
LOS ALAMOS SCIENTIFIC LABORATORY COMPUTER BENCHMARK PERFORMANCE 1979
Ann H. Hayes, Ingrid Y. Bucher, and Margery McCormick, ed. Feb. 1981 29 p refs
(Contract W-7405-eng-36)
(LA-8689-MS) Avail: NTIS HC A03/MF A01

Computers are benchmarked for performance evaluation and procurement purposes. Compile times, execution speeds, and comparison histograms are presented for a representative set of benchmark programs and the following computers: Cray-1; CDC 7600, CDC 6600 Cyber 73, Cyber 760, Cyber 750; Cyber 730, and Cyber 720; and IBM 370/195 and IBM 3033.
S.L.

N82-19850# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PROGRAMMABLE PRINTING TERMINAL M.S. Thesis [TERMINAL IMPRESSOR PROGRAMAVEL]
Luiz Carlos Perondini Corato May 1981 104 p refs In PORTUGUESE; ENGLISH summary
(INPE-2082-TDL/056) Avail: NTIS HC A06/MF A01

A functional model of a Programmable Printing Terminal is proposed in this work. This terminal utilizes an electric typewriter as a printer. Besides the common functions of programmable terminals, this model offers the capability of being configured as a 'terminal concentrator', as well as associated with a cassette-type mass memory. The hardware that implements the proposed model is described at a block diagram level. The operating functions, including a text editor, as well as the software structure that implements them, are described at fluxogram level. Some simulation processes intended to validate selected programming modules are presented. A critical evaluation of the model, as well as some considerations on the possible ways of upgrading it, are made.
Author

N82-19851# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PROGRAMMABLE PRINTING TERMINAL [TERMINAL IMPRESSOR PROGRAMAVEL]
Luiz Carlos Perondini Corato Jun. 1981 10 p refs In PORTUGUESE; ENGLISH summary Presented at the 2nd Natl. Meeting on Automation, Salvador, Brazil, Jul. 1981
(INPE-2096-RPE/326) Avail: NTIS HC A02/MF A01

A programmable printing data terminal is described which utilizes an electric typewriter as a printer. An electromechanical set makes this conversion possible with no need for access to the mechanism of the typewriter. The electronic circuit is based on a microprocessor which controls the conversion set and implements the terminal functions. A text editor, adapted to the particularities of the typewriter, is part of the operational program of the terminal.
Author

N82-19852# Sterling Systems, Inc., Golden, Colo.
DATA INDEPENDENT ACCESSING METHODOLOGY DISTRIBUTED ACCESS Final Technical Report
Lowell I. Schneider and Michael Levin Griffiss AFB, N.Y. RADC

Jun. 1981 242 p refs
(Contract F30602-79-F-0054; AF Proj. 4594)
(AD-A108645; RADC-TR-81-137) Avail: NTIS
HC A11/MF A01 CSCL 09/2

DIAM, The Data Independent Accessing Model, is a theory for describing the various ways in which information can be represented in a computer. This report uses a relational model of data to define the information resources of a collection of data archives, and the details of how it is stored to the extent necessary to extract it. Access begins by asking a question of the Relational Model (which cuts across sources in combination). The DIAM model then makes it possible to decompose the question into parts so small that no more than one source is needed to answer each part, translate each part to correspond to the representation used by the source, and recompose the translated parts into the largest possible pieces, each of which corresponds to a common source. These requests are then transmitted to the required sources and the returned information is decomposed and recomposed in precisely the opposite way that the question was, yielding the originally sought answer. The report concludes that it is now both feasible and justified to develop a prototype data base access compiler for experimental testing in existing networks. Author (GRA)

N82-19853# Purdue Univ., Lafayette, Ind. Dept. of Computer Sciences.
OVERVIEW OF THE CHiP COMPUTER Interim Technical Report
Lawrence Snyder 19 Aug. 1981 13 p refs
(Contracts N00014-80-K-0816; N00014-80-K-0360; NR Proj. SR0-100)
(AD-A109293; CSD-TR-377) Avail: NTIS HC A02/MF A01 CSCL 09/2

The main question under study is how wide the corridor width should be for the switch lattice of the Configurable, Highly Parallel (CHiP) computer. (The CHiP computer family is introduced and its use for parallel algorithm composition is motivated.) It is argued on the basis asymptotic analysis that a constant corridor width is preferred even though such lattices cannot make full use of the processor elements for most complex interconnection patterns, e.g., universal interconnection structures like the cube connected cycles and shuffle exchange, and for certain 'simple' ones, e.g., certain planar graphs. Author (GRA)

N82-19854# Stanford Univ., Calif. Dept. of Computer Science.
NATURAL LANGUAGE ACCESS TO DATABASES: INTERPRETING UPDATE REQUESTS
Jim Davidson and S. Jerrold Kaplan 30 Sep. 1981 24 p refs
(Grant N00039-80-G-0132)
(AD-A109183) Avail: NTIS HC A02/MF A01 CSCL 09/2

For natural language database systems to operate effectively in practical domains, they must have the capabilities required by real applications. One such capability is understanding and performing update requests. The processing of natural language updates raises problems not encountered in the processing of queries. These difficulties stem from the fact that the user will naturally phrase requests with respect to his conception of the domain, which may be a considerable simplification of the actual underlying database structure. Updates which are meaningful and unambiguous from the user's standpoint may not translate into reasonable changes to the underlying database. Update requests may be impossible (cannot be performed in any way), ambiguous (can be performed in several ways), or pathological (can be performed only in ways which cause undesirable side effects). Drawing on work in Linguistics and Philosophy of Language, we have developed a domain-transparent approach to identifying and performing 'reasonable' changes in response to a user's update request, using only knowledge sources typically present in existing database systems. A simple notion of 'user model' and explanation with respect to the user's state of knowledge are central to the design. This paper describes a system PIQUE (Program for Interpreatation of Query/Update in English), which implements this approach. Author (GRA)

N82-19855# Measurement Concept Corp., Rome, N. Y.
INTELLIGENCE PROCESSOR PERFORMANCE ANALYSIS (IPPA) Final Technical Report, 29 Feb. 1980 - 31 Mar. 1981
Jim Cantrell, Roger Poland, and Jim Labout (Bunker-Ramo Corp.) Griffiss AFB, N.Y. RADC Jul. 1981 240 p
(Contract F30602-80-C-0099; AF Proj. 4594)
(AD-A108794; RADC-TR-81-207) Avail: NTIS
HC A11/MF A01 CSCL 15/4

This report has documented the functional design that was developed for an AN/GYQ-21(V) hardware monitor. The report provides a concept of monitoring to place the development of the hybrid monitor in its proper perspective. The report defines the measurement set the monitor will measure. The functional design includes both the software and hardware components with the rationale for their use to be able to monitor the measurement set selected. The software specifications include tasks such as coordination between the host processor and monitor, measurements, and measurement reporting. Foremost in the designer's mind has been the ease of user interface with the monitor. The hardware/specifications include such areas as packaging, power requirements, EMI/RFI emissions, Qualifier Logic, and special modules. The report includes a theory of operations that references the design and specifications and provides an insight into functional breakout by measurement requirements. Author (GRA)

N82-19856# Mitre Corp., Bedford, Mass.
TRUSTED COMPUTER SYSTEMS. GLOSSARY
George A. Huff Mar. 1981 24 p refs
(Contract F19628-81-C-0001; AF Proj. 8420)
(AD-A108829; MTR-8201) Avail: NTIS HC A02/MF A01 CSCL 09/2

A Trusted Computer System is a computer system that employs sufficient hardware and software integrity measures to allow its use for the simultaneous processing of multiple levels of classified or sensitive information. This glossary was prepared for distribution at the Third Computer Security Initiative Seminar held at the National Bureau of Standards, November 18-20, 1980. Emphasis is on terms which relate to the formal specification and verification of such systems. Author (GRA)

N82-19857# Naval Research Lab., Washington, D. C. Computer Science and Systems Branch.
BEST AVAILABLE TECHNOLOGIES (BATS) FOR COMPUTER SECURITY Interim Report
Carl E. Landwehr 21 Dec. 1981 27 p refs
(RR0140941)
(AD-A109189; NRL-8554) Avail: NTIS HC A03/MF A01 CSCL 09/2

Over more than a decade, government, industry, and academic centers have invested substantial resources in techniques for developing secure computer systems. The major projects to develop such systems are surveyed from the perspective of a system developer about to undertake the design and implementation of a secure software system. Experience with specific techniques and applications is summarized, and recommendations are given. Suggested approaches to each phase of the system life cycle are provided. The principal recommendations to developers are that they consider the security requirements of each system as part of its functional requirements, rather than as a separate set of requirements; that they continue to think about security throughout the design and implementation of the system; and that they use the best available software engineering technology. Author (GRA)

N82-19858# Boeing Aerospace Co., Seattle, Wash.
SYNTACTIC VISUAL IMAGE GENERATION SYSTEM FEASIBILITY STUDY Final Technical Report, Jun. - Nov. 1981
Dec. 1981 28 p refs
(Contract MDA903-81-C-0332; ARPA Order 4278)
(AD-A109334) Avail: NTIS HC A03/MF A01 CSCL 09/2

During phase 1 of the Syntactic Visual Image Generation program; Boeing has investigated several methods of implementing a pipelined multiprocessor multimemory image generation system. Also, Boeing has assessed architectures for a fractal-object processor and has developed high level simulations to predict performance and architecture feasibility. Additionally, cost/

performance analysis and possible VLSI implementation of the various architectures have been assessed. GRA

N82-19859# Aeronautical Research Labs., Melbourne (Australia).
PRINTR: A TEXT AND GRAPH PLOTTING SYSTEM WITH EXPANDED CAPABILITIES
G. F. Forsyth Jul. 1981 14 p
(AD-A109045; ARL/AERO-TM-333) Avail: NTIS
HC A02/MF A01 CSCL 09/2

A system for using control character sequences to extend a printer's character set and to more efficiently handle graph data and drawings has been written as a machine language program for the PDP8 computer with electrostatic plotter. Features added to text files include Greek and mathematical symbols, superscripts, two levels of subscripts and overstruck (superimposed) bars, dots and combined bars and dots. Plot files have two modes using 8 or 12 bit data words and may be either continuous scan or byte addressed. Plot and Text files may be mixed but not superimposed. Author (GRA)

N82-19860# JRS Industries, Inc., San Diego, Calif. Technical Services Div.
STUDY AND EXPERIMENTATION OF HORIZONTAL MICROPROCESSOR MACHINE DESCRIPTION TECHNIQUES Final Report, Apr. - Nov. 1981
John L. Gieser and Robert J. Sheraga 1 Nov. 1981 69 p refs
(Contract DAAG29-81-C-0018)
(AD-A109136; ARO-18012.1-S-EL) Avail: NTIS
HC A04/MF A01 CSCL 09/2

This document reports on the research and investigation aspects of microarchitecture description methodologies. Its primary objectives are: (1) to identify the methodology that appears to have the most promise for use in an automatic microcode generation system; and (2) to define the means for developing the necessary tools and techniques needed for further evaluating this methodology. In automatically generating microcode from a high level source language, a significant issue is the description of the target microengine architecture. The techniques and methodologies used to accomplish this must address the practical issues of: (1) a detailed description of all microprogrammed controlled hardware elements of the microengine, the microinstruction, the rules for valid use of all microprogrammed features, and the behavior of microprogrammed operations; and (2) the use of this description to interpret and decode higher level source intermediate language to form microoperations and ultimately microinstructions. This work is a step in conceptually defining the techniques and methodologies for microarchitecture descriptions to accomplish the above. Author (GRA)

N82-19861# Virginia Polytechnic Inst. and State Univ., Blacksburg. Computer Science Industrial Engineering/Operations Res.
A TWO-DIMENSIONAL CORE GRAPHICS SYSTEM FOR RESEARCH IN HUMAN-COMPUTER INTERFACES
Roger W. Ehrich Oct. 1981 63 p
(Contract N00014-81-K-0143)
(AD-A109280; CSIE-81-4) Avail: NTIS HC A04/MF A01 CSCL 09/2

Graphics is an important requirement for human-computer communication, and in order to construct good interfaces and conduct behavioral experiments, a flexible and reliable package is required. Such a package must be extensible, and because of the dynamic nature of facilities, it must be quickly adaptable to new device types. This report describes a limited implementation of the ACM/SIGGRAPH Core System that will be the vehicle for the graphics aspects of the research program at Virginia Tech in human factors in computation. Author (GRA)

N82-19862# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
A REMOTE TERMINAL EMULATOR FOR PRIME COMPUTERS
Daniel H. Forsyth, Jr. Aug. 1981 34 p refs
(Contract N00014-79-C-0873; GIT Proj. G36-643)
(AD-A108818; GIT-ICS-81/12) Avail: NTIS
HC A03/MF A01 CSCL 09/2

A remote terminal emulator is a device that emulates sources of on-line input to a computer system, and is one of the mo reliable tools for measuring the performance of time-share computer systems. The remote terminal emulator described this report provides simultaneous emulation for a number communication lines as well as the software necessary for th preparation of scripts (a sequence of actions to be performe by the emulator) the setup and control of test sessions, and th analysis of test results. Author (GRA

N82-19863# Georgia Inst. of Tech., Atlanta. School Information and Computer Science.
INITIAL EXPERIENCE WITH A LOCAL NETWORK NET/ONE BY UNGERMANN-BASS, INCORPORATED
Philip H. Enslow, Jr., Paul D. Manno, and Jeannette T. Myer
1 Oct. 1981 26 p refs
(Contracts N00014-79-C-0873; F30602-78-C-0120; GIT Proj. G36-643; GIT Proj. G36-649)
(AD-A108817; GIT-ICS-81/11) Avail: NTI
HC A03/MF A01 CSCL 09/2

Net/One, the local area network produced by Ungermann-Bass, has been installed and operated in the Georgia Tech Full Distributed Processing System's (FDPS) testbed. Currentl Net/One interfaces with Prime 400, Prime 550, and PDI 11/45 computers which are located in the computer lab and several different types and brands of ASCII, asynchronous terminals. This report includes a description of the design and operation of the various Net/One components, a discussion of the rationale for the selection of Net/One for installation in the FDPS testbed, our initial experiences with Net/One including problems encountered and their solutions, and concludes with a description of the plans for future enhancements to its operation. Author (GRA)

N82-19864# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
PERFORMANCE OF DISTRIBUTED AND DECENTRALIZED CONTROL MODELS FOR FULLY DISTRIBUTED PROCESSING SYSTEMS. INITIAL SIMULATION STUDIES Final Technical Report, 1 Jul. 1980 - 30 Jun. 1981
Phillip H. Enslow, Jr. and Timothy G. Saponas Jul. 1981 103 p refs
(Contract F30602-78-C-0120; GIT Proj. G36-654)
(AD-A108974; GIT-ICS-81/09) Avail: NTIS
HC A06/MF A01 CSCL 09/2

An essential component of a Fully Distributed Processing System (FDPS) is the distributed and decentralized control. This component unifies the management of the resources of the FDPS and provides system transparency to the user. In a previous study, the problems of distributed and decentralized control were analyzed resulting in the specification of several control models. This study continues that work by further specifying the control models defined in the first report and comparing the performance of these models in various environments. This performance analysis is accomplished by means of simulation experiments. The results of the experiments indicate that the control message traffic generated by the distributed and decentralized control is much less than expected and probably does not present a barrier to the implementation of FDPSs. Comparison of the results of the simulation of a uniprocessor and that of an FDPS indicate that little or no loss of performance is experienced by the FDPS. An important limitation of these initial performance studies is the fact that user traffic is not included in this series of tests. Author (GRA)

N82-19865# Harvard Univ., Cambridge, Mass. Computation Lab.
ON THE POWER OF PROBABILISTIC CHOICE IN SYNCHRONOUS PARALLEL COMPUTATIONS
John H. Reif Nov. 1981 32 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A109047; TR-30-81) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper introduces probabilistic choice to synchronous parallel machine models; in particular parallel RAMs. The power of probabilistic choice in parallel computations is illustrated by O(log n) time algorithms for connectivity and recognizing bipartite graphs and O(log n) squared time algorithms for testing if a graph has a perfect matching, testing in time O(n) irreducibility of polynomials over finite fields. We characterize the computational complexity of time, space, and processor bounded probabilistic sequential RAMs. We show that parallelism uniformly speeds up time bounded probabilistic, sequential RAM computations by nearly a quadratic factor. We also show that probabilistic choice can be eliminated from parallel computations by introducing nonuniformity. Author (GRA)

N82-19866# Stanford Univ., Calif. Dept. of Computer Sciences.
SYNTHESIS OF COMMUNICATING PROCESSES FROM TEMPORAL LOGIC SPECIFICATIONS
Zohar Manna (The Wiezmann Inst., Rehovoth, Israel) and Pierre Wolper Sep. 1981 29 p refs Presented at the Workshop on Logics of Programs, Yorktown-Heights, N.Y., 1981
(Contract N00014-76-C-0687; Grants AF-AFOSR-0014-81; NSF MCS-80-06930)
(AD-A109853; SU-STAN-CS-81-872) Avail: NTIS HC A03/MF A01 CSCL 09/2

In this paper, we apply Propositional Temporal Logic (PTL) to the specification and synthesis of the synchronization part of communicating processes. To specify a process, we give a PTL formula that describes its sequence of communications. The synthesis is done by constructing a model of the given specifications using a tableau-like satisfiability algorithm for PTL. This model can then be interpreted as a program. Author (GRA)

N82-19867# Research Inst. of National Defence, Linkoeping (Sweden).
DATA COMMUNICATION FOR MINICOMPUTERS [DATA KOMMUNIKATION FOER SMAADATORER]
Rolf Mellberg Aug. 1981 64 p refs In SWEDISH
(FOA-C-30226-E2) Avail: NTIS HC A04/MF A01

Data communication problems posed by the increasing use of minicomputers are discussed. A standard network is needed in order to overcome difficulties arising from the geographical dispersion of these computers. Program files based on existing techniques are adapted to minicomputers. Ways in which data processing terminals of larger computers can be linked to minicomputers are discussed. Author (ESA)

N82-19868# Horray K.G., Furtwangen (West Germany).
MICROPROCESSOR CONTROLLED STAMPING UNIT WITH NEEDLE PRINTER Final Report, Dec. 1980
Klaus Ruppert Klein Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 50 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-189; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,50

The development of the Horray KG CS80 Computer Stamp was developed. A duty file in which all important functions are defined was worked out. The mechanical boundary conditions were determined and a mechanical prototype was constructed. The electromechanical device was built to permit printing tests. The computer system 8085, is composed of several boards containing power supply, power amplifier and display. These modules are, mounted on one board. Matching software is written in ASSEMBLER. Author (ESA)

N82-19869# Polytec Gesellschaft fuer Mess- und Regeltechnik m.b.H. und Co., Waldbronn (West Germany).
MICROPROCESSOR AIDED CONTROL AND SIGNAL PROCESSING SYSTEM FOR A LASER-TWO-FOCUS VELOCIMETER IN TURBOMACHINERY RESEARCH Final Report, Sep. 1980
Helmut Selbach Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 52 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-190; ISSN-340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,90

A control and signal processing system for a time of flight velocimeter for measurement of velocity and turbulence in the rotating components of turbomachinery and for other applications was developed. The signal processor is based on pulse air timing techniques and multichannel analysis. An electronic shaft angle encoder measures the velocity distributions at up to 16 positions between successive rotor blades by tagging each time interval measurement with the proper angular position of the blade rows. The control functions are carried out by microprocessors. Author (ESA)

N82-19870# Centre de Recherches en Physique de l'Environnement Terrestre et Planetaire, Orleans (France).
FAST PROCESSOR FOR SPECTRAL ANALYSIS (ORAS)
P. Gilles Aug. 1981 21 p Presented at 20th URSI General Assembly on Telecomunications and Digital Signal Processing, Washington, D.C., 11 Aug. 1981
(CRPE-NT-106) Avail: NTIS HC A02/MF A01

A digital peripheral for a minicomputer, microprogrammed and macroprogrammable, dedicated to geophysical measurements signal analysis is presented. Processing capabilities include linear/vectorial functions, real/complex functions, and auto/cross spectra of an adjustable number of channels. The ORAS gives a HP 1000 F computer the capability of quickly calculating and integrating the spectral matrices of VLF satellite data with nine, or fewer, components. The complex Fourier transform with summation takes 20 msec for 1024 samples. The computer software controls the sequence of operations and the data transfers up to 1 M w/sec. Author (ESA)

N82-20123*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
IMPROVING THE COMPUTER-HUMAN INTERFACE: THE QUALITATIVE MONITOR DISPLAY
H. W. Baugh and A. I. Zygielbaum *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 66-69 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09B

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-19871 Virginia Polytechnic Inst. and State Univ., Blacksburg.
COMPUTATIONALLY FAST ALGORITHMS FOR ARMA SPECTRAL ESTIMATION Ph.D. Thesis
Koji Ogino 1981 187 p
Avail: Univ. Microfilms Order No. 8126278

The high performance method for obtaining an ARMA model spectral estimate of a wide-sense stationary time series was found to provide typically superior performance when compared to such contemporary approaches as the Box-Jenkins and maximum entropy methods. Fast recursive algorithmic implementations of the high performance method are developed. They are recursive in the sense that as a new element of the time series is observed, the parameters characterizing an ARMA spectral estimate are algorithmically updated. The number of multiplications and additions required at each recursive stage are of the order p with p being the number of denominator coefficients of the ARMA model. Methods of modification of the data are applied to achieve a significant computational improvement. The development is predicated on utilization of various projection operators. Dissert. Abstr.

N82-19872# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ANALYSIS OF THE ILLUMINATION OF AREAS COVERED BY A SATELLITE IN A HELIOSYNCHRONOUS CIRCULAR ORBIT [ANALISE DE ILUMINACAO DAS AREAS COBERTAS PORUM SATELITE DE ORBITA HELIO-SINCRONA CIRCULAR]
Valder Matos deMedeiros Aug. 1981 59 p refs In PORTUGUESE; ENGLISH summary
(INPE-2208-RPE/398) Avail: NTIS HC A04/MF A01

A FORTRAN 4 program is described which provides information concerning the sunlighting conditions on the subsatellite point required for sensor dimensioning. Some

examples are given to illustrate the interpretation of results.
M.G.

N82-19873# Los Alamos Scientific Lab., N. Mex.
COVFILS: A 30-GROUP COVARIANCE LIBRARY BASED ON ENDF/B-V
D. W. Muir and R. J. Labauve Mar. 1981 166 p refs
(Contract W-7405-eng-36)
(LA-8733-MS) Avail: NTIS HC A08/MF A01

A library of 30-group cross sections and covariances called COVFILS was prepared from Evaluated Nuclear Data File/B-V data using the NJOY code system. The library includes data on the total cross sections, scattering cross sections, and the most important absorption cross sections for H, B, C, O, Cr, Fe, Ni, Cu, and Pb. Detailed descriptions of various features of the library, a listing of a FORTRAN retrieval program, and 143 plots of the multigroup cross section uncertainties and their correlations are given.
M.G.

N82-19874# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DISTRIBUTION OF PERSONNEL, VEHICLES, AND SUPPLIES BY SHIP: A MODEL APPLIED TO THE BRAZILIAN NAVY M.S. Thesis [DISTRIBUICAO DE PESSOAL, VIATURAS E SUPRIMENTOS POR NOVIOS: UM MODELO APLICADO AO CASO DA MARINHA BRASILEIRA]
Sergio Martins Vianna Jan. 1982 107 p refs In PORTUGUESE; ENGLISH summary
(INPE-2305-TDL/073) Avail: NTIS HC A06/MF A01

The development of a mathematical algorithm together with a data processing system, in the area of linear programming is studied with the purpose of finding several alternatives related to the demands of maritime transportation. The modeling of the theory used for the solution of transportation problems is presented, emphasizing the decomposition technique idealized by Dantzig-Wolfe. The mathematical selected (Mathematical Programming System), is discussed. Finally, a practical application of a typical problem related to Navy operations is presented, generating a model whose data approximate the reality within the dimensions of naval problems encountered. A short discussion of the theme presented, together with a synopsis of suggestions that may influence future studies and developments of the topic are presented.
R.J.F.

N82-19875# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ALGOL-MS, A LANGUAGE FOR THE DEVELOPMENT OF MULTIPROGRAMMED SMALL SYSTEMS M.S. Thesis [ALGOL-MS UMA LINGUAGEM PARA O DESENVOLVIMENTO DE SISTEMAS MULTIPROGRAMADOS DE PEQUENO PORTE]
Ubirajara Moura deFreitas Dec. 1981 115 p refs In PORTUGUESE; ENGLISH summary
(INPE-2282-TDL/067) Avail: NTIS HC A06/MF A01

A high level language, called ALGOL-MS, tailored to multiprogramming of small computers is developed. The language uses a set of primitives, that constitutes the system Kernel. The Kernel and a cross-compiler which generates machine code to the INTEL 8080 microcomputer are developed. During compilation, the Kernel code is included on the generated code. Author

N82-19876# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A SYSTEM FOR IMPLANTATION OF DATA BANKS IN BURROUGHS SERIES B7000/B6000 COMPUTERS M.S. Thesis [UM SISTEMA PARA A IMPLANTACAO DE BANCOS DE DADOS RELACIONAIS NOS COMPUTADORES BURROUGHS DAS SERIES B7000/B6000]
Jose Oscar Machado Alexandre and Paulo Cesar Pereira Guerra Jan. 1982 95 p refs In PORTUGUESE; ENGLISH summary
(INPE-2299-TDL/070) Avail: NTIS HC A05/MF A01

The relational system designed for Burroughs' machines (series B7000/B6000) is introduced. The relational system was conceived to implement multipurpose relational data bases in the Burroughs' environment using the dbms software package, DMS-II, as a support tool. It offers the users a high level non-procedural query language, called SEQUEL2/Q5, and usual procedural languages as COBOL, ALGOL, and PL/1. Author

N82-19877# Delaware Univ., Newark. Dept. of Computer and Information Sciences.
PRACTICAL ISSUES IN HAVING A USABLE LIBRARY OF SOFTWARE SPECIFICATIONS Interim Technical Report
Ralph M. Weischedel Mar. 1981 40 p refs
(Contract F49620-79-C-0131; Grants AF-AFOSR-3539-78; AF-AFOSR-0190-80; AF Proj. 2304)
(AD-A108656; AFOSR-81-0799TR) Avail: NTIS HC A03/MF A01 CSCL 09/2

Though formal specifications of software modules offer much toward the design problems of large software systems, creating formal specifications is very difficult, requiring much upfront effort. This paper examines a common idea for dealing with the high cost of software, but in the context of specification. That idea is a pool or 'library' of specifications, so that it is easy to build on the work of others. Unlike other efforts that have concentrated on technical problems in having such a library, this paper identifies and studies several common sense requirements on such a library being effectively used. Such issues are closer related to human factors than to technical problems; yet these are clearly as critical in use as technical issues. Our conclusions have arisen from two studies. In one, we wrote several module specifications in the form that might appear in a library. The module varied in complexity from a stack to the kernel of a text editor; the text editor specifications ranged in length from 9 to 28 pages including copious comments as in-line documentation. The second study compared portions of the English and formal specifications of KSOS (Ford Aerospace, 1978), the Kernelized Secure Operating System. The paper may be viewed as rather tutorial about writing correct, understandable formal specifications for others to use in their system design.
GRA

N82-19878# Delaware Univ., Newark. Dept. of Computer and Information Science.
PREREQUISITES TO DERIVING FORMAL SPECIFICATIONS FROM NATURAL LANGUAGE REQUIREMENTS Final Report, 1 Jul. 1980 - 31 Aug. 1981
Ralph M. Weischedel Oct. 1981 21 p refs
(Grant AF-AFOSR-0190-80; AF Proj. 2304)
(AD-A108612; AFOSR-81-0798TR) Avail: NTIS HC A02/MF A01 CSCL 05/2

Since English specifications and formal specifications of modules are complementary and since formal specifications require so much effort to write, our work is investigating application of artificial intelligence techniques to aid in the software specification process. The first area studied is comparing English descriptions with formal specifications of the same software module. This work is now complete; however, some of the examples will continue to serve as a guide to the software tool being constructed. The second area is suggesting modifications to formal specification languages, which would make them more understandable. In particular, we have been suggesting alternatives to logical quantifiers. The third and fourth areas deal with the syntactic and semantic components of an experimental software tool. Its purpose is to test our solutions to a handful of problems in transforming English descriptions to formal specifications under significant user assistance. In dealing with syntactic ambiguity, one of the solutions that many have speculated about is the use of a semantic component to reject anomolous parses; we intend to test its effectiveness using the RUS grammar. When ambiguity is not resolved, questions must be presented to the user for his/her selection of the intended interpretation. Partial heuristics for this are part of the results of this year's effort. In addition, modification of the RUS parser and dictionary for the domain of software specification will continue during the next year.
GRA

N82-19879# Mitre Corp., Bedford, Mass.
THE SOFTWARE ACQUISITION RESOURCE EXPENDITURE (SARE) METHODOLOGY, DATA REQUIREMENTS AND DATA UTILIZATION
W. E. Byrne 7 Oct. 1981 20 p Presented at the 16th Ann. DOD Cost Anal. Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109372) Avail: NTIS HC A02/MF A01 CSCL 09/2

SARE reporting is a data collection methodology used to collect software-unique financial data plus technical data that make the financial data meaningful. The data can be used to monitor the progress of software development work on the contract in which the data is collected. Also, the data is to be submitted to a multiproject Air Force Systems Command (AFSC) software data base. The data base will help formulate, calibrate, and validate software cost/schedule estimation methods. GRA

N82-19880# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

METAPHOR: AN INESCAPABLE PHENOMENON IN NATURAL LANGUAGE COMPREHENSION Interim Report

Jaime G. Carbonell 4 May 1981 25 p refs
(Contracts N00014-79-C-0661; F33615-78-C-1551; ARPA Order 3597)
(AD-A109026; CMU-CS-81-115) Avail: NTIS HC A02/MF A01 CSCL 09/2

Interpreting metaphors is an integral and inescapable process in human understanding of natural language. This paper discusses a method of analyzing metaphors based on the existence of a small number of generalized metaphor mappings. Each generalized metaphor contains a recognition network, a basic mapping, additional transfer mappings, and an implicit intention component. It is argued that this method reduces metaphor interpretation from a reconstruction to a recognition task. Steps towards automating certain aspects of language learning are also discussed. Part II analyzes analogical mappings underlying metaphors and implications for inference and memory organization. Regularities have been observed indicating that certain types of conceptual relations are much more apt to remain invariant in analogical mappings than other relations, resulting in an induced invariance hierarchy. The central thesis is that human inference processes are governed by the same analogical mappings manifest as metaphors in language. GRA

N82-19881# Coastal Engineering Research Center, Fort Belvoir, Va.

PRODUCTS FROM TWO COMPUTER PROGRAMS WHICH PROCESS DIGITAL BATHYMETRIC DATA

Barry E. Herchenroder Oct. 1981 17 p refs
(AD-A108757; CERC-CETA-81-13) Avail: NTIS HC A02/MF A01 CSCL 08/10

A description is given of products from two computer programs which process digital bathymetric data. One program generates regularly spaced bathymetric data from irregularly spaced data. The other uses regularly spaced data to determine and draw contours. A large set of irregularly spaced bathymetric data available on magnetic tape for U.S. coastal regions is also described. Examples of output from each program are displayed for two coastal areas. Author (GRA)

N82-19882# SRI International Corp., Menlo Park, Calif. Computer Science Lab.

TECHNIQUES FOR AUTOMATIC DEDUCTION Final Report, Jul. 1979 - Jul. 1981

Robert E. Shostak, P. Michael Melliar-Smith, and Richard L. Schwartz Oct. 1981 106 p
(Contract F49620-79-C-0099; SRI Proj. 8752; AF Proj. 2304)
(AD-A108979; AFOSR-81-0853TR) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report covers progress on a 2-year research effort toward the development of new theorem-proving methods for program verification, and the empirical investigation of these methods in actual verification systems. The research conducted during the course of the project focused on methods for simplifying formulas of the kind that arise frequently in the verification of programs. The importance of simplification methods, as opposed to pure proof methods, was pointed up by verification work conducted under a previous AFOSR contract. Perhaps the most significant outcome of the project is the development of an experimental theorem prover that has been used extensively in the proof of correctness of the design of a fault-tolerant operating system developed under NASA support. We believe that the technology embodied in this experimental system could be successfully applied to the development of a production verification system. Author (GRA)

N82-19883# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

GPRINT: A LISP PRETTY PRINTER PROVIDING EXTENSIVE USER FORMAT-CONTROL MECHANISM

Richard C. Waters Oct. 1981 23 p refs
(Contracts N00014-80-C-0505; N00014-75-C-0643)
(AD-A109031; AI-M-611) Avail: NTIS HC A02/MF A01 CSCL 09/2

A pretty printer is presented which makes it easy for a user to control the format of the output produced. The printer can be used as a general mechanism for printing, data structures as well as programs. It is divided into two parts: a set of formatting functions, and an output routine. Each formatting function creates a sequence of directions which specify how an object is to be formatted if it can fit on one line and how it is to be formatted if it must be broken up across multiple lines. Based on the line length available, the output routines decides what structures have to be broken up across multiple lines and produces the actual output following the directions created by the formatting functions. The directions passed from the formatting functions to the output routine form a well defined interface: a language for specifying formatting options. Three levels of user format-control are provided. A simple template mechanism makes it easy for a user to control certain aspects of the format produced. A user can exercise much more complete control over how a particular type of object is formatted by writing a special formatting function for it. He can make global changes in format by modifying the formatting process as a whole. Author (GRA)

N82-19884# Naval Postgraduate School, Monterey, Calif.

AN EVALUATION OF ESTIMATORS FOR RECEIVER DETECTION PROHABILITIES AND UNKNOWN SIGNAL POPULATION SIZE M.S. Thesis

David Scott Hendrickx Sep. 1981 70 p refs
(AD-A109536) Avail: NTIS HC A04/MF A01 CSCL 12/1

Imagine a signal acquisition system composed of a number of receivers or sensors concurrently scanning the same domain for signals. It is reasonable to expect that different signals will each be detected by a different subset of receivers over the scanning period. Using the data collected from the receivers, it is possible to estimate the total signal population size including those signals not detected by any receiver. Additionally, it is possible to estimate the probability each individual receiver detects signals. Several estimators are developed for these quantities in the context of a model designed to represent the signal detection process. This model forms the basis for a simulation conducted to analyze the behavior of the estimators over a variety of conditions. Author (GRA)

N82-19885# Loughborough Univ. of Technology (England). Dept. of Mathematics.

THE USE OF A NONQUADRATIC MODEL IN A CONJUGATE GRADIENT METHOD OF OPTIMIZATION WITH INEXACT LINE SEARCHES

A. Tassopoulos and C. Storey May 1981 19 p refs
(MATHS-Res-157) Avail: NTIS HC A02/MF A01

Conjugate gradient methods in optimization were studied. The traditional search method exhibits finite termination when applied to quadratic problems if exact line searches are used. The use of these, however, can cause excessive computational effort and consequently conjugate gradient methods, using inexact line searches, are suggested. Using a rational model (nonquadratic), different standard test functions were tried in various dimensions in order to examine the effectiveness of three methods: (1) function minimization by conjugate gradients, i.e., standard method; (2) conjugate gradient optimization method invariant to nonlinear scaling; and (3) conjugate direction method. Numerical results show the performance of the three methods, tested on a variety of updating formulas for the search directions and line search accuracy parameters. Author (ESA)

N82-19886# Analytical and Computational Mathematics, Zurich (Switzerland).

STUDY ON THE EXTENSION OF THE STROBOSCOPIC METHOD TO THE SECOND ORDER

J.-P. Halbritter Paris ESA Apr. 1981 147 p refs
(Contract ESOC-3856/79/D-JS(SC))
(ESA-CR(P)-1488) Avail: NTIS HC A07/MF A01

The second order effects of the second coefficient considered in gravity field expansion of planets in zonal spherical harmonics (J2) are calculated by an algebraic processor which exploits the structure of the one revolution solution. The stroboscopic method is outlined. Computer programs are given. Sample runs show the expected increase in accuracy. Results for one revolution are given for two inclinations and eccentricities from 0.1 to 0.9. The method is applied to long-term evolution over 1000 revolutions. The graphs show no deterioration of accuracy compared with precise stable numerical integration of the orbital elements. The processor can handle other perturbations after minor modifications. Author (ESA)

N82-19887# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
COMPARISON OF SOME IRREGULAR METHODS FOR LEVEL PLOTTING INTERPOLATION [JAEMFOERELSE MELLAN NAAGRA IRREGULJAERA INTERPOLATIONS-METODER FOER NIVAAPLOTTNING]
Anders Widman Nov. 1981 114 p refs In SWEDISH
(FOA-C-20433-D8) Avail: NTIS HC A06/MF A01

Four plotting interpolation methods are compared with regard to performance speed, standard deviation and image quality: Akima's irregular method, Nielson-Frankes method, quadratic Shephard, and thin plate splines. Akima's irregular method appears to be the fastest, but gives lowest image quality. Quadratic Shephard and thin plate splines give the best images. Marlow-Powell's regular method from the Harwell Subroutine Library is discussed. Other methods require a subroutine for level curves generation from regularly given data. In all cases the graphic package GPGS-F and its extensions GRAPHISTO and SURRENDER are applied for the graphic output. Author (ESA)

N82-19888# Research Inst. of National Defence, Linkoeping (Sweden).
IMIO: A ROUTINE LIBRARY FOR IMAGE INPUT/OUTPUT FILES ON DEC-10. DIRECTIONS FOR USE [IMIO - ETT RUTINBIBLIOTEK FOER BILDFILS-I/O PAA DEC-10. ANVAENDARHANDLEDNING]
Gunilla Loennemark Sep. 1981 116 p In SWEDISH
(FOA-C-30228-E1) Avail: NTIS HC A06/MF A01

A subroutine library which facilitates disk and tape storage of matrix form data is presented. The subroutines are written in MACRO 10 and are compatible with FORTRAN, PASCAL and SIMULA programs. Using appropriate coordinates, a rectangular sample of the image can be selected for processing. Author (ESA)

N82-19889# Stuttgart Univ. (West Germany). Abt. Datenverarbeitung und Numerik.
ARITHMETIC MANIPULATION OF VARIABLES AND DATA BASE CONTENTS BY A SIMPLE DIALOG ORIENTED LANGUAGE WITH STRUCTURED ELEMENTS [ARITHMETISCHE MANIPULATION VON VARIABLEN UND DATENBANKINHALTEN DURCH EINE EINFACH DIALOGORIENTIERTE SPRACHE MIT STRUCTURIERERTEN ELEMENTEN]
Isabel Loebich Dec. 1979 122 p refs In GERMAN; ENGLISH summary
(IKE-4-104; ISSN-0173-6892) Avail: NTIS HC A06/MF A01

A module (ARS) was developed for the manipulation of global variables and data base contents, using arithmetic expressions formulated in a dialog language which can be interpreted immediately. The expressions are structured so as to allow bracketing and calling for in ARS defined functions. The structure elements, IF THEN ELSE, and WHILE DO are used for program control. Functional units such as parsing or table management are also included. A comparison with higher programming languages is made and examples where usage of ARS is particularly indicated are given. The modular structure allows application of subunits of ARS in other programs and enhances its versatility. Author (ESA)

N82-19890# Sheffield Univ. (England). Dept. of Control Engineering.
PSICON: A SIMULATION PACKAGE FOR THE DESIGN OF DIGITALLY CONTROLLED SYSTEMS
D. A. Linkens, L. S. Gray, M. Menad, and N. Mort (Royal Naval Engineering College) Oct. 1981 29 p refs
(RR-162) Avail: NTIS HC A03/MF A01

A simulation language based on a block oriented continuous systems simulator (PSI) is described. Using the message transfer capability of the multitasking operating system of a minicomputer, external digital control algorithms can be developed rapidly in FORTRAN, while retaining the advantages of a flow chart based and precompiled structure of the continuous simulation language. The use of the package is illustrated by (1) an anesthetics problem where time delay dynamics are controlled, using an external FORTRAN program comprising a Smith predictor plus a PID regulator; and (2) a self tuning adaptive autopilot for ship steering. The package gives fast simulation and good interactive properties, with the external controller segments giving the required flexibility for a wide range of uses. Author (ESA)

N82-19891# Imperial Coll. of Science and Technology, London (England). Dept. of Aeronautics.
IMPROVEMENTS OF THE ALGORITHMS USED FOR MONTE-CARLO DIRECT SIMULATION COMPUTATIONS
M. N. Macrossan Oct. 1981 20 p refs
(Contract AT/2037/084; Grant SRC-GR/B/67025)
(IC-Aero-81-03) Avail: NTIS HC A02/MF A01

Errors arising from the searching scheme used in the Monte Carlo direct simulation of gas flow program are identified. The calculation of cell volumes is clarified and the errors in using the four point searching scheme are examined. An error which results in the smearing of local surface coefficients and another which reduces these coefficients near the axis of the flow are overcome by a procedure which checks surface collisions. A plotting program produces a drawing of the cell boundaries from the Monte Carlo program input data in order to verify the arrangement of cells in the flow field. For a curved body surface, surface segment length is varied gradually. The requirements that cell sizes and time interval be small reduce errors. Author (ESA)

N82-19892# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abt. Regelung.
SIMULATION OF LINEAR MULTI-INPUT/MULTI-OUTPUT SYSTEMS BY PIECEWISE CONTINUOUS INPUT FUNCTIONS AND VARIOUS OPTIONS FOR THE GRAPHICAL REPRESENTATION OF RESULTS
Josef Petry Sep. 1981 129 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-749)
(DFVLR-Mitt-81-23) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 27

A FORTRAN program for the simulation of linear continuous systems with multiple inputs and outputs is presented for regulation analysis. The input functions should be treatable as trajectories of ordinary homogeneous linear differential equation systems with constant coefficients. The program flow chart is discussed with emphasis on the initialization phase and the integration over the successive continuity intervals. Subprograms are provided for numerical or graphical presentation of the computed trajectories. The implementation and usage of the program is illustrated in several examples. Author (ESA)

62 COMPUTER SYSTEMS

Includes computer networks.

N82-19893# Purdue Univ., Lafayette, Ind. Dept. of Computer Sciences.
PROGRAMMING PROCESSOR INTERCONNECTION STRUCTURES Interim Technical Report
Lawrence Snyder Oct. 1981 28 p refs
(Contracts N0001480-K-0816; N00014-80-K-0360; Proj. Blue CHiP)
(AD-A109294; CSD-TR-381) Avail: NTIS HC A03/MF A01 CSCL 09/2

Parallel computer architecture complicates the already difficult task of parallel programming in many ways, e.g., by a rigid interconnection structure, addressing complexity, and the shape and size mismatches. The CHiP computer is a new architecture that reduces these complications by permitting the processor interconnection structure to be programmed. This new kind of

programming is explained. Algorithms are presented for several interconnection patterns including the torus and the complete binary tree and general embedding strategies are identified.
Author (GRA)

N82-19894# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DEVELOPMENT OF A COMPUTER CONSULTING SYSTEM USING DECISION RULES [DESENVOLVIMENTO DE UM SISTEMA DE CONSULTA, USANDO REGRAS OF DECISAO]
Edson Luiz Franca Senne and Paulo Ouvera Simoni Jan. 1982 26 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2296-PRE/068) Avail: NTIS HC A03/MF A01

A computer consultation system is developed using artificial intelligence techniques and decision rules as a means for knowledge representation. The system consists of three main subsystems: the rule acquisition system, the diagnosis system, and the explanation system. The knowledge acquisition subsystem was designed as an interactive program in order to simplify the task of transferring knowledge to the system. This process occurs in two levels: enlarging or modifying the knowledge bank introducing new decision rules or changing existing ones; and acquiring new primitive concepts with which the rules are built up. The independence between the acquisition mechanism and the knowledge domain was given special consideration during the acquisition system design phase. Details are given on the acquisition system implementation, as well as on the diagnosis and explanation systems data structures. S.L.

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

N82-19895# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STRUCTURAL PATTERN RECOGNITION [RECONHECIMENTO ESTRUCTURAL DE PADROES]
Flavio Roberto Dias Velasco Jun. 1981 23 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Ann. Meeting of SBPC, Salvador-Bahia, Brazil, Jul. 1981 and the 13th Brazilian Math. Colloq., Pocos de Caldas, Brazil, Jul. 1981
(INPE-2096-RPE/328) Avail: NTIS HC A02/MF A01

Some aspects of the structural approach to pattern recognition are presented. Particularly, the syntactic method and the filtering/relaxation method are emphasized. R.J.F.

N82-19896# Army Material Systems Analysis Activity, Aberdeen Proving Ground, Md.
PROCEEDINGS OF THE 3RD MEETING OF THE COORDINATING GROUP ON MODERN CONTROL THEORY, PART 1
Herbert E. Cohen Nov. 1981 297 p refs Conf. held at Redstone Arsenal, Ala., 20-21 Oct. 1981
(DA Proj. 1R6-65706-M-541)
(AD-A109124) Avail: NTIS HC A13/MF A01 CSCL 15/3

Contents: Analysis of Tank Fire Control Systems by Optimal Control Theory; General Structure Discrete-Time Observers; On the Design of Predictors for Fire Control Systems; Microprocessor Implementation of an Adaptive Second Order Tracking/Prediction Algorithm for Tank Fire Control; On the Credibility of Models; A Linear Nonlinear Control Problem; Application of Modern Estimation and Control Techniques to the Glaads Test Vehicle; On Designing Robust Predictors Using Finite State Markov Chains; Robust Kalman Filtering; A Case Study of Modern Direct Digital Autopilot Design; Robust Missile Guidance; A New Class of Guidance Laws for Air-to-Air Missiles; Estimating Time-to-Go for use in Advanced Guidance Laws; Microprocessor-Based Optimal Controllers for a Helicopter Turret Control System; Discrete-Time Disturbance-Accommodating Control Theory; The Disturbance-Utilization Mode; Discrete Controller Design for Gaussian and Waveform Type Disturbances; and Stability Control of Large Inertia, Dynamical, Nonlinear Systems in the Presence of Unstabilizing Disturbances. GRA

N82-19897# Stanford Univ., Calif. Dept. of Computer Science.
GOOD LAYOUTS FOR PATTERN RECOGNIZERS
Howard W. Trickey Aug. 1981 16 p refs
(Contract MDA903-80-C-0107; Grant NSF MCS-80-12907)
(AD-A109324; SU-STAN-CS-81-871) Avail: NTIS HC A02/MF A01 CSCL 09/2

A system to lay out custom circuits that recognize regular languages can be a useful VLSI design automation tool. This paper describes the algorithms used in an implementation of a regular expression compiler. Layouts that use a network of programmable logic arrays (PLA's) have smaller areas than those of some other methods, but there are the problems of partitioning the circuit and then placing the individual PLA's. Regular expressions have a structure which allows a novel solution to these problems: dynamic programming can be used to find layouts which are in some sense optimal. Various search pruning heuristics have been used to increase the speed of the compiler, and the experience with these is reported in the conclusions.
Author (GRA)

N82-19898# Sheffield Univ. (England). Dept. of Control Engineering.
A MULTIVARIABLE FEEDBACK CONTROL PROBLEM WITH APPLICATION TO STRIP BASE CONTROL FOR SENDZIMIR MILLS
D. H. Owens Jul. 1981 14 p refs
(RR-153) Avail: NTIS HC A02/MF A01

The design of feedback controllers for a plant with transfer function matrix G(s)=diag [g sub i(s)]G sub m, where G sub m is a square and constant matrix and g sub i(s) is a scalar transfer function, 1< or = i < or = m is considered. The case when g sub i(s) = g(s), 1< or = i < or = m, and G sub m is singular or almost singular is emphasized. The robustness of the design with respect to errors in G sub m is represented in terms of a system of strict inequalities. This case is amenable to analysis in the standard, nonstandard and robustness sense.
Author (ESA)

N82-19899# Sheffield Univ. (England). Dept. of Control Engineering.
THE RECEDING HORIZON PRINCIPLE FOR DISTRIBUTED SYSTEMS
S. P. Banks Dec. 1981 26 p refs Presented at J. Franklin Inst. Conf. on Control of Distributed Systems, Penn.
(RR-167) Avail: NTIS HC A03/MF A01

A nonlinear control law which improves on the classical linear quadratic solution is obtained by generalizing the receding horizon principle to wave and diffusion type distributed parameter systems. If the system operator (A or B) generates a group, the generalization is straightforward. In a system defined by a semigroup, spaces H sub 1 (-t) and H sub 2 (-t) are introduced. When A is self-adjoint with discrete spectral resolution the feedback control can be found explicity. Bounded B is assumed. Wave and heat equation examples show that the control reacts more quickly than the linear quadratic solution to large error states, but more slowly to small disturbances. Author (ESA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-19900 Alabama Univ. in Huntsville.
OPTIMAL RENDEZVOUS BETWEEN CLOSE CIRCULAR ORBITS Ph.D. Thesis
Larry Douglas Plexico 1981 157 p
Avail: Univ. Microfilms Order No. 8128323

Optimal fixed time rendezvous trajectories between close circular orbits are determined. The scheme utilizes necessary conditions applied to equations of motion linearized about a point moving on a nearby reference orbit. Trajectories involving two, three, and four impulses are discussed. In the two impulse case, direct comparisons are made between linear solutions and those derived using classical conic equations. The choice of reference orbit radius is critical in developing an accurate linear model. The development of a reference orbit whose radius depends on boundary conditions is described, and its advantages are discussed. Finally, a method for arriving at a nonlinear solution is described. Selected parameters from the linear solution are applied to classical conic equations, and a series of Lambert problems are solved. Dissert. Abstr.

N82-19901 South Carolina Univ., Columbia.
STOCHASTIC CONVERGENCE OF RANDOMLY WEIGHTED SUMS Ph.D. Thesis
Carol Ann Calhoun 1981 71 p
Avail: Univ. Microfilms Order No. 8129445

The stochastic convergence of randomly weighted sums S sub n is investigated. To obtain convergence of weighted sums involving Banach space valued random variables, some geometric conditions must be placed on the Banach space. The classical strong law of large numbers holds only in Banach spaces of type p. Direct analogs of results for random weights were obtained by placing certain independence conditions on the weights and by assuming the Banach space of type p. However, in obtaining an analog of the result, a more restrictive condition is needed on the Banach space, namely that of p smoothability due to the possible lack of independence of the special weights under consideration. Also, an example shows that if the weights and the Banach space valued random variables are dependent, then S sub n may not converge almost surely or in probability. Hence, the correlation between the weights and the Banach space valued random variables must be considered. Dissert. Abstr.

N82-19902 Royal Aircraft Establishment, Farnborough (England).
AN EXAMINATION OF STABILITY CRITERIA FOR ITERATIVE NUMERICAL SCHEMES USED IN SOLVING DIFFERENTIAL EQUATIONS
Katherine Moore Jul. 1981 35 p refs
(RAE-TR-81081; RAE-Aero-3508; BR81080) Copyright. Avail: Issuing Activity

The stability of numerical schemes for solving algebraic finite difference equations, resulting from finite difference approximations to differential equations, is discussed. It is suggested that the von Neumann method together with its stability criterion provides a reasonably simple way of determining stability. However, there are limitations in its applicability, which are indicated. The method is tested in two examples. How best to treat first and mixed derivative terms, occurring in differential equations, is indicated. Author (ESA)

N82-19903 Sheffield Univ. (England). Dept. of Control Engineering.
ASYMPTOTIC PROPERTIES OF UNKNOWN SYSTEMS
D. H. Owens Sep. 1981 6 p refs Presented at I.E.E.E. Conf. CDC, San Diego, California, 1981
(RR-156) Avail: Issuing Activity

Controller design for multivariable systems with uncertain dynamics, and the difficulty of making precise theoretical predictions based on uncertain data, is discussed. Formalization of this problem and description of how asymptotic analysis which plays an important role in the presence of severe plant uncertainty was examined by differential sensitivity methods and, by adaptive and self tuning control. Low gain and high gain theories are considered. Asymptotic analysis for root loci and singular perturbations is cited. The framework for a systematic design tool is presented. A theorem is proven for the typical structure, providing existence and parameterization of stabilizing controllers, along with an asymptotic characterization of performance.
Author (ESA)

N82-19904*# PEDA Corp., Palo Alto, Calif.
CONSERVATIVE SUPRA-CHARACTERISTICS METHOD FOR SPLITTING THE HYPERBOLIC SYSTEMS OF GAS-DYNAMICS FOR REAL AND PERFECT GASES Progress Report, 1 Jul. 1980 - 31 Sep. 1981
C. K. Lombard Jan. 1982 37 p refs
(Contract NAS2-10744)
(NASA-CR-166307) Avail: NTIS HC A03/MF A01 CSCL 12A

A conservative flux difference splitting is presented for the hyperbolic systems of gasdynamics. The stable robust method is suitable for wide application in a variety of schemes, explicit or implicit, iterative or direct, for marching in either time or space. The splitting is modeled on the local quasi one dimensional characteristics system for multi-dimensional flow similar to Chakravarthy's nonconservative split coefficient matrix method; but, as the result of maintaining global conservation, the method is able to capture sharp shocks correctly. The embedded characteristics formulation is cast in a primitive variable the volumetric internal energy (rather than the pressure) that is effective for treating real as well as perfect gases. Finally the relationship of the splitting to characteristics boundary conditions is discussed and the associated conservative matrix formulation for a computed blown wall boundary condition is developed as an example. The theoretical development employs and extends the notion of Roe of constructing stable upwind difference formulas by sending split simple one sided flux difference pieces to appropriate mesh sites. The developments are also believed to have the potential for aiding in the analysis of both existing and new conservative difference schemes. M.G.

N82-19905# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FUZZY INFERENCE USING A MODIFIED MODUS PONENS RULE [INTERENCIA NEBULOSA UTILIZANDO O MODUS PONENS MODIFICADO]
deOliveira Orion Silva and Celso de Renna Esouza Sep. 1981 29 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Reuniao Ann. da SBPC, Salvador-Bahia, Brazil, 8-15 Jul. 1981
(INPE-2224-PRE/020) Avail: NTIS HC A03/MF A01

The modus ponens inference rule for fuzzy premises and conclusion can be described as follows: If x is P, then y is Q (represented by (x,y) is (Bar-P'+ Bar-Q); x is R; therefore, y is Ro (Bar-P'+ Bar-Q); where P' is the complement of P,Bar-P' is the cylindrical extension of P' over the universe of Q,Bar-Q is the cylindrical extension of Q over the universe of P, and + is the bounded sum operation. It follows that is R = P, all values of the tribution Po (Bar-P'+ Bar-Q) are greater than or equal to the corresponding ones from Q. The results that the values are > or = Q is due to a certain information loss in the application of +. Another binary operation is proposed, improving the result obtained when R = P. Moreover, the association of a degree of belief in the interval (0,1) to the implication is allowed, thus generalizing the fuzzy modus ponens rule. M.G.

N82-19906# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF PROBLEMS OF ILL-CONDITIONED REGRESSION OR WITH MULTICOLINEARITY [ESTUDO DE PROBLEMAS DE REGRESSAO MAL-CONDICIONADOS OU COM PRESENCA DE MULTICOLINEARIDADE]
Luiz Antonio Nogueira Lorena and Jose Roberto Reis [1982] 19 p refs In PORTUGUESE; ENGLISH summary Presented at 3rd Brazilian Econometrics Meeting, Pernambuco, Brazil, 8-11 Dec. 1981
(INPE-2234-PRE/022) Avail: NTIS HC A02/MF A01

Ill-conditioned linear regression models or models with multicolinearity are presented. The objective is to point out the bad effects resulting from perturbations in the estimated coefficients are shown, when the system of normal equations is ill-conditioned. The condition number of the normal matrix (presented in the correlation matrix form) is related to the multicolinearity problem. The ridge estimator is presented as alternative to the least squares one, when there exists strong multicolinearity. The relationship between these two estimators is shown. S.L.

N82-19907# Technische Hogeschool, Eindhoven (Netherlands).
ROUND-OFF ERROR ANALYSIS OF DESCENT METHODS FOR SOLVING LINEAR EQUATIONS Ph.D. Thesis
Joseph Antonius Maria Bollen 2 Dec. 1980 204 p refs
Avail: NTIS HC A10/MF A01

Round-off error analysis of iterative methods for solving linear systems are considered. The class of descent methods which is a large sub-class of iterative methods is studied. Special attention is paid to the gradient method and the conjugate gradient method.

often referred to as the steepest descent method. A number of results on the good-behavior and numerical stability of the gradient method and the conjugate gradient method for both well- and ill-conditioned systems are presented. Computational tests to verify the results of round-off error analysis are also discussed. M.D.K.

N82-19908# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SOLUTION OF PROBLEMS WITH TIME AS AN INDEPENDENT VARIABLE, USING THE FINITE ELEMENT METHOD [SOLUCAO DE PROBLEMAS COM O TEMPO COMO VARIAVEL INDEPENDENTE, ATRAVES DO METODO DE ELEMENTOS FINITOS]
Santiago Alves Tavares Nov. 1981 16 p refs In PORTUGUESE; ENGLISH summary Presented at the INPE-LCC Seminar, Rio de Janeiro, 25-27 Nov. 1981
(INPE-2269-PRE/050) Avail: NTIS HC A02/MF A01

The solution by finite element methods of two classes of problems, where time appears as the independent variable, is analyzed, they are: (1) optimum control Bolza problem; and (2) initial value problem of parabolic type. Validation of the method is established by applying to particular problem with known solutions. Author

N82-19909# Princeton Univ., N. J. Dept. of Statistics.
COMPARISON OF THE BIOPTIMAL CURVE FOR TWO ROBUST ESTIMATES
Katherine Bell Krystinik and Stephan Morgenthaler Oct. 1981 12 p refs Revised
(Contract DAAG29-79-C-0205)
(AD-A109132; TR-195-SER-2; ARO-16669.12-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

The performance of one-step biweights and Bob Bell estimates are compared with the performance of the bioptimal estimates. This is done for sample sizes 5, 10 and 20. The two situations are the Gaussian and slash. Author (GRA)

N82-19910# Naval Ship Research and Development Center, Bethesda, Md. Computation, Mathematics and Logistics Dept.
ACCELERATION OF CONVERGENCE OF A VECTOR SEQUENCE BY REDUCED RANK EXTRAPOLATION Final Report, 1975 - 1980
Robert P. Eddy Nov. 1981 60 p refs Presented at the 1st Ann. Workshop on the Inform. Linkage Between Appl. Math. and Ind. Monterey, Calif., 23-25 Feb. 1978 Submitted for publication
(AD-A108765; DTNSRDC-81-084) Avail: NTIS HC A04/MF A01 CSCL 12/1

A new family of methods, called reduced rank extrapolation, is developed for accelerating convergence of the sequence of vectors generated during the iterative solution of a system of m linear algebraic equations in m unknowns. Large systems of this kind arise, for example, in the finite difference or finite element solution of partial differential equations. Reduced rank extrapolation is derived from full rank extrapolation, which is a straightforward generalization to vector space of the well known Aitken delta sq.-shanks e sub 1, scalar extrapolation. It is applicable when the iteration has reached a point where only a few, say r, eigenvalues dominate the situation and hence only r difference vectors can be linearly independent to specified tolerance. The rank, r, is determined during the solution of an auxiliary problem of best approximation in vector space, i.e., 'best' in the sense of minimizing some specified vector norm. Least squares theory, corresponding to the Euclidean norm, is developed in detail herein. Application to Laplace's equation in a square and in a cube yielded reduction in computation time by a factor ranging between 2.4 and 4.7, and reduction in iteration count by a factor ranging between 3.6 and 5.4. Author (GRA)

N82-19911# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
COMMENTS ON THE DOUBLY ASYMPTOTIC APPROXMATION. 2: A SIMPLE APPROXIMATION FOR CUTOFF VELOCITY Final Report, Jan. - Jun. 1981
David W. Nicholson and Martin H. Marcus 15 Sep. 1981 14 p refs
(AD-A108926; NSWC/TR-81-329-2) Avail: NTIS HC A02/MF A01 CSCL 19/4

A model problem is used to examine the error of a simple approximation, obviating the calculation of relief pressures used in the Doubly Asymptotic Approximation. The error is a function of a quantity which may be interpreted as the ratio of structural response times to fluid pressure decay times. The greatest relative error is about 27% and usually is somewhat less, suggesting the use of a simple 'correction factor' for cutoff velocity. Author (GRA)

N82-19912# Sverdrup Technology, Inc., Arnold Air Force Station, Tenn.
ACCELERATED CONVERGENCE OF STRUCTURED BANDED SYSTEMS USING CONSTRAINED CORRECTIONS Final Report, Oct. 1980 - Aug. 1981
Karl Kneile AEDC Dec. 1981 22 p
(AD-A108805; AEDC-TR-81-22) Avail: NTIS HC A02/MF A01 CSCL 12/1

Descretization of fluid flow equations results in a structured banded system of equations. Interative methods used to solve such a system transfer information rapidly between neighboring points but exhibit slow global communication when the system is large. This phenomenon results in a slow convergence with the asymptotic stages showing a spatially smooth behavior for the errors, iterative corrections, and residuals. This smooth behavior is exploited by approximating the error and corrections with an interpolation over a selected subset of the grid. A variational form is used to compress the original system of equations into a smaller system. This compression is repeated through several levels of grid sizes to obtain a dramatic improvement in convergence rate. A relaxation parameter is dynamically calculated at each step with a negligible increase in computational effort. Although the method was developed for solving full potential flow using a variational principle, it is applicable to other problems with the structured banded property. Author (GRA)

N82-19913# University of Southern California, Los Angeles. Electronic Sciences Lab.
SYNCHRONIZATION PATTERNS AND RELATED PROBLEMS IN COMBINATORIAL ANALYSIS AND GRAPH THEORY
Herbert Taylor Jun. 1981 100 p refs
(Contract N00014-80-C-0745)
(AD-A108888; USCEE-509) Avail: NTIS HC A05/MF A01 CSCL 12/1

Several theorems about graphs and their application are discussed. General topics include: odd path sums in an edge-labeled tree; counting induced subgraphs; choosability in graphs; the M-pire problem; and two dimensional synchronization patterns for minimum ambiquity. M.G.

N82-19914# Harvard Univ., Cambridge, Mass. Computation Lab.
K-CONNECTIVITY IN RANDOM UNDIRECTED GRAPHS
John H. Reif and Paul G. Spirakis 1981 19 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A108826; TR-19-81) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper concerns vertex connectivity in random graphs. We present results bounding the cardinality of the biggest k-block in random graphs of the G sub n,p model, for any constant value of k. These results generalize those of (Erdos, Renyi, 60) and (Karp, Tarjan, 80) for k = 1 and 2. We furthermore prove here that the cardinality of the biggest k-block is > or = n-logn with probability > or = 1/n-squared for p > or = c1(k)/n and c1(k) > k + 2. We also show that if p > or = c(k)(logn)/n with c(k) > 32 k-squared then the graph G sub n,p is k-connected with probability > or = 1-2n to the -d'(k) power, d'(k) > 1. GRA

N82-19915# Harvard Univ., Cambridge, Mass. Computation Lab.
STRONG K-CONNECTIVITY IN DIGRAPHS AND RANDOM DIGRAPHS
John H. Reif and Paul G. Spirakis Oct. 1981 31 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A109034; TR-25-81) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper concerns an extension of the strong connectivity notion in directed graphs. A digraph D is k-strongly connected if, for each x,y vertices of D, there exist > or = k vertex disjoint paths from x to y and also > or = k vertex disjoint paths from y to x. A k-strong block of a digraph D is a maximal k-strongly connected subgraph of D. We show here how many results about the k-blocks in undirected graphs extend to k-strong blocks in digraphs. (Separation lemma, overlapping of k-strong blocks, number of them.) We prove, for example, that the maximum number of k-strong blocks for all k > or = 1 in any n-vertex graph is ((2n-1)/3). We also prove that two k-strong blocks cannot have more than k-1 vertices in common. We furthermore present results bounding the cardinality of the biggest k-strong block in random digraphs of the D(n,p) model. This work generalizes previous work on random undirected graphs. GRA

N82-19916# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

ROTATIONALLY SYMMETRIC OPERATORS FOR SURFACE INTERPOLATION

Michael Brady and Berthold K. P. Horn Nov. 1981 38 p refs
(Contract N00014-80-C-0505)
(AD-A109032; AI-M-654) Avail: NTIS HC A03/MF A01 CSCL 12/1

The use of rotationally symmetric operators in vision is reviewed and conditions for rotational symmetry are derived for linear and quadratic forms in the first and second partial directional derivatives of a function f(x, y). Surface interpolation is considered to be the process of computing the most conservative solution consistent with boundary conditions. The 'most conservative' solution is modelled using the calculus of variations to find the minimum function that satisfies a given performance index. To guarantee the existence of a minimum function, Grimson has recently suggested that the performance index should be a seminorm. It is shown that all quadratic forms in the second partial derivatives of the surface satisfy this criterion. The seminorms that are, in addition, rotationally symmetric form a vector space whose basis is the square Laplacian and the quadratic variation. Whereas both seminorms give rise to the same Euler condition in the interior, the quadratic variation offers the tighter constraint at the boundary and is to be preferred for surface interpolation. Author (GRA)

N82-19917# Naval Postgraduate School, Monterey, Calif.

COMPUTATIONAL ADVANCES IN LARGE-SCALE NONLINEAR OPTIMIZATION M.S. Thesis

Dennis Ross Dean Sep. 1981 135 p refs
(AD-A109528) Avail: NTIS HC A07/MF A01 CSCL 12/1

This is a comparison of two state-of-the-art large-scale nonlinear optimization systems exhibiting unprecedented problem solution capabilities both in size of problem handled and method of solution. These codes are MINOS, developed by B.A. Murtagh and M.A. Saunders, and XS, developed by G. G. Brown and G. W. Graves. The codes are evaluated with respect to their problem solving capabilities and potential for practical application by analysts. Computational results are presented for thirteen nonlinear and nonlinear mixed integer test problems with from two to 793 variables (12 to 100 integer variables) and one to 401 constraints. Portions of this work were presented at the CORS/ORSA/TIMS joint meeting in Toronto, May 1981. Author (GRA)

N82-19918# Kaiserslautern Univ. (West Germany). Fachbereich Mathematik.

ALGORITHM FOR THE CALCULATION OF THE LARGEST INTEGER IN THE SQUARE ROOT OF A NATURAL NUMBER [EIN ALGORITHMUS ZUR BERECHNUNG DER GROESSTEN GANZEN AUS WURZEL D]

Heinz Lueneburg 1980 6 p ref In GERMAN
(Preprint-11) Avail: NTIS HC A02/MF A01

The preparation of algorithms to calculate the square root of a natural number (d) for a computer program is outlined. The total of the first-n odd number equals n-square. The PASCAL program calculates (square root-d) for d Epsilon N. Different auxiliary theorems are demonstrated to calculate square root-d. It is concluded that the instructions for the repeat curve of this program are more complicated than the instructions for the while curve of the first program in which the number of steps is much smaller, and the total gain is considerable. Transl. by E.A.K.

N82-19919# Loughborough Univ. of Technology (England). Dept of Mathematics.

ON PYTHAGOREAN TRIANGLES AND COPRIME LATTICE POINTS

P. Shiu Oct. 1980 16 p ref
(MATHS-Res-154) Avail: NTIS HC A02/MF A01

Topics in number theory are discussed. By a Pythagorean triangle, a triangle with coprime positive integer sides X, Y, Z, satisfying X squared + y squared = z squared, is meant. For N > or = 1, F(N) denotes the number of Pythagorean triangles that have hypotenuse N. By a lattice point (X, Y), a point with integer coordinates X, Y is meant. If X, Y are nonzero coprime integers, then (X, Y) is a coprime lattice point. The number of ways of writing N as a sum of two squares of integers, or the number of lattice points on the circle a squared + b squared = N, is set. For N > or = 1, let F(N) = the summation, for 1 < or = N < or = N, of F(N). A heuristic argument, then a formal proof, which show that F(N) has the average value 1/pi and that F(N) is zero for almost all N, are given. More precisely, the theorem that as N tends to infinity, F(N) = (N/pi) + 0 (square root of N) is developed. Author (ESA)

N82-19920# Loughborough Univ. of Technology (England).

A VARIABLE METRIC METHOD USING A NON-QUADRATIC MODEL

A. Tassopoulos and C. Storey Jun. 1981 17 p refs
(MATHS-Res-158) Avail: NTIS HC A02/MF A01

The problem of finding an unconstrained local minimizer X of a continuously differentiable function F(X) with X an element of R sup N is dealt with. A model for the variable metric method is proposed and tested, using an updating formula that generates a sequence (brackets X sub K), K = 0, 1, 2, ... of approximations to a local minimizer of F(X). Finite termination can be proved for the variable metric method, using the proposed model and applied to several standard test functions of different dimensionality. Numerical results show that the proposed model behaves as efficiently as the currently used model in general and is more efficient for problems of higher dimensionality. Author (ESA)

N82-19921# Royal Inst. of Tech., Stockholm (Sweden). Inst. foer Haallfasthetslaera.

CALCULATION OF EQUIVALENT FORCES AT NODES. SOME EXAMPLES IN ACTUAL PRACTICE FOR CALCULATIONS WITH THE FEM METHOD [ALLOKERING AV NODKRAFTER. NAAGRA PRAKTISKA EXEMPEL FOER BERAEKNING MED FEM]

Kjell Eriksson 1980 59 p ref In SWEDISH
(KTH-Publ-212) Avail: NTIS HC A04/MF A01

The finite element method is introduced and its use in calculating discrete forces, e.g. distributed loads found in constructions such as frames, is outlined. Basic functional analysis theory is presented along with coordinate transformation calculation from local to global coordinates. Twenty-six equivalent force calculations are given, including rectangular, trapezoidal, triangular, and nonsymmetric curved edge structures. The variable load problem is also discussed. Author (ESA)

N82-19922# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

SPINOR GENERA OF ORDERS AND QUADRATIC FORMS

J. Brzezinski 1981 38 p refs
(CTH-Math-1981-20) Avail: NTIS HC A03/MF A01

A group of spinor genera of orders in central simple algebras over fields of quotients of Dedekind rings is defined and computed in particular cases. As an application to the theory of integral quadratic forms, a necessary and sufficient condition is given for a genus of ternary semi-Bass quadratic forms to consist of only one spinor genus. As a consequence of this, a generalization of classical results about genera of indefinite ternary quadratic forms, consisting of only one class, is obtained. Author (ESA)

N82-19923# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

APPLICATIONS OF A GENERAL COMPARISON THEORY

FOR CONVOLUTION INTEGRALS
Joergen Loefstroem 1981 41 p refs
(CTH-Math-1981-21) Avail: NTIS HC A03/MF A01

Some Tauberian theorems with applications to approximation theory are extended. Let X be a Banach space and B a Banach algebra of tempered distributions on R sup d. For F belongs to B put F sub (lambda) (x) = (lambda sup d) F (lambda X). The space of all test functions such that (double modulus F sub (lambda) * test function; Omega) sub X = the convolution integral of (lambda to the minus s power) as lambda tends to infinity is characterized when Omega is all of R sup d or a bounded subset of R sup d. The proofs are based on the Shapiro comparison theorem. Author (ESA)

N82-19924# Sheffield Univ. (England). Dept. of Control Engineering.
NORM BOUNDS FOR LINEAR SYSTEMS USING STEP RESPONSE DATA
D. H. Owens and A. Chotai Sep. 1981 24 p refs
(Contract SERC-GR/B/23250)
(RR-159) Avail: NTIS HC A02/MF A01

Norms for operators which pertain to the stability and approximation theory of linear and nonlinear systems are considered. How certain induced operator norms can be bounded for continuous and discrete systems, using plant step response data only, is described. For continuous systems, a stable m-output/l-input, linear time-invariant system is associated with a mapping L of the Banach space C sup l (zero, infinity) of bounded continuous mappings. The mapping L is represented by a convolution integral equation. The approach taken is to reduce the evaluation of the double modulus of L to the evaluation of single-input/single-output systems. To do this, the system is decomposed into a l-input/single-output stable system. Relations between the norms are identified and proven, relating the norm of L to the impulse response matrix H(+). Given the impulse response data H(+) and D, the double modulus of L can be computed, or bounded. The result shows that only a countable (r [illegible], in many cases, finite) amount of step response data is needed to evaluate the double modulus of L. The results carry over with little change to the analysis of a stable, l-input/m-output, linear, time-invariant discrete system. Examples are given. Author (ESA)

N82-19925# Sheffield Univ. (England). Dept. of Control Engineering.
ON THE COMPENSATION OF OPTIMAL SYSTEM ASYMPTOTIC ROOT-LOCI
D. H. Owens Nov. 1981 11 p refs Revised Previously announced as RR-101
(Contract SERC-GR/B/79455)
(RR-163; RR-101) Avail: NTIS HC A02/MF A01

A procedure for manipulating the free parameters of the asymptotes of the optimal closed-loop poles of a time invariant linear regulator as the weight of the input in the performance criterion approaches zero by suitable choice of weighting matrices Q and R is described. A systematic method for choosing Q and/or R in order to produce arbitrary, specified values of the parameters lambda sub jr, l < or = r < or = d sub j, l < or = j < or = q is indicated. A duality between Q and R is outlined and used to reduce the problem to that of developing procedures for the choice of R. Results are presented as an algorithm. The choice of Q and R such that they produce specified values for the free parameters of the system asymptotes, is achieved, but the choice of lamboa sub jr can not be achieved theoretically. Author (ESA)

N82-19926# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Automatisierung.
CONTOUR RECOGNITION AND MEASUREMENTS USING FOURIER TRANSFORMATION
Klaus Artner Sep. 1981 34 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-745)
(DFVLR-Mitt-81-22; ESA-TT-745) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 8,80

By means of Fourier transformation, a number of features characterizing a given contour are derived, called Fourier descriptors, and which by their invariance to translation, rotation and size, are particularly suited for contour recognition such as required in TV tracking systems. The descriptors are shown to be unique, insensitive to random contour errors and to represent complex contours by few complex numbers. Formulas for contour measurement and for numerical Fourier transformation of line scanned contours are given. The properties of the proposed method are illustrated in several examples. Author (ESA)

N82-20137# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
TWO-STEP IMPLICIT SCHEMES FOR THE SOLUTION OF A CONSERVATION EQUATION
H. Hollanders and R. Peyret *In its* La Rech. Aerospatiale. Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 61-67 refs Transl. into ENGLISH of La Rech. Aerospatiale Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 287-294 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-19927# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SELECTION OF ATTRIBUTES APPLIED TO MULTISPECTRAL IMAGES [SELECAO DE ATRIBUTOS APLICADA A IMAGENS MULTISPECTRAIS]
Fernando A. Mitsuo Ii Jan. 1982 92 p refs In PORTUGUESE; ENGLISH summary
(INPE-2303-TDL/072) Avail: NTIS HC A05/MF A01

Classes of Gaussian distribution are defined, given a multispectral scene of 12 channels. The best channels for separating classes are identified using the J-M distance criterion. The quantitative analysis of these interclass separations is also discussed. M.G.

N82-19928# Purdue Univ., Lafayette, Ind. Dept. of Statistics.
ON A LOCALLY OPTIMAL PROCEDURE BASED ON RANKS FOR COMPARISON OF TREATMENTS WITH A CONTROL
Deng-Yuan Huang and S. Panchapakesan Jul. 1981 10 p refs
(Contract N00014-75-C-0455)
(AD-A109283; MMS-81-30) Avail: NTIS HC A02/MF A01 CSCL 12/1

Let Phi sub 1,...,Phi sub k be independent populations representing k experimental treatments and let Phi sub O be the control treatment. Let f(x,Theta sub i denote the density of Phi sub i, i=O,1,...,k, satisfying certain regularity conditions. Any population Phi sub i is said to be superior to the control if Theta sub i > Theta sub O, and inferior otherwise. We assume that the value of Theta sub O is unknown but a good upper bound Theta sub O* is known. We are interested in selecting a subset (possibly empty) of the k experimental treatments consisting of the ones that are superior to the control. Though the functional form of f(x,Theta) is assumed to be known, we derive a procedure based on ranks in view of the usual considerations of robustness against possible deviations from the model. In deriving the rule, we control the error probabilities and maximize the ability to detect a superior population in a certain local sense. The rule is based on the ranks of the obvservations in a pooled sample of (k+1)n (n from each population) observations. In the special case of logistic density, this rule is expressed in terms of the rank-sum statistics. Author (GRA)

N82-19929# Naval Ocean Systems Center, San Diego, Calif.
ASYMPTOTIC NORMALITY OF AUTOREGRESSIVE PARAMETER ESTIMATES FOR MIXED TIME SERIES
D. F. Gingras Sep. 1981 16 p refs
(AD-A108781; NOSC/TR-733) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this report it is shown for mixed time series, a series

generated by an autoregressive moving-average (ARMA) process or by an autoregressive process observed in additive white noise (AR+N), that estimates of the autogressive (AR) parameters are asymptotically multivariate jointly normal with zero mean and finite covariance matrix. The structure of the asymptotic covariance matrix is evaluated for both types of mixed time series.
Author (GRA)

N82-19930# Tennessee Univ., Knoxville. Dept. of Psychology.
ESTIMATION OF THE OPERATING CHARACTERISTICS WHEN THE TEST INFORMATION OF THE OLD TEST IS NOT CONSTANT. 2: SIMPLE SUM PROCEDURE OF THE CONDITIONAL P.D.F. APPROACH/NORMAL APPROACH METHOD USING THREE SUBTESTS OF THE COLD TEST, NUMBER 2
Fumiko Samejima Jul. 1981 136 p refs
(Contract N00014-77-C-0360)
(AD-A109112; RR-81-2) Avail: NTIS HC A07/MF A01 CSCL 12/1

This is a continuation of a previous study reported as RR-80-4, 'Estimation of the Operating Characteristics When the Test Information of the Old Test Is Not Constant II: Simple Sum Procedure of the Conditional P.D.F. Approach/Normal Approach Method Using Three Subtests of the Old Test'. In that study, a new method of estimating the operating characteristics of discrete item responses based upon an Old Test, which has a non-constant test information function, was tested upon each of two subtests of the original Old Test, Subtests 1 and 2. The results turned out to be quite successful. In the present study, Subtest 3, which contains as small a number of test items as fifteen, was used as the Old Test. Unlike the previous study, we have an additional challenge of handling negative and positive infinities of the maximum likelihood estimate obtained upon Subtest 3.
Author (GRA)

N82-19931# Harvard Univ., Cambridge, Mass. Computation Lab.
RANDOM INDEPENDENCE SYSTEMS
John H. Reif and Paul G. Spirakis Nov. 1981 26 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A109046; TR-32-81) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report introduces a new random structure generalizing matroids. These random independence systems allow us to develop general techniques for solving hard combinatorial optimization problems with random inputs. GRA

N82-19932# Harvard Univ., Cambridge, Mass. Computation Lab.
PROBABILISTIC ANALYSIS OF RANDOM EXTENSION-ROTATION ALGORITHMS
John H. Reif and Paul G. Spirakis Oct. 1981 55 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A109035; TR-28-81) Avail: NTIS HC A04/MF A01 CSCL 12/1

We introduce a new random structure generalizing matroids. The random independence systems (RIS) allow us to develop general techniques for solving hard combinatorial optimization problems with random inputs. We describe a randomized algorithm for efficiently constructing an independent set of fixed size in an instance of a random independence system. We provide a general method of analysis of the performance of this algorithm, which allows us to derive bounds on the mean, variance and all the moments of the time complexity of the algorithm.
Author (GRA)

N82-19933# Loughborough Univ. of Technology (England).
A K-SAMPLE EXTENSION OF TUKEY'S 2-SAMPLE QUICK TEST
E. Ioannou Oct. 1981 24 p refs
(MATHS-Res-159) Avail: NTIS HC A02/MF A01

Exact null and asymptotic null distributions of the test statistic are derived; tables of critical values and tail probabilities are presented. A Monte Carlo study, comparing the power of the test with other K-sample tests, is also included. The performance of the test is evaluated and its treatment of ties is discussed. The main advantage of the quick test is that it does not involve the tedious arithmetic usually necessary in parametric tests nor the ranging of all the data as required by most nonparametric tests.
Author (ESA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-19934 International Institute for Applied Systems Analysis, Laxenburg (Austria).
SHARING COSTS FAIRLY: A PRACTICAL INTRODUCTION TO COOPERATIVE GAME THEORY
H. Peyton Young, N. Okada, and T. Hashimoto Sep. 1981 33 p ref
(ER-5) Copyright. Avail: Issuing Activity

Traditional methods of allocating costs of water facilities are compared with more recently developed methods, involving game theory, in order to show how these methods work in actual use and to give a pratical introduction to game theory. The problem of sharing the costs of a joint water supply facility between cities is explained. Eight ways of dealing with this problem are outlined and evaluated. Popular game theory methods of cost allocation have significant advantages over naive methods. However, in actual applications, it may be unrealistic to expect the kind of information and technical understanding that game theory requires. There are cases where using a single numerical criterion for costing, such as apportioning costs by population or by demand, are preferable to more complicated methods.
Author (ESA)

N82-19935# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A MODEL FOR DIMENSIONING A CORRECTIVE MAINTENANCE SYSTEM M.S. Thesis - 17 Nov. 1980 [UM MODELO PARA DIMENSIONAMENTO DE UM SISTEMA DE MANUTENCAO CORRETIVA]
Fernando Manoel Athayde Reis Sep. 1981 208 p refs In PORTUGUESE; ENGLISH summary
(INPE-2233-TDL/064) Avail: NTIS HC A10/ A01

The design of an auxiliary tool to be used in systems planning, the objective of which is to maintain other systems, is discussed. The planner's task may be defined as the minimization of the relationship between the total cost of the maintenance system and the operating system availability, subjected to the restrictions of minimal acceptable availability and reliability for the operating system and a given budget. A simulation model is developed; interactions between the two systems and component supply are observed. The maintenance and repair tasks are reproduced. The simulation output consists of estimates for availability, total cost, and other statistics. This output allows the planner to evaluate changes in the objective function caused by variations in the maintenance system parameters. M.G.

N82-19936# Harvard Univ., Cambridge, Mass. Computation Lab.
SYMMETRIC COMPLEMENTATION, REVISION
John H. Reif 1981 47 p refs
(Contract N00014-80-C-0647; Grant NSF MCS-79-21024)
(AD-A108823; TR-07-81-Rev) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper introduces a class of 1 player games of perfect information, which we call complementing games; the player is allowed moves which complement the value of successive plays. A complementing game is symmetric if all noncomplement moves are reversible (i.e., form a symmetric relation). These games are naturally related to a class of machines we call symmetric complementing machines. Symmetric nondeterministic machines were studied in (Lewis and Papadimitriou, 801): they are identical to our symmetric complementing machines with complement moves allowed only on termination. (A companion paper to appear will describe the computational complexity of symmetric complementing and alternating machines.) Of particular interest is the complexity class Sum *CSYMLOG, which contains the outcome problem of symmetric complementing games with constant complement bound with game positions encoded in log space, and next move relations computable in log space. We show that the decision problem for a restricted quantified Boolean logic Sum *QBF sum is complete in Sum *CSYMLOG. We also show that Sum *CSYMLOG contains many well-known and common combinatorial problems: minimum spanning forests; k-connectivity and k-connected components, and also the recognition problems for many classes of graphs: planar graphs of valence 3; chordal graphs; comparability graphs; interval graphs; split graphs, and permutation graphs. GRA

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-19937 New Mexico State Univ., Las Cruces.
STANDARD CONSTRUCTIONS IN ABELIAN GROUP THEORY Ph.D. Thesis
Anthony John Giovannitti 1981 107 p
Avail: Univ. Microfilms Order No. 8129387

The use of standard constructions in abelian group theory is examined. The definition of exactness in abelian categories is extended to pointed categories in a manner that does not lose the desirable properties of exactness. Properties of standard constructions on preabelian categories are explored and the properties needed to guarantee that the class of sequences exactly relative to a cotriple or triple, respectively, forms a proper class are specified. This is done by first showing that the intersection of the class of stable exact sequences and the class of sequences exactly relative to a standard construction is a proper class. Theorems generalizing some of the results for preabelian categories are presented. Several examples are given of standard constructions in categories that have proven important in abelian group theory. They by no means exhaust the known examples, but are meant to give some indication of the use of the theory developed here. Dissert. Abstr.

N82-19938# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
ON THE UNIFORM BOUNDEDNESS OF A FAMILY OF MATRICES AND THE APPLICATIONS TO ONE-LEG AND LINEAR MULTISTEP METHODS
Germund Dahlquist, Huang Mingyou, and Randall LeVeque (Stanford Univ., California) 1981 14 p refs Sponsored by People's Republic of China's Ministry of Education, Swedish Natural Research Council and NSF
(TRITA-NA-8101) Avail: NTIS HC A02/MF A01

In applications of multistep methods to stiff systems, e.g., to partial differential equations by the method of lines, the uniformity of the stability results obtained by analysis of the scalar linear test equation y' = lambda y with respect to the parameter q = lambda h is questioned. Results of this type are easily obtained by contractivity analysis. A simple proof of a complete answer to this question is found by proving a more general result through the use of the resolvent criterion of Kreiss. Let F be a set of matrices of bounded order with the properties: (1) individual power-boundedness, i.e., for each A belonging to F, m(A) is congruent to sup N (double modulus (A sup N) < infinity for N = 1,2...; (2) A belongs to F has no multiple eigenvalue of unit modulus; and (3) F is closed and bounded. Then F is uniformly power-bounded in the sense that there is a finite constant (m vector product) such that m(A) < or = (M vector product), for any A belonging to F. Author (ESA)

N82-19939# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
COURSE-OF-VALUES RECURSION ON LISTS IN INTUITIONIST TYPE THEORY
Jan Smith Sep. 1981 26 p refs
(CTH-Math-1981-19) Avail: NTIS HC A03/MF A01

A formalization of constructive analysis, intuitionist type theory, is considered for use as a programming language. In intuitionist type theory only primitive recursion is allowed. Since general recursion is extensively used in functional programming, alternative methods of constructing programs must be developed for type theory. It is shown how to reduce a useful scheme of course-of-values recursion on lists to primitive recursion, using a higher-order function. As an example, the method is used to construct a program in type theory for the sorting algorithm QUICKSORT. Author (ESA)

N82-19940# Sheffield Univ. (England). Dept. of Control Engineering.
VARIABLE STRUCTURE SYSTEMS AND SYSTEM ZEROS
O. M. E. El-Ghezawi, S. A. Billings, and A. S. I. Zinober Sep. 1981 15 p refs
(RR-157) Avail: NTIS HC A02/MF A01

Variable structure system (VSS) theory is used to derive a method for computing the zeros of a linear, time invariant multivariable system. The system zeros are the eigenvalues of a reduced order matrix which arises naturally in VSS design. The properties of the algorithm are investigated by decomposing the state space. The algorithm proves valuable when determining the state and input zero directions since the calculation of the (n+m) dimensional null space of system matrix P(s) is avoided. The algorithm is computationally fast and easy to implement. Author (ESA)

N82-19941# Sheffield Univ. (England). Dept. of Control Engineering.
EXPANSION OF LINEAR AND SEMI-LINEAR SYSTEMS AND THE POPOV CRITERION
S. P. Banks Oct. 1981 30 p refs
(RR-158) Avail: NTIS HC A03/MF A01

The extension of linear systems in order to reveal properties which are not apparent in the contracted form is introduced. The extension of the state vectors for a linear system leads to a definition of generalized extensions via expansive resolutions. The concept is widened in order to include semilinear systems, where Anderson's generalization of the Popov criterion can be extended by removing the condition that the complete linear part generates the positive real matrix pi sub o(s), and replacing it by the weaker condition that diagonal submatrices of the extended linear part have corresponding real matrices pi sub o sup i(s). Author (ESA)

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-19942# Technische Hogeschool, Delft (Netherlands).
SOME APPLICATIONS OF THE PERTURBED DIRECTIONAL CORRELATION TECHNIQUE IN NUCLEAR PHYSICS, SOLID STATE PHYSICS AND RADIO CHEMISTRY Ph.D. Thesis
Robert Wilhelmus Hollander 11 Mar. 1981 174 p refs
(ISBN-90-6231-084-2) Avail: NTIS HC A08/MF A01

The 'perturbed directional correlation technique' for nuclear physics experiments is the linking factor of the described experiments, which differ considerably in subject. The interaction between magnetic dipole and electric quadrupole moments of excited nuclear states and 'perturbing' extranuclear magnetic fields and electric field gradients are used in order to extract nuclear information, if the perturbing fields are known, or to obtain informaion about the external fields, if the relevant nuclear properties are known. The measuring technique is the same for the different experiments, however, the experiment set-ups are not. Some aspects of a set-up for the determination of the nuclear g factor of short lived nuclear states are described. S.L.

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-19943*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
USER'S GUIDE TO NOISE DATA ACQUISITION AND ANALYSIS PROGRAMS FOR HP9845: NICOLET ANALYZERS

Michael C McGary Feb 1982 40 p refs
(NASA-TM-83256) Avail NTIS HC A03/MF A01 CSCL 20A

A software interface package was written for use with a desktop computer and two models of single channel Fast Fourier analyzers This software features a portable measurement and analysis system with several options Two types of interface hardware can alternately be used in conjunction with the software. Either an IEEE-488 Bus interface or a 16-bit parallel system may be used Two types of storage medium, either tape cartridge or floppy disc can be used with the software. Five types of data may be stored, plotted, and/or printed. The data types include time histories, narrow band power spectra, and narrow band, one-third octave band, or octave band sound pressure level. The data acquisition programming includes a front panel remote control option for the FFT analyzers. Data analysis options include choice of line type and pen color for plotting A.R.H.

N82-19944*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF FACILITY VARIATION ON THE ACOUSTIC CHARACTERISTICS OF THREE SINGLE STREAM NOZZLES
Orlando A. Gutierrez 1980 38 p refs Presented at the 100th Meeting of the Acoust Soc of Am., Los Angeles, 17-21 Nov 1980
(NASA-TM-81635; E-646) Avail: NTIS HC A03/MF A01 CSCL 20A

The characteristics of the jet noise produced by three single stream nozzles were investigated statistically at the NASA-Lewis Research Center outdoor jet acoustic facility. The nozzles consisted of a 7.6 cm diameter convergent conical, a 10.2 cm diameter convergent conical and an 8-lobe daisy nozzle with 7.6 cm equivalent diameter flow area. The same nozzles were tested previously at cold flow conditions in other facilities such as the Royal Aircraft Establishment (RAE) 7.3 m acoustic wind tunnel. The acoustic experiments at NASA covered pressure ratios from 1.4 to 2.5 at total temperatures of 811 K and ambient. The data obtained with four different microphone arrays are compared. The results are also compared with data taken at the RAE facility and with a NASA prediction procedure. Author

N82-19945# National Aerospace Lab., Tokyo (Japan). Noise and Emission Research Group.
AERODYNAMIC NOISE GENERATED BY JET WING/FLAP INTERACTIONS OF THE EXTERNAL USB CONFIGURATION OF STOL AIRCRAFT. PART 2: FULL SCALE MODEL EXPERIMENT USING FJR710 TURBOFAN ENGINE
Masataka Maita, Shigemi Shindo, Shin Nakayama, Masakatsu Matsuki, Tadao Torisaki, Mitsuo Morita, Akira Yoshida, Katsumi Takeda, Shizuo Sekine, and Hiroshi Kondo Oct 1981 26 p refs
(NAL-TR-687T-Pt-2; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

Acoustic characteristics of the external upper surface blowing (USB) concept of a propulsive lift configuration were studied by full scale model static experiments. Test components included an FJR710 turbofan engine with an acoustically treated nacelle and a USB wing/flap assembly. These were utilized in conjunction with the ground verification testing of the propulsive systems of the National Aerospace Laboratory Quiet STOL Research Aircraft. Results were compared with the previous 8% scale cold flow model data. The defect of shielding provided by the wing/flap surface on aftradiated turbofan engine noise was studied and some attempts were made to reduce USB noise. Author

N82-19946*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AIRCRAFT NOISE PREDICTION PROGRAM THEORETICAL MANUAL, PART 1
William E. Zorumski Feb. 1982 180 p refs 2 Vol.
(NASA-TM-83199-Pt-1; L-14805-Pt-1) Avail: NTIS HC A09/MF A01 CSCL 20A

Aircraft noise prediction theoretical methods are given. The prediction of data which affect noise generation and propagation is addressed. These data include the aircraft flight dynamics, the source noise parameters, and the propagation effects. R.J.F.

N82-19947*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AIRCRAFT NOISE PREDICTION PROGRAM THEORETICAL MANUAL, PART 2
William E. Zorumski Feb. 1982 296 p refs 2 Vol.
(NASA-TM-83199-Pt-2; L-14805-Pt-2) Avail: NTIS HC A13/MF A01 CSCL 20A

Detailed prediction methods for specific aircraft noise sources are given. These sources are airframe noise, combustion noise, fan noise, single and dual stream jet noise, and turbine noise. Modifications to the NASA methods which comply with the International Civil Aviation Organization standard method for aircraft noise prediction are given. R.J.F.

N82-19948# Stanford Univ., Calif.
ACOUSTIC MICROSCOPY AT CRYOGENIC TEMPERATURES Annual Summary Report, 1 Jul. 1980 - 30 Jun. 1981
C. F. Quate and J. Heiserman Nov. 1981 13 p refs
(Contract N00014-77-C-0412; NR Proj. 384-924)
(AD-A109271; SU-GL-3369) Avail: NTIS HC A02/MF A01 CSCL 20/1

This report summarizes our progress in a research program devoted to high resolution acoustic microscopy and cryogenic temperatures. During the past year we have studied the acoustic properties of two cryogenic fluids - liquid argon and liquid 4He below the temperature of 0.5 degrees K. In argon we have determined that nonlinear effects provide us with a dramatic increase in resolving power for focused acoustic beams. In liquid helium we have measured the attenuation versus temperature of sound at 1 GHz where the wavelength is less than 2500 A. The predicted behavior below 0.5 degrees K where the attenuation varies as the fourth power of temperature is confirmed for the first time at these small wavelengths. It gives us further confidence in our program to realize an instrument that will permit us to examine our specimens with an acoustic probe that is less than 1000 A in diameter. GRA

N82-19949# Naval Research Lab., Washington, D. C. Acoustics Div.
SPHERICAL ACOUSTIC BROADBAND RECEIVER Final Report, Fiscal Year 1981
W. James Trott 16 Dec. 1981 42 p refs
(AD-A109273; NRL-MR-4633) Avail: NTIS HC A03/MF A01 CSCL 17/1

The development of a hydrophone array for determining signal bearing in three dimensions is described in theory and experiment. The array of omnidirectional elements, on a spherical surface is shaded in amplitude to produce a frequency-independent directional response. Design of omnidirectional elements is discussed. Author (GRA)

N82-19950# Defence Research Establishment Valcartier (Quebec).
ALGORITHMS FOR TRACKING A SOUND SOURCE USING FREQUENCY AND BEARINGS
C. Kent Sep. 1981 66 p refs
(AD-A109276; DREV-R-4199/81) Avail: NTIS HC A04/MF A01 CSCL 20/1

This report develops some of the analytical support for algorithms designed to permit one or more mobile searchers to track a sound source moving in a straight line. The searchers measure bearing and received frequency to infer range, the true frequency and velocity components. The measurements of bearing and frequency are subject to random errors.
Author (GRA)

N82-19951# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
A FINITE ELEMENT METHOD FOR COMPUTING SOUND PROPAGATION IN DUCTS CONTAINING FLOW Final Technical Report, Dec. 1975 - May 1981
Dennis W. Quinn Sep. 1981 31 p refs
(AD-A108836; AFWAL-TR-81-3087) Avail: NTIS HC A03/MF A01 CSCL 20/1

Solutions for equations which describe sound propagation in nonuniform ducts containing flow are computed with a finite element approach. A least squares approach is considered and compared to a Galerkin approach. The least squares problem is solved using an iterative method and compared with results obtained using direct Gaussian elimination. The accuracy of linear basis functions on triangles, bilinear basis functions on rectangles, and biquadratic basis functions on rectangles are compared. The biquadratics permit good approximation of curved boundaries and better convergence than the bilinear basis functions. The finite element solution space consists of piecewise biquadratics defined on the finite element discretization of the geometry of the duct. Acoustic fields within uniform ducts both with and without flow were computed. For nonuniform ducts without flow, the computed acoustic fields also compare well with exact or other computed solutions. For the case of two-dimensional flow within nonuniform ducts, sample calculations favorably compare with other solutions or limiting cases. GRA

N82-19952# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
ACOUSTIC MEASUREMENTS OF F100-PW-100 ENGINE OPERATING IN HUSH HOUSE NSN 4920-02-070-2721 Final Report, May - Sep. 1981
Vincent R. Miller, G. A. Plzak, and J. M. Chinn Sep. 1981 58 p refs
(AD-A108814; AFWAL-TM-81-133-FIBE) Avail: NTIS HC A04/MF A01 CSCL 20/1

The purpose of this test program was to measure the acoustic environment in the hush house facility located at Kelly AFB Texas during operation of the F100-PW-100 engine to ensure that engine structural acoustic design limits were not exceeded. The acoustic measurements showed that no sonic fatigue problems are anticipated with the F100-PW-100 engine structure during operation in the hush house. The measured acoustic levels were less than those measured in an existing F100-PW-100 engine wet-cooled noise suppressor, but were increased over that measured during operation on an open test stand. It was recommended that the acoustic load increases measured in this program should be specified in the structural design criteria for engines which will be subjected to hush house operation or defining requirements for associated equipment. Author (GRA)

N82-19953# TRW Defense and Space Systems Group, Redondo Beach, Calif.
INVESTIGATION OF SHALLOW BULK ACOUSTIC WAVES Final Report, 1 Oct. 1978 - 19 Sep. 1981
K. H. Yen, R. S. Kagiwada, K. F. Lau, and R. B. Stokes 12 Nov. 1981 53 p refs
(Contract DAAG26-78-C-0043)
(AD-A109028; ARO-15367.7-EL) Avail: NTIS HC A04/MF A01 CSCL 20/1

This final report summarizes the most important results of the Investigation of Shallow Bulk Acoustic Waves (SBAW) program. This program was conceived on the principle that SBAW technology could lead to devices that are superior to those presently available for frequency filtering and control. The primary objective was to establish whether this technology could provide devices that were as stable as the low frequency bulk wave resonators and yet operate at frequencies higher than the surface acoustic wave devices. The investigations have shown that SBAW devices can be built with excellent temperature stability, low spurious modes and at frequencies higher than those of SAW devices and bulk wave resonators. GRA

N82-19954# Aeritalia S.p.A., Naples (Italy). Acoustics Group.
GUIDELINES FOR THE DESIGN OF INHERENTLY QUIET AIRLOOPS FOR MANNED SPACECRAFT
Achille Carbone Paris ESA Dec. 1980 270 p refs
(Contract ESTEC-3840/79/NL-PP(SC))
(ACUN-8006; ESA-CR(P)-1477) Avail: NTIS HC A12/MF A01

Acoustic factors in spacecraft cabin design are treated. Criteria for setting interior noise requirements and the response of crew members to the noise environment experienced during missions are reviewed. Typical noise sources of environmental control systems, methods available for noise control, acoustical optimization of system and procedures for assessment of component target noise are presented. Fan noise and the techniques available for its reduction at source are analyzed with methods for prediction and testing. Noise generation caused by interaction of flow with system components, like valves, heat exchangers, and CO2 control assemblies, is addressed. The principles of noise transmission with air flow and in the structure are discussed. A procedure for duct lining design and attenuation prediction is given. Acoustic material impedance models and testing techniques for linings and reactive mufflers are presented. Principles underlying the application of antivibration mounts and of damping materials are outlined. Author (ESA)

N82-19955# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
DETECTION OF PERIODICALLY FLUCTUATING NOISE [DETEKTERING AV PERIODISKT FLUKTUERANDE BRUS]
A. Gjaerdman and L. Goetherstroem Jun. 1981 17 p refs In SWEDISH
(FOA-C-30223-E1) Avail: NTIS HC A02/MF A01

A method which identifies ships by their high frequency noise characteristics is presented. Noise modulated by the periodic cavitation from the propeller is analyzed after demodulation. The signal to noise ratio (S/N) is directly proportional to the quotient of the predetector filter bandwidth to the postdetector filter bandwidth, multiplied by the square of the degree of modulation for low S/N on the input side of the detector. Author (ESA)

N82-19956# Loughborough Univ. of Technology (England). Dept. of Transport Technology.
AN EXPERIMENTAL STUDY OF THE EFFECTS OF AN INLET FLOW CONDITIONER ON THE NOISE OF A LOW SPEED AXIAL FLOW FAN
J. Scoles and J. B. Ollerhead Jan. 1981 92 p refs
(Contract AT/2170/049/XR)
(TT-8101) Avail: NTIS HC A05/MF A01

The effects of inflow condition on the noise generated by a 40kW, 560mm diameter, seven blade ducted fan at speeds up to 5000rpm in an anechoic chamber were measured. A 1.25m diameter hemisperical honeycomb flow conditioner (HFC) which could be fitted with an internal gauze liner was used. Fan entry flow was measured by static and rotating hot-wire anemometers. Noise levels in the first few harmonics of blade passing frequency are very sensitive to inflow condition, but the HFC reduces them to a residual level independent of upstream disturbance levels. Broadband noise is reduced (by a smaller amount) at high blade angles and flow rates. No systematic effect of the gauze liner is detected. Experimental difficulties are caused by unsteadiness in the chamber airflow which causes harmonic level fluctuations with amplitudes of up to 10dB. Although the inlet flow conditioner reduces these fluctuations markedly, long term variations reduce confidence in the data. Author (ESA)

N82-19957# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abt. Technische Akustik.
NOISE MEASUREMENTS ON THE HELICOPTER BK 117 DESIGN. WEIGHTED NOISE LEVELS AND INFLUENCE OF AIRSPEED
Wolf R. Splettstoesser, Klaus P. Anders, and Karl-Heinz Spiegel Aug. 1981 93 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-748)
(DFVLR-Mitt-81-18) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 22,95

Noise measurements on the prototype helicopter BK 117 were performed in strict compliance with the proposed International Civil Aviation Organization regulations for noise certification of helicopters. Measurement procedure, noise data acquisition, analysis and reduction as well as applied correction procedures are described. Effective perceived noise levels (EPNL) and other noise descriptors were evaluated and related to the proposed noise limits. Additional level flyover tests with variable airspeed were conducted to investigate the resulting effect on the EPNL and other noise measures. Author (ESA)

N82-19958# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Technische Akustik.
COLLECTION AND EVALUATION OF PROPELLER AIRCRAFT NOISE CERTIFICATION DATA
Manfred Ahlswede and Klaus Peter Anders Aug. 1981 87 p refs In GERMAN; ENGLISH summary

(DFVLR-Mitt-81-20) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 25,20

More than 300 individual noise certification levels were measured for propeller driven airplanes up to 5700 kg takeoff weight and for powered gliders in accordance with the rules and regulations as set forth in International Civil Aviation Organization Annex 16. Information on the airplanes, the engines and the propellers is provided as well as on the prevailing meteorological parameters and the operational parameters together with acoustic data. Of the latter, the measured A-weighted levels with their 90% confidence limit are listed, the performance correction is given and the certification level as well as the noise-limit are provided. Data are evaluated by plotting the measured A-weighted levels versus the helical blade tip Mach number. Author (ESA)

N82-20135# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
SIMULATION USING COMPUTER-PILOTED POINT EXCITATIONS OF VIBRATIONS INDUCED ON A STRUCTURE BY AN ACOUSTIC ENVIRONMENT
P. Monteil *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 43-49 Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 267-273 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-19959 Texas A&M Univ., College Station.
THE EVALUATION OF CHARGE TRANSFER MATRIX ELEMENTS IN LIGHT ION COLLISIONS WITH NON-RELATIVISTIC ATOMS Ph.D. Thesis
Shensheng Ann Chang Fitchard 1981 138 p
Avail: Univ. Microfilms Order No. 8128889

Charge transfer is the process in which an orbital electron is transferred between two colliding atoms or ions. The projectile ion is assumed to follow a straight line classical trajectory. As the projectile approaches the target, it provides a time dependent perturbation of the electrons which are attached to the target. The resulting time dependent Schroedinger equation is solved by expanding the wave function in a truncated set of Hilbert states centered on the target, or on the projectile, with coefficients which are found from a variational principle. The infinite rank operators which appear in the Schroedinger equation are thus replaced by finite matrices. The elements of these matrices are called charge transfer matrix elements. A technique is derived which allows a completely analytic evaluation of these elements. A computer program to calculate the elements was written. The resulting matrix elements are checked against approximate analytic expressions, and against a charge transfer code. Dissert. Abstr.

N82-19960# Helsinki Univ. (Finland).
ON NUCLEAR KOETHE SPACES DEFINED BY DRAGILEV FUNCTIONS Ph.D. Thesis
Hannu Ahonen 18 Nov. 1981 61 p refs
(ISSN-0355-0087; ISBN-951-41-0431-5) Copyright. Avail: Issuing Activity

The class of nuclear Frechet spaces studied consists of the spaces L sub f(alpha,r). Here f is a real valued function of a real variable with certain convexity properties; this is a Dragilev function. The letter alpha stands for an increasing sequence (alpha sub j) of real numbers with lim sub j approaches limit of infinity alpha sub j = + infinity. The parameter r belongs to the set R U/+ infinity/. In the special case of so called slowly increasing Dragilev functions f all the spaces L sub f(alpha,r) are isomorphic to the power series spaces; otherwise they are isomorphic to one of the spaces L sub f(beta,-1), L sub f(beta,o), L sub f (beta,1), L sub f(beta,infinity) with some sequence beta. S.L.

N82-19961# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MEASUREMENTS OF THE ELECTRON-POSITRON ANNIHILATION LINE AT 511 KeV EMITTED FROM THE GALACTIC CENTER
Jeronimo Osvaldo Dias Jardim, Maria Virginia Alves Jardim, John Louis Benson, and Inacio Malmonge Martin Sep. 1981 14 p refs In PORTUGUESE; ENGLISH summary
(INPE-2222-PRE/018) Avail: NTIS HC A02/MF A01

The detection of the electron-positron annihilation line flux coming from the Galactic Center as a means to estimate the rate of positron production is examined. The results of the measurements of the 511 KeV line flux made with a gamma ray experiment in the energy interval 0.3 to 3 MeV, on-board a stratospheric Balloon are presented. The detector field of view looked at the galactic longitudinal interval -31 deg < L(II) < +41 deg. The observed flux is (6.70 + or - 0.85) x 0.001 photons/sq cm/s, which is in good agreement with the expected flux when assuming that the Galactic Center is a line source emitting uniformly. Some likely sources of positrons are also discussed. M.G.

N82-19962*# Wisconsin Univ. - Madison. Dept. of Physics.
ANOTHER SELF-SIMILAR BLAST WAVE: EARLY TIME ASYMPTOTE WITH SHOCK HEATED ELECTRONS AND HIGH THERMAL CONDUCTIVITY
Donald P. Cox and Richard J. Edgar 1982 29 p refs
(Grant NGL-50-002-044)
(NASA-CR-168562) Avail: NTIS HC A03/MF A01 CSCL 20H

Accurate approximations are presented for the self-similar structures of nonradiating blast waves with adiabatic ions, isothermal electrons, and equation ion and electron temperatures at the shock. The cases considered evolve in cavities with power law ambient densities (including the uniform density case) and have negligible external pressure. The results provide the early time asymptote for systems with shock heating of electrons and strong thermal conduction. In addition, they provide analytical results against which two fluid numerical hydrodynamic codes can be checked. Author

N82-19963# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
THERMALLY DISSOCIATED CHLORINE AND BROMINE MOLECULAR JETS Thesis [THERMISCH DISSOZIIERTE CHLOR- UND BROM-DUESENSTRAHLEN]
Juergen Frick Dec. 1980 109 p refs In GERMAN
(MPIS-26/1980; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,35

High temperature nozzle sources producing thermal dissociation of chlorine and bromine are described. Scattering between molecular potential functions in nonelastic transfer of energy processes and chemical reactions was investigated by molecular beam technique. It is shown that the recombination freezes up faster when the nozzlehole duct is shorter. Transl. by E.A.K.

N82-19964# RAND Corp., Santa Monica, Calif.
THE DEVELOPMENT OF HIGH-INTENSITY NEGATIVE ION SOURCES AND BEAMS IN THE USSR
Nikita Wells Sep. 1981 81 p refs
(Contract MDA903-78-C-0189; ARPA Order 3520)
(AD-A108935; RAND/R-2816-ARPA) Avail: NTIS HC A05/MF A01 CSCL 20/7

This report reviews Soviet R and D of (1) high-intensity negative ion sources and (2) transport and focusing of negative ion beams, using Soviet open literature of the past ten years, and correlates this data with data on Soviet institutes responsible for negative ion beam development. The Soviets are developing intense negative ion beams as the basis for creating neutral beams for injection into mirror traps and tokamaks, for inertial confinement fusion, and possibly for exoatmospheric beam weapon applications. The report focuses specifically on surface-plasma-type ion sources, which were first developed in the USSR and which show great promise for creating beams of high intensity, high brightness, and low emittance. Mechanisms for optimum negative ion beam transport are also discussed. GRA

N82-19965# RCA Labs., Princeton, N. J.
HIGH-ENERGY ION IMPLANTATION FOR MULTIGIGABIT-RATE GaAs INTEGRATED CIRCUITS Final Report, 1 May 1978 - 30 Jun. 1981
S. G. Liu, E. C. Douglas, C. P. Wu, C. W. Magee, and S. Y. Narayan Oct. 1981 166 p refs
(Contract N00014-78-C-0367; NR Proj. 383-046; RF54582001)
(AD-A108777; PRRL-81-CR-32) Avail: NTIS HC A08/MF A01 CSCL 07/4

The objectives of the program are to: (1) investigate high-energy ion implantation of donors into GaAs for multigigabit-rate GaAs integrated-circuit (IC) development and (2) to study the use of high-power lasers and other techniques for removing lattice damage and activating implanted species. GaAs ICs require the selective definition of n-layers in semi-insulating (SI) GaAs for the fabrication of active devices such as FETs, TELDs, and Schottky-barrier diodes. In order to fabricate such device elements, a capability for realizing n-layers with doping ranging from 10 to the 16th power to 5 x 10 to the 18th power/cc and thicknesses from 1 to 0.15 micrometer is required. Until the inception of this program, the major effort on ion implantation into GaAs has been at energies less than 500 keV, which limits the implant depth to typically less than several hundred nanometers. During this program, high-energy implantation of Si into SI GaAs at energies of 30 to 1200 keV has been investigated. Projected ranges and straggles have been measured by secondary ion-mass spectrometry (SIMS). Based on these measurements, we have produced up to approx. 1-micrometer-thick n-type GaAs layers at doping levels of approx. 5 x 10 to the 16th power to 1 x 10 to the 18th power/cc by multiple-energy Si implantation.
GRA

N82-19966# Williams Coll., Williamstown, Mass. Dept. of Physics.
RESONANCE STUDIES OF HYDROGEN ATOMS INTERACTING WITH VERY COLD SURFACES Annual Summary Report, 1 Mar. 1981 - 28 Feb. 1982
Stuart B. Crampton 16 Dec. 1981 8 p
(Contracts N00014-80-C-0240; JPL-95544; Grant NSF PHY-79-10967)
(AD-A109040; SBCONR2) Avail: NTIS HC A02/MF A01 CSCL 07/4

Experimental techniques and theoretical methods of analysis for the study of hydrogen atoms stored in containers having very cold surfaces are developed. The temperature dependence of the probability of adsorption and average time of adsorption of hydrogen atoms on frozen molecular hydrogen surfaces is measured. Recombination and other relaxations while adsorbed are studied. A high intensity state-selected hydrogen atom beam with thermal speeds at 6 K is developed and applied to atomic hydrogen maser development. Author (GRA)

N82-19967# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
MEASUREMENT OF INTEGRAL SCATTERING CROSS SECTIONS OF HYDROGEN ATOM-MOLECULAR SYSTEMS IN THE SUBTHERMAL RANGE Ph.D. Thesis - Georg-August Univ. [MESSUNGEN INTEGRALER STREUQUERSCHNITTE VON H-ATOM - MOLEKUELSYSTEMEN IM SUBTHERMISCHEN BEREICH]
Ulrich Schwalm Mar. 1981 129 p refs In GERMAN
(MPIS-5/1981; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany GM 22,35

Three groups of hydrogen atom molecular systems with high energy disintegration to relative integral total scattering profiles were measured. Orbiting resonances in each group were observed. The H-atom of hydrogen halide compounds shows clear van der Waal reactions. The measuring methods are applied to weak anisotropic yet reactive scattering systems. Scatter profile measurements of the systems provide information on occurrences of orbiting resonances in strong anisotropic potentials. Experimental determination of orbiting resonances are important in the recombination of gas phase reactions when stabilization occurs through a further burst with a third particle. Transl. by E.A.K.

N82-19968# Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazioni.
THE NUCLEON EXCHANGE MECHANISM IN COMPOSITE NUCLEI INTERACTION
G. Cianganu (New York State Univ., Stony Brook) 15 May 1981 87 p refs
(ISS-R-81/4; ISSN-0390-6477) Avail: NTIS HC A05/MF A01

Nucleon exchange density matrices are introduced as a means of reducing the calculations involved in theoretical determinations of integral kernels. The matrices provide analytic expressions for nucleon exchange processes within the resonating group method framework. Nuclear shapes are assumed to be spherical. Mutual polarization of nucleon orbits is not considered. Only interactions leaving the nuclei in their ground states are treated. The method is exact when both nuclei are very light, both are heavy, or one is much heavier than the other. No approximation is achieved with two medium masses.
Author (ESA)

N82-20065# Illinois Univ., Urbana. Dept. of Physics.
ELECTRON KINETIC EQUATIONS IN COMPTONIZATION BY ISOTROPIC PHOTONS
Naoki Iwamoto *In* ESA Plasma Astrophys. Nov. 1981 p 331-332 refs Co-Sponsored with NORDITA (For primary document see N82-20030 10-88)
(Grant NSF PHY-80-25605)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20082*# Maryland Univ., College Park. Dept. of Physics and Astronomy.
COMMENTS ON HIGH MACH NUMBER MAGNETOSONIC SHOCKS
K. Papadopoulos *In* ESA Plasma Asrophys. Nov. 1981 p 409-411 refs (For primary document see N82-20030 10-88)
(Grant NAGw-81; Contract N00014-79-C-0665)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-19969*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRELIMINARY ANALYSIS OF ACCELERATED SPACE FLIGHT IONIZING RADIATION TESTING
J. W. Wilson, L. V. Stock (Old Dominion Univ.), D. J. Carter, and C. K. Chang (Christopher Newport Coll.) Jan. 1982 19 p refs
(NASA-TM-83209) Avail: NTIS HC A02/MF A01 CSCL 03B

A preliminary analysis shows that radiation dose equivalent to 30 years in the geosynchronous environment can be accumulated in a typical composite material exposed to space for 2 years or less onboard a spacecraft orbiting from perigee of 300 km out to the peak of the inner electron belt (approximately 2750 km). Future work to determine spacecraft orbits better tailored to materials accelerated testing is indicated. It is predicted that a range of 10 to the 9th power to 10 to the 10th power rads would be accumulated in 3-6 mil thick epoxy/graphite exposed by a test spacecraft orbiting in the inner electron belt. This dose is equivalent to the accumulated dose that this material would be expected to have after 30 years in a geosynchronous orbit. It is anticipated that material specimens would be brought back to Earth after 2 years in the radiation environment so that space radiation effects on materials could be analyzed by laboratory methods. A.R.H.

N82-19970# Los Alamos Scientific Lab., N. Mex.
NATURAL REPOSITORY ANALOGUE PROGRAM Progress

Report, 1 Oct. - 31 Dec. 1980
David B. Curtis, comp. Mar. 1981 19 p refs
(LA-8743-PR; Rept-1) Avail: NTIS HC A02/MF A01

One fission product, molybdenum, was found in rocks which were taken at distances between 1 and 40 meters from reactor zones. It is concluded that this element was mobilized in the nearby zones of criticality, transported over distances up to a few tens of meters and redeposited in these rocks. In contrast, the same samples contain undetectable quantities of both fissiogenic ruthenium or of the U-235 depleted reactor fuel. The redistribution processes enriched molybdenum by several orders of magnitude relative to ruthenium and uranium. Ores peripheral to reactor zones are, on the average, deficient in one half of the radiogenic lead. Rocks from the conglomerate underlying the mineralized stratum contain, on the average, 6000 ppm of excess lead. One sample contains a remarkable 34,000 ppm of unsupported radiogenic lead. This basal conglomerate must have been a major transport path and repository for lead lost from the ores. A.R.H.

74 OPTICS

Includes light phenomena.

N82-19971 Virginia Univ., Charlottesville.
APPLICATIONS OF INTEGRATED OPTICS TO SIGNAL PROCESSING AND PATTERN RECOGNITION Ph.D. Thesis
Arthur Onyekwere Anyiwo 1981 105 p
Avail: Univ. Microfilms Order No. 8129334

The problem of preprocessing remotely sensed data to achieve high data rate reduction is addressed. Two distance measure optical processors that operate on the principle of interferometry are proposed. Processing algorithms (parametric and nonparametric) that take full advantage of the statistical dependence of the sensed data on their neighbors as well as the high processing speed of the optical processors are developed. System performance is evaluated and it is shown that intensity fluctuations of the optical source (laser) can have an adverse effect on the entire system. A second problem which involves the detection of electromagnetic interference sources in computer subsystems is solved as a two-class pattern recognition problem. A hybrid optical/digital system for implementation is developed. An integrated optical time-integrating correlator is interfaced with other analog and digital subsystems to yield compact test equipment. The effects of first-order sources of degradations on the correlator output and on the processing algorithms are investigated. It is shown that the processing algorithm is invariant under the degrading effects on the correlator output. Dissert. Abstr.

N82-19972*# Howard Univ., Washington, D. C.
CHARACTERIZATION OF LOW INTENSITY X-RAY IMAGING DEVICES (LIXISCOPE) Final Report, 15 Jun. 1979 - 31 Dec. 1981
George A. Ferguson 31 Dec. 1981 19 p refs
(Grant NsG-5268)
(NASA-CR-168584) Avail: NTIS HC A02/MF A01 CSCL 20F

Radioisotopic sources were used to excite the LIXISCOPE in preliminary experimental attempts to evaluate the usefulness of this instrument for industrial and medical applications. The characteristics of the LIXISCOPE when excited by X-ray produced by conventional electrically powered X-ray generators were studied. The optimum X-ray spectrum was determined and the mode of operation of the generator, which yields satisfactory LIXISCOPE images of medical and industrial specimens was investigated. S.L.

N82-19973# Colorado State Univ., Fort Collins. Dept. of Chemistry.
LIGHT SCATTERING FROM MACROMOLECULAR SYSTEMS: MOLECULAR CRYSTALS AND POLYMERS Final Technical Report
Elliot R. Bernstein Nov. 1981 32 p refs
(Grant AF-AFOSR-3317-77; AF Proj. 2303)
(AD-A109086; AFOSR-81-0861TR) Avail: NTIS HC A03/MF A01 CSCL 07/4

The research objectives were to: (1) characterize phase transitions theoretically and experimentally in molecular crystal systems; (2) use the above understanding gained by light scattering studies and theoretical interpretation to apply to the more complex system of lyotropic liquid crystals; and (3) then apply knowledge gained on the model systems of increasing complexity to polymer liquid crystals and solid polymers as observed by laser light scattering techniques. Systems experimentally and theoretically discussed are: trioxane, triazine, benzil, and chloranil. Studies of lyotropic liquid crystals (sodium decyl sulfate, sodium sulfate, decanol, water) have progressed. The major findings are: a number of phase transitions occur between 20 and 60 C; these transitions evidence strong critical behavior and long correlation times for fluctuations; and liquid crystals can be studied by light scattering. Spectra of solid powders, ribbons, and liquid crystals of PBT and solid PBO were obtained. GRA

N82-19974# Defence Research Establishment Valcartier (Quebec).
DETECTION RANGE PROBABILITIES OF PASSIVE INFRARED SYSTEMS FOR THE NORTH ATLANTIC
A. Laflamme Sep. 1981 90 p refs
(AD-A108812; DREV-R-4233/81) Avail: NTIS HC A05/MF A01 CSCL 17/5

In this report the probabilities of extinction of infrared radiation in the atmosphere, range probabilities for target detection by passive infrared surveillance systems are presented. The geographic area covered is the North Atlantic. The two major atmospheric infrared windows, the 3 to 5 and the 8 to 12 micrometer bands, are considered. The results allow to predict and compare readily the performance of detection systems. GRA

N82-19975# Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
BACKSCATTER AND EXTINCTION IN WATER CLOUDS Final Report
R. G. Pinnick, S. G. Jennings, Petr Chylek, and Chris Ham Oct. 1981 52 p refs
(DA Proj. 1L1-61102-B-53A)
(AD-A109277; ERADCOM/ASL-TR-0097) Avail: NTIS HC A04/MF A01 CSCL 20/6

Atmospheric clouds can adversely affect the operation of military electro-optical systems. Probing of clouds by the lidar technique, is attractive for two reasons. First, it is a remote sensing technique, and measurements at ranges of several kilometers are possible. Second, it can give a two dimensional picture of the cloud and trace its time development. Unfortunately, in some cases meaningful information from a lidar backscatter signal is hard to obtain. In this report a linear relation between the volume extinction coefficient and backscatter coefficient of atmospheric cloud at visible and near infrared wavelengths is derived. The relation is in good agreement with Mie calculations of extinction and backscatter coefficients based on 156 measurements of cloud droplet spectra in cumulus and stratus type clouds. The relation suggests that visible or near infrared extinction coefficients in a cloud of unknown type could be inferred from lidar backscatter measurements alone. No similar size distribution independent relation between backscatter coefficient and liquid water content of cloud was found. GRA

N82-19976# Hughes Research Labs., Malibu, Calif.
POLARIZATION-INDEPENDENT OPTICAL WAVEGUIDE SWITCH Final Report, 12 Sep. 1980 - 12 Sep. 1981
O. G. Ramer Oct. 1981 70 p refs
(Contract N00173-80-C-0439)
(AD-A108764) Avail: NTIS HC A04/MF A01 CSCL 20/6

This highly successful program has resulted in the demonstration of an electrically activated planar waveguide polarization independent switch, one of the key components required to implement signal processing components. These switches operate at a wavelength of 0.83 micron and have optical crosstalk values of less than 20 dB. The switch is based on the delta beta-reversal directional coupler switch. The polarization independence is incorporated in the delta beta reversal switch by tapering the coupling strength of the directional coupler, and by fabricating the waveguides so that the integrated coupling coefficients for TE and TM modes are nearly identical. Author (GRA)

N82-19977# Utah State Univ., Bedford, Mass. Electro-Dynamics Labs.
AIRCRAFT-BORNE MEASUREMENT OF INFRARED SOURCES AND BACKGROUNDS Final Report, 21 Oct. 1977 - 30 Jun. 1981
Ronald J. Huppi 30 Jun. 1981 61 p refs
(Contract F19628-78-C-0018; AF Proj. 7670; ARPA Order 2656)
(AD-A108871; EDL-SRL-81-3; AFGL-TR-81-0199) Avail: NTIS HC A04/MF A01 CSCL 20/6

Instruments for infrared measurements of natural and man produced infrared sources are described and measurements were planned, performed, and analyzed. The measured or analyzed data included the following: Measurements of aircraft emissions and reflections in fixed spectral bands between 2.5 and 7.5 micrometer; analyses of near infrared auroral and airglow emissions in the 1.7 micrometer and 2.8 micrometer region; and quantitative measurements and analyses of the spatial emissions and backgrounds in the 2 to 15 micrometer region. The measurements were taken with the radiometric instruments described and by spectrometers, and spatial mappers which were operated on AFGL's NKC-135 aircraft. The instruments were periodically inspected, maintained and kept in a state of readiness. Studies and recommendations were made indicating that the reliability of many future measurements could be improved using cryogenically cooled radiometers and interferometer-spectrometers. Author (GRA)

N82-19978# Lincoln Lab., Mass. Inst. of Tech., Lexington.
ACCURACY OF PARAMETER ESTIMATES FOR CLOSELY SPACED OPTICAL TARGETS USING MULTIPLE DETECTORS
Keh-Ping Dunn 23 Oct. 1981 57 p refs
(Contract F19628-80-C-0002)
(AD-A109185; TR-589; ESD-TR-81-292) Avail: NTIS HC A04/MF A01 CSCL 17/8

In order to obtain the cross-scan position of an optical target, more than one scanning detector is used. As expected, the cross-scan position estimation performance degrades when two nearby optical targets interfere with each other. Theoretical bounds on the two-dimensional parameter estimation performance for two closely spaced optical targets are found. Two particular classes of scanning detector arrays, namely, the crow's foot and the brickwall (or mosaic) patterns, are considered. Author (GRA)

N82-19979# Engins Matra, Velizy (France). Dept. Instrumentation.
OPTICAL IMAGING INSTRUMENTS FOR THE LAND APPLICATION SATELLITE SYSTEM. PHASE A STUDY. VOLUME 1 Final Report
Paris ESA 15 Sep. 1980 283 p refs Prepared in cooperation with Technische Physische Dienst TNO-TH and Royal Netherlands Aircraft Factories Fokker 2 Vol.
(Contract ESA-4167/79/F-CG(SC))
(Rept-60/1023-Vol-1; ESA-CB(P)-1480-Vol-1) Avail: NTIS HC A11/MF A01

System analysis and configuration tradeoffs were performed for a pushbroom imager operating in four visible bands and two reflected IR bands with a ground resolution of 30 m and a noise equivalent albedo of 0.5%. Results show that separate instruments are required for the visible and the IR bands. The visible band camera is designed around a pure dioptric 590 mm f/6.2 lens. A quasi-diffraction limited resolution is obtained over a 14 deg field of view for all spectral channels. A multichroic beam splitter is used for channel separation. The IR camera has a pure dioptric 590 mm f/2.95 lens. A Petzval system consisting of two convergent groups plus a divergent field corrector is adopted. Since the passive cooling of the detectors requires that the focal plane be parallel to the side of the spacecraft which does not receive sunlight, a flat folding mirror is placed between the last convergent group and the field corrector. Reliability of both cameras is 0.8 for two years in orbit. Author (ESA)

N82-19980# Engins Matra, Velizy (France). Dept. Instrumentation.
OPTICAL IMAGING INSTRUMENTS FOR THE LAND APPLICATION SATELLITE SYSTEM, PHASE A STUDY, VOLUME 2 Final Report
Paris ESA 15 Sep. 1980 183 p refs Prepared in cooperation with Technische Physische Dienst TNO-TH and Royal Netherlands Aircraft Factories Fokker 2 Vol.
(Contract ESA-4167/79/F/CG-SC)
(Rept-60/1023-Vol-2; ESA-CR(P)-1480-Vol-2) Avail: NTIS HC A09/MF A01

Focal plane assembly alignment and manufacturing problems for the visible band camera of the Land Application Satellite, are discussed. Spectral separation and photometric properties are treated. Charge coupled device detector properties and test program are outlined. Optical tolerances are analyzed. Structural and thermal models are given. Linear arrays of IR detectors for the 1.5 to 5 micron range of the IR camera, are evaluated. Passive coolers for low altitude polar orbits are discussed. Author (ESA)

N82-19981# Sener, S.A., Madrid (Spain).
DEVELOPMENT OF AN OPTICAL SCANNING MECHANISM ASSEMBLY (OSMA)
L. B. Fernandez Sainz Paris ESA Mar. 1981 91 p In ESTONIAN
(Contract ESTEC-3873/79)
(PS-1450; ESA-CR(P)-1490) Avail: NTIS HC A05/MF A01

A spaceborne OSMA design model was built in order to study the optimum conceptual design and investigate parameters that significantly affect oscillating scanner performance. Mass and inertia effects are considered. Scan linearity, frequency and efficiency are reported. Pointing stability, momentum compensation, and repeatability are examined. Improvements are needed in mirror compensating inertia, average difference between successive scans, and pointing stability. Analysis techniques perform well. Author (ESA)

N82-19982# Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).
ELECTROOPTICAL EFFECTS FOR APPLICATION IN LIQUID CRYSTAL DISPLAYS Final Report
Guenter Baur, Gerhard Meier, Ekwal Sah, Bernd Scheuble, Axel Stieb, Waltraud Fehrenbach, and Friedrich Windscheid Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 129 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-170; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 27,30

In order to improve the optical characteristics of twisted nematic cells, the cell and material parameters necessary for optimal cell performance were evaluated and a variant of this cell type was characterized. For the development of liquid crystal mixtures with the respective properties, material investigations were carried out with a substantially increased accuracy. Further improvements of the fluorescence activated display allowed the construction of a prototype ready for production. The structure of the defects occurring in cholesteric layers was discovered in the case of homeotropic boundary alignment. Additionally, the contrast limits and optical merit factors of reflective dichroic cells were calculated, taking into account various optical interference factors. Author (ESA)

N82-19983# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Physik der Atmosphaere.
THE VISIBLE DETECTION OF AERIAL TARGETS AS A FUNCTION OF ENVIRONMENTAL, TARGET AND OBSERVATION PARAMETERS FOR SURFACE TO AIR OR AIR TO AIR OBSERVATIONS [DIE OPTISCHE ERFASSUNG VON LUFTZIELEN IN ABHAENGIGKEIT VON UMGEBUNGS-, ZIEL, UND BEOBACHTUNGSPARAMETERN BEI BEOBACHTUNGEN BODEN-LUFT BZW. LUFT-LUFT]
Hans-Eberhard Hoffmann Bonn Bundesministerium der Verteidigung 1981 47 p refs In GERMAN; ENGLISH summary
(BMVg-FBWT-81-12) Avail: NTIS HC A03/MF A01; DOKZENTBw, Bonn DM 30

The influence of different environmental, target and observa-

tional parameters on the maximum detection range of aircraft was studied in an outdoor test, using a dark green Do-27 airplane. The environmental parameters include the degree of turbidity of the atmosphere, background, direction of observation, flight altitude, and brightness. Size and color were considered as target parameters, whereas the observation conditions were differentiated according to naked eye or field glasses observations. Graphs showing these various dependencies are given. Although the observations were made from the ground, the results are shown to apply equally well to air to air observations.
Author (ESA)

N82-20121*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CAPACITY LIMIT OF THE NOISELESS, ENERGY-EFFICIENT OPTICAL PPM CHANNEL
J. R. Lesh *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 54-58 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20F

N82-20134# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
AIRCRAFT INFRARED RADIATION MODELING
G. Gauffre *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 21-41 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 245-265 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-19984 Iowa Univ., Oakdale.
THE SIMULATION OF PLASMA DOUBLE LAYER STRUCTURES IN TWO DIMENSIONS Ph.D. Thesis
Joseph Eric Borovsky 1981 203 p
Avail: Univ. Microfilms Order No. 8128373

Electrostatic plasma double layers are numerically simulated using a 21/2-dimensional particle-in-cell method. The system is represented by a two-dimensional grid, periodic in one direction and bounded by reservoirs of Maxwellian plasma in the other. The investigations concentrated on double-layer formation, stability, scaling, and morphology, on particle trajectories, and on electrostatic plasma waves. The temporal modulation of accelerated beams is also investigated; the possibilities of the double-layer production of ion conics and of ion precipitation are hypothesized; and the consequences of electrostatic plasma-wave excitement are discussed. Auroral double-layer simulations including the atmospheric backscattering of electrons which predict the presence of an ionospheric sheath which acts to confined ionospheric electrons and to accelerate ionospheric ions upward are also discussed.
Dissert. Abstr.

N82-19985*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A NUMERICAL METHOD FOR SOLVING THE VLASOV EQUATION
Nobuyuki Satofuka (Kyoto Technical Univ.) Feb. 1982 23 p refs
(NASA-TM-81339; A-8794) Avail: NTIS HC A02/MF A01 CSCL 20I

A numerical procedure is derived for the solution of the Vlasov-Poisson system of equations in two phase-space variables. Derivatives with respect to the phase-space variables are approximated by a weighted sum of the values of the distribution function at property chosen neighboring points. The resulting set of ordinary differential equations is then solved by using an appropriate time intergration scheme. The accuracy of the proposed method is tested with some simple model problems. The results for the free streaming case, linear Landau damping, and nonlinear Landau damping are investigated and compared with those of the splitting scheme. The proposed method is found to be very accurate and efficient.
S.L.

N82-19986# Naval Research Lab., Washington, D. C.
LEVEL SHIFTS AND INELASTIC ELECTRON SCATTERING IN DENSE PLASMAS Interim Report
J. Davis and M. Blaha 10 Dec. 1981 35 p refs
(RR0110941)
(AD-A108799; NRL-MR-4689) Avail: NTIS HC A03/MF A01 CSCL 20/9

A completely quantum mechanical formalism has been developed to describe the high density plasma effects on fundamental atomic parameters. Both the bound and free electrons are treated by a method which in principle is similar to Hartree's self-consistent field method. The free plasma electrons' wavefunction is obtained from the Schrodinger equation with the effective potential representing the spherically averaged Coulomb interaction with bound and free electrons. Results are given for level shifts, coefficients of transition probabilities, and electron collision cross sections of Ne(9+) for temperature and 200 and 500 eV for an electron density range of 1 - 6 x 10 to the 24th power/cc, and of Ar(17+) for temperatures of 1000 and 2000 eV and electron densities from 2 x 10 to the 25th power to 8 x 10 to the 25th power/cc. In the low-density region, level shifts are obtained for H and He+.
Author (GRA)

N82-19987# Naval Research Lab., Washington, D. C.
THE CAVITY Q FOR ERGODIC EIGENMODES Interim Report
Edward Ott and Wallace M. Manheimer 22 Dec. 1981 8 p
(AD-A109041; NRL-MR-4641) Avail: NTIS HC A02/MF A01 CSCL 14/2

The problem of calculating the Q of a very overmoded, irregularly shaped resonant cavity due to absorption of the electromagnetic radiation at the walls is considered. It is assumed that the volume inside the cavity can be either vacuum, or else partially filled with anisotropic inhomogeneous dielectric or plasma. Both the scale length of the dielectric and the radius of curvature of the walls are assumed much larger than the radiation wavelength. However, near the cavity walls, a vacuum is assumed. Focus is on applications concerning magnetically confined plasmas.
GRA

N82-19988# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics.
AN APPENDIX TO THE PAPER PLASMA ELECTRON TEMPERATURE DETERMINATION IN LOW-DENSITY PLASMAS FROM THE HELIUM I 3889 A AND 5016 A LINE INTENSITIES
Nils Brenning 6 Oct. 1981 10 p refs Sponsored by Swedish Natural Science Research Council
(TRITA-EPP-81-03; ISSN-0348-7539) Avail: NTIS HC A02/MF A01

The use of the 3889 A line for measurements of plasma electron temperature is discussed, with comments on the requirement of optical thinness of the plasma against the 3889 A line radiation. The reduction in line intensity due to absorption is calculated and a useful range of parameters is determined within which plasma electron temperature determination is uniefluenced by the effects of absorption. Author (ESA)

N82-19989# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
SCALING LAWS OF THE MULTICOMPONENT COOL PLASMA MANTLE Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Physics (EUR-NE)
J. R. Drake, A. Kuthy, and M. Tendler Nov. 1981 14 p refs
(TRITA-PFU-81-04; ISSN-0348-7644) Avail: NTIS HC A02/MF A01

The two component plasma mantle was investigated theoretically and experimentally. In the case of classical transport, the plasma density is shown to vary as the cube root of the main neutral density at the wall. The impurity neutral density is shown to vary with the product of the square of the impurity ion density and the main neutral density in the diffusive regime, and as the product of the impurity ion density and the square

of the main neutral density for the convective regime. This latter was observed experimentally for plasma parameters corresponding to the convective regime, where the penetration of neutral helium into a cold and dense, but fully ionized, hydrogen plasma was compared with hydrogen penetration in the same plasma.
Author (ESA)

N82-19990# Sheffield Univ. (England). Dept. of Control Engineering.
ON OPTIMAL CONTROL OF PLASMA CONFINEMENT
S. P. Banks and S. A. Mousavi-Khalkhali (Univ. of Manchester Inst. of Technology, England) 1981 25 p refs
(RR-155) Avail: NTIS HC A02/MF A01

Feedback control of plasmas is considered by treating them as distributed parameter systems and using the lowest order approximation to Liouvilles equation as the state equation, given by the linearized Vlasov equation for a collisionless plasma. A control term is introduced into the Vlasov equation, which allows the plasma dynamics to be written in standard state space form. A quadratic cost functional is constructed on a Hilbert space. Optimal control is obtained in a standard way via the Riccati equation. Methods for obtaining finite-dimensional approximations to the solution are indicated.
Author (ESA)

N82-20036# Oxford Univ. (England). Magdalen College.
MODULATIONAL INSTABILITIES IN ASTROPHYSICS
D. terHaar *In* ESA Plasma Astrophys. Nov. 1981 p 45-49 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20039# Academy of Sciences (USSR), Moscow. Inst. of Space Research.
WEAK TURBULENCE THEORY OF ENHANCED GAS IONIZATION BY PLASMA FLOW
A. A. Galeev *In* ESA Plasma Astrophys. Nov. 1981 p 77-82 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20040# Princeton Univ., N. J.
IDEAL MHD FLUIDS
Russell M. Kulsrud *In* ESA Plasma Astrophys. Nov. 1981 p 83-87 (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN and NO (+20% others)

N82-20047# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.
PLASMA PROCESSES AT COLLISIONLESS SHOCK WAVES
V. Formisano *In* ESA Plasma Astrophys. Nov. 1981 p 145-165 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20071# Harry Diamond Labs., Adelphi, Md.
SECOND-ORDER NONLINEAR CONDUCTIVITY TENSOR FOR AN UNMAGNETIZED RELATIVISTIC TURBULENT PLASMA
Howard E. Brandt *In* ESA Plasma Astrophys. Nov. 1981 p 361-364 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20078# Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.
DOUBLE LAYER AND POTENTIAL JUMP: A REVIEW OF LABORATORY EXPERIMENTAL EVIDENCE
M. Guyot, C. Hollenstein, and M. Tran *In* ESA Plasma Astrophys. Nov. 1981 p 391-393 refs Sponsored by Swiss National Science Foundation and Euratom (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20084# Academia Sinica, Peking (China). Inst. of Space Physics.
A PLASMA CURRENT SHEET STUDIED BY MEANS OF THE PARTICLE MOTION
Xu Rong-lan *In* ESA Plasma Astrophys. Nov. 1981 p 417-419 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

N82-19991# Technische Hogeschool, Eindhoven (Netherlands).
GROWTH AND CHARACTERIZATION OF LIQUID PHASE EPITAXIALLY GROWN SPINEL FERRITE FILMS Ph.D. Thesis
Petrus Johannus Maria vanderStraten 7 Nov. 1980 102 p refs
Avail: NTIS HC A06/MF A01

The characteristics of ferrimagnetic and ferromagnetic materials are reviewed with particular emphasis on the uniaxial magnetic anisotropy which may be presented in liquid phase epitaxy (LPE) grown in spinel ferrite films. The properties of spinel ferrites are explored and the preparation of substrates for the growth of ferrite films are considered. The LPE growth procedure as well as methods for characterizing film thickness and film lattice parameters, composition, and saturation magnetization are described as well as magnetic anisotropies, the magnetic domain configuration and uniaxial anisotropy. The growth of indium substituted magnesium ferrite films, LPE growth of lithium-ferrite-alluminate films, LPE growth of copper ferrite films, stress induced anisotropy in LPE grown Ni(Fe, Al)2O4 films, and the LPE growth of Mn, Ni, and Al-substituted copper ferrite films are discussed.
A.R.H.

N82-19992# Florida Univ., Gainesville. Dept. of Materials Science and Engineering.
ELECTROTRANSPORT IN THIN FILMS Final Report, 1 Jan. 1976 - 31 Dec. 1980
R. E. Hummel and R. T. DeHoff 27 Oct. 1981 61 p refs
(Grant AF-AFOSR-2963-76; AF Proj. 2306)
(AD-A108421; AFOSR-81-0708TR) Avail: NTIS HC A04/MF A01 CSCL 08/1

The objective of this research was to develop a scientific perspective that forms a foundation for understanding the processes that lead to the development of holes in thin film metal strips. This understanding allows the prediction and control of hole formation in thin film connectors that are in integral part of all microelectronic devices, thus extending their design lifetime, and improving their reliability. This project focused upon the effects of dopants on the behavior of thin films subject to high current densities, and upon the relative contributions of the several mass transport processes that may contribute to changes in the structure of film strips. Specifically, in addition to electrotransport, which may involve both electron wind and electrolysis effects, grain boundary grooving, driven by surface tension forces, and thermotransport, driven by temperature gradients, was found to significantly alter the structure of the strip. Experimental strategies have been developed which emphasize each of these contributions, permitting assessment of their relative roles in the overall process.
GRA

N82-19993# Stanford Univ., Calif. Solid-State Electronics Lab.
ION IMPLANTATION AND LASER PROCESSING OF 3-5 COMPOUND SEMICONDUCTORS WITH APPLICATIONS TO THE FABRICATION OF MICROWAVE DEVICES Final Report, 1 Jun. 1978 - 31 May 1981
James F. Gibbons Oct. 1981 44 p refs
(Grant DAAG29-78-G-0119)
(AD-A109033; ARO-15605.5-EL) Avail: NTIS HC A03/MF A01 CSCL 20/12

Research was carried out on laser processing of 3-5 compound semiconductors, concentrating on the mechanisms that are responsible for annealing ion implanted dopants in GaAs and on the possibility of obtaining laser-assisted diffusion of dopants. Seven papers describing this work have been written during the period covered by this report. A brief overview of these papers is given. The full papers are attached for detailed presentation of experimental conditions, theoretical calculations and results. Author (GRA)

N82-19994# Stanford Univ., Calif.
THE ELECTRONIC AND ATOMIC STRUCTURE OF DIAMOND SURFACE AND EFFECTS OF HYDROGEN TERMINATION Final Report, 1 Jul. 1978 - 30 Jun. 1981
B. B. Pate, P. J. Jupiter, I. Lindau, and W. E. Spicer 2 Nov. 1981 21 p refs
(Grant DAAG29-78-G-0130)
(AD-A109142; ARO-15878.3-P) Avail: NTIS HC A02/MF A01 CSCL 20/12

The electronic and atomic structure of the diamond (111) surface and the effects of hydrogen termination are studied using photoemission, photon stimulated desorption, low energy electron diffraction, and Auger electron spectroscopy. Hydrogen termination results in a 1 x 1 surface with no filled surface states in or near the band gap region. A high temperature anneal (approx. 1000 degrees C) removes the hydrogen and results in a 2 x 2/2 x 1 surface structure. Author (GRA)

N82-19995# Cornell Univ., Ithaca, N. Y. Dept. of Chemistry.
SIMS STUDIES ON ANOMALOUS BEHAVIOR OF PHOSPHORUS AND OTHER IMPLANTS IN SILICON Interim Technical Report
Paul K. Chu, Dachang Zhu (Fudan univ., Shanghai), and George H. Morrison 17 Dec. 1981 22 p refs Sponsored in part by NSF
(Contract N00014-80-C-0538; NR Proj. 051-736)
(AD-A108870; TR-6) Avail: NTIS HC A02/MF A01 CSCL 07/4

A phosphorus implant in p-type silicon was analyzed by SIMS, and both the implant profile and the matrix signal were observed to exhibit some anomalous behavior. Further studies revealed the same behavior in other implants. This phenomenon was observed when an n-type dopant was implanted into a p-type matrix, or vice versa. However, some exceptions arose, making the interpretation difficult. The use of matrix signal normalization was adopted and found to improve the results. Author (GRA)

N82-19996# IBM Federal Systems Div., Manassas, Va. Federal Systems Div.
ELECTRICAL CHARACTERIZATION OF SUPER SCHOTTKY Final Technical Report
R. A. Lawrence Griffiss AFB, N.Y. RADC Jul. 1981 229 p
(Contract F30602-80-C-0068; AF Proj. 2338)
(AD-A108766; RADC-TR-81-194) Avail: NTIS HC A11/MF A01 CSCL 09/1

State-of-the-art bipolar logic technology has advanced with the recent introduction of 'Super Schottky' and 'Low Power Super Schottky' product lines by two semiconductor manufacturers. Texas Instruments (T.I.) and Fairchild Semiconductor have utilized advances in processing techniques such as oxide isolation and refinements in the resolution of photolithographic equipment to enhance the speed and reduce the power of present day Schottky (S) and Low Power Schottky (LS) technologies. This report provides results obtained from the electrical characterization over the military temperature range (-55 CTj to +125 CTj) of gate and flip-flop samples of three new transistor Transistor Logic (TTL) technologies: Advanced Schottky (AS), Advanced Low Power Schottky (ALS), and Fairchild Advanced Schottky (TTL) (FAST). This report shows that each technology offers the system designer unique advantages in terms of improved performance, power reductions, and space savings derived from functional design complexity. The performance improvements obtained by these new logic technologies, however, present implicit new application and testing considerations that could previously be ignored by the military system designer. GRA

N82-19997# Massachusetts Inst. of Tech., Cambridge. Magnet Lab.
IMPURITY AND DEFECT CHARACTERIZATION IN EPITAXIAL GaAs, InP AND THE TERNARY AND QUATERNARY COMPOUND SEMICONDUCTORS Annual Interim Report, 1 Aug. 1980 - 31 Jul. 1981
Kenneth J. Button and M. N. Afsar 14 Oct. 1981 17 p refs
(Grant AF-AFOSR-3708-78; AF Proj. 2306)
(AD-A109052; AFOSR-81-0849TR) Avail: NTIS HC A02/MF A01 CSCL 20/2

An ultimate method for the unambiguous identification of donors in epitaxial GaAs and related compounds has been devised and demonstrated. A specimen is grown by means of the molecular beam epitaxy technique and is lightly doped with a single donor element during growth so as to render the specimen n-type. The far infrared photoconductivity method of spectroscopy is used to determine the energy difference between the electron ground state and the next higher excited state (2p, m = -1) at low temperature and in high intensity magnetic fields. A 'signature curve' of energy vs. magnetic field intensity is generated for various values of applied magnetic field intensity. Thereafter, any time that this particular element is present as a residual donor in any other specimen, a single measurement at any field will yield a point which must lie on the signature curve of the particular donor element. By this means any residual donor can be identified without ambiguity. We have generated and published signature curves for Sn, Se, Si, Ge and sulfur. Author (GRA)

N82-19998# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
TRANSITION ELECTRON MICROSCOPE (TEM) IN-SITU STRAINING AND BULK STUDIES OF THE SELECTION OF GLIDE SYSTEMS IN FACE CENTERED CUBIC (FFC) CRYSTALS Ph.D. Thesis - Delft Univ. of Technologie
H. J. Kolkman Jun. 1980 116 p refs
(NLR-TR-80041-U) Avail: NTIS HC A06/MF A01

Plastic deformation of FCC metals was studied during straining experiments with a TEM on single Cu and Al crystals in order to ascertain whether the thin specimens used in TEM straining experiments give information on the plastic deformation process representative of bulk behavior. In situ TEM straining experiments on copper single crystalline foils with an area transparent to electrons and with four different foil plane normals were performed. The experimental procedure is described. In bulk crystals, and in thin foil specimens with the same orientation, the same nonprimary systems were observed, demonstrating that the choice of glide systems is governed not only by their resolved shear stresses, but also by the crystallographic orientation of the surface. Results are compared with published results for body centered cubic crystals and recommendations for future studies are given. Author (ESA)

N82-19999# Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).
ANALYSIS OF DEEP DEFECTS IN III-V SEMICONDUCTORS Final Report, Mar. 1981
Juergen Schneider, Ulrich Kaufmann, Helmut Ennen, and Rico Woerner Bonn Bundesministerium fuer Forschung und Technology Nov. 1981 61 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technology
(BMFT-FB-T-81-197; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13

Special point defects in GaP and GaAs by electron spin resonance (ESR) and optical spectroscopy are reported in order to establish the influence of deep defects in III-V semiconductors. Stoicheometric defects assessed by ESR in GaP are the antisite defect, P sub Ga, and the isolated gallium vacancy, V sub Ga. Results show that P sub Ga is an intrinsic defect characteristic for light emitting crystal GaP which may act as a center for nonradiative Auger recombination. An important group of extrinsic defects formed by ubiquitous three dimensional transition metal impurities was identified: (1) double acceptor behavior of Fe, Ni, and Cr in GaP and of Ni in GaAs; (2) hole trapping of Cr in GaP and GaAs; and (3) strong association tendency of Ni with donors in GaP. The importance of these results for GaP-LED efficiency optimization and for GaAs-FET performance is stressed. Author (ESA)

N82-20000# Technische Universitaet, Munich (West Germany). Inst. fuer Anorganische Chemie.
PREPARATION OF COMPOUNDS WITH NEW STRUCTURES FOR SUPERCONDUCTOR INVESTIGATIONS Final Report, Dec. 1980
Eberhard Amberger Bonn Bundesministerium fuer Forschung und Technology Nov. 1981 21 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-203; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4,60

The relation between the superconductive and the structural properties of superconductors was confirmed by comparing the X-ray structures of five classes of compounds, involving metal clusters, with their superconductive properties. The various substances were prepared following a common recipe: (1) clusters with small metal distance; (2) large metal-metal distance between clusters; and (3) cluster interconnection by means of a different atom type. The results confirm the cluster theory of superconductive compounds. Author (ESA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-20001 New Hampshire Univ., Durham.
SPECIAL APPLICATIONS OF IRREVERSIBLE THERMODYNAMICS Ph.D. Thesis
Yakov Michael Zilberberg 1981 321 p refs
Avail: Univ. Microfilms Order No. 8129272

The main irreversible phenomena that occur in thermoviscoelastic solids and fluids, namely, the absorption and propagation of the sound waves and the influence of thermal energy conduction and dissipation within the said media upon the phenomena are evaluated and analyzed. The theoretical methods of such analysis, specifically those of evaluation of the spatial attenuations of the sound wave propagating through a thermoviscoelastic media (solid or fluid) contain a substantially incomplete and very restricted in its validity procedure which is based upon a dimensional modification of the temporal attenuations. Specifically, the sound absorption coefficient, gamma, defined as the ratio of the mean value of the mechanical energy dissipation to twice the mean energy flux of the wave, is dimensionally modified by dividing it by the transverse or longitudinal velocities of sound in a given media, which procedure formally permits to obtain a dimensionally consistent result. Dissert. Abstr.

N82-20002# Technische Hogeschool, Eindhoven (Netherlands).
IMPURITIES IN QUASI ONE-DIMENSIONAL SYSTEMS. A STUDY ON SOME THERMODYNAMIC PROPERTIES Ph.D. Thesis
Joseph Christophorus Schouten 20 Jan. 1981 140 p refs
Avail: NTIS HC A07/MF A01

The effect of impurity in a magnetic system depends on the character of the impurity (magnetic or nonmagnetic) as well as on the dimensionality of the system. Amorphous and random magnetic systems are defined and the theoretical methods used to compute the behavior of quasi-one dimensional mixed magnetic systems with anisotropic interactions are presented. Various Mn (++) systems mixed with Cu or Cd are described. As well as the magnetic properties of the quasis one dimensional system (CH3)2NH2MnCl3. Quasi one dimensional systems Co(++) systems, mixed with Cu are discussed as well as the mixed CsMn (Cl sub(1-x) Br sub x)3 H2O. A.R.H.

N82-20003# Technische Hogeschool, Eindhoven (Netherlands).
THE ANISOTROPIC CLASSICAL CHAIN. THERMODYNAMIC PROPERTIES AND PHASE DIAGRAMS Ph.D. Thesis
Frans Boersma 3 Feb. 1981 135 p refs
Avail: NTIS HC A07/MF A01

The Hamiltonian for the classical model of a one dimensional system containing orthorhombic anisotropy in an external magnetic field is defined, the transfer matrix formalism and the theory of the eigenvalue problem are discussed, and the accuracy of the numerical approach presented is evaluated. Magnetic response functions, correlations, and other thermodynamic variables are considered and experimental results are examined. The chemical and magnetic properties of quasi-one dimensional manganese compounds built up of more or less linear chains of Mn (++) ions were determined and phase diagrams plotted. It is shown that the classical model including orthorhombic anisotropy describes the experimental phase diagrams correctly for all three directions of the magnetic field. A.R.H.

N82-20004# Technische Hogeschool, Delft (Netherlands).
SOME ASPECTS OF TWO-PHASE FLOW, HEAT TRANSFER AND DYNAMIC INSTABILITIES IN MEDIUM AND HIGH PRESSURE STEAM GENERATORS Ph.D. Thesis
Huseyin Cetin Unal 18 Mar. 1981 249 p refs
Avail: NTIS HC A11/MF A01

Experimental data for void fraction, incipient point of boiling, initial point of net vapor generation, bubble dynamics, dryout, two-phase flow pressure drop and density-wave oscillations were obtained in long, sodium heated steam generator tubes of different geometries for a wide range of operating conditions and at medium and high pressures. These data and data from literature taken in sodium and electrically heated steam generator tubes were correlated. Aspects of two-phase flow, heat transfer and density-wave oscillations in these steam generators disclosed include the distribution factor in small- and medium-size diameter steam generator tubes, the characteristic of the transitions at the incipient point of boiling and initial point of net vapor generation, bubble growth during subcooled nucleate flow boiling, the importance of the equivalent length for dryout in non-uniformly heated steam generator tubes and the mechanisms of density-wave oscillations in once-through steam generator tubes. A.R.H.

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-20005*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
AN INVESTIGATION OF THE LAG BETWEEN THE START OF RESEARCH AND THE DEVELOPMENT OF NEW TECHNOLOGY Final Report
Steven E. Glass Feb. 1982 31 p refs
(Contract NASw-3204)
(NASA-CR-168583; Rept-40) Avail: NTIS HC A03/MF A01 CSCL 05A

The lag which occurs between the start of NASA-sponsored research and the development of new technology is addressed. A possible common gestation period is examined. The lags vary from one to zero years. The observed lag as it relates to patent applications is shorter than the lag as it relates to invention disclosures. The sequential hypothesis testing showed that invention disclosures correlated better to the measures of research effort used then did patent applications. N.W.

N82-20006*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOCAL AND NATIONAL IMPACT OF AEROSPACE

RESEARCH AND TECHNOLOGY
John F. McCarthy, Jr. Dec. 1981 10 p refs Presented at Cleveland City Club, Ohio, 4 Dec. 1981
(NASA-TM-82775; E-1106) Avail: NTIS HC A02/MF A01 CSCL 05A

An overview of work at the NASA Lewis Research Center in the areas of aeronautics space, and energy is presented. Local and national impact of the work is discussed. Some aspects of the U.S. research and technology base, the aerospace industry, and foreign competition are discussed. In conclusion, U.S. research and technology programs are cited as vital to U.S. economic health. Author

N82-20007# Helsinki Univ. of Technology, Espoo (Finland). Lab. of Information Processing Science.
AN APPROACH FOR GROSS DESIGN OF OPERATIONS MANAGEMENT SYSTEMS Ph.D. Thesis
Eero Eloranta 1981 120 p refs
(ISBN-951-752-308-4; ISSN-0356-5068) Avail: NTIS HC A06/MF A01

The control aspect of management systems is studied. Subtasks of management planning, directing and montoring are closely related to those of control, defined as recepting, effecting and informing or sensing, selecting and effecting. Management is considered the control of an organization by one of more of its parts. The redesign of management systems implies an improvement in effectiveness or in efficiency, measured of just estimated by tangible or intangible benefits. Effectiveness is to do the right thing while efficiency is to do the thing right. A change in effectiveness rather than a change in efficiency is emphasized. The very first stage of the design process start from a vague problem identification and end at a project proposal for detailed design of improvement. The gross design of operations management systems is introduced. S.L.

N82-20008# General Electric Co., Santa Barbara, Calif. Center for Advance Studies.
PLANNING STUDY TO ESTABLISH DOD MANUFACTURING TECHNOLOGY INFORMATION ANALYSIS CENTER Final Technical Report, May 1980 - Jan. 1981
Jan. 1981 191 p refs
(Contract DAAG46-80-C-0026)
(AD-A108925; GE80TMP-43) Avail: NTIS HC A09/MF A01 CSCL 05/1

Based on the results of the planning study, it is recommended that the DoD sponsor and initiate administrative procedures to establish an MTIAC within 2 years with the mission of improving the diffusion of DoD Manufacturing Technology (MT) program results by serving as a focal point between defense-related industries and the Military Services. It is also recommended that the MTIAC be: (1) Operated and staffed by one of several qualified nongovernment, DoD contractor organizations; (2) Administered by DLA and technically monitored by a Military Services agency such as AMMRC; and (3) Initially funded (by OSD and the Military Services) at an annual level ranging from $400,000 to $700,000 with a growth not to exceed $1,000,000 in 5 years. GRA

N82-20009# Texas Univ. at Arlington. Center for Cybernetics Studies.
AN MDI MODEL AND AN ALGORITHM FOR COMPOSITE HYPOTHESES TESTING AND ESTIMATION IN MARKETING
A. Charnes, W. W. Cooper, D. B. Learner (Market Research Corp. of America), and F. Y. Phillips (Market Research Corp. of America) Sep. 1981 33 p refs Prepared in cooperation with Carnegie-Mellon Univ.
(Contracts N00014-81-C-0236; N00014-81-C-0410; NR Proj. 047-021)
(AD-A109147; CCS-397) Avail: NTIS HC A03/MF A01 CSCL 05/1

A strategy is provided for using constrained versions of the MDI (minimum discrimination information) statistic to test and estimate market relations involving composite hypotheses. An algorithm for applying the tests and effecting the estimates is also provided along with numerical illustrations. Other, more general, developments in statistics and mathematical programming (duality) theories and methods are also briefly discussed for their possible bearing on further uses in marketing research and management. Author (GRA)

N82-20010# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
IMPROVING COMMUNICATION IN ORGANIZATION OPERATION: PREPARING COMMUNICATION RESOURCES IN A LARGE ENTERPRISE [VERBESSERN DER KOMMUNIKATION IN DER BETRIEBSORGANISATION - EINSATZ VON KOMMUNIKATIONSMITTELN IN EINEM GROSSUNTERNEHMEN]
W. Bochnig 1981 6 p refs Reprint from VDI-Berichte, no. 404, 1981 p 11-13 In GERMAN
(MBB-BB-499-81-O) Avail: NTIS HC A02/MF A01

The adaptation of a large organization to the increasing use of communication methods is discussed. It is shown that with the right use of modern means of communication considerable cost reduction and time saving can be accomplished. The profit an organization can make through acceleration of information, especially when communication is a condition for production success is enumerated. Transl. by E.A.K.

N82-20011# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
TRANSFER OF AEROSPACE PROJECT MANAGEMENT TO THE DEVELOPMENT OF TECHNICAL SERIES PRODUCTION [NUTZUNG DES PROJEKT-MANAGEMENTS AUS DER RAUMFAHRT FUER DIE ENTWICKLUNG TECHNISCHER SERIENPRODUKTE]
B. Madauss 1981 47 p Partly in GERMAN and ENGLISH Presented at Battelle-Inst. Conf. on Management von Entwicklungsprojekten, Frankfurt, 26-27 Mar., 1981
(MBB-UR-482-81-O) Avail: NTIS HC A03/MF A01

The application of aerospace management techniques to commercial systems management was examined. To establish criticality and sequence of action the following measures are outlined: identification of most critical problems; layout of a complete plan for everything; identify placing elements. Aerospace management techniques are cited: decision analysis, technological forecasting, system engineering management, reliability analysis, value engineering, management information systems, and quality assurance. Transl. by E.A.K.

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N82-20012*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MODELING THE DATA SYSTEMS ROLE OF THE SCIENTIST (FOR THE NEEDS COMMAND AND CONTROL TASK)
Donald J. Hei, Jr., William J. Winter, Jr. (Sigma Data Services Corp.), Robert Brookes (Sigma Data Services Corp.), and Maureen Locke (Sigma Data Services Corp.) Sep. 1981 75 p
(NASA-TM-84028; NSSDC/WDC-A-R&S-81-04) Avail: NTIS HC A04/MF A01 CSCL 05B

Research was conducted into the command and control activities of the scientists for five space missions: International Ultraviolet Explorer, Solar Maximum Mission, International Sun-Earth Explorer, High-Energy Astronomy Observatory 1, and Atmospheric Explorer 5. A basis for developing a generalized description of the scientists' activities was obtained. Because of this characteristic, it was decided that a series of flowcharts would be used. This set of flowcharts constitutes a model of the scientists' activities within the total data system. The model was developed through three levels of detail. The first is general and provides a conceptual framework for discussing the system. The second identifies major functions and should provide a fundamental understanding of the scientists' command and control activities. The third level expands the major functions into a more detailed description. N.W.

N82-20013# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

METHODS OF IMAGE COMPRESSION WITHOUT INFORMATION LOSS [METODOS DE COMPRESSAO DE IMAGENS SEM PERDA DE INFORMACAO]

Orion deOliveira Silva Nov. 1981 21 p refs In PORTUGUESE. ENGLISH summary Presented at the 4th Natl. Congr. on Appl. and Computational Math., Rio de Janeiro, 8-11 Sep. 1981 Submitted for publication
(INPE-2274-PRE/054) Avail: NTIS HC A02/MF A01

Large programs, large blocks of text, and a wide variety of data bases can now be stored and retrieved by computers. While the storage cost has been dropping continuously, the need for compression techniques for saving memory space still exists. Several digital image compression methods that avoid information loss are presented. Details about the algorithm implementation are given, and comparative results derived from their application to remote sensing and meteorological satellite imagery. N.W.

N82-20014# Booz-Allen and Hamilton, Inc., New York.

COST DATA BASE DEVELOPMENT: A TWELVE-YEAR PERSPECTIVE

Anthony C. Leggitt 7 Oct. 1981 14 p Presented at the 16th Ann. DOD Cost Anal. Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109371) Avail: NTIS HC A02/MF A01 CSCL 05/2

We have a way to go in compiling the data needed to accomplish various cost estimating and analysis tasks. Data currently exists to answer most questions that arise and that for the most part it is partitionable to the extent required for particular applications. The real issue is one of obtaining the data in a timely manner and of reducing the redundant data collection effort needed every time a cost effectiveness question arises in the decision making arena. GRA

N82-20015# Naval Postgraduate School, Monterey, Calif.

SASS HARDWARE ARCHITECTURE AND DEVELOPMENT MONITOR

Gary Stewart Baker Jun. 1981 278 p refs
(AD-A109552; NPS52-81-016) Avail: NTIS HC A13/MF A01 CSCL 09/2

This report contains the documentation for the Secure Archival Storage System hardware architecture, developmental monitor program, amd all necessary support programs to effect programming of the firmware. Author (GRA)

N82-20016# Naval Postgraduate School, Monterey, Calif.

THE NAVAL POSTGRADUATE SCHOOL SECURE ARCHIVAL STORAGE SYSTEM. PART 2: SEGMENT AND PROCESS MANAGEMENT IMPLEMENTATION

Lyle A. Cox, Roger R. Schell, and Sonja I. Perdue Mar. 1981 451 p refs
(RR0000110)
(AD-A109553; NPS52-81-001) Avail: NTIS HC A20/MF A01 CSCL 09/2

The security kernel technology has provided the technical foundation for highly reliable protection of computerized information. However, the operating system implementations face two significant challenges: providing (1) adequate computational resources for applications tasks, and (2) a clean, straightforward structure whose correctness can be easily reviewed. This paper presents the experience on an ongoing security kernel implementation using the Advanced Micro Devices 4116 single-board computer based on the Z8002 microprocessor. The performance issues of process switching, domain changing, and multiprocessor bus contention are explicitly addressed. The strictly hierarchical (i.e., loop-free) structure provides a series of increasingly capable, separately usable operating system subsets. Security enforcement is structured in two layers: the basic kernel rigorously enforces a non-discretionary (viz., lattice model) policy, while an upper layer provides the access refinements for a discretionary policy. Author (GRA)

N82-20017# European Space Agency, Paris (France).

CATALOGUE OF ESA PUBLICATIONS IN 1980

Jacqui Miort, comp. May 1981 20 p refs
(ESA-SP-1037) Avail: NTIS HC A02/MF A01

Approximately 140 publications concerning aeronautics, astronautics, chemistry, engineering, geosciences, life sciences, mathematics, space sciences, physics, social sciences, and computer science are listed. Details of contractor reports are given. Author (ESA)

N82-20018# Intermountain Forest and Range Experiment Station, Ogden, Utah.

FORMATTING AND DOCUMENTING MULTIDISCIPLINARY DATA Forest Service Research Note

Joyce A. Schlieter Aug. 1981 6 p refs
(PB82-122862; FSRN/INT-317) Avail: NTIS HC A02/MF A01 CSCL 05B

The management of data accumulated during the course of a 5 year multidisciplinary research program is discussed. A system developed for organizing collected data is described and a reference sheet, designed to identify and facilitate data access, is shown. GRA

N82-20019# Physical Research Lab., Ahmedabad (India).

THE PERIODICAL MANAGEMENT SYSTEM

D. R. Kulkarni, R. R. Bharucha, and U. A. Ghiya 1980 42 p
(PB82-116518; PRL/TN-80-02) Avail: NTIS HC A03/MF A01 CSCL 05B

A computerized Periodical Management System was developed and implemented for the Library of the Physical Reseach Laboratory. The system monitors various procedures related to procurement of periodicals. It also processes the information related to periodicals and presents it in the form of comprehensive reports. Thus the system leads to better management of periodicals as well as better service to the users. The system was made operational on the Computer System IBM 360/44 under the operating system 44 PS. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N82-20020# European Space Agency, Paris (France).

THE ECONOMIC IMPACT OF AN OPERATIONAL EUROPEAN METEOROLOGICAL SATELLITE PROGRAM IN THE 1980'S

W. R. Burke, ed. and N. Longdon, ed. Dec. 1980 28 p Prepared by Eurosat S.A. Original contains color illustrations
(ESA-BR-03; ISSN-0250-1589) Avail: NTIS HC A03/MF A01

The Meteosat program is reviewed and the cost/benefit ratios of a European Meteosat type network are extrapolated for the period 1979 to 1990, based on Meteosat costs. Only those benefits accruing from the improvement of conventional meteorological products are considered. Taking inflation rates and growth in gross domestic product into account, the effects on all major sectors of economic activity are reviewed and the impact on all the countries in the Meteosat coverage zone is assessed. Benefits are conservatively estimated at three times the corresponding expenditure. Author (ESA)

N82-20021# Interior Dept., Washington, D.C. Office of Minerals Policy and Research Analysis.

COBALT: EFFECTIVENESS OF ALTERNATIVE US POLICIES TO REDUCE THE COSTS OF A SUPPLY DISRUPTION

Elizabeth Abbe, Robert Adams, Julius Chang, Thomas Doyle, Ron Hurdelbri, Stan Miller, David Quick, and Ted Tupper Aug. 1981 100 p
(PB82-110560; DOI/OMPRA-81/01) Avail: NTIS HC A05/MF A01 CSCL 05C

During the 1980-90 period there is a low probability of a severe disruption in cobalt exports from Zaire and Zambia and a high probability of several smaller disruptions in 1985 and 1986. Since cobalt has few good substitutes and often constitutes a small proportion of the total cost of a product, large cobalt price increases do not result in significant losses in consumption. Effective U.S. policies tend to be supply oriented and stockpile oriented rather than demand oriented. The effectiveness of tested policies depends on the timing, costs and severity of the supply disruption expected. The maximum social cost to the United

States of a cobalt supply disruption is estimated based on a market analysis and on an interindustry model. Strategic Stockpile releases alone or in combination with a domestic production price guarantee are an effective policy for moderating economic impacts for all disruptions analyzed. GRA

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

No abstracts in this category.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

N82-20022*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

FUTURE FUELS AND ENGINES FOR RAILROAD LOCOMOTIVES. VOLUME 1: SUMMARY

S. G. Liddle, B. B. Bonzo, G. P. Purohit, and J. A. Stallkamp 1 Nov. 1981 41 p

(Contracts NAS7-100; DE-AI01-78CS-55151)

(NASA-CR-168642; JPL-Pub-81-101-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 13F

The potential for reducing the dependence of railroads on petroleum fuel, particularly Diesel No. 2 was investigated. Two approaches are studied: (1) to determine how the use of Diesel No. 2 can be reduced through increased efficiency and conservation, and (2) to use fuels other than Diesel No. 2 both in Diesel and other types of engines. Because synthetic hydrocarbon fuels are particularly suited to medium speed diesel engines, the first commercial application of these fuels may be by the railroad industry. B.W.

N82-20023# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

MODELS OF PROJECTION AND LOCALIZATION OF URBAN POPULATION USING SIMULATION TECHNIQUES

Maria Suelena Santiago Barros, Damaceno Dal Bianco, and Odwaldo Bueno Netto, Jr. Aug. 1981 25 p refs In PORTUGUESE; ENGLISH summary Presented at 33d Ann. Meeting of SBPC, Salvador, 8-15 Jul. 1981

(INPE-2207-PRE/013) Avail: NTIS HC A02/MF A01

A method for the projection and location of urban population is presented using multivariate simulation of the supply and demand of urban space, applying Monte Carlo technique. The calibration of this model is attained by stratified sampling in homogeneous occupation zones, defined through remote sensing, from which results a considerable reduction of the sample size for the same precision and confidence level. The total future population of the city is an exogenous variable, which is then distributed through simulation over the urban area. Addressing the demand for urban space the model proceeds to reproduce the households' site selection process through simulation of the decision variables values in the following sequence: income, construction standards and the neighborhood urbanization level. Author

N82-20024# Commerce Dept., Washington, D.C. Patent and Trademark Office.

TECHNOLOGY ASSESSMENT AND FORECAST REPORT, 10TH

Nov. 1981 175 p

(Rept-10) Avail: NTIS HC A08/MF A01

Patent and Trademark Office subclasses that are very active or predominantly of foreign origin are examined as an aid to identifying technologies having such characteristics. The 50 most active subclasses in chemical, electrical, and mechanical disciplines are presented showing highest growth, highest growth rate, and highest foreign resident inventor share. The influence in the U.S. technology market of five European and five Japanese corporations owning and/or controlling the most U.S. Patents for the period 1963-1980 is assessed. Patenting in computer software related technologies is analyzed with focus on the present status of the law in this field and the effects of laws on seismic data processing. Applications for and patents granted in aerospace technology are discussed with particular emphasis on the uses of patent information for historical review, as a research tool, and as a bibliographical data source. A.R.H.

N82-20025# National Research Council of Canada, Ottawa (Ontario). Div. of Mechanical Engneering.

URBAN TRAFFIC SIGNAL CONTROL FOR FUEL ECONOMY. PART 2: EXTENSION TO SMALL CARS

G. S. Messenger Nov. 1981 13 p refs

(AD-A109393; DME-ME-249; NRC-19846) Avail: NTIS HC A02/MF A01 CSCL 13/6

Use of a small car's characteristics in a simulation program utilizing velocity profiles obtained in a traffic study by the Metropolitan Toronto Roads and Traffic Department and the Engine Laboratory at the National Research Council Canada has shown that trends shown in fuel consumption in NRC, Division of Mechanical Engineering Report No. ME-247 are similar for a small-engined vehicle. NRC, DME Report No. ME-247 showed that under the TRANSYT timing plan vehicles encountered fewer stops, saved time and used a slightly smaller amount of fuel than under the existing timing plan. In the above mentioned report, a large vehicle's fuel consumption was calculated using a computer model of the vehicle which used velocity profiles obtained from an instrumented floating car. GRA

N82-20026# Sheffield Univ. (England). Dept. of Control Engineering.

WARD-LEONARD CHARACTERISTICS FROM NONLINEARLY-CONTROLLED SERIES MOTOR DRIVES

J. B. Edwards, K. Pacey (Chloride Legg Ltd., Wolverhampton, England), and T. A. Al-Fileyah Nov. 1981 29 p refs Submitted for publication

(RR-165) Avail: NTIS HC A03/MF A01

Improving the maneuverability of fork lift trucks driven by chopper controlled series motors is discussed. Computerized simulation shows nonlinear feedforward cancellation of one system state (speed) to be unstable. Analytical solution of the system equations confirms this. The instability results from neglect of field inductive effects in the feedforward model. Simulation shows that a method which employs synthesized torque and transient velocity estimates derived purely from armature current feedback is highly tolerant of uncertainty in the vehicle and drive parameter estimates. It produces overall control characteristics resembling those of Ward-Leonard drives. The manual handling of the truck on a variable gradient test track shows a considerable improvement on conventional linear current control systems. Author (ESA)

N82-20027# Market Facts, Inc., Arlington, Va. Public Sector Research Group.

CONSUMER BEHAVIOR TOWARDS FUEL EFFICIENT VEHICLES. VOLUME 1: EXECUTIVE SUMMARY Final Report Oct. 1977 - Mar. 1981

James T. Heisler and Sid Groeneman Mar. 1981 22 p

(Contract DOT-HS-7-01781)

(PB82-103300; DOT-HS-805936) Avail: NTIS HC A02/MF A01 CSCL 10A

Information on likely market response to various vehicle design and performance collected to minimize the possibility of market rejection is discussed. Group discussion and consumer experiments with drivers in different vehicle size classes were used. Analysis focuses on the believability of the energy crisis and concern about its effects, the acceptability of possible fuel economy options, consumer preference with respect to vehicles embodying selected design and engineering changes, and predicted purchase and usage patterns under different future scenarios. GRA

N82-20028# Transport and Road Research Lab., Crowthorne (England). Vehicle Safety Div.
BRAKING FORCE COEFFICIENTS OF WORN TYRES
A. R. Williams, V. E. Davies, B. S. Riley, and H. A. Wilkins 1981 18 p refs
(PB82-122698; TRRL-Supplementary-672; ISSN-0305-1315)
Copyright. Avail: NTIS HC A02/MF A01 CSCL 13F

Car tires become worn in practice evenly, with one shoulder wear, with double shoulder wear, or with center wear. Peak and locked wheel brake force coefficients were measured for both new tires and those worn in these various ways. The tests were done on two research track surfaces representing the extremes of rough and smooth surfaces likely to be found on roads. Speeds ranging from 30 km/h to 125 km/h were used. GRA

N82-20029# Systems Applications, Inc., San Rafael, Calif.
APPLICATION OF THE EMPIRICAL KINETIC MODELING APPROACH TO URBAN AREAS. VOLUME 2: TULSA
G. Z. Whitten, H. Hogo, and S. D. Reynolds Research Triangle Park, N.C. EPA May 1981 194 p refs
(Contract EPA-68-02-3376)
(PB82-114224; Rept-49B-81-EF-81-116; EPA-450/4-81-005B) Avail: NTIS HC A09/MF A01 CSCL 13B

The EKMA was evaluated using applications in the Tulsa area primarily by comparing the trajectory model that forms the basis of the EKMA (OZIPP) with other more sophisticated models. The study was carried out at several levels, beginning with evaluation of OZIPP and ending with an evaluation of the control strategy predictions that result from employing the EKMA isopleth methodology. The OZIPP trajectory model was compared with the SAI airshed model and the SAI trajectory model, as well as with some modified versions of the original OZIPP model. The basic OZIPP model is a simple moving air parcel, or trajectory, model that uses a detailed chemical mechanism for the surrogate propylene and butane hydrocarbons. GRA

88 SPACE SCIENCES (GENERAL)

N82-20030# European Space Agency, Paris (France).
PLASMA ASTROPHYSICS
T. D. Guyenne, ed. and G. Levy, ed. Nov. 1981 571 p refs Proceedings of Intern. School of Plasma Phys. Course and Workshop, Varenna, Italy, 27 Aug. - 7 Sep. 1981; sponsored by CNR, CNES, ESA, Milan Univ., Regione Lombardia, Italy, Camera di Commercio di Como, Italy, Cassa di Risparmio delle Provincie Lombarde, Italy and Gilardoni S.p.A.
(ESA-SP-161; ISSN-0379-6566) Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Plasmas in the universe, plasma processes, the Sun and heliosphere, and galaxies and radiogalaxies are discussed. X-ray astronomy and the physics of collapsed objects are covered. Other subjects treated are particle acceleration, accretion, collective phenomena, and cosmic rays. The correlation between plasma physics and astrophysics as well as solar and interplanetary processes were also dealt with. For individual titles, see N82-20031 through N82-20086.

N82-20031# California State Univ., San Diego.
THE NEW PARADIGM IN COSMIC PLASMA PHYSICS c90
H. Alfven *In* ESA Plasma Astrophys. Nov. 1981 p 3-10 Sponsored in cooperation with Royal Inst. of Tech., Stockholm (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A transition in accepted cosmic theory from a magnetic field description to an electric current description is propounded. The change in paradigm in cosmic plasma physics was surveyed. Particle description often gives a better picture than a hydromagnetic one. A frozen-in field line model is sometimes useful, although often erroneous because of boundary condition mistakes. The inhomogeneous structure (cellular structure) of space plasmas is emphasized in opposition to homogeneous models. Electric circuits offer a good first approximation. While the evolution of the solar system continues to be explained almost exclusively by mechanical forces, plasma effects seem essential for the formation and evolution of interstellar clouds, for band structure, and for cosmogonic shadow effects. Author (ESA)

N82-20032# Royal Inst. of Tech., Stockholm (Sweden).
THE VOYAGER 1 SATURN ENCOUNTER AND THE COSMOGONIC SHADOW EFFECT c91
H. Alfven *In* ESA Plasma Astrophys. Nov. 1981 p 11-21 refs Prepared in cooperation with California State Univ., San Diego (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The cosmogonic shadow effect is described, considering charged particles (electrons, ions, charged dust) in an axisymmetric dipole field around a gravitating, rotating body. The medium is two-thirds supported by centrifugal force and one-third by electromagnetic forces under the condition that the magnetic field is strong enough to control the motion. If the electromagnetic forces disappear, e.g., by deionization of the dusty plasma, the medium contracts to two-thirds its original central distance. The Voyager 1 Saturn results demonstrate that the macrostructure of the Saturnian ring system can be explained as a result of this effect at the formation of the system. A similar analysis of the asteroidal belt shows that its macrostructure can also be explained by the cosmogonic shadow effect. The observational results show that during their formation both the Saturnian rings and the asteroidal belt passed a plasma state dominated by electromagnetic effects. Author (ESA)

N82-20033# Chicago Univ., Ill. Dept. of Physics.
THE MAGNETOHYDRODYNAMIC DYNAMO c90
E. N. Parker *In* ESA Plasma Astrophys. Nov. 1981 p 23-29 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A mechanism for the maintenance of the magnetic fields of planets, stars, and galaxies is postulated. It appears that cyclonic convection and nonuniform rotation within the liquid metal cores of planets, the convective zones of stars, and the gaseous disks of galaxies provide an efficient dynamo mechanism for the production of these fields. The dominant field within the body is azimuthal, produced by nonuniform rotation from the poloidal field. The interaction of cyclonic convection within the azimuthal field produces loops of flux in meridional planes whose net effect is a meridional circulation of field in the same sense as the original poloidal field. Both stationary and oscillatory fields can be generated in this way. Author (ESA)

N82-20034# Chicago Univ., Ill. Dept. of Physics.
THE NONEQUILIBRIUM OF MAGNETIC FIELDS c90
E. N. Parker *In* ESA Plasma Astrophys. Nov. 1981 p 31-35 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The more subtle properties of magnetic fields which create nonequilibrium and lead to vigorous activity in otherwise sluggish gas-field systems are evaluated for gross hydromagnetic effects. The gentle manipulation of magnetic fields on a large scale leads to the production of small scale variations and discontinuities, providing intense dissipation of magnetic field in a large scale system. A magnetic field embedded in a conducting fluid possesses a static equilibrium only if the topology of the lines of force is suitably invariant along the direction of the field. When the field does not possess the necessary invariance, it is subject to internal neutral point reconnection. The magnetic fields of most stars suffer such nonequilibrium, and consequent enhanced dissipation, providing an important source of heat in their outer atmospheres. Author (ESA)

N82-20035# Nagoya Univ. (Japan). Dept. of Astrophysics.
INTERSTELLAR MATTER c90
S. Hayakawa *In* ESA Plasma Astrophys. Nov. 1981 p 37-42 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Several components of the interstellar medium were demonstrated to coexist by thermal balance and/or pressure balance. The two phase stability is explained by the temperature and density dependencies of the heating and cooling rates. Cooling rates are given for a thin hot plasma under ionization equilibrium for the interstellar media of solar abundances and of metal depleted abundances. Thermal instabilities are discussed with regard to the temperature dependence of the cooling rate. A deviation from ionization equilibrium and from electron-ion equipartition may take place in a tenuous plasma. Numerical examples of the nonsteady behavior are shown. The generation of a hot plasma by supernova blast waves is discussed on the basis of evolution models of the supernova remnant. Obervational results, indicating the distribution of the hot plasma component are presented in reference to soft X-ray and nonthermal radio maps. Author (ESA)

N82-20036# Oxford Univ. (England). Magdalen College.

MODULATIONAL INSTABILITIES IN ASTROPHYSICS c75

D. terHaar *In* ESA Plasma Astrophys. Nov. 1981 p 45-49 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The occurrence of modulational instabilities in an isotropic, unmagnetized plasma is discussed and an extension of the theory to magnetized plasmas is considered. The basic equations were derived, following a two fluid description of the plasma. Application to the theory of type 1 solar bursts is proposed. Type 3 solar bursts, auroral kilometric radiation, and pulsar radiation are also dealt with. Galactic density waves are another manifestation of modulational instabilities in astrophysics. Author (ESA)

N82-20037# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.

STABILITY OF THE EQUILIBRIUM STATES OF THE INTERSTELLAR GAS AND FIELD SYSTEM c90

Catherine J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 51-59 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Possible static equilibrium configurations of the interstellar gas-fields system (including cosmic rays) are described and were tested for stability. The simplest equilibrium configurations, with horizontal magnetic fields and with equal scale heights for the three components (stratified equilibrium), are unstable if the polytropic index of the gas is larger than a critical value. The perturbations that grow most rapidly have wavelengths equivalent to several 100 parsecs along the field and very short wavelengths across the field. The stability of two dimensional curved equilibria, where the magnetic field lines lie in planes orthogonal to the galactic plane, can be tested using the MHD energy principle. It is found that any state connected through flux freezing with an initially unstable horizontal state is also unstable to perturbations with a short transverse wavelength. Author (ESA)

N82-20038# Academy of Sciences (USSR), Moscow. Inst. of Physics.

PLASMA EMISSION MECHANISMS AND ACCELERATION OF RELATIVISTIC PARTICLES IN COSMIC PLASMAS c90

V. N. Tsytovich *In* ESA Plasma Astrophys. Nov. 1981 p 61-75 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Recent theory in plasma physics was reviewed, and the emission mechanism for relativistic particles in space was analyzed. The difference between the synchrotron emission mechanism and emission in random small-scale magnetic fields is clarified. It is emphasized that often in space, relativistic particles have a power-law energy distribution. Cosmic emission also has a power-law frequency dependance. For a synchrotron emission mechanism, there exists a universal relation between gamma and mu, i.e., mu = 1/2 (gamma - 1). Whether this relation is indeed universal is discussed. Results show under which circumstances the relation is not valid and what kind of relation should be used in the case of relativistic particle emission, e.g., in a small-scale random field or in strong turbulence. Author (ESA)

N82-20039# Academy of Sciences (USSR), Moscow. Inst. of Space Research.

WEAK TURBULENCE THEORY OF ENHANCED GAS IONIZATION BY PLASMA FLOW c75

A. A. Galeev *In* ESA Plasma Astrophys. Nov. 1981 p 77-82 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A quasilinear theory of collisionless energy transfer from a counterstreaming plasma-gas flow to electrons is presented. The critical ionization velocity was reexamined. It is recognized that this phenomenon requires enhanced heating of electrons, via some hypothetical collisionless interaction between plasma species, that can be studied by a well developed weak plasma turbulence theory. Since a plasma cannot interact collisionlessly with a neutral gas, it is assumed that, in astrophysical situations, some seed ionized atoms are produced in the plasma flow by external ionization sources, e.g., stellar ultraviolet radiation. The orbits of newly ionized atoms are such that they form an unstable distribution in a velocity space. Although the branch of plasma modes excited by an instability is the same in a wide range of plasma and field parameters, the driving term has a different form in two limiting cases, which are considered. Author (ESA)

N82-20040# Princeton Univ., N. J.

IDEAL MHD FLUIDS c75

Russell M. Kulsrud *In* ESA Plasma Astrophys. Nov. 1981 p 83-87 (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN and NO (+20% others)

The general properties of the fluids are discussed. In particular, the definition and significance of flux freezing is emphasized. Energy conservation was demonstrated and its importance for plasma motion and equilibrium is shown. These concepts are illustrated by a model of magnetic fields above the solar photosphere. Author (ESA)

N82-20041*# Maryland Univ., College Park. Dept. of Physics and Astronomy.

PLASMA LASERS (A STRONG SOURCE OF COHERENT RADIATION IN ASTROPHYSICS) c36

K. Papadopoulos *In* ESA Plasma Astrophys. Nov. 1981 p 89-95 refs (For primary document see N82-20030 10-88)

(Contracts NAGw-81; N00014-79-C-0665)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 20E

The generation of electromagnetic radiation from the free energy available in electron streams is discussed. The fundamental principles involved in a particular class of coherent plasma radiation sources, i.e., plasma lasers, are reviewed, focusing on three wave coupling, nonlinear parametric instabilities, and negative energy waves. The simplest case of plasma lasers, that of an unmagnetized plasma containing a finite level of density fluctuations and electrons streaming with respect to the ions, is dealt with. A much more complicated application of plasma lasers to the case of auroral kilometric radiation is then examined. The concept of free electron lasers, including the role of relativistic scattering, is elucidated. Important problems involving the escape of the excited radiation from its generation region, effects due to plasma shielding and nonlinear limits, are brought out. Author (ESA)

N82-20042# Rome Univ. (Italy). Ist. Astronomico.

RADIATION PROCESSES IN ACTIVE GALACTIC NUCLEI c93

A. Cavaliere *In* ESA Plasma Astrophys. Nov. 1981 p 97-103 refs Sponsored by CNR (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The peculiar conditions of the plasma filling the emission regions of the powerful continuum radiation from active galactic nuclei and quasars are discussed. The plasma is energized by gravitation; it is radiation dominated, out of thermal equilibrium, at least weakly relativistic, and it is likely to comprise a large number of positrons. Specific tenets of plasma physics are called into question. Author (ESA)

N82-20043# Princeton Univ., N. J. Dept. of Astrophysical Sciences.
PARTICLE ACCELERATION c93
Russell M. Kulsrud *In* ESA Plasma Astrophys. Nov. 1981 p 105-109 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The general theory of particle acceleration is illustrated by three particular types of acceleration. These are Fermi acceleration, acceleration by strong electromagnetic waves such as those assumed to be produced by pulsars, and acceleration by collisionless shocks. The physical processes involved as well as the amount of acceleration produced in each case are discussed. Fermi acceleration is entirely stochastic. Pulsar acceleration is entirely coherent. Shock acceleration is a mixture of the two in which stochastic acceleration is organized by the shock in such a way as to yield a good power spectrum. Author (ESA)

N82-20044# Utrecht State Univ. (Netherlands). Inst. of Astronomy.
HEATING PROCESSES OF THE SOLAR CORONA c92
M. Kuperus *In* ESA Plasma Astrophys. Nov. 1981 p 113-128 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Coronal heating processes are discussed in the context of the magnetic structure of the solar corona. Existing theories are divided into acoustic theories, where the magnetic field plays a passive role, and electrodynamic theories where the magnetic field plays an active role in the sense that transversal waves are possible. The dissipation mechanisms are shock wave dissipation in the acoustic theory and viscous and Joule dissipation of Alfven waves in the electrodynamic theory. The dissipation of Alfven waves appears to be much more effective in a structured medium than in a homogeneous medium. Anomalous Joule heating is likely to be important as a steady heating mechanism. Author (ESA)

N82-20045*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
PLASMA DYNAMICS IN THE RAPIDLY ROTATING MAGNETOSPHERE OF JUPITER c91
John W. Belcher *In* ESA Plasma Astrophys. Nov. 1981 p 129-134 refs (For primary document see N82-20030 10-88) (Contract JPL-953733; Grant NGR-22-009-015)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

The major Voyager findings concerning the low energy plasma in the Jovian magnetosphere are reviewed. The magnetosphere of Jupiter is unique in the solar system because of its large extent and rapid rotation, and because of the prodigious source of plasma provided by the satellite Io. Io injects > 10 to the 29th power AMU/sec of freshly ionized material into the Jovian magnetosphere, producing a plasma dominated by heavy ions which are mostly various ionization states of oxygen and sulfur. This injected material is the source for the Io plasma torus, which is centered at Io's L-shell with a scale height of 1 Jovian radii and a mass of approximately 10 to the 38th power AMU. Ninety percent of the injected plasma diffuses outward, forming the Jovian magnetodisk. Io interacts with the plasma torus via the generation of an Alfven wave which propagates from Io into the ionosphere of Jupiter, carrying an energy flux of approximately 10 to the 12th power watts. Author (ESA)

N82-20046*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
INFERENCES ABOUT THE SOLAR WIND DYNAMICS FROM OBSERVED DISTRIBUTIONS OF ELECTRONS AND IONS c92
Stanislaw Olbert *In* ESA Plasma Astrophys. Nov. 1981 p 135-143 refs (For primary document see N82-20030 10-88) (Grant NGR-22-009-015)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+ 20% others) CSCL 03B

Recent measurements, mostly from Helios and Voyager, were reviewed. The observational material was compiled into a series of radial profiles for various macroscopic plasma parameters. Several examples for experimentally determined three-dimensional distribution functions of protons are shown. The physical properties of the solar wind electrons were surveyed. The still unresolved question of the driving mechanism of the solar wind is considered. The problem of the energy balance in pure, high velocity streams emanating from solar coronal holes was outlined. It is suggested that the suprathermal electrons may play an important role in driving the wind. Numerical estimates, referring to the lower corona, are offered in support of this hypothesis. Author (ESA)

N82-20047# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.
PLASMA PROCESSES AT COLLISIONLESS SHOCK WAVES c75
V. Formisano *In* ESA Plasma Astrophys. Nov. 1981 p 145-165 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The importance of the curvature of the Earth bow shock surface for particle acceleration is discussed. Plasma quantities at collisionless shock waves obey the generalized Rankine-Hugoniot relations. Four parameters are considered: the magnetosonic Mach number, the angle between the shock normal and the upstream magnetic field direction, the ratio of particle pressure to magnetic pressure, and the electron to ion temperature ratio. At low Mach number (M < or = 3), the shock is resistive. Between M = 3 and M = 5, viscosity is needed to dissipate the solar wind energy. Above M = 5, ion gyration becomes important with the dissipation length on the order of one or several ion gyroradii. Both electromagnetic and electrostatic turbulence were observed. Two processes for accelerating particles seem to be working at the Earth bow shock: one based essentially on the electric field tangent to the shock seen by particles trying to move upstream; the other working on particles already accelerated with the previous mechanism, being a Fermi-like mechanism and operating in front of quasi-parallel shocks. Author (ESA)

N82-20048# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.
THE INTERNATIONAL SOLAR POLAR MISSION (ISPM) c92
R. G. Marsden and K.-P. Wenzel *In* ESA Plasma Astrophys. Nov. 1981 p167-175 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The scientific objectives of the instrumentation chosen to carry out the exploratory investigations of ISPM are reviewed, including mission time-lines and trajectory. The ISPM will allow exploration of the heliosphere within a few astronomical units of the Sun over the full range of heliographic latitudes. The prime mission objective is to study, as a function of solar latitude, the properties of the interplanetary medium and solar corona. The ISPM is a cooperative mission carried out jointly by ESA and NASA, to be launched in the mid-1980's and utilizing a Jupiter gravity assist to achieve a high solar latitude trajectory. The scientific instrumentation was designed to explore, in the third heliospheric dimension, the properties of the solar corona, the solar wind, the Sun-wind interface, the heliospheric magnetic field, solar radio bursts and plasma waves, solar and galactic cosmic rays, and interplanetary/interstellar neutral dust and gas. Author (ESA)

N82-20049# Academy of Sciences (USSR), Moscow. Inst. of Space Research.
ORIGIN OF THE LARGE-SCALE STRUCTURE OF THE UNIVERSE c90
I. D. Novikov *In* ESA Plasma Astrophys. Nov. 1981 p 179-189 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The problems in galaxy formation theory associated with plasma astrophysics and plasma theory were related to a theory of origin for the large-scale structure of the universe. Gravitational stability of an expanding relativistic plasma and the evolution of relic neutrino perturbations were considered. The gravitational forces of neutrino perturbations influence the growth of density perturbations in a photon plasma. The nonlinear stage in the kinetic evolution of inhomogeneities due to free gravitating particles in an expanding gravitational medium was numerically simulated. Results for a one dimensional and for a two dimensional gravitational instability are presented. A cosmology of primordial sound waves is hypothesized. Author (ESA)

N82-20050# Massachusetts Inst. of Tech., Cambridge.

GALACTIC DYNAMICS AND GRAVITATIONAL PLASMAS c90

C. C. Lin and G. Bertin *In* ESA Plasma Astrophys. Nov. 1981 p 191-205 refs Sponsored by CNR and NSF (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF Member States, AU, CN, and NO (+20% others)

Phenomena associated with the collective behavior of stellar systems are discussed, focusing on the problem of spiral structure of galaxies. The density wave theory in a relatively complete form makes it possible to formulate a dynamical classification of spiral galaxies. Realistic galaxy models were found to support discrete unstable spiral modes. Modes can be unstable or stable and they can be either normal spiral modes or barred spiral modes, depending on the properties of the equilibrium model. A tentative proposal is that these modes correspond to normal spiral galaxies and transition barred galaxies along with some barred galaxies. Issues related to such a proposal are addressed. Author (ESA)

N82-20051# California Inst. of Tech., Pasadena.

EXTRAGALACTIC RADIO SOURCES c93

R. D. Blandford *In* ESA Plasma Astrophys. Nov. 1981 p 207-214 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Recent observational and theoretical developments in the study of extragalactic radio sources are reviewed. Over 70 radio sources possess jets (narrow features that appear to link the main radio emitting regions with the nuclei of the associated galaxies or quasars). It is argued that these jets are conduits along which flow mass, momentum, energy and magnetic flux. Particular attention is paid to symmetric sources, magnetic collimation and instabilities. These observations are interpreted with a unified theory of active extragalactic objects. Author (ESA)

N82-20052# Cornell Univ., Ithaca, N. Y. Dept. of Applied Physics.

EXTRAGALACTIC DOUBLE RADIO SOURCES c93

R. V. E. Lovelace and H. A. Scott *In* ESA Plasma Astrophys. Nov. 1981 p 215-221 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A unified model of double radio sources in which the accretion disk of a massive black hole acts as a unipolar induction dynamo, producing oppositely directed beams of relativistic particles is discussed. The hydrodynamics of accretion flow with angular momentum are considered. The empty vortex funnels which are found to occur are essential both in providing a path of easy egress for the outward propagation of beams and in collimating the beams. Hydrodynamic jets are found under some conditions and these may be relevant to mass outflow from active galactic nuclei. The factors which determine the axial magnetic field strength near the inner edge of the accretion disk of the black hole are treated. Author (ESA)

N82-20053*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.

EVOLUTION OF X-RAY ASTRONOMY c89

Bruno Rossi *In* ESA Plasma Astrophys. Nov. 1981 p 225-249 refs (For primary document see N82-20030 10-88)
(Contract NAS5-24441)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03A

The development of X-ray astronomy, stopping short of recent observations by grazing incidence telescope, is surveyed. The discovery in 1962 of an extrasolar X-ray source, Sco X-1, with orders of magnitude stronger than astronomers believed might exist is recounted. It turned out to belong to a class of previously unknown galactic objects, the X-ray stars. The identification of a strong X-ray source with the Crab Nebula and the identification of Sco X-1 with a faint, peculiar optical object soon followed. The demonstration that X-ray stars are binary systems, each consisting of a collapsed object (a neutron star, occasionally a black hole) accreting matter from an ordinary star, and the discovery of X-ray bursts are further milestones. The discovery of exceedingly strong X-ray emission from active galaxies, quasars and clusters of galaxies and the demonstration that in these the principal X-ray source is a hot gas filling the space between galaxies sum up results. Author (ESA)

N82-20054# Tokyo Univ. (Japan).

DIAGNOSIS OF THE NEUTRON STAR AND ITS ENVIRONMENT WITH X-RAY ASTRONOMY c89

Minoru Oda *In* ESA Plasma Astrophys. Nov. 1981 p 251-263 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The physics of the neutron star, its atmosphere and its environment are discussed, relating to observational results from X-ray astronomy. The behavior of an X-ray pulsar, Vela X-1, observed with the X-ray astronomy satellite Hakucho, is considered in relation to the nature of the neutron star and its interaction with an accretion disk. X-ray bursts, also observed with the satellite, are a rich source of information for physics of the atmosphere and the plasma environment of the neutron star. The hard X-ray imaging of the Crab Nebula undertaken by balloon observation reveals the internal structure of the Crab Nebula. Author (ESA)

N82-20055# Cambridge Univ. (England). Inst. of Astronomy.

PRODUCTION AND PROPAGATION OF JETS c93

Martin J. Rees *In* ESA Plasma Astrophys. Nov. 1981 p 267-271 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The processes in active galactic nuclei which give rise to the large-scale jet structures in radio galaxies are dealt with. The physical conditions in beam plasma and the initial collimation are treated. Collimated jets are set up within a few parsecs of a massive black hole. Jet physics show that the large-scale radio structures are influenced by the galactic and extragalactic environment. The energy densities are low; the speeds are probably not relativistic. Even though the physics is not extreme, large-scale source morphology is comparable to computational meteorology for complexity. Primary energy production seems easier to understand, even though it entails more extreme conditions, e.g., relativistic flows, black holes. The crucial processes may be quite symmetric and thus more amenable to serious modelling. Author (ESA)

N82-20056# California Univ., Berkeley. Dept. of Astronomy.

PULSAR THEORY: PARTICLE ACCELERATION AND PHOTON EMISSION IN THE POLAR FLUX TUBE c90

Jonathon Arons *In* ESA Plasma Astrophys. Nov. 1981 p 273-289 refs (For primary document see N82-20030 10-88)
(Grant NSF AST-79-23243)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Particle acceleration and photon emission in the polar field lines of a pulsar are considered. Observations of pulsar pulse, subpulse and micropulse morphology, spectra and polarization, as well as high frequency radiation are reviewed and used to suggest a steady streaming model with pair creation as the seat of the emission phenomenon. The energetics of polar beam flow are described with emphasis on acceleration in a slot gap. A possible global model of the magnetosphere is outlined. The plasma content of the flow is described, then used to discuss several transfer processes which may be associated with subpulse morphology and polarization and with the formation of micropulses. Various ideas about possible emission processes are discussed with emphasis on emission from shear flows in the boundary layers of the pair plasma flow. A model of the origin of marching subpulses is suggested, involving a rotating drift wave over the polar cap. Author (ESA)

N82-20057# Los Alamos Scientific Lab., N. Mex.
SUPERNOVA HYDRODYNAMICS c90
Stirling A. Colgate *In* ESA Plasma Astrophys. Nov. 1981 p 291-296 refs Sponsored by California Univ. and NSF Prepared in cooperation with New Mexico Inst. of Mining and Technology
(For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The physics as well as astrophysics of the supernova (SN) phenomenon are illustrated with the appropriate numbers. The explosion of a star, a supernova, occurs at the end of its evolution when the nuclear fuel in its core is almost, or completely, consumed. The star may explode due to a small residual thermonuclear detonation, type I SN, or it may collapse, type I and type II SN, leaving a neutron star remnant. The type I progenitor is thought to be an old accreting white dwarf, 1.4 interior mass, with a close companion star. A type II SN is thought to be a massive young star, 6 to 10 interior mass. The mechanism of explosion is still a challenge to model, being the most extreme conditions of matter and hydrodynamics that occur presently and excessively in the universe. Author (ESA)

N82-20058# Cambridge Univ. (England). Inst. of Astronomy.
HOT PLASMAS IN ACTIVE GALACTIC NUCLEI c90
Martin J. Rees *In* ESA Plasma Astrophys. Nov. 1981 p 297-301 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Transrelativistic plasma, where the mean energy per particle may be > or equivalent to (m sub e) c squared, is considered. In the deep potential well around a compact object, plasma can retain thermal energies of 1 to 100 Mev per particle, even if it is gravitationally bound. The radiative losses are then likely to be due to synchrotron/Compton emission. Pair production may be so prolific that positrons greatly outnumber the ions; the ion and electron temperatures would be unequal unless there are strong collective effects which couple them. These processes, important in determining the radiative and dynamical properties of galactic nuclei, are described. Author (ESA)

N82-20059# Ecole Polytechnique, Palaiseau (France). Centre de Physique Theorique.
ON THE POSSIBILITY OF EXISTENCE OF LARGE AMPLITUDE WAVES AROUND PULSARS c90
Estelle Asseo *In* ESA Plasma Astrophys. Nov. 1981 p 309-312 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Possible acceleration of particles is related to the properties of propagation and stability of large amplitude waves. Radiative damping effects compete with Weibel instability to prevent the propagation of large amplitude, low frequency, linearly polarized plasma waves. These inhibition phenomena are important for understanding the eventual acceleration of particles in the strong waves emitted by pulsars beyond the light cylinder distance. Due to the electric field induced by the rotation of a star, electromagnetic forces in the direction of the magnetic field lines dominate gravitational ones. Charged particles cannot remain bounded to the neutron star surface; they form a plasma which flows along closed and open magnetic field lines, fills the pulsar magnetosphere, and reaches regions beyond the light cylinder. The large amplitude radiated wave propagates through this plasma. Realistic models have to include simultaneously the electromagnetic wave emission and the relativistic plasma outflow. Author (ESA)

N82-20060*# Maryland Univ., College Park. Dept. of Physics and Astronomy.
ELECTRON ACCELERATION IN MAGNETOSONIC SHOCK FRONTS c93
K. Papadopoulos *In* ESA Plasma Astrophys. Nov. 1981 p 313-315 refs (For primary document see N82-20030 10-88) (Grant NAGw-81; Contract N00014-79-C-0665)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

It is shown that the low frequency turbulence driven by ions reflected in the foot of magnetosonic shocks can accelerate electrons to large energies. The mechanism seems to account for the energetic electron fluxes and the associated wave activity observed in the Earth bow shock. Author (ESA)

N82-20061# Commissariat a l'Energie Atomique, Saclay (France) Section d'Astrophysique.
HIGH ENERGY COSMIC RAY ACCELERATION BY DIFFUSIVE SHOCKS c93
P. O. Lagage and C. J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 317-318 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Difficulties with the mechanism of acceleration of cosmic rays by shock waves are addressed. One of the problems is that shock waves cannot accelerate particles to very high energies. This is because the mean time between shock crossings is long for high energy particles so that the acceleratien process is slow. A derivation of the mean crossing time is presented which has the advantage of being readily generalized when the diffusion coefficient is space dependent. The upper limit to the energy that can be attained for a supernova shock, and for a stellar wind terminal shock, is evaluated. Author (ESA)

N82-20062# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.
COSMIC RAY ACCELERATION BY STELLAR WINDS AND SELF-CONFINEMENT IN GIANT H2 REGIONS c93
T. Montmerle and C. J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 319-322 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

An idealized model of galactic cosmic ray acceleration by stellar winds is explained. The region behind the stellar wind shock, filled with a hot, tenuous gas, forms a bubble which expands gradually into the interstellar medium. Acceleration by a plane wave is considered; all the acceleration takes place in the low density regions on both sides of the shock. The cosmic rays are accelerated at the shock boundary of the stellar winds and are partially confined in the H2 region and in the molecular cloud. The cosmic ray density near the acceleration region is high. However, the associated pressure remains low with respect to the gas pressure and its effect on the shock structure is negligible. If the particles accelerated by this mechanism are extracted from the wind, implied injection rate is very low. Author (ESA)

N82-20063# Nagoya Univ. (Japan). Dept. of Astrophysics.
OBSERVABLE PROPERTIES OF ACCRETION DISKS c89
S. Hayakawa *In* ESA Plasma Astrophys. Nov. 1981 p 325-327 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Astronomical phenomena associated with the accretion of matter onto stars and galaxies are surveyed. The standard disk model from plasma physics is introduced and its modification by X-ray irradiation is discussed. Properties of the accretion disk formed around neutron stars are found from observations of the absorption of X-rays by the accretion disk, radiation emitted from the disk, and the change of the spin periods of X-ray pulsars. The standard model is constructed for the stationary disk, while nonstationary disks can be responsible for transient phenomena including X-ray and gamma-ray bursts. Author (ESA)

N82-20064# Memorial Univ. of Newfoundland, St. Johns. Dept. of Mathematics and Statistics.
BONDI ACCRETION c90
D. Summers *In* ESA Plasma Astrophys. Nov. 1981 p 329-330 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The Bondi accretion model is analyzed. It is pointed out that the model is still not well understood. While the Bondi critical accretion rate is widely quoted, its conditions of validity are in doubt. Reexamination of the stability of the Bondi critical solution, the shocked Bondi solutions, and the wholly subsonic solutions is suggested. Author (ESA)

N82-20065# Illinois Univ., Urbana. Dept. of Physics.
ELECTRON KINETIC EQUATIONS IN COMPTONIZATION BY ISOTROPIC PHOTONS c72
Naoki Iwamoto *In* ESA Plasma Astrophys. Nov. 1981 p 331-332 refs Co-Sponsored with NORDITA (For primary document see N82-20030 10-88)
(Grant NSF PHY-80-25605)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The kinetic equations that describe the time evolution of the distribution of nondegenerate nonrelativistic electrons interacting with isotropic thermal photons via Compton scattering are derived. Two cases, when the electrons are isotropic and when the electron motion is restricted to one spatial dimension due to strong magnetic field, are considered. The latter case is relevant to radiative transfer in the atmosphere of neutron stars with magnetic field of order 10 to the 12th power G. The time scales associated with various competing processes in the system are compared and the applicability of these equations is discussed. Explicit calculation results for the entropy gain show that these equations satisfy Boltzmann's H theorem for the coupled electron-photon system as a whole. Author (ESA)

N82-20066# Colorado Univ., Boulder. Dept. of Astro-Geophysics.
PULSAR MAGNETOSPHERE POTENTIAL STRUCTURE c90
Dean F. Smith, Lorant A. Muth, and Jonathan Arons (California Univ., Berkeley) *In* ESA Plasma Astrophys. Nov. 1981 p 333-335 refs Sponsored by NSF (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The electric fields in the polar cap region of the magnetosphere of a pairless orthogonal rotator are calculated, using a modified Poisson equation for the potential, Phi. This is the first step in determining whether return currents are formed in these models and the resulting global current flow patterns. The potential was calculated from 0.1 to 5 R sub L, where R sub L is the light cylinder radius, using known results for Phi at 0.1 R sub L with an inner last closed magnetic field line corresponding to that of a point dipole. The potential distribution indicates that return currents should be formed. Author (ESA)

N82-20067# Cambridge Univ. (England). Inst. of Astronomy.
ION PRESSURE-SUPPORTED ACCRETION TORI AND THE ORIGIN OF RADIO JETS. A PLEA FOR SPECIFIC ADVICE ON THE PLASMA PHYSICS c93
E. S. Phinney *In* ESA Plasma Astrophys. Nov. 1981 p 337-341 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Despite their impressive outputs of power, it is suggested that quasars probably do not provide diagnostics of any exotic relativistic physics. It is argued that radio galaxies may be cleaner laboratories which give a direct view of purely nonthermal electrodynamic processes occurring near black holes. Quasar and radio galaxy observations are reviewed. How inadequate cooling and particle coupling can give rise to a pressure supported accretion torus is described. Its structure in the absence of large scale magnetic fields and how it can be modified to extract sufficient energy from a rotating black hole to power a double radio source are discussed. Relevant plasma parameters are postulated. Author (ESA)

N82-20068# Sterrewacht, Leiden (Netherlands).
A DOUGHNUT MODEL OF QUASARS c90
P. M. Allen *In* ESA Plasma Astrophys. Nov. 1981 p 349-350 refs Sponsored by SERC (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A model for quasars, which overcomes the problem with accretion disks of not knowing the correct viscosity, is proposed. One of the most studied scenarios involves an accretion disk i which the gas is heated by viscous processes so that it radiate energy and spirals slowly into the black hole as a result of th loss of energy and angular momentum. An alternative scenari in which the viscosity is small enough that viscous evolutio does not occur and where the accreted gas has the sam component of angular momentum along the rotation axis at a points in space, so that the gas forms a ring around the blac hole, is described. The infalling gas deposits its energy in th ring, which then radiates predominantly in the near ultraviolet, and may result in the thermal peak which is well observed i 3C273 as well as in other quasars. Author (ESA

N82-20069# Sterrewacht, Leiden (Netherlands).
PLASMA BEAMS FROM DOUGHNUTS c90
P. M. Allen *In* ESA Plasma Astrophys. Nov. 1981 p 351-352 refs Sponsored by SERC (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A single model that explains the jets seen in radio galaxies and SS433, in which gas is accelerated by radiation pressure from a doughnut, is proposed. It has long been suspected that the extended lobes of double radio sources are powered by beams of material being ejected from the central galaxy. It is suggested that in cases where the viscosity is small, a doughnut or torus of gas may form in orbit around a compact body (neutron star or black hole) and that this can provide an alternative to accretion disks in explaining the energy requirements of quasars. This model seems to indicate what to expect from gas flows off standard alpha disks. General validity is implied in application to axisymmetric accretion systems. Author (ESA)

N82-20070# Turin Univ. (Italy). Ist. di Fisica Generale.
LARGE SCALE KELVIN-HELMHOLTZ INSTABILITIES IN EXTRAGALACTIC RADIO JETS c93
A. Ferrari and E. Trussoni *In* ESA Plasma Astrophys. Nov. 1981 p 353-357 refs Prepared in cooperation with CNR, Turin (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The relation of the morphological features detected in radio jets from active galactic nuclei with the development of large scale Kelvin-Helmholtz instabilities in supersonic flows is discussed. In particular, it is pointed out that, depending on the Mach number and the beam velocity, different damping processes are expected to occur which dissipate the unstable modes and saturate their nonlinear evolution. Applications of this theoretical scheme to peculiar radio jets are described. Author (ESA)

N82-20071# Harry Diamond Labs., Adelphi, Md.
SECOND-ORDER NONLINEAR CONDUCTIVITY TENSOR FOR AN UNMAGNETIZED RELATIVISTIC TURBULENT PLASMA c75
Howard E. Brandt *In* ESA Plasma Astrophys. Nov. 1981 p 361-364 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The symmetry properties of the second-order nonlinear conductivity tensor for an unmagnetized, relativistic, weakly turbulent plasma are considered in the analysis of collective Bremsstrahlung instability. This tensor has an exact symmetry which, if resonant wave-particle interactions are neglected, becomes the widely known symmetry related to the Manley-Rowe relations, crossing symmetry, and the nondissipative nature of the nonlinear current. Using the well-known expression for the conductivity from plasma turbulence theory, a polynomial representation for the tensor is obtained in which all derivatives are removed and the pole structure is clearly exhibited. The exact symmetry can be obtained by a lengthy algebraic reduction using this representation. It can also be obtained much more simply and directly by using a coordinate-free differential geometric formulation. Author (ESA)

N82-20072# Tel-Aviv Univ. (Israel). Dept. of Physics and Astronomy.
COLLECTIVE GRAVITATIONAL EFFECTS c46
Gerald E. Tauber *In* ESA Plasma Astrophys. Nov. 1981

p 365-368 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A covariant statistical mechanics which underlies a microscopic description of particles moving under the influence of gravitational forces is established. The internal state of large masses, e.g., a gravitating gas, must be described by the general theory of relativity, applied not only to the gravitational field, but also to the motion of matter that generates the field that acts on it. Even if the mass concentration is not high, relativistic effects are important, such as in the case of high temperatures or degenerate matter distributions. The situation becomes more complicated when deviations from thermal equilibrium, or particles interacting via some given force law, are considered. An 8N-dimensional phase space is constructed for which Liouville's equation can be written down. The BBGKY hierarchy of equations is then obtained by defining a reduced distribution function and integrating over an appropriate sub-space. The resulting equation contains the collective effects due to particle interaction.
Author (ESA)

N82-20073*# Colorado Univ., Boulder. Dept. of Astro-Geophysics.
CONFINEMENT OF COSMIC RAYS IN MOLECULAR CLOUDS c93
Ellen G. Zweibel and J. Michael Shull (Joint Inst. for Laboratory Astrophysics) *In* ESA Plasma Astrophys. Nov. 1981 p 371-373 refs Co-sponsored by NASA (For primary document see N82-20030 10-88)
(Grant NSF AST-80-19960)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The consequences of cosmic ray production by a supernova in a molecular cloud are discussed. Self-trapping problems for a higher flux of cosmic rays in a molecular cloud are focused on. The column density of molecular clouds is probably too high to explain the majority of galactic cosmic ray sources, even allowing for fortuitous asymmetry in the placement of the supernova in the cloud, however, measurements of antiproton flux suggest that some cosmic ray sources do have a high column density. The large predicted gamma-ray luminosity of such a cloud invites comparison with COS-B sources. Author (ESA)

N82-20074# Lodz Univ. (Poland).
CERTAIN ASPECTS OF PRIMARY COSMIC RAYS COMPOSITION AT ENERGIES OF 10 TO THE 14TH POWER TO 10 TO THE 15TH POWER eV c93
J. Kempa *In* ESA Plasma Astrophys. Nov. 1981 p 375-376 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Indications that the chemical composition of primary cosmic rays at energies from 10 to the 14th power to 10 to the 15th power eV consists of heavier particles than in the energy domain 10 to the 12th power eV are examined. From analysis of high energy hadrons, in extensive air showers, the pure proton composition of the primary cosmic radiation can be excluded. The comparison of various components shows that the average atomic weight of the primary particles is about 10 to 15.
Author (ESA)

N82-20075# Massachusetts Inst. of Tech., Cambridge.
FORMATION OF ION CONICS AND LOWER HYBRID ACCELERATION IN THE SUPRAURORAL REGION c90
Tom Chang and Bruno Coppi *In* ESA Plasma Astrophys. Nov. 1981 p 379-381 refs Sponsored by AFGL (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

It is argued that broadband lower hybrid waves generated by energetic electron beams can be quite efficient in accelerating ions of ionospheric origin (H+ and O+). Throughout the lower altitudes of the suprauroral region, satellite measurements detected plasma waves dominated by broadband lower hybrid modes. How ions of ionospheric origin can be energized perpendicularly to the geomagnetic field lines by resonant interactions with these modes is shown. The added influence of the Earth's magnetic field geometry can lead the energized portion of the ions to evolve into conic distributions. The calculated pitch angles of the ions cluster around 90 to 140 deg. Pitch angles < 90 deg can also occur, since the ions can drift towards the ionosphere initially. Author (ESA)

N82-20076# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
ON THE EXISTENCE OF THE ION TEARING MODE c93
H. Goldstein *In* ESA Plasma Astrophys. Nov. 1981 p 383-384 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

An ion tearing mode is suggested as a possible onset mechanism for magnetospheric substorms. Earlier work, based on a WKB approximation where the wavelength of the mode along the tail had to be restricted to values much smaller than the characteristic length for magnetic field variation in that direction, indicated that the ion tearing instability may not exist in the magnetotail. In the present theory the WKB method is abandoned and the exact energy principle for the (two-dimensional) Vlasov theory is used instead. The tail equilibrium is represented by two-dimensional self-consistent solutions. The computed minimizing modes have the shape of tearing modes. The characteristic length is by order of magnitude the length scale for the magnetic field variation. Results show that the ion tearing instability does in fact occur in the long wavelength regime and therefore is a possible onset mechanism.
Author (ESA)

N82-20077# Ruhr Univ., Bochum (West Germany). Inst. fuer Theoretische Physik.
INSTABILITIES IN INHOMOGENEOUS COLLISION-FREE SELF-GRAVITATING STELLAR SYSTEMS c90
Wolfgang Seboldt *In* ESA Plasma Astrophys. Nov. 1981 p 385-389 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Stability criteria for collision-free self-gravitating stellar systems are discussed with applications to elliptical galaxies. It is concluded that rotationally symmetric systems which are either sufficiently oblate or prolate are unstable against ringlike and sausagelike perturbations, respectively. Author (ESA)

N82-20078# Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.
DOUBLE LAYER AND POTENTIAL JUMP: A REVIEW OF LABORATORY EXPERIMENTAL EVIDENCE c75
M. Guyot, C. Hollenstein, and M. Tran *In* ESA Plasma Astrophys. Nov. 1981 p 391-393 refs Sponsored by Swiss National Science Foundation and Euratom (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Double layers, potential differences which occur in plasma, are characterized. Double layers are collisionless with a transition region of a few tens Debye length. They are created when the electron drift velocity is greater than the thermal velocity. Aside from this class of potential structure, another type of potential structure was discovered recently for which the preceding criteria concerning collisionality and the electron drift velocity are violated, i.e., the potential jump. The conditions under which the potential jump occurs are outlined. Author (ESA)

N82-20079# Ruhr Univ., Bochum (West Germany). Inst. fuer Theoretische Physik.
QUASISTATIC EVOLUTION OF PREFLARE EQUILIBRIA c92
Wolfgang Zwingmann *In* ESA Plasma Astrophys. Nov. 1981 p 297-400 refs Sponsored by Deutsche Forschungsgemeinschaft (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A special type of solar preflare equilibria, the newly-emerging-Flux model, is considered. This model describes the quasistatic evolution occurring before the onset of a solar eruptive process (e.g., flare) as the formation of a new magnetic structure within an otherwise stationary equilibrium. The model is analyzed

quantitatively in the framework of two-dimensional magnetohydrostatic theory. It is shown that the equilibrium ceases to exist when the newly emerging flux exceeds a critical field strength; this point is regarded as the onset of an eruptive process. The equilibrium and the onset criterion are discussed quantitatively.
Author (ESA)

N82-20080*# Colorado Univ., Boulder. Dept. of Astro-Geophysics.

LARGE LOOP THERMAL MODELS OF SOLAR HARD X-RAY BURSTS c92

Dean F. Smith and D. W. Harmony *In* ESA Plasma Astrophys. Nov. 1981 p 401-404 refs Co-sponsored with NSF (For primary document see N82-20030 10-88)
(Grant NsG-7505)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

Results for small loop thermal models of hard X-ray bursts are extended to large loops. In this model a magnetic arch with a coronal length of 45,000 km has the electrons near the top heated to temperatures above 1 billion K. The resulting conduction fronts which form are dominated by collisionless processes and travel down the arch to the transition region and chromosphere where they evaporate off part of the latter. This relatively cool material travels back up the loop and eventually quenches the source for energy injection times of order 10 sec. Most of the X-ray emission comes from the footpoints of the arch over most of the source lifetime and the spectrum is a power law with a typical spectral index of 3.0. Even though the efficiency gain in this model is only 2.8, it is much easier from the point of view of plasma physics to heat all the electrons in a plasma than to accelerate a substantial fraction of them. Author (ESA)

N82-20081# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).

WAVE HEATING AND ACCELERATION OF SOLAR WIND IONS BY CYCLOTRON RESONANCE c92

Eckart Marsch *In* ESA Plasma Astrophys. Nov. 1981 p 405-406 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A model is presented which describes the radial evolution of solar wind ion temperatures and speeds within a fluid framework. Resonant wave-particle interactions are taken into account and the ion-wave dynamic equilibrium is calculated self-consistenly. Numerical results show that self-consistency in the calculations is of major importance for a realistic description of energy and momentum balance between waves and particles.
Author (ESA)

N82-20082*# Maryland Univ., College Park. Dept. of Physics and Astronomy.

COMMENTS ON HIGH MACH NUMBER MAGNETOSONIC SHOCKS c72

K. Papadopoulos *In* ESA Plasma Asrophys. Nov. 1981 p 409-411 refs (For primary document see N82-20030 10-88)
(Grant NAGw-81; Contract N00014-79-C-0665)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 20H

It is shown that the ion thermalization process required by the Hugoniot conditions for high Mach number magnetosonic shocks is controlled by loss cone type distributions, i.e., (partial differentiation of the ion distribution function/partial differentiation of the ion distribution energy component) > zero, formed by a combination of ion reflection and gyration downstream. The thermalization length corresponds to few ion gyroradii, while the final distribution deviates substantially from Maxwellian. The results are applied to the Earth bow shock. Author (ESA)

N82-20083# Academia Sinica, Peking (China). Inst. of Space Physics.

IDENTIFICATION OF THE DISCONTINUITIES AT THE MAGNETOPAUSE c46

Zhou Guo-cheng *In* ESA Plasma Astrophys. Nov. 1981 p 413-414 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Different magnetopause discontinuities were identified by characterizing these in terms of the magnetic fields, the bulk flow velocity and other thermodynamic parameters. This total-parameter method is independent of the normal direction of the magnetopause. The measurements of the magnetic field and the plasma during the IMP-6, and ISEE 1 and 2 magnetopause crossings showed that the sum of the thermal pressure and magnetic pressure of the plasma remained nearly constant while other parameters changed at a different rate. Based on these observed data, the discontinuity equations for an ideal MHD fluid in which the pressure was assumed to be isotropic were solved. Solutions include the tangential discontinuities (twelve sets), the rotational discontinuity, the transitional discontinuities between tangential and rotational discontinuities (two sets), and the transitional discontinuities between a tangential discontinuity and a slow shock wave (nine sets). Author (ESA)

N82-20084# Academia Sinica, Peking (China). Inst. of Space Physics.

A PLASMA CURRENT SHEET STUDIED BY MEANS OF THE PARTICLE MOTION c75

Xu Rong-lan *In* ESA Plasma Astrophys. Nov. 1981 p 417-419 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A one dimensional plasma current sheet is modeled as the regular pattern of motion of charged particles moving in a neutral sheet magnetic field. A guiding center theorem similar to that of Alfven is used. The '8' shaped motion in the nonperturbation region (where the magnetic field is small or equal to zero) is divided into two circular motions. Since each circular motion is equivalent to a magnet, the 8 shaped motion is equivalent to two magnets in opposite direction. The electric plasma current is derived with the plasma distribution function a funcion of constant motion. Results show that the current sheet is mainly due to the inverse drift motion in the nonperturbation region. A self-consistent magnetic field is also derived from the relation between charged particle motions and the magnetic field.
Author (ESA)

N82-20085# Academia Sinica, Peking (China). Inst. of Space Physics.

THE ANALYTICAL TRAJECTORY OF THE CHARGED PARTICLE MOVING IN A NEUTRAL SHEET MAGNETIC FIELD c90

Xu Rong-lan *In* ESA Plasma Astrophys. Nov. 1980 p 421-423 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The trajectory of a charged particle, moving in a neutral magnetic field, is derived analytically. The solution of the equation of motion is written as: Referents of a relation (+) = Referents of a relation sub c + Referents prime of a relation (+), where Referents of a relation sub c is the position of the center of the trajectory and Referents prime of a relation (+) is a closed oscillatory motion. The results are essentially the same as with numerical trajectory evaluation. The trajectory of a particle in a neutral sheet magnetic field, including the region where the magnetic field is equal to zero, can be expressed as two motions. One is along a closed oscillatory trajectory in the plane perpendicular to the magnetic field; its center drifts in a direction parallel to the neutral line. The other follows the magnetic line with a constant velocity. In the perturbation region, the closed oscillatory motion is circular, while in the nonperturbation region it is 8 shaped. In the nonperturbation region, its center drifts in the opposite direction to that in the perturbation region and its drift velocity is very large. Author (ESA)

N82-20086# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).

ACCELERATION OF COSMIC RAYS BY SHOCK WAVES c93

W. I. Axford *In* ESA Plasma Astrophys. Nov. 1981 p 425-449 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The problem of the origin of galactic cosmic rays is reviewed. The observed properties of galactic cosmic rays and the interferences that can be drawn from them are summarized.

The basic properties of the interstellar medium are included. Scatter-free acceleration of energetic particles by shock waves is outlined. The acceleration mechanism is then extended, taking into account scattering. Modifications associated with time dependence and losses due to interaction with the background medium are described along with effects of nonplanar geometry. The possibility that galactic cosmic rays are accelerated by supernova shocks is discussed. Difficulties encountered with the shock acceleration theory indicate that a completely nonlinear treatment is necessary. This must comprehend the generation amplification and damping of hydromagnetic waves in a medium with strong supersonic turbulence and streaming cosmic ray fluxes. Author (ESA)

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-20087*# Stanford Univ., Calif. Inst. for Plasma Research.
THE DIFFERENTIAL EMISSION MEASURE OF DYNAMIC CORONAL LOOPS
Spiro K. Antiochos Dec. 1981 10 p refs
(Grants NGL-05-020-272; NAGw-92; Contract N00014-75-C-0673)
(NASA-CR-168638; SU-SUIPR-863) Avail: NTIS HC A02/MF A01 CSCL 03A

The effects of time dependent phenomena, such as flare energization and decay, on the temperature and density structure of the transition region and, in particular, on the form of the differential emission measure are studied. It is found that unlike the case of the static models, the form of the differential emission measure can be used to determine the important physical mechanisms in the dynamic models. B.W.

N82-20088*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DOCUMENTATION FOR THE MACHINE-READABLE VERSION OF THE CATALOGUE OF STARS WITHIN 25 PARSECS OF THE SUN
Wayne H. Warren, Jr. Jan. 1982 17 p refs
(NASA-TM-84038; NSSDC/WDC-A-R&S-82-03) Avail: NTIS HC A02/MF A01 CSCL 03A

The machine-readable version of the Catalogue of Stars within twenty-five parsecs of the Sun contains essentially all information given in Table Ia of the published catalog, plus positional data and all cross references to other catalog numbers given in Table IIa. Not included from Table Ia are the flags (asterisks appended to catalog numbers) indicating notes in the published catalog, nor are the notes in machine-readable form. Omitted from Table IIa are the finding chart identifiers (Lowell G numbers or notes reference) and miscellaneous cross identifications to other names and catalog identifiers. The machine-readable version of the subject catalog is currently available on magnetic tape from the Astronomical Data Center. A.R.H.

N82-20089*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DATA ANNOUNCEMENT BULLETIN: THE ARIEL V SSI 3A X-RAY CATALOGUE
Dec. 1981 1 p
(NASA-TM-84029; NSSDC/WDC-A-R&S-81-13) Avail: NTIS HC A02/MF A01 CSCL 03A

The catalog covers the galactic plane in low latitudes (b2 < 10) and high galactic X-ray sources. It is based on the complete 5 1/2 year data base of the sky survey instrument on the Ariel 5 satellite. Source identifications, error boxes and fluxes are included. The low latitude portion contains 109 X-ray sources. The high latitude revision contains 142 sources. S.L.

N82-20090*# Information Systems and Networks Corp., Chevy Chase, Md.
SPACE TELESCOPE OBSERVATORY MANAGEMENT SYSTEM PRELIMINARY TEST AND VERIFICATION PLAN Final Report
James S. Fritz, Charles F. Kaldenbach, and Warren B. Williams 8 Jan. 1982 215 p refs
(Contract NAS5-26624)
(NASA-CR-168587; ISN/TR-81/1079) Avail: NTIS HC A10/MF A01 CSCL 03A

The preliminary plan for the Space Telescope Observatory Management System Test and Verification (TAV) is provided. Methodology, test scenarios, test plans and procedure formats, schedules, and the TAV organization are included. Supporting information is provided. N.W.

N82-20091# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.
SPECTRAL AND TEMPORAL BEHAVIOR OF THE X-RAY BINARY STARS Cgy X-1 IN THE HARD X-RAY DOMAIN [DAS SPEKTRALE UND ZEITLICHE VERNALTEN DES VARIABLEN ROENTGENDOPPELSTERNS Cyg X-1 IM HARTEN ROENTGENBEREICH]
Helmut Steinle Jun. 1981 138 p refs In GERMAN
(MPI-PAE/Extraterr-166; ISSN-0340-8922) Avail: NTIS HC A07/MF A01

The X-ray spectrum of binary stars within the energy range of 15 to 160 keV was measured. The Compton scattering of low energy photons in hot plasma is described and is adjusted to the binary star Cyg X-1 spectrum. The radiation intensity burst in the 15 to 150 keV shows large fluctuation within seconds. The chronological sequence of registered Cyg X-1 photons shows statistical dissipation and maximum three events take place in 5 msec. E.A.K.

N82-20092# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.
THE MASS SPECTRUM OF STELLAR ORIGIN [DAS MASSENSPEKTRUM BEI DER STERNENTSTEHUNG]
Hans Zinnecker Aug. 1981 297 p refs In GERMAN
(MPI-PAE-Extraterr-167; ISSN-0340) Avail: NTIS HC A13/MF A01

The distribution function of stellar masses (mass spectra) in stellar formation was investigated. Two fundamentally different models of mass spectra are presented. The mass spectrum models are established on direct fragmentation and hierarchical fragmentation. The kinetic theory is linear in both cases. The model remains linear because the number of original protostars remains the same. The accretion model examines quantitatively the effect of accretion on the shape of the mass spectra. The model shows that variations in the mass spectra of the field star in other galaxies depend on fast dispersion of interstellar gases in the average interstellar magnetic fields. It is found that direct fragmentation is more likely to be the exception and that hierarchical fragmentation is more likely to be the rule. E.A.K.

N82-20093# Technische Univ., Berlin (West Germany). Institut fuer Astronomie und Astrophysik.
[ACTIVITIES REPORT OF THE INSTITUTE FOR ASTRONOMY AND ASTROPHYSICS] Annual Report, 1980
R. Wielen 1980 9 p refs In GERMAN
(TUB-IAA-Mitt-1) Avail: NTIS HC A02/MF A01

Research into stars, star systems, and X-ray astronomy is summarized. Model atmospheres for normal stars, white dwarfs, and variable stars were developed and the structure of He stars and neutron stars was investigated. The dynamical evolution of star systems, such as star clusters, galaxies, and galactic clusters, was studied as well as star currents, galactic shock fronts, galactic radio continuum emission, and the density distribution in galactic clusters. Author (ESA)

N82-20094# Technische Univ., Berlin (West Germany). Institut fuer Astronomie und Astrophysik.
[ACTIVITIES REPORT OF THE INSTITUE FOR ASTRONOMY AND ASTROPHYSICS] Annual Report, 1980 [INSTITUT FUER ASTRONOMIE UND ASTROPHYSIK]
R. Wielen 1981 9 p refs In GERMAN
(TUB-IAA-Mitt-2) Avail: NTIS HC A02/MF A01

Research projects on stars, interstellar matter, star systems and X-ray astronomy are summarized. Spectral measurements of normal stars, He stars, white dwarfs, variable stars, and stellar X-ray sources were performed and interpreted. The formation of interstellar matter through expansion of the atmosphere of cold stars was investigated. Work on the dynamical evolution of star clusters, galaxies, and galactic clusters and on star currents, density distribution in star and galactic clusters, galactic shckfronts, and galactic radio emission is surveyed. Author (ESA)

N82-20053*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
EVOLUTION OF X-RAY ASTRONOMY
Bruno Rossi *In* ESA Plasma Astrophys. Nov. 1981 p 225-249 refs (For primary document see N82-20030 10-88)
(Contract NAS5-24441)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03A

N82-20054# Tokyo Univ. (Japan).
DIAGNOSIS OF THE NEUTRON STAR AND ITS ENVIRONMENT WITH X-RAY ASTRONOMY
Minoru Oda *In* ESA Plasma Astrophys. Nov. 1981 p 251-263 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20063# Nagoya Univ. (Japan). Dept. of Astrophysics.
OBSERVABLE PROPERTIES OF ACCRETION DISKS
S. Hayakawa *In* ESA Plasma Astrophys. Nov. 1981 p 325-327 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-20095 Iowa Univ., Oakdale.
POLARIZATION PROPERTIES OF MAIN-LINE OH MASER EMISSION FROM CIRCUMSTELLAR SHELLS OF LATE TYPE VARIABLE STARS Ph.D. Thesis
Mark J. Claussen 1981 114 p
Avail: Univ. Microfilms Order No. 8128380

Main line OH emission was observed in all four Stokes parameters in seven late type variable stars and the F8 supergiant IRC + 10420. The late type stars are WX Psc, IK Tau, U Her, UX Cyg, R Leo, R LMI, and U Ori. Those sources whose spectra are 'prototypical' of standard expanding shell models (the emission occurring in two well defined velocity ranges) had either no polarization or very weak circular polarization in their spectra. The spectrum of WX Psc, the 'prototype', was unpolarized. In sources with no systematic spectral structure, moderate to strong (> 30%) circular and sometimes linear polarization was observed in UX Cyg, U Ori, and IRC + 10420 at 1665 MHz. The linear features in UX Cyg and IRC + 10420, when combined with associated circularly polarized features are suggestive of Zeeman patterns. Dissert. Abstr.

N82-20096# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
INTRODUCTION TO CELESTIAL MECHANICS
Hans U. Pilchowski, Wilson C. C. Silva, and Luiz Davilo D. Ferreira Jun. 1981 131 p refs In PORTUGUESE; ENGLISH summary
(INPE-2126-RPE/350) Avail: NTIS HC A07/MF A01

Basic mechanical concepts from the Central Field to Lagrangian and Delanay Equations are presented. Orbital determination, reference systems and their transformation are also presented. N.W.

N82-20097*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HEAO 1 MEASUREMENTS OF THE GALACTIC RIDGE.
D. M. Worrall (Maryland Univ., College Park), F. E. Marshall, E. A. Boldt, and Jean H. Swank Oct. 1981 38 p refs Submitted for publication
(NASA-TM-83844) Avail: NTIS HC A03/MF A01 CSCL 03B

The HEAO A2 experiment data was systematically searched for unresolved galactic disc emission. Although there were suggestions of non-uniformities in the emission, the data were consistent with a disc of half-thickness 241 + 22 pc and surface emissivity (2-10 keV) at galactic radius R(kpc) of 2.2 10 to the minus 7th power exp(-R/3.5) erg/sq cm to the (-2)power/s (R > 7.8 kpc), giving a luminosity of approximately 4.4 10 to the 37th power erg S to the (-1) power. If the model is extrapolated to radii less than 7.8 kpc, the unresolved disc emission is approximately 1.4 10 to the 38th power erg S to the (-1) power (2-10 keV) i.e., a few percent of the luminosity of the galaxy in resolved sources. the disc emission has a spectrum which is significantly softer than that of the high galactic latitude diffuse X-ray background and it is most probably of discrete source origin. Author

N82-20098*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ASTROPHYSICAL TESTS FOR RADIATIVE DECAY OF NEUTRINOS AND FUNDAMENTAL PHYSICS IMPLICATIONS
F. W. Stecker and R. W. Brown (Case Western Reserve Univ.) Dec. 1981 31 p refs Submitted for publication
(NASA-TM-83873) Avail: NTIS HC A03/MF A01 CSCL 03B

The radiative lifetime tau for the decay of massious neutrinos was calculated using various physical models for neutrino decay. The results were then related to the astrophysical problem of the detectability of the decay photons from cosmic neutrinos. Conversely, the astrophysical data were used to place lower limits on tau. These limits are all well below predicted values. However, an observed feature at approximately 1700 A in the ultraviolet background radiation at high galactic latitudes may be from the decay of neutrinos with mass approximately 14 eV. This would require a decay rate much larger than the predictions of standard models but could be indicative of a decay rate possible in composite models or other new physics. Thus an important test for substructure in leptons and quarks or other physics beyond the standard electroweak model may have been found. Author

N82-20099# Technische Universitaet, Brunswick (West Germany). Inst. fuer Geophysik und Meteorologie.
ROUTINE DATA PROCESSING AND PHYSICAL INTERPRETATION OF DATA OBTAINED BY THE FLUXGATE AND SEARCH COIL MAGNETOMETER EXPERIMENTS ON BOARD HELIOS 1 AND 2 Final Report, Jun. 1981
Fritz Manfred Newbauer, Henning Barnstorf, Hans-Juergen Beinroth, Kurt Ulrich Denskat, Guenter Musmann, Hinrich Rupprecht, and Peter Volkmer Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 107 p refs In GERMAN; ENGLISH summary Co-sponsored by Bundesministerium fuer Forschung und Technologie and DFVLR
(BMFT-FB-W-81-039; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22,70

The processing and interpretation of data collected by Helios 1 and Helios 2 showed discontinuities and wave characteristics in the solar and interplanetary magnetic fields are described. The fluxgate measurements are corrected for filter phase shifts, zero shifting by variable spacecraft fields, magnetometer zeroes and misalignment angles. The treatment of the spectral data of the search coil magnetometer involves the application of the calibration factors whereas for the waveform data, corrections for the stray magnetic field B/sub d/ and its time derivative are required. Results obtained on the macrostructure of the interplanetary magnetic field, on the microstructure of discontinuities and shock wave, and on MHD and whistler waves in the interplanetary magnetoplasma are considered. Author (ESA)

N82-20100# Royal Observatory, Edinburgh (Scotland). Science and Research Council.
THE ROLE OF EPISODIC BOMBARDMENT IN GEOPHYSICS
S. V. M. Clube and W. M. Napier Nov. 1981 26 p refs Submitted for publication
Avail: NTIS HC A03/MF A01

The effects of cometary or asteroidal impacts on the boundary conditions at the core, outer mantle and atmosphere of the Earth are discussed through the literature. Impact episodes occur following the capture or orbital disturbance of these bodies as the solar system passes through the spiral arms of the galaxy. There is thus a tendency for magnetic field reversals, principal plate movements, ice ages and mass extinctions to be correlated and to recur on time scales dictated by galactic processes. Major geophysical phenomena can thus be synthesized in a purely astronomical theory. Knowledge of the continuous state of the galaxy then becomes a prerequisite for the understanding of terrestrial history. Author (ESA)

N82-20101# Royal Observatory, Edinburgh (Scotland). Science and Engineering Council.
SPIRAL ARMS, COMETS AND TERRESTRIAL CATASTROPHISM
S. V. M. Clube and W. M. Napier Nov. 1981 45 p refs
Submitted for publication
Avail: NTIS HC A03/MF A01

A hypothesis of terrestrial catastrophism in which comets grow in molecular clouds and are captured by the Sun as it passes through the spiral arms of the galaxy is reviewed. Assuming that comets are a major supplier of the Earth crossing (Apollo) asteroid population, the latter fluctuates correspondingly and leads to episodes of magnetic field reversal and tectonic activity, while surface phenomena lead to ice ages and mass extinctions. An episodic geophysical history with an interstellar connection is thus implied. If comets in spiral arms are necessary intermediaries in the process of star formation, the theory also sheds light on early solar system history and galactic chemistry. Author (ESA)

N82-20031# California State Univ., San Diego.
THE NEW PARADIGM IN COSMIC PLASMA PHYSICS
H. Alfven *In* ESA Plasma Astrophys. Nov. 1981 p 3-10 Sponsored in cooperation with Royal Inst. of Tech., Stockholm (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20033# Chicago Univ., Ill. Dept. of Physics.
THE MAGNETOHYDRODYNAMIC DYNAMO
E. N. Parker *In* ESA Plasma Astrophys. Nov. 1981 p 23-29 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20034# Chicago Univ., Ill. Dept. of Physics.
THE NONEQUILIBRIUM OF MAGNETIC FIELDS
E. N. Parker *In* ESA Plasma Astrophys. Nov. 1981 p 31-35 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20035# Nagoya Univ. (Japan). Dept. of Astrophysics.
INTERSTELLAR MATTER
S. Hayakawa *In* ESA Plasma Astrophys. Nov. 1981 p 37-42 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20037# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.
STABILITY OF THE EQUILIBRIUM STATES OF THE INTERSTELLAR GAS AND FIELD SYSTEM
Catherine J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 51-59 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20038# Academy of Sciences (USSR), Moscow. Inst. of Physics.
PLASMA EMISSION MECHANISMS AND ACCELERATION OF RELATIVISTIC PARTICLES IN COSMIC PLASMAS
V. N. Tsytovich *In* ESA Plasma Astrophys. Nov. 1981 p 61-75 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20049# Academy of Sciences (USSR), Moscow. Inst. of Space Research.
ORIGIN OF THE LARGE-SCALE STRUCTURE OF THE UNIVERSE
I. D. Novikov *In* ESA Plasma Astrophys. Nov. 1981 p 179-189 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20050# Massachusetts Inst. of Tech., Cambridge.
GALACTIC DYNAMICS AND GRAVITATIONAL PLASMAS
C. C. Lin and G. Bertin *In* ESA Plasma Astrophys. Nov. 1981 p 191-205 refs Sponsored by CNR and NSF (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF Member States, AU, CN, and NO (+20% others)

N82-20056# California Univ., Berkeley. Dept. of Astronomy.
PULSAR THEORY: PARTICLE ACCELERATION AND PHOTON EMISSION IN THE POLAR FLUX TUBE
Jonathon Arons *In* ESA Plasma Astrophys. Nov. 1981 p 273-289 refs (For primary document see N82-20030 10-88) (Grant NSF AST-79-23243)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20057# Los Alamos Scientific Lab., N. Mex.
SUPERNOVA HYDRODYNAMICS
Stirling A. Colgate *In* ESA Plasma Astrophys. Nov. 1981 p 291-296 refs Sponsored by California Univ. and NSF Prepared in cooperation with New Mexico Inst. of Mining and Technology (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20058# Cambridge Univ. (England). Inst. of Astronomy.
HOT PLASMAS IN ACTIVE GALACTIC NUCLEI
Martin J. Rees *In* ESA Plasma Astrophys. Nov. 1981 p 297-301 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20059# Ecole Polytechnique, Palaiseau (France). Centre de Physique Theorique.
ON THE POSSIBILITY OF EXISTENCE OF LARGE AMPLITUDE WAVES AROUND PULSARS
Estelle Asseo *In* ESA Plasma Astrophys. Nov. 1981 p 309-312 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20064# Memorial Univ. of Newfoundland, St. Johns. Dept. of Mathematics and Statistics.
BONDI ACCRETION
D. Summers *In* ESA Plasma Astrophys. Nov. 1981 p 329-330 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20066# Colorado Univ., Boulder. Dept. of Astro-Geophysics.
PULSAR MAGNETOSPHERE POTENTIAL STRUCTURE
Dean F. Smith, Lorant A. Muth, and Jonathan Arons (California Univ., Berkeley) *In* ESA Plasma Astrophys. Nov. 1981 p 333-335 refs Sponsored by NSF (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20068# Sterrewacht, Leiden (Netherlands).
A DOUGHNUT MODEL OF QUASARS
P. M. Allan *In* ESA Plasma Astrophys. Nov. 1981 p 349-350 refs Sponsored by SERC (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20069# Sterrewacht, Leiden (Netherlands).
PLASMA BEAMS FROM DOUGHNUTS
P. M. Allan *In* ESA Plasma Astrophys. Nov. 1981 p 351-352 refs Sponsored by SERC (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20075# Massachusetts Inst. of Tech., Cambridge.
FORMATION OF ION CONICS AND LOWER HYBRID ACCELERATION IN THE SUPRAURORAL REGION
Tom Chang and Bruno Coppi *In* ESA Plasma Astrophys. Nov. 1981 p 379-381 refs Sponsored by AFGL (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20077# Ruhr Univ., Bochum (West Germany). Inst. fuer Theoretische Physik.
INSTABILITIES IN INHOMOGENEOUS COLLISION-FREE SELF-GRAVITATING STELLAR SYSTEMS
Wolfgang Seboldt *In* ESA Plasma Astrophys. Nov. 1981 p 385-389 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20085# Academia Sinica, Peking (China). Inst. of Space Physics.
THE ANALYTICAL TRAJECTORY OF THE CHARGED PARTICLE MOVING IN A NEUTRAL SHEET MAGNETIC FIELD
Xu Rong-lan *In* ESA Plasma Astrophys. Nov. 1980 p 421-423 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-20102*# National Aeronautics and Space Administration, Washington, D. C.
NASA FACTS: IMAGES OF SATURN FROM VOYAGER 2
1981 4 p refs Original contains color illustrations
(NASA-NF-132/10-81) Avail: NTIS HC A01; SOD HC $2.00 CSCL 03B

Six color images of Saturn and four of her moons, acquired by Voyager 2, are presented. A brief narrative and explanatory captions, including explanations of the planet's atmosphere and rings, are presented. N.W.

N82-20103*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE TROPOSPHERIC GAS COMPOSITION OF JUPITER'S NORTH EQUATORIAL BELT (NH3, PH3, CH3D, GeH4, H2O) AND THE JOVIAN D/H ISOTROPIC RATIO
V. Kunde, R. Hanel, W. Maguire, D. Gautier, J. P. Baluteau, A. Marten, A. Chedin, N. Husson, and N. Scott Feb. 1982 70 p refs Prepared in cooperation with Observatoire de Paris-Meudon and Ecole Polytechniques, Palaiseau Submitted for publication
(NASA-TM-83891) Avail: NTIS HC A04/MF A01 CSCL 03B

The gas composition of the troposphere of Jupiter in the clearest regions of the North Equatorial Belt (NEB) was derived from the Voyager 1 IRIS data. The infrared spectrum for this homogeneous cloud free region was modeled to infer altitude profiles for NH3, PH3, GeH4 and H2O. The Profiles for NH3 and PH3 were found to be depleted in the upper troposphere but otherwise in agreement with their solar values at the 1 bar level. The mole fraction for CH3D was determined to be 3.5(+1.0 or -1.3) x 10 to the minus 7th power. The GeH4 mole fraction of 7+ or -2 x 10 to the minus 10th power at the 2 to 3 bar level is a factor of 10 lower than the solar value. The H2O mole fraction is approximately 1 x 0.00001 at the 2.5 bar level and is increasing to approximately 3 x 0.00001 at 4 bars where it is a factor of 30 lower than solar. Using IRIS infrared values for the mole fractions of CH3D and CH4 a value of D/H = 3.6(+1.0 or -1.4)x 0.00001 is derived. Assuming this Jovian D/H ratio is representative of the protosolar nebula, and correcting for chemical galactic evolution, yields a value of 5.5 - 9.0 x 0.00001 for the primordial D/H ratio and an upper limit of 1.8 to 2.4 x 10 to the minus 31st power cu cm for the present day baryon density. Author

N82-20104*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EVIDENCE FOR SOLAR WIND CONTROL OF SATURN RADIO EMISSION
Michael D. Desch Feb. 1982 22 p refs Submitted for publication
(NASA-TM-83889) Avail: NTIS HC A02/MF A01 CSCL 03B

Using data collected by the Voyager 1 and 2 spacecraft in 1980 and 1981, strong evidence is presented for a direct correlation between variations in the solar wind at Saturn and the level of activity of Saturn's nonthermal radio emission. Correlation coefficients of 57 to 58% are reached at lag times of 0 to 1 days between the arrival at Saturn of high pressure solar wind streams and the onset of increased radio emission. The radio emission exhibits a long-term periodicity of 25 days, identical to the periodicity seen in the solar wind at this time and consistent with the solar rotation period. The energy coupling efficiency between the solar wind with the Saturn radio emission is estimated and compared with that for Earth. R.J.F.

N82-20105*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MAGNETIC FIELD MEASUREMENTS AT JUPITER BY VOYAGERS 1 AND 2: DAILY PLOTS OF 48 SECOND AVERAGES
Ronald P. Lepping, Mark J. Silverstein, and Norman F. Ness Nov. 1981 82 p refs
(NASA-TM-83864) Avail: NTIS HC A05/MF A01 CSCL 03B

A series of 24 hour summary plots of the magnetic field, in 48-s average form, measured in the vicinity of Jupiter by the magnetometers onboard Voyagers 1 and 2 are presented. The Voyager 1 data cover the period from 27 February 1979 (day = 58) to 23 March (day = 82) inclusive, and the Voyager 2 data cover the period from 2 July 1979 (day = 183) to 14 August (day = 226) inclusive. Closest approach to the planet occurred on days 64 (AT 1205 UT) and 190 (AT 2230 UT) for Voyagers 1 and 2, respectively. Also included are: a description of the characteristics of the magnetometers, a brief description of the near-planet trajectories of the two spacecraft, a listing of the bow shock and magnetopause crossing times, and a bibliography containing Voyager-Jupiter related papers and reports. B.W.

N82-20032# Royal Inst. of Tech., Stockholm (Sweden).
THE VOYAGER 1 SATURN ENCOUNTER AND THE COSMOGONIC SHADOW EFFECT
H. Alfven *In* ESA Plasma Astrophys. Nov. 1981 p 11-21 refs Prepared in cooperation with California State Univ., San Diego (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20045*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
PLASMA DYNAMICS IN THE RAPIDLY ROTATING MAGNETOSPHERE OF JUPITER
John W. Belcher *In* ESA Plasma Astrophys. Nov. 1981 p 129-134 refs (For primary document see N82-20030 10-88)
(Contract JPL-953733; Grant NGR-22-009-015)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-20106*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ACCRETION DISK CORONAE

N. E. White (Maryland Univ., College Park) and S. S. Holt Oct. 1981 60 p refs Submitted for publication
(NASA-TM-83840) Avail: NTIS HC A04/MF A01 CSCL 03B

Recent observations of partial X-ray eclipses from 4U1822-37 have shown that the central X-ray source in this system is diffused by a large Compton-thick accretion disk corona (ADC). Another binary, 4U2129-47, also displays a partial eclipse and contains an ADC. The possible origin of an ADC is discussed and a simple hydrostatic evaporated ADC model is developed which, when applied to 4U1822-37, 4U2129+47 and Cyg X-3, can explain their temporal and spectral properties. The quasi-sinusoidal modulation of all three sources can be reconciled with the partial occultation of the ADC by a bulge at the edge of the accretion disk which is caused by the inflowing material. The height of this bulge is an order of magnitude larger than the hydrostatic disk height and is the result of turbulence in the outer region of the disk. The spectral properties of all three sources can be understood in terms of Compton scattering of the original source spectrum by the ADC. Spectral variations with epoch in Cyg X-3 are probably caused by changes in the optical depth of the corona. A consequence of our model is that any accreting neutron star X-ray source in a semi-detached binary system which is close to its Eddington limit most likely contains an optically thick ADC. Author

N82-20107# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.

SOLAR-GEOPHYSICAL DATA NUMBER 443. PART 1: (PROMPT REPORTS). DATA FOR JUNE 1981, MAY 1981

Helen E. Coffey Jul. 1981 167 p refs 2 Vol.
(PB82-113853; SGD-443-Pt-1; NOAA-81082602) Avail: NTIS HC A08/MF A01 CSCL 03B

Data from June 1981 on alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, coronal holes, interplanetary magnetic field polarities, mean solar magnetic field, and spacecraft observations, are provided in addition to the Boulder geomagnetic substorm log. Daily solar activity centers, sudden ionospheric disturbances, solar radio emission, cosmic rays for May 1981 are given. Late data include solar radio emission for April 1981, cosmic rays for April 1981, geomagnetic indices for April 1981, and radio propagation indices for March 1981. GRA

N82-20108# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.

SOLAR-GEOPHYSICAL DATA NUMBER 443. PART 2: (COMPREHENSIVE REPORTS). DATA FOR JANUARY 1981, DECEMBER 1979

Helen E. Coffey Jul. 1981 73 p 2 Vol.
(PB82-113861; SGD-443-Pt-2; NOAA-81082603) Avail: NTIS HC A04/MF A01 CSCL 03B

Data on solar radio emission, solar X-ray radiation, and mass ejections from the Sun are given for occurrences in January 1981. Data on solar flares for December 1979 are given. Miscellaneous data include: mass ejections from the Sun for December 1980, energetic solar particles and plasma for August to November 1980, and the regional flare index for November 1979. GRA

N82-20044# Utrecht State Univ. (Netherlands). Inst. of Astronomy.

HEATING PROCESSES OF THE SOLAR CORONA

M. Kuperus *In* ESA Plasma Astrophys. Nov. 1981 p 113-128 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20046*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.

INFERENCES ABOUT THE SOLAR WIND DYNAMICS FROM OBSERVED DISTRIBUTIONS OF ELECTRONS AND IONS

Stanislaw Olbert *In* ESA Plasma Astrophys. Nov. 1981 p 135-143 refs (For primary document see N82-20030 10-88)
(Grant NGR-22-009-015)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+ 20% others) CSCL 03B

N82-20048# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.

THE INTERNATIONAL SOLAR POLAR MISSION (ISPM)

R. G. Marsden and K.-P. Wenzel *In* ESA Plasma Astrophys. Nov. 1981 p167-175 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20079# Ruhr Univ., Bochum (West Germany). Inst. fuer Theoretische Physik.

QUASISTATIC EVOLUTION OF PREFLARE EQUILIBRIA

Wolfgang Zwingmann *In* ESA Plasma Astrophys. Nov. 1981 p 297-400 refs Sponsored by Deutsche Forschungsgemeinschaft (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20080*# Colorado Univ., Boulder. Dept. of Astro-Geophysics.

LARGE LOOP THERMAL MODELS OF SOLAR HARD X-RAY BURSTS

Dean F. Smith and D. W. Harmony *In* ESA Plasma Astrophys. Nov. 1981 p 401-404 refs Co-sponsored with NSF (For primary document see N82-20030 10-88)
(Grant NsG-7505)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

N82-20081# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).

WAVE HEATING AND ACCELERATION OF SOLAR WIND IONS BY CYCLOTRON RESONANCE

Eckart Marsch *In* ESA Plasma Astrophys. Nov. 1981 p 405-406 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-20109*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

EXTRAGALACTIC GAMMA RADIATION: USE OF GALAXY COUNTS AS A GALACTIC TRACER

D. J. Thompson and C. E. Fichtel Feb. 1982 13 p refs Submitted for publication
(NASA-TM-83901) Avail: NTIS HC A02/MF A01 CSCL 03B

A derivation of the extragalactic diffuse gamma radiation with energies above 35 MeV was carried out using galaxy counts as a tracer of galactic matter. The extragalactic radiation has a differential photon number spectrum which may be expressed as a power law with index 2.35 (+0.4, -0.3) and an intensity above 35 MeV of (5.5 + or - 1.3) 0.00001 photons sq cm/s/ster, consistent with previous derivations. Use of a 1/sin of the absolute value of b expression of the galactic component produces a poorer fit, suggesting that the high-latitude galactic gamma-ray production may be dominated by cosmic ray interactions with matter rather than by Compton interactions of cosmic rays with photon fields. B.W.

N82-20110*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

PRECISE SOURCE LOCATION OF THE ANOMALOUS 1979 MARCH 5 GAMMA RAY TRANSIENT

T. L. Cline, U. D. Desai, B. J. Teegarden, W. D. Evans, R. W. Klebesadel, J. G. Laros, C. Barat, K. Hurley, M. Niel, G. Vedrenne et al Dec. 1981 16 p refs Prepared in cooperation with NASA. Marshall Space Flight Center, LASL, CNRS and the Inst. of Space Research and Center for Astrophysics Submitted for publication

(NASA-TM-83884) Avail: NTIS HC A02/MF A01 CSCL 03B

Refinements in the source direction analysis of the observations of the unusual gamma ray transient are presented. The final results from the interplanetary gamma ray burst network produce a 0.1 arc sq. min. error box. It is nested inside the initially determined 2 arc sq min. source region. This smaller source location is within both the optical and X-ray contours of N49 although not positioned at either contour center. M.D.K.

N82-20111*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ON THE THEORY OF GAMMA RAY AMPLIFICATION THROUGH STIMULATED ANNIHILATION RADIATION (GRASAR)

R. Ramaty, J. M. McKinley (Oakland Univ.), and F. C. Jones Nov. 1981 36 p refs Submitted for publication

(NASA-TM-83857) Avail: NTIS HC A03/MF A01 CSCL 03B

The theory of photon emission, absorption, and scattering in a relativistic plasma of positrons, electrons, and photon was studied. Expressions for the emissivities and absorption coefficients of pair annihilation, pair production, and Compton scattering are given and evaluated numerically. The conditions for negative absorption were investigated. In a system of photons and e(+) - e(-) pairs, an emission line at at approximately 0.43 MeV can be produced by grasar action provided that the pair chemical potential exceeds approximately 1 MeV. At a temperature of approximately 10 to the 9th power. This requires a pair density > approximately 10 to the 30th power cm to the (-3) power a value much larger than the thermodynamic equilbrium pair density at this temperature. This emission line could account without a gravitational redshift for the observed lines at this energy from gamma ray bursts. Author

N82-20112*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

GODDARD CONTRIBUTIONS TO THE WORKSHOP ON GAMMA RAY TRANSIENTS

Aug. 1981 84 p refs Conf. held at La Jolla, Calif., 5-8 Aug. 1981

(NASA-TM-83816) Avail: NTIS HC A05/MF A01 CSCL 03B

Six articles addressing cosmic and solar gamma ray transients are presented. The topics covered include: gamma ray lines from solar flares and cosmic transients including burst spectra; a review of the 1979 March 5 transient; time variation in the 511 KeV flux observed by the ISEE spectrometer; time variations of an absorption feature in the spectrum of the burst on 1980 April 19; and the theory of gamma ray amplification through stimulated annihilation radiation. M.G.

N82-20042# Rome Univ. (Italy). Ist. Astronomico.

RADIATION PROCESSES IN ACTIVE GALACTIC NUCLEI

A. Cavaliere *In* ESA Plasma Astrophys. Nov. 1981 p 97-103 refs Sponsored by CNR (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20043# Princeton Univ., N. J. Dept. of Astrophysical Sciences.

PARTICLE ACCELERATION

Russell M. Kulsrud *In* ESA Plasma Astrophys. Nov. 1981 p 105-109 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20051# California Inst. of Tech., Pasadena.

EXTRAGALACTIC RADIO SOURCES

R. D. Blandford *In* ESA Plasma Astrophys. Nov. 1981 p 207-214 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20052# Cornell Univ., Ithaca, N. Y. Dept. of Applied Physics.

EXTRAGALACTIC DOUBLE RADIO SOURCES

R. V. E. Lovelace and H. A. Scott *In* ESA Plasma Astrophys. Nov. 1981 p 215-221 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20055# Cambridge Univ. (England). Inst. of Astronomy.

PRODUCTION AND PROPAGATION OF JETS

Martin J. Rees *In* ESA Plasma Astrophys. Nov. 1981 p 267-271 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20060*# Maryland Univ., College Park. Dept. of Physics and Astronomy.

ELECTRON ACCELERATION IN MAGNETOSONIC SHOCK FRONTS

K. Papadopoulos *In* ESA Plasma Astrophys. Nov. 1981 p 313-315 refs (For primary document see N82-20030 10-88) (Grant NAGw-81; Contract N00014-79-C-0665)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

N82-20061# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.

HIGH ENERGY COSMIC RAY ACCELERATION BY DIFFUSIVE SHOCKS

P. O. Lagage and C. J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 317-318 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20062# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.

COSMIC RAY ACCELERATION BY STELLAR WINDS AND SELF-CONFINEMENT IN GIANT H2 REGIONS

T. Montmerle and C. J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 319-322 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20067# Cambridge Univ. (England). Inst. of Astronomy.

ION PRESSURE-SUPPORTED ACCRETION TORI AND THE ORIGIN OF RADIO JETS. A PLEA FOR SPECIFIC ADVICE ON THE PLASMA PHYSICS

E. S. Phinney *In* ESA Plasma Astrophys. Nov. 1981 p 337-341 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20070# Turin Univ. (Italy). Ist. di Fisica Generale.

LARGE SCALE KELVIN-HELMHOLTZ INSTABILITIES IN EXTRAGALACTIC RADIO JETS

A. Ferrari and E. Trussoni *In* ESA Plasma Astrophys. Nov. 1981 p 353-357 refs Prepared in cooperation with CNR, Turin (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20073*# Colorado Univ., Boulder. Dept. of Astro-Geophysics.

CONFINEMENT OF COSMIC RAYS IN MOLECULAR CLOUDS

Ellen G. Zweibel and J. Michael Shull (Joint Inst. for Laboratory Astrophysics) *In* ESA Plasma Astrophys. Nov. 1981 p 371-373 refs Co-sponsored by NASA (For primary document see

N82-20030 10-88)
(Grant NSF AST-80-19960)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

N82-20074# Lodz Univ. (Poland).
CERTAIN ASPECTS OF PRIMARY COSMIC RAYS COMPOSITION AT ENERGIES OF 10 TO THE 14TH POWER TO 10 TO THE 15TH POWER eV
J. Kempa *In* ESA Plasma Astrophys. Nov. 1981 p 375-376 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20076# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
ON THE EXISTENCE OF THE ION TEARING MODE
H. Goldstein *In* ESA Plasma Astrophys. Nov. 1981 p 383-384 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20086# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
ACCELERATION OF COSMIC RAYS BY SHOCK WAVES
W. I. Axford *In* ESA Plasma Astrophys. Nov. 1981 p 425-449 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

99 GENERAL

N82-20113*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT Progress Report, Nov. - Dec. 1981
N. A. Renzetti, ed. 15 Feb. 1982 140 p refs Sponsored by NASA
(NASA-CR-168577; JPL-PR-42-67) Avail: NTIS HC A07/MF A01 CSCL 22D

Progress in the development and operations of the Deep Space Network is reported. Developments in Earth-based radio technology as applied to other research programs are also reported. These programs include geodynamics, astrophysics, and radio searching for extraterrestrial intelligence in the microwave region of the electromagnetic spectrum. For individual titles, see N82-20114 through N82-20130.

N82-20114*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SETI DOWNCONVERTER c33
B. Crow *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 1-5 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09C

The SETI (Search for Extraterrestrial Intelligence) breadboard subsystem was begun in order to develop the technology to efficiently implement a SETI instrument capable of searching wide bandwidth with high resolution. The downconverter covered is the interface hardware between the receiver IF output and ADC used as the input to the spectrum analyzer. Author

N82-20115*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DSN RADIO SCIENCE SYSTEM MARK 3, 1980 c32
B. J. Buckles *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 6-11 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 17B

The DSN Radio Science System supported the Voyager 2 Saturn encounter radio science experiments in August 1981. Support for these experiments was provided by all the Deep Space Stations of the DSN. However, the critical support for the Saturn occultation and ring scattering experiment was provided at DSS 43 by the medium-band open-loop recording system. The DSN Radio Science System is descried and the recent implementation at DSS 43 is emphasized. Author

N82-20116*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A SUMMARY OF SPACE FLIGHT MISSIONS SUPPORTED BY THE DEEP SPACE NETWORK c12
E. S. Burke *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 13-17 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 22A

Since the Ranger series in the 1960s the DSN evolved to a highly sophisticated telecommunications and data acquisition network. The 26 meter antennas were converted to 34 meters, and 64 meter antennas were built at all complexes. The L-band systems were changed to S-band, with X-band now also being used on Voyager and Pioneer 12. Ranging systems were developed and are used along with other techniques to determine exact spacecraft locations. Each mission is summarized and the launch date, objective, and results are presented. T.M.

N82-20117*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
HELIOS MISSION SUPPORT c14
A. L. Berman, C. T. Stelzried, B. L. Seidel, J. C. Nash, and R. E. Nevarez *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 18-23 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 22D

Ongoing Deep Space Network support of the Helios 1 spacecraft is described. In addition, planning for a Solar Corona Faraday Rotation Experiment during the December 1981 14th Helios 1 perihelion and subsequent solar conjunction phase is detailed. Author

N82-20118*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DEVELOPMENT OF A MAGNETICALLY ENHANCED HYDROGEN GAS DISSOCIATION c36
L. Maleki and T. K. Tucker *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 24-28 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20E

Application of a dc magnetic field on an RF hydrogen gas dissociator led to the development of a more efficient source of atoms for hydrogen masers. The influence of the applied magnetic field on the plasma and some details of the resulting enhancement of the dissociation efficiency are discussed. Ways that this improved efficiency can result in the enhancement of the operation and field life of hydrogen masers, as well as aid the development of spaceborne masers, are considered. Author

N82-20119*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MAGNETIC REFRIGERATION FOR MASER AMPLIFIER COOLING c36
D. L. Johnson *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 29-38 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20E

The development of a multifrequency upconverter-maser system for the DSN has created the need to develop a closed-cycle refrigerator (CCR) capable of providing more than 3 watts of refrigeration capability at 4.5 K. In addition, operating concerns such as the high cost of electrical power consumption and the loss of maser operation due to CCR failures require that improvements be made to increase the efficiency and reliability of the CCR. One refrigeration method considered is the replacement of the Joule-Thomson expansion circuit with a magnetic refrigeration. Magnetic refrigerators can provide potentially reliable and highly efficient refrigeration at a variety of temperature ranges and cooling power. The concept of magnetic refrigeration is summarized and a literature review of existing magnetic refrigerator designs which have been built and tested and that may also be considered as possibilities as a 4 K to 15 K magnetic refrigeration stage for the DSN closed-cycle refrigerator is provided. T.M.

N82-20120*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SIDEBAND-AIDED RECEIVER ARRAYING c32
S. A. Butman, L. J. Deutsch, R. G. Lipes, and R. L. Miller *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 39-54 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 17B

Efforts to increase the amount of data that can be received from outer planet missions by coherently combining signals from ground antennas in such a way as to increase the total effective aperture of the receiving system are discussed. As these signals become weaker, the baseband arraying technique in current use degrades somewhat due to carrier jitter. One solution to this problem is Sideband-Aided Receiver Arraying (SARA). In SARA, sidebands demodulated to baseband in a master receiver at the largest antenna are used to allow slave receivers in the other antennas to track the sideband power in the signal rather than the carrier power. The already existing receivers can be used in the slaves to track and demodulate the signals in either a residual carrier or a suppressed carrier environment. The resultant baseband signals from all the antennas can then be combined using existing baseband combining equiment. Computer simulations of SARA show increases in throughput (measured in data bits per second) over baseband-only combining 17 percent at Voyager 2 Uranum encounter and 31 percent at Neptune for a four-element antenna array and (7, 1/2) convolutional coding. Author

N82-20121*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CAPACITY LIMIT OF THE NOISELESS, ENERGY-EFFICIENT OPTICAL PPM CHANNEL c74
J. R. Lesh *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 54-58 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20F

It is shown that even though the capacity per photon can be made to increase without bound, the capacity per channel use (for best power efficiency) is always less than 2 nats per symbol. Furthermore, it approaches 2 nats per symbol as the bandwidth expansion factor goes to infinity. T.M.

N82-20122*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ON THE GROUP DELAY EFFECT OF DSN MICROWAVE COMPONENTS ON MULTIMEGABIT TELEMETRY c17
P. J. Lee *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 59-65 ref (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09F

When the gain and phase shift characteristics of the overall system between the modulator and demodulator are given, the group delay effect for the intended data rate can be assessed by examining the equation for the recovered signal for several rectangular pulse inputs with different duty cycles. For example, the group delay loss of 30 Mbit/sec telemetry with only a Block II X-band maser is less than 0.2 dB even with a 10-MHz center frequency offset. Author

N82-20123*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
IMPROVING THE COMPUTER-HUMAN INTERFACE: THE QUALITATIVE MONITOR DISPLAY c60
H. W. Baugh and A. I. Zygielbaum *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 66-69 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09B

A technique for displaying the information needed by DSN operators for monitoring station performance is described. Known as a 'qualitative monitor,' it presents continuous variables in quasi-analog form on a digital cathode ray tube (CRT) display. Color changes, field reverses and blinking symbols assist the operator in identifying variables that are within acceptable limits and in performing corrective action when needed. Author

N82-20124*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MASTER TIMING SYSTEM MEASUREMENTS c35
E. F. Endsley *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 70-74 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14B

The test results indicate that the system performs within the specifications established. The overall system appears to be well designed and built to a good commercial grade. The triple redundant time code generators, whose outputs are majority voted, performed adequately as far as could be determined on an operational situation. T.M.

N82-20125*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
OPTIMUM EQUIPMENT MAINTENANCE/REPLACEMENT POLICY. PART 2: MARKOV DECISION APPROACH c38
T. Charng *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 75-89 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

Dynamic programming was utilized as an alternative optimization technique to determine an optimal policy over a given time period. According to a joint effect of the probabilistic transition of states and the sequence of decision making, the optimal policy is sought such that a set of decisions optimizes the long-run expected average cost (or profit) per unit time. Provision of an alternative measure for the expected long-run total discounted costs is also considered. A computer program based on the concept of the Markov Decision Process was developed and tested. The program code listing, the statement of a sample problem, and the computed results are presented. Author

N82-20126*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GLOBAL POSITIONING SYSTEM TIMING RECEIVERS IN THE DSN c04
P. A. Clements *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 90-99 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 17G

The system (GPS) is a worldwide navigation system using a constellation of Earth satellites with onboard clocks. The GPS is also usable to transfer time and frequency. Preliminary tests with the breadboard receiver at NBS produced precision in time and frequency transfer between the United States Naval Observatory (USNO) and NBS. JPL's plans to install receivers in the DSN to demonstrate their ability to transfer time and frequency within the DSN and between the DSN and outside agencies are discussed. T.M.

N82-20127*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NOISE TEMPERATURE AND NOISE FIGURE CONCEPTS: DC TO LIGHT c32
C. T. Stelzried *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 100-111 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20N

The Deep Space Network is investigating the use of higher operational frequencies for improved performance. Noise temperature and noise figure concepts are used to describe the noise performance of these receiving systems. It is proposed to modify present noise temperature definitions for linear amplifiers so they will be valid over the range (hf/kT) < 1 < (hf/kT). This is important for systems operating at high frequencies and low noise temperatures, or systems requiring very accurate calibrations. The suggested definitions are such that for an ideal amplifier, T sub e = (hg/k) = T sub q and F = 1. These definitions revert to the present definition for (hf/kT) < < 1. Noise temperature calibrations are illustrated with a detailed example. These concepts are applied to system signal-to-noise analysis. The fundamental limit to a receiving system sensitivity is determined by the thermal noise of the source and the quantum noise limit of the receiver. The sensitivity of a receiving system consisting of an ideal linear amplifier with a 2.7 K source, degrades significantly at higher frequencies. Author

N82-20128*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TIGER RELIABILITY ANALYSIS IN THE DSN c38

J. M. Gunn *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 112-120 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

The TIGER algorithm, the inputs to the program and the output are described. TIGER is a computer program designed to simulate a system over a period of time to evaluate system reliability and availability. Results can be used in the Deep Space Network for initial spares provisioning and system evaluation. T.M.

N82-20129*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SPECIAL ACTIVITY UTILIZATION OF GDSCC ANTENNAS DURING 1981 c32
E. B. Jackson *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 121-126 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20N

The activities are categorized as advanced systems program, radio astronomy program, crustal dynamics program, and operations and support activities. The goals of each of the activities that received tracking support at Goldstone during 1981 are discussed. All Goldstone stations (DSSs 11, 12, 13 and 14) provided a total of 2353.55 hours of support to special activities during the period. T.M.

N82-20130*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MAINTENANCE AND OPERATIONS TASKS ACCOMPLISHED AT DSS 12 DURING THE ANTENNA PANEL REPLACEMENT DOWNTIME c38
L. Butcher, T. Jones, and W. Wood *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 127-128 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

The heavy schedule of tracking activities at the Echo Deep Space Station (DSS 12) prevents some time-consuming maintenance tasks from being performed. Careful coordination prior to and during a mandatory task (antenna panel replacement) made it possible to do a large number of unrelated tasks that ordinarily would have to be deferred. The maintenance and operations tasks accomplished during the downtime are described. Author

N82-20131# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BI-MONTHLY BULLETIN NUMBER 1981-4, JULY - AUGUST 1981
Claude Sevestre, ed. Paris ESA Nov. 1981 68 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 223-294 Sponsored by ESA
(ESA-TT-722) Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Advances in calculation and simulation methodology reported include: (1) determination of a compressor transfer function; (2) modeling of Reynolds stress equations in a rotating reference system; (3) a two-step implicit scheme for the solution of a conservation equation; (4) determination of temperature/velocity probability density functions in a turbulent flame; (5) modeling aircraft IR radiation; and (6) computer controlled structural vibration simulation. For individual titles, see N82-20132 through N82-20137.

N82-20132# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
THEORETICAL AND EXPERIMENTAL DETERMINATION OF A COMPRESSOR TRANSFER FUNCTION c02
J. Fabri and J. Paulon *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 1-8 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 223-231 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

The physical meaning of compressor transfer functions proposed in the technical literature was examined. None of them correctly explains the transient phenomena observed during transient tests of a single stage compressor submitted to a pressure step. Measurement of the evolutions of wall pressure on an axial compressor submitted to a flow step demonstrated a certain number of facts which have to be taken into account when studying the operation of compressors under transient conditions. An analysis of the equations of momentum and continuity through the compressor, which allows for the action of the blades on the fluid, gives a theoretical scheme that is closer to the experimental results. The best theoretical/experimental cross checks are obtained assuming that the acceleration of the fluid under the effect of volume forces satisfies a relaxation equation involving the history (memory) of the phenomenon. Author (ESA)

N82-20133# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
EXPERIMENTAL DETERMINATION OF TEMPERATURE/VELOCITY PROBABILITY DENSITY FUNCTIONS IN A TURBULENT FLAME c25
P. Moreau *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 9-20 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 233-244 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Optical measurements of velocity by laser velocimetry, and temperature by infrared pyrometry were performed in a combustion chamber in which a premixed air-methane flow was ignited by a parallel flow of hot gases. The mean velocity and velocity fluctuation profiles show the influence of inlet turbulence and velocity ratio on flame development. The velocity probability density functions reveal various zones in the flow: fresh mixture, mixing and combustion zone, and burnt gases. The temperature histograms obtained give similar results. Author (ESA)

N82-20134# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
AIRCRAFT INFRARED RADIATION MODELING c74
G. Gauffre *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 21-41 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 245-265 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Numerical modeling of aircraft IR emission comprised two phases: research of the main physical phenomena which are involved, and the development of calculation techniques capable of numerically resolving the problems which were identified. A software package is offered. The major processes taken into account are heating sources, geometrical representation and obscuration, plume description, infrared emittance of solids and gases, atmospheric transmission, and background. The input data are geometrical description of target, flight parameters and observation system. The code states the origin of radiation and the spectral distribution. The results can be exploited as an intensity function of range or polar diagrams. Author (ESA)

N82-20135# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
SIMULATION USING COMPUTER-PILOTED POINT EXCITATIONS OF VIBRATIONS INDUCED ON A STRUCTURE BY AN ACOUSTIC ENVIRONMENT c71
P. Monteil *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 43-49 Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 267-273 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Computation of the overall levels and spectral densities of the responses measured on a launcher skin, the fairing for instance, merged into a random acoustic environment during take off, was studied. The analysis of transmission of these vibrations to the payload required the simulation of these responses by a shaker control system, using a small number of distributed shakers. Results show that this closed loop computerized digital system

allows the acquisition of auto and cross spectral densities equal to those of the responses previously computed. However, wider application is sought, e.g., road and runway profiles. The problems of multiple input-output system identification, multiple true random signal generation, and real time programming are evoked. The system should allow for the control of four shakers.
Author (ESA)

N82-20136# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
REYNOLDS STRESS EQUATIONS MODELING IN A ROTATING REFERENCE SYSTEM c39
J. Cousteix and B. Aupoix *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 51-60 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 275-285 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Simplifying hypotheses for analyzing the effect of rotation on the behavior of turbulent stresses are introduced. Two particular cases are considered: (1) a two dimensional boundary layer rotating around a flow with its axis perpendicular to the plane of the flow and (2) a three dimensional boundary layer rotating around an axis perpendicular to the wall. In the first case, stabilization or destabilization of the turbulence appears to depend on the direction of rotation. In the second, the effect of rotation is a misalignment between the turbulent shearing stress and the derivative of the mean velocity, following the coordinate normal to the wall.
Author (ESA)

N82-20137# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
TWO-STEP IMPLICIT SCHEMES FOR THE SOLUTION OF A CONSERVATION EQUATION c64
H. Hollanders and R. Peyret *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 61-67 refs Transl. into ENGLISH of La Rech. Aerospatiale Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 287-294 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

A class of two-step implicit schemes, generalizing an implicit predictor-corrector type scheme to solve evolution equations with application to Navier-Stokes equations for compressible fluids, is considered. The class is constructed on the basis of two-step explicit (S beta alpha) schemes which are explicit at the first step, implicit at the second in the centered case alpha = beta = 1/2. MacCormack implicit schemes, alpha = 1 and beta = 0 or beta = 1, are emphasized. These schemes are applied to the solution of a hyperbolic equation. The dispersive and dissipative properties of these schemes are deduced from a study of the equivalent equation. Numerical experiments are carried out, relating to the problem of the propagation of a discontinuity. Results show that the MacCormak bidiagonal resolution scheme, and the centered scheme based on the optimal explicit alpha = 1 + [illegible] square root of 5/2 and on an implicit operator, deduced either from a subclass of explicit-implicit schemes or from Lerat's one-step scheme are interest for representing discontinuity
Author (ESA)

N82-20138# Office of Naval Research, London (England).
EUROPEAN SCIENTIFIC NOTES, VOLUME 35, NUMBER 11 Monthly Publication Report, 30 Nov. 1981
Francis A. Richards, ed. and Don J. Peters, ed. 30 Nov. 1981 37 p
(AD-A109387; ESN-35-11) Avail: NTIS HC A03/MF A01 CSCL 05/1

A collection of articles on recent developments in European scientific research is presented. The following topics are discussed: Artificial and Human Intelligence; Organizational Change in Merchant Shipping; Unit of Blood Pressure: Protecting the Millimeter of Mercury; Third International Symposium on Inorganic Ring Systems; NATO Advanced Research Institute on Surface Modification and Alloying of Materials by Direct Energy Processing; and FRAM Ice Floe Stations.
E.A.K.

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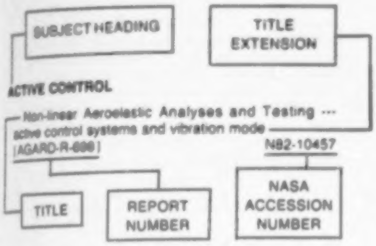

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BIBLIOGRAPHIES
Aeronautical Engineering: A continuing bibliography (supplement 143)
[NASA-SP-7037(143)] N82-19131
Bibliography of NASA published reports on general aviation, 1975 to 1981
[NASA-TM-83307] N82-19132
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[PB82-114224] N82-20029

CIVIL AVIATION
Bibliography of NASA published reports on general aviation, 1975 to 1981
[NASA-TM-83307] N82-19132
FAA statistical handbook of aviation
[AD-A109289] N82-19198

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European Scientific Notes, volume 35, number 11
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[INPE-2270/PRE/051] N82-19776

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[INPE-2299-TDL/070] N82-19876

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[VTH-LR-319] N82-19847

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[AD-A108924] N82-19207

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[ESA-TR!B-2] N82-19483

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[BLL-TRANS-1510-(9022.552)] N82-19758

COEFFICIENTS
Acta Polytechnica Scandinavica. Oxygen-metal (Ag, Au, Bi, Cu, In, Ni, Sb, Sn, Te) interactions in dilute molten lead alloys
[ISBN-951-666-137-3] N82-19359

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[NASA-CR-168644] N82-19543
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[NASA-TM-84028] N82-20012
COMMERCIAL AIRCRAFT
Bibliography of NASA published reports on general aviation, 1975 to 1981
[NASA-TM-83307] N82-19132
FAA statistical handbook of aviation
[AD-A109289] N82-19198
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane
[NASA-TP-1966] N82-19225
COMMUNICATION
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Study of the availability of satellite telecommunication networks subject to rain attenuation
[INPE-2300-TDL/071] N82-19425
SATNET development and operation. Pluribus satellite IMP development. Remote site maintenance. Internet operations and maintenance. Mobile access terminal network. TCP for the HP3000. TCP-TAC. TCP for VAX-UNIX. Combined quarterly technical report
[AD-A108783] N82-19432
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[LA-8689-MS] N82-19849
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[NASA-TP-1974] N82-19222
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[NASA-TP-1974] N82-19222
High-speed laser anemometer system for intrarotor flow mapping in turbomachinery
[NASA-TP-1663] N82-19521
COMPRESSORS
Foundations for computer simulation of a low pressure oil flooded single screw air compressor
[AD-A108230] N82-19391
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NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 3: Aerodynamics and Structures Session
[NASA-TM-84147] N82-19172

Recent advances in space structure design-verification techniques --- conference proceedings
[ESA-SP-1036] N82-19308

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[PB82-104753] N82-19663

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Human Factors in System Development: Experiences and Trends --- conference proceedings
[FOA-A-56003-H9] N82-19839

Plasma Astrophysics — conference proceedings, Varenna, Italy, 27 Aug. - 7 Sep. 1981
[ESA-SP-161] N82-20030
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AgRISTARS: Foreign commodity production forecasting. Corn/soybean decision logic development and testing
[E82-10056] N82-19631
CROP INVENTORIES
AgRISTARS: Interim catalog ground data summary, data acquisition year 1979
[E82-10032] N82-19608
Recommended data sets, corn segments and spring wheat segments, for use in program development
[E82-10034] N82-19610
AgRISTARS: Foreign commodity production forecasting. Minutes of the annual formal project manager's review, including preliminary technical review reports of FY80 experiments --- wheat/barley and corn/soybean experiments
[E82-10039] N82-19614
Notes for Brazil sampling frame evaluation trip
[E82-10060] N82-19635
Utilization of Aerochrome 2443 film for identification and estimating wheat growing areas --- Rio Grande do Sul, Brazil
[INPE-2197-PRE/006] N82-19639
CROP VIGOR
AgRISTARS: Soil moisture/early warning and crop condition assessment. Interface control document
[E82-10053] N82-19628
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The Shock and Vibration Digest, volume 13, no. 12
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Turbulence within cumulus clouds and outside them
[BLL-TRANS-1481-(9022.552)] N82-19762

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Australian tropical cyclones Kerry and Rosa, February - March 1979
[PB82-114182] N82-19794

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Arithmetic manipulation of variables and data base contents by a simple dialog oriented language with structured elements
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Collection and evaluation of propeller aircraft noise certification data
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Data rate reduction. Impact of image data compression on end to end data management of a multispectral payload — for satellite imagery
[REPT-44/130] N82-19654

Methods of image compression without information loss
[INPE-2274-PRE/054] N82-20013

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MICAD: An interactive computer for the design of microwave circuits
[LEOK-TR-1980-06] N82-19473

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LANDSAT imagery of the Venetian Lagoon: A multitemporal analysis
[E82-10036] N82-19612

DATA LINKS

SATNET development and operation. Pluribus satellite IMP development. Remote site maintenance. Internet operations and maintenance. Mobile access terminal network. TCP for the HP3000. TCP-TAC. TCP for VAX-UNIX. Combined quarterly technical report
[AD-A108783] N82-19432

DATA MANAGEMENT

AgRISTARS: Interim catalog ground data summary, data acquisition year 1979
[E82-10032] N82-19608

Data rate reduction. Impact of image data compression on end to end data management of a multispectral payload — for satellite imagery
[REPT-44/130] N82-19654

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SAM: A configurable experimental text editor for investigating human factors issues in text processing and understanding
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The Naval postgraduate school SECURE ARCHIVAL STORAGE SYSTEM. Part 2: Segment and process management implementation
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Routine data processing and physical interpretation of data obtained by the fluxgate and search coil magnetometer experiments on board Helios 1 and 2 — on interplanetary and solar magnetic fields
[BMFT-FB-W-81-039] N82-20099

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Air traffic control en route computer system
[GPO-89-008] N82-19202
AgRISTARS: Early warning and crop condition assessment. Patch image processor user's manual
[E82-10055] N82-19630

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[NASA-TM-83256] N82-19943

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[MATHS-RES-159] N82-19933

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[BLL-TRANS-1510-(9022.552)] N82-19758

DATA TRANSMISSION
Universal documentation system handbook. Supplement 2: Procedures for the electronic transmission and processing of level 1, 2, and 3 test requirements and support information
[AD-A108901] N82-19251
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Six degree of freedom manual controls study report
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[ICTIS-TR-15] N82-19332

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[AD-A108890] N82-19375
Conventional engine technology. Volume 2: Status of diesel engine technology
[NASA-CR-168644] N82-19543
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Performance of industrial-type engines in military equipment using synthetic crankcase oils
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Future fuels and engines for railroad locomotives. Volume 1: Summary
[NASA-CR-168642] N82-20022

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An examination of stability criteria for iterative numerical schemes used in solving differential equations
[RAE-TR-81061] N82-19902

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High energy cosmic ray acceleration by diffusive shocks N82-20061

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Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
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[NASA-TM-83256] N82-19943

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[REPT-3972-ISSUE-1] N82-19440

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Three dimensional numerical model for estimation of pollutant concentration
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A numerical method for solving the Vlasov equation
[NASA-TM-81339] N82-19985

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DIVING (UNDERWATER)
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DOCUMENTS
Catalogue of ESA publications in 1980
[ESA-SP-1037] N82-20017

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Energy conservation in the production of domestic hot water
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DRAINAGE
Water resources data for New Hampshire and Vermont, water year 1980
[PB82-110156] N82-19658
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Distribution of personnel, vehicles, and supplies by ship: A model applied to the Brazilian Navy
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Detection of periodically fluctuating noise — from ships
[FOA-C-30223-E1] N82-19955
La Recherche Aerospatiale, Bi-monthly Bulletin number 1981-4, July - August 1981 — aerospace R and D
[ESA-TT-722] N82-20131
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Convergence zones in the South Atlantic and their influence on the precipitation regime in Northeastern Brazil
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Australian tropical cyclones Kerry and Rosa, February - March 1979
[PB82-114182] N82-19794

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The problem of precipitation measurement by attenuation of radio waves
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Report on the analysis of data from the NOAA/Alaskan MST radar system
[AD-A109056] N82-19782

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A new meteorological code for 1 January 1982
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Statistical study of freezing clouds in the GINA 2-PAP, March - April 1979
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[PB82-104753] N82-19663

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[MBB-UA-532-80-O] N82-19211

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EXUV. Phase A study. Volume 1: Executive summary — extreme UV/soft X-ray survey mission (EXUV)
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Upper stage alternatives for the shuttle era
[NASA-TM-84137] N82-19303

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AgRISTARS: Yield model development/soil moisture. Interface control document
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[AD-A095594] N82-19558

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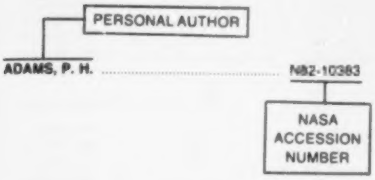

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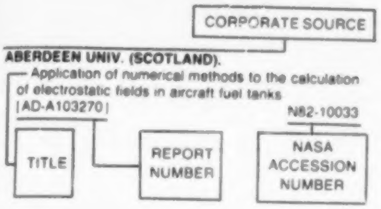

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ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND, FORT MONMOUTH, N. J.
Radiation and temperature tests of cadmium telluride detectors
[AD-A108774] N82-19522

ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Abrasion-erosion resistance of fiber reinforced concrete
[AD-A108986] N82-19394
Precast concrete pavements
[AD-A108802] N82-19395
Analysis of methodologies used for the assessment of wetlands values: Appendices C-E
[PB82-110362] N82-19807

ARMY MATERIALS AND MECHANICS RESEARCH CENTER, WATERTOWN, MASS.
Stress intensity and fatigue crack growth in multiply-cracked, pressurized, partially autofrettaged thick cylinders
[AD-A109081] N82-19580

ARMY MATERIEL SYSTEMS ANALYSIS ACTIVITY, ABERDEEN PROVING GROUND, MD.
Proceedings of the 3rd Meeting of the Coordinating Group on Modern Control Theory, part 1
[AD-A109124] N82-19896

ARMY MISSILE COMMAND, REDSTONE ARSENAL, ALA.
A survey of atmospheric turbulence characteristics
[AD-A109306] N82-19738

ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMMAND, FORT BELVOIR, VA.
The effect of surface coatings on the fatigue strength of aluminum alloys
[AD-A108869] N82-19363
Performance of industrial-type engines in military equipment using synthetic crankcase oils
[AD-A109023] N82-19545

ARO, INC., ARNOLD AIR FORCE STATION, TENN.
Hypervelocity track tests of the NASA Galileo probe heatshield
[AD-A109042] N82-19291

ATMOSPHERIC RADIATION CONSULTANTS, ACTON, MASS.
Inversion of spire NO data
[AD-A108866] N82-19736

ATMOSPHERIC SCIENCES LAB., WHITE SANDS MISSILE RANGE, N. MEX.
Backscatter and extinction in water clouds
[AD-A109277] N82-19975

B

BALL STATE UNIV., MUNCIE, IND.
Determination of the effects of material from alternate energy sources on the upper respiratory tract clearance mechanism. Part 1: In vitro exposure to particulate pollutants. Part 2: In vivo exposure to ozone
[PB82-117037] N82-19811

BARNES ENGINEERING CO., STAMFORD, CONN.
Electro-optical system for remote position measurements in real time N82-19272

BATTELLE COLUMBUS LABS., OHIO.
The development of a dynamic elastoplastic finite element analysis for fast fracture under impact loading
[AD-A109323] N82-19575
Finite element analysis of dynamic crack propagation
[AD-A109322] N82-19576
The numerical simulation of crack growth in weld-induced residual stress fields
[AD-A109321] N82-19577
Numerical deconvolution to obtain cloud signatures from scattered light pulses
[AD-A108606] N82-19783

BAYLOR UNIV., HOUSTON, TEX.
Evaluation of materials proposed for use in space flight
[NASA-CR-167537] N82-19815

BOEING AEROSPACE CO., KENT, WASH.
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491] N82-19226

BOEING AEROSPACE CO., SEATTLE, WASH.
Configuration development of the Land Mobile Satellite System (LMSS) Spacecraft N82-19277
Configuration development of the Land Mobile Satellite System (LMSS) Spacecraft: Conclusions N82-19278
Program for nonlinear structural analysis
[AD-A108975] N82-19578
Syntactic visual image generation system feasibility study
[AD-A109334] N82-19858

BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
Electric flight systems N82-19144
Transonic pressure measurements and comparison of theory to experiment for three arrow-wing configurations
[NASA-CR-3434] N82-19177
Computation of transonic potential flow about 3 dimensional inlets, ducts, and bodies
[NASA-CR-3514] N82-19179

BOEING MILITARY AIRPLANE DEVELOPMENT, SEATTLE, WASH.
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852] N82-19167

BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
SATNET development and operation. Pluribus satellite IMP development. Remote site maintenance. Internet operations and maintenance. Mobile access terminal network. TCP for the HP3000. TCP-TAC. TCP for VAX-UNIX. Combined quarterly technical report
[AD-A108783] N82-19432

BOOZ-ALLEN AND HAMILTON, INC., NEW YORK.
Cost data base development: A twelve-year perspective
[AD-A109371] N82-20014

BOSCH (ROBERT) G.M.B.H., BERLIN (WEST GERMANY).
Spectrum saving speech transmission for land mobile radio. A study on single sideband transmission in 5 kHz channels for 2 and 4 m bandwidths
[BMFT-FB-T-81-173] N82-19442

BRISTOL UNIV. (ENGLAND).
An investigation into wing-canard interaction for a model with forward swept wings
[BU-261] N82-19191
The unsteady aerodynamics of certain bluff shapes
[BU-264] N82-19192
A study of the effects of leading-edge slats on the performance of slender wings
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Shear diffusion in sandwich specimens having glass reinforced plastic face plates with paper honeycomb cores
[BU-270] N82-19327
The structural behaviour of inflated cylindrical cantilever beams
[BU-260] N82-19597

BRITISH AEROSPACE DYNAMICS GROUP, BRISTOL (ENGLAND).
EXUV. Phase A study. Volume 1: Executive summary
[REPT-44/69/JS/CB-VOL-1] N82-19292
EXUV. Phase A study. Volume 2A: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2A] N82-19293
EXUV. Phase A study. Volume 2B: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2B] N82-19294
EXUV. Phase A report. Volume 3: Preliminary payload interface specification
[REPT-44/69/JS/CB-VOL-3] N82-19295
EXUV. Phase A study. Volume 4: Satellite development program
[REPT-44/69/JS/CB-VOL-4] N82-19296
Giotto Comet Halley mission, phase A study. Volume 1: Spacecraft design
[ESS/SS/1000] N82-19313
Life-size quantitative tests on a simple counterspun flywheel nutation damper
[BAE-NUTDAM-11] N82-19541

BRITISH AEROSPACE DYNAMICS GROUP, STEVENAGE (ENGLAND).
Study of Earth Resources Satellite (ERS) data reduction unit
[BAE-TP-7905] N82-19649

BRITISH BROADCASTING CORP., KINGSWOOD (ENGLAND).
Improvements to speech quality from a diving helmet
[BBC-RD-1981/9] N82-19399
Digital audio. Recursive digital filtering for high quality audio signals
[BBC-RD-1981/10] N82-19400

BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).
Mixed convection in molten metals
[BLL-RISLEY-TR-4385-(9091.9F)] N82-19355
Stratospheric ozone concentration measurements at sunrise and at sunset
[BLL-TRANS-1499-(9022.552)] N82-19720
Geophysical effects on the length of the sideral day
[BLL-TRANS-1489-(9022.552)] N82-19721
Maximum wind speeds in the North Pacific (with special reference to OWS P, N and V)
[BLL-TRANS-1495-(9022.552)] N82-19749
Area precipitation measurement by weather radar: Problems and practical experiences
[BLL-TRANS-1456-(9022.552)] N82-19750
The computation of the ground surface temperature for simulation of the general atmospheric circulation
[BLL-TRANS-1521-(9022.552)] N82-19751
Regional classification of the spectral variance of long European temperature series and its application in a statistical filter model for forecasting in the region north of the alps
[BLL-TRANS-1514-(9022.552)] N82-19752
Instruments and methods for studying atmospheric electricity
[BLL-TRANS-1487-(9022.552)] N82-19753
Statistical study of freezing clouds in the GINA 2-PAP, March - April 1979
[BLL-TRANS-1511-(9022.552)] N82-19754

The applicability of pressure measurements by radiosondes to calculating the height
[BLL-TRANS-1505-(9022.552)] N82-19755

Classification of the fields of anomaly in monthly water temperature of the North Atlantic during the cold half-year
[BLL-TRANS-1509-(9022.552)] N82-19756

Methodology for the use of (foreign) synoptic messages in the generalization of climatological information (derivation of climatic parameters)
[BLL-TRANS-1506-(9022.552)] N82-19757

A new meteorological code for 1 January 1982
[BLL-TRANS-1510-(9022.552)] N82-19758

The control of the quality of surface meteorological information
[BLL-TRANS-1503-(9022.552)] N82-19759

Cost estimates in connection with the selection of a system for long-term storage of hydrometeorological data
[BLL-TRANS-1502-(9022.552)] N82-19760

Some characteristics of the variation of air temperature in the northern hemisphere during individual months of the period 1881-1975
[BLL-TRANS-1497-(9022.552)] N82-19761

Turbulence within cumulus clouds and outside them
[BLL-TRANS-1481-(9022.552)] N82-19762

The use of weather radar in the civil aviation weather service
[BLL-TRANS-1456-(9022.552)] N82-19763

Inversion layers and their interaction with cumulus clouds below
[BLL-TRANS-1482-(9022.549)] N82-19764

Automatic measurement of areal precipitation using C-band radar
[BLL-TRANS-1378-(9022.552)] N82-19765

The problem of precipitation measurement by attenuation of radio waves
[BLL-TRANS-1475-(9022.549)] N82-19766

BRITISH PLASTICS FEDERATION, LONDON (ENGLAND).

The weathering of plastics materials in the tropics. 6: The further evaluation of a solar radiation concentrating device (EMMA) as a means of accelerating the weathering of plastics
[AD-A109385] N82-19376

BROWN UNIV., PROVIDENCE, R. I.

Electromagnetic deep-probing (100-1000 KMS) of the Earth's interior from artificial satellites: Constraints on the regional emplacement of crustal resources
[E82-10043] N82-19618

Electromagnetic deep-probing (100-1000 KMS) of the Earth's interior from artificial satellites: Constraints on the regional emplacement of crustal resources
[E82-10044] N82-19619

BUNDESANSTALT FUER GEOWISSENSCHAFTEN UND ROHSTOFFE, HANNOVER (WEST GERMANY).

Deuterium hydrogen isotope ratios in organic matter, mineral oils, and natural gases
[BMFT-FB-T-81-204] N82-19319

BUNDESMINISTERIUM FUER FORSCHUNG UND TECHNOLOGIE, BONN (WEST GERMANY).

Digital time control for camera shutters
[PB82-116328] N82-19529

BUREAU OF MINES, TWIN CITIES, MINN.

In Situ Mining Research. Proceedings of Bureau of Mines Technology Seminar
[PB82-104753] N82-19663

BUREAU OF RECLAMATION, BOULDER CITY, NEV.

Water assessment for the Lower Colorado River region-emerging energy technology development
[PB82-110107] N82-19398

BUREAU OF RECLAMATION, DENVER, COLO.

Thermodynamic features affecting convective cloud growth and dynamic seeding: A comparative summary of HIPLEX soundings, 1975 to 1977
[PB82-123423] N82-19791

BUSINESS AND TECHNOLOGICAL SYSTEMS, INC., SEABROOK, MD.

Equivalent source modeling of the main field using Magsat data
[E82-10041] N82-19616

Magsat science investigations
[E82-10045] N82-19620

An information adaptive system study report and development plan
[NASA-CR-166768] N82-19644

C

CAE ELECTRONICS LTD., MONTREAL (QUEBEC).

Six degree of freedom manual controls study report
[NASA-CR-167532] N82-19937

CALIFORNIA INST. OF TECH., PASADENA.

Extragalactic radio sources N82-20051

CALIFORNIA STATE UNIV., SAN DIEGO.

The new paradigm in cosmic plasma physics N82-20031

The Voyager 1 Saturn encounter and the cosmogonic shadow effect N82-20032

CALIFORNIA UNIV., BERKELEY.

Numerical study of incompressible slightly viscous flow past blunt bodies and airfoils N82-19163

Effect of nuclear spin on chemical reactions and internal molecular rotation N82-19330

One and two dimensional photochemical modeling of the two chemical interactions in the middle atmosphere (0-120 km) N82-19719

Pulsar theory: Particle acceleration and photon emission in the polar flux tube N82-20056

CAMBRIDGE UNIV. (ENGLAND).

Production and propagation of jets N82-20055

Hot plasmas in active galactic nuclei N82-20058

Ion pressure-supported accretion tori and the origin of radio jets. A plea for specific advice on the plasma physics N82-20067

CANADA INST. FOR SCIENTIFIC AND TECHNICAL INFORMATION, OTTAWA (ONTARIO).

New bioreactors for aerobic processes
[ISSN-0077-5606] N82-19679

Study of the kinetics of oxygen saturation of fluorocarbon emulsions
[ISSN-0077-5606] N82-19810

CANYON RESEARCH GROUP, INC., WESTLAKE VILLAGE, CALIF.

Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type
[AD-A108801] N82-19206

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.

Integrated devices of semiconductor metal-oxides in conjunction with silicon for solid-state gas sensors
[DE82-000397] N82-19477

Metaphor: An inescapable phenomenon in natural language comprehension
[AD-A109026] N82-19880

An MDI model and an algorithm for composite hypotheses testing and estimation in marketing
[AD-A109147] N82-20009

CENTER FOR ASTROPHYSICS, CAMBRIDGE, MASS.

Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83884] N82-20110

CENTRE D'ETUDE SPATIALE DES RAYONNEMENTS, TOULOUSE (FRANCE).

Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83884] N82-20110

CENTRE DE RECHERCHES EN PHYSIQUE DE L'ENVIRONNEMENT TERRESTRE ET PLANETAIRE, ORLEANS (FRANCE).

Fast processor for spectral analysis (ORAS)
[CRPE-NT-106] N82-19870

CENTRE NATIONAL D'ETUDES SPATIALES, TOULOUSE (FRANCE).

Study of a COMSS high accuracy positioning system: High Accuracy Positioning System (HASP)
[CNES-85.55.00] N82-19307

Methodology of uniaxial transient vibration tests for satellites N82-19311

CENTRO INFORMAZIONI STUDI ESPERIENZE, MILAN (ITALY).

Corrosion of carbon steel at high temperature in reducing chemical conditions
[CISE-1699] N82-19368

High stability coplanar oscillators
[CISE-1720] N82-19485

TRANSID: A computer program for the analysis of hydraulic transients in condenser cooling circuits
[CISE-1722] N82-19512

CHALMERS UNIV. OF TECHNOLOGY, GOTEBORG (SWEDEN).

Spinor genera of orders and quadratic forms
[CTH-MATH-1981-20] N82-19922

Applications of a general comparison theory for convolution integrals
[CTH-MATH-1981-21] N82-19923

Course-of-values recursion on lists in intuitionist type theory
[CTH-MATH-1981-19] N82-19939

CHICAGO UNIV., ILL.

The magnetohydrodynamic dynamo N82-20033

The nonequilibrium of magnetic fields N82-20034

CITY COLL. OF THE CITY UNIV. OF NEW YORK.

Monte Carlo studies of ocean wind vector measurements by SCATT: Objective criteria and maximum likelihood estimates for removal of aliases, and effects of cell size on accuracy of vector winds
[NASA-CR-165837-1] N82-19799

COASTAL ENGINEERING RESEARCH CENTER, FORT BELVOIR, VA.

Products from two computer programs which process digital bathymetric data
[AD-A108757] N82-19881

COLOGNE UNIV. (WEST GERMANY).

Atlas of the global distribution of the total ozone concentration according to satellite measurements
[MITT-28] N82-19740

COLORADO STATE UNIV., FORT COLLINS.

Light scattering from macromolecular systems: Molecular crystals and polymers
[AD-A109066] N82-19973

COLORADO UNIV., BOULDER.

Pulsar magnetosphere potential structure N82-20066

Confinement of cosmic rays in molecular clouds N82-20073

Large loop thermal models of solar hard X-ray bursts N82-20080

COLORADO UNIV. AT BOULDER.

A measurement of long term tilt in Colorado and Wyoming
[AD-A108865] N82-19737

COMMERCE DEPT., WASHINGTON, D.C.

US energy for the rest of the century
[PB82-115866] N82-19697

Technology assessment and forecast report, 10th
[REPT-10] N82-20024

COMMISSARIAT A L'ENERGIE ATOMIQUE, SACLAY (FRANCE).

Stability of the equilibrium states of the interstellar gas and field system N82-20037

High energy cosmic ray acceleration by diffusive shocks N82-20061

Cosmic ray acceleration by stellar winds and self-confinement in giant H2 regions N82-20062

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).

Space Shuttle operations
[GPO-89-861] N82-19300

COMMITTEE ON FOREIGN AFFAIRS (U. S. HOUSE).

United States-Canadian relations and acid rain
[GPO-80-995] N82-19706

COMMITTEE ON SCIENCE AND TECHNOLOGY (U. S. HOUSE).

Aircraft collision avoidance systems
[GPO-79-431] N82-19201

Air traffic control en route computer system
[GPO-89-008] N82-19202

Future space programs, 1981
[GPO-86-913] N82-19234

COMMUNICATIONS RESEARCH CENTRE, OTTAWA (ONTARIO).

ANIK-B program delivery pilot project. A 12 month performance assessment
[CRC-1349] N82-19426

A method of measuring and recording. The impulse response of the ionospheric channel
[CRC-1352] N82-19427

A microwave FET oscillator design approach and its application in an injection locked oscillator
[CRC-1347] N82-19472

Review of health and safety aspects of video display terminals
[CRC-TN-712-E] N82-19816

COMPUTER SCIENCES CORP., SILVER SPRING, MD.

Microwave radiometric observations near 19.35, 92 and 183 GHz of precipitation in tropical storm Cora
[NASA-TM-82164] N82-19779

CONNECTICUT UNIV., STORRS.

Interaction of microsegregation and coarsening during dendritic nickel-base alloy monocrystal growth
[AD-A108960] N82-19362

CONSIGLIO NAZIONALE DELLE RICERCHE, TURIN (ITALY).
Large scale Kelvin-Helmholtz instabilities in extragalactic radio jets N82-20070
CONSIGLIO NAZIONALE DELLE RICERCHE, VENICE (ITALY).
LANDSAT imagery of the Venetian Lagoon: A multitemporal analysis
[E82-10036] N82-19612
COPENHAGEN UNIV. (DENMARK).
Cardiovascular reactions to tilt and lower body positive pressure (LBPP) N82-19625
Measurements of intra and extracellular water spaces and electrolyte concentrations in human skeletal muscle N82-19629
A comparison between acetylene and freon rebreathing for measuring cardiac output during exercise N82-19631
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Solute-gas equilibria in multi-organic aqueous systems
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Report on the analysis of data from the NOAA/Alaskan MST radar system
[AD-A109056] N82-19762
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[AD-A108870] N82-19995
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DANISH METEOROLOGICAL INST., COPENHAGEN.
Diffuse and discrete optical emissions at the poleward border of the morning auroral oval
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DEFENCE RESEARCH ESTABLISHMENT VALCARTIER (QUEBEC).
Algorithms for tracking a sound source using frequency and bearings
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Detection range probabilities of passive infrared systems for the North Atlantic
[AD-A108812] N82-19974
DEFENCE RESEARCH INFORMATION CENTRE, ORPINGTON (ENGLAND).
Magnetic properties of copper alloys
[DRIC-T-6498] N82-19356
Maintenance of hydrostatic transmissions
[DRIC-T-6497] N82-19490
Pellini's theory of brittle fracture and the limits of its applicability
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DELAWARE UNIV., NEWARK.
Detrital exchange processes of a Delaware salt marsh N82-19699
Practical issues in having a usable library of software specifications
[AD-A108656] N82-19677
Prerequisites to deriving formal specifications from natural language requirements
[AD-A108612] N82-19678
DELFT HYDRAULICS LAB. (NETHERLANDS).
On the Neumann problem for the pressure in a Navier-Stokes model
[PUBL-257] N82-19511
DEPARTMENT OF AGRICULTURE, HOUSTON, TEX.
AgRISTARS: Soil moisture/early warning and crop condition assessment. Interface control document
[E82-10053] N82-19628
AgRISTARS: Yield model development/soil moisture. Interface control document
[E82-10054] N82-19629
Taxonomic classification of world map units in crop producing areas of Argentina and Brazil with representative US soil series and major land resource areas in which they occur
[E82-10056] N82-19633
DEPARTMENT OF ENERGY, LONDON (ENGLAND).
Review of the UK transport energy outlook: And policy recommendations
[EP-47] N82-19664
Energy conservation in the production of domestic hot water
[EP-48] N82-19665
Tidal power from the Severn estuary, volume 1
[EP-46-VOL-1] N82-19666
Tidal power from the Severn estuary. Volume 2: Analysis, studies, reports and evaluations
[EP-46-VOL-2] N82-19667
DEPARTMENT OF TRADE AND INDUSTRY, LONDON (ENGLAND).
Report of the Air Traffic Forecasting Working Party, 1981 N82-19195
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).
Electronics for data acquisition of laser gyroscope measurements
[DFVLR-MITT-81-16] N82-19534
Interactions between helmet mounted sight display and sensor platform under the influence of a human pilot
[DFVLR-FB-81-30] N82-19648
Noise measurements on the helicopter BK 117 design. Weighted noise levels and influence of airspeed
[DFVLR-MITT-81-18] N82-19957
Collection and evaluation of propeller aircraft noise certification data
[DFVLR-MITT-81-20] N82-19958
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).
On the design of missile models for static force measurements in wind tunnels
[DFVLR-MITT-81-21] N82-19207
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, GOETTINGEN (WEST GERMANY).
An investigation of wall pressure fluctuations behind a sudden enlargement of the cross sectional area of a round pipe
[DFVLR-FB-81-35] N82-19510
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, OBERPFAFFENHOFEN (WEST GERMANY).
Planning of a C-band pulse Doppler radar with polarization diversity for atmospheric research in the mesoscale range
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Simulation of linear multi-input/multi-output systems by piecewise continuous input functions and various options for the graphical representation of results
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[BMVG-FBWT-81-12] N82-19983
DEUTSCHES GEODAETISCHES FORSCHUNGSINSTITUT, MUNICH (WEST GERMANY).
Helmut Wolf: On the occasion of his 70th birthday
[SER-E-18] N82-19603
Developments in geodesy within the scope of Helmut Wolf's work N82-19604
Mathematical and stochastic models in photogrammetry relating to Helmut Wolf's work N82-19605
The diagnosis settlement 1980 of the German main triangulation network. Part 2: Trajectories
[SER-B-253-MITT-159-PT-2] N82-19646
DONOHUE AND ASSOCIATES, INC., SHEBOYGAN, WIS.
Small scale reclamation/disposal of toxic porcelain enameling waste sludges
[PB82-101593] N82-19710
DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN (WEST GERMANY).
EXUV. Phase A study. Volume 1: Executive summary
[REPT-44/69/JS/CB-VOL-1] N82-19292
EXUV. Phase A study. Volume 2A: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2A] N82-19293
EXUV. Phase A study. Volume 2B: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2B] N82-19294
EXUV. Phase A report. Volume 3: Preliminary payload interface specification
[REPT-44/69/JS/CB-VOL-3] N82-19295
EXUV. Phase A study. Volume 4: Satellite development program
[REPT-44/69/JS/CB-VOL-4] N82-19296
Giotto Comet Halley mission, phase A study. Volume 1: Spacecraft design
[ESS/SS/1000] N82-19313
Improvement of the X-ray procedure for the detection of defective adhesions in fiber composites by adding contrast substances to the adhesives
[BMVG-FBWT-81-11] N82-19324
Satellite scatterometer feasibility study. Volume 1: Technical results
[ESA-CR(P)-1492-VOL-1] N82-19650
Satellite scatterometer feasibility study. Volume 2: Data extraction algorithm and error simulation for wind sensor
[ESA-CR(P)-1492-VOL-2] N82-19651
Study of a radar altimeter for the European remote sensing program. Volume 1: Executive summary
[SPAR-R.1090-ISSUE-A] N82-19652
Development of simple solar collectors
[BMFT-FB-T-81-174] N82-19690
DORTMUND UNIV. (WEST GERMANY).
A solar high temperature kiln
[BMFT-FB-T-81-181] N82-19692
DUFRESNE-HENRY, INC., NORTH SPRINGFIELD, VT.
An inexpensive biologic method of upgrading Lagoon effluent, phase 1: Small business innovative research program
[PB82-101072] N82-19713

E

ECOLE NATIONALE SUPERIEURE DES MINES, VALBONNE (FRANCE).
The TOCIND experiment
[CTAMN/81/R/10] N82-19805
ECOLE POLYTECHNIQUE, PALAISEAU (FRANCE).
On the possibility of existence of large amplitude waves around pulsars N82-20059
The tropospheric gas composition of Jupiter's north equatorial belt (NH3, PH3, CH3D, GeH4, H2O) and the Jovian D/H isotropic ratio
[NASA-TM-83891] N82-20103
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (SWITZERLAND).
Activities report of the Hydraulics Laboratory N82-19489
Double layer and potential jump: A review of laboratory experimental evidence N82-20076
ELECTRONIC TECHNIQUES, INC., FORT COLLINS, COLO.
SCPP forecasting support
[PB82-123167] N82-19797
ELECTRONICS RESEARCH LAB., ADELAIDE (AUSTRALIA).
An aerial survey of water turbidity and laser depth sounding performance along the Queensland Coast
[AD-A109050] N82-19802
[illegible]ORY UNIV., ATLANTA, GA.
The effects of sulfur dioxide and acid precipitation on decomposition and nutrient cycling processes N82-19700
ENGINEERING DYNAMICS INTERNATIONAL, ST. LOUIS, MO.
Airport related residential accoustical insulation demonstration project: Report 1720
[PB82-100777] N82-19396
ENGINS MATRA, VELIZY (FRANCE).
EXUV. Phase A study. Volume 1: Executive summary
[REPT-44/69/JS/CB-VOL-1] N82-19292
EXUV. Phase A study. Volume 2A: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2A] N82-19293
EXUV. Phase A study. Volume 2B: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2B] N82-19294
EXUV. Phase A report. Volume 3: Preliminary payload interface specification
[REPT-44/69/JS/CB-VOL-3] N82-19295
EXUV. Phase A study. Volume 4: Satellite development program
[REPT-44/69/JS/CB-VOL-4] N82-19296
Data rate reduction. Impact of image data compression on end to end data management of a multispectral payload
[REPT-44/130] N82-19654

Optical imaging instruments for the Land Application Satellite System. Phase A study. Volume 1
[REPT-80/1023-VOL-1] N82-19979

Optical imaging instruments for the Land Application Satellite System, phase A study, volume 2
[REPT-80/1023-VOL-2] N82-19980

ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.

SAR calibration technology review
[NASA-CR-167534] N82-19407

Notes for Brazil sampling frame evaluation trip
[E82-10060] N82-19635

ERGONOMAAD A.B., KARLSTAD (SWEDEN).

Human factors and safety in nuclear power plant operation N82-19643

EUROPEAN SPACE AGENCY, PARIS (FRANCE).

Equipment for testing and measuring a 'helmet mounted sight and display' system with a coupled movable TV camera in the flight simulator for research of the DFVLR
[ESA-TT-675] N82-19219

Space activities in the 80's: The programs and the industry. Parts 1 and 2: Survey of space programs (1975 to 1980); survey of the capabilities and experience of the European space industry
[ESA-SP-1012-VOL-1] N82-19243

Space activities in the 80's: The programs and the industry. Part 3: Detailed presentation of the European space industry (1981)
[ESA-SP-1012-VOL-2] N82-19244

Space activities in the 80's: The programs and the industry. Part 4: Outlook of space industry outside Europe (1981)
[ESA-SP-1012-VOL-3] N82-19245

Recommendations on the development of space science in the 1980's
[ESA-SP-1015] N82-19246

Recent advances in space structure design-verification techniques
[ESA-SP-1036] N82-19308

Modeling of the influence of static acceleration on surface wave (quartz) oscillator
[ESA-TT-726] N82-19444

Human cardiovascular adaptation to zero gravity
[ESA-SP-1033] N82-19817

Catalogue of ESA publications in 1980
[ESA-SP-1037] N82-20017

The economic impact of an operational European meteorological satellite program in the 1980's
[ESA-BR-03] N82-20020

Plasma Astrophysics
[ESA-SP-161] N82-20030

EUROPEAN SPACE RESEARCH AND TECHNOLOGY CENTER, NOORDWIJK (NETHERLANDS).

Introduction to problems of structural dynamics verification N82-19309

Plasma processes at collisionless shock waves N82-20047

The International Solar Polar Mission (ISPM) N82-20048

EUROSAT S.A., GENEVA (SWITZERLAND).

Teleoperation and automation: A survey of European expertise applicable to docking and assembly in space
[MP/PR/4905] N82-19240

The economic impact of an operational European meteorological satellite program in the 1980's
[ESA-BR-03] N82-20020

EUROSPACE, PARIS (FRANCE).

Television services in Europe in the age of direct satellite television
[ESA-CR(P)-1503] N82-19439

F

FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.

Analysis of a nonlinear altitude tracking method
[AD-A108378] N82-19197

Transport aircraft cockpit standardization (Federal Aviation regulations part 25)
[AD-A108924] N82-19207

Workshop on Mathematical Fire Modeling
[AD-A108676] N82-19343

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.

FAA statistical handbook of aviation
[AD-A109269] N82-19198

FERRANTI LTD., BRACKNELL (ENGLAND).

Analogue SAR signal processing: Device evaluation and radiation tests
[REPT-3972-ISSUE-1] N82-19440

FIAT RESEARCH CENTER, TURIN (ITALY).

Follow on study on Fluid Physics Module (PM). Part 1: Independent operating Fluid Physics Module (FPM)
[REPT-79-RV-0] N82-19241

FLORIDA STATE UNIV., TALLAHASSEE.

The twenty year average atmospheric structure at Lima, Peru
[PB82-114216] N82-19795

Coastal upwelling ecosystems analysis. Atlas of the JOINT I aircraft winds for the 500 foot level
[PB82-114703] N82-19796

FLORIDA UNIV., GAINESVILLE.

The polarized infrared reflection spectroscopic characterization and aqueous durability of lithia-disilicate glass ceramics N82-19369

Fracture mechanics and failure predictions for glass, glass-ceramic, ceramic systems N82-19370

Use of thermal inertia determined by HCMM to predict nocturnal cold prone areas in Florida
[E82-10040] N82-19615

Electrotransport in thin films
[AD-A108421] N82-19992

FONDAZIONE UGO BORDONI, ROME (ITALY).

The generation of pseudorandom binary sequences in parallel
[FUB-9-1981] N82-19486

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, ROME (ITALY).

Precipitation assessment from environmental satellite data for northwest Libya including the Gefara plan
[RSC-4] N82-19790

FORD AEROSPACE AND COMMUNICATIONS CORP., HOUSTON, TEX.

Mission support plan STS-2
[NASA-CR-167435] N82-19249

FORSCHUNGSINSTITUT FUER HOCHFREQUENZPHYSIK, WERTHHOVEN (WEST GERMANY).

Comparative studies of correlation techniques in the sidelobe canceller in the presence of pulse-type jamming signals
[REPT-3/81] N82-19402

Measurements of azimuth and distance using arbitrary configurations of sensors with unknown coordinates in two dimensions
[REPT-7/81] N82-19403

Determination of the velocity and the distance of a moving CW source by exploiting the Doppler effect on the reverberation signal
[REPT-6/81] N82-19404

Comparison of subjective and automatic procedures for estimating apparent target length from echo duration
[REPT-8/81] N82-19405

FRANKLIN ASSOCIATES, PRAIRIE VILLAGE, KANS.

Impediments to energy and materials recovery facilities for municipal solid waste
[PB82-102302] N82-19383

FRANKLIN RESEARCH CENTER, PHILADELPHIA, PA.

Literature study of the biodegradability of chemicals in water. Volume 1: Biodegradability prediction, advances in chemical interferences with wastewater treatment
[PB82-100843] N82-19711

Literature study of the biodegradability of chemicals in water. Volume 2: Permutated index of chemicals, microbial populations, and wastewater treatment systems with bibliography
[PB82-100850] N82-19712

FRAUNHOFER-INST. FUER ANGEWANDTE FESTKOERPERPHYSIK, FREIBURG (WEST GERMANY).

Electrooptical effects for application in liquid crystal displays
[BMFT-FB-T-81-170] N82-19982

Analysis of deep defects in III-V semiconductors
[BMFT-FB-T-81-197] N82-19999

FRAUNHOFER-INST. FUER SYSTEMTECHNIK UND INNOVATIONSFORSCHUNG, KARLSRUHE (WEST GERMANY).

Examination of heat storage in soil
[BMFT-FB-T-81-200] N82-19694

FRIEDRICHSFELD G.M.B.H., MANNHEIM (WEST GERMANY).

Production technology of an oxygen ion conductive ceramic for high temperature fuel cells and high temperature water electrolysis
[BMFT-FB-T-81-180] N82-19691

G

GARRETT TURBINE ENGINE CO., PHOENIX, ARIZ.

Cooled variable-area radial turbine technology program
[NASA-CR-165408] N82-19221

GENERAL ELECTRIC CO., CINCINNATI, OHIO.

A propulsion view of the all-electric airplane N82-19136

GENERAL ELECTRIC CO., FAIRFIELD, CONN.

Life sciences passive GN2 freezer thermal performance test
[NASA-CR-167546] N82-19809

GENERAL ELECTRIC CO., HOUSTON, TEX.

Analysis of evaporative water loss in the Skylab astronauts
[NASA-CR-167462] N82-19814

GENERAL ELECTRIC CO., PHILADELPHIA, PA.

Quad aperture RF definition N82-19280

Ultra high speed image processing techniques
[NASA-CR-166771] N82-19466

Design and fabrication of containment rings for use in tests of six prototype flywheel rotors
[DE81-030357] N82-19689

GENERAL ELECTRIC CO., SANTA BARBARA, CALIF.

Planning study to establish DOD manufacturing technology information analysis center
[AD-A108925] N82-20006

GENERAL ELECTRIC CO., SCHENECTADY, N. Y.

Impact response characteristics of polymeric materials
[AD-A109261] N82-19377

GEOLOGICAL SURVEY, BOSTON, MASS.

Water resources data for New Hampshire and Vermont, water year 1980
[PB82-110166] N82-19656

GEOLOGICAL SURVEY, HARRISBURG, PA.

Water resources data for Pennsylvania, water year 1980: Volume 2: Susquehanna and Potomac River Basins
[PB82-115908] N82-19662

GEOLOGICAL SURVEY, RICHMOND VA.

Water resources data for Virginia, water year 1980
[PB82-113416] N82-19659

GEORGETOWN UNIV., WASHINGTON, D.C.

Multiangular scanning absorption-emission techniques for three-dimensional combustion diagnostics
[AD-A109060] N82-19346

Fracture and fatigue characterization of aircraft structural materials under biaxial loading
[AD-A109054] N82-19587

GEORGIA INST. OF TECH., ATLANTA.

Microwave radiometric observations near 19.35, 92 and 183 GHz of precipitation in tropical storm Cora
[NASA-TM-82164] N82-19779

A remote terminal emulator for prime computers
[AD-A108818] N82-19862

Initial experience with a local network: Net/One by Ungermann-Bass, Incorporated
[AD-A108817] N82-19863

Performance of distributed and decentralized control models for fully distributed processing systems. Initial simulation studies
[AD-A108974] N82-19864

GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.

Taped random spectra for reliability demonstration testing
[AD-A108803] N82-19552

H

HAMILTON STANDARD, WINDSOR LOCKS, CONN.

Environmental Control Systems N82-19141

Evaluation of wind tunnel performance testings of an advanced 45 deg swept 8-bladed propeller at Mach numbers from 0.45 to 0.85
[NASA-CR-3505] N82-19176

HARRIS CORP., MELBOURNE, FLA.
Maypole (Hoop/Column) concept development program N82-19263
RF verification tasks underway at the Harris Corporation for multiple aperture reflector system N82-19267
The suitability of mesh membrane material for radiometer reflector applications N82-19270

HARRY DIAMOND LABS., ADELPHI, MD.
Second-order nonlinear conductivity tensor for an unmagnetized relativistic turbulent plasma N82-20071

HARVARD UNIV., CAMBRIDGE, MASS.
Unbounded speed variability in distributed communications systems
[AD-A108824] N82-19437
On the power of probabilistic choice in synchronous parallel computations
[AD-A109047] N82-19865
K-connectivity in random undirected graphs
[AD-A108826] N82-19914
Strong K-connectivity in digraphs and random digraphs
[AD-A109034] N82-19915
Random independence systems
[AD-A109046] N82-19931
Probabilistic analysis of random extension-rotation algorithms
[AD-A109035] N82-19932
Symmetric complementation, revision
[AD-A108823] N82-19936

HELSINKI UNIV. (FINLAND).
On nuclear Koethe spaces defined by Dragilev functions
[ISSN-0355-0087] N82-19960

HELSINKI UNIV. OF TECHNOLOGY, ESPOO (FINLAND).
Acta Polytechnica Scandinavica. Oxygen-metal (Ag, Au, Bi, Cu, In, Ni, Sb, Sn, Te) interactions in dilute molten lead alloys
[ISBN-951-666-137-3] N82-19350
An approach for gross design of operations management systems
[ISBN-951-752-308-4] N82-20007

HONEYWELL, INC., CLEARWATER, FLA.
Overview of Honeywell electromechanical actuation programs N82-19142

HORRAY K.G., FURTWANGEN (WEST GERMANY).
Microprocessor controlled stamping unit with needle printer
[BMFT-FB-T-81-189] N82-19868

HOUSTON UNIV., TEX.
Search for large-scale coherent structures in the nearly self-preserving region of a turbulent axisymmetric jet
[AD-A108334] N82-19501
Three-dimensional migration velocity analysis in the space-frequency domain N82-19718

HOWARD UNIV., WASHINGTON, D. C.
Characterization of low intensity X-ray imaging devices (Lixiscope)
[NASA-CR-168584] N82-19972

HUGHES RESEARCH LABS., MALIBU, CALIF.
Polarization-independent optical waveguide switch
[AD-A108764] N82-19976

I

IBM FEDERAL SYSTEMS DIV., MANASSAS, VA.
Electrical characterization of super Schottky
[AD-A108766] N82-19986

IEA COAL RESEARCH, LONDON (ENGLAND).
Chemical desulphurisation of coal
[ICTIS-TR-15] N82-19332
Hydrological problems of surface mining
[ICTIS-TR-17] N82-19606

ILLINOIS UNIV. AT URBANA.
Initiation, combustion and transition to detonation in homogeneous and heterogeneous reactive mixtures: A summary
[AD-A109057] N82-19347

ILLINOIS UNIV. AT URBANA-CHAMPAIGN.
Wave propagation problems in certain elastic anisotropic half spaces N82-19454
Numerical simulation of reinforced concrete subjected to multiaxial stress conditions N82-19554

ILLINOIS UNIV., URBANA.
An improved scheme to develop multidimensional generalized yield and failure surfaces for structural elements
[LA-8728-MS] N82-19569
Electron kinetic equations in comptonization by isotropic photons N82-20065

IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
Improvements of the algorithms used for Monte-Carlo direct simulation computations
[IC-AERO-81-03] N82-19691

INDIAN INST. OF SCIENCE, BANGALORE.
Evaluation and control of the exhaust noise of reciprocating I.C. engines N82-19559

INDIAN INST. OF TECH., NEW DELHI.
Vibration control with viscoelastic materials, 2 N82-19560

INDUSTRIEANLAGEN-BETRIEBSGESELLSCHAFT M.B.H., OTTOBRUNN (WEST GERMANY).
Dynamic analysis and modeling of electrodynamic vibration test facilities applied to the AIBG 160 kN system N82-19310
Achievements in multi-axes testing using servohydraulic vibration system N82-19312

INFORMATION SYSTEMS AND NETWORKS CORP., CHEVY CHASE, MD.
Space telescope observatory management system preliminary test and verification plan
[NASA-CR-168587] N82-20090

INSTITUT D'AERONOMIE SPATIALE DE BELGIQUE, BRUSSELS.
Some aspects of the solar radiation incident at the top of the atmospheres of Mercury and Venus
[AERONOMICA-ACTA-A-236-1981] N82-19722
Theory of the auroral magnetosphere
[AERONOMICA-ACTA-A-237-1981] N82-19723
Solar irradiance retween 120 and 400 mm and its variations
[AERONOMICA-ACTA-A-238-1981] N82-19724
A free boundary value problem arising in climate dynamics
[AERONOMICA-ACTA-A-240-1981] N82-19767

INSTITUTE FOR DEFENSE ANALYSES, ARLINGTON, VA.
Assessment of Avionic Equipment Field Reliability and Maintainability as Functions of Unit Cost
[AD-A109373] N82-19218

INSTITUTE OF OCEANOGRAPHIC SCIENCES, BIRKENHEAD (ENGLAND).
Publications and reports of the Institute of Oceanographic Sciences 1973-1978
[IOS-R-122] N82-19798

INSTITUTE OF SPACE RESEARCH, MOSCOW (USSR).
Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83884] N82-20110

INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
General configuration and internal disposition of equipment in a satellite for collecting environmental data
[INPE-2240-PRE/026] N82-19256
Thermoelastic deformation in cylindrical shells of great length
[INPE-2268-PRE/049] N82-19286
Retrospective analysis of satellite thermal systems
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Data collection platforms: Applications to hydrology
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The science and engineering of materials
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Study of the availability of satellite telecommunication links subject to attenuation by rain
[INPE-2239-PRE/025] N82-19411
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Design for the installation of a system of antennas for stratospheric balloon mobile tracking stations
[INPE-2306-PRE/073] N82-19424
Study of the availability of satellite telecommunication networks subject to rain attenuation
[INPE-2300-TDL/071] N82-19425
A 12 GHz mixer with planar circuits in a waveguide
[INPE-2149-RPE/370] N82-19467
Two dimensional filters for digital processing of images: Design and implementation techniques
[INPE-2273-PRE/053] N82-19469
The 10 MHz crystal filter for SCPC Earth stations
[INPE-2286-PRE/062] N82-19470
Analysis of phase noise in a J band transmitter
[INPE-2294-NTE/178] N82-19471
Temperature distribution in the walls of a cylindrical thermal chamber: Formulation and proposed solution
[INPE-2267-PRE/048] N82-19500
Automatic analysis of multispectral images
[INPE-2212-MD/009] N82-19520
Utilization of Aerochrome 2443 film for identification and estimating wheat growing areas
[INPE-2197-PRE/006] N82-19639
Method of interpretation of remote sensing data and applications to vegetation
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Methodology of the interpretation of remote sensing data and applications in pedology
[INPE-2211-MD/008] N82-19641
Methodology of the interpretation of remote sensing data and applications in geomorphology
[INPE-2209-MD/007] N82-19642
Three dimensional numerical model for estimation of pollutant concentration
[INPE-2193-TDL/060] N82-19703
Preliminary results of a study of mapping thermal discharge in the ocean, using remote sensing data
[INPE-2229-PRE/021] N82-19704
Ionospheric irregularities in low latitudes of the American sector
[INPE-2243-TDL/065] N82-19725
Association between irregularities caused ionospheric bubbles and airglow perturbations in low latitudes in Brazil
[INPE-2122-RPE/346] N82-19726
Correction for atmospheric effects in satellite images
[INPE-2281-PRE/059] N82-19728
Forecasts of precipitation in the Northeast of Brazil: Dynamic aspects
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A study on the development of intermediate scale disturbances with a model of primitive equations of high vertical resolution
[INPE-2232-TDL/063] N82-19773
A numerical model for simulation of local circulation, applied to the coastal region of Northeastern Brazil
[INPE-2270/PRE/051] N82-19776
Studies of the energy and the flux of water vapor in the atmosphere over northeastern Brazil
[INPE-2288-TDL/068] N82-19777
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[INPE-2307-TDL/074] N82-19778
Programmable printing terminal
[INPE-2082-TDL/056] N82-19850
Programmable printing terminal
[INPE-2096-RPE/326] N82-19851
Analysis of the illumination of areas covered by a satellite in a heliosynchronous circular orbit
[INPE-2208-RPE/398] N82-19872
Distribution of personnel, vehicles, and supplies by ship: A model applied to the Brazilian Navy
[INPE-2305-TDL/073] N82-19874
ALGOL-MS, a language for the development of multiprogrammed small systems
[INPE-2282-TDL/067] N82-19875
A system for implantation of data banks in Burroughs series B7000/B6000 computers
[INPE-2299-TDL/070] N82-19876
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Study of problems of ill-conditioned regression or with multicolinearity
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A model for dimensioning a corrective maintenance system
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[INPE-2274-PRE/054] N82-20013

Models of projection and localization of urban population using simulation techniques
[INPE-2207-PRE/013] N82-20023

Introduction to celestial mechanics
[INPE-2126-RPE/350] N82-20096

INSTITUUT TNO VOOR WISKUNDE, INFORMATIEVERWERKING EN STATISTIEK, THE HAGUE (NETHERLANDS).

Binary mosaics and point quadrat sampling in ecology
[A-80-ST-96-37] N82-19705

INTERIOR DEPT., WASHINGTON, D.C.

COBALT: Effectiveness of alternative US policies to reduce the costs of a supply disruption
[PB82-110560] N82-20021

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION, OGDEN, UTAH.

Formatting and documenting multidisciplinary data
[PB82-122662] N82-20018

INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS, LAXENBURG (AUSTRIA).

Life on a warmer Earth: Possible climatic consequences of man made global warming
[ER-3] N82-19701

Operational water quality management: Beyond planning and design
[ER-7] N82-19702

Sharing costs fairly: A practical introduction to cooperative game theory
[ER-5] N82-19934

IOWA UNIV., IOWA CITY.

Investigation of creep by use of closed loop servo-hydraulic test system
[NASA-CR-168613] N82-19566

Use of Magsat anomaly data for crustal structure and mineral resources in the US midcontinent
[E82-10049] N82-19624

IOWA UNIV., OAKDALE.

Radiative heat transfer in turbulent MHD channel flow N82-19487

Stratigraphy, petrography and depositional history of the Hertha Formation (Upper Pennsylvanian), midcontinent North America N82-19746

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ISTITUTO DI RICERCA E TECNOLOGIA PER LO STUDIO DEL PLASMA NELLO SPAZIO, FRASCATI (ITALY).

The suspension system of the cryogenic gravitational antenna of the Istituto Plasma Spazio
[IPS-81-14] N82-19549

Ionospheric ions in the near Earth geomagnetic tail plasma lobes
[IPS-81-7] N82-19743

Kelvin-Helmholtz instability of the magnetopause boundary: Comparison with observed fluctuations
[IPS-81-12] N82-19744

ISTITUTO SUPERIORE DI SANITA, ROME (ITALY).

The nucleon exchange mechanism in composite nuclei interaction
[ISS-R-81/4] N82-19966

J

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.

Vehicle test report: Battronic pickup truck
[NASA-CR-168637] N82-19205

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Conventional engine technology. Volume 1: Status of OTTO cycle engine technology
[NASA-CR-168643] N82-19542

Conventional engine technology. Volume 2: Status of diesel engine technology
[NASA-CR-168644] N82-19543

Conventional engine technology. Volume 3: Comparisons and future potential
[NASA-CR-168645] N82-19544

The geothermal probabilistic cost model with an application to a geothermal reservoir at Heber, California
[NASA-CR-168641] N82-19674

A review of the salt-gradient solar pond technology
[NASA-CR-168635] N82-19675

Vacuum lamination of photovoltaic modules
[NASA-CR-168634] N82-19676

A low-power photovoltaic system with energy storage for radio communications: Description and design methodology
[NASA-CR-168640] N82-19677

Evaluation of crystal oscillators and frequency dividers for high temperature operation
[NASA-CR-168561] N82-19682

Future fuels and engines for railroad locomotives. Volume 1: Summary
[NASA-CR-168642] N82-20022

The telecommunications and data acquisition report
[NASA-CR-168577] N82-20113

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JRS INDUSTRIES, INC., SAN DIEGO, CALIF.

Study and experimentation of horizontal microprocessor machine description techniques
[AD-A109136] N82-19660

K

KAISERSLAUTERN UNIV. (WEST GERMANY).

Algorithm for the calculation of the largest integer in the quare root of a natural number
[PREPRINT-11] N82-19918

KAMAN AEROSPACE CORP., BLOOMFIELD, CONN.

Development of manufacturing technology for fabrication of a composite helicopter main rotor spar by tubular braiding
[AD-A109377] N82-19209

Structural system identification technology verification
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KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.

A vortex-filament and core model for wings with edge vortex separation
[NASA-CR-165847] N82-19166

Dielectric properties of snow
[NASA-CR-166764] N82-19638

Active microwave investigation of snowpacks: Experimental documentation, Colorado 1979-1980
[NASA-CR-166727] N82-19646

KENTRON INTERNATIONAL, INC., HAMPTON, VA.

A computer program for wing subsonic aerodynamic performance estimates including attainable thrust and vortex lift effects
[NASA-CR-3515] N82-19151

KIRUNA GEOPHYSICAL INST. (SWEDEN).

Studies of the stratospheric and mesospheric wind system and temperature distribution from observations of infrasonic waves generated during regular Concorde flights
[KGI-176] N82-19789

KOBENHAVNS AMTS SYGEHUS I GENTOFTE, HELLERUP (DENMARK).

Cerebral hemodynamics at zero gravity N82-19827

KOBENHAVNS AMTS SYGEHUS I GLOSTRUP (DENMARK).

Clinical physiology of the renin-angiotensin-aldosterone system N82-19820

KOMMUNE HOSPITAL, COPENHAGEN (DENMARK).

Cardiovascular reflexes during upright position N82-19821

L

LABORATORY FOR ELECTRONIC DEVELOPMENT OF THE ARMED FORCES, OEGSTGEEST (NETHERLANDS).

MICAD: An interactive computer for the design of microwave circuits
[LEOK-TR-1980-06] N82-19473

LEHIGH UNIV., BETHLEHEM, PA.

Surface reactions and fatigue crack growth
[AD-A109296] N82-19588

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.

Millstone hill radar satellite tracking system
[AD-A109279] N82-19252

Multi-dimensional signal-processing research program
[AD-A108641] N82-19429

Seismic discrimination
[AD-A109184] N82-19739

Accuracy of parameter estimates for closely spaced optical targets using multiple detectors
[AD-A109185] N82-19978

LITTLE (ARTHUR D.), INC., CAMBRIDGE, MASS.

An assessment of the crash fire hazard of liquid hydrogen fueled aircraft
[NASA-CR-165526] N82-19196

LOCKHEED-CALIFORNIA CO., BURBANK.

Electric flight systems, overview N82-19135

LOCKHEED ENGINEERING AND MANAGEMENT SERVICES CO., INC., HOUSTON, TEX.

Wheat stress indicator model, Crop Condition Assessment Division (CCAD) data base interface driver, user's manual
[E82-10031] N82-19607

AgRISTARS: Interim catalog ground data summary, data acquisition year 1979
[E82-10032] N82-19608

Recommended data sets, corn segments and spring wheat segments, for use in program development
[E82-10034] N82-19610

AgRISTARS: Early warning and crop condition assessment. Patch image processor user's manual
[E82-10055] N82-19630

AgRISTARS: Foreign commodity production forecasting. Corn/soybean decision logic development and testing
[E82-10056] N82-19631

Agricultural soil moisture experiment, Colby, Kansas 1978: Measured and predicted hydrological properties of the soil
[E82-10057] N82-19632

Preliminary evaluation of spectral, normal and meteorological crop stage estimation approaches
[E82-10059] N82-19634

Segment-level evaluation of the simulated aggregation test: US corn and soybean exploratory experiment
[E82-10081] N82-19836

LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
Manufacturing in space: Fluid dynamics numerical analysis
[NASA-CR-166610] N82-19236
Structural dynamic analysis of the Space Shuttle Main Engine
[NASA-CR-161945] N82-19902

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
Underwater shock analysis of nonlinear structures, a reference manual for the USA-STAGS code, version 3
[AD-A108911] N82-19584

LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CALIF.
Offset wrap rib antenna concept development N82-19259

LODZ UNIV. (POLAND).
Certain aspects of primary cosmic rays composition at energies of 10 to the 14th power to 10 to the 16th power eV N82-20074

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Continental scientific drilling program curatorial needs
[LA-8726-MS] N82-19643
Los Alamos Scientific Laboratory computer benchmark performance 1979
[LA-8669-MS] N82-19849
COVFILS: A 30-group covariance library based on ENDF/B-V
[LA-8733-MS] N82-19873
Natural repository analogue program
[LA-8743-PR] N82-19870
Supernova hydrodynamics N82-20057
Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83864] N82-20110

LOUGHBOROUGH UNIV. OF TECHNOLOGY (ENGLAND).
The use of a nonquadratic model in a conjugate gradient method of optimization with inexact line searches
[MATHS-RES-157] N82-19885
On Pythagorean triangles and coprime lattice points
[MATHS-RES-154] N82-19919
A variable metric method using a non-quadratic model
[MATHS-RES-156] N82-19920
A K-sample extension of Tukey's 2-sample quick test
[MATHS-RES-159] N82-19933
An experimental study of the effects of an inlet flow conditioner on the noise of a low speed axial flow fan
[TT-8101] N82-19956

LOUISIANA STATE UNIV., BATON ROUGE.
Prediction of surf zone characteristics
[AD-A108759] N82-19604

M

MARKET FACTS, INC., ARLINGTON, VA.
Consumer behavior towards fuel efficient vehicles. Volume 1: Executive summary
[PB82-103300] N82-20027

MARTIN MARIETTA AEROSPACE, DENVER, COLO.
Near field testing of LARC multiple beam antenna N82-19273
Conceptual design of electrostatic antenna N82-19275

MARTIN MARIETTA CORP., DENVER, COLO.
Preliminary analytical results using surface current integration for predicting effects of surface pillows on RF performance N82-19266

MARYLAND UNIV., COLLEGE PARK.
Plasma lasers (a strong source of coherent radiation in astrophysics) N82-20041
Electron acceleration in magnetosonic shock fronts N82-20080
Comments on high Mach number magnetosonic shocks N82-20082

MARYLAND UNIV., SOLOMONS.
Estuarine community dynamics benthic program, Patuxent River Estuary, preliminary data report
[PB82-106689] N82-19806

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Additional results of a study of unsteady airfoil surface pressures and turbulent boundary layers
[AD-A108978] N82-19184
Structural Assembly Demonstration Experiment (SADE) experiment design N82-19283
Study of the magnetic phase dependence of the Ni-CO reaction rate
[AD-A108422] N82-19336
Grain-coarsening resistance and the stability of second-phase dispersions in rapidly solidified steels
[AD-A109152] N82-19364
Surface modification in control SiO2 fiber fracture
[AD-A108796] N82-19589
A pitch control system for large scale wind turbines
[FFA-TN-HU-2262-PT-6] N82-19695
GPRINT: A LISP pretty printer providing extensive user format-control mechanism
[AD-A109031] N82-19863
Rotationally symmetric operators for surface interpolation
[AD-A109032] N82-19916
Impurity and defect characterization in epitaxial GaAs, InP and the ternary and quaternary compound semiconductors
[AD-A109052] N82-19997
Plasma dynamics in the rapidly rotating magnetosphere of Jupiter N82-20045
Inferences about the solar wind dynamics from observed distributions of electrons and ions N82-20046
Galactic dynamics and gravitational plasmas N82-20050
Evolution of X-ray astronomy N82-20053
Formation of ion conics and lower hybrid acceleration in the suprauroral region N82-20075

MATHTECH, INC., PRINCETON, N. J.
Impediments to energy and materials recovery facilities for municipal solid waste
[PB82-102302] N82-19383

MAX-PLANCK-INSTITUT FUER AERONOMIE, KATLENBURG-LINDAU (WEST GERMANY).
On the existence of the ion tearing mode N82-20076
Wave heating and acceleration of solar wind ions by cyclotron resonance N82-20081
Acceleration of cosmic rays by shock waves N82-20086

MAX-PLANCK-INSTITUT FUER PHYSIK UND ASTROPHYSIK, GARCHING (WEST GERMANY).
Spectral and temporal behavior of the X-ray binary stars Cgy X-1 in the hard X-ray domain
[MPI-PAE/EXTRATERR-166] N82-20091
The mass spectrum of stellar origin
[MPI-PAE-EXTRATERR-167] N82-20092

MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).
Theoretical investigation of the flow of a supersonic free jet from a slit
[MPIS-25/1980] N82-19182
Singularities of the solution of the problem of a weakly perturbed supersonic free jet with rotational symmetry
[MPIS-6/1980] N82-19188
Investigation of a CaCl molecular jet by means of laser induced fluorescence
[MPIS-29/1980] N82-19337
Measurement of the differential scattering cross sections of electron excited sodium by argon
[MPIS-31/1980] N82-19349
Integral total collision and ionization cross sections for the interaction of excited He in the (2/super 1/S, 2/super 3/S) state with Ar in the thermal energy range
[MPIS-32/1980] N82-19350
Kinetic investigations of the reactions of UFG in the gaseous phase
[MPIS-1/1981] N82-19351
Thermally dissociated chlorine and bromine molecular jets
[MPIS-26/1980] N82-19983
Measurement of integral scattering cross sections of hydrogen atom-molecular systems in the subthermal range
[MPIS-5/1981] N82-19967

MCDONNELL-DOUGLAS CORP., ST. LOUIS, MO.
Subsonic panel method for the efficient analysis of multiple geometry perturbations
[NASA-CR-3528] N82-19180
The NASA standard 20 ampere hour nickel-cadmium battery manual
[NASA-CR-166700] N82-19680

MEASUREMENT CONCEPT CORP., ROME, N. Y.
Intelligence Processor Performance Analysis (IPPA)
[AD-A108794] N82-19[illegible]

MEMORIAL UNIV. OF NEWFOUNDLAND, ST. JOHNS.
Bondi accretion N82-20084

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).
The European Airbus: A challenge to the American commercial aircraft industry
[MBB-UH-01-81-O] N82-19162
Experience during the development of the German-Japanese helicopter BK 117
[MBB-UD-318-81-O] N82-19210
Perspectives for Controlled Weapons Technology: Report of the 90th Helicopter Forum
[MBB-UA-532-80-O] N82-19211
Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts
[MBB-FE-172/S/PUB/38-PT-1] N82-19229
Report on a study of the maintenance in readiness of on-ground spacecraft systems for operational application programs
[MBB-80-182/150] N82-19242
Galvanic charging in air and space flight
[MBB-BB-465-O] N82-19478
Surface layer orientation coordination for boundary layer calculations on general configurations
[MBB-FE-122/S/PUB/41] N82-19507
Joint Indian-German program on solar energy: Phase 2
[BMFT-FB-T-81-182] N82-19693
Improving communication in organization operation: Preparing communication resources in a large enterprise
[MBB-BB-499-81-O] N82-20010
Transfer of aerospace project management to the development of technical series production
[MBB-UR-482-81-O] N82-20011

MIAMI UNIV., FLA.
Investigations of medium wavelength magnetic anomalies in the Eastern Pacific using Magsat data
[E82-10047] N82-19622

MICHIGAN ENERGY AND RESOURCE RESEARCH ASSOCIATION, DETROIT.
Resourceful decisions: LANDSAT in Michigan
[E82-10037] N82-19601

MICHIGAN STATE UNIV., EAST LANSING.
Electron exchange between Bis (eta meson-6-Arene) Chromium (I) and Bis (eta meson-6-Arene) Chromium (0). Comparisons between experimental and calculated kinetics parameters
[AD-A109051] N82-19346

MICHIGAN UNIV., ANN ARBOR.
Time effects of low-amplitude shear modulus of cohesive soils N82-19386

MINISTRY OF DEFENCE, LONDON (ENGLAND).
The weathering of plastics materials in the tropics. 6: The further evaluation of a solar radiation concentrating device (EMMA) as a means of accelerating the weathering of plastics
[AD-A109385] N82-19376

MINNESOTA DEPT. OF TRANSPORTATION, ST. PAUL.
Water pollution from highways and urban areas: An annotated bibliography (supplement)
[PB82-113317] N82-19714

MINNESOTA UNIV., MINNEAPOLIS.
Percolation and conduction phenomena in disordered composite media N82-19331

MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
Application of remote sensing to state and regional problems
[E82-10033] N82-19609

Vegetative erosion control studies Tennessee-Tombigbee Waterway
[AD-A108316] N82-19706

MITRE CORP., BEDFORD, MASS.
Analysis of multipath interference for APATS
[AD-A108797] N82-19305
Analysis of the multipath environment for APATS testing
[AD-A109345] N82-19306
RIW workshop report
[AD-A108798] N82-19551
Trusted computer systems. Glossary
[AD-A108829] N82-19656
The Software Acquisition Resource Expenditure (SARE) methodology, data requirements and data utilization
[AD-A109372] N82-19679

MITRE CORP., MCLEAN, VA.
Active Beacon Collision Avoidance System (BCAS) logic performance during operational flight tests
[AD-A108893] N82-19203
A concept for a fuel efficient flight planning aid for general aviation
[NASA-CR-3533] N82-19217

MONTANA STATE UNIV., BOZEMAN.
The compressible laminar two-dimensional wake with arbitrary initial asymmetry
[AD-A109084] N82-13185

N

NAGOYA UNIV. (JAPAN).
Interstellar matter N82-20035
Observable properties of accretion disks N82-20063

NAJARIAN, THATCHER AND ASSOCIATES, CLOSTER, N.J.
Upper Chesapeake Bay salinity study
[PB82-110841] N82-19717

NARA WOMEN'S UNIV. (JAPAN).
Cardiovascular responses to isometric exercise in sitting and lying position N82-19823

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Aeronautical Engineering: A continuing bibliography (supplement 143)
[NASA-SP-7037(143)] N82-19131
Bibliography of NASA published reports on general aviation, 1975 to 1981
[NASA-TM-83307] N82-19132
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 1: Executive Summary
[NASA-TM-84149] N82-19170
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 2: Operators' Views
[NASA-TM-84148] N82-19171
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 3: Aerodynamics and Structures Session
[NASA-TM-84147] N82-19172
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors
[NASA-TM-84146] N82-19173
Student's experiment to fly on third Shuttle mission
[NASA-NEWS-RELEASE-82-27] N82-19232
Mission operation report. MLR flight equipment installed in the Orbiter cabin
[NASA-TM-84153] N82-19233
Columbia carries astronomy experiments on third test flight
[NASA-NEWS-RELEASE-82-29] N82-19298
Mission operation report. Space Shuttle program STS-3 launch
[NASA-TM-84154] N82-19301
Upper stage alternatives for the shuttle era
[NASA-TM-84137] N82-19303
Satellite Earth resources data, module U-3
[E82-10035] N82-19611
NASA Oceanic Processes Program, Fiscal Year 1981
[NASA-TM-84467] N82-19801
NASA Facts: Images of Saturn from Voyager 2
[NASA-NF-132/10-81] N82-20102

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Spanwise loading distribution and wake velocity surveys of a semi-span wing
[NASA-TM-84213] N82-19164
A numerical method for solving the Vlasov equation
[NASA-TM-81339] N82-19985

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
OAO-3 end of mission tests report
[NASA-TM-83824] N82-19268
A high resolution spectroscopic study of the v sub 2 band of hydrogen sulfide and the 1-0 band of hydrogen iodide
[NASA-TM-83852] N82-19336
Fresnel-region fields and antenna noise-temperature calculations for advanced microwave sounding units
[NASA-TM-83813] N82-19428
A comparison of unsupervised classification procedures on LANDSAT MSS data for an area of complex surface conditions in Basilicata, Southern Italy
[E82-10038] N82-19613
Studies related to Magsat
[E82-10050] N82-19625
The effect of finite field size on classification and atmospheric correction
[NASA-TM-83816] N82-19645
Assessment of the first radiances received from the VSSR Atmospheric Sounder (VAS) instrument
[NASA-TM-83827] N82-19730
Information theory lateral density distribution for Earth inferred from global gravity field
[NASA-TM-83825] N82-19731
VISSR Atmospheric Sounder (VAS) simulation experiment for a severe storm environment
[NASA-TM-83822] N82-19774
Predictability of the tropical atmosphere
[NASA-TM-83829] N82-19775
Microwave radiometric observations near 19.35, 92 and 183 GHz of precipitation in tropical storm Cora
[NASA-TM-82164] N82-19779
Monitoring tropical cyclone intensity using wind fields derived from short-interval satellite images
[NASA-TM-82162] N82-19780
Estimating ocean-air heat fluxes during cold air outbreaks by satellite
[NASA-TM-83864] N82-19781
Modeling the data systems role of the scientist (for the NEEDS Command and Control Task)
[NASA-TM-84028] N82-20012
Documentation for the machine-readable version of the catalogue of stars within 25 parsecs of the Sun
[NASA-TM-84030] N82-20088
Data announcement bulletin: The Ariel V SSI 3A X-ray Catalogue
[NASA-TM-84029] N82-20089
HEAO 1 measurements of the galactic ridge
[NASA-TM-83844] N82-20097
Astrophysical tests for radiative decay of neutrinos and fundamental physics implications
[NASA-TM-83873] N82-20098
The tropospheric gas composition of Jupiter's north equatorial belt (NH3, PH3, CH3D, GeH4, H2O) and the Jovian D/H isotropic ratio
[NASA-TM-83891] N82-20103
Evidence for solar wind control of Saturn radio emission
[NASA-TM-83889] N82-20104
Magnetic field measurements at Jupiter by Voyagers 1 and 2: Daily plots of 48 second averages
[NASA-TM-83864] N82-20105
Accretion disk coronae
[NASA-TM-83840] N82-20106
Extragalactic gamma radiation: Use of galaxy counts as a galactic tracer
[NASA-TM-83901] N82-20109
Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83884] N82-20110
On the theory of Gamma Ray Amplification through Stimulated Annihilation Radiation (GRASAR)
[NASA-TM-83867] N82-20111
Goddard Contributions to the Workshop on Gamma Ray Transients
[NASA-TM-83818] N82-20112

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Electromechanical actuators N82-19148
Large Space Shuttle Flight Experiment N82-19285
AgRISTARS: Foreign commodity production forecasting. Minutes of the annual formal project manager's review, including preliminary technical review reports of FY80 experiments
[E82-10039] N82-19614

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Electric Flight Systems
[NASA-CP-2209] N82-19134
Digital flight controls N82-19149
Electric flight systems integration N82-19150
RAXJET: A computer program for predicting transonic, axisymmetric flow over nozzle afterbodies with supersonic jet exhausts
[NASA-TM-83235] N82-19175
Effects of installation of F101 DFE exhaust nozzles on the afterbody-nozzle characteristics of the F-14 airplane
[NASA-TM-83250] N82-19181
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane
[NASA-TP-1966] N82-19225
Large Space Systems Technology, part 2, 1981
[NASA-CP-2215-PT-2] N82-19257
Summary of antenna technology development at the Langley Research Center N82-19262
Radio frequency verification tasks related to a multiple aperture reflector system N82-19264
Preliminary experimental test results using 35 GHz offset fed reflector simulating surface pillows and aperture cables N82-19265
Distorted reflector antenna performance prediction technique N82-19266
Measurement of losses of mesh membrane material for reflector applications with an S-band radiometer N82-19269
Electrostatic membrane antenna concept testing N82-19274
Bolt clampup relaxation in a graphite/epoxy laminate
[NASA-TM-83268] N82-19320
Effect of vacuum processing on outgassing within an orbiting molecular shield
[NASA-TP-1960] N82-19390
Historical perspectives on thermostructural research at the NACA Langley Aeronautical Laboratory from 1948 to 1958
[NASA-TM-83266] N82-19498
Effects of repetition rate and impulsiveness of simulated helicopter rotor noise on annoyance
[NASA-TP-1969] N82-19707
SAM 2 Measurements of the Polar Stratcapheric Aerosol, volume 2. April 1979 to October 1979
[NASA-RP-1088-VOL-2] N82-19734
Wave spectra of a shoaling wave field: A comparison of experimental and simulated results
[NASA-TM-83211] N82-19800
User's guide to noise data acquisition and analysis programs for HP9845: Nicolet analyzers
[NASA-TM-83256] N82-19943
Aircraft noise prediction program theoretical manual, part 1
[NASA-TM-83199-PT-1] N82-19946
Aircraft noise prediction program theoretical manual, part 2
[NASA-TM-83199-PT-2] N82-19947
Preliminary analysis of accelerated space flight ionizing radiation testing
[NASA-TM-83209] N82-19969

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Engine technology N82-19145
Power systems N82-19146
Environmental control systems N82-19147
Dilution jet behavior in the turn section of a reverse flow combuster
[NASA-TM-82776] N82-19220
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
[NASA-TP-1974] N82-19222

The aerospace technology laboratory (a perspective, then and now)
[NASA-TM-82754] N82-19229

NASA Redox cell stack shunt current, pumping power, and cell performance tradeoffs
[NASA-TM-82686] N82-19333

Tribological properties at 25 C of seven polyimide films bonded to 440 C high-temperature stainless steel
[NASA-TP-1944] N82-19373

Surface chemistry and wear behavior of single-crystal silicon carbide sliding against iron at temperatures to 1500 C in vacuum
[NASA-TP-1947] N82-19374

Effect of location in an array on heat transfer to a cylinder in crossflow
[NASA-TM-82797] N82-19493

Hydrodynamic and aerodynamic breakup of liquid sheets
[NASA-TM-82800] N82-19494

High-speed laser anemometer system for intrarotor flow mapping in turbomachinery
[NASA-TP-1663] N82-19521

Composite seal for turbomachinery
[NASA-CASE-LEW-12131-3] N82-19540

Experience with modified aerospace reliability and quality assurance method for wind turbines
[NASA-TM-82803] N82-19550

Phosphoric acid fuel cell technology status
[NASA-TM-82791] N82-19670

Mechanism and models for zinc metal morphology in alkaline media
[NASA-TM-82768] N82-19671

Performance and operational economics estimates for a coal gasification combined-cycle cogeneration powerplant
[NASA-TM-82729] N82-19672

Operational performance of the photovoltaic-powered grain mill and water pump at Tangaye, Upper Volta
[NASA-TM-82767] N82-19673

Effect of facility variation on the acoustic characteristics of three single stream nozzles
[NASA-TM-81635] N82-19944

Local and national impact of aerospace research and technology
[NASA-TM-82775] N82-20006

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

Structural assembly demonstration experiment
N82-19282

Solar Array Flight Experiment (SAFE) N82-19284

Propulsion system ignition overpressure for the Space Shuttle
[NASA-TM-82458] N82-19299

Environmental durability of electroplated black chromium
[NASA-TM-82454] N82-19357

Longwall Guidance and Control Development
[NASA-TM-82455] N82-19637

Characterization of ASEC BSR 2 ohm-cm silicon solar cells with dielectric wraparound contacts as a function of temperature and intensity
[NASA-TM-82456] N82-19668

Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83884] N82-20110

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).

A method for applying linear optimal control theory to the design of a regulator for a flexible aircraft
[NLR-TR-80032-U] N82-19212

The effect of visual information on the manual approach and landing
[NLR-TR-80055-U] N82-19836

Transition Electron Microscope (TEM) in-situ straining and bulk studies of the selection of glide systems in Face Centered Cubic (FFC) crystals
[NLR-TR-80041-U] N82-19998

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).

A study of liquid hydrogen cooled LO-2/LH-2 rocket combustor with slotted wall liner
[NAL-TR-679] N82-12314

Acoustic fatigue endurance test of USB flap structure models at elevated temperature
[NAL-TR-683] N82-19570

Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.

Configurational effects in the adsorption of HD on ZnO
[AD-A109368] N82-19341

NATIONAL CENTRE OF TRIBOLOGY, RISLEY (ENGLAND).

Molybdenum disulphide lubrication. A continuation survey: 1977/78
[ESA-TRIB-4] N82-19379

British Aerodynamics Group (BAE) solar-array drive mechanism: Life test, stripdown and optical encoder examination
[ESA-TRIB-2] N82-19483

Thermal vacuum real-life test of an Marconi Space and Defence Systems (MSDS) solar-array drive mechanism (MSDS 002). First four years of operation
[ESA-TRIB-3] N82-19484

Selected European Space Tribology Laboratory (ESTL) papers on ball bearings for satellites
[ESA-TRIB-1] N82-19547

Ion-plated lead as a film lubricant for bearings in vacuum N82-19546

NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER, BOULDER, COLO.

Solar-geophysical data number 443. Part 1: (Prompt reports). Data for June 1981, May 1981
[PB82-113853] N82-20107

Solar-geophysical data number 443. Part 2: (Comprehensive reports). Data for January 1981, December 1979
[PB82-113861] N82-20108

NATIONAL METEOROLOGICAL CENTER, WASHINGTON, D. C.

Climate Analysis Center Users Conference
[PB82-113325] N82-19793

NATIONAL OCEAN SURVEY, ROCKVILLE, MD.

United States Coast Pilot 2. Atlantic Coast: Cape Cod to Sandy Hook, 16th edition
[PB82-109505] N82-19204

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ANN ARBOR, MICH.

Improved St. Clair River dynamics flow models and comparison analysis
[PB82-119272] N82-19657

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.

Turbulence statistics for design of wind turbine generators
[PB82-112939] N82-19792

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, MIAMI, FLA.

Australian tropical cyclones Kerry and Rosa, February - March 1979
[PB82-114182] N82-19794

NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).

Urban traffic signal control for fuel economy. Part 2: Extension to small cars
[AD-A109393] N82-20025

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, WASHINGTON, D.C.

Direct broadcast satellites: Policies, prospects, and potential competition
[PB82-110164] N82-19446

Proposed techniques for adding FM broadcast stations in a major market, part 2
[PB82-114240] N82-19447

NATIONAL TRAINING AND OPERATIONAL TECHNOLOGY CENTER, CINCINNATI, OHIO.

Inorganic analyses in water quality control programs: Instructor's guide
[PB82-111378] N82-19353

NAVAL HEALTH RESEARCH CENTER, SAN DIEGO, CALIF.

Nonauditory effects of high intensity noise on ground crews at a naval air station
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NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.

Asymptotic normality of autoregressive parameter estimates for mixed time series
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NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.

An evaluation of estimators for receiver detection probabilities and unknown signal population size
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Computational advances in large-scale nonlinear optimization
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SASS hardware architecture and development monitor
[AD-A109552] N82-20015

The Naval postgraduate school SECURE ARCHIVAL STORAGE SYSTEM. Part 2: Segment and process management implementation
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NAVAL RESEARCH LAB., WASHINGTON, D. C.

Ranging and sychronization between nominally co-orbital satellites
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Weak and strong ignition. 2: Sensitivity of the hydrogen-oxygen system
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VLFACM program description and operational manual
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Spherical acoustic broadband receiver
[AD-A109273] N82-19949

Level shifts and inelastic electron scattering in dense plasmas
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NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, ANNAPOLIS, MD.

Relative effects of a graphite fiber reinforced epoxy composite and nickel-aluminum bronze on a cathodic protection system in seawater
[AD-A109078] N82-19321

Foundations for computer simulation of a low pressure oil flooded single screw air compressor
[AD-A108230] N82-19391

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.

Acceleration of convergence of a vector sequence by reduced rank extrapolation
[AD-A108765] N82-19910

NAVAL SURFACE WEAPONS CENTER, DAHLGREN, VA.

Aerodynamic design manual for tactical weapons
[AD-A109180] N82-19290

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.

Parametric study of propellant crack combustion
[AD-A108789] N82-19381

Comments on the doubly asymptotic approximation. 2: A simple approximation for cutoff velocity
[AD-A108926] N82-19011

NAVAL WEAPONS SUPPORT CENTER, CRANE, IND.

Results of continuous synchronous orbit testing of sealed nickel-cadmium cells
[NASA-CR-168564] N82-19678

NAVY EXPERIMENTAL DIVING UNIT, PANAMA CITY, FLA.

Cost analysis of NEDU's helium reclaimer
[AD-A108409] N82-19230

NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER, SAN DIEGO, CALIF.

Human factors in system development: Status and evaluation N82-19841

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NETWORK ANALYSIS CORP., VIENNA, VA.

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NEW HAMPSHIRE UNIV., DURHAM.

Special applications of irreversible thermodynamics N82-20001

NEW MEXICO INST. OF MINING AND TECHNOLOGY, SOCORRO.

Supernova hydrodynamics N82-20057

NEW MEXICO STATE UNIV., LAS CRUCES.

Design calculation procedure for passive solar houses at Navy installations in regions with cold climate, volume 1 [AD-A108382] N82-19683

Design calculation procedure for passive solar houses at Navy installations in East Coast regions with temperate climate, volume 2 [AD-A108383] N82-19684

Design calculation procedure for passive solar houses at Navy installations in regions with warm, humid climate, volume 3 [AD-A108384] N82-19685

Design calculation procedure for passive solar houses at Navy installations in the Pacific Northwest, volume 4 [AD-A108385] N82-19686

Design calculation procedure for passive solar houses at Navy installations in warm California climates, volume 5 [AD-A108386] N82-19687

Standard constructions in Abelian group theory N82-19937

NEW MEXICO UNIV., ALBUQUERQUE.

Asphalt recycling technology: Literature review and research plan [AD-A108199] N82-19392

NEW YORK STATE UNIV., ALBANY.

Integrated and spectral energetics of the GLAS general circulation model [NASA-CR-166766] N82-19729

NEW YORK UNIV., WESTBURY.

The investigation of the propagation mechanism of pressure fluctuation in turbulent flow [AD-A108498] N82-19502

NEWCASTLE-UPON-TYNE UNIV. (ENGLAND).

Chain and belt drives, a review N82-19556

NIELSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.

Laminar flow transition: A large-eddy simulation approach [NASA-CR-3516] N82-19499

NORTH CAROLINA STATE UNIV. AT RALEIGH.

The synthesis of biodegradable block copolymers containing amylose and polyester oligomeric blocks N82-19371

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NORTHWESTERN UNIV., EVANSTON, ILL.

Electronically induced phase transformations [AD-A108962] N82-19380

NORTHWICK PARK HOSPITAL, HARROW (ENGLAND).

Safety demonstration study on proposed biorack glove box [ESA-CR(P)-1482] N82-19239

O

OAO CORP., BELTSVILLE, MD.

Microwave radiometric observations near 19.35, 92 and 183 GHz of precipitation in tropical storm Cora [NASA-TM-82164] N82-19779

OBSERVATOIRE DE PARIS-MEUDON (FRANCE).

The tropospheric gas composition of Jupiter's north equatorial belt (NH3, PH3, CH3D, GeH4, H2O) and the Jovian D/H isotropic ratio [NASA-TM-83891] N82-20103

ODENSE UNIV. (DENMARK).

On-line, real-time determinations of breath-to-breath gas exchange N82-19632

OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).

La Recherche Aerospatiale, Bimonthly Bulletin number 1981-3, May - June 1981 [ESA-TT-714] N82-19152

Rolling up of vortex sheets from the edges of lifting surfaces N82-19153

Multivariable aircraft control by maneuver commands: An application to air to surface gunnery N82-19154

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La Recherche Aerospatiale, Bi-monthly Bulletin number 1981-4, July - August 1981 [ESA-TT-722] N82-20131

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OFFICE OF NAVAL RESEARCH, LONDON (ENGLAND).

European Scientific Notes, volume 35, number 11 [AD-A109387] N82-20136

OHIO STATE UNIV., COLUMBUS.

Ignition, combustion, detonation and heat addition to established flows [AD-A108580] N82-19339

Sophisticated jammers and adaptive arrays [AD-A109300] N82-19430

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OKLAHOMA STATE UNIV., STILLWATER.

Investigations of flowfields found in typical combustor geometries [NASA-CR-168585] N82-19495

OKLAHOMA UNIV., NORMAN.

An experimental investigation of flow surrounding an airfoil with a jet exhausting from the lower surface [NASA-CR-166131] N82-19133

OLD DOMINION UNIV., NORFOLK, VA.

Experimental study of delta wing leading-edge devices for drag reduction at high lift [NASA-CR-165846] N82-19165

OXFORD UNIV. (ENGLAND).

Modulational instabilities in astrophysics N82-20036

P

PARIS VI UNIV. (FRANCE).

Research on the effects of hydrostatic pressure on the electronic states of impurities [AD-A108403] N82-19503

PEDA CORP., PALO ALTO, CALIF.

Conservative supra-characteristics method for splitting the hyperbolic systems of gasdynamics for real and perfect gases [NASA-CR-166307] N82-19904

PENNSYLVANIA DEPT. OF ENVIRONMENTAL RESOURCES, HARRISBURG.

Water resources data for Pennsylvania, water year 1980: Volume 2: Susquehanna and Potomac River Basins [PB82-115908] N82-19662

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.

Application of an airfoil stall flutter computer prediction program to a three-dimensional wing: Prediction versus experiment [NASA-CR-168586] N82-19169

An experimental study of the effect of tail configuration on the spinning characteristics of general aviation aircraft [NASA-CR-168579] N82-19224

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PENNSYLVANIA UNIV., PHILADELPHIA.

Static and hydrodynamic studies of the conformation of adsorbed macromolecules at the solid/liquid interface N82-19488

PHILIPS LABS., BRIARCLIFF MANOR, NEW YORK.

Development of a novel laser material for miniaturized laser systems [AD-A109129] N82-19533

PHOENIX CORP., MCLEAN, VA.

Improved definition of crustal anomalies for Magsat data [E82-10051] N82-19626

PHYSICAL RESEARCH LAB., AHMEDABAD (INDIA).

The periodical management system [PB82-116518] N82-20019

POLYTEC GESELLSCHAFT FUER MESS- UND REGELTECHNIK M.B.H. UND CO., WALDBRONN (WEST GERMANY).

Microprocessor aided control and signal processing system for a laser-two-focus velocimeter in turbomachinery research [BMFT-FB-T-81-190] N82-19869

PRATT AND WHITNEY AIRCRAFT, EAST HARTFORD, CONN.

Tailored plasma sprayed MCrAlY coatings for aircraft gas turbine applications [NASA-CR-165234] N82-19360

PRATT AND WHITNEY AIRCRAFT GROUP, EAST HARTFORD, CONN.

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PRINCETON UNIV., N. J.

OAO-C Copernicus operations report [NASA-CR-166774] N82-19237

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PRINCETON UNIV. OBSERVATORY, N. J.

OAO-3 end of mission tests report [NASA-TM-83824] N82-19286

PRINS MAURITS LAB. TNO, RIJSWIJK (NETHERLANDS).

The DAEDUT/PMLTNO hybrid rocket motor facilities [VTH-LR-321] N82-19315

PUBLIC TECHNOLOGY, INC., WASHINGTON, D. C.

Remote sensing procurement package: A management report for state and local governments [E82-10052] N82-19627

PUERTO RICO UNIV., MAYAGUEZ.

Implementation of a postcracking model for finite element analysis of reinforced concrete [AD-A108984] N82-19572

PURDUE UNIV., LAFAYETTE, IND.

Flutter and time response analyses of three degree of freedom airfoils in transonic flow [AD-A108867] N82-19227

Determination of the combustion mechanisms of aluminized propellants [AD-A109058] N82-19340

The optimal planning of computerized manufacturing systems [PB82-110644] N82-19397

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On a locally optimal procedure based on ranks for comparison of treatments with a control
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R

R AND D ASSOCIATES, MARINA DEL REY, CALIF.
Stress pulsed reflection and tensile cracking in a one-dimensional bilinear material
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RADIO TECHNICAL COMMISSION FOR AERONAUTICS, WASHINGTON, D. C.
FM broadcast interference related to airborne ILS, VOR and VHF communications
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RAND CORP., SANTA MONICA, CALIF.
The development of high-intensity negative ion sources and beams in the USSR
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RANGE COMMANDERS COUNCIL, WHITE SANDS MISSILE RANGE, N. MEX.
A glossary of range terminology
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Universal documentation system handbook. Supplement 2: Procedures for the electronic transmission and processing of level 1, 2, and 3 test requirements and support information
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RCA LABS., PRINCETON, N. J.
High-energy ion implantation for multigigabit-rate GaAs integrated circuits
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RENSSELAER POLYTECHNIC INST., TROY, N. Y.
The role of environment on time dependent crack growth
[AD-A109388] N82-19673

RESEARCH INST. OF NATIONAL DEFENCE, KARLSTAD (SWEDEN).
Human factors and the real world N82-19840
Work paradigms in human factors research N82-19844

RESEARCH INST. OF NATIONAL DEFENCE, LINKOEPING (SWEDEN).
Variations in propagation attenuation at the frequencies 11, 18 and 36 GHz
[FOA-A-30028-E2] N82-19438
Recognition of, and damages caused to a radar antenna by a carbon dioxide laser
[FOA-C-30244-E1] N82-19441
Microwave tubes. Literature study number 2 relating to the year 1980
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IMIO: A routine library for image input/output files on DEC-10. Directions for use
[FOA-C-30228-E1] N82-19868
Detection of periodically fluctuating noise
[FOA-C-30223-E1] N82-19855

RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM (SWEDEN).
A study of dislocation density and phase elongation as a function of deformation in sintered tungsten composites
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High energy propellants containing magnesium
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Human Factors in System Development: Experiences and Trends
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Comparison of some irregular methods for level plotting interpolation
[FOA-C-20433-D8] N82-19887

RICE UNIV., HOUSTON, TEX.
Phase perturbation measurements through a heated ionosphere
[NASA-CR-167550] N82-19406

ROCHESTER UNIV., N. Y.
On the synergistic effects of laser/phonon-stimulated processes: A master equation approach
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ROCKWELL INTERNATIONAL CORP., CEDAR RAPIDS, IOWA.
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ROCKWELL INTERNATIONAL CORP., EL SEGUNDO, CALIF.
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
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ROCKWELL INTERNATIONAL SCIENCE CENTER, THOUSAND OAKS, CALIF.
Study of near-threshold fatigue crack propagation in pipeline steels in high pressure environments
[NASA-CR-166295] N82-19368

ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION, FORT COLLINS, COLO.
Social and Environmental Consequences of Natural Resources Policies with Special Emphasis on Biosphere Reserves
[PB82-113937] N82-19660

ROME UNIV. (ITALY).
Radiation processes in active galactic nuclei N82-20042

ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
A criterion for the prediction of the recovery characteristics of spinning aircraft
[RAE-TN-AERO-2251] N82-19223
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[RAE-TR-81081] N82-19902

ROYAL DENTAL COLL., COPENHAGEN (DENMARK).
The etiology of facial pain as related to masticatory muscles N82-19828

ROYAL INST. OF TECH., STOCKHOLM (SWEDEN).
Detailed investigation of a time of flight neutron spectrometer
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The new paradigm in cosmic plasma physics N82-20031
The Voyager 1 Saturn encounter and the cosmogonic shadow effect N82-20032

ROYAL NETHERLANDS AIRCRAFT FACTORIES FOKKER, AMSTERDAM.
Optical imaging instruments for the Land Application Satellite System, phase A study, volume 2
[REPT-80/1023-VOL-2] N82-19960

ROYAL NETHERLANDS AIRCRAFT FACTORIES FOKKER, SCHIPHOL-OOST.
Development of a breadboard cooler for infrared remote sensing payloads, phase 1
[FOK-RV-R-81-064] N82-19663

ROYAL OBSERVATORY, EDINBURGH (SCOTLAND).
The role of episodic bombardment in geophysics N82-20100
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ROYAL SIGNALS AND RADAR ESTABLISHMENT, MALVERN (ENGLAND).
A review of millimetre wave devices
[RSRE-MEMO-3372] N82-19465

RUHR UNIV., BOCHUM (WEST GERMANY).
Instabilities in inhomogeneous collision-free self-gravitating stellar systems N82-20077
Quasistatic evolution of preflare equilibria N82-20079

S

SAAB-SCANIA, LINKOPING (SWEDEN).
On the accuracy of thermal inertia mapping by infrared imagery
[SAAB-REPR-AE-10] N82-19656

SACLANT ASW RESEARCH CENTER, LA SPEZIA (ITALY).
The SACLANTCEN oceanographic data base. Volume 2: Access, interrogation and display
[AD-A109417] N82-19803

SAINT LOUIS UNIV., MO.
Catoptric X-ray optical system for use in laser-fusion diagnostics
[AD-A109037] N82-19532

SAN DIEGO STATE UNIV., CALIF.
Laboratory verification of blast-induced liquefaction mechanism
[AD-A109000] N82-19393

SCIENCE APPLICATIONS, INC., EL SEGUNDO, CALIF.
Performance Technology Program (PTP-S 2). Volume 9: Evaluation of reentry vehicle nosetip transition and heat transfer in the AEDC hyperballistics track G
[AD-A108848] N82-19505

SCIENCE RESEARCH COUNCIL, CHILTON (ENGLAND).
The techniques, magnitudes and opportunities for development of energy storage (UK)
[PB82-120858] N82-19696

SCIENTIFIC SERVICE, INC., REDWOOD CITY, CALIF.
A mobile stream diversion system for hazardous materials spills isolation
[PB82-109679] N82-19681

SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CALIF.
Spring and Fall measurements of European very low altitude volume scattering coefficients
[AD-A108879] N82-19787

SENER, S.A., MADRID (SPAIN).
Development of an Optical Scanning Mechanism Assembly (OSMA)
[PS-1450] N82-19961

SHEFFIELD UNIV. (ENGLAND).
On the control of cocurrent tubular chemical reactors
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SHOCK AND VIBRATION INFORMATION CENTER (DEFENSE), WASHINGTON, D. C.
The Shock and vibration Digest, volume 13, no. 5
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The Shock and Vibration Digest, volume 13, no. 1
[AD-A095594] N82-19558
The Shock and Vibration Digest, volume 13, no. 12
[AD-A109583] N82-19562
Vortex shedding from cylinders and the resulting unsteady forces and flow phenomena, part 2
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SIEMENS A.G., ERLANGEN (WEST GERMANY).
Superconducting niobium-tin resonators
[BMFT-FB-T-81-188] N82-19480

SIEMENS A.G., MUNICH (WEST GERMANY).
Ga (As, P): N - LED's for monochromatic illumination
[BMFT-FB-T-81-198] N82-19482

SIGMA TAU STANDARDS CORP., TUSCALOOSA, ALA.
Lightweight hydrogen maser
[AD-A108628] N82-19530

SOCIETE ANONYME BELGE DE CONSTRUCTIONS AERONAUTIQUES, BRUSSELS (BELGIUM).
High performance Variable Conductance Heat Pipe (VCHP) follow-on development: Phase 2
[SABCA-JPM/LN/HO5/NO144-VOL-1] N82-19508
Follow-on development of small cryogenic heat pipes: Phase 2 report
[SABCA-JPM/LN/HO5/N11-VOL-2] N82-19509

SOCIETE POUR LE PERFECTIONNEMENT DES MATERIELS ET EQUIPEMENTS AEROSPATIAUX, TOULOUSE (FRANCE).
Definition study on multishakers for vibration testing
[SOPEMEA-ET-17004] N82-19526

SOLAREX CORP., ROCKVILLE, MD.
Design of mobile photovoltaic power systems: 0.5-3kW
[AD-A108889] N82-19668

SOUTH CAROLINA UNIV., COLUMBIA.
Stochastic convergence of randomly weighted sums
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SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
Laboratory evaluation of multiviscosity-grade engine oils in US Army diesel engines
[AD-A108890] N82-19375
Study of liquid slosh in the tracking and data relay satellite hydrazine tanks
[NASA-CR-166745] N82-19492

SPAR AEROSPACE PRODUCTS LTD., TORONTO (ONTARIO).
Study of a radar altimeter for the European remote sensing program. Volume 1: Executive summary
[SPAR-R.1090-ISSUE-A] N82-19652

SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
Market analysis of seismic security systems
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Compressed television transmission: A market survey
[NASA-CR-168614] N82-19410
The feasibility of miniaturizing the versatile portable speech prosthesis: A market survey of commercial products
[NASA-CR-168611] N82-19638
Techniques for automatic deduction
[AD-A108979] N82-19882

STADTWERKE BOCHOLT G.M.B.H., (WEST GERMANY).
Preliminary study on the supply of industrial water by advanced treatment of waste water discharged from a sewage treatment plant
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STANFORD UNIV., CALIF.
Some observations of surface pressures and the near wake of a blunt trailing edge airfoil
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The differential emission measure of dynamic coronal loops
[NASA-CR-168638] N82-20087

STATE UNIV. OF NEW YORK AT BUFFALO.
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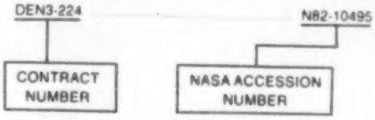

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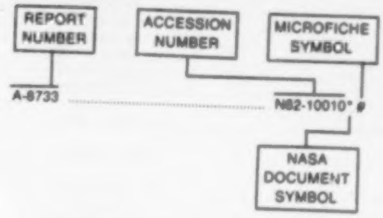

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